

10 Amp Schottky Barrier Rectifier
PowerDI™ 5

DESCRIPTION

The UPDS1045 offers a small and powerful surface mount package for a 45 Volt 10 Amp rated Schottky with very low forward voltage and low leakage current. For critical applications requiring very fast switching, these Schottky higher reverse voltage ratings with their “hot carrier” features provide extremely fast switching to replace conventional ultrafast rectifiers. The very low thermal resistance of the PowerDI™5 package design permits cooler operating junction temperatures for minimal reverse leakage currents and lower power loss.

APPEARANCE



PowerDI™5

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

FEATURES

- Guard ring die construction for transient protection
- Low power loss, high efficiency
- Low forward voltage drop
- Low reverse leakage current
- High junction temperature capability
- High forward surge current capability
- Environmentally friendly molding compound (no Br, Sb)
- Low inductive parasitics for minimal Ldi/dt effects
- Lead-Free Finish & RoHS Compliant per EU Directive Rev 13.2.2003 (glass and high temperature solder exemptions per Annex Notes 5 and 7 therein)

APPLICATIONS / BENEFITS

- Silicon Schottky (hot carrier) rectifier for minimal t_{rr} and elimination of reverse-recovery oscillations to reduce need for EMI filtering
- For use in high-frequency switching power supplies, inverters, free wheeling, polarity protection, and “O-Ring” applications
- Low power loss and high efficiency
- Robust package configuration for pick-and-place handling
- Full-metallic bottom eliminates flux entrapment

MAXIMUM RATINGS

- Junction and Storage Temperature (T_J, T_{STG}): -65 to +150°C
- Average Rectified Output Current (I_O): 10 Amps for Single phase, half wave, 60Hz, resistive or inductive load (also see Figure 5). For capacitive load, derate current by 20%.
- Peak Repetitive Reverse Voltage (V_{RRM}): 45 V Working Peak Reverse Voltage (V_{RWM}): 45 V DC Blocking Voltage (V_R): 45 V
- RMS Reverse Voltage ($V_{R(RMS)}$): 32 V
- Non-Repetitive Peak Forward Surge Current @ 8.3 ms Single half sine-wave Superimposed on Rated Load (I_{FSM}): 275A
- Thermal Resistance Junction to case bottom ($R_{\theta JC}$) or Soldering Point ($R_{\theta JS}$): 0.8°C/W
- Thermal Resistance ($R_{\theta JA}$): 85°C/W (Note 1), 70°C/W (Note 2), 40°C/W (Note 3) junction to ambient air (see last page)

Notes: 1. FR-4 PCB, 2 oz. Copper, minimum recommended pad layout (pg 4)
2. Polyimide PCB, 2 oz. Copper, minimum recommended pad layout (pg 4)
3. Polyimide PCB, 2 oz. Copper with larger Cathode pad dimensions 13.2 mm x 10.1 mm and Anode pad dimensions 4.0 mm x 2.2 mm

MECHANICAL AND PACKAGING

- Case Material: Molded Plastic, Environmentally Friendly “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C.
- Terminals: Finish – Matte Tin annealed over Copper lead frame (€3 per JESD97) Solderable per MIL-STD-202, Method 208
- Marking: See marking information on page 3
- Polarity: See diagram in “Dimensions & Schematic” (page 4)
- Weight: 0.096 grams (approx.)
- Tape & Reel Option: 5000/reel (13”)

ELECTRICAL CHARACTERISTICS @ 25°C unless specified otherwise

Part Number	Working Peak Reverse Voltage	Maximum RMS Voltage	Minimum Reverse Breakdown Voltage (Note 1)	Maximum Forward Voltage (Note 3)		Maximum Reverse Current (Note 1 & 2)		Maximum Reverse Current (Note 1 & 2)	
	V_{RWM}	$V_{R(RMS)}$	$V_{BR} @ 1.0 \text{ mA}$	$V_F @ 5A$	$V_F @ 10A$	$I_R @ 35 \text{ V}$	$I_R @ 45 \text{ V}$	$I_R @ 35 \text{ V}$	$I_R @ 45 \text{ V}$
	Volts	Volts	Volts	Volts	Volts	mA	mA	mA	mA
UPDS1045	45	32	45	0.45	0.51	0.3	0.6	25	150

NOTE 1: Short duration test pulse used to minimize self-heating effect.
 NOTE 2: See Figures 2 & 3 for typical values at other voltages and temperatures.
 NOTE 3: See Figure 1 for typical values at various temperatures

GRAPHS

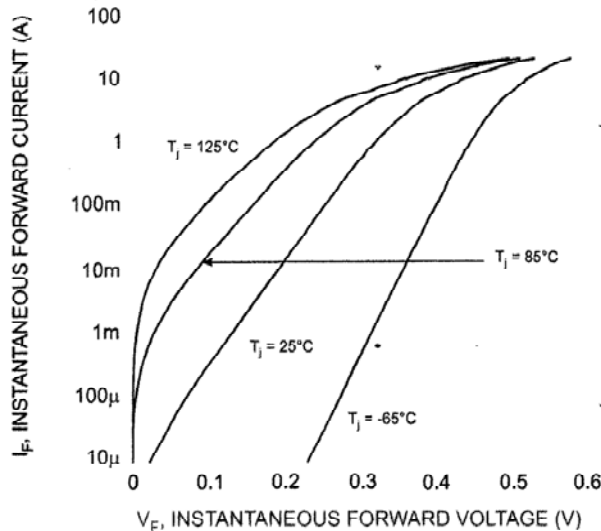


Fig. 1 Typical Forward Characteristics

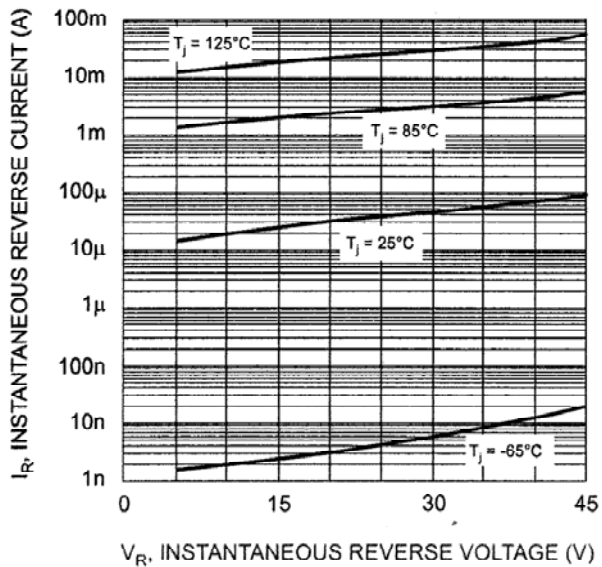


Fig. 2 Typical Reverse Characteristics

10 Amp Schottky Barrier Rectifier
PowerDI™ 5

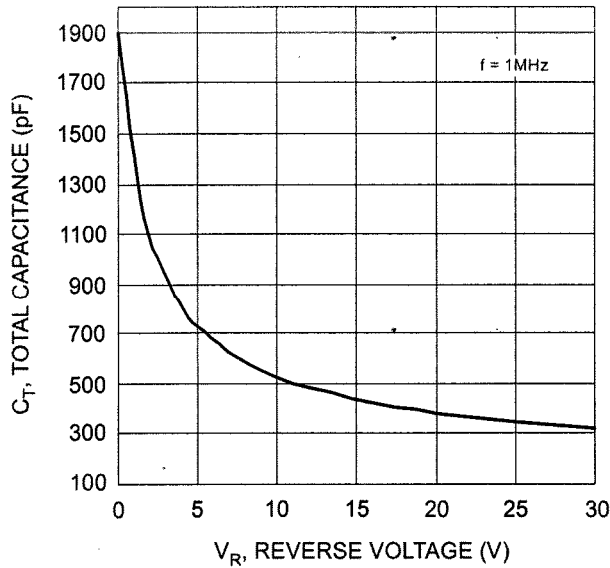


Fig. 3 Typical Total Capacitance vs. Reverse Voltage

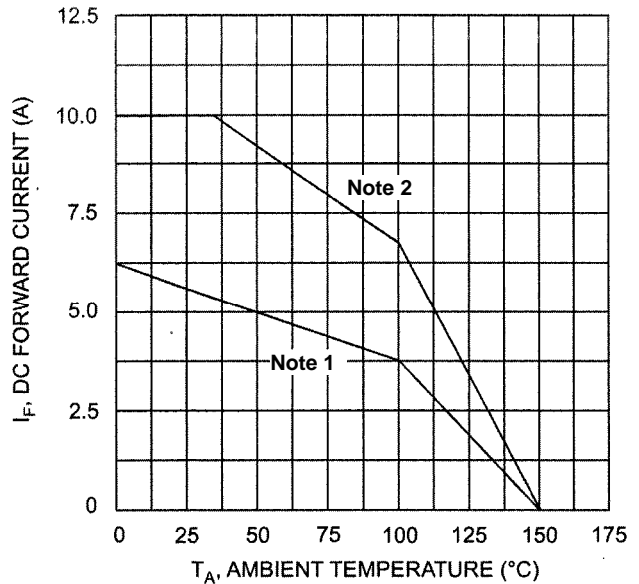


Fig. 4 DC Forward Current Derating

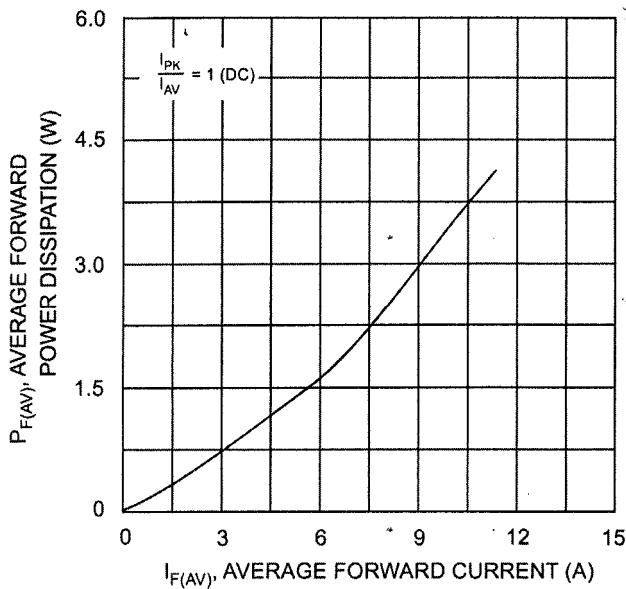


Fig. 5 Forward Power Dissipation

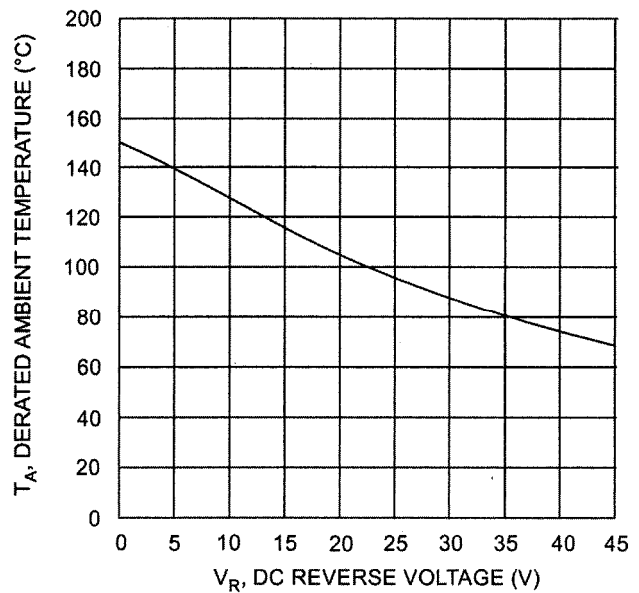
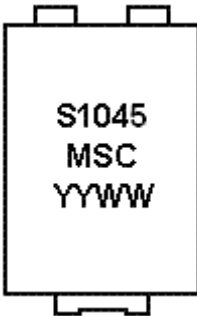


Fig. 6 Operating Temperature Derating

NOTE 1: FR-4 PCB, 2 oz. Copper, minimum recommended pad layout (see mounting pad illustration)

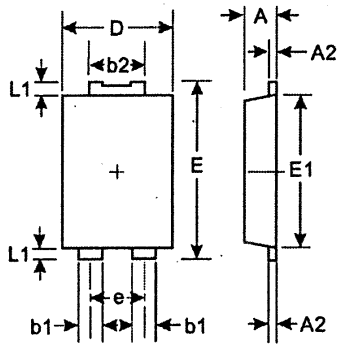
NOTE 2: Polyimide PCB, 2 oz. Copper. Cathode pad dimensions 18.8 mm x 14.4 mm. Anode pad dimensions 5.6 mm x 3.0 mm.

MARKING INFORMATION

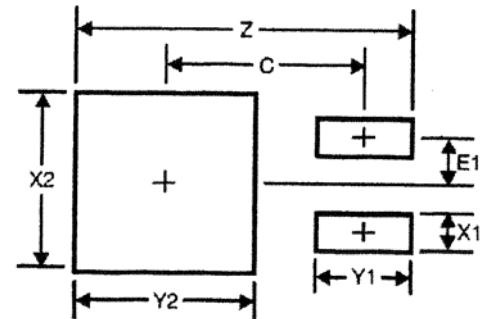


S1045 = Product type marking code.
MSC = Manufacturers' code marking
YYWW = Date code marking
YY = Last digit of year ex: 04 for 2004
WW = Week code 01 to 52

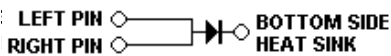
DIMENSIONS



PowerDI™5		
Dim	Min	Max
A	1.05	1.15
A2	0.33	0.43
b1	0.80	0.99
b2	1.70	1.88
D	3.90	4.05
D2	3.05 NOM	
E	6.40	6.60
e	1.84 NOM	
E1	5.30	5.45
E2	3.55 NOM	
L	0.75	0.95
L1	0.50	0.65
W	1.20	1.50
All Dimensions in mm		



PAD dimensions (mm)	
Z	6.6
X1	1.4
X2	3.6
Y1	0.8
Y2	4.7
C	3.87
E1	0.9



Note: Pins Left & Right must be electrically connected at the printed circuit board

PowerDI™5