



VOID-LESS HERMETICALLY SEALED ULTRAFAST RECOVERY GLASS RECTIFIERS

Qualified per MIL-PRF-19500/477

Qualified Levels:
JAN, JANTX,
JANTXV and JANS

DESCRIPTION

This "Ultrafast Recovery" rectifier diode series is military qualified and is ideal for high-reliability applications where a failure cannot be tolerated. The industry-recognized 6.0 amp rated rectifiers with working peak reverse voltages from 50 to 150 volts are hermetically sealed with void-less glass construction using an internal "Category 1" metallurgical bond. These devices are available in both surface mount MELF and leaded package configurations. Microsemi also offers numerous other rectifier products to meet higher and lower current ratings with various recovery time requirements including standard, fast and ultrafast device types in both through-hole and surface mount packages.

Important: For the latest information, visit our website <http://www.microsemi.com>.

FEATURES

- JEDEC registered surface mount equivalent of 1N5807, 1N5809, 1N5811 series.
- Void-less hermetically sealed glass package.
- Quadruple-layer passivation.
- Extremely robust construction.
- Internal "Category 1" metallurgical bonds.
- JAN, JANTX, JANTXV and JANS qualifications are available per MIL-PRF-19500/477.
- RoHS compliant versions available (commercial grade only).

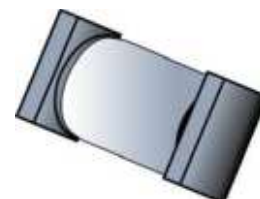
APPLICATIONS / BENEFITS

- Ultrafast recovery 6 amp rectifier series from 50 to 150 V.
- Military, space 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 @ T_A = 25 °C unless otherwise specified

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T _J and T _{STG}	-65 to +175	°C
Thermal Resistance Junction-to-End Cap Figure 1	R _{θJEC}	6.5	°C/W
Thermal Resistance	R _{θJX}	52	°C/W
Working Peak Reverse Voltage:	V _{RWM}	50	V
1N5807		100	
1N5809		150	
1N5811			
Forward Surge Current ⁽³⁾	I _{FSM}	125	A
Average Rectified Output Current @ T _L = +75 °C at 3/8 inch lead length ⁽¹⁾	I _{O1}	6.0	A
Average Rectified Output-Current @ T _A = +55 °C at 3/8 inch lead length ⁽²⁾	I _{O2}	3.0	A
Capacitance @ V _R = 10 V, f = 1 MHz; V _{sig} = 50 mV (p-p)	C _J	60	pF
Reverse Recovery Time ⁽⁴⁾	t _{rr}	30	ns
Solder Temperature @ 10 s	T _{SP}	260	°C

- Notes:**
1. I_{O1} is rated at T_{EC} = 75 °C. Derate at 60 mA/°C for T_{EC} above 75 °C.
 2. I_{O2} is derated at 25 mA/°C above T_A = 55 °C for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where T_{J(max)} 175 °C is not exceeded.
 3. T_A = 25 °C @ I_O = 3.0 A and V_{RWM} for ten 8.3 ms surges at 1 minute intervals.
 4. I_F = 1.0 A, I_{RM} = 1.0 A, I_{R(REC)} = .010 A and di/dt = 100 A/μs min.



"B" MELF Package (US)



"B" MELF Package (URS)

Also available in:

"B" Package
(axial-leaded)

 [1N5807, 09 and 11](#)

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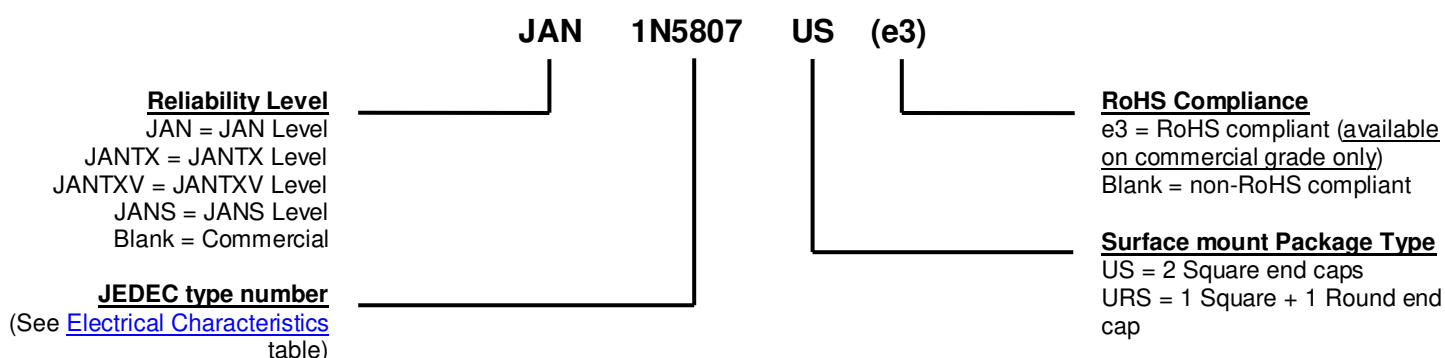
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MECHANICAL and PACKAGING

- CASE: Hermetically sealed void-less hard glass with tungsten slugs.
- TERMINALS: Tin/lead (Sn/Pb) or RoHS compliant matte/tin (commercial grade only) over nickel plate over copper.
- MARKING: Body coated in blue with part number.
- POLARITY: Cathode indicated by band.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities.
- WEIGHT: 539 milligrams.
- See [Package Dimensions](#) on last page.

PART NOMENCLATURE

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.
I_O	Average Rectified Output Current: Output current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.
V_F	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
I_R	Maximum Leakage Current: The maximum leakage current that will flow at the specified voltage and temperature.
C	Capacitance: The capacitance in pF at a frequency of 1 MHz and specified voltage.
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 occurs.

ELECTRICAL CHARACTERISTICS @ $T_A = 25^\circ\text{C}$ unless otherwise stated

	BREAKDOWN VOLTAGE (MIN.) @ 100 μA $V_{(BR)}$	MAXIMUM FORWARD VOLTAGE @ 4 A (8.3 ms pulse) V_{FM}	REVERSE CURRENT (MAX.) @ V_{RWM} I_R	SURGE CURRENT (MAX) I_{FSM} (Note 1)	REVERSE RECOVERY TIME (MAX) t_{rr} (Note 2)
TYPE	Volts	Volts		μA	
		25 $^\circ\text{C}$	125 $^\circ\text{C}$	25 $^\circ\text{C}$	125 $^\circ\text{C}$
1N5807	60	0.875	0.800	5	525
1N5809	110	0.875	0.800	5	525
1N5811	160	0.875	0.800	5	525
				Amps	ns

- NOTES:** 1. $T_A = 25^\circ\text{C}$ @ $I_O = 3.0\text{ A}$ and V_{RWM} for ten 8.3 ms surges at 1 minute intervals.
 2. $I_F = 1.0\text{ A}$, $I_{RM} = 1.0\text{ A}$, $I_{R(REC)} = 0.10\text{ A}$ and $di/dt = 100\text{ A}/\mu\text{s min}$.

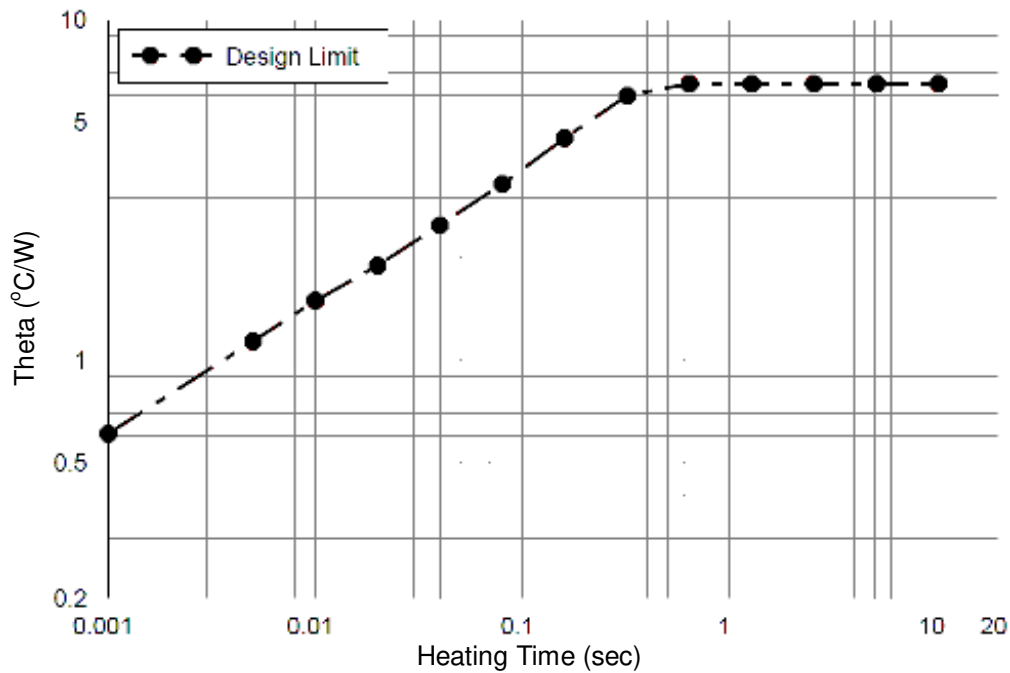
GRAPHS


FIGURE 1
Maximum Thermal Impedance

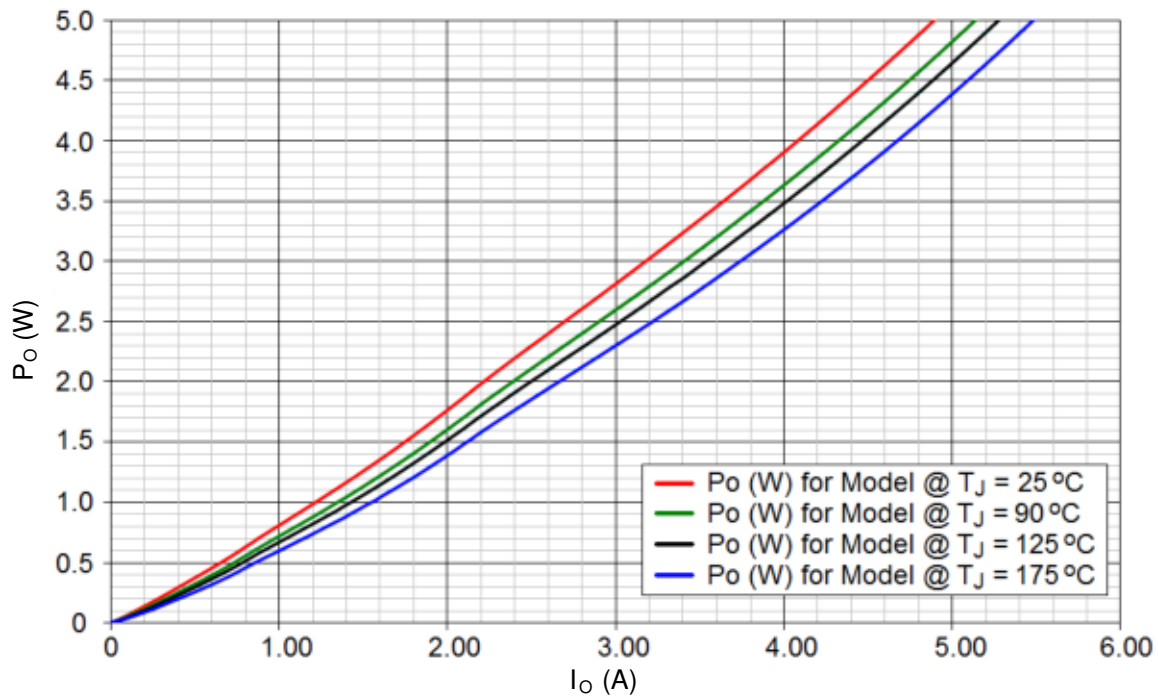
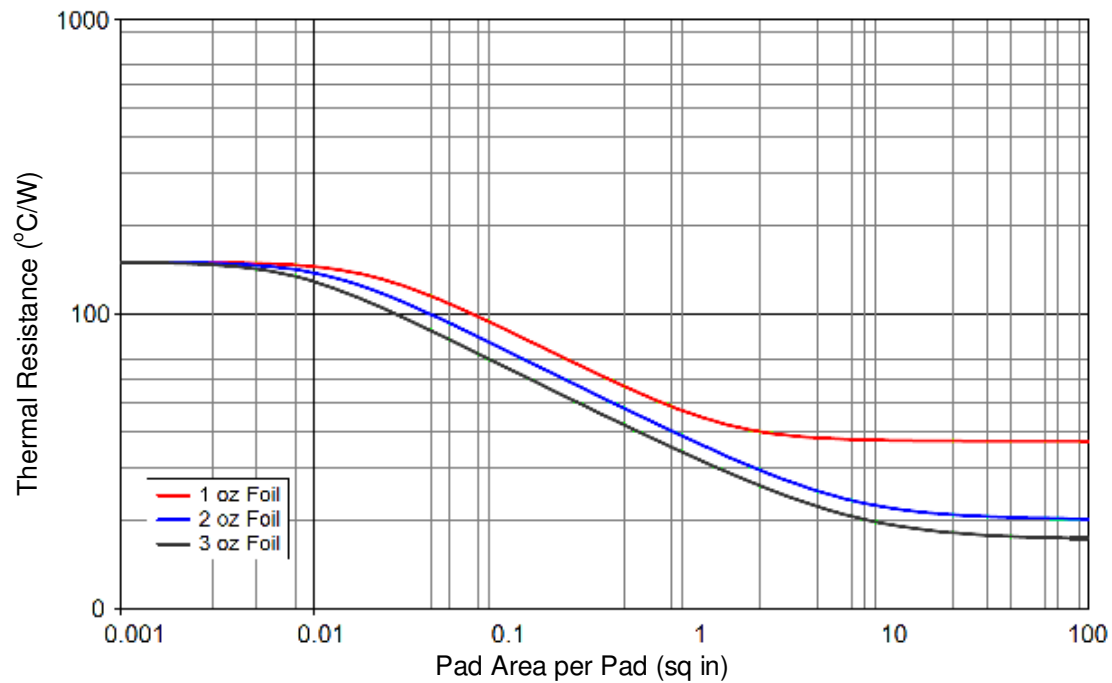
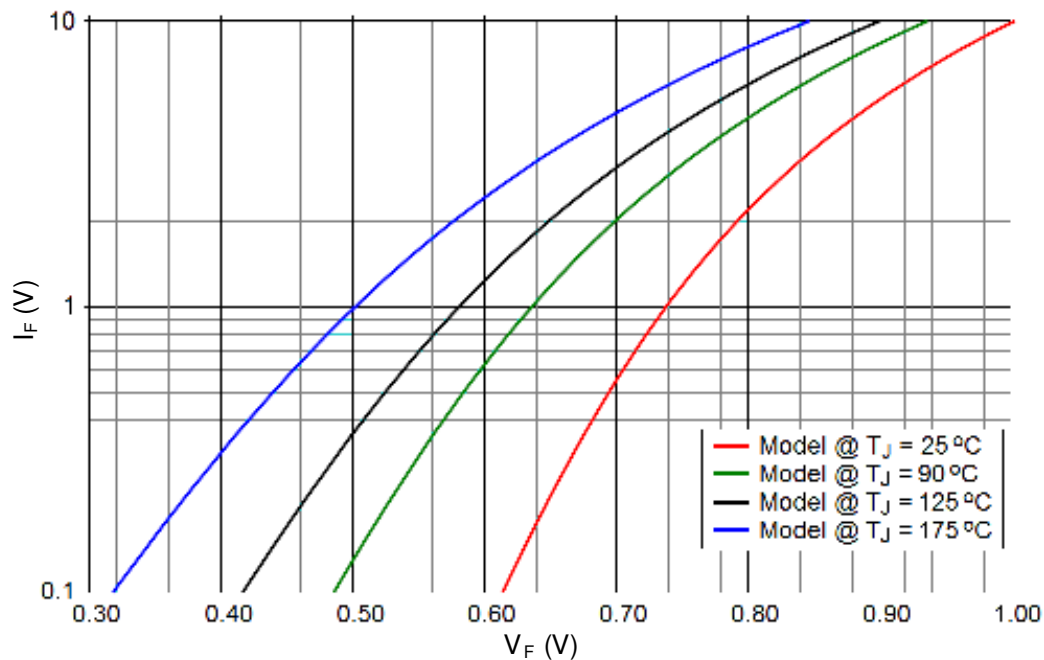


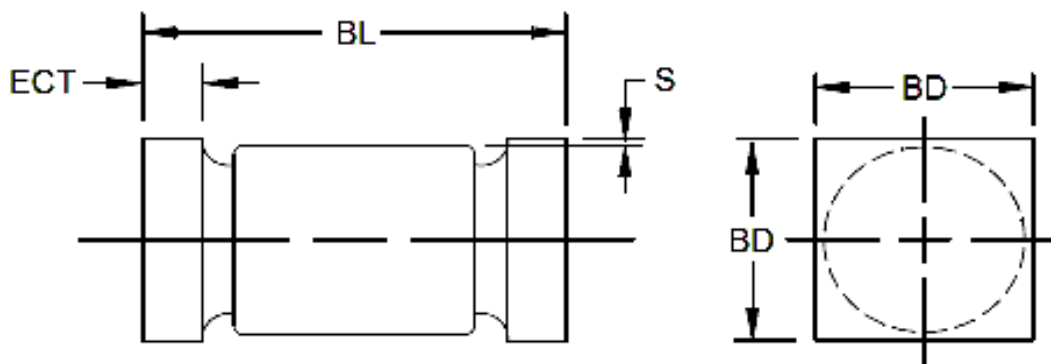
FIGURE 2
Rectifier Power vs I_O (Average Forward Current)

GRAPHS (continued)

FIGURE 3

Thermal Resistance vs FR4 Pad Area At Ambient
PCB horizontal (for each pad) with 1, 2, and 3 oz copper

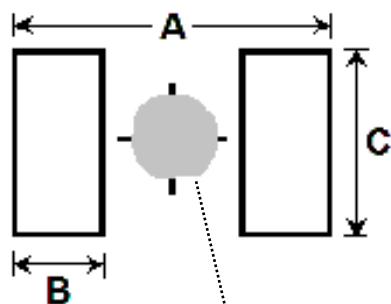

FIGURE 4

Forward Voltage vs Forward Current

PACKAGE DIMENSIONS

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimensions are pre-solder dip.
4. Minimum clearance of glass body to mounting surface on all orientations.
5. Cathode marking to be either in color band, three dots spaced equally or a color dot on the face of the end tab.
6. Color dots will be .020 inch (0.51 mm) diameter minimum and those on the face of the end tab shall not lie within .020 inch (0.51 mm) of the mounting surface.
7. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.
8. On "URS" one end cap shall be square and the other end cap shall be round.

Ltr	DIMENSIONS				Notes
	INCH		MILLIMETERS		
	Min	Max	Min	Max	
BD	.137	.148	3.48	3.76	8
BL	.200	.225	5.08	5.72	
ECT	.019	.028	0.48	0.71	8
S	.003		0.08		

PAD LAYOUT


DIM	INCH	MILLIMETERS
A	0.288	7.32
B	0.070	1.78
C	0.155	3.94

NOTE: If mounting requires adhesive separate from the solder, an additional 0.080 inch diameter contact may be placed in the center between the pads as an optional spot for cement.