



Powermite High Efficiency 2 Amp Ultrafast Rectifier

DESCRIPTION

The Microsemi UPR60e3 Powermite high efficiency rectifiers are RoHS compliant and offers optimized forward voltage characteristics with reverse blocking capabilities up to 600 Volts. They are ideal for surface mount applications that operate at high frequencies. In addition to its size advantages, Powermite package features include a full metallic bottom that eliminates possibility of solder flux entrapment during assembly and a unique locking tab acts as an efficient heat path from die to mounting plane for external heat sinking with very low thermal resistance junction to case (bottom). Its innovative design makes this device ideal for use with automatic insertion equipment.

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

FEATURES

- Low thermal resistance DO-216 package for higher current operation
- Ultrafast recovery time of 30 ns
- Efficient heat path with Integral locking bottom metal tab
- Low forward voltage
- Full metallic bottom eliminates flux entrapment
- Compatible with automatic insertion equipment
- Low profile-maximum height of 1 mm
- RoHS compliant

APPLICATIONS / BENEFITS

- Switching and regulating power supplies
- Charge pump circuits
- Reduces reverse recovery loss with low I_{RM}
- Small 8.45 mm² foot print (See [mounting pad](#) details)
- Replaces wire bonded die with a flip chip package

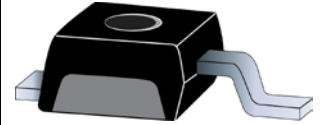
MAXIMUM RATINGS @ 25 °C unless otherwise specified

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T _J and T _{STG}	-55 to +150	°C
Thermal Resistance Junction-to-Tab		30	°C/W
Thermal Resistance Junction-to-Bottom		10	°C/W
Non-Repetitive Peak Forward Surge Current (At 8.3 ms Single half-sine wave)	I _{FSM}	20	A
Working Peak Reverse Voltage	V _{RWM}	600	V
Rated Average Power Dissipation @ T _{TAB} = 75 °C ⁽¹⁾	P _{M(AV)}	2.5	W
Average Rectified Output Current (At rated V _{RWM} , T _C = 75°C)	I _O	2.0	A
Solder Temperature @ 10 s		260	°C

Notes: 1. When mounted on FR-4PC board using 2 oz copper with recommended minimum foot print.

SPICE MODEL UPR60 (SURFACE MOUNT RECTIFIER)

.MODEL UPR60 D(Is = 1.88n N = 1.6 Rs = 0.133 Ikf = 2.37m
+ XTI = 3 EG = 1.11 Cjo = 25p M = .41 Vj = .424 Fc = 0.5
+ Isr = 10n Nr = 2.135 Bv = 600 Ibv = 300n Tt = 62n



DO-216 Package

MSC – Lawrence

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MSC – Ireland

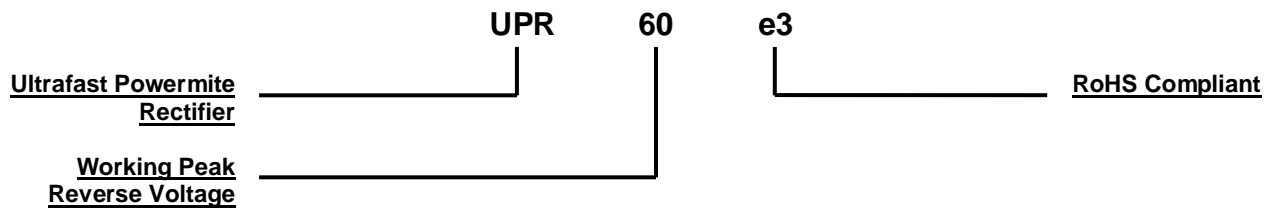
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MECHANICAL and PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy compound meeting UL94V-0
- TERMINALS: Annealed matte-tin plating over copper and readily solderable per MIL-STD-750, method 2026. (Consult factor for tin-lead plating.)
- MARKING: R60• for UPR60e3 (dot indicates “e3” designation)
- POLARITY: Cathode designated by TAB 2
- TAPE & REEL option: 12 mm tape per standard EIA-481-B. Consult factory for quantities.
- WEIGHT: Approximately 0.016 gram
- See [Package Dimensions](#) on last page.

PART NOMENCLATURE

SYMBOLS & DEFINITIONS

Symbol	Definition
C_T	Total Capacitance: The total small signal capacitance between the diode terminals of a complete device.
f	Frequency
I_F	Forward Current: The dc current flowing from the external circuit into the anode terminal
I_{FSM}	Surge Peak Forward Current: The forward current including all nonrepetitive transient currents but excluding all repetitive transients (ref JESD282-B)
I_O	Average Rectified Output Current: The Output Current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.
I_R	Reverse Current: The dc current flowing from the external circuit into the cathode terminal at the specified voltage V_R
I_{REC}	Recovery Current:
V_R	Reverse Voltage: A positive dc cathode-anode voltage below the breakdown region
V_{RWM}	Working Peak Reverse Voltage: The peak voltage excluding all transient voltages (ref JESD282-B). Also sometimes known historically as PIV.

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

Parameter	Symbol	Conditions	Min	Max	Units
Forward Voltage (Note 1)	V_F	$I_F = 2.0\text{ Amps}$		1.6	V
Forward Voltage (Note 1)	V_F	$I_F = 1.2\text{ Amps}$		1.4	V
Reverse Current	I_R	$V_R = 600\text{ V}, T_J = 25\text{ }^\circ\text{C}$		1	μA
Reverse Current	I_R	$V_R = 600\text{ V}, T_J = 125\text{ }^\circ\text{C}$		100	μA
Reverse Recovery Time	t_{rr}	$I_F = 0.5\text{ A}; I_R = 1.0\text{ A}; I_{REC} = 0.25\text{ A}$		30	ns

Note 1: Short duration test pulse used to minimize self – heating effect.

GRAPHS

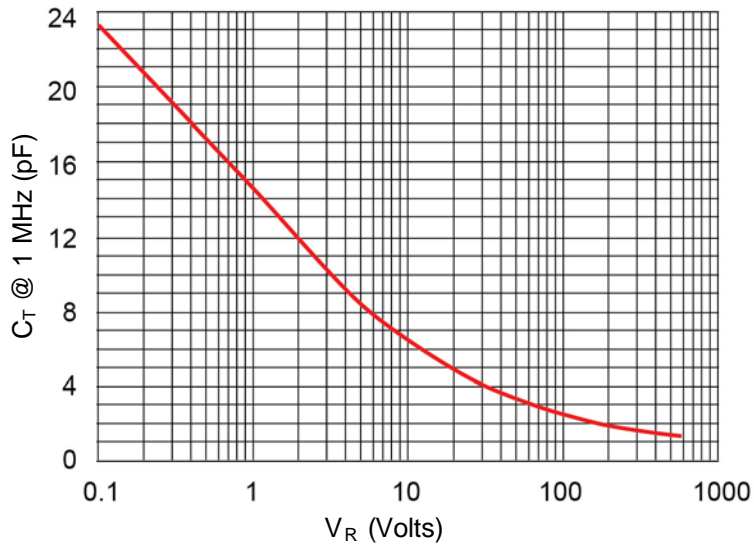


FIGURE 1
Typical Capacitance

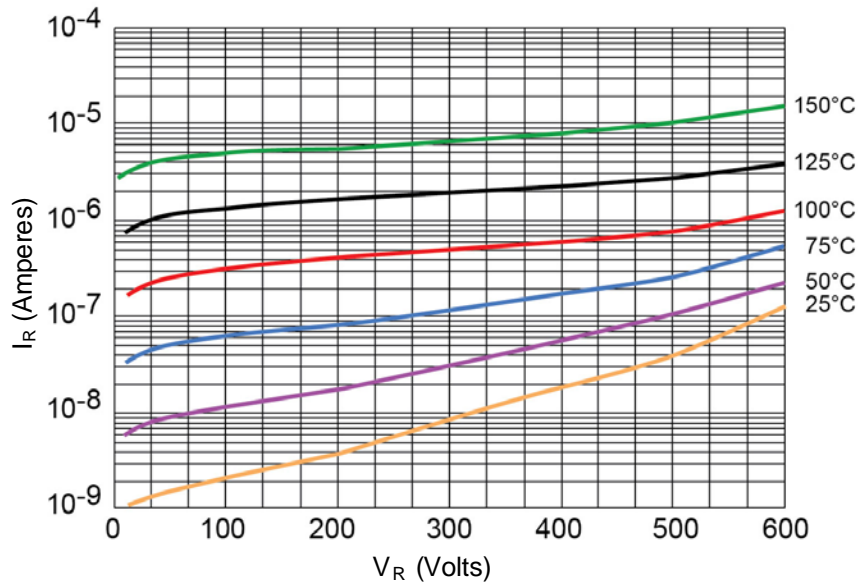


FIGURE 2
Typical Reverse Current versus Voltage

GRAPHS

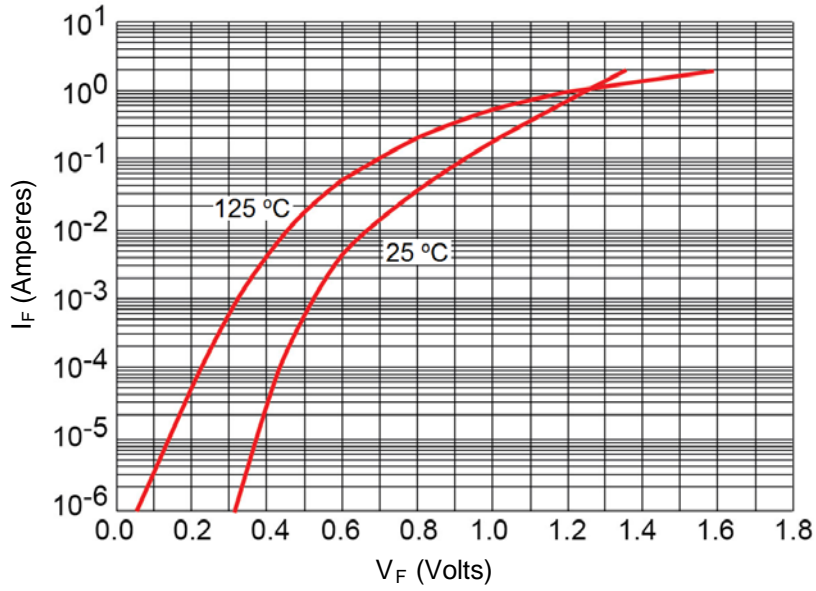
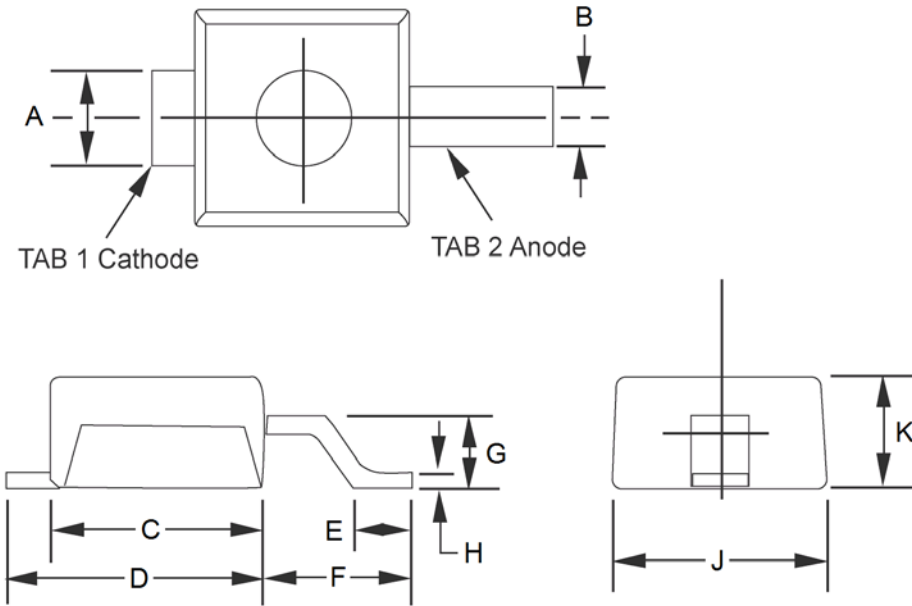
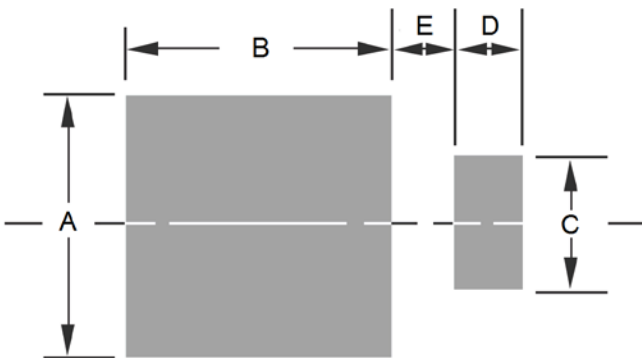


FIGURE 3
Typical Forward Voltage versus Current

PACKAGE DIMENSIONS


Ltr	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A	0.029	0.039	0.73	0.99
B	0.016	0.026	0.40	0.66
C	0.070	0.080	1.77	2.03
D	0.087	0.097	2.21	2.46
E	0.020	0.030	0.50	0.76
F	0.051	0.061	1.29	1.54
G	0.021	0.031	0.53	0.78
H	0.004	0.008	0.10	0.20
J	0.070	0.080	1.77	2.03
K	0.035	0.045	0.89	1.14

MOUNTING PAD DIMENSIONS


Ltr	Dimensions	
	Inch	Millimeters
A	0.100	2.54
B	0.105	2.67
C	0.050	1.27
D	0.030	0.76
E	0.025	0.64