

# Passivated Rectifier

**TRANSIENT VOLTAGE PROTECTED**  
2.5 Amps 200-1000 Volts

<b>A14 SERIES</b>
<b>1N5059</b>
<b>1N5060</b>
<b>1N5061</b>
<b>1N5062</b>
<b>A14P</b>

THE GENERAL ELECTRIC A14 IS A 2.5 AMPERE RATED, AXIAL-LEADED GENERAL PURPOSE RECTIFIER. DUAL HEATSINK CONSTRUCTION PROVIDES RIGID MECHANICAL SUPPORT FOR THE PELLET AND EXCELLENT THERMAL CHARACTERISTICS. PASSIVATION AND PROTECTION OF THE SILICON PELLETS PN JUNCTION ARE PROVIDED BY SOLID GLASS; NO ORGANIC MATERIALS ARE PRESENT WITHIN THE HERMETICALLY SEALED PACKAGE.

The A14 is "Transient-Voltage Protected." This device will dissipate up to 1000 watts in the reverse direction without damage. Voltage Transients generated by household or industrial power lines are dissipated.

**absolute maximum ratings:** (25°C unless otherwise specified)

	1N5059 (A14B)	1N5060 (A14D)	1N5061 (A14M)	1N5062 (A14N)	A14P	
*Reverse Voltage (-65°C to +175°C, T <sub>J</sub> ) (-65°C to +165°C for 1N5062 and A14P)						
Working Peak, V <sub>RWM</sub>	200	400	600	800	1000	Volts
DC, V <sub>R</sub>	200	400	600	800	1000	Volts
*Average Forward Current, I <sub>O</sub>						
*100°C Ambient (90°C for 1N5062 and A14P)	←			1.0	→	Amp
25°C Ambient (See Rating Curves)	←			2.5	→	Amp
*Peak Surge Forward Current, I <sub>FSM</sub>						
Non-repetitive, .0083 sec., half sine wave, Full Load JEDEC Method	←			50	→	Amps
No Load (25°C Case)	←			65	→	Amps
Peak Surge Forward Current, I <sub>FSM</sub>						
Non-repetitive, .001 sec., half sine wave, Full Load	←			90	→	Amps
No Load (25°C Case)	←			100	→	Amps
*Junction Operating and Storage Temperature Range, T <sub>J</sub> & T <sub>STG</sub>	← -65 to +175			→ -65 to +165		°C
I <sup>2</sup> t, RMS (for fusing), .001 to .01 sec.	←			4.0	→	Amps <sup>2</sup> sec.
Maximum Avalanche Voltage	←			1600	→	Volts
Peak Non-repetitive Reverse Power Rating, P <sub>RM</sub>						
20 μsec., half sine wave, at Max. T <sub>J</sub>	←			1000	→	Watts
*100 μsec., JEDEC	←			450	→	Watts
*Mounting: Any position. Lead Temperature 290°C maximum to 1/8 inch from body for 5 seconds maximum during mounting.						

**electrical characteristics:** (25°C unless otherwise specified)

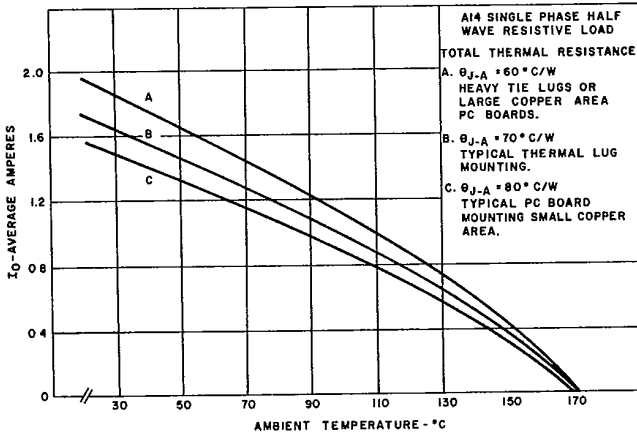
*Maximum Forward Voltage Drop, V <sub>F</sub> , 1A, T <sub>J</sub> = 75°C	←					1.2	→	Volts
Maximum Reverse Current, I <sub>R</sub> , at Rated V <sub>RRM</sub> :								
T <sub>J</sub> = 25°C	←					5.0	→	μA
*T <sub>J</sub> = 165°C				200	200		μA	
*T <sub>J</sub> = 175°C	300	300	200				μA	
Typical Reverse Current, I <sub>R</sub> , at Rated V <sub>RRM</sub>	←					1.0	→	μA
Typical Reverse Current, I <sub>R</sub>								
T <sub>J</sub> = 25°C	0.2	0.2	0.3	0.5	0.5		μA	
T <sub>J</sub> = 100°C	20	20	20	30	30		μA	
Typical Reverse Recovery Time, T <sub>RR</sub>	←					3	→	μsec.
Maximum Reverse Recovery Time, T <sub>RR</sub>	←					6	→	μsec.
Recovery circuit per MIL-S-19500/286C. *JEDEC Registered data.								

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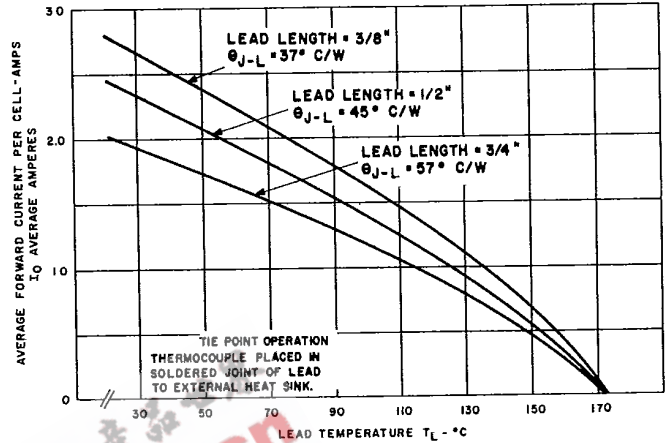
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**MAXIMUM ALLOWABLE DC OUTPUT CURRENT RATINGS**  
**SINGLE PHASE**  
**600 VOLTS & BELOW**

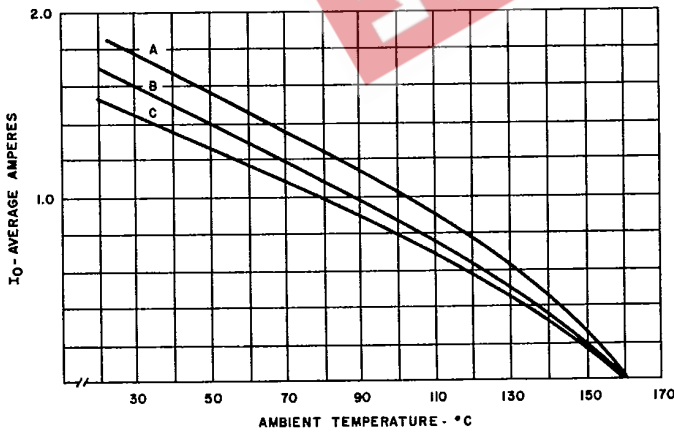


AMBIENT OPERATION

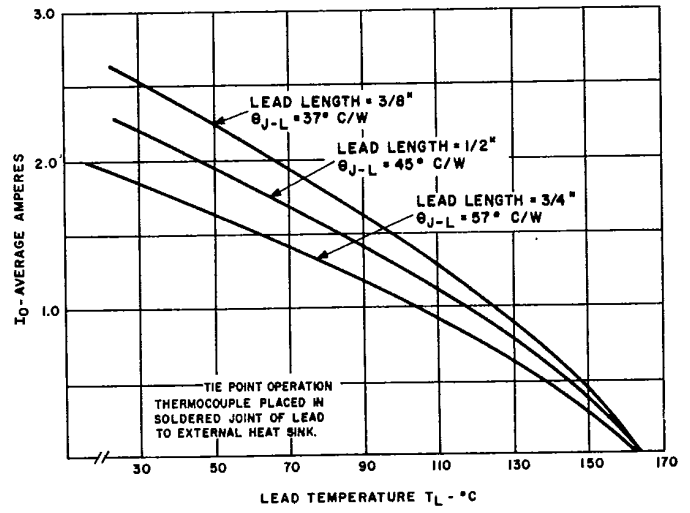


TIE POINT OPERATION

**RESISTIVE OR INDUCTIVE LOAD**  
**800 AND 1000 VOLTS**

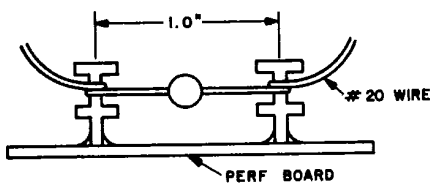


AMBIENT OPERATION

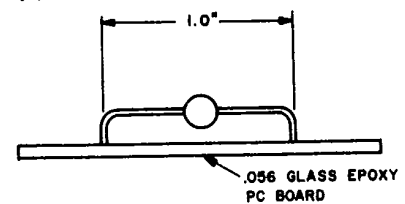


TIE POINT OPERATION

TYPICAL TIE LUG MOUNTS



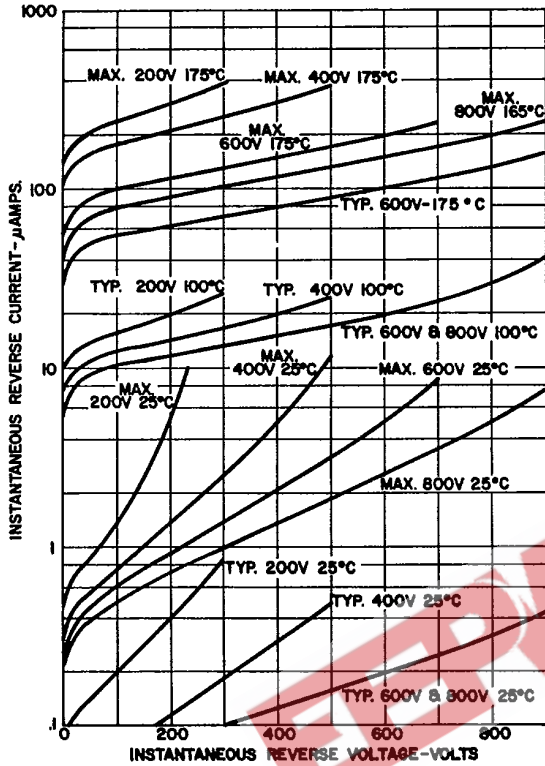
TYPICAL PC BOARD MOUNTING



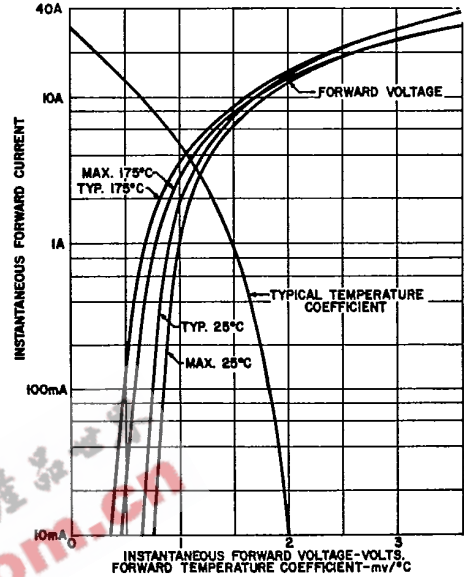
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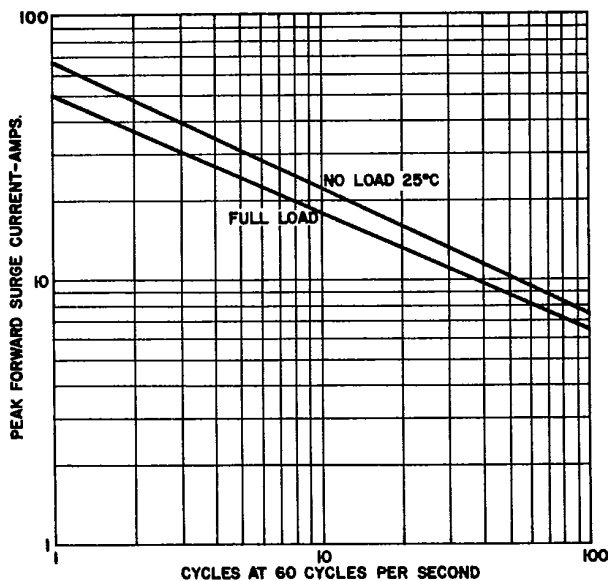
TYPICAL CHARACTERISTICS



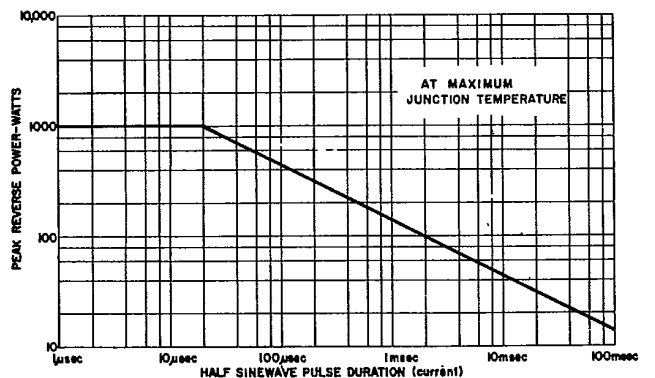
REVERSE CHARACTERISTICS AT SELECTED JUNCTION TEMPERATURES



FORWARD CHARACTERISTICS



MAXIMUM NON-REPETITIVE MULTICYCLE FORWARD SURGE CURRENT



MAXIMUM NON-REPETITIVE AVALANCHE SURGE POWER

1N5059-3

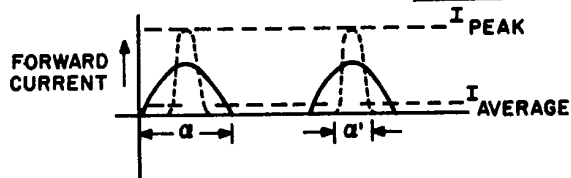
**CAPACITIVE LOADS**

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**Current Derating (capacitive load)**

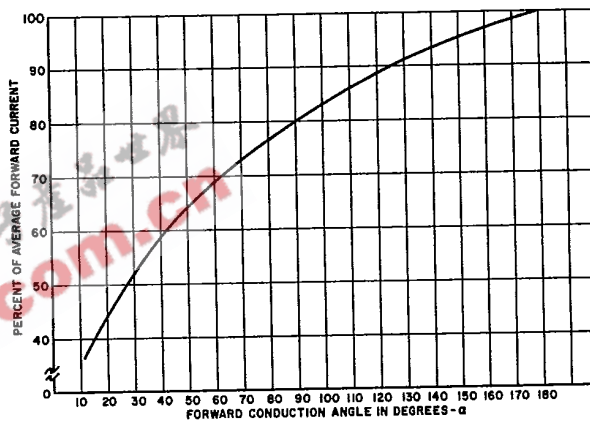
Average forward current as specified under **MAXIMUM RATINGS** page 1 and derating curves for high temperature operation page 2, must be corrected for applications with capacitive loads. As the current conduction angle,  $\alpha'$ , is decreased, the peak current required to maintain the same average current increases, i.e., the peak-to-average current ratio increases from 3.14. Figure 9 gives the derating required based on this increase in peak to average current ratio for sine wave operation. For more complete information consult Application Note 200.30.

- METHOD:**
1. Determine conduction angle  $\alpha'$  in degrees for particular circuit as designed.
  2. Enter Figure 9 for the particular conduction angle and read corresponding percent of forward current per cell.
  3. Multiply this value times average forward current for resistive load from figures on page 2 as given for the actual ambient or tiepoint temperature required.



$\alpha$  = CONDUCTION ANGLE (180°)  
 $\alpha'$  = SHORTENED CONDUCTION ANGLE

**OSCILLOSCOPE PRESENTATION**



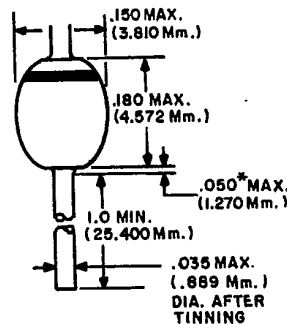
**9. DERATING FOR SHORTENED CONDUCTION ANGLE**

TYPICAL EXAMPLES (25°C Ambient Temperature)					
	Example No. 1	Example No. 2	Example No. 3	Example No. 4	Units
Input Voltage	100	100	300	300	Volts
D.C. (Average) Output Voltage	34	75	180	270	Volts
Surge Resistor	1	1	3.5	3.5	Ohms
Load Current	0.5	0.5	0.5	0.5	Amps.
Input Filter Capacitance	30	100	30	100	$\mu$ F.
Conduction Angle	170	70	90	50	Degrees
Rated Average Current (Resistive Load)	1	1	1	1	Amp.
Rated Average Current (Capacitive Load)	0.98	0.73	0.80	0.65	Amp.

**INTERNAL CONSTRUCTION**

1. Dual heatsink design for maximum heat dissipation under both surge and continuous duty. No fragile "whiskers" or S leads with their potential trouble spots.
2. Glass Package. No internal cavity to act as potential source of moisture or contamination on junction. Temperature coefficient of the glass is matched with the internal parts.
3. Diffused silicon junction passivated surface.

Marking band to appear on cathode end.



**OUTLINE DRAWING**

ALL DIMENSIONS ARE IN INCHES AND (METRIC)  
 \*WELD AND SOLDER FLASH NOT CONTROLLED IN THIS AREA

**TYPICAL APPLICATIONS**

- FREE-WHEELING RECTIFIERS
- TIME DELAY CIRCUITS
- POWER LOGIC CIRCUITS
- ARC SUPPRESSION
- BATTERY CHARGERS
- TV DAMPER DIODES
- TV AND RADIO POWER SUPPLIES
- COMMUNICATION EQUIPMENT
- S.C.R. TRIGGER CIRCUITS
- SMALL PORTABLE APPLIANCES
- GENERAL PURPOSE POWER SUPPLIES
- LOW LEVEL LIMITERS