

No. 2. As grid No. 2 is made negative, the grid-No. 1 characteristic is shifted in the positive direction. The use of grid No. 2 as the control electrode (with grid No. 1 connected to cathode at socket) has the advantage of increased sensitivity but consideration must be given to the higher pre-conduction current, higher capacitance to anode, and less stability of operation.

A grid-No. 1 resistor having a value as high as 10 megohms to give circuit sensitivity can be used with the 2050-A because its control-grid current is very low. However, when a high value of grid resistor is used, care should be taken to keep the tube base and socket clean and dry in order to make the effect of leakage currents between the control-grid base pin and anode base pin very small.

Sufficient anode-circuit resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings of the tube.

2076/5R4GB

Refer to chart at end of section.

2076/5R4GYB

For replacement use type 2076/5R4GB.

2081/6AW8A

Refer to chart at end of section.

2082/12AY7

Refer to chart at end of section.

5636

Refer to chart at end of section.

5639

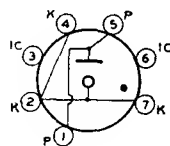
Refer to chart at end of section.

5642

Refer to chart at end of section.

5651A INDUSTRIAL TYPE

VOLTAGE-REFERENCE TUBE



5B0

Miniature type cold-cathode, glow-discharge voltage-reference tube for use in dc power supplies. Outlines section, 5C; requires miniature 7-contact socket.

MAXIMUM RATINGS (Absolute-Maximum Values)

DC Operating Current (Continuous)	3.5	mA
DC Operating Current (Continuous)	1.5	mA
Ambient Temperature Range	-55 to 90	°C

CHARACTERISTICS AND OPERATION RANGE VALUES

	Min.	Av.	Max.	
DC Starting Voltage	—	107	115*	volts
DC Operating Voltage (Variation from tube to tube):				
At 1.5 mA	83	85	87	volts
At 2.5 mA	83.5	85.5	87.5	volts
At 3.5 mA	84.5	86.5	88.5	volts
Regulation (1.5 mA to 3.5 mA)	—	—	3	volts
Temperature coefficient of Operating Voltage (over ambient temperature range of -55 to 90°C)	—	-4	—	mV/°C
Percentage Variation of Operating Voltage:†				
During first 300 hours of life	—	—	0.1	per cent
During subsequent 1000 hours of life	—	—	0.1	per cent
Short-term (100 hours)				
Variation of Operating Voltage after first 300 hours of life	—	—	0.05	per cent
Instantaneous Voltage				
Fluctuation (Voltage jump)†	—	—	0.1	volt

CIRCUIT VALUES

Shunt Capacitor	—	—	0.02	μF
Series Resistor	—	‡		

* A dc supply voltage of 115 volts minimum should be provided to insure "starting" throughout tube life.

■ DC operating current = 2.5 mA.

● After initial 3-minute warm-up period.

† Defined as the maximum instantaneous voltage fluctuation at any current level within the operating current range.

‡ A series resistor must always be used with the 5651A. The resistance value must be chosen so that (1) the maximum current rating of 3.5 mA is not exceeded at the highest anode-supply voltage employed, and (2) the minimum current rating of 1.5 mA is always exceeded when the anode-supply voltage is at its lowest value.

Installation and Application

Make no connection to pins 3 and 6. Any potentials applied to these pins may cause erratic tube performance. The three pin terminals for the cathode (pins 2, 4, and 7) and the two for the anode (pins 1 and 5) offer the equipment designer several different possibilities for connection of the 5651A. Any pair of interconnected pins can be used as a jumper connection to a circuit common to either the cathode or to the anode. The use of such a jumper connection provides a means for opening the circuit to protect circuit components when the 5651A is removed from its socket. Under no circumstances should the current through any pair of interconnected pins exceed one ampere.

If the load for the regulated power supply is disconnected either directly or by removing the 5651A from its socket, the rectifier capacitors will charge to the rectifier peak voltage. It is important, therefore, that these capacitors be rated to withstand such voltage.

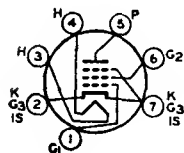
A warm-up period of 3 minutes should be allowed each time the equipment is turned on to insure minimum voltage drift of the 5651A.

When a shunt capacitor is used with the 5651A, its value should be limited to 0.02 μ F. A large value of capacitance may cause the tube to oscillate and thus give unstable performance.

Shielding should be utilized for the 5651A to insure maximum stability when the tube is operated in the presence of strong rf or magnetic fields.

Refer to chart at end of section.

5651WA



7BD

SHARP-CUTOFF PENTODE

5654

INDUSTRIAL
TYPE

Miniature type sharp-cutoff pentode used in RF and IF broad-band applications at frequencies up to 400 mHz. Outlines section, 5B; requires miniature 7-contact socket.

Heater Voltage (ac/dc)	6.3 $\pm 10\%$	volts
Heater Current	0.175	ampere
Heater-Cathode Voltage:		
Peak value	± 100	volts
Direct Interelectrode Capacitances: Δ		
Grid No.1 to Plate	0.020 max.	pF
Input	4.0	pF
Output	2.85	pF

Δ With external shield.

Class A₁ Amplifier

MAXIMUM RATINGS (Absolute-Maximum Values)

Plate Voltage	200	volts
Grid-No.2 (Screen) Voltage	155	volts