Microsemi

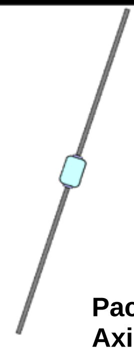
SCOTTSDALE DIVISION

VOIDLESS-HERMETICALLY SEALED ULTRA FAST RECOVERY GLASS RECTIFIERS

DESCRIPTION

This "Ultrafast Recovery" rectifier diode series is military qualified to MIL-PRF-19500/585 and is ideal for high-reliability applications where a failure cannot be tolerated. These industry-recognized 1.5 to 2.0 Amp rated rectifiers for working peak reverse voltages from 200 to 1000 volts are hermetically sealed with voidless-glass construction using an internal "Category I" metallurgical bond. These devices are also available in surface mount MELF package configurations by adding a "US" suffix (see separate data sheet for 1N6620US thru 1N6625US). Microsemi also offers numerous other rectifier products to meet higher and lower current ratings with various recovery time speed requirements including standard, fast and ultrafast device types in both through-hole and surface mount packages.

APPEARANCE



Package "A"
Axial

IMPORTANT: For the most current data, consult *MICROSEMI's* website: **http://www.microsemi.com**

FEATURES

- Popular JEDEC registered 1N6620 to 1N6625 series
- Voidless hermetically sealed glass package
- Extremely robust construction
- Triple-layer passivation
- Internal "*Category I"* Metallurgical bonds
- JAN, JANTX, and JANTXV available per MIL-PRF-19500/585
- Further options for screening in accordance with MIL-PRF-19500 for JANS by using a "SP" prefix, e.g. SP6620, SP6624, etc.
- Surface mount equivalents also available in a square end-cap MELF configuration with "US" suffix (see separate data sheet for 1N6620US thru 1N6625US)

APPLICATIONS / BENEFITS

- Ultrafast recovery rectifier series 200 to 1000 V
- Military and other high-reliability applications
- Switching power supplies or other applications requiring extremely fast switching & low forward loss
- High forward surge current capability
- Low thermal resistance
- Controlled avalanche with peak reverse power capability
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Junction Temperature: -65°C to +175°C
- Storage Temperature: -65°C to +175°C
- Peak Forward Surge Current @ 25°C: 20 Amps (except 1N6625 which is 15 Amps)
  Note: Test pulse = 8.3 ms, half-sine wave.
- Average Rectified Forward Current (I_O) at T_L= +55°C (L=.375 inch from body):
  1N6620 thru 1N6622: 2.0 Amps
  1N6623 thru 1N6625: 1.5 Amps
  (Derate linearly at 0.833%/°C for T_L> +55°C)
- Average Rectified Forward Current (I_O) at T_A=25°C:
  1N6620 thru 1N6622: 1.2 Amps
  1N6623 thru 1N6625: 1.0 Amp
  (Derate linearly at 0.67%/°C for T_A>+25°C. This I_O rating is typical for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where $T_{J(max)}$ is not exceeded.)
- Thermal Resistance L= 0.375 inch ($R_{\theta JL}$): 38°C/W
- Capacitance at V_R= 10 V: 10 pF
- Solder temperature: 260°C for 10 s (maximum)

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed voidless hard glass with Tungsten slugs
- TERMINATIONS: Axial-leads are Copper with Tin/Lead (Sn/Pb) finish
- MARKING: Body painted and part number, etc.
- POLARITY: Cathode indicated by band
- Tape & Reel option: Standard per EIA-296
- Weight: 340 mg
- See package dimensions on last page

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ELECTRICAL CHARACTERISTICS @ 25°C

TYPE NUMBER	MINIMUM BREAK-DOWN VOLTAGE V_R I_R = 50µA	MAXIMUM FORWARD VOLTAGE V_F @ I_F		WORKING PEAK REVERSE VOLTAGE V_{RWM}	MAXIMUM REVERSE CURRENT I_R @ V_{RWM} I_R		MAXIMUM REVERSE RECOVERY TIME (LOW CURRENT) t_{rr} Note 1	MAXIMUM REVERSE RECOVERY TIME (HIGH CURRENT) t_{rr} Note 2	PEAK RECOVERY CURRENT I_{RM} (rec) I_F = 2A, 100A/µs Note 2	FORWARD RECOVERY VOLTAGE V_{FRM} Max I_F = 0.5A t_{fr} =12ns
					T_A=25°C	T_A=150°C				
	V	V @ A	V @ A	V	µA	µA	ns	ns	A	V
1N6620	220	1.40V @ 1.2A	1.60V @ 2.0A	200	0.5	150	30	45	3.5	12
1N6621	440	1.40V @ 1.2A	1.60V @ 2.0A	400	0.5	150	30	45	3.5	12
1N6622	660	1.40V @ 1.2A	1.60V @ 2.0A	600	0.5	150	30	45	3.5	12
1N6623	880	1.55V @ 1.0A	1.80V @ 1.5A	800	0.5	150	50	60	4.2	18
1N6624	990	1.55V @ 1.0A	1.80V @ 1.5A	900	0.5	150	50	60	4.2	18
1N6625	1100	1.75V @ 1.0A	1.95V @ 1.5A	1000	1.0	200	60	80	5.0	30

NOTE 1: Low Current Reverse Recovery Time Test Conditions: I_F=0.5A, I_{RM}=1.0A, $I_{R(REC)}$ = 0.25A per MIL-STD-750, Method 4031, Condition B.

NOTE 2: High Current Reverse Recovery Time Test Conditions: I_F = 2 A, di/dt=100 A/µs MIL-STD-750, Method 4031, Condition D.

SYMBOLS & DEFINITIONS

Symbol	Definition
V_{BR}	Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
V_{RWM}	Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range.
V_F	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
I_R	Maximum Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.
C	Capacitance: The capacitance of the TVS as defined @ 0 volts at a frequency of 1 MHz and stated in picofarads.
t_{rr}	Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified recovery decay point after a peak reverse current is reached.

CHARTS AND GRAPHS

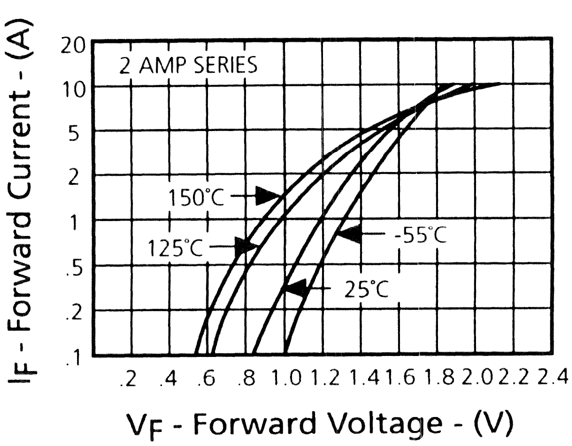

FIGURE 1
Typical Forward Current
vs
Forward Voltage

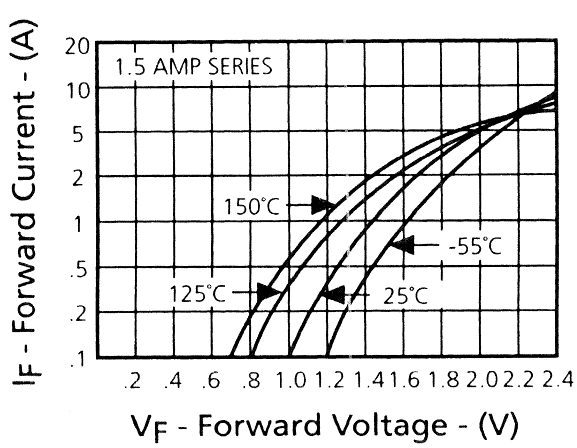

FIGURE 2
Typical Forward Current
vs
Forward Voltage

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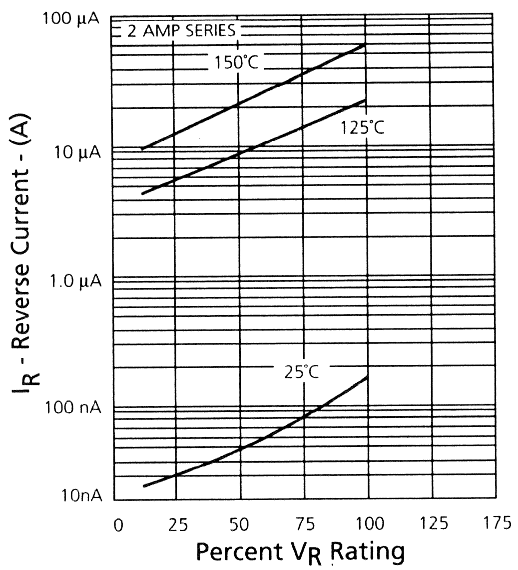

FIGURE 3
Typical Reverse Current vs.
Applied Reverse Voltage

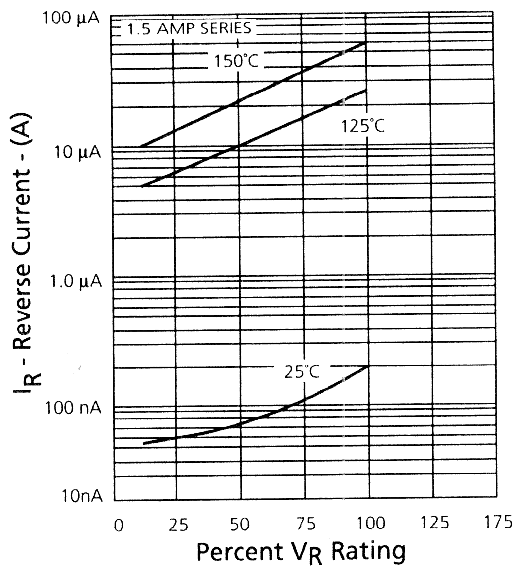

FIGURE 4
Typical Reverse Current vs.
Applied Reverse Voltage

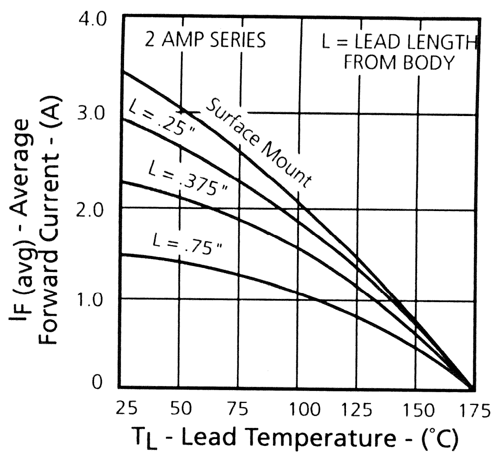

FIGURE 5
Average Forward Current vs.
Lead Temperature (50% Duty Cycle, Square Wave)

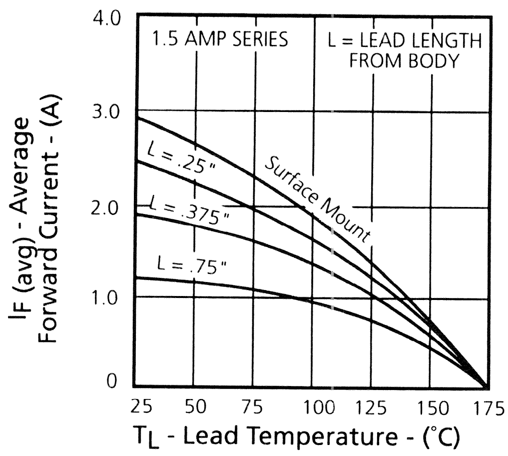

FIGURE 6
Average Forward Current vs
Lead Temperature (50% Duty Cycle, Square Wave)

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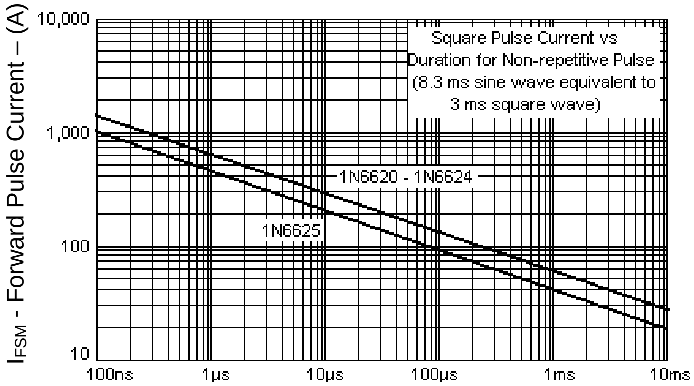
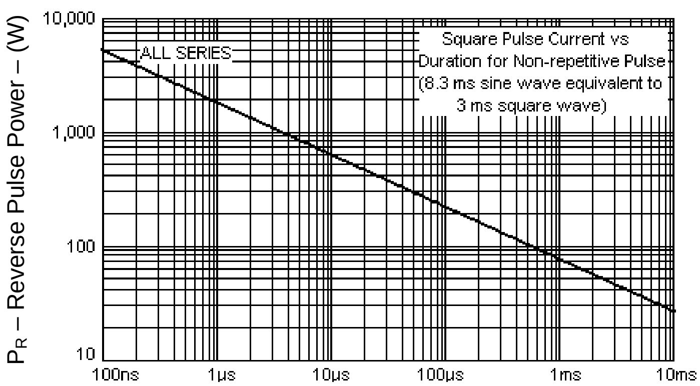
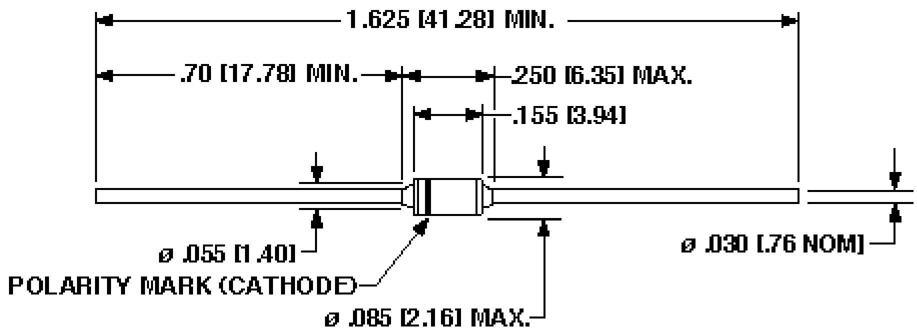


Pulse Duration
FIGURE 7
Forward Pulse Current vs. Pulse Duration



Pulse Duration
FIGURE 8
Reverse Pulse Power vs. Pulse Duration

PACKAGE DIMENSIONS



NOTE: DIMENSIONS IN INCHES [mm]

Lead tolerance = +0.002/-0.003 inches

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