

*Toshiba*

**Transmitting  
Discharge  
Microwave  
Camera  
Photo Multiplier  
Counting**

# **Electron Tubes**

**INDEX**

Type	Page	Type	Page	Type	Page	Type	Page
1B24A (1B24A)	30	3G15 (C1A)	20	6H51	20	VVC60-AL	36
1B35A (1B35A)	30	3G22 (3D22A)	22	6P80	18	VVC60-AP	36
1B63A (1B63A)	30	3G49P (5949)	24	6P80A	18	LL-100	38
1G35P (4C35)	24	3K76 (576)	6	6T13	8	LL-200	38
1G45P (3C45)	24	3P50, 3P50A	16	6T35 (750TL)	8	UV-203A	6
1G50 (2050)	22	3T12	8	6T40 (TB4/1500)	8	SN-205C	8
1G84	20	3T35 (35TG)	6	6T50 (7092·TB5/2500)	8	UV-211A	6
1H16 (816)	18	3T35C	6	6V431(SRC-43A·VA-220F)	26	P-213	18
1K14	6	3W20	28	6V432(SRC-43B·VA-220E)	26	P-220	18
1K22 (2X2A)	6	3W80	28	6V433 (SRC-43C)	26	K-252	6
1K24 (3B24W)	6	3V10	26	7F25 (4-1000A)	14	LL-500	38
1K24WA (3B24WA)	6	3V30	26	7F25A	14	P-520A	18
1K29 (3B29)	6	GM-B-3	34	7F31R	14	P-535A	16
1P25(F)	36	4B13 (813)	16	7G57	22	P-560A	16
1Q18	38	4B85	16	7H57 (857-B)	20	725A (725A)	28
1Q19	38	4F15R (4X150A)	12	7T24R	10	726C (726C)	26
1Q20	38	4F20R (4X150D)	12	7T31	8	UY-807 (807)	16
1Q21	38	4F21 (4-125A/4D21)	12	7T40 (1000T)	8	UY-807A	16
1V10	26	4G14 (6014/C1K)	20	7T40A	8	UV-845	8
GM-G-1	34	4G23 (3C23)	20	7T45	8	884 (884)	20
GM-X-1	34	4G48P (5948)	24	7T54	10	TX-911	20
GMD-B-1	34	4G63 (5563)	24	7T54R	10	TX-915 (FG67)	22
GMH-B-1	34	4G63A (5563A)	22	7T54RA	10	TX-920 (FG57)	22
GMH-G-1	36	4H22 (3B22)	18	7T58R	10	HX-968D	18
GMH-X-1	36	4H32 (4B32)	18	7T59R P	8	HV-972A	18
GMS-G-1	36	4H72 (872-A)	18	7V40	26	1007 (1007)	18
GMT-B-1	36	4H73 (673)	20	7V434(SRC-43D·VA-220D)	26	1625 (1625)	16
IGW-1	24	4H74	20	7V435(SRC-43E·VA-220C)	26	4008A	36
IGX-1	24	4H88A (8008)	20	7V436(SRC-43F·VA-220B)	26	4008B	36
UVG-1	38	4P55	16	7W25	28	4008C	36
2B29 (829-B)	16	4P56	16	7W40A	28	4008D	36
2B29P (3E29)	14	4P60	18	8F66R (6166)	14	R4410 (R4410)	38
2B32 (832-A)	14	4P83 (803)	18	8T10	10	5550 (5550)	24
2B46 (6146)	14	4T16 (100TL)	8	8T10R	10	5551 (5551)	24
2B46P (6293)	14	4T17 (100TH)	8	8T20A	10	5552 (5552)	24
2B52 (6252)	14	GM-B-4	34	8T20RA	10	5553 (5553)	24
2B94 (5894)	16	VVC4-60-AL	36	8T30	10	5609	28
2C39A (2C39A)	8	5F20RA (4CX250B)	12	8T30R	10	5727 (5727/2D21W)	22
2C43 (2C43)	6	5F22 (4-250A/5D22)	12	8T33	10	5820 (5820)	32
2D21 (2D21)	22	5F22A	12	8T33R	10	5822 (5822)	26
2E24 (2E24)	14	5F23 (4-400A)	14	8T34R	10	5886 (5886)	38
2E26 (2E26)	14	5F23A	14	8T36R	12	5976	26
2G22P (5C22)	24	5F35R	14	8T50	12	6027/2J42A (6027/2J42A)	28
2G57A (5557)	20	5G11 (6011/710)	22	8T54	12	6032 (6032)	35
2G66A	20	5G32 (5632/C3J)	22	8T58	10	6130 (6130)	24
2H28 (3B28)	18	5G69	22	8T61	12	6326 (6326)	32
2H66 (866-A)	18	5G84 (5684/C3J/A)	22	8T67	12	6378 (6378)	30
2J42 (2J42)	28	5H69	20	8T71R (5671)	12	6396 (6396)	30
2J42H (2J42H)	28	5H69A (869B)	20	8T72	12	6406A (QK-428)	28
2J49 (2J49)	28	5J26 (5J26)	28	8T72A	12	6410A	28
2J50 (2J50)	28	5M36A	28	8V437(SRC-43G·VA-220A)	26	6521	28
2J55 (2J55)	28	5P70	18	8V438 (VA-220Z)	26	6700 (6700)	34
2K12	6	5T20 (250TL)	8	8W20	28	6781 (6780)	26
2K25 (2K25)	26	5T21 (250TH)	8	8W23	30	7012	30
2K26 (2K26)	26	5T25	8	8W24	30	7012A	30
2M20 (QK390)	28	5T30 (450TL)	8	8W40	30	7012B	30
2M21	28	5T31 (450TH)	8	9T71 (5770)	12	7012C	30
2P22 (2E22)	16	5T32	8	12V20	26	7018	38
2T11	6	5T34 (304TL)	8	MS-9S (931-A)	32	7038 (7038)	32
2T12P	6	5T35 (304TH)	8	MS-9SY (1P28)	32	7305 (1P22)	32
2T24 (3C24)	6	GM-B-5	34	MK11, MK12(BD-301)	34	7513 (7513)	32
2T27A	6	6D4 (6D4)	20	DK20 (GC10D)	34	7676 (6292)	32
GM-X-2	34	6F50R (4X500A)	14	DK21 (GS10C)	34	7849A	26
GMD-B-2	34	6G21 (5C21/C6J)	22	LL-20	38		
GMH-B-2	34	6G45 (5545)	22	LL-50	38		
GMH-X-2	36	6G51	22	PM50	32		
GMS-G-2	36	6G58 (6858/760)	22	UX-54B (FP-54)	38		
VVC2-60-AL	36	6G60 (C6A)	22	T66G-GT	20		
3F65 (4-65A)	12	6G85 (5685/C6J/A)	22	TY-66G	20		

( ) Shows the name of equivalent foreign made tube.



# EXPLANATION OF ABBREVIATIONS

## 1. Cathode

- FW — Pure tungsten filament
- FT — Thorium tungsten filament
- FO — Direct heating oxide coated filament
- HO — Indirect heating oxide coated filament
- Cold — Cold cathode

## 2. Use

- CT — Class C telegraph (suitable also as oscillator)
- CP — Class C telephone anode modulation
- CS — Class C-telephone grid modulation
- AB<sub>1</sub> — Class AB<sub>1</sub> push-pull audio frequency amplification
- AB<sub>2</sub> — Class AB<sub>2</sub> push-pull audio frequency amplification
- B — Class B push-pull audio frequency amplification
- BSSB — Class B SSB telephone
- BTV — Class B television
- CW — Continuous wave oscillation or amplification
- PW — Pulse oscillation

3. Max. frequency, max. rating and typical operation are for respective uses. Typical operation of Class AB<sub>1</sub>, AB<sub>2</sub>, and B shows the value of two tubes.

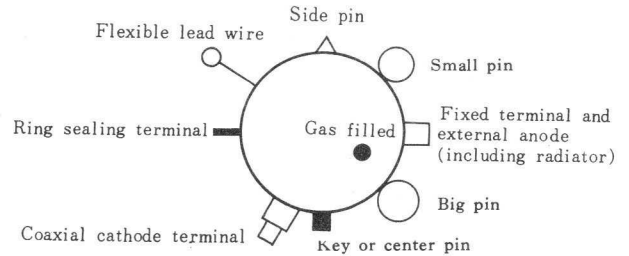
- Egm — Audio frequency peak voltage between grids.
- Zp — Effective load resistance (between anodes)

## 4. Cooling system

- N — Natural air cooling
- V — Forced ventilation
- R — Forced air cooling
- QR — Wind volume
- SP — Still pressure
- W — Water cooling
- QW — Water volume

## 5. Base wiring diagram

- F — Filament
- F<sub>1</sub>, F<sub>2</sub>, F<sub>A</sub>, F<sub>B</sub> — Those which require distinction between filament terminals
- FCT — Filament center tap
- H — Heater
- HR — Heater reserver
- HCT — Heater center tap
- K — Cathode
- G — Grid, focussing electrode, starting electrode, guide electrode
- G<sub>1</sub> — No. 1 grid, No. 1 guide electrode
- G<sub>2</sub> — No. 2 grid, No. 2 guide electrode
- G<sub>3</sub> — No. 3 grid, No. 3 guide electrode
- P — Plate
- A — Anode (with cold cathode)
- FS — Filament terminal connected to cathode shield
- IS — Inner shield
- NC — Not connected to electrodes
- IC — Inner-connected, but can not be used
- BS — Base sleeve
- SH — Shell
- K<sub>(R,F)</sub> — Cathode HF connecting shell
- IG — Igniter (in case of ignitron)
- R — Reserver
- SP — Spade
- PC — Photo-cathode



- 1 G — Grid of No. 1 unit
- 2 G — Grid of No. 2 unit
- 1 P — Anode of No. 1 unit
- 2 P — Anode of No. 2 unit
- DEF — Deflector
- COL — Collector
- DY — Dynode
- R — Reflector
- RS — Cavity resonator
- PM — Permanent magnet
- HK — Heater cathode
- HEL — Helix
- In case of combined tube (Compound tube of same line)
- P J — Pattern electrode
- S J — Signal electrode
- TA — Target
- I — Igniter
- OL — Output wire
- Go — Zero guide electrode
- Ko — Zero cathode

## 6. Name of base

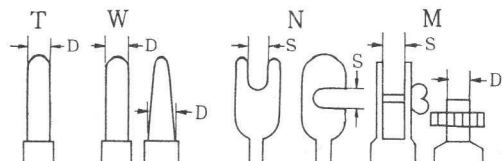
- (I) A 14 S A (example)
- Difference in dimension and structure necessary for use which can not be distinguished in items 1, 2, and 3.
  - S : Standard
  - P : With side pin
  - K : With key or guide
  - L : Pin lengths differing from standard
  - Q : With key, guide or side nipple.
  - Diameter of pin configuration or cap is shown in mm.
  - Number of pin is shown alphabetically

Letters	A	B	C	D	E	F	G	H	J
Number of pin	1	2	3	4	5	6	7	8	9

(II) E7-1 — 7-pin mT tube (JEDEC number)

## 7. Name of terminal

- T 8 - 2 (example)
- Difference in dimension and shape which can not be distinguished in items 1 and 2
  - In case of bar, its diameter; for other cases, diameter essential to inserting
  - T : Bars fixed to tubes
  - N : Nipples attached to lead wire
  - W : Bars attached to lead wire
  - M : Other



## EXPLANATION OF TERMS

### ○ Maximum frequency for full input

This shows the frequency usable at full input and serves as a standard of the frequency characteristic of transmitting tube. If the maximum input is lowered frequencies above this frequency can be used. Lowering of anode input is accomplished by lowering the anode voltage.

### ○ Maximum anode rating, Maximum rating

The maximum anode rating shows only those items directly related to the anode while the maximum rating shows other principal items.

All maximum and minimum ratings are absolute and must not be exceeded regardless of operating conditions.

### ○ Typical operation

Typical operation shows a general example of operation for every principal use.

#### (Transmitting tube)

Typical operation without "note" shows the designated maximum frequency for the full input.

Anode output is the output supplied by the tube to the tube (anode input—*anode dissipation*). Therefore, the difference of anode output and circuit loss is the effective output usable for the actual load.

#### (Rectifying discharge tube)

DC output voltage to the filter is computed according to the rectifying system designated in "Rectifier System" column.

If another rectifying system is used, this value changes accordingly.

#### (Microwave tube)

The output is the value of the matched load and the condition is a typical example. The designed range of adjustment is shown in the test standard.

### ○ Maximum peak inverse voltage

This is the instantaneous value of maximum inverse voltage applicable to a given tube without any danger, below the regular temperature and surge current. If the inverse voltage exceeds this value, there is danger of inverse arc.

### ○ Maximum peak forward voltage

This is the maximum instantaneous value of positive voltage applicable to the anode within normal temperature, limits without making the grid inoperative.

In contrast to the peak inverse voltage excessive peak forward voltage does not inflict permanent damage, but trouble may occur as a result of the inoperative grid.

### ○ Maximum average time of anode current

The maximum average anode current, when flowing in rapid recurrence, can be measured for regulation with a DC ammeter. When this is not done, the average current must be otherwise regulated for the specified time or the tube may burn out.

This specified time is called the Maximum Average Time of Anode Current, and the average current should be calculated within this time.

### ○ Maximum commutation factor

The ratio of decreasing current, just prior to the occurrence of commutation, is shown in Amp/ $\mu$ sec, and the increasing ratio of inverse voltage just after the commutation in Volt/ $\mu$ sec. The product of the two, VA/ $\mu$ sec<sup>2</sup>, is designated the commutation factor.

The heat cathode grid control discharge tube filled with xenon gas, argon gas or hydrogen gas should be provided with a buffer circuit to slow down the rising ratio of initial inverse voltage and to keep the commutation factor below the maximum value, thus protecting against gas clean-up.

### ○ Maximum control power

This is the maximum value of the product of effective values of circuit voltage and control current of ignitron.

In the case of small power consumption ratios, even with a small average current, any drop in internal voltage is accompanied by a generation of heat and the pressure of the mercury vapor falls instantaneously below the minimum safety limit. Therefore under conditions of small power consumption since the maximum permissible current is inversely proportionate to circuit voltage, a minimum safety limit for this voltage must be provided for.

### ○ Cooling

#### (Air cooled tubes)

The anode seal section and glass section should be cooled so as to below 170°C and 250°C respectively.

If care is taken in ventilation, this is usually sufficient with normal circulation. However, if adjacent tubes are located too close, or there is insufficient ventilation, a separate cooling device is required.

Tubes marked "forced ventilation" should be cooled as specified.

#### (Forced air cooled tubes)

The air current is forced upward from the bottom of the tube, and uniform cooling should be attained by adhering to the designated wind volume. The wind volume can be regulated by the pressure at the radiator in let. However, if the out let for the cooled air is directed by a wind tunnel, the wind volume should be determined by the balance of pressures in the radiator.

#### (Water cooled tubes)

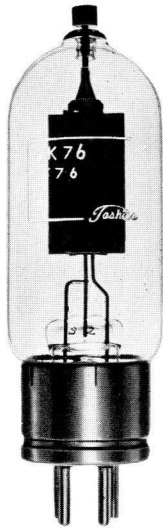
The anode is cooled with a designated volume of water. The temperature of the water coming out is maintained at 60°C. Temperature rise of the cooling water is kept below 10°C.

# TRANSMITTING TUBES

## RECTIFIER TUBES



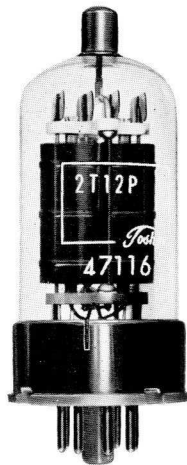
1K24



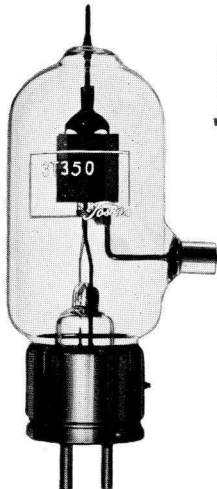
3K76



2C43



2T12P



3T35C

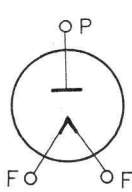
Type	Cathode			Dimensions		Base number	
	Classification	Voltage (V)	Current (A)	Length (mm)	Dia. (mm)	Cap	Base
1K14▲	FW	2.0	4.0	100	30	—	—
1K22	HO	2.5	1.75	112	38	A9S	D16S
1K24	FT	5.0♦ 2.5+	3.0	118	38	A9S	D16P
1K24WA	FT	5.0♦ 2.5+	3.0	118	38	A9S	D16P
☆K-252	FT	5.0	3.25	170	60	A9S	D16P
1K29	HO	2.5	4.75	130	38	A9S	D16P
2K12△	FT	5.0	4.0	140 Max.	52 Max.	—	D16P
3K76□	FT	5.0 5.4++	14.0 15.0++	190	57	—	D25S C

☆ For replacement only    ▲ For measuring HF voltage    △ For Full wave rectification  
 ○ Value of each unit

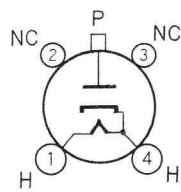
## TRIODES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (mμ) (Plate current (A))	Amplification	Static capacity between plate and grid (pF)
	Classification	Voltage (V)	Current (A)	Length Max. (mm)	Max. Dia. (mm)				
2C43	HO	6.3	0.9	68.3	33.3 Max.	H17Y (H17S)	8.1 (0.025)	50	1.7
☆2T11	HO	10.0	1.5	155	40	A14S D16P	5.0 (0.03)	28	7.0
2T12P	HO	10.0	1.5	105	43	A 9S H17S	5.0 (0.03)	28	8.0
2T24	FT	6.3	3.0	106	35	D16S	2.0 (0.025)	23	1.5
2T27A	FT	6.3	3.0	120	40	A 9S D16P	2.0 (0.025)	23	1.5
3T35	FT	5.0	4.0	140	45	D16P	2.85 (0.1)	39	1.8
3T35C	FT	5.0	4.25	140	45	A 9S D16P	2.8 (0.035)	39	1.8
☆UV-203A	FT	10.0	3.25	170	52	D25L	3.5 (0.075)	23	16.0
UV-211A	FT	10.0	3.25	170	52	D25L	3.8 (0.075)	12	15.0

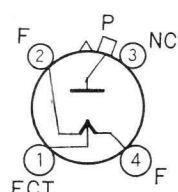
☆ For replacement only    ★ Inlet air temperature for forced air cooling should be below 40°C  
 † Typical operation is for pulse oscillation, with output at peak value. Other columns are at average value (duty factor 0.01).



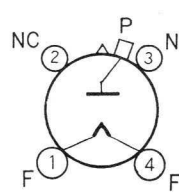
1K14



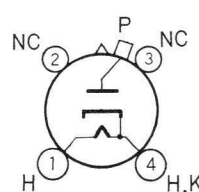
1K22



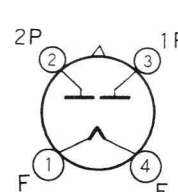
1K24  
1K24WA



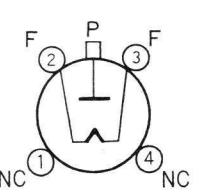
K-252



1K29



2K12



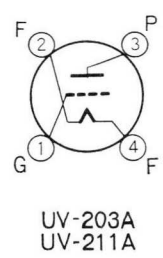
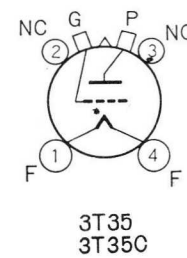
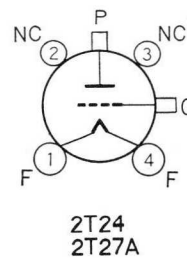
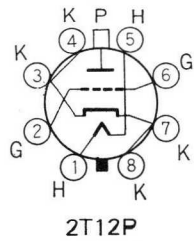
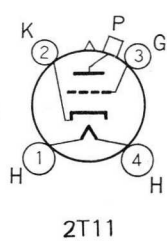
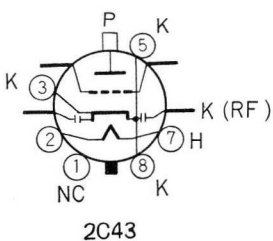
3K76

Tube voltage drop (V) (Max. plate current (mA))	Maximum plate ratings						U.S.A. equivalent	Type
	Peak inverse voltage (kV)	Peak current (A)	Average current (A)	Plate Dissipation (W)	Frequency (Mc)	Static capacity between plate and cathode (pF)		
—	30	—	—	—	50	0.2		1K14▲
200 (45)	12.5 7.5	0.06 0.1	0.0075 0.0075	—	—	—	2X2A	1K22
250 (160)	20.0 20.0+	0.3 0.15+	0.06 0.03+	—	—	—	3B24W	1K24
250 (160)	20.0 20.0+	0.3 0.15+	0.06 0.03+	—	—	—	3B24WA	1K24WA
130 (60)	30.0	0.2	0.06	—	—	—		☆K-252
130 (110)	16.0	0.25	0.065	—	—	—	3B29	1K29
75 (380)○	2.0	1.0	0.43●	—	—	—		2K12△
200 (450)	25.0 25.0++	2.5 12.0++	0.5 0.03++	95	—	—	576	3K76□

● At chalk input    □ Suitable for Shunt diode    ++ Value when used as shunt diode    + One side of filament used  
 ◆ Equipped with neutral point terminal (Don't use 2.5V in parallel)

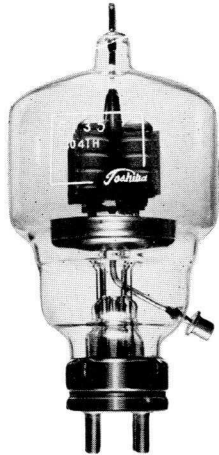
Use	Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
		Voltage (kV)	Input (W)	Dissipation (W)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (W)			
□ CT	3370	0.5 (3.5)	— (—)	12 (12)	0.47 (3.0)	Rg=1 kΩ (Rg=100Ω)	0.038 (—)	— (—)	— (—)	9 (0.75)	N	2C43	2C43
⊕ CT	30	1.5	70	20	1.0	— 100	0.012	3	—	800	N		☆2T11
⊖ CT	30	1.5	70	20	1.0	— 100	0.012	3	—	800	N		2T12P
CT CP B	60 60 —	2.0 1.6 2.0	100 70 80	25 17 25	1.5 1.2 1.2	— 170 — 180 — 40	0.065 0.05 0.02/0.1	20 17 18	6 5 2	75 46 75 Z <sub>p</sub> =24200Ω	N	3C24	2T24
CT	100	1.0	125	40	1.5	— 150	0.08	20	5	85	N		2T27A
CT CP B	100 100 —	2.0 1.6 2.0	200 140 160	50 34 50	1.5 1.2 1.5	— 120 — 120 — 30	0.12 0.1 0.04/0.16	40 40 50	9 9 5	135 90 150 Z <sub>p</sub> =19200Ω	N	35TG	3T35
CT CP B	100 100 —	2.0 1.6 2.0	200 140 160	50 34 50	1.5 1.2 1.5	— 120 — 120 — 30	0.13 0.1 0.04/0.16	40 40 50	9 9 5	150 90 150 Z <sub>p</sub> =19200Ω	N		3T35C
CT CP B	10 10 —	1.25 0.85 1.25	180 115 150	75 50 75	1.0 0.8 1.0	— 100 — 100 — 40	0.13 0.11 0.01/0.28	25 20 15	5 4 2	90 60 150 Z <sub>p</sub> =6200Ω	N		☆UV-203A
CT B	10 —	1.25 1.25	180 150	75 75	1.0 1.0	— 150 — 77	0.13 0.02/0.28	20 20	5 3	90 180 Z <sub>p</sub> =7600Ω	N		UV-211A

□ Typical operation shows value of 2 tubes for the oscillating frequency of 350 Mc, and ( ) shows the average value at pulse width of 1μs and recurrence frequency of 1000/c/s for plate pulse oscillation.

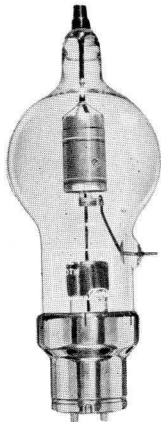




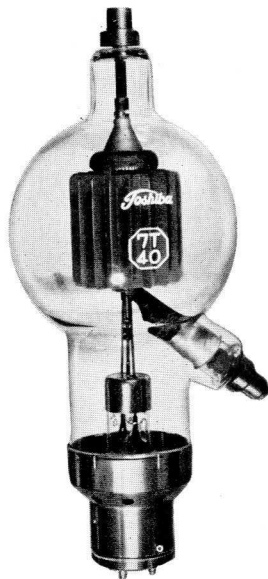
2C39A



5T35



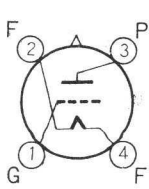
5T21



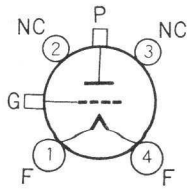
7T40

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (A))	Amplification	Static capacity between plate and grid (pF)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				
UV-845	FT	10.0	3.25	170	52	D25L	3.0 (0.075)	5	14.5
3T12	FT	10.0	4.25	190	65	D16S	3.0 (0.08)	20	2.8
2C39A	HO	6.3	1.0	66	32	—	22 (0.07)	100	1.95
4T16	FT	5.0	6.3	190	80	A 9S D16P	2.9 (0.2)	14	2.0
4T17	FT	5.0	6.3	190	80	A 9S D16P	4.5 (0.2)	38	2.0
5T20	FT	5.0	10.5	250	96	A 9S D25L	1.7 (0.1)	14	3.0
5T21	FT	5.0	10.5	250	96	A 9S D25L	3.5 (0.1)	36	2.6
5T34	FT	5.0 10.0	25.0 12.5	190	89	A 9S D27S	16.7 (1.0)	12	8.6
5T35	FT	5.0 10.0	25.0 12.5	190	89	A 9S D27S	16.7 (1.0)	20	10.2
5T25	FT	5.0	10.5	250	96	A 9S D25L	1.7 (0.1)	14	3.0
5T30	FT	7.5	12.0	310	127	A14S D25L	3.5 (0.15)	18	4.5
5T31	FT	7.5	12.0	310	127	A14S D25L	4.4 (0.15)	38	5.0
5T32	FT	7.5	12.0	330	127	D25P	4.0 (0.18)	18	5.5
☆6T13	FT	12.0	10.0	325	150	A30S B35S	5.0 (0.17)	29	6.3
☆SN-205C	FT	11.0	12.0	380	140	—	7.5 (0.25)	14	34
6T40	FT	5.0	32.5	235	130		3.3 (0.12)	21	5.1
6T35	FT	7.5	21.0	420	175	A14S D53S	3.5 (0.2)	15	6.0
6T50	FT	6.3	32.5	251	150		5.1 (0.19)	22	6.2
7T31	FT	7.5	16.0	350	140		6.0 (0.3)	18	5.0
7T40	FT	7.5	16.0	310	127	A14S D25L	7.0 (0.3)	35	5.0
7T40A	FT	7.5	16.0	315	140	A14S D25P	7.0 (0.3)	35	5.0
7T59R P	FT	5.0	80.0	240	126	T 9	5.5 (0.25)	20	14
7T45	FT	7.5	24.0	420	175	A14S D53S	4.0 (0.3)	15	6.0

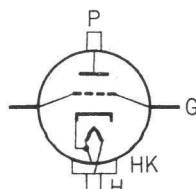
☆ For replacement only ● Typical operation with grid grounded  
○ In typical operation, the upper figures are for 500 Mc. lower for 2500 Mc.



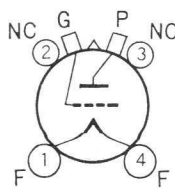
UV-845



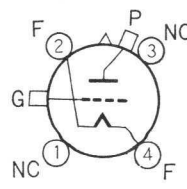
3T12



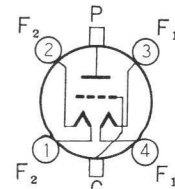
2C39A



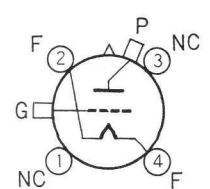
4T16  
4T17



5T20  
5T21



5T34  
5T35

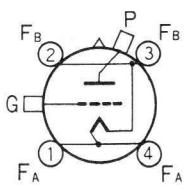


5T25

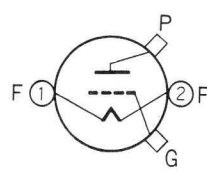


Use	Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
		Voltage (kV)	Input (W)	Dissipation (W)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (W)			
AB <sub>1</sub>	—	1.25	150	75	1.0	— 170	0.07/0.23	Eg <sub>m</sub> =330V	—	Z <sub>p</sub> =4600Ω/70	N		UV-845
CT CP	75 75	2.25 1.8	350 230	90 60	2.0 1.5	— 250 — 300	0.15 0.125	25 30	10 13	220 110	N		3T12
○CT	2500	1.0	125	100	0.8 0.9	— 45 — 22	0.08 0.09	32 27	▲ 6	▲▲ 27 ▲▲ 12	R QR=0.4m <sup>3</sup> /min	2C39A	2C39A
CT CP	40 40	3.5 2.5	400 260	100 65	3.0 2.0	— 400 — 500	0.13 0.13	25 30	15 21	300 200	N	100TL	4T16
B	—	3.0	350	100	2.5	— 150	0.05/0.2	8	1.5	Z <sub>p</sub> =24000Ω/300	N	100TH	4T17
CT CP	40 40	3.5 2.5	400 260	100 65	3.0 2.0	— 200 — 250	0.13 0.13	35 45	11 17	300 200	N		
B	—	3.0	350	100	2.5	— 50	0.06/0.2	20	2.5	Z <sub>p</sub> =25200Ω/300	N		
CT CP	40 40	4.0 3.2	1000 660	250 165	3.5 3.0	— 450 — 550	0.26 0.2	35 30	26 25	700 460	N	250TL	5T20
B	—	4.0	850	250	3.0	— 200	0.06/0.35	8	2.5	Z <sub>p</sub> =16400Ω/620	N	250TH	5T21
CT CP	40 40	4.0 3.2	1000 660	250 165	3.5 3.0	— 250 — 250	0.26 0.2	55 55	25 23	700 460	N		
B	—	4.0	800	250	3.0	— 70	0.06/0.36	25	3.8	Z <sub>p</sub> =16000Ω/630	N	304TL	5T34
CT CP	40 40	3.0 2.5	1200 800	300 200	3.0 2.0	— 400 — 500	0.37 0.37	80 90	40 60	850 570	N		
B	—	3.0	1000	300	2.5	— 230	0.16/0.6	25	6.5	Z <sub>p</sub> =8000Ω/900	N	304TH	5T35
CT CP	40 40	3.0 2.5	1200 800	300 200	3.0 2.0	— 300 — 350	0.37 0.37	120 130	45 55	850 570	N		
B	—	3.0	1000	300	2.5	— 120	0.16/0.6	30	4.8	Z <sub>p</sub> =8400Ω/900	N		
CT	40	4.0	1200	350	3.5	— 400	0.28	55	35	700	N		5T25
CT CP	40 40	6.0 4.5	1800 1200	450 300	5.0 4.0	— 500 — 550	0.35 0.27	45 50	30 37	1350 920	N or V	450TL	5T30
CT CP	40 40	6.0 4.5	1800 1200	450 300	5.0 4.0	— 350 — 450	0.35 0.27	60 75	32 47	1350 920	N or V	450TH	5T31
B	—	5.0	1500	450	4.0	— 120	0.08/0.5	80	7	Z <sub>p</sub> =16400Ω/1200	N or V		
CT	40	6.0	1800	450	5.0	— 500	0.35	45	30	1350	N or V		5T32
CT	40	3.5	1000	500	3.0	— 250	0.3	36	13	550	N		☆6T13
CT	15	3.0	1500	500	2.0	— 300	0.55	90	40	750	N		☆SN-205C
CT	50	5.0	2500	500	5.0	— 400	400	100	55	1500	N or V		6T40
CT CP	40 40	7.5 5.5	3500 2000	750 450	6.0 5.0	— 750 — 850	0.53 0.3	82 90	88 100	2500 1200	N or V	750TL	6T35
CT	50	6.0	4000	800	5.0	— 400	700	160	105	2700	N or V	7092	6T50
CT	50	7.5	4000	1000	6.0	— 500	600	60	45	2800	N or V		7T31
CT CP	50 50	7.5 5.5	4000 2600	1000 660	6.0 5.0	— 400 — 450	0.6 0.45	80 110	55 75	2700 1800	V	1000T	7T40
B	—	7.5	3000	1000	6.0	— 160	0.15/0.83	40	12	Z <sub>p</sub> =14800Ω/3100	V		
CT CP	50 50	7.5 6.0	4000 2600	1000 660	9.0 5.0	— 400 — 450	600 450	80 110	55 75	2700 1800	V		7T40A
B	—	7.0	3000	1000	6.0	— 160	0.83/0.15	40	12	3100	V		
♣CT	60	11.0	2500	1000	10.0	— 900	0.035	5	—	25000	R QR=4m <sup>3</sup> /min SP=15mm aq.		7T59R P
CT CP	40 40	7.5 6.0	6000 4000	1500 1000	6.0 5.0	— 700 — 1100	0.85 0.6	90 100	105 150	3800 2350	V		7T45

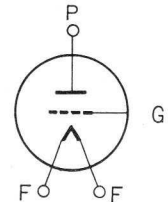
♣ Typical operation is for pulse oscillation, with output at peak value. Other columns are at average value (duty factor 0.01).  
 ▲ Output of exciter stage    ▲▲ Effective output    ★ Inlet air temperature for forced air cooling should be below 40°C.



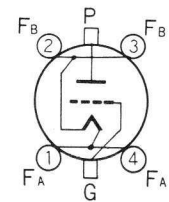
5T30  
5T31  
5T32



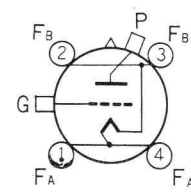
6T13



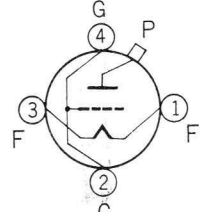
SN-205C



6T35  
7T45



7T31  
7T40  
7T40A



6T40  
6T50



7T58R



8T33



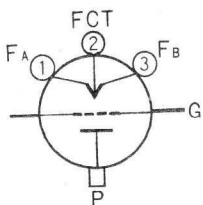
8T33R



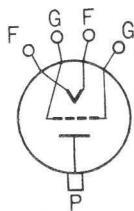
8T34R

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (A))	Amplification	Static capacity between Plate and Grid (pF)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				
7T24R	FT	12.6 $\blacklozenge$	29.0	160	117.5	T8-2	11.0 (0.5)	30	13.5
7T54R	FT	12.0	25.0	245	126	N 9	5.0 (0.4)	25	12.5
7T54RA	FT	12.0	25.0	240	126	M 6	5.0 (0.4)	25	12.5
7T54	FT	12.0	25.0	240	80	N 9	5.0 (0.4)	25	12
7T58R	FT	5.0	80.0	240	204	T 9	7.5 (0.5)	20	14
8T58	FT	5.0	80.0	235	90	T 9	7.5 (0.5)	20	13
8T10R	FW	22.0	60.0	395	204	T 9	6.5 (0.6)	25	19
8T20RA	FT	12.0	40.0	330	204	T 9	11.0 (1.0)	21	20
8T30R	FT	12.0	40.0	385	204	T 9	9.0 (1.0)	50	18
8T33R	FT	7.5	60.0	360	204	T 9	18.0 (1.0)	40	27
8T10	FW	22.0	60.0	385	100	T 9	6.5 (0.6)	25	18
8T20A	FT	12.0	40.0	325	120	T 9	11.0 (1.0)	21	19
8T30	FT	12.0	40.0	380	115	T 9	9.0 (1.0)	50	18
8T33 $\blacktriangle$	FT	7.5	60.0	355	120	T 9	18.0 (1.0)	40	26
8T34R	FT	7.5	120.0	330	180		25 (2.0)	25	25

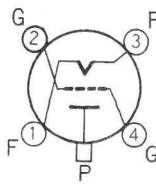
$\blacklozenge$  Equipped with FCT.  $\bullet$  Typical operation with grid grounded  
 $\blacktriangle$  Filaments and grid seals are cooled by forced air.



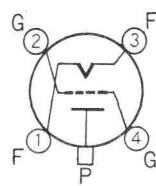
7T24R



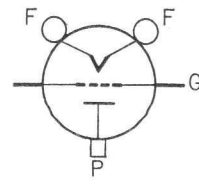
7T54R  
7T54



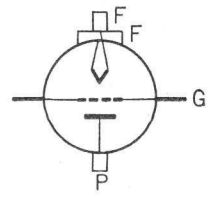
8T10R  
8T10



7T54RA  
7T58R  
8T58



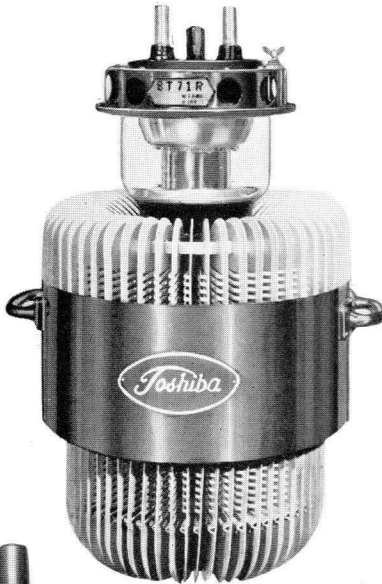
8T20RA 8T20A  
8T30R 8T30  
8T33R 8T33



8T34R

Use	Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
		Voltage (kW)	Input (kW)	Dissipation (kW)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (kW)			
●CT CP	120 120	5.0 4.0	5.0 3.5	2.0 1.3	4.0 3.5	- 250 - 300	1.0 0.8	150 200	550 100	3.2 2.0	R QR= 10m <sup>3</sup> /min SP= 40mm aq. △		7T24R
CT CP B	40 40 —	8.0 6.0 7.0	6.0 4.0 6.0	2.5 1.7 2.5	7.0 6.0 7.0	- 800 - 850 - 220	0.85 0.6 0.3/1.4	110 100 80	140 130 40	4.3 2.7 Z <sub>p</sub> =10000Ω 6.0	R QR= 8m <sup>3</sup> /min SP= 36mm aq. ○		7T54R
CT CP B	40 40 —	8.0 6.0 7.0	6.0 4.0 6.0	2.5 1.7 2.5	7.0 6.0 7.0	- 800 - 850 - 220	0.85 0.6 0.3/1.4	110 100 80	140 130 40	4.3 2.7 Z <sub>p</sub> =10000Ω 6.0	R QR= 8m <sup>3</sup> /min SP= 36mm aq. ○		7T54R A
CT CP B	40 40 —	8.0 6.0 7.0	7.0 4.0 7.0	3.0 2.0 3.0	7.0 6.0 7.0	- 800 - 850 - 220	0.85 0.6 0.3/1.4	110 100 80	140 130 40	4.3 2.7 Z <sub>p</sub> =10000Ω 6.0	W QW= 5l/min		7T54
CT CP B	30 30 —	8.0 6.0 8.0	15.0 8.4 12.0	4.0 2.6 4.0	7.0 6.0 7.0	- 800 - 900 - 340	1.6 1.2 0.2/2.4	200 200 130	250 260 80	8.0 5.5 Z <sub>p</sub> =5600Ω 10.0	R QR= 13m <sup>3</sup> /min SP= 15mm aq. ○		7T58R
CT CP B	30 30 —	8.0 6.0 8.0	16.0 8.4 12.0	5.0 3.3 5.0	7.0 6.0 7.0	- 800 - 900 - 340	1.8 1.2 0.2/2.4	220 200 130	280 260 80	9.0 5.5 Z <sub>p</sub> =5600Ω 10.0	W QW= 10l/min △		8T58
CT CP B	30 30 —	12.0 10.0 12.0	17.0 10.0 12.0	6.0 4.0 6.0	10.0 9.0 9.0	-1100 -1200 - 300	1.6 1.0 0.5/2.4	160 140 55	300 230 35	11.5 7.0 Z <sub>p</sub> =7200Ω 12.5	R QR= 20m <sup>3</sup> /min SP= 17mm aq.		8T10R
CT CP B	30 30 —	12.0 10.0 12.0	22.0 16.0 20.0	6.0 4.0 6.0	10.0 9.0 10.0	-1100 -1200 - 430	2.0 1.3 0.5/2.6	190 200 55	290 300 35	15.5 9.0 Z <sub>p</sub> =8000Ω 16.0	R QR= 16m <sup>3</sup> /min SP= 20mm aq. ○		8T20R A
CT CP B	30 30 —	12.0 10.0 12.0	15.0 10.0 10.0	6.0 4.0 6.0	10.0 9.0 9.0	- 800 -1000 - 110	1.45 0.85 0.4/1.8	230 220 120	300 310 50	10.0 5.5 Z <sub>p</sub> =9000Ω 9.0	R QR= 20m <sup>3</sup> /min SP= 16mm aq.		8T30R
CT CP B	30 30 —	10.0 7.5 10.0	22.0 15.0 18.0	6.0 4.0 6.0	9.0 5.0 8.0	- 500 - 400 - 200	2.2 1.55 0.2/3.3	280 330 180	220 220 75	15.0 6.0 Z <sub>p</sub> =5200Ω 18.0	R QR= 20m <sup>3</sup> /min SP= 16mm aq.		8T33R
CT CP B	30 30 —	12.0 10.0 12.0	22.0 10.0 20.0	10.0 6.6 10.0	11.0 9.0 11.0	-1200 -1200 - 370	1.8 1.0 0.5/3.4	200 140 65	400 230 55	14.5 7.0 Z <sub>p</sub> =6600Ω 23.0	W QW= 20l/min △		8T10
CT CP B	30 30 —	12.0 10.0 12.0	27.0 18.0 25.0	10.0 6.6 10.0	11.0 9.0 11.0	-1100 -1200 - 480	2.2 1.3 0.5/4.0	200 200 65	310 300 48	18.0 9.0 Z <sub>p</sub> =5600Ω 27.0	W QW= 20l/min △		8T20A
CT CP B	30 30 —	14.0 10.0 12.0	22.0 14.0 20.0	10.0 6.5 10.0	12.0 9.0 11.0	-1000 -1000 - 145	1.7 0.85 0.5/3.0	250 220 150	400 310 85	14.0 5.5 Z <sub>p</sub> =7200Ω 20.0	W QW= 20l/min △		8T30
CT CP B	30 30 —	10.0 7.5 10.0	27.0 15.0 25.0	10.0 6.6 10.0	9.0 5.0 8.0	- 500 - 400 - 200	2.5 1.55 0.2/4.0	300 330 200	250 220 100	17.0 6.0 Z <sub>p</sub> =4400Ω 22.0	W QW= 20l/min △		8T33
●CT ⊕BTV	130 130	7.0 7.0	20.0 24.0	10.0 10.0	6.0 6.0	- 330 - 200	3.0 3.8	330 300	1700 1750	13.0 12.5	R QR= 12m <sup>3</sup> /min SP= 70mm aq.		8T34R

○ Radiator has opening for thermometer    ★ Inlet air temperature for forced cooling should be below 40°C.  
 ⊕ Typical operation shows values when synchronizing signal is of 8 Mc bandwidth.



8T71R



8T54



4F15R



5F20RA

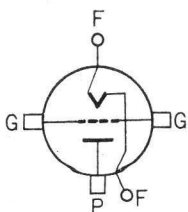
Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (A))	Amplification	Static capacity between plate and grid (pF)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				
8T36R	FT	7.5	60.0	360	204	T 9	18.0 (1.0)	40	27
8T67	FW	24.0	75.0	480	120	W 6 T12	7.2 (1.5)	20	17
8T50	FT	8.0	225	380	210	T14	16.0 (2.0)	20	35
8T71R	FT	11.0	285	625	349	T17	30.0 (2.0)	39	52
☆8T72	FT	8.0	180	410	150	T14	16.0 (2.0)	20	32
8T72A	FT	8.0	180	460	150	T14	16.0 (2.0)	20	32
8T61	FT	8.0	280	450	150	T14	30.0 (2.0)	20	41
8T54	FT	9.0	240	443	175	—	45.0 (4.0)	30	35
9T71	FT	11.0	285	610	234	T17	30.0 (2.0)	39	53

☆ For replacement only.  $\Delta$  Filaments and grid seal parts air.  
 $\Delta\Delta$  Electrode seals and glass parts are cooled by forced air are cooled by farced.

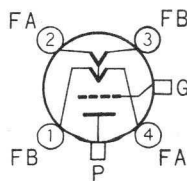
**TETRODES**

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (mA))	Grid-No. 2 amplification	Internal static capacity		
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No.1 & plate (pF)	Input (pF)	Output (pF)
3F65	FT	6.0	3.5	106	60	A 9S G25Y	4.0 (0.125)	6	0.08	7.2	2.3
4F21	FT	5.0	6.5	138	73	A 9S E32S	2.45(0.05)	6.2	0.05	8.0	4.0
4F15R	HO	6.0	2.6	59	41.3	H17SA	12 (0.25)	5.0	0.06 Max.	15	4.6
4F20R	HO	26.5	0.56	59	41.3	H17SA	12 (0.25)	5.0	0.06 Max.	15	4.6
5F20RA	HO	6.0	2.6	61	41.3	H17SA	12 (0.2)	5.0	0.04	15.5	5.5
5F22	FT	5.0	14.0	156	89	A 9S E32S	4.0 (0.1)	5.3	0.12	12.7	4.5
5F22A	FT	5.0	14.0	145	92	A 9S E32S	4.0 (0.1)	5.3	0.12	12.7	4.5

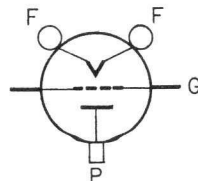
★ Inlet air temperature forced cooling should be below 40°C.  
 $\blacktriangle\blacktriangle$  Effective output.



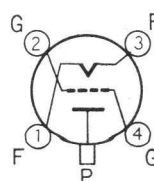
8T67



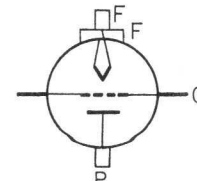
8T50



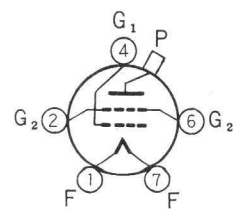
8T36R  
8T61  
8T71R  
8T72A  
9T71



8T72



8T54



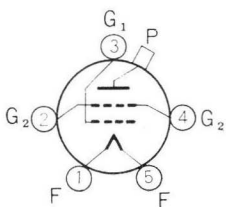
3F65

Use	Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
		Voltage (kV)	Input (kW)	Dissipation (kW)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (kW)			
CT CP B	30 30 —	10.0 7.5 10.0	27 15 25	10.0 6.6 10.0	9.0 6.0 8.0	-500 -530 -200	2.5 1.8 0.2/4.0	300 330 240	250 270 100	17.0 8.5 Zp=4400Ω 22.0	QR=20m <sup>3</sup> /min SP=60mm aq.		8T36R
CT CP B	30 30 —	14.0 11.0 14.0	35.0 17.0 55.0	15.0 8.0 25.0	12.0 10.0 12.0	-1400 -1400 -550	2.7 1.4 1.2/8.0	270 230 360	670 520 320	21.0 10.0 42.0 28.0 Zp=3000Ω 60.0	QR=30l/min W △△ QW=45l/min		8T67 8T50
CT CP B	10 10 —	15.0 12.5 15.0	100.0 55.0 75.0	25.0 17.0 25.0	13.0 12.0 12.0	-1200 -1200 -300	6.0 4.0 0.6/9.0	800 800 300	1400 1300 200	58.0 38.0 Zp=2700Ω 68.0	QR=65m <sup>3</sup> /min SP=50mm aq.	5671	8T71R
CT CP B	25 25 —	14.0 11.0 14.0	60.0 36.0 50.0	25.0 17.0 25.0	12.5 10.0 12.0	-1200 -1200 -570	4.5 3.0 0.7/8.0	450 500 300	800 850 270	40.0 23.0 Zp=3000Ω 60.0	QR=40l/min W △ QW=45l/min		☆8T72
CT CP B	25 25 —	14.0 11.0 14.0	60.0 36.0 50.0	25.0 17.0 25.0	12.5 10.0 12.0	-1200 -1200 -570	4.5 3.0 0.7/8.0	450 500 300	800 850 270	40.0 23.0 Zp=3000Ω 60.0	QR=40l/min W △ QW=45l/min		8T72A
CT CP B	30 30 —	12 9.5 12	100 60 80	35.0 23.0 35.0	10.0 9.5 11.5	-1000 -800 -700	8.0 5.0 0.2/0.8	950 750 250	1400 860 210	58000 30000 Zp=3000Ω 60000	QR=65l/min W △ QW=65l/min		8T61
● CT ⊕ BTV	130 130	10.0 10.0	60.0 80.0	45.0 45.0	9.0 9.0	-450 -300	6.5 8.8	500 1300	4500 6800	40.0 57.5	QR=90l/min W △△ QW=90l/min		8T54
CT CP B	20 20 —	17.0 12.5 15.0	150.0 60.0 90.0	50.0 33.0 50.0	15.0 12.0 12.0	-1200 -1200 -300	8.0 4.5 0.6/10.0	800 900 400	1450 1500 235	88.0 43.0 75.0	QR=88l/min W △ QW=75l/min	5770	9T71

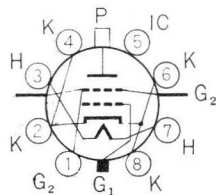
● Typical operation when grid grounded. ⊕ Typical operation shows values for 8 Mc.  
★ Inlet air temperature for forced cooling should be below 40°C. ○ Radiator has opening for thermometer.

Use	Max. frequency for full input (Mc)	Max. ratings					Typical operation							★ Cooling system	U.S.A. equivalent	Type
		Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (mA)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
CT CP AB <sub>2</sub>	150 150 —	3.0 2.5 3.0	400 400 600	260 180 200	65 45 65	10 10 10	2.5 2.0 1.5	250 200 250	-100 -100 -30	90 80 60/200	10 20 15	1.2 3.0 0.4	170 120 180 Zp=15200Ω	N or V	4-65A	3F65
CT CP AB <sub>2</sub>	120 120 —	3.5 2.5 3.0	400 400 600	450 300 400	125 85 125	20 20 20	3.0 2.0 2.5	350 350 350	-180 -250 -85	150 140 40/220	30 30 7	3.3 4.2 0.6	350 220 320 Zp=24000Ω	N or V	4-125A/ 4D21	4F21
CP, CT ⊕ BTV	500 500	1.25 1.25	300 400	250 400	150 150	12 12	1.0 1.0	250 300	-110 -65	200 330	7 45	▲ 25 8	▲▲ 120 200	QR=0.16m <sup>3</sup> /min SP=6.6mm aq.		4F15R
CP, CT ⊕ BTV	500 500	1.25 1.25	300 400	250 400	150 150	12 12	1.0 1.0	250 300	-110 -65	200 330	7 45	▲ 25 8	▲▲ 120 200	QR=0.16m <sup>3</sup> /min SP=6.6mm aq.		4F20R
CT CP	500 500	2.0 1.3	300 250	500 250	250 165	12 12	1.5 1.25	250 250	-90 -100	250 175	7 7	▲ 25 10	▲▲ 200 140	QR=0.11m <sup>3</sup> /min SP=7.6mm aq.	7203 4CX250B	5F20RA
CT CP AB <sub>2</sub>	75 75 —	2.0 3.2 4.0	600 500 600	1000 660 800	250 165 250	35 30 35	3.5 2.5 3.0	500 400 500	-200 -200 -105	260 210 60/420	50 50 18	3.5 3.5 1	700 400 Zp=14600Ω 780	QR=0.14m <sup>3</sup> /min SP=7mm aq.	4-250A/ 5D22	5F22
CT CP BSSB	75 75 —	4.0 3.2 4.0	600 500 600	1000 660 800	250 165 250	35 30 35	3.5 2.5 3.0	500 400 500	-200 -200 -105	260 210 210	50 50 9	3.5 3.5 0.5	700 400 Zp=14600Ω 380	QR=0.14m <sup>3</sup> /min SP=2mm aq.		5F22A

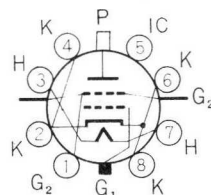
⊕ Typical operation shows values when synchronizing signal is 5 Mc, bandwidth below Frequency 216 Mc.  
▲ Including circuit loss. △ Cooling socket is used.



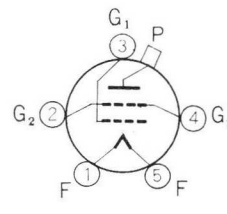
4F21



4F15R  
4F20R



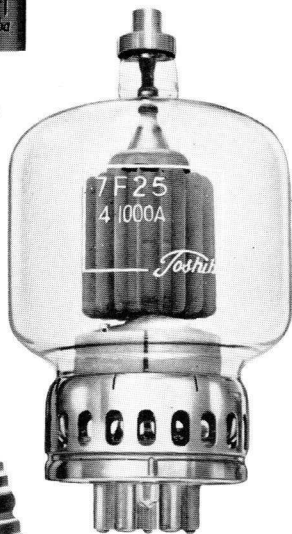
5F20RA  
5F35R



5F22  
5F22A



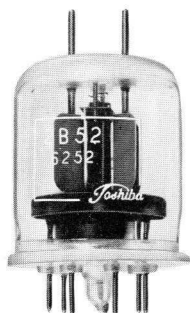
5F35R



7F25



8F66R



2B52



2B29P



2B46P

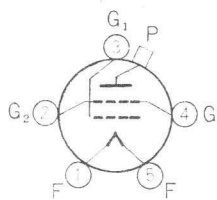
Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (mA))	Grid-No. 2 amplification	Inner static capacity		
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No.1 & plate (pF)	Input (pF)	Output (pF)
5F35R	HO	6.0	3.75	76	50	H17SA	15.0 (0.35)	5.0	0.2 Max.	25	6.5
5F23	FT	5.0	14.0	156	89	A 9S E32S	4.0 (0.1)	5.3	0.12	12.5	4.7
5F23A	FT	5.0	14.0	145	92	A 9S E32S	4.0 (0.1)	5.3	0.12	12.5	4.7
6F50R	FT	5.0	13.5	115	65	T 8-1	5.2 (0.2)	6.2	0.05	12.8	5.6
7F25	FT	7.5	21.0	235	127	A14S E38SA	10.0 (0.3)	7.0	0.24	27.2	7.6
7F25A	FT	7.5	21.0	220	127	A14S E38SA	10.0 (0.3)	7.0	0.24	27.2	7.6
7F31R	FT	6.0	48.0	215	105	—	22.0 (2.0)	10.0	0.3	68	15.5
8F66R	FT	5.0	177	285	162	T11	20.0 (1.0)	10.0	0.6 Max.	105	24

★ Inlet air temperature forced cooling should be below 40°C.  
 △ Cooling socket used. □ Example is for below 30Mc.

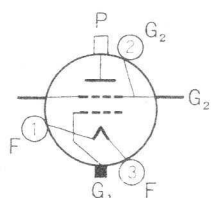
## BEAM POWER TUBES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (mA))	Grid-No. 2 amplification	Inner static capacity		
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No.1 & plate (pF)	Input (pF)	Output (pF)
2E24	FO	6.3	0.65	89	34	A 9S H17S	3.2 (16)	7.5	0.11 Max.	8.5	6.5
2E26	HO	6.3	0.8	89	34	A 9S H17S	3.5 (20)	6.5	0.2 Max.	12.5	7
2B46P □	HO	6.3	1.25	94	43	A 9S H17S	7.0 (100)	4.5	0.22 Max.	13.5	8.5
3B32 ◇	HO	6.3 12.6	1.6 0.8	81	60	G25S	3.5 (30)+	6.5	0.07 + Max.	8 +	3.8+
2B29P ◇ □	HO	6.3 12.6	2.25 1.125	105	60	G25S	8.5 (60)+	9.0	0.12 + Max.	14.5+	7 +
2B52 ◇	HO	6.3 12.6	1.3 0.65	80	47	G25S	2.5 (20)+	8.0	0.05 +	6.5+	2.6+
2B46 ■	HO	6.3	1.25	94	43	A 9S H17S	7.0 (100)	4.5	0.22 Max.	13.5	8.5

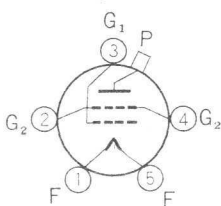
△ Twin beam tube.  
 □ Maximum ratings and typical operation may be custom-adjusted to client's requirements within limitations.  
 ○ Maximum ratings shows values at duty factor 0.001~1.0 (Max. average time 10 msec.)



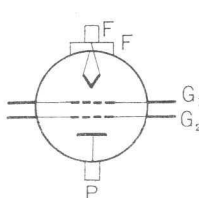
5F23  
5F23A



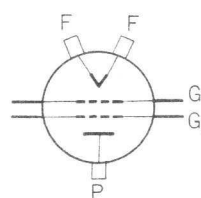
6F50R



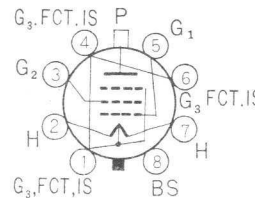
7F25  
7F25A



7F31R



8F66R



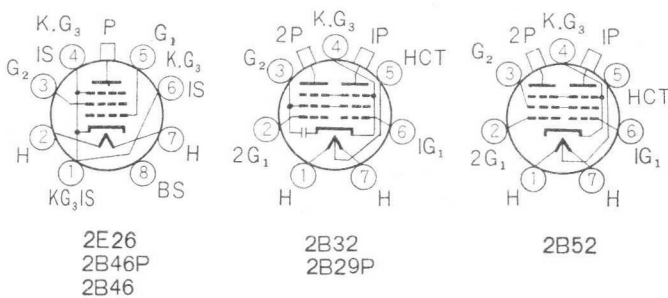
2E24

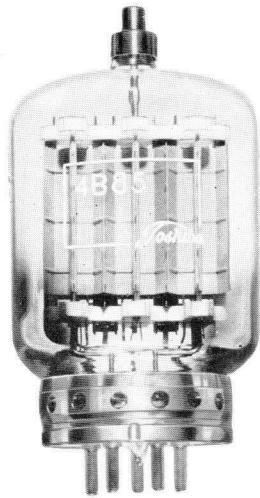
Use	Max. frequency for full input (Mc)	Max. ratings					Typical operation							Cooling system	U.S.A. equivalent	Type
		Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (kW)	Plate loss Dissipation (kW)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (A)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (kW)			
CP, CT BT <sub>V</sub>	250	1.5	300	700	350	15	1.25	250	- 60	450	35	▲ 40	350	R QR= 0.4m <sup>3</sup> /min SP= 10mm aq.		5F35R
CT CP BSSB	75 75 75	4.5 3.2 4.0	600 600 600	1.4 0.85 1.0	0.4 0.27 0.4	35 30 35	4.0 3.0 3.5	500 500 500	-230 -230 - 90	0.31 0.27 0.26	55 50 11	5 4.5 0.6	0.95 0.61 0.54	R QR= 0.4m <sup>3</sup> /min SP= 40mm aq.	4-400A	5F23
AB <sub>2</sub>	—	4.0	600	1.0	0.4	35	3.5	500	- 90	0.12/0.52	22	1.2	Z <sub>p</sub> =13600Ω 1.1	V QR= 0.4m <sup>3</sup> /min SP= 8mm aq.		5F23A
CT CP BSSB	75 75 75	4.5 3.2 4.0	600 600 600	1.4 0.85 1.0	0.4 0.27 0.4	35 30 35	4.0 3.0 3.5	500 500 500	-230 -230 - 90	0.31 0.27 0.26	55 50 11	5 4.5 0.6	0.95 0.61 0.54	R QR= 1m <sup>3</sup> /min SP= 36mm aq.	4X500A	6F50R
AB <sub>2</sub>	—	4.0	600	1.0	0.4	35	3.5	500	- 90	0.12/0.52	22	1.2	Z <sub>p</sub> =13600Ω 1.1	V QR= 1m <sup>3</sup> /min SP= 36mm aq.		6F50R
CT	120	4.0	500	1.2	0.5	30	3.0	500	-150	0.3	35	▲ 15	0.6	R QR= 1m <sup>3</sup> /min SP= 36mm aq.	4X500A	6F50R
CT CP BSSB	110 110 110	6.0 5.0 6.0	1000 1000 1000	4.0 2.7 3.2	1.0 0.67 1.0	75 75 75	5.5 4.5 5.0	500 500 500	-200 -200 - 65	0.6 0.55 0.5	90 120 50	15 15 3	2.5 1.95 1.5	R QR= 1.25m <sup>3</sup> /min SP= 70mm aq.	4-1000A	7F25
AB <sub>2</sub>	—	6.0	1000	3.2	1.0	75	5.0	500	- 65	0.18/1.0	100	6	Z <sub>p</sub> =10400Ω 3.1	V QR= 1.25m <sup>3</sup> /min SP= 70mm aq.		7F25A
CT CP BSSB	110 110 110	6.0 5.0 6.0	1000 1000 1000	4.0 2.7 3.2	1.0 0.67 1.0	75 75 75	5.5 4.5 5.0	500 500 500	-200 -200 - 65	0.6 0.55 0.5	90 120 50	15 15 3	2.5 1.95 1.5	R QR= 1.25m <sup>3</sup> /min SP= 12mm aq.		7F25A
AB <sub>2</sub>	—	6.0	1000	3.2	1.0	75	5.0	500	- 65	0.18/1.0	100	6	Z <sub>p</sub> =10400Ω 3.1	V QR= 4m <sup>3</sup> /min SP= 60mm aq.		7F31R
CT CP BT <sub>V</sub>	220 220 220	4.0 3.2 4.0	1000 800 1000	5.0 3.3 6.0	2.5 1.65 2.5	120 120 120	4.0 3.0 3.8	800 500 800	-200 -200 - 80	1.2 1.0 1.47	85 70 95	▲ 150 70 ▲ 250	3.2 2.05 3.5	R QR= 4m <sup>3</sup> /min SP= 60mm aq.		7F31R
CT CP BT <sub>V</sub>	220 220 220	6.0 4.8 6.0	1800 1800 2000	16.0 9.4 22.0	10.0 6.6 10.0	400 270 400	5.8 4.7 5.8	1200 800 1200	-200 -280 -130	2.6 1.56 3.45	200 217 220	▲ 750 70 ▲ 700	9.0 5.5 12.0	R QR= 10m <sup>3</sup> /min SP= 76mm aq.	6166	8F66R

▲ Including circuit loss. ♣ Example shows values when synchronizing signal is of 6 Mc. bandwidth  
 × Example shows values when synchronizing signal is of 8.5 Mc bandwidth.

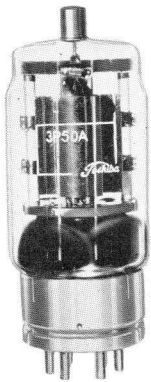
Use	Max. frequency for full input (Mc)	Max. ratings					Typical operation							Cooling system	U.S.A. equivalent	Type
		Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Disipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (mA)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
CT CP	125 125	0.5 0.4	200 200	30 20	10 6.7	2.5 1.7	0.5 0.4	190 190	- 45 - 45	65 50	10 8	0.2 0.15	20 13.5	N	2E24	2E24
AB <sub>2</sub>	—	0.4	200	30	10	2.5	0.4	125	- 15	18/150	26	0.43	Z <sub>p</sub> =7000Ω 42			
CT CP	125 125	0.5 0.4	200 200	30 20	10 6.7	2.5 1.7	0.5 0.4	185 160	- 40 - 50	60 50	7 7.5	0.15 0.15	20 13.5	N	2E26	2E26
AB <sub>2</sub>	—	0.4	200	30	10	2.5	0.4	125	- 15	20/150	32	0.3	Z <sub>p</sub> =6200Ω 42			
○ Pule modulator	—	3.5	500	80	10	1.75								N	6293	2B46P□
CT CP	200 200	0.75 0.6	250 250	36 22	15 10	5.0 3.4	0.75 0.6	200 200	- 65 - 65	48 36	15 16	0.19 0.18	26 17	N	832-A	2B32◇
○○ Pule modulator	—	5.0	850	85	15	3								N	3E29	2B29P◇
CT CP	300 300	0.6 0.5	250 250	60 40	20 13.3	3.0 3.0	0.6 0.5	180 180	- 60 - 70	100 80	5 8	▲ 2.0 ▲ 3.5	43 30	N	6252	2B52◇
CT CP BSSB	60 60 60	0.6 0.48 0.6	250 250 250	67.5 45 62.5	20 13.3 20	3.0 2.0 3.0	0.6 0.475 0.6	150 135 165	- 58 - 77 - 45	112 94 100	9 6.4 8	0.2 0.3 0.1	52 34 45	N	6146	2B46■
AB <sub>2</sub>	—	0.6	250	62.5	20	3.0	0.6	165	- 44	22/207	17	0.2	Z <sub>p</sub> =6800Ω 90			

▲ Including circuit losses. ■ Special high stability 2B46 Suitable for TV modulation also available.  
 + Shows value of each unit. ○○ Maximum ratings show values at the duty factor 0.0001~1.0 (max., average time 1.2 msec.)

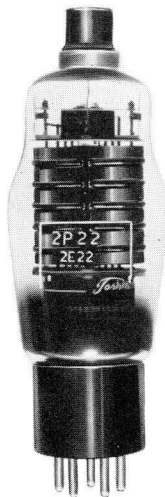




4B85



3P50A



2P22

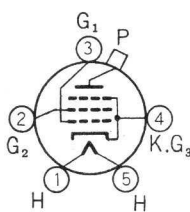
Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (mA))	Grid-No. 2 amplification	Inner static capacity		
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No.1 & plate (pF)	Input (pF)	Output (pF)
UY-807	HO	6.3	0.9	142	50	A 9S E19S	6.0	8.0	0.2 Max.	12	7
1625	HO	12.6	0.45	142	50	A 9S G22S	6.0	8.0	0.2 Max.	12	7
☆UY-807A	HO	6.3	0.9	115	39	A 9S F19S	6.0	7.5	0.2 Max.	12	7
2B29 ◇	HO	6.3 12.6	0.25 1.125	105	60	G25S	8.5 (60) <sup>+</sup>	9.0	0.12 <sup>+</sup> Max.	14.5 <sup>+</sup>	7 <sup>+</sup>
2B94 ◇	HO	6.3 12.6	1.8 0.9	105	47	G25S	6.0 (40) <sup>+</sup>	8.2	0.08 <sup>+</sup>	10.5 <sup>+</sup>	3.2 <sup>+</sup>
4B13	HO	10.0	5.0	185	65	A14S G25PA	3.75(50)	8.5	0.16	16	13
4B85 ■	HO	6.3	4.8	175	90	A 9S E32S	20.0 (300)	4.8	1.5	48	20

☆ For replacement only. ■ Special high stability 4B85 also available.

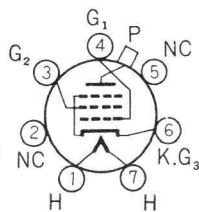
## PENTODES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (mA))	Grid-No. 2 amplification	Inner static capacity		
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No.1 & plate (pF)	Input (pF)	Output (pF)
2P22	FO	6.3	1.5	152	50	A14S E19S	5.5 (60)	9.0	0.2 Max.	13	8
☆P-535A	FT	12.0	2.5	140	45	A 9S E19S	2.8 (45)	4.5	0.2	14	11
3P50	HO	12.0	1.25	135	50	A 9S D25QB	4.0 (50)	5.0	0.06	20	10
3P50A	HO	10.0	1.5	135	50	A 9S E25P	4.0 (50)	5.0	0.06	20	10
☆P-560A	FT	6.0 <sup>★</sup>	3.85 <sup>★</sup>	160	75	A14S F47S	2.8 (70)	6.0	0.13	17	13
4P55	HO	6.3	2.6	160	75	A14S E32S	6.5 (100)	5.5	0.4	25	21
4P56	HO	12.0	1.6	160	75	A14S E32S	6.5 (100)	5.5	0.4	25	21

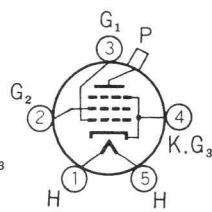
☆ For replacement only.



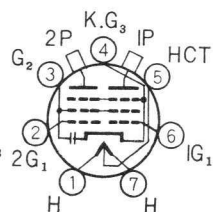
UY-807



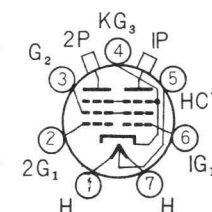
1625



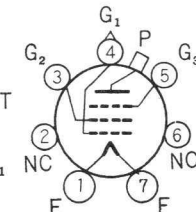
UY-807A



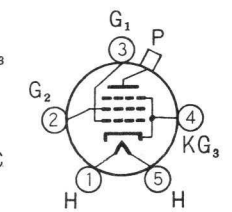
2B29



2B94



4B13



4B85

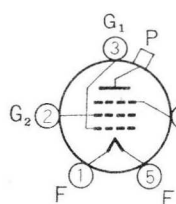


Use	Max. frequency for full input (Mc)	Max. ratings					Typical operation							Cooling system	U.S.A. equivalent	Type
		Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (mA)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
CT CP AB <sub>2</sub>	60 60 —	0.6 0.475 0.6	300 300 300	60 40 60	25 16.5 25	3.5 2.5 3.5	0.6 0.475 0.6	250 225 300	- 45 - 85 - 32	100 83 48/200	8 8 0.7/18	0.3 0.4 0.1	40 28 Z <sub>p</sub> =6900Ω 80	N	807	UY-807
CT CP AB <sub>2</sub>	60 60 —	0.6 0.475 0.6	300 300 300	60 40 60	25 16.5 25	3.5 2.5 3.5	0.6 0.475 0.6	250 225 300	- 45 - 85 - 32	100 83 48/200	8 8 0.7/18	0.3 0.4 0.1	40 28 Z <sub>p</sub> =6900Ω 80	N	1625	1625
CT CP AB <sub>2</sub>	60 60 —	0.6 0.475 6.0	300 300 300	60 40 60	25 16.5 25	3.5 2.5 3.5	0.6 0.475 0.6	250 225 300	- 45 - 85 - 32	100 83 48/200	8 8 0.7/18	0.3 0.4 0.1	40 28 Z <sub>p</sub> =6900Ω 80	N		☆UY-807A
CT CP AB <sub>2</sub>	200 200 —	0.75 0.6 0.6	225 225 250	120 90 120	40 28 40	7.0 4.5 7.0	0.6 0.5 0.6	200 200 250	- 55 - 70 - 80	190 160 200	18 20 16	0.65 0.75 4.0 ▲ 0.6	82 60 Z <sub>p</sub> =8000Ω 50 80	N or V	829-B	2B29 ◇
CT CP AB <sub>2</sub>	250 250 —	0.6 0.45 0.6	250 250 250	120 72 120	40 27 40	7.0 4.5 7.0	0.6 0.45 0.6	250 250 250	- 80 -100 - 25	200 150 50/200	16 16 26	0.2	85 50 Z <sub>p</sub> =8000Ω 80	N or V	5894	2B94 ◇
CT CP AB <sub>1</sub>	30 30 —	2.25 1.6 2.5	450 350 800	400 240 360	100 65 100	20.0 20.0 20.0	2.0 1.5 2.25	400 300 750	-120 -160 - 95	190 135 45/288	35 25 40	2.0 1.8 —	290 155 Z <sub>p</sub> =16000Ω 450	N	813	4B13
AB <sub>1</sub>	—	1.25	300	450	150	15.0	1.0	200	- 50	120/800	45	—	Z <sub>p</sub> =2840Ω 560	N or V		4B85 ■

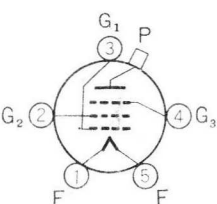
▲ Including circuit loss. ◇ Twin beam power tube. + Shows value of each unit.

Use	Max. frequency for full input (Mc)	Max. ratings					Typical operation							Cooling system	U.S.A. equivalent	Type	
		Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 3 voltage (V)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (mA)	Grid-No. 2 current (mA)	Exciting power (W)				Plate output (W)
CT CS AB <sub>2</sub>	30 30 —	0.75 0.75 0.75	300 300 300	90 45 75	30 30 30	10 10 10	0.7 0.6 0.6	— 0 - 68 0	250 17kΩ from plate voltage 250	- 50 -100 - 28	100 57 30/160	25 22 15	0.4 0.7 0.1	47 12 Z <sub>p</sub> =6400Ω 50	N	2E22	2P22
CT CS AB <sub>2</sub>	30 30 —	1.25 1.25 1.25	250 250 250	120 60 120	45 45 45	10 10 10	1.0 1.0 1.25	40 - 50 40	250 40kΩ from plate voltage 250	-100 -100 - 50	110 58 50/180	22 20 15	0.3 0.4 0.07	85 22 Z <sub>p</sub> =14400Ω 140	N		☆P-535A
CT CS BSSB AB <sub>1</sub>	30 30 30 —	1.2 1.2 1.2 1.2	400 400 400 400	160 85 160 160	60 60 60 60	8 8 8 8	1.0 1.0 1.0 1.0	0 - 75 0 0	300 15kΩ from 600V 300 300	-120 -120 - 50 - 50	150 80 120 40/190	20 23 8 6	0.7 1.1 0.15 —	105 28 65 Z <sub>p</sub> =6600Ω 75	N		3P50
CT CS AB <sub>1</sub>	30 30 —	1.2 1.2 1.2	400 400 400	160 85 160	60 60 60	8 8 8	1.0 1.0 1.0	0 - 75 0	300 15kΩ from 600V 300	-120 -120 - 50	150 80 40/190	20 23 6	0.7 1.1 —	105 28 Z <sub>p</sub> =6600Ω 75	N		3P50A
CT CS AB <sub>1</sub>	30 30 —	1.5 1.5 1.5	400 400 400	300 150 300	100 100 100	20 20 20	1.5 1.5 1.5	50 - 95 50	400 40kΩ from plate voltage 400	-150 -150 - 65	170 80 50/165	25 31 6	1.0 1.3 —	180 45 Z <sub>p</sub> =11600Ω 98	N		☆P-560A
CT BSSB AB <sub>1</sub>	25 25 —	1.5 1.5 1.5	400 400 400	300 300 300	120 120 120	15 15 15	1.25 1.25 1.25	50 0 0	300 300 300	-120 - 60 - 60	200 200 20/280	25 18 20	0.3 0.1 —	180 150 Z <sub>p</sub> =8800Ω 220	N		4P55
CT BSSB AB <sub>1</sub>	25 25 —	1.5 1.5 1.5	400 400 400	300 300 300	120 120 120	15 15 15	1.25 1.25 1.25	50 0 0	300 300 300	-120 - 60 - 60	200 200 20/280	25 18 20	0.3 0.1 —	180 150 Z <sub>p</sub> =8800Ω 220	N		4P56

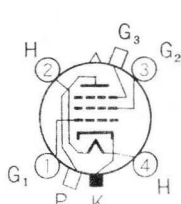
★ Value per section (2-phase heating).



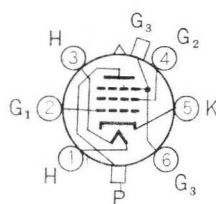
2P22



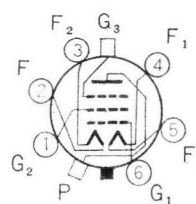
P-535A



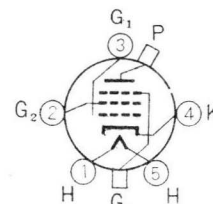
3P50



3P50A



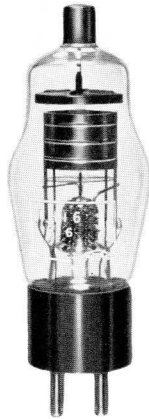
P-560A



4P55  
4P56



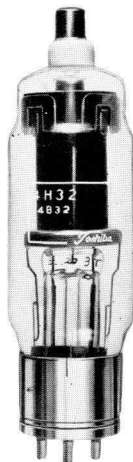
5P70



1H16



2H28



4H32

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m $\mu$ ) (Plate current (mA))	Grid-No. 2 amplification	Inner static capacity		
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No.1 & plate (pF)	Input (pF)	Output (pF)
4P60	FT	10.0	3.25	160	65	A14S E38K	2.6 (60)	6.0	0.07	11	13
☆4P83	FT	10.0	5.0	230	64	A14S E32P	4.0 (62.5)	15	0.15 Max.	17	29
☆P213	FT	12.0	2.75	160	60	A14S D25QB	3.0 (80)	6.0	0.09	12	15
P220	FT	12.0	4.25	205	90	A20S E47S	4.5 (110)	6.5	0.1	17	20
☆P-520A	FT	6.0 <sup>★★</sup>	4.25 <sup>★★</sup>	205	90	A20S F47S	4.5 (110)	6.5	0.1	17	20
5P70	FT	12.0	10.0	225	120	A20S F65S	6.0 (200)	4.5	0.1	26	21
6P80	FT	12.0	20.0	310	160	A30S F84S	6.0 (200)	7.0	0.12	31	23
☆6P80A	FT	12.0	20.0	310	160	A30S F84S	6.0 (200)	7.0	0.12	31	23

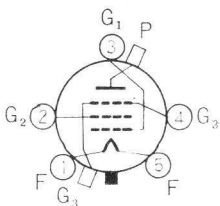
☆ For replacement only. Equipped with FCT (2-phase heating possible).

# DISCHARGE TUBES

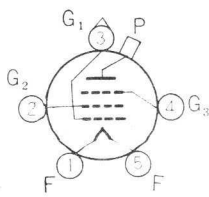
## RECTIFIER TUBES

Type	Construction	Gas	Cathode				Dimensions		Base number	
			Classification	Voltage (V)	Current (A)	Heating-up time (sec) Min.	Length (mm)	Max. Dia. (mm)	Cap	Base
1007	Full wave	Xe	FO	1	1.2	5	Max. 66.8	34	—	H17S
1H16	Half wave	Hg	FO	2.5	2.0	30	116	38	A9S	D16S
☆HX-968D	Half wave	Hg	FO	2.5	3.0	30	135	40	A9S	D16P
2H66	Half wave	Hg	FO	2.5	5.0	30	165	60	A14S	D16P
2H28	Half wave	Xe	FO	2.5	5.0	5	153	51	A14S	D16P
☆HV-972A	Half wave	Hg	FO	5.0	10.0	30	265	100	A14S	D25P
4H22	Full wave	Xe	FO	2.5	6.25	20	Max. 152	42	—	D16P
4H72	Half wave	Hg	FO	5.0	7.5	30	220	60	A14S	D25P
4H32	Half wave	Xe	FO	5.0	7.5	30	205	57	A14S	D25P

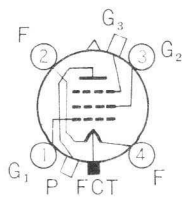
☆ For replacement only. ※ Condition assumed: (1) Sine wave voltage supply (2) Zero tube drop



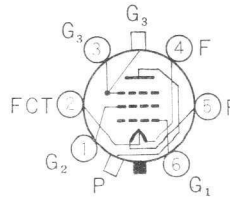
4P60



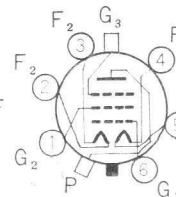
4P83



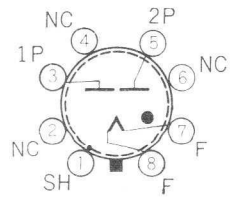
P213



P220 6P80  
5P70 6P80A



P-520A



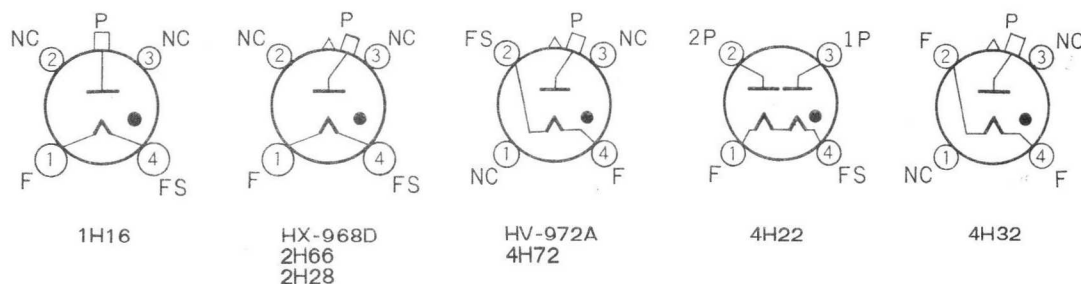
1007

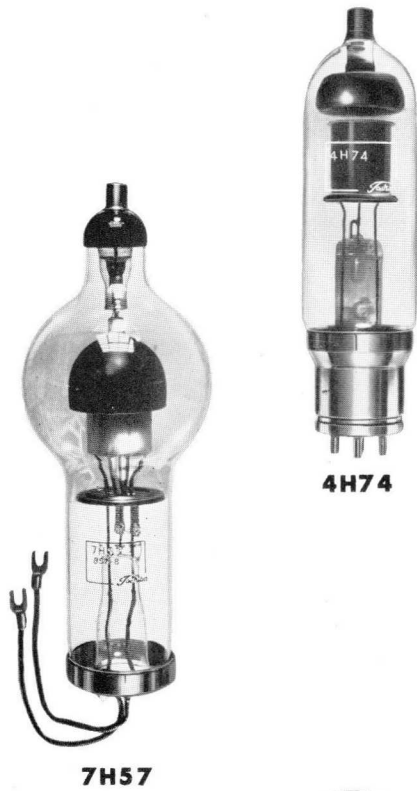
Use	Max. frequency for full input (Mc)	Maximum ratings					Typical operation									Cooling system	U.S.A. equivalent	Type
		Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 3 voltage (V)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (mA)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)				
CT	40	2.0	500	350	125	25	2.0	0	500	-200	160	25	1.1	230	N		4P60	
CS	40	2.0	500	200	125	25	2.0	-145	20kΩ from 1000V	-200	85	34	2	60				
AB <sub>1</sub>	—	2.0	900	350	125	25	2.0	0	500	-80	40/150	3	—	115	N	803	4P83	
CT	20	2.0	600	350	125	30	2.0	40	500	-90	160	45	2	210				
CP	20	1.6	500	250	85	30	1.6	100	27kΩ from plate voltage	-80	150	45	5	155	N		4P83	
CS	20	2.0	600	180	125	30	2.0	-110	35kΩ from plate voltage	-110	80	48	2.5	53				
CT	30	2.0	500	350	125	25	1.5	0	500	-120	200	25	1.3	200	N		P213	
CS	30	2.0	500	180	125	25	1.5	-150	20kΩ from 100V	-120	90	30	1.4	50				
CT	30	2.0	500	600	230	30	2.0	0	500	-180	240	30	1.6	330	N		P220	
CS	30	2.0	500	350	230	30	2.0	-120	50kΩ from plate voltage	-180	115	33	2	85				
AB <sub>1</sub>	—	2.0	900	550	230	30	2.0	0	500	-75	70/216	24	—	170	N		P220	
CT	25	2.0	500	600	230	30	2.0	50	500	-180	250	40	1.6	350				
CS	25	2.0	500	350	230	30	2.0	-100	37kΩ from plate voltage	-180	125	46	2.4	90	N		☆P-520A	
B	—	2.0	500	600	230	30	2.0	50	700	-110	70/380	30	—	420				
CT	30	3.5	600	1500	420	80	3.0	0	500	-220	450	80	6	1000	N		5P70	
CS	30	3.5	600	750	420	80	3.0	-300	5.3kΩ from 1000V	-230	220	95	7.5	250				
AB <sub>1</sub>	—	3.5	800	1100	420	80	3.0	0	500	-100	60/420	3	—	500	N		6P80	
CT	30	4.0	800	2000	600	100	3.5	0	600	-200	515	70	6.5	1350				
CS	30	4.0	800	2000	600	100	3.5	0	600	-200	515	90	6.5	1350	N		☆6P80A	
CS	30	4.0	800	1000	600	100	3.5	-230	27kΩ from plate voltage	-200	260	110	8	350				

★★ Value per section (2-phase heating).

Tube voltage drop (approx. V)	Maximum plate ratings					Typical operation ※					U.S.A. equivalent	Type
	Ambient temperature (°C)	Condensed mercury temperature (°C)	Peak inverse voltage (kV)	Peak current (A)	Average current (A)	Plate peak inverse voltage (kV)	AC voltage (kV)	DC output voltage to filter (kV)	Max. DC output current (A)	Rectifier system		
20 12	-55~+70 -55~+70	—	1.08 1.08	0.36 0.36	0.03~0.12※※ 0~0.12※※	1.08	0.382	0.35	0.12	Single phase full wave	1007	1007
15	—	20~60	7.5	0.5	0.125	7.5	2.65	2.38	0.25	Single phase two tubes	816	1H16
15	—	20~55	5	0.6	0.15	5	1.77	1.59	0.3	″	—	☆HX-968D
15	—	{ 25~60 25~70 25~70	10 5 2	1.0 1.0 2.0	0.25 0.25 0.5	10 5 2	3.54 1.77 0.75	3.18 1.59 0.64	0.5 0.5 1.0	″	866-A	2H66
10	-55~+75	—	{ 10 5	1.0 2.0	0.25 0.5	10 5	3.54 1.77	3.18 1.59	0.5 1.0	″	3B28	2H28
15	—	30~40	18	3.2	0.8	18	6.37	5.73	1.6	″	—	☆HV-972A
10	-55~+70	—	0.725	4.0	1.0 ※※	0.725	0.256	0.23	1.0	Single phase full wave	3B22	4H22
15	—	{ 25~55 25~65	10 5	5.0 5.0	1.25 1.25	10 5	3.54 1.77	3.18 1.59	2.5 2.5	Single phase two tubes	872-A	4H72
10	-55~+70	—	10	5.0	1.25	10	3.54	3.18	2.5	″	4B32	4H32

(3) Pure resistance load. ※※ Full wave output.





4H74

7H57

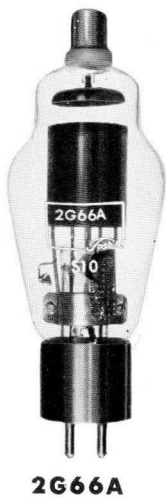
Type	Construction	Filled gas	Cathode				Dimensions		Base number	
			Classification	Voltage (V)	Current (A)	Heating-up time (sec) Min.	Length (mm)	Max. Dia. (mm)	Cap	Base
4H74	Half wave	Hg	FO	5.0	7.5	30	230	60	A14S	D25P
4H88A	Half wave	Hg	FO	5.0	7.5	30	220	60	A14S	D25PA
4H73	Half wave	Hg	FO	5.0	10.0	30	280	76	A14S	D25PA
5H69	Half wave	Hg	FO	5.0	19.0	60	330	127	A20S	Flexible leads N6.5-1
☆5H69A	Half wave	Hg	FO	5.0	19.0	60	370	127	A20S	B35K
6H51	Half wave	Hg	FO	5.0	25.0	60	420	150	A20S	Flexible leads
7H57	Half wave	Hg	FO	5.0	30.0	60	500	180	A20S	Flexible leads N9-2

☆ For replacement only. ※ Condition assumed: (1) Sine wave voltage supply (2) Zero tube drop

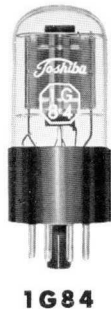
## HOT CATHODE GRID CONTROLLED DISCHARGE TUBES (TRIODE)

Type	Filled gas	Cathode				Dimensions		Base number		Tube voltage drop (approx. V)
		Classification	Voltage (V)	Current (A)	Heating-up time (sec) Min.	Length (mm)	Max. Diam. (mm)	Cap	Base	
6D4	Ar	HO	6.3	0.25	30	Max. 54	19	—	E 7-1	10
☆T66G-GT	Ar	HO	6.3	0.4	60	Max. 90	34	—	H17S	18
☆TY-66G	Ar	HO	6.3	0.4	60	Max. 108	39	—	E19S	18
1G84	Ar	HO	6.3	0.6	30	Max. 90	34	—	E17S	16
884	Ar	HO	6.3	0.6	30	Max. 105	40	—	H17Y	16
2G66A	Hg	FO	2.5	5.0	30	170	60	A14S	D16P	15
2G57A	Hg	FO	2.5	5.0	5	149	50	A14S	D16P	16
☆TX-911	Hg	HO	5.0	3.5	300	165	75	A 9 S	D16P	15
3G15	Xe	FO	2.5	6.0	40	165	40	A14S	D16P	10
4G14	Xe	FO	2.5	6.3	20	Max. 108	40	—	D16P	10
4G23	Ar+Hg	FO	2.5	7.0	15	149	50	A14S	D16P	10
☆4G63	Hg	FO	5.0	10.0	60	280	76	A14S	D25P	15

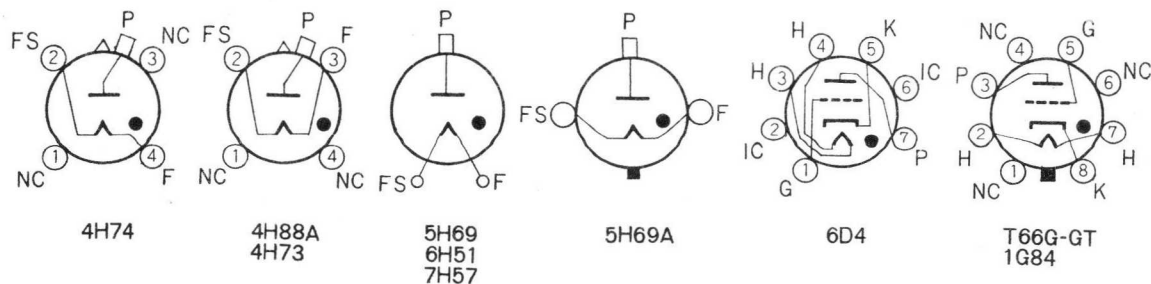
☆ For replacement only. ○ Starting time is -55°C Min.



2G66A



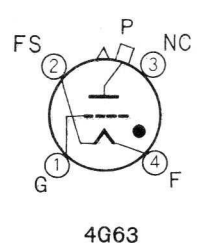
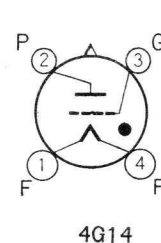
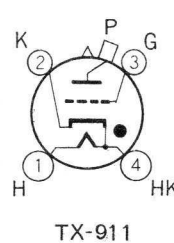
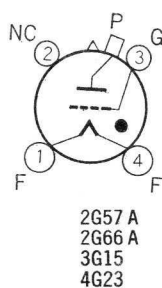
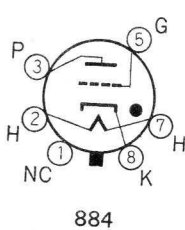
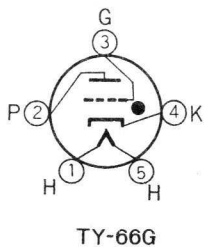
1G84



Tube voltage drop (approx.) V	Max. plate ratings					Typical operation ※					U.S.A. equivalent (Similar)	Type
	Ambient temperature (°C)	Condensed mercury temperature (°C)	Peak inverse voltage (kV)	Peak current (A)	Average current (A)	Plate peak inverse voltage (kV)	AC voltage (kV)	DC output voltage to filter (kV)	Max. DC output current (A)	Rectifier system		
15	—	25~55	15	5.0	1.25	15	6.1	14.3	3.75	Three-phase six tubes	—	4H74
15	—	25~50	15	5.0	1.25	15	6.1	14.3	3.75	''	8008	4H88A
15	—	{ 25~50 25~60	15 10	6.0 7.0	1.5 1.75	15 10	6.1 4.06	14.3 9.5	4.5 5.25	''	673	4H73
15	—	{ 30~40 30~50 30~60	20 15 10	10.0 10.0 10.0	2.5 2.5 2.5	20 15 10	8.13 6.1 4.06	19.0 14.3 9.5	7.5 7.5 7.5	''	(869 B)	5H69
15	—	{ 30~40 30~50 30~60	20 15 10	10.0 10.0 10.0	2.5 2.5 2.5	20 15 10	8.13 6.1 4.06	19.0 14.3 9.5	7.5 7.5 7.5	''	869 B	☆5H69A
15	—	30~40	16	20.0	5.0	16	6.52	15.2	15.0	''	—	6H51
15	—	{ 30~40 25~60	20 10	40.0 40.0	10.0 10.0	20 10	8.13 4.06	19.0 9.5	30.0 30.0	''	857-B	7H57

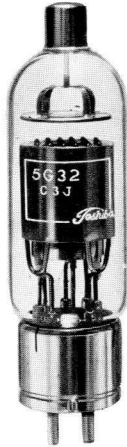
(3) Pure resistance load.

Ambient temperature (°C)	Max. plate ratings						Commutation factor (VA/μs²)	Starting characteristics		Main applications	U.S.A. equivalent (Similar)	Type
	Condensed mercury temperature (°C)	Peak inverse voltage (kV)	Peak forward voltage (kV)	Peak current (A)	Average current (A)	Average time (sec)		Plate voltage (kV)	Grid voltage (V)			
-55~+90	—	0.35	0.35	0.11	0.025	30	—	0.125	-12.5	Noise generation, relay	6D4	6D4
-60~+85	—	0.25	0.25	0.3	0.075	30	—	0.1, 0.2	-11, -21	Time axis sweep oscillation, relay	(884)	☆T66G-GT
-60~+85	—	0.25	0.25	0.3	0.075	30	—	0.1, 0.2	-11, -21	''	(884)	☆TY-66G
-60~+85	—	0.3	0.3	0.3	0.075	30	—	0.11, 0.25	-12.5, -26	''	(884)	1G84
-60~+85	—	0.3	0.3	0.3	0.075	30	—	0.11, 0.25	-12.5, -26	''	884	884
—	25~60	10.0	10.0	1.0	0.25	30	—	10	-25	Relay, grid control rectifier, welder	—	2G66A
—	40~80	5.0	2.5	2.0	0.5	15	—	0.1, 1.0	-2, -7	Relay, grid control rectifier, speed control of small motors	5557	2G57A
—	30~55	5.0	5.0	3.6	0.6	10	—	0.1, 1.0	-3, -10	Speed control of small motors	—	☆TX-911
-55~+70	—	0.34	0.17	7.7	0.64	4.5	0.66	0.12 rms	Max. -5.3	Automatic control of gyro-compass motors	C1A	3G15
-60~+75	—	1.25	1.0	8.0	1.0	4.5	0.15	1.0	-4.5	Speed control of small motors, regulated rectifier	6014/C1K	4G14
—	20~80	1.25	1.25	6.0	1.5	5	—	0.5	-3.8	Speed control of small motors	3C23	4G23
—	{ 25~45 40~80	15.0 1.0	15.0 1.0	6.4 30.0	1.6 2.5	15 3	—	1, 12	-6, -47	Grid control high-voltage rectifier	5563	☆4G63

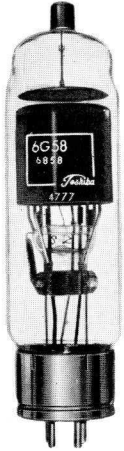




5G11



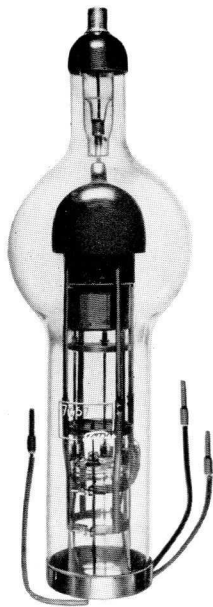
5G32



6G58



2D21



7G57

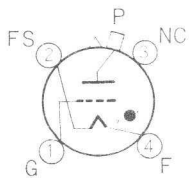
Type	Gas	Cathode				Dimensions		Base number		Tube voltage drop (approx. V)
		Classification	Voltage (V)	Current (A)	Heating-up time (sec) Min.	Length (mm)	Max. Dia. (mm)	Cap	Base	
4G63A	Hg	FO	5.0	10.0	60	261	63	A14S	D25P	15
☆TX-915	Hg	HO	5.0	4.5	300	180	75	A14S	D16P	15
☆TX-920	Hg	HO	5.0	4.5	300	180	75	A14S	D16P	15
5G11	Ar+Hg	FO	2.5	9.0	20	154	40	A14S	D16P	15
5G32	Xe	FO	2.5	9.0	30	150	40	A14S	D16P	10
5G84	Xe	FO	2.5	9.0	30	150	40	A14S	D16P	10
5G69	Hg	FO	5.0	19.0	60	350	130	A20S	Flexible leads N6-5-1	15
6G51	Hg	FO	5.0	25.0	60	460	150	A20S	Flexible leads N9-2	15
6G21	Xe	FO	2.5	20.0	60	222	50	A14S	D25SC	10
6G45	Xe	FO	2.5	21.0	60	203	64	A14S	D25PA	16
6G58	Ar+Hg	FO	2.5	21.0	60	233	63	A14S	D25PA	12
6G60	Xe	FO	2.5	20.0	40	292	62	2.8φ×16.4 2.8φ×14.6	E39-12	10
6G85	Xe	FO	2.5	21.0	60	222	50	A14S	D25SC	10
7G57	Hg	FO	5.0	30.0	180	550	180	A20S	Flexible leads N6-1	15

☆ Maintenance tube. ※ Plate. ※※ Grid

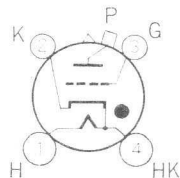
## HOT CATHODE GRID CONTROLLED DISCHARGE TUBES (TETRODE)

Type	Gas	Cathode				Dimensions		Base number	
		Classification	Voltage (V)	Current (A)	Heating-up time (sec) Min.	Length Max. (mm)	Max. Dia. (mm)	Cap	Base
2D21	Xe	HO	6.3	0.6	20	54	19	—	E7-1
5727	Xe	HO	6.3	0.6	20	54	19	—	E7-1
1G50	Xe	HO	6.3	0.6	20	105	40	—	H17S
3G22	Xe	HO	6.3	2.6	30	117	60	—	G25PA

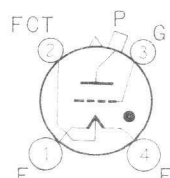
※ Grid No. 1 resistance 100 kΩ, Grid No. 2 voltage zero.



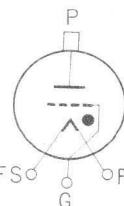
4G63A



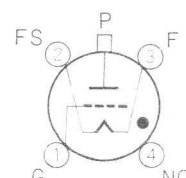
TX-915  
TX-920



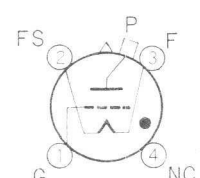
5G11  
5G32  
5G84



5G69  
6G51  
7G57



6G21  
6G85



6G45  
6G58

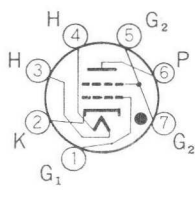
Ambient temperature (°C)	Max. plate ratings						Commutation factor (VA/μs <sup>2</sup> )	Starting characteristics		Main applications	U.S.A. equivalent (similar)	Type
	Condensed mercury temperature (°C)	Peak inverse voltage (kV)	Peak forward voltage (kV)	Peak current (A)	Average current (A)	Average time (sec)		Plate voltage (kV)	Grid voltage (V)			
—	{ 25~50 25~55	20.0 15.0	20.0 15.0	6.4 10.0	1.6 1.8	20 20	—	3, 20	-13, -80	Grid controlled high-voltage rectifiers	5563A	4G63A
—	30~70	1.0	1.0	15	2.5	10	—	0.1, 1	+5, -3.5	Grid control rectifiers, Relays, Motor controls, Inverters	(FG67)	☆TX-915
—	30~70	1.0	1.0	15	2.5	10	—	0.1, 1	-3, -12	Grid control rectifiers, Motor controls	(FG57)	☆TX-920
—	-40~+80	1.5	1.5	30	2.5	5	—	0.1, 1	-1.5, -5	"	6011/710	5G11
-55~+75	—	1.25	0.75	30	2.5	4.5	0.66	0.75	-4.5	Small welders, Speed control of motors, Ignitor-firing	5632/C3J	5G32
-55~+75	—	1.25	1.0	30	2.5	4.5	0.66	1	-6	"	5684/C3J/A	5G84
—	30~40	20	20	15	2.5	30	—	3, 15	-15, -37	Grid controlled high-voltage rectifiers, Radio heaters	—	5G69
—	30~40	16	16	20	5	30	—	3, 15	-4, -18	"	—	6G51
-55~+75	—	1.25	0.75	77	6.4	6	0.66	0.75	-3.5	Welders, Speed control of motors	5C21/C6J	6G21
-55~+70	—	1.5	1.5	80	6.4	15	130	0.1, 1	0, -7	Speed control of motors	5545	6G45
—	-40~+80	1.5	1.5	77	6.4	15	—	1.25	-5.5	"	6858/760	6G58
-55~+70	—	0.6	0.3	77	6.4	6	0.66	0.11 rms	-0.7	"	C6A	6G60
-55~+70	—	1.25	1.0	77	6.4	6	0.66	1	-4.6	Welders, Speed control of motors	5685/C6J/A	6G85
—	30~40	18	18	40	10	60	—	3, 15	-4, -18	Grid controlled high-voltage rectifiers, Radio heaters	—	7G57

Tube voltage drop (approx. V)	Max. plate ratings						Starting characteristics		Main applications	U.S.A. equivalent	Type
	Ambient temperature (°C)	Peak inverse voltage (kV)	Peak forward voltage (kV)	Peak current (A)	Average current (A)	Average time (sec)	Plate voltage (V/rms)	Grid voltage (V)			
10	-75~+90	1.3	0.65	0.5	0.1	30	460 460	-3.7 ※ -5.2 ※※	Timers, Relays	2D21	2D21
10	-75~+90	1.3	0.65	0.5	0.1	30	460 460	-3.7 ※ -4.2 ※※	Pulse modulation, Timers, Relays	5727/2D21W	5727
10	-75~+90	{ 1.3 0.35	0.65 0.18	1.0 1.0	0.1 0.2	30 30	460 460	-3.7 ※ -5.2 ※※	Timers, Relays	2050	1G50
10	-75~+90	1.3	0.65	6	0.75	30	500	-6.8 ※※※	Relays, Grid control rectifiers, Motor controls	3D22A	3G22

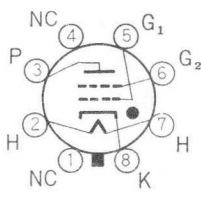
※※ Grid No. 1 resistance 10 MΩ, Grid No. 2 voltage zero. ※※※ Grid No. 1 resistance 2 MΩ, Grid No. 2 voltage zero.



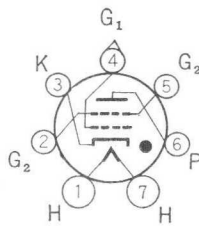
6G60



2D21  
5727



1G50



3G22

## HOT-CATHODE GRID CONTROLLED DISCHARGE TUBES (HYDROGEN GAS FILLED)



Type	Cathode				Dimensions		Base number	
	Classification	Voltage (V)	Current (A)	Heating up time (sec) Min.	Length (mm)	Max. Dia. (mm)	Cap	Base
1G45P	HO	6.3	2.25	120	122	38	A 9 S	D16S
6130	HO	6.3	2.25	120	127	38	A 9 S	D16S
1G35P	HO	6.3	6.1	180	170	63	A14 S	D25 P A
2G22P	HO	6.3	10.6	300	216	63	A14 S	D25 P A
3G49P	HO	6.3	18.5	900	305	82	A14 S	E32S-1
4G48P	HO	6.3	29.0	900	400	127*	A14 S	Flexible leads

\* The plate peak forward voltage (V) × plate peak current (A) × pulse repetition rate (pps).

## IGNITRONS

For resistance-welding control  
(two tubes in inverse parallel)

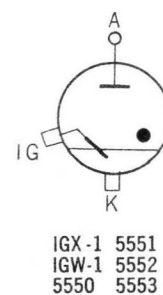
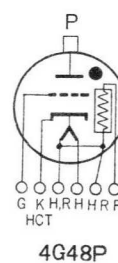
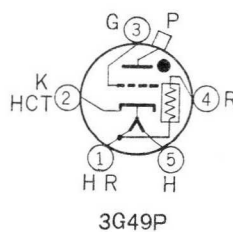
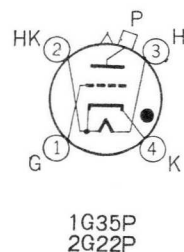
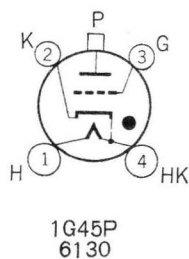


Type	Dimensions		Envelope	Cooling system	Line voltage (V/rms)
	Length Max. (mm)	Max. Dia. (mm)			
IGX-1	245	52	Glass	Natural air cooling	200-500
IGW-1	400	155	Glass	Forced air cooling	200-500
5550	254	70	Metal	Air cooling or water cooling <sup>(1)</sup>	250-600
5551	343	67	Metal	Water cooling <sup>(2)</sup>	250-600
5552	368	105	Metal	Water cooling <sup>(3)</sup>	250-600
5553	508	143	Metal	Water cooling <sup>(4)</sup>	250-600

§ Maximum dimension at fixed part.

§§ Maximum diameter excluding Ignitor, base and water inlet.

\* Clamp temperature 10-50°C    \*\* Clamp temperature 10-70°C





Maximum plate ratings									Starting characteristics		U.S.A. equivalent	Type
Ambient temperature (°C)	Peak inverse voltage (kV)	Peak forward voltage (kV)	Peak current (A)	Average current (A)	Rate of rise of cathod current (A/μs)	Pulse repetition rate (pps)	Pulse duration (μs)	Operation ※	DC. voltage supplied to plate min (kV)	Peak Grid voltage (V)		
-50~+90	3.0	3.0	35	0.045	750	2500	6	0.3×10 <sup>9</sup>	0.8	175 Min	3C45	1G45P
-50~+90	3.0	3.0	35	0.045	750	2500	6	0.3×10 <sup>9</sup>	0.8	175 Min	6130	6130
-50~+90	8.0	8.0	90	0.1	1000	2500	6	2.0×10 <sup>9</sup>	2.5	175 Min	4C35	1G35P
-50~+90	16.0	16.0	325	0.2	1500	1000	6	3.2×10 <sup>9</sup>	4.5	200 Min	5C22	2G22P
-55~+75	25.0	25.0	500	0.5	2500	2000	6	6.25×10 <sup>9</sup>	5.0	550~1000	5949	3G49P
-90~+75	25.0	25.0	1000	1.0	5000	1500	10	9.0×10 <sup>9</sup>	5.0	700~1000	5948	4G48P

\* Shows the diameter of tube.

Maximum plate ratings					Maximum Ignitor ratings						U.S.A. equivalent	Type
Demand power (kVA)	Average current per tube (A)	Average time (sec)			Peak forward voltage (V)	Peak inverse voltage (V)	Peak current (A)	Effective current (A/rms)	Average current (A)	Average time (sec)		
		200~250 (V/rms)	500 (V/rms)	600 (V/rms)								
{ 45 15	1.2 2.0	20	10	—	150~750	5	25~100	10	1	5	—	1GX-1
{ 225 75	12.0 29.2	6.5	3.3	—	150~750	5	25~100	10	1	5	—	1GW-1
* { 300 100	12.1 22.4	22	11	9.2	200~900	5	30~100	10	1	5	5550	5550
** { 150 50	4.86 9.0	27.8	13.9	11.6								
{ 600 200	30.2 56.0	18	9	7.5	200~900	5	30~100	10	1	5	5551	5551
{ 1200 400	75.6 140.0	14	7.1	5.8	200~900	5	30~100	10	1	5	5552	5552
{ 2400 800	192 355	11	5.6	4.6	200~900	5	30~100	10	1	5	5553	5553

- (1) Negative clamp cooled by air or water
- (2) Water flow 3 l/m Min., inlet water temperature 10°C Min., outlet water temperature 40°C Max., water temperature rise 4°C Max.
- (3) " 6 l/m Min., " 10°C Min., " 40°C Max., " 6°C Max.
- (4) " 12 l/m Min., " 10°C Min., " 40°C Max., " 9°C Max.

For control of frequency change resistance welders

Type	Dimensions		Envelope	Cooling system
	Length § Max. (mm)	Max. diam §§ (mm)		
5822	368	105	Metal	Water cooling (5)

§ Maximum dimension at fixed part.

§§ Shows maximum diameter excluding Ignitor, base and water Inlet.

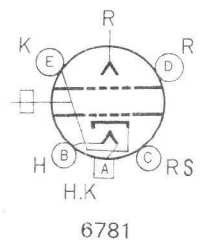
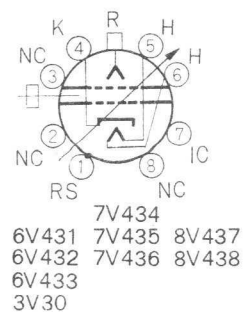
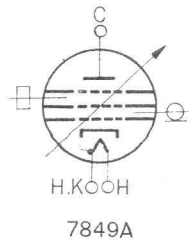
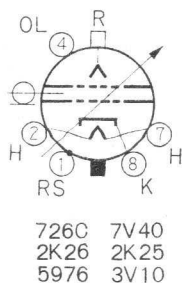
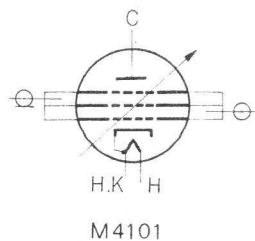
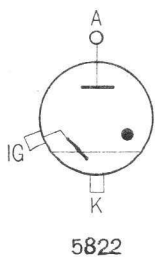
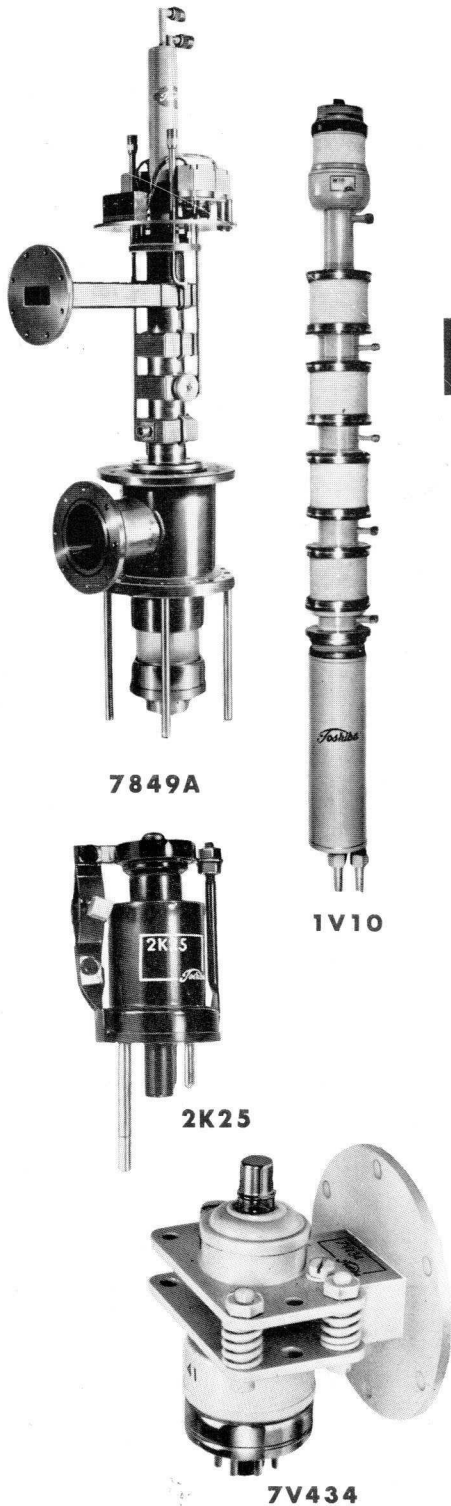
# MICROWAVE TUBES

## KLYSTRONS

Type	Frequency range (Mc)	Classification	Heater		Dimensions (mm)	Base	
			Voltage (V)	Current (A)		Cap	Bottom
1V10	460~690	CW	10	40	1596×130×117	—	—
3V10	2500~2700	CW	6.3	0.44	86×32.6×40	A6S	B6-90
3V30	2500~2700	CW	6.3	0.8	100×72×47	A9S	Medum shell octal
726C	2700~2960	CW	6.3	0.44	86×32.6×40	A6S	B6-90
△7849A	2775~2825	PW	20	30	1550×350×600	—	—
6V431	5925~6225	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
6V432	6125~6425	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
2K26	6250~7060	CW	6.3	0.44	86×32.6×40	A6S	B6-90
5976	6250~7425	CW	6.3	0.44	86×32.6×40	A6S	B6-90
6V433	6350~6650	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
7V434	6575~6875	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
7V435	6850~7150	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
7V436	7125~7425	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
7V40	7100~7800	CW	6.3	0.44	86×32.6×40	A6S	B6-90
8V437	7425~7725	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
8V438	7725~8025	CW	6.3	0.8	100×79.6×58	A9S	Medum shell octal
2K25	8500~9660	CW	6.3	0.44	86×32.6×40	A6S	B6-92
6781	8500~10000	CW	6.3	1.2	79.2×48.3×44.5	—	Viking connector VP5/2AA1
12V20	10500~13500	CW	6.3	0.5	79.4×44.4×44.4	A6S	A3-1

☆ For replacement only    △ Demountable

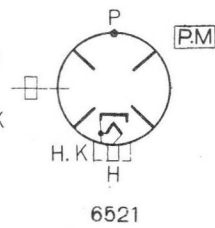
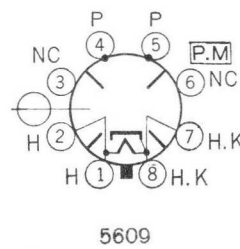
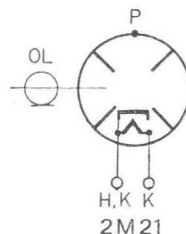
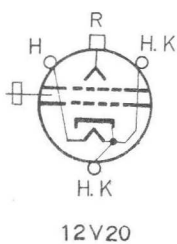
※ Frequency difference between two Points at 50% of the maximum output.



Max. Plate ratings						Max. Ignitor ratings						U.S.A. equivalent	Type
Peak inverse voltage (V)	Peak forward voltage (V)	Peak current (A)	Average current (A)	Surge current (A)	Average time (sec)	Peak forward voltage (V)	Peak negative voltage (V)	Peak current (A)	Effective current (A/rms)	Average current (A)	Average time (sec)		
1200	1200	1500	20	18750	6.25	Plate voltage	5	30~100	10	1	5	5822	5822
1500	1500	1200	70	5250									

(5) Water flow 6 l/m minimum, Inlet water temperature 10°C Min, outlet water Temp. 35°C Max. Temp. rise 6°C Max.

Type of cavity	Output coupl- ing	Max. ratings				Typical operation							U.S. equivalent tube	Type
		Resonator		Re- flector voltage (V)	Fre- quency (Mc)	Resonator		Re- flector voltage (V)	Electro- nic tuning* range (Mc)	Modu- lation sensitivity (kc/V)	Cooling method	Power output (mW)		
		Voltage (V)	Current (mA)			Voltage (V)	Current (mA)							
Ex- ternal 4 cavities	3 1/8" Coax.	20 kV	2.6A	—	690	18.7 kV	2.41A	—	—	—	W QW=95l/min	20 kW		1V10
Internal	Probe	330	35	-400	2600	300	25	-130	20	—	N	100		3V10
Internal	Caxial line	900	110	-850	2600	750	80	-325	15	50	V QR=0.85m³/min	1000		3V30
Internal	Probe	330	35	-350	2800	300	25	-105	30	—	N QR=1.4m³/min	100	726C	726C
4 cavities internal	WR-284	160 kV	65A	—	2800	160 kV	65A	Pulse width=5 μs Duty cycle=0.003			W	3MW		Δ7849A
Internal	WR-137	900	110	-850	6075	750	75	-325	45	375	V QR=0.85m³/min	1000	SRC-43A VA-220F	6V431
Internal	WR-137	900	110	-850	6275	750	75	-325	45	375	V QR=0.85m³/min	1000	SRC-43B VA-220E	6V432
Internal	Probe	330	35	-400	6660	300	25	-95	50	—	N	100	2K26	2K26
Internal	Probe	330	35	-400	6750	300	25	-118	50	—	N	110	5976	5976
Internal	WR-137	900	110	-850	6500	750	75	-325	45	375	V QR=0.85m³/min	1000	SRC-43C	6V433
Internal	WR-137	900	110	-850	6725	750	75	-325	45	375	V QR=0.85m³/min	1000	SRC-43D VA-220D	7V434
Internal	WR-137	900	110	-850	7000	750	75	-325	45	375	V QR=0.85m³/min	1000	SRC-43E VA-220C	7V435
Internal	WR-137	900	110	-850	7275	750	75	-325	45	375	V QR=0.85m³/min	1000	SRC-43F VA-220B	7V436
Internal	Probe	330	35	-400	7500	300	25	-120	50	—	N	80		7V40
Internal	WR-137	900	110	-850	7575	750	75	-325	45	375	V QR=0.85m³/min	1000	SRC-43G VA-220A	8V437
Internal	WR-137	900	110	-850	7895	750	75	-325	45	375	V QR=0.85m³/min	1000	VA-220Z	8V438
Internal	Probe	330	37	-400	9370	300	25	-155	50	—	N	30	2K25	2K25
Internal	WR-112	350	42	-1000	9660	200	20	-130	30	—	N	30	6781	6781
Internal	WR-112	500	65	-1000	12400	500	55	-500	35	600	V QR=0.85m³/min	250		12V20



# MAGNETRONS



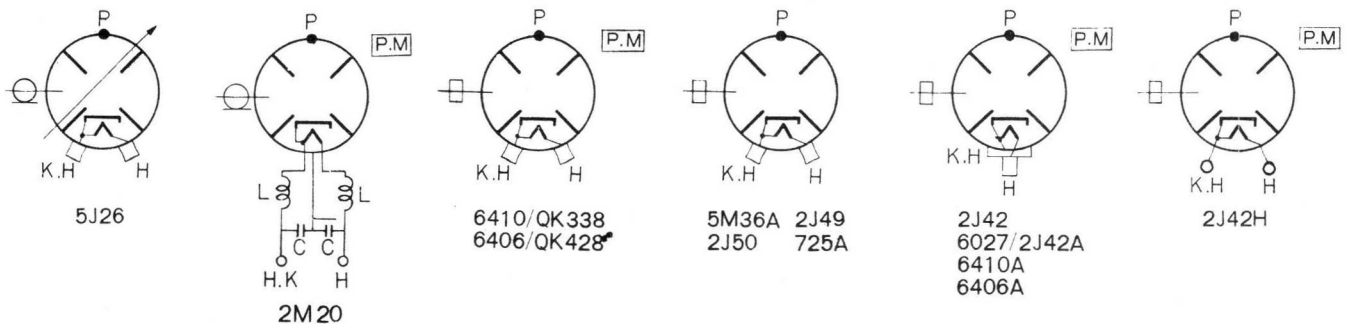
Type	Frequency range (Mc)	Heater		Dimensions (mm)	Output coupling
		Voltage (V)	Current (A)		
5 J 26	1220~1350	23.5	2.2	318×190×130	1 <sup>5</sup> / <sub>8</sub> coaxial
2M20	2450	9.3	32.5	165×203×254	Probe
2M21	2450	9.3	33	232×123×76	Probe
5609	2450	6.3	3.5	153×127×76	Coaxial
6410A	2805	7.7	76	543×408×181	WR-284
6406A	2880	8.8	85	543×408×181	WR-284
5M36A	5300	6.3	3.25	285×92×125	WR-159
6521	5400	10	3.2	181×114×184	WR-159
☆ 2 J 50	8825	6.3	1.0	138×156×84	WR-112
☆ 2 J 49	9080	6.3	1.0	138×156×84	WR-112
2 J 42	9375	6.3	0.52	114×137×85	WR-90
■ 2 J 42H *	9375	6.3	0.52	114×134×85	WR-90
2 J 55	9375	6.3	1.0	145×157×137	WR-112
725A	9375	6.3	1.0	138×156×84	WR-112
6027/2 J 42A	9375	6.3	0.52	114×137×135	WR-90

☆ For replacement only ■ Packaged magnet type ● Tp<100°C \* For high altitude use  
 ※ Heater current, 85A for preheat 82A for operation  
 ※※ Heater current, 85A both for preheat and operation

# TRAVELING WAVE TUBES

Type	Frequency range (Mc)	Heater		Dimensions		Base		Class of service	Input and outputs coupling method
		voltage (V)	current (A)	Length (mm)	Max. diam. (mm)	Cap	Bottom		
3W20	2400~3200	6.3	0.7	506	81	Special	Octal 8 pins	Power amplifier	Coaxial
3W80	2600~2900	6.3	7	465	50.5	Special	B14-D1	Pules power amplifier	Coaxial
7 W 25	6400~7200	6.3	0.6	350	79	Special	Octal 8 pins	Power amplifier	Wave *** guide WR-137
7 W 40 A	6400~7200	6.3	0.6	375	79	Special	Octal 8 pins	Power amplifier	Wave *** guide WR-137
8 W 20	7300~7800	6.3	0.45	350	32.5	Special	Octal 8 pins	Low noise amplifier	Wave *** guide WR-137

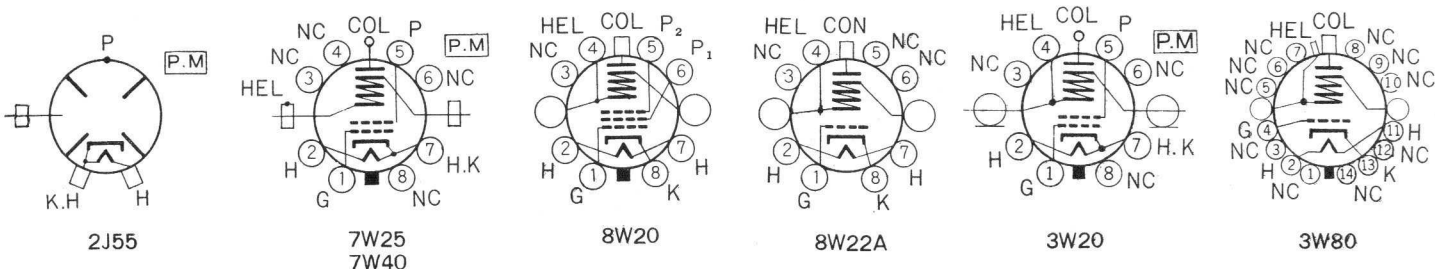
※ Specified electro-magnetic coil used ※※ Specified coupler used

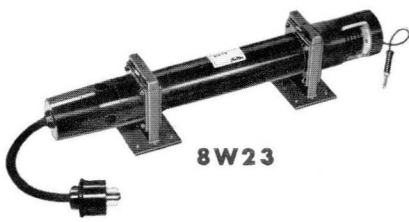


Max. anode ratings				Typical operation									U.S.A. equivalent	Type
Voltage (kV)	Current (A)	Average input (W)	Duty cycle	Magnetic field (Gauss)	Pulse voltage (kV)	Pulse current (A)	Average current (mA)	Heater voltage (V)	Pulse width ( $\mu$ s)	Pulse repetition rate (pps)	Cooling system	Pulse output (kW)		
31	60	1800	0.002	1400	28.5	46	46	15.5	1	1000	V ●	550	5 J 26	5 J 26
6.2	0.34	2000	CW	P kg ■	5.75	—	300	7.3	—	—	V	0.9 (CW)	QK390	2 M 20
6.5	0.295	1860	CW	1400	6.3	—	240	7.3	—	—	W	0.95 (CW)	QK707	2 M 21
1.5	0.135	190	CW	P kg	1.45	—	90	6.3	—	—	V QW=1 l/min	0.08 (CW)	5609	5609
75	135	10000	0.001	P kg	70	130	94	82A ※	2	360	W QW=6 l/min	4.8 (MW)	QK338A	6410A
52	95	3200	0.0007	P kg ■	52	85	51	85A ※※	2	300	W QW=4 l/min	1750	QK428A	6404A
23	40	600	0.0007	3100	21	40	20	2.5	1	500	V ●	350		5 M 36A
16	16	256	0.001	P kg ■	15	13.5	16.9	9.1	2	400	V	85	6521	6521
16	16	180	0.0012	5400	12	12	12	0	1	1000	V ●	50	2 J 50	☆ 2 J 50
16	16	180	0.0012	5400	12	12	12	0	1	1000	V ●	50	2 J 49	☆ 2 J 49
6	5.5	82.5	0.0025	P kg ■	5.5	4.5	1.44 9.0 4.5	6.3 4.5 6.0	0.4 1.0 2.0	800 2000 500	N V ● V ●	11	2 J 42	2 J 42
6	5.5	82.5	0.0025	P kg ■	5.5	4.5	1.44 9.0	6.3 4.5	0.4 1.0	800 2000	N V ●	11	2 J 42H	2 J 42H *
16	16	180	0.001	P kg ■	12	12	8.0 12.0	2.5 0	2.0 1.0	325 1000	V ● V ●	50	2 J 55	2 J 55
16	16	180	0.001	5400	12	12	12	0	1.0	1000	V ●	50	725A	725A
8	8	80	0.0025	P kg ■	6.9 6.5	7.5 3.5	7.5 7.0	4.5 4.5	1.0 1.0	1000 2000	V ●	20	6027/ 2 J 42A	6027/2 J 42A

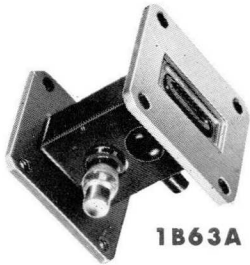
▲ The heater voltages shown are those suitable for conditions of typical operation. If used under other conditions, they should be adjusted according to the average plate input. To preheat before supplying plate voltage supply normal heater voltage.

Max. ratings				Typical operation											Type		
Helix		Collector		Frequency (Mc)	Focusing electrode voltage (V)	No. 1 anode voltage (V)	No. 2 anode voltage (V)	Helix		Collector		Power output (W)	Power gain (db)	Noise figure (db)		Magnetic field (Gauss)	Cooling system
Voltage (V)	Loss (W)	Voltage (V)	Loss (W)					Voltage (V)	Current (mA)	Voltage (V)	Current (mA)						
2800	2.8	2800	12	2800	-5	2500	—	2600	0.1	2600	35	5	35	—	Packaged	R QR=0.5 m <sup>3</sup> /min	3 W 20
8500	7.5	8500	230	2750	-220	—	—	8000 Peak	180	8000 Peak	420	400	26	—	1300 ※	Forced Air	3 W 80
2850	1.5	2850	85	6800	-5	1750	—	2700	0.2	2700	25	8	38	—	Packaged magnet	R QR=0.5 m <sup>3</sup> /min	7 W 25
3350	3.3	3350	67	6800	-5	2400	—	3100	0.1	3100	40	12	38	—	Packaged magnet	R QR=0.5 m <sup>3</sup> /min	7 W 40
1100	0.1	1200	1.8	7500	0	110	50	1000	0.005	1100	0.5	—	23	10	700 ※	N	8 W 20

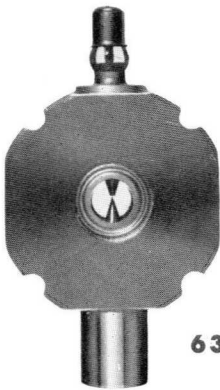




8W23



1B63A



6378

Type	Frequency range (Mc)	Heater		Dimensions		Base		Class of service	Input and output coupling method
		voltage (V)	current (A)	Length (mm)	Max. Dia. (mm)	Cap	Bottom		
8W23	7300-7800	6.3	0.6	350	79	Special	Octal 8 pins	Power amplifier	Waveguide WR-137
8W24	7300-7800	6.3	0.6	355	32.5	Special	Octal 8 pins	Power amplifier	Waveguide WR-137
8W40	7300-7800	6.3	0.6	375	79	Special	H17S	Power amplifier	Waveguide WR-137

\* Regular electro-magnetic coil is used. \*\* Regular coupler is used.

### TR. ATR TUBES

Type	Frequency range (Mc)	Classification	Dimensions (mm)	Base	Waveguide
1B24A	8490-9600	VF-TR	119x45x27	A6S	WR-90CH
1B63A	8490-9578	BP-TR	56x35x40	A6S	WR-90CH
6378	8490-9600	VF-TR	75x41x15.5	A6S	WR-90CH
1B35A	9000-9600	LQ-ATR	44x33x20	-	WR-90CH
6396	9000-9600	LQ-ATR	32x31x18	-	WR-90GA

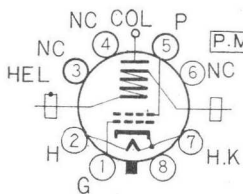
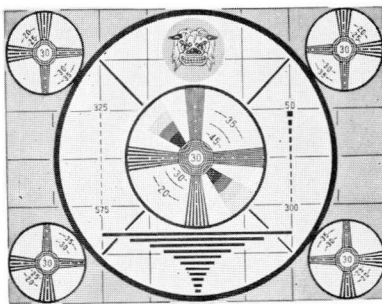
BP: Band pass LQ: Low Q VF: Tunable frequency ATR: ATR Tube

## CAMERA TUBES

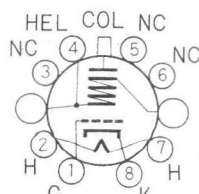
### MONOSCOPES

Type	Cathode		Dimensions		Base		Direct inter-electrode capacitance		Pattern	
	Heater voltage (V)	Heater current (A)	Length (mm)	Max. Dia. (mm)	Top	Bottom	Between grid No.1 and other electrode (pF)	Between anode and pattern electrode (pF)	Type	Effective dimension (mm)
☆ 7012	6.3	0.6	305	127	J1-22	A6-12	about 7	about 5	Costo-meter's mark inserted	70.5x94
7012A	6.3	0.6	305	127	J1-22	A6-12	about 7	about 5	RETMA	70.5x94
☆ 7012B	6.3	0.6	305	127	J1-22	A6-12	about 7	about 5	Toshiba standard	70.5x94
7012C	6.3	0.6	305	127	J1-22	A6-12	about 7	about 5	Toshiba standard	58.5x78

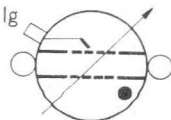
☆ For replacement only ※ For continuous scanning. When screen is only partially scanned.



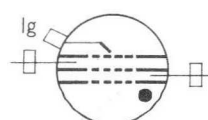
8W23  
8W40



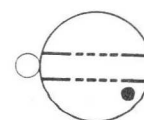
8W24



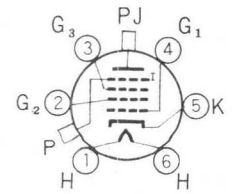
1B24A  
6378



1B63A



1B35A  
6396



7012 7012B  
7012A 7012C

Max. Ratings				Typical Operation												Type	
Helix		Collector		Frequency (Mc)	Focusing electrode voltage (V)	No. 1 anode voltage (V)	No. 2 anode voltage (V)	Helix		Collector		Power output (W)	Power gain (db)	Noise figure (db)	Magnetic field (Gauss)		Cooling method
Voltage (V)	Loss (W)	Voltage (V)	Loss (W)					Voltage (V)	Current (mA)	Voltage (V)	Current (mA)						
2650	1.5	2650	90	7650	-5	1850	—	2500	0.1	2500	25	5	36	—	Packaged	QR = <sup>R</sup> 0.5 m <sup>3</sup> /min	8W23
2800	2.8	2800	98	7650	-10	—	—	2600	0.2	2600	30	9	37	—	700※	QR = <sup>R</sup> 0.5 m <sup>3</sup> /min	8W24
3350	3.3	3350	165	7600	-5	2400	—	3100	0.2	3100	40	12	38	—	Packaged	QR = <sup>R</sup> 0.8 m <sup>3</sup> /min	8W40

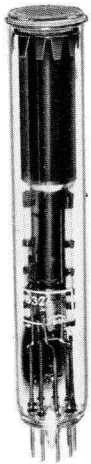
Max. ratings				Typical operation												U.S.A. equivalent	Type
Peak Power (kW)		Ignitor		Transmitting pulse		Ignitor current (μA)	Transmitting Characteristics			Receiving characteristics							
Min.	Max.	Voltage (V)	Current (μA)	Power (kW)	Frequency (Mc)		Leakage power (Spike (erg) Flat (mW))	Arc loss (db)	Voltage standing wave ratio	Recovery time (μsec)	Insertion loss (db)	Ignitor interaction (db)	Loaded Q	Equivalent conductance			
4	100	-750	65 Min 200 Max	10	9375	100	30 mW		—	—	4	2	0.2	350	—	1B24A	1B24A
4	200	-650	65 Min 200 Max	200	9375	100	0.1	0.40	0.8	—	10	0.7	0.2	—	—	1B63A	1B63A
4	100	-500	65 Min 200 Max	10	9375	100	30 mW		—	—	4	1.5	0.2	350	—	6378	6378
5	350	—	—	50	9300	—	—	—	0.8	1.1 Max	8	—	—	6.5	0.1	1B35A	1B35A
5	250	—	—	50	9300	—	—	—	0.8	1.1 Max	8	—	—	6.5	0.1	6396	6396

CH : Choke coupling GA : Gasket contact TR : TR tube

Focusing method	Deflection method	Deflection angle	Use	Typical operations										U.S. equivalents	Type
				Pattern-electrode voltage (V)	Anode		Grid-No. 3 voltage (V)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage for visual cut-off on monitor (V)	Signal output current (P-P) (μA)	Resolution capability		Grid-No. 1 resistance (MΩ)		
					Voltage (V)	Current (A)					Center (line)	Edge (line)			
Static	Electro-magnet	about 50°		1000	1050	0.5	240~360	1000	-30~-90	about 0.5	—	—	Below 1.5		☆7012
Static	Electro-magnet	about 50°	Control of transmitter	1000	1050	0.5	240~360	1000	-30~-90	about 0.5	about 600	about 400	Below 1.5		7012A
Static	Electro-magnet	about 50°	Control of transmitter	1000	1050	0.5	240~360	1000	-30~-90	about 0.5	about 500	about 350	Below 1.5		☆7012B
Static	Electro-magnet	about 50°	Control of transmitter	1000	1050	0.5	240~360	1000	-30~-90	about 0.5	about 500	about 350	Below 1.5	2F21	7012C

beam current should be reduced to prevent breaking up pattern.

## IMAGE ORTHICONS



6326



MS-9S



7696

Type	Cathode		Dimensions		Base number		Interelectrode capacitance (between anode to all other electrodes) (pF)	Useful size of rectangular image (mm)	Focusing method	Deflecting method	Use
	Heater Voltage (V)	Heater current (A)	Length (mm)	Max. dia. (mm)	Shoulder	Base					
5820	6.3	0.6	386	76.2	Keyed Jumbo Annular 7 pins	Small shell diheptal 14 pins	12	24×32	Magnetic	Magnetic	TV
7513	6.3	0.6	386	76.2	Special 7 pins	Small shell diheptal 14 pins	12	24×32	Magnetic	Magnetic	TV

## VIDICONS

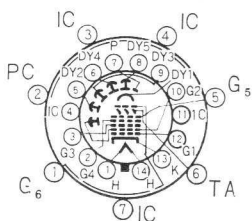
Type	Cathode		Dimensions		Base number	Interelectrode capacitance (between signal electrode to all electrodes) (pF)	Useful size of rectangular image (mm)	Focusing method	Deflecting method	Use
	Heater voltage (V)	Heater current (A)	Length (mm)	Max. dia. (Excluding side tip) (mm)						
6326	6.3	0.6	159	28.6	Special 8 pins	4.5	9.5×12.7	Magnetic	Magnetic	TV
7038	6.3	0.6	159	28.6	Special 8 pins	4.6	9.5×12.7	Magnetic	Magnetic	TV

※ In film chain ※※ Scene of limited motion

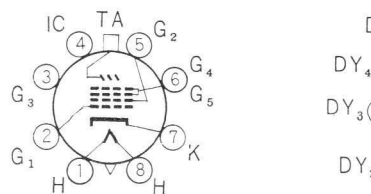
## PHOTO MULTIPLIERS

Type	Photo cathode		Dimensions			Base number	Interelectrode capacitance		Stage type
	Spectral response	Wave length Max. (Å)	Photo cathode projected size (mm)	Length (mm)	Max. dia. (mm)		Anode to last dynode (pF)	Anode to all other electrode (pF)	
MS-9S	S4	4000±500	Above 8×24	90	32.5	11 pins *	4.4 About	6.0 About	9
MS-9SY	S5	3400±500	Above 8×24	90	32.5	11 pins *	4.4 About	6.0 About	9
7305	S8	4200±500	Above 8×24	90	32.5	11 pins *	4.4 About	6.0 About	9
7696	Semi-transparent S11	4400±500	Above 40φ	143	55.5	14 pins **	1.3 About	3.3 About	10
PM50	Semi-transparent S10	3700~5600	Above 40φ	143	55.5	14 pins **	1.3 About	3.3 About	10

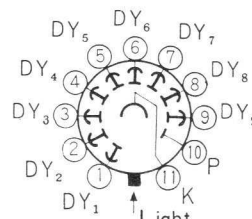
\* Submagnal \*\* Diheptal  
 □ Supply voltage (Ebb) is distributed evenly to 10 electrodes by bleeder.



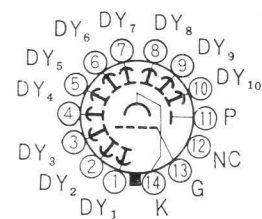
5820  
7513



7038



MS-9S  
MS-9SY  
7305



7692  
PM50



Typical operation																	U.S.A. equivalent	Type
Photocathode voltage (V)	Grid No. 6 voltage (V)	Target voltage (V)	Grid No. 5 voltage (V)	Grid No. 4 voltage (V)	Grid No. 3 voltage (V)	Grid No. 2 and dynode No. 1 voltage (V)	Grid-No. 1 voltage for picture cut-off (V)	Dynode No. 2 voltage (V)	Dynode No. 3 voltage (V)	Dynode No. 4 voltage (V)	Dynode No. 5 voltage (V)	Anode voltage (V)	Signal out-put current (peak to peak) ( $\mu$ A)	Anode current (A)	Resolution capability (center) (line)	Target temperature ( $^{\circ}$ C)		
-400~-540	-300~-405	0~3	0~125	140~180	225~330	300	-45~-115	600	800	1000	1200	1250	3~24	30	Above 500	35~50	5820	5820
-400~-540	-260~-350	-1~3	0~125	140~180	225~330	300	-45~-115	600	800	1000	1200	1250	5~38	30	500	35~50	7513	7513

Typical operation														U. S. A. equivalent	Type
Face plate illumination (lux)	signal electrode voltage (V)	Grid. No. 3 and No. 4 voltage (V)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Signal electrode current ( $\mu$ A)			Max. dark current ( $\mu$ A)	Alight-ment field (gauss)	Focusing field (Gauss)	Resolu-tion capability (center) (line)				
					High-light	Average	Peak								
※ 500~3000 ※※ 200	※ 20~40 ※※ 40~70	250~300	300	-45~-100	0.3~0.4	0.1~0.2	0.3~0.4	※ 0.004 ※※ 0.02	0~4	40	500	6326	6326		
* 20 ** 150 ** 1000	* 60~100 ** 30~50 *** 15~25	250~300	300	-45~-100	* 0.4~0.5 ** 0.3~0.4 *** 0.3~0.4	0.08~0.1 0.1~0.2 0.1~0.2	0.2~0.3 0.3~0.4 0.3~0.4	* 0.2 ** 0.02 *** 0.004	0~4	40	500	7038	7038		

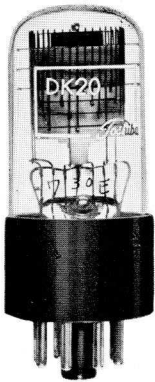
\* Maximum-Sensitivity operation for live pickup. \*\* Overage-Sensitivity operation for live pickup.  
 \*\*\* Minimum-Log operation for film pickup.

Kind of window	Use	Maximum ratings						Typical operations						U. S. A. equivalent	Type
		Anode supply voltage (V)	Voltage between anode and dynode (V)	Focusing electrode voltage (V)	Anode No. 1 voltage (V)	Anode current (mA)	Ambient temperature ( $^{\circ}$ C)	Anode supply voltage (V)	Cathode sensitivity ( $\mu$ A/lm)	Anode sensitivity ( $\mu$ A/ $\mu$ lm)	Amplification	Dark current ( $\mu$ A)	Load resistor (k $\Omega$ )		
Side	For measuring microlight	1250	250	—	300	0.1	50	1000 □	20	20	About $1 \times 10^6$	Below 0.1	10	931-A	MS-9S
Side	For measuring microlight and ultraviolet rays	1250	250	—	300	0.1	50	1000 □	20	20	About $1 \times 10^6$	Below 0.1	10	1P28	MS-9SY
Side	For measuring microlight, and sensitive to red wave length	1250	250	—	300	0.1	50	1000 □	3	0.6	About $2 \times 10^5$	Below 0.25	10	1P22	7305
Top	For scintillation counter and flying spot camera	1500	250	300	300	0.75	50	1250 ■	60	30	About $5 \times 10^5$	Below 0.05	10	(6292)	7696
Top	For flying spot camera and colorimeter	1500	250	300	300	0.75	50	1250 ■	30	25	About $8 \times 10^5$	Below 0.5	10	—	PM50

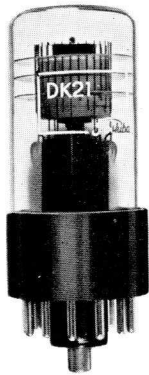
■ Supply voltage (Ebb) is distributed evenly to 12 electrodes. by bleeder.

# COUNTING TUBES

## COUNTING DISCHARGE TUBES



DK20



DK21

Type	Construction	Dimensions		Base number	Counting speed (pps)
		Length (mm)	Max. dia. (mm)		
DK20	One output decimal single pulse	81±2	34	B 8-6	0~20,000
DK21	Ten outputs decimal double pulse	95±3	38	Special 12 pins	0~4,000

For convenient of count reading, a bezel impressed with figures from 0 to 9 in white against black is attached (BZ-1 for DK 20, BZ-2 for DK21). The dial is fixed on a glass valve, and glow position can be read directly.



MK11



GM-G-1

## MAGNETRON TYPE COUNTING TUBES (BEAM)

Type	Construction	Dimensions		Base number	Counting speed (pps)
		Length Max. (mm)	Max. diam (mm)		
MK11	Permanent magnetic, high vacuum, ten outputs	90	43±0.5	Special 26 pins	0~1,000,000
MK12	Permanent magnetic, ten outputs, shielded type	86	57.25±0.15	Special 26 pins	0~1,000,000
6700	Permanent magnetic, high vacuum, ten outputs	90	43.7±0.5	Special 26 pins	0~1,000,000

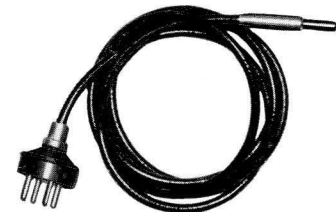
\* Refer to TOSHIBA Bulletin on electronic tubes for typical operation, typical wiring diagrams and notes.



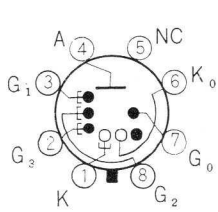
GMH-B-1

## GM COUNTING TUBES

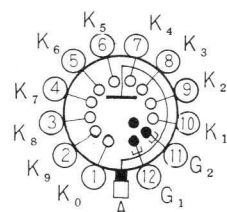
Type	Remarks	Quenching gas	Base number
GM-B-3	Mica window type for low energy $\beta$ ray	Alcohol	A 4-9
GM-B-4	For $\beta$ ray, mica window type	"	A 4-9
GM-B-5	Mica window type for low energy $\beta$ ray	"	A 4-9
GM-G-1	For $\gamma$ ray	"	A 4-9
GM-X-1	Mica window type for X ray analysis	"	A 4-9
GM-X-2	For X ray analysis, twin electrode, mica window type	"	A 4-9
GMD-B-1	For $\beta$ ray, for inserting to the gullet, small sized	Halogen	Special terminal
GMD-B-2	For $\beta$ ray, for inserting to the stomach, small sized	"	"
GMH-B-1	For $\beta$ ray, mica window type, long life, wide range of applicable temperature.	"	A15S
GMH-B-2	For $\beta$ ray, mica window type, long life, wide range of applicable temperature.	"	A15S



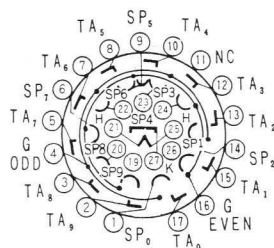
GMD-B-2



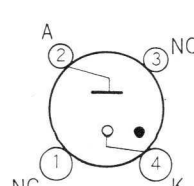
DK20



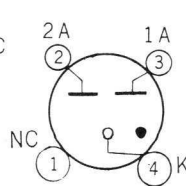
DK21



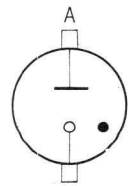
MK11  
MK12  
6700



GM-B-3  
GM-B-4  
GM-B-5  
GM-G-1



GM-X-1  
GM-X-2



GMH-B-1  
GMH-B-2

Anode supply DC voltage Min (V)	Anode maintaing voltage about (V)	Max. anode current (mA)	Min. anode current (mA)	Recommended circuit constants***							British equivalent	Type
				Anode supply DC voltage (V)	Anode resistance (kΩ)	Output resistance (kΩ)	Output cathode bias voltage Max. (V)	Guide resistance kΩ	Guide condenser (pF)	Guide bias voltage (V)		
420	180	1.2	0.7	475±10%	330	10	-10	200	100	60~90	GC 10D	DK20
400	200	0.55	0.25	475±10%	700	50	—	—	—	**	(GS 10C)	DK21

- \* With bias voltage at zero, output resistance should be set to keep cathode output voltage below 10V. In this case, 10 kΩ is proper.
- \*\* Output resistance should to maintain guide bias voltage 18V higher than cathode voltage.
- \*\*\* Inquire for further detail.

SWITCHING TUBES)

Cathode		Maximum Ratings							Typical operation	Cooling type, using position	U.S.A. equivalents	Type
voltage (V)	Current (A)	Heater voltage (V)	Target voltage (V)	Spade voltage (V)	Grid voltage (V)	Target loss (W)	Cathode current (mA)	Voltage between heater to cathode (V)				
6.3	0.3	6.3±10%	300	200	300	1	20	±90	*	Natural air cooling, optional	—	MK11
6.3	0.3	6.3±10%	300	200	300	1	20	±90	*	Natural air cooling, optional	BD-301	MK12
6.3	0.3	6.3±10%	300	200	300	1	20	±90	*	Natural air cooling, optional	6700	6700

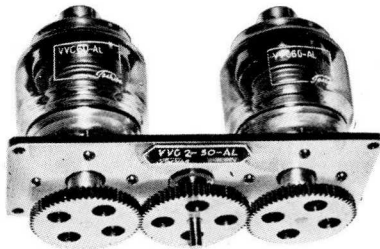
Dimensions		Mica or wall mg/cm <sup>2</sup>	operating voltage (V)	Characteristics			Type
Length Max. (mm)	Max. dia. (mm)			Plateau (V)	Inclination	Natural Counts	
104	35	2.5	1150±115	±5% of using voltage	Below 10%/100V	Below 50	GM-B-3
104	35	3.5	1150±115	±5% of using voltage	" 10%/100V	" 50	GM-B-4
104	35	Below 1.9	1150±115	±5% of using voltage	" 10%/100V	" 50	GM-B-5
104	35	—	1150±115	±5% of using voltage	" 10%/100V	" 50	GM-G-1
157	32	3.5	1300±130	Above 200	" 10%/100V	" 50	GM-X-1
170	35	3.5	1150±115	" 200	" 10%/100V	" 50	GM-X-2
48	7.5	75	450~700	" 20	" 4%/10V	" 5	GMD-B-1
40	6.0	75	450~700	" 20	" 4%/10V	" 5	GMD-B-2
83	33	3.5	300±20	" 30	" 3%/10V	" 60	GMH-B-1
83	33	3.5	600±50	" 100	" 20%/100V	" 60	GMH-B-2



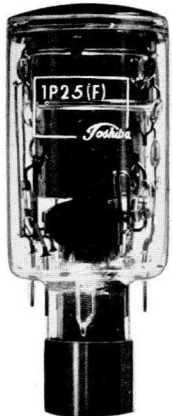
4008D

GMT-B-1

VVC60-AL



VVC2-60-AL



1P25 (F)

Type	Remarks	Quenching gas	Base number Anode theminal
GMH-G-1	For $\gamma$ rays, long life, wide range of applicable temperature	Halogen	A 15S
GMH-X-1	For X rays analysis, mica window type, long life, wide range of applicable temperature	"	Cap $7\phi \times 12$ mm
GMH-X-2	For X ray analysis, twin electrode, mica window type, long life, wide range of applicable temperature	"	C 1-1
GMS-G-1	For low background counting equipment for cosmic ray counting off-set	Alcohol	C 1-1
GMS-G-2	"	"	C 1-1
GMT-B-1	For $\beta$ rays for hand foot monitor	"	Special 4 pins

## VACUUM CONDENSERS

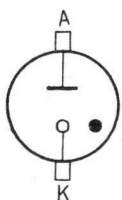
Type	Construction	Dimensions (mm)			Capacity (pF)
4008A	Fixed type	Overall Length 170	Max. dia. 65		7
4008B	"	" " 170	" 65		12
4008C	"	" " 170	" 65		25
4008D	"	" " 170	" 65		50
VVC60-AL	Variable type	" " 145	" 78		10-60
VVC60-AP	"	" " 145	" 78		10-60
VVC2-60-AL	"	Depth 160 Height 80 Width 206			Parallel 20-120 Series 5-30
VVC4-60-AL	"	" 160 " 200 " 200			" 40-240 " 10-60

## NOCTOVISION TUBES

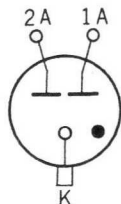
Type	Cathode		Dimensions				Base	Fluorescent screen	Phosphor	
	Classification	Wavelength range of max. sensitivity (A)	Overall length (mm)	Max. dia. (mm)	Useful photo-cathode dia. (mm)	Useful fluorescent dia. (mm)			Fluorescence	Persistence
1P25 (F)	*Ag-Cs	8000±1000	102	41	Above 28.6 $\phi$	Above 12.7 $\phi$	7 pins $\triangle$	Flat face	Green	Medium
6032	*Ag-Cs	8000±1000	114	53	Above 25.4 $\phi$	Above 14 $\phi$	$\blacktriangle$	Flat face	Yellow green	Short

• Semi-transparent cesium on oxidized silver photo cathode  
 $\triangle$  Special type  $\blacktriangle$  Sealed plate type

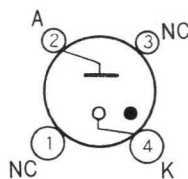
$\blacksquare$  Metal back



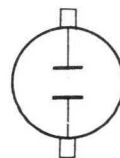
GMH-G-1 GMS-G-1  
GMH-X-1 GMS-G-2



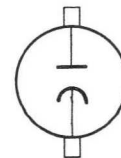
GMH-X-2



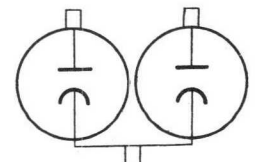
GMT-B-1



4008A ~ D



VVC60-AL  
VVC60-AP

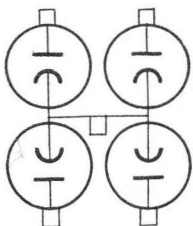


VVC2-60-AL

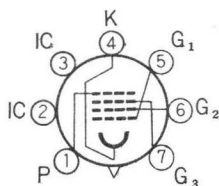
Dimensions		Mica or wall mg/cm <sup>2</sup>	Operating voltage (V)	Characteristics			Type
Length Max. (mm)	Max. dia. (mm)			Plateau (V)	Inclination	Natural counts (C/M)	
83	33	—	300±20	Above 30	Below 3%/10V	Below 60	GMH-G-1
150	25	3.5	1000±100	" 70	" 20%/100V	" 60	GMH-X-1
130	30	3.5	1000±100	" 50	" 20%/100V	" 60	GMH-X-2
590	50	—	1250±125	" 200	" 5%/100V	" 700	GMS-G-1
435	50	—	1250±125	" 200	" 5%/100V	" 500	GMS-G-2
270	30	—	1200±120	" 150	" 5%/100V	" 350	GMT-B-1

Max. peak HF voltage (kV)	Max. current (effective value) (A)	Max. frequency (Mc)	r.p.m.	Cooling system	Type
32	22	25	—	N	4008A
32	25	15	—	N	4008B
32	25	15	—	N	4008C
32	25	15	—	N	4008D
10	30	17	17	N or V	VVC60-AL
10	25	110	17	V	VVC60-AP
Parallel 10    Series 20	Parallel 60    Series 30	17	17	N or V	VVC2-60-AL
" 10    " 20	" 120    " 60	17	17	N or V	VVC4-60-AL

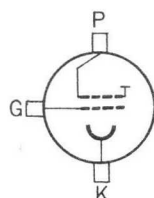
Focusing method	Use	Max. ratings						Typical operation						U.S. equiva- lent	Type
		Anode voltage (V)	Grid- No. 3 voltage (V)	Grid- No. 2 voltage (V)	Grid- No. 1 voltage (V)	Cathode current (μA)	Amb. temp. (°C)	Anode voltage (V)	Grid- No. 3 voltage (V)	Grid- No. 2 voltage (V)	Grid- No. 1 voltage (V)	Para- axial magni- fication factor	Resolu- tion capabi- lity (line)		
Electro- static focus con- densed type	Noctovi- sion equip- ment	4500	800	250	50	1	50	4000	335~785	90	10	0.5	500	1P25	1P25(F)
Electro- static focus con- densed type	Noctovi- sion equip- ment	20000	—	—	2700	1	50	16000	—	—	1729~ 2120	0.5	500	6032	6032



VVC4-60-AL

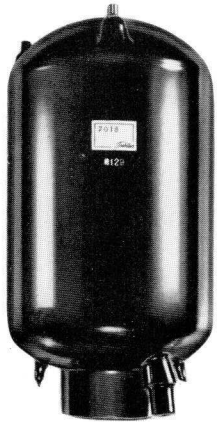


1P25 (F)



6032

# X-RAY FLUORESCENT MULTIPLIERS



7018

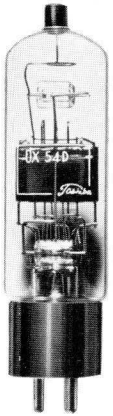


R4410

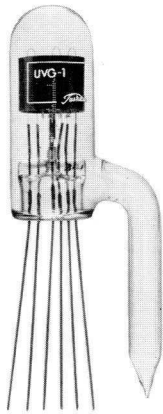
Type	Dimensions				Base terminal	Focusing method	Output screen phosphor
	Overall length (mm)	Max. dia. (mm)	Input fluorescent screen useful dia. (mm)	Output fluorescent screen useful dia. (mm)			
△ 7018	325	171	Above 125	Above 14.7	C 1-1	Electrostatic focusing	P20

\* Brightness ratio between Toshiba fluoroscopic screen DFD and output fluorescent screen of Toshiba M7018

# OTHER SPECIAL PURPOSE TUBES



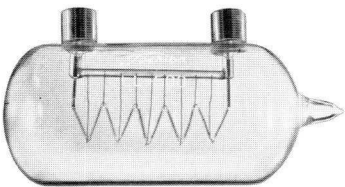
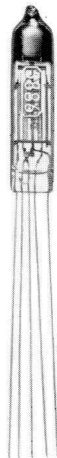
UX-54B



UVG-1

Type	Construction	Cathode			
		Classification	voltage (V)	Current (A)	Power consumption (W)
R4410	Arc relay discharge tube for driving magnetic distortion oscillating elements of sonar and fish detector	Cold	—	—	—
UX-54B	Tetrode for measuring micro-current	FO	2.0	0.05	—
5886	Pentode for measuring micro-current	FO	1.25	0.01	—
☆ 1Q18	High resistance vacuum tube	—	—	—	—
☆ 1Q19	"	—	—	—	—
☆ 1Q20	"	—	—	—	—
☆ 1Q21	"	—	—	—	—
UVG-1	Ionization gage	FW	About 6 ※	About 4	—
LL-20	Argon filled HF load tube ◆	FW	45	—	20
LL-50	"	FW	70	—	50
LL-100	"	FW	100	—	100
LL-200	"	FW	70	—	200
LL-500	"	FW	53	—	500

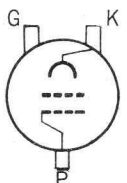
5886



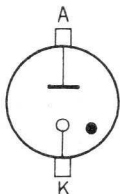
LL-500

☆ For replacement only △ Equivalent tubes are not bracketed; semi-equivalent tubes are bracketed. ◆ Voltage and power consumption of load lamp rated at 2000°K.

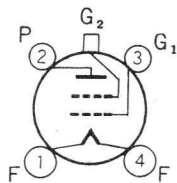
Direction of X Ray



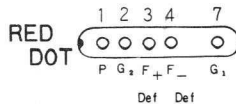
7018



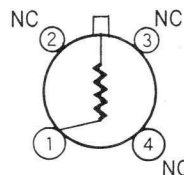
R4410



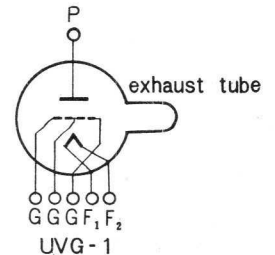
UX-54B



5886



1Q18-21



UVG-1

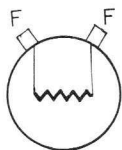
Output fluorescent screen	Linear demagnification factor of image	Brightness intensification factor	Maximum ratings				Typical Operation					Type	
			Anode		Focusing electrode voltage (V)	Ambient temperature (°C)	Anode voltage (kV)	Focusing electrode voltage (V)	Linear demagnification factor	Brightness intensification factor	Resolution capability		
			Voltage (kV)	Current (μA)							Central (L/cm)		Peripheral (L/cm)
Flat face ■	1/7.5~1/8.5	Above 350	25	2	250	50	22	0~200	1/8.0	800	Above 15	Above 10	7018

■ Metalback    △ When a pair of black and white is combined.

Dimensions		Base number		Remarks	U. S. A. equivalent or semi-equivalent	Type
Overall length (mm)	Max. dia. (mm)	Cap	Bottom			
241.3	30.4	A14S	A14S	Anode supply source voltage=1800V Max., Averaged anode current=100 mA Max., Pulse repetition=4 pps Max., a bare wire is wound at the center, pulse voltage of peak value 20,000~30,000V is impressed for driving.	R4410	R4410
150	38	A9S	D16S	Mutual conductance=25 μΩ, amplification=1, anode voltage=6V, grid No. 1 voltage=4V, grid No. 2 voltage=-4V, anode current=60 μA, grid No. 1 current=0.35 mA, grid No. 2 current=10 <sup>-15</sup> A	FP-54	UX-54B
38.1 Max.	7×9	—	—	(Triode connection) Anode voltage=10.5 V, grid voltage=-3 V, plate current=200 μA, amplification=1.8, mutual conductance=175 μΩ, max. grid current=2.5×10 <sup>-13</sup> A (Pentode connection) Anode voltage=8.5V, grid voltage=-2V, plate current=6 μA, mutual conductance=14 μΩ, anode resistance=8 MΩ, grid current=3×10 <sup>-5</sup> A	5886	5886
145	30	A9S	D16S	Resistance value=1.0×10 <sup>8</sup> ~9.9×10 <sup>8</sup> Ω (At room temperature)		☆ 1Q18
145	30	A9S	D16S	" =1.0×10 <sup>9</sup> ~9.9×10 <sup>9</sup> Ω ( " )		☆ 1Q19
145	30	A9S	D16S	" =1.0×10 <sup>10</sup> ~9.9×10 <sup>10</sup> Ω ( " )		☆ 1Q20
145	30	A9S	D16S	" =1.0×10 <sup>11</sup> ~9.9×10 <sup>11</sup> Ω ( " )		☆ 1Q21
100	40	—	—	Typical operation: Grid voltage=200 V, anode voltage=-20 V, grid current=5mA, vacuum=1×10 <sup>-6</sup> mm/Hg (at anode current 2 μA)		UVG-1
60	30	A9S	—			LL-20
60	35	A9S	—			LL-50
90	45	A9S	—			LL-100
130	80	A14S	—			LL-200
160	80	A20S	—			LL-500

※ At 5 ma grid current.

※※ With vacuum increased increased to point where tube almost stops discharging.



LL-20 LL-200  
LL-50 LL-500  
LL-100

## MAIN PRODUCTS

Power Equipment	Industrial Equipment
Rolling Stock	Nuclear Equipment
Lighting Appliances	Measuring Instruments
Communications and Electronic Equipment	
Electron Tubes and Semiconductors	
Testing and Research Equipment	
Electro-Medical Equipment	
Home Appliances	Materials

The Toshiba logo is written in a stylized, red, cursive script font.

**TOKYO SHIBAURA ELECTRIC CO., LTD.**

TOKYO, JAPAN      CABLE: TOSHIBA TOKYO