

# HALF-WAVE GAS RECTIFIER

HOT-CATHODE TYPE

Electrical:  Filament, Coated:     Voltage 2.5 ± 5%	GENERAL DATA								
Filament, Coated:  Voltage	1	UNIN			ļ				
Voltage									
Current at 2.5 volts. 5  Minimum Heating Time Before Anode Voltage is Applied . 10 seconds Peak Anode Voltage Drop (Approx.) . 10 volts  Mechanical:  Mounting Position	Voltage 2.5	5 ± 5%		ac	volts				
Anode Voltage is Applied . 10 seconds volts  Mechanical:  Mounting Position	Current at 2.5 volts	5			amp				
Peak Anode Voltage Drop (Approx.)	Minimum Heating Time Before	11		10 -					
Mechanical:  Mounting Position	Peak Anode Voltage Is Approx	lied.		10 s	econas volts				
Mounting Position Any Overall Length 5.87" to 6.15" Seated Length 5.25" to 5.53" Maximum Diameter 2-1/16" Bulb 7-16 Cap Medium (JETEC No. C1-5) Base Medium-Shell Small 4-Pin, Bayonet (JETEC No. A4-10) Basing Designation for BOTTOM VIEW 4P1  Pin 1 - Filament Pin 2 - No Connection Pin 3 - No Connection Peak INVERSE ANODE VOLTAGE 5000 max . 10000 max . volts ANODE CURRENT: Peak 2 max 1 max amp Average* 2 max 1 max amp Fault, for duration of 0.1 second max 20 max 20 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 TEMPERATURE75 to +9075 to +90 oC CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN	<b>i</b> .	.,		10	10,10				
Overall Length. 5.87" to 6.15" Seated Length . 5.25" to 5.53" Maximum Diameter. 2-1/16" Bulb									
Seated Length				5 87" ta					
Maximum Diameter. 2-1/16" Bulb 7-16 Cap Medium (JETEC No.C1-5) Base. Medium-Shell Small 4-Pin, Bayonet (JETEC No.C4-10) Basing Designation for BOTTOM VIEW. 4P1 Pin 1 - Filament Pin 2 - No Connection Pin 3 - No Connection  HALF-WAVE RECTIFIER  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. amp FREQUENCY OF POWER SUPPLY . 500 max. 150 max. cps AMBIENT TEMPERATURE75 to +90 -75 to +90 oc  CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN Note Min. Max. Filament Current. 1 - 5.40 amp				. 5.25" to	5.53"				
Cap	Maximum Diameter			2	-1/16"				
Pin 1 - Filament Pin 2 - No Connection Pin 3 - No Connection  HALF-NAVE RECTIFIER  Maximum Ratings, Absolute values:  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 TEMPERATURE75 to +90 -75 to +90 oc  CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN Note Min. Max.  Filament Current 1 - 5.40 amp	Bulb		Modiu	Na	T-16				
Pin 1 - Filament Pin 2 - No Connection Pin 3 - No Connection  HALF-NAVE RECTIFIER  Maximum Ratings, Absolute values:  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 TEMPERATURE75 to +90 -75 to +90 oc  CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN Note Min. Max.  Filament Current 1 - 5.40 amp	Rase Medium—Shell Small 4-	-Pin I	mediu Pavonet	JETEC NO.	A4-10)				
Pin 2 - No Connection Pin 3 - No Connection  HALF-WAVE RECTIFIER  Maximum Ratings, Absolute Values:  PEAK INVERSE ANODE VOLTAGE. 5000 max. 10000 max. volts ANODE CURRENT: Peak 2 max. 1 max. amp Average* 20 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	Basing Designation for BOTTOM	VIEW.			4P <sub>1</sub>				
Pin 2 - No Connection Pin 3 - No Connection  HALF-NAVE RECTIFIER  Maximum Ratings, Absolute Values:  PEAK INVERSE ANODE VOLTAGE. 5000 max. 10000 max. volts ANODE CURRENT: Peak 2 max. 1 max. amp Average* 20 max. 0.25 max. amp Fault, for duration of 0.1 second max 20 max. 150 max. cps AMBIENT TEMPERATURE	Pin 1 - Filament		Pi	n 4 - Filan	nent.				
Connection Pin 3 - No Connection  HALF-WAVE RECTIFIER  Maximum Ratings, Absolute Values:  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	(2)	<b>1</b>	, ,	Catho	de				
HALF-WAVE RECTIFIER  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 FREQUENCY OF POWER SUPPLY	1	` \ '		Shi	eld				
HALF-WAVE RECTIFIER  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*	Pin 3 – No	•/	Ca	p — Anode	ļ				
Maximum Ratings, Absolute Values:  Rating r Rating rr  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	Connection	<b>-</b> (4)							
Rating r Rating rr	HALF-WAVE F	RECTIF	ER						
ANODE CURRENT:  Peak	Maximum Ratings, Absolute Value.	s:			1				
ANODE CURRENT:  Peak		Ratin	gI	Rating II					
Peak		5000	max. 1	L0000 max.	volts				
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 TEMPERATURE75 to +90 -75 to +90 °C  CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN Note Nin. Nax.  Filament Current 1 - 5.40 amp		2		1					
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of 0.1 second max 20 max. 20 max. amp FREQUENCY OF POWER SUPPLY . 500 max. 150 max. cps AMBIENT TEMPERATURE75 to +90 -75 to +90 OC  CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN Note Min. Max.  Filament Current 1 - 5.40 amp	Fault, for duration								
CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN  Note Min. Max.  Filament Current. 1 - 5.40 amp	of 0.1 second max	20	max.	20 max.	amp				
CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN  Note Min. Max.  Filament Current. 1 - 5.40 amp	FREQUENCY OF POWER SUPPLY	500	max.	150 max.	cps				
Note Min. Max. Filament Current 1 - 5.40 amp									
Note Min. Max. Filament Current 1 - 5.40 amp	AMOTERT TEMPERATORE	-/5 L	0 +90	-/3 10 790	- ŭ				
Filament Current 1 - 5.40 amp									
	CHARACTERISTICS RANGE VALU	ES FOR	EQUIPM	ENT DESIGN					
	CHARACTERISTICS RANGE VALU	ES FOR Vote	EQUIPM	ENT DESIGN					
	CHARACTERISTICS RANGE VALU  Filament Current	ES FOR Vote	EQUIPM	ENT DESIGN Max. 5.40	amp				
	CHARACTERISTICS RANGE VALU Filament Current Critical Anode Voltage.	ES FOR Vote	EQUIPM	ENT DESIGN  Hax.  5.40  50	amp volts				
Note 2: With 2.38 volts rms on filament.	CHARACTERISTICS RANGE VALU Filament Current Critical Anode Voltage. Peak Anode Voltage Drop	ES FOR Vote 1 2 3	EQUIPM	ENT DESIGN  Hax.  5.40  50	amp volts				
* Averaged over any period of 30 seconds maximum.	CHARACTERISTICS RANGE VALU  Filament Current Critical Anode Voltage. Peak Anode Voltage Drop  Note 1: with 2.5 volts rms on filamen	ES FOR  Vote  1 2 3	EQUIPM	ENT DESIGN  Hax.  5.40  50	amp volts				
	CHARACTERISTICS RANGE VALU Filament Current Critical Anode Voltage. Peak Anode Voltage Drop Note 1: With 2.5 volts rms on filame	ES FOR  Vote  1 2 3 nt. ent.	EQUIPM Min.  -	ENT DESIGN  Hax.  5.40  50	amp volts				
	CHARACTERISTICS RANGE VALU  Filament Current Critical Anode Voltage. Peak Anode Voltage Drop  Note 1: With 2.5 volts rms on filament Note 2: With 2.38 volts rms on filament	ES FOR  Vote  1 2 3 nt. ent.	EQUIPM Min.  -	ENT DESIGN  Hax.  5.40  50	amp volts				

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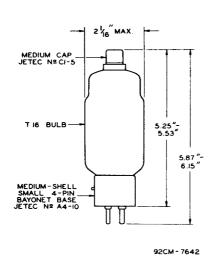


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Note 3: With 2.5 volts rms on filament, peak anode current of 2 amperes provided by half-cycle pulse from a 60-cps sine wave and recurring approximately once a second. Tube drop is measured by an oscilloscope connected between anode and center tap 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  $\pm 30^{\circ}$ . 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.



TENTATIVE DATA 1

382B



## HALF-WAVE GAS RECTIFIER For Circuit Figures, see Front of this Section

CIRCUIT	MAX. TRANS. SEC. VOLTS (RMS)	APPROX.  DC OUTPUT VOLTS TO FILTER  Eav	MAX. DC OUTPUT AMPERES		MAX. DC OUTPUT KW TO FILTER Pdc	
Fig.   Half-Wave Single-Phase In-Phase Operation	7000 <b>≜</b> 3500 <sup>©</sup>	3200 1600	0.25 0.5		0.8	
Fig. 2 Full-Wave Single-Phase In-Phase Operation	3500 <b>≜</b> 1700 <sup>●</sup>	3200 1600	0.5 1.0		I.6 I.6	
Fig. 3 Series Single-Phase In-Phase Operation	7000 <b>≜</b> 3500 <sup>●</sup>	6400 3200	0.5 1.0		3.2 3.2	
Fig. 4 Half-Wave Three-Phase In-Phase Operation	4000▲ 2000	4800 2400	0.75 1.5		3.6 3.6	
Fig.5 Parallel Three-Phase Quadrature Operation	4000▲ 2000●	4800 2400	1.5 3.0		7.2 7.2	
Fig.6 Series Three-Phase Quadrature Operation	4000≜ 2000	9600 4300	0.75 1.5		7.2 7.2	
Fig.7 Half-Wave Four-Phase Quadrature Operation	3500 <b>≜</b> 1700 <sup>●</sup>	4500 2250	Resis- tive Load 0.9	Induc- tive Load 1.0 2.0	Resis- tive Load 4.0 4.0	Induc- tive Load 4.5 4.5
Fig.8 Half-Wave Six-Phase Quadrature Operation	3500 <b>≜</b> ∤700 <sup>●</sup>	4800 2400	Resis- tive Load 0.95	Induc- tive Load 1.0 2.0	Resis- tive Load 4.5 4.5	Induc- tive Load 4.8 4.8

<sup>▲</sup> For maximum peak inverse anode voltage of 10000 volts.

<sup>•</sup> For maximum peak inverse anode voltage of 5000 volts.