

Full-Wave Vacuum Rectifier

GENERAL DATA

Electrical:

Filament, Coated:

Voltage (AC or DC) $3.3 \pm 10\%$ volts

Current at 3.3 volts.	3.8	amp
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Mechanical:

Operating Position. Any

Maximum Overall Length. 4-5/8"

Maximum Seated Length 4-1/16"

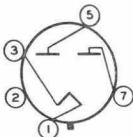
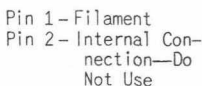
Diameter. 1.438" to 1.562"

Bulb. T12

Base. Short Medium-Shell Octal 5-Pin
with External Barriers, Style A
(JEDEC Group 1, No.B5-234)

or Short Medium-Shell Octal 5-Pin
with External Barriers, Style B
(JEDEC Group 1, No.B5-239)

Basing Designation for BOTTOM VIEW. 5DE



Pin 3 - Filament
Pin 5 - Plate No.2
Pin 7 - Plate No.1

FULL-WAVE RECTIFIER

Maximum Ratings, Design-Maximum Values:

PEAK INVERSE PLATE VOLTAGE. 1050 max. volts

AC PLATE SUPPLY VOLTAGE PER PLATE (RMS) . . See *Rating Chart I*

PEAK PLATE CURRENT PER PLATE.	1.2 max.	amp
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HOT-SWITCHING TRANSIENT PLATE CURRENT
PER PLATE^a 6.5 max. amp

DC OUTPUT CURRENT See Rating Chart I

BULB TEMPERATURE (At hottest point on bulb surface) 200 max. °C

Typical Operation:

With capacitor input to filter

AC Plate-to-Plate Supply Voltage (RMS). . . 550 volts

Filter-Input Capacitor ^b	40	μf
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Total Effective Plate Supply		
Impedance Per Plate	32	ohms

DC Output Voltage (Approx.) at input to filter at full-load current of 350 ma.	300	vols
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Characteristics:

Tube-Voltage Drop for plate ma.

= 350 (Per plate). 25 volts

^a Even occasional hot-switching with capacitor-input circuits permits the flow of plate current having magnitudes which can adversely affect the life and reliability of rectifier tubes. If capacitor-input circuits are to be used, protect the circuits against the adverse effects of possible hot-switching, and do not exceed a hot-switching transient plate current per plate of 6.5 amperes during the initial cycles of the hot-switching transient. If hot-switching is required in operation, the use of choke-input circuits is recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

^b Values of capacitance higher than those indicated may be used, provided the effective plate supply impedance is increased to prevent exceeding the maximum peak-plate-current rating.

RATING CHARTS and OPERATION CHARACTERISTICS

Rating Chart I represents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor input and choke input to filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

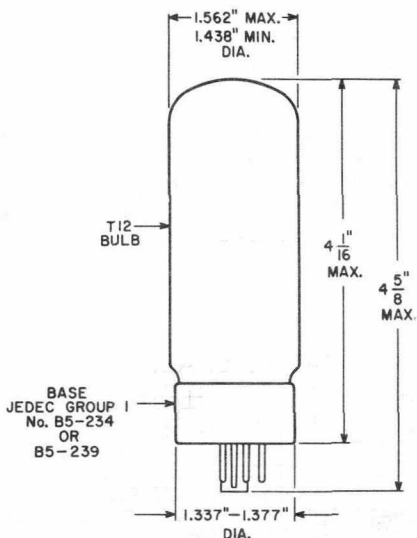
Rating Chart II represents graphically the relationship between maximum rectification efficiency and maximum dc output current per plate for conditions of capacitor input to filter.

A choice of operating values of dc output current per plate and rectification efficiency should be made such that they fall within the area of permissible operation to insure that the maximum peak-plate-current rating will not be exceeded. If the operating values chosen fall outside the permissible operating area, a different choice of parameters should be made. For a given value of ac voltage input and dc output current, it is possible to reduce the rectification efficiency either by increasing the plate supply resistance per plate or by using a smaller value of input filter capacitor.

Rating Chart III represents graphically the relationships between minimum effective plate supply resistance per plate and maximum ac plate supply voltage per plate under no-load conditions of capacitor input to filter when occasional hot-switching is employed.

If occasional hot-switching is required with capacitor-input circuits, it is important to protect the tube and the circuits against the flow of plate currents having magnitudes in excess of the maximum hot-switching-current rating of 6.5 amperes. To limit the hot-switching current, adequate series plate supply resistance per plate is necessary. This resistance value may be determined with the formula shown in legend of *Rating Chart III*. To insure that the maximum hot-switching current is not exceeded, a value of series plate supply resistance per plate should be chosen such that it is equal to or greater than the minimum value indicated by the curve.

If appreciable series inductance is present in the plate supply, a value of series plate supply resistance smaller than that indicated by the curve may be employed provided it is experimentally determined that the combined effect of inductance and plate supply resistance used are adequate to limit the hot-switching current to the indicated maximum-rated value.

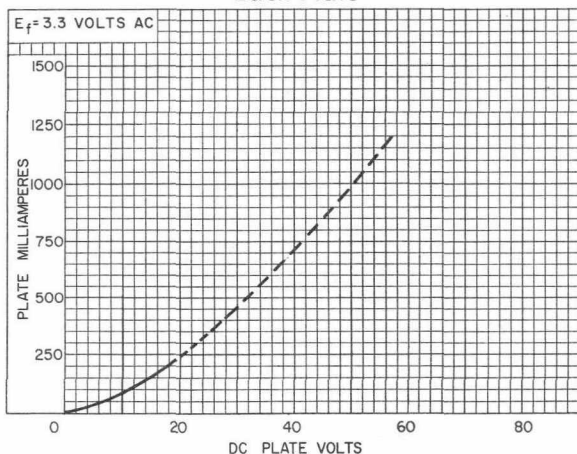


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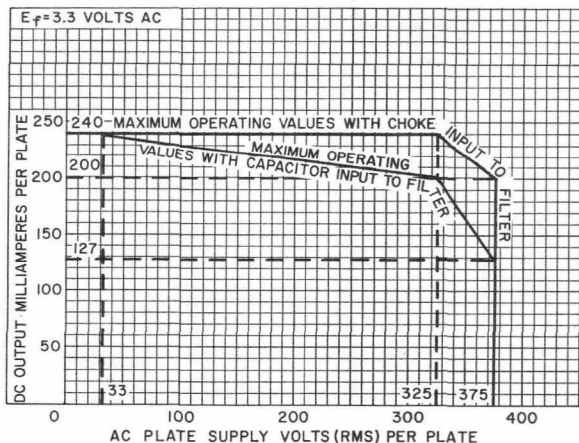
3DG4

AVERAGE PLATE CHARACTERISTIC Each Plate



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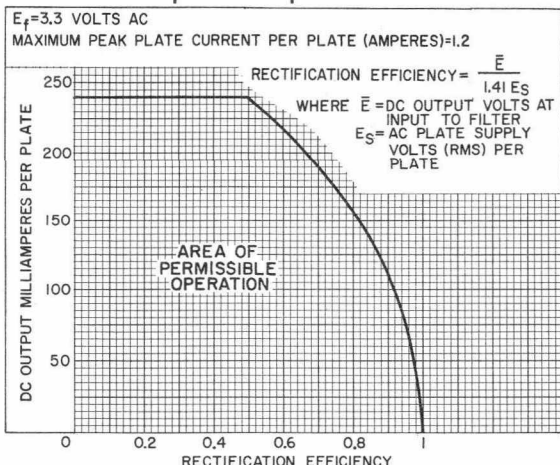
RATING CHART I



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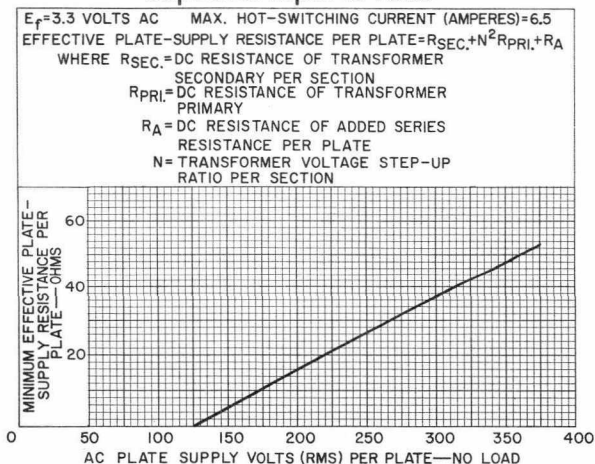


RATING CHART II Capacitor Input to Filter



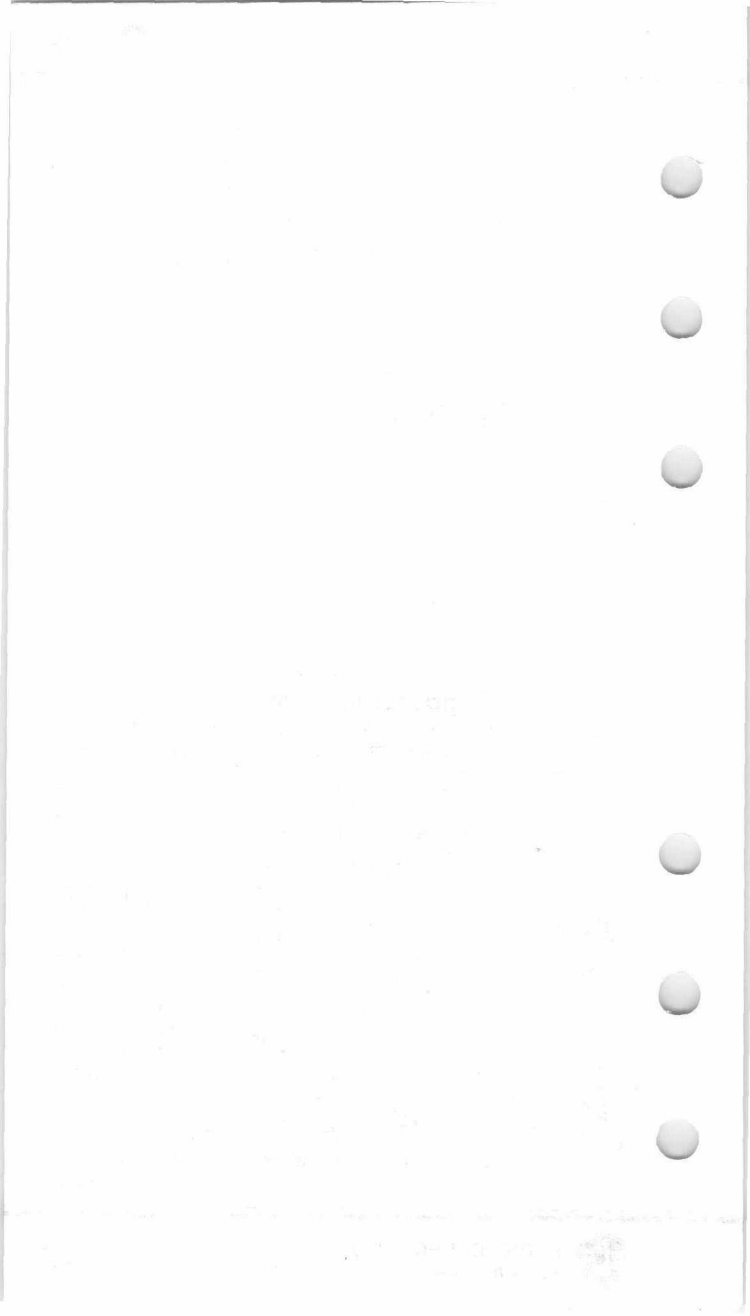
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RATING CHART III Capacitor Input to Filter



92CS-10977





Half-Wave Vacuum Rectifier

Designed to minimize X-Radiation

$-e_{bm} = 38,000$ max. V

$i_{bm} = 100$ mA

ELECTRICAL CHARACTERISTICS — Bogey Values

Heater Voltage, ac or dc	E_h	3.15 ± 0.5	V
Heater Current at $E_h = 3.15$ V	I_h	0.30	A
Direct Interelectrode Capacitance: ^a			
P to (K + IS + H)	c_{p-all}	1.6	pF
Instantaneous Tube Voltage			
Drop for Instantaneous			
Plate Current (i_b) = 7 mA	e_b	70	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.812 in (96.82 mm)
Maximum Seated Length	3.250 in (82.55 mm)
Maximum Diameter	1.188 in (30.17 mm)
Envelope	JEDEC T9
Top Cap	Small embossed (JEDEC C1-50)
Base	Ultra-Short Small-Wafer with External Barriers: 8-pin (JEDEC No. B8-251)
Terminal Diagram	JEDEC 8 MX
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS^b — High Voltage Rectifier

*For operation as a pulsed rectifier tube in a
525-line, 30-frame system^c*

Inverse Plate Voltage ^d			
Total DC and Peak (absolute max.) . . .	$-e_{bm}$	38,000	V
Average (absolute max.)	$E_{b(av)}$	30,000	V
Plate Current:			
Peak (design max.)	i_{bm}	100	mA
Average (design max.)	$I_{b(av)}$	2.0	mA
Heater Voltage (absolute max.)	E_h	3.65	V
Heater Voltage (absolute min.)	E_h	2.65	V

^a Measured without external shield in accordance with the current issue of EIA Standard RS-191.

^b As defined in the current issue of EIA Standard RS-239A.

3DJ3

- c As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.
- d This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μ s.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3DJ3 fit the standard octal socket. Socket terminals 1, 3, 4, 5, 6, and 8 may be connected to terminal 7 or to a corona shield which connects to terminal 7. Terminals 4 and 6 may be used as tie points at or near cathode potential. Otherwise, do not use.

Measurement of Heater Voltage. It is recommended that a thermocouple rms voltmeter be used to measure heater voltage. The meter and its leads must be insulated to withstand 38,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum

25 mR/hr

Operation of the 3DJ3 outside of the absolute values indicated above may result in either temporary or permanent changes in the X-radiation characteristic of the tube. Equipment design must be such that these absolute values are not exceeded.

X-Radiation is measured in accordance with JEDEC Publication No. 67A, "Recommended Practice for Measurement of X-Radiation from Receiving Tubes", and controlled in accordance with JEDEC Publication No. 73A, "Recommended Practice for Quality Control of X-Radiation Emitted from High Voltage Rectifier and Shunt Regulator Receiving Tubes".

Warning

X-Radiation

The high voltages associated with the 3DJ3 result in production of X-Radiation which may constitute a health

hazard on prolonged exposure at close range unless the tube is adequately shielded. Equipment design must provide for this shielding.

Precautions must be exercised during the servicing of equipment employing the 3DJ3 to assure that the high voltage is adjusted to the recommended value and that any shielding components are replaced to their intended positions before the equipment is operated.

Shock Hazard

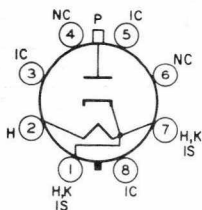
The high voltages at which the 3DJ3 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be exercised during the replacement or servicing of the 3DJ3 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while disconnecting the top cap connector.

THE EQUIPMENT MANUFACTURER SHOULD PROVIDE A WARNING LABEL IN AN APPROPRIATE POSITION ON THE EQUIPMENT TO ADVISE THE SERVICEMAN OF ALL PRECAUTIONS HEREIN.

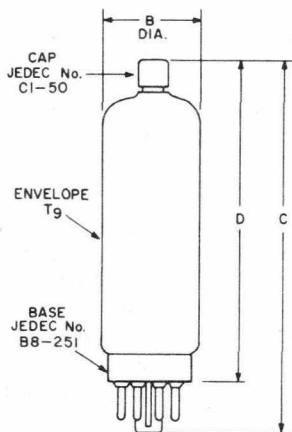
TERMINAL DIAGRAM — JEDEC 8 MX — Bottom View

- Pin 1 - Heater, Cathode,
Internal Shield
- Pin 2 - Heater
- Pin 3 - Do Not Use
- Pin 4 - No Connection
- Pin 5 - Do Not Use
- Pin 6 - No Connection
- Pin 7 - Heater, Cathode,
Internal Shield
- Pin 8 - Do Not Use
- Top Cap - Plate



3DJ3

DIMENSIONAL OUTLINE



92CS-15232R1

DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
B	1.062*	1.188	26.98*	30.17
C	—	3.812	—	96.82
D	3.062	3.250	77.78	82.55
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				
* Applies to the minimum diameter except in the area of the seal.				

3DK6

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

The 3DK6 is the same as the 6DK6 except for the following items:

Heater Characteristics and Ratings:

Current.	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600.	3.15	volts
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	300 ^a max.	volts
Heater positive with respect to cathode	200 ^b max.	volts

3DT6A

Sharp-Cutoff Pentode

With Two Independent Control Grids

7-PIN MINIATURE TYPE

The 3DT6A is the same as the 6DT6A except for the following items:

Heater Characteristics and Ratings:

Current.	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600.	3.15	volts
Warm-up time (Average)	11	sec

^a The dc component must not exceed 200 volts.

^b The dc component must not exceed 100 volts.



3DZ4

Medium-Mu Triode

7-PIN MINIATURE TYPE

The 3DZ4 is the same as the 6DZ4 except for the following items:

Heater Characteristics and Ratings:

Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	3.2	volts
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180 ^b max.	sec

3EA5

Sharp-Cutoff Tetrode

7-PIN MINIATURE TYPE

The 3EA5 is the same as the 6EA5 except for the following items:

Heater Characteristics and Ratings:

Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	2.9	volts
Warm-up time (Average)	11	sec

3EH7

Semiremote-Cutoff Pentode

9-PIN MINIATURE TYPE

The 3EH7 is the same as the 6EH7 except for the following items:

Heater Characteristics and Ratings:

Current.	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600.	3.4	volts

^b The dc component must not exceed 100 volts.

3EJ7

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 3EJ7 is the same as the 6EJ7 except for the following items:

Heater Characteristics and Ratings:

Current.	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600.	3.4	volts

3ER5

High-Mu Triode

7-PIN MINIATURE TYPE

The 3ER5 is the same as the 6ER5 except for the following items:

Heater Characteristics and Ratings:

Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	2.8	volts

3FH5

High-Mu Triode

7-PIN MINIATURE TYPE

The 3FH5 is the same as the 6FH5 except for the following items:

Heater Characteristics and Ratings:

Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	3.0	volts
Warm-up time (Average)	11	sec



3FS5

Beam Hexode

7-PIN MINIATURE TYPE

The 3FS5 is the same as the 6FS5 except for the following items:

Heater Characteristics and Ratings:

Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	2.9	volts
Warm-up time (Average)	11	sec

3GK5

High-Mu Triode

7-PIN MINIATURE TYPE

The 3GK5 is the same as the 6GK5 except for the following items:

Heater Characteristics and Ratings:

Current.	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450.	2.8	volts
Warm-up time (Average)	11	sec



3GS8

Sharp-Cutoff Twin Pentode With Common Cathode, Grid No.1, and Grid No.2

The 3GS8 is the same as the 4GS8/4BU8 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.15	V

3HM5/3HA5

High-Mu Triode

The 3HM5/3HA5 is the same as the 6HM5/6HA5 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	E_h	2.7	V
Warm-up time (Average).		11	s

3HS8

Sharp-Cutoff Twin Pentode

The 3HS8 is the same as the 6HS8 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.15	V
Warm-up time (Average).		11	s



3JC6, 3JC6A

Sharp-Cutoff Pentodes

The 3JC6 and 3JC6A are the same as the 6JC6 and 6JC6A, respectively, except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.5	V
Warm-up time (Average).		11	s

3JD6

Sharp-Cutoff Pentode

The 3JD6 is the same as the 6JD6 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.5	V
Warm-up time (Average).		11	s

3KT6

Semiremote-Cutoff Pentode

The 3KT6 is the same as the 6KT6 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	E_h	3.5	V
Warm-up time (Average).		11	s

