



## Powermite High Efficiency 2.5 Amp Ultrafast Rectifier

### DESCRIPTION

The Microsemi UPR5e3, UPR10e3, and UPR15e3 Powermite high efficiency rectifiers are RoHS compliant and offers optimized forward voltage characteristics with reverse blocking capabilities up to 150 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 25 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.

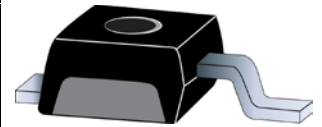
### APPLICATIONS / BENEFITS

- Switching and regulating power supplies
- Charge pump circuits
- Reduces reverse recovery loss with low  $I_{RM}$
- Small 8.45 mm<sup>2</sup> foot print (See [mounting pad](#) details)

### 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)	$I_{FSM}$	25	A
Working Peak Reverse Voltage	$V_{RWM}$	50 100 150	V
		UPR5e3 UPR10e3 UPR15e3	
Average Rectified Output Current (At rated $V_{RWM}$ , $T_C = 75^\circ\text{C}$ )	$I_O$	2.5	A
Solder Temperature @ 10 s		260	°C

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



**DO-216 Package**

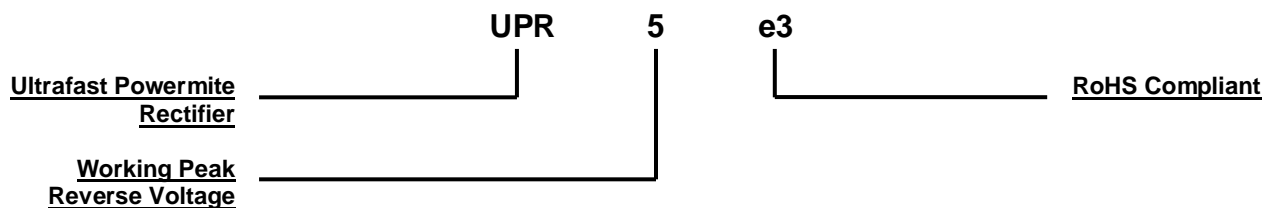
**MSC – Lawrence**  
6 Lake Street,  
Lawrence, MA 01841  
1-800-446-1158  
(978) 620-2600  
Fax: (978) 689-0803

**MSC – Ireland**  
Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

**Website:**  
[www.microsemi.com](http://www.microsemi.com)

**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: R05• for UPR5e3, R10• for UPR10e3, and R15• for UPR15e3 (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.

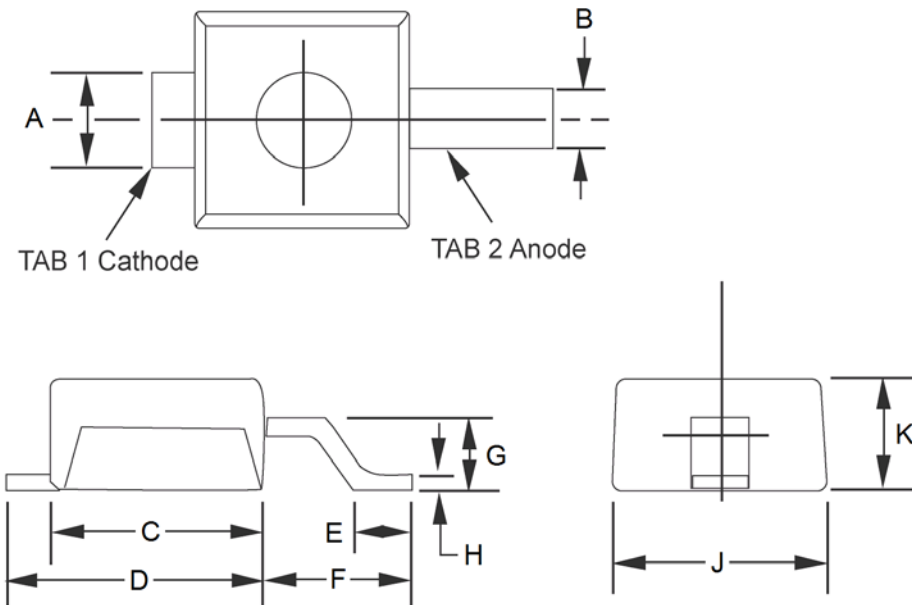
**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

Symbol	Definition
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.

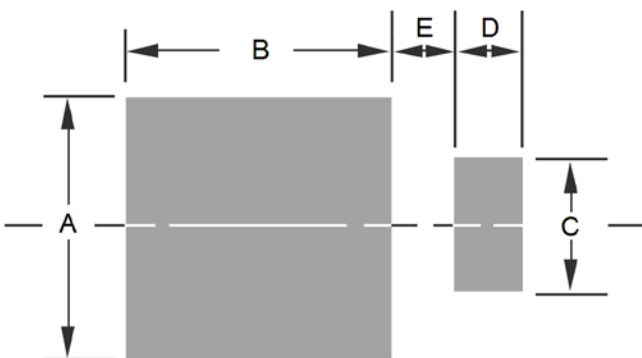
**ELECTRICAL CHARACTERISTICS @  $T_A = +25\text{ }^\circ\text{C}$  unless otherwise noted**

Parameter	Symbol	Conditions	Min	Max	Units
Forward Voltage (Note 1)	$V_F$	$I_F = 2.0\text{ Amps}$		0.975	V
Forward Voltage (Note 1)	$V_F$	$I_F = 2.0\text{ Amps}, T_J = 100\text{ }^\circ\text{C}$		0.895	V
Reverse Current	$I_R$	$V_R = V_{RWM}, T_J = 25\text{ }^\circ\text{C}$		2.0	$\mu\text{A}$
Reverse Current	$I_R$	$V_R = V_{RWM}, T_J = 100\text{ }^\circ\text{C}$		50	$\mu\text{A}$
Reverse Recovery Time	$t_{rr}$	$I_F = 0.5\text{ A}; I_R = 1.0\text{ A}; I_{REC} = 0.25\text{ A}$		25	ns

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

**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

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