RCA

3B28

HALF-WAVE GAS RECTIFIER

HOT-CATHODE TYPE

GENERAL DATA

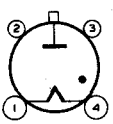
Electrical:

Filament, Coated:		
Voltage	2.5 ± 5%	ac volts
Current at 2.5 volts	5	amp
Minimum Heating Time Before Anode Voltage is Applied	10	seconds
Peak Anode Voltage Drop (Approx.)	10	volts

Mechanical:

Mounting Position	Any
Overall Length	5.87" to 6.15"
Seated Length	5.25" to 5.53"
Maximum Diameter	2-1/16"
Bulb	T-16
Cap	Medium (JETEC No.C1-5)
Base	Medium-Shell Small 4-Pin, Bayonet (JETEC No.A4-10)
Basing Designation for BOTTOM VIEW	$4P_1$

Pin 1 – Filament
Pin 2 – No Connection
Pin 3 – No Connection
Pin 4 – Filament, Cathode Shield
Cap – Anode



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Maximum Ratings, *Absolute Values*:

	Rating I	*Rating II*	
PEAK INVERSE ANODE VOLTAGE	5000 max.	10000 max.	volts
ANODE CURRENT:			
Peak	2 max.	1 max.	amp
Average*	0.5 max.	0.25 max.	amp
Fault, for duration of 0.1 second max.	20 max.	20 max.	amp
FREQUENCY OF POWER SUPPLY	500 max.	150 max.	cps
AMBIENT TEMPERATURE	−75 to +90	−75 to +90	°C

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Filament Current	1	–	5.40	amp
Critical Anode Voltage	2	–	50	volts
Peak Anode Voltage Drop	3	–	14	volts

Note 1: With 2.5 volts rms on filament.
Note 2: With 2.38 volts rms on filament.

* Averaged over any period of 30 seconds maximum.

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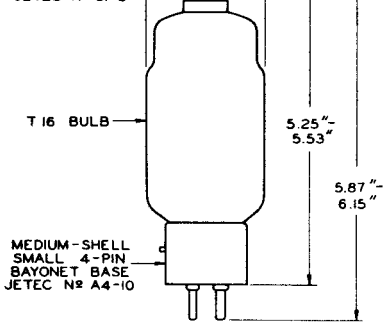
Note 3: With 2.5 volts rms on filament, peak anode current of 2 amperes provided by half-cycle pulse from a 60-cps sine wave and recurring approximately once a second. Tube drop is measured by an oscilloscope connected between anode and center tap of filament transformer.

OPERATING NOTES

The filament-supply voltage for the 3B28 may be either in phase or out of phase with the anode voltage. With out-of phase excitation (quadrature operation), improved utilization of the cathode is possible. Although the 3B28 carries no higher anode-current rating for quadrature operation than for in-phase operation, quadrature operation is conducive to appreciably longer tube life. For optimum results, the filament and anode voltages should be 90° out of phase. In practical applications however, nearly, full realization of the advantages of this type of excitation is possible even when the phase difference between the filament and anode supply voltages ranges from the optimum value by as much as ± 30°. In polyphase operation where the anode voltage shifts from one phase to another during the current-conduction period, quadrature operation is obtained when the filament voltage passes through zero at the center of the current-conduction period.



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For Circuit Figures, see Front of this Section

CIRCUIT	MAX. TRANS. SEC. VOLTS (RMS) E	APPROX. DC OUTPUT VOLTS TO FILTER E_{av}	MAX. DC OUTPUT AMPERES I_{av}	MAX. DC OUTPUT KW TO FILTER P_{dc}
Fig. 1 **Half-Wave** **Single-Phase** In-Phase Operation	7000▲	3200	0.25	0.8
	3500●	1600	0.5	0.8
Fig. 2 **Full-Wave** **Single-Phase** In-Phase Operation	3500▲	3200	0.5	1.6
	1700●	1600	1.0	1.6
Fig. 3 **Series** **Single-Phase** In-Phase Operation	7000▲	6400	0.5	3.2
	3500●	3200	1.0	3.2
Fig. 4 **Half-Wave** **Three-Phase** In-Phase Operation	4000▲	4800	0.75	3.6
	2000●	2400	1.5	3.6
Fig. 5 **Parallel** **Three-Phase** Quadrature Operation	4000▲	4800	1.5	7.2
	2000●	2400	3.0	7.2
Fig. 6 **Series** **Three-Phase** Quadrature Operation	4000▲	9600	0.75	7.2
	2000●	4800	1.5	7.2
			Resistive Load / *Inductive Load*	*Resistive Load* / *Inductive Load*
Fig. 7 **Half-Wave** **Four-Phase** Quadrature Operation	3500▲	4500	0.9 / 1.0	4.0 / 4.5
	1700●	2250	1.8 / 2.0	4.0 / 4.5
			Resistive Load / *Inductive Load*	*Resistive Load* / *Inductive Load*
Fig. 8 **Half-Wave** **Six-Phase** Quadrature Operation	3500▲	4800	0.95 / 1.0	4.5 / 4.8
	1700●	2400	1.9 / 2.0	4.5 / 4.8

▲ For maximum peak inverse anode voltage of 10000 volts.
● For maximum peak inverse anode voltage of 5000 volts.