# UPS540e3

## 5 A Schottky Barrier Rectifier

## DESCRIPTION

This UPS540e3 in the Powermite3® package is a high efficiency Schottky rectifier that is also RoHS compliant offering high current/power capabilities previously found only in much larger packages. They are ideal for SMD applications that operate at high frequencies. In addition to its size advantages, the Powermite3® package includes a full metallic bottom that eliminates the possibility of solder flux entrapment during assembly and a unique locking tab act as an efficient heat path to the heat-sink mounting. Its innovative design makes this device ideal for use with automatic insertion equipment.

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

## ABSOLUTE MAXIMUM RATINGS AT 25º C (UNLESS OTHERWISE SPECIFIED)

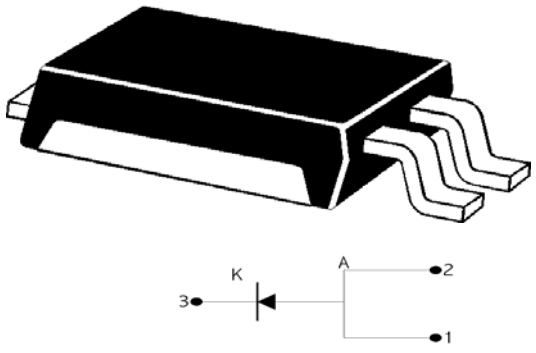
| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 40 | V |
| RMS Reverse Voltage | $V_{R(RMS)}$ | 28 | V |
| Average Rectified Output Current | $I_o$ | 5 | A |
| Non-Repetitive Peak Forward Surge Current 8.3ms Single half sine wave Superimposed on Rated Load@ $T_c$ =90 ºC | $I_{FSM}$ | 100 | A |
| Storage Temperature | $T_{STG}$ | -55 to +150 | ºC |
| Junction Temperature | $T_J$ | -55 to +125 | ºC |

## THERMAL CHARACTERISTICS

| Thermal Resistance | | | |
|---|---|---|---|
| Junction-to-case (bottom) | $R_{\theta JC}$ | 3.2 | ºC/ Watt |
| Junction to ambient (1) | $R_{\theta JA}$ | 65 | ºC/ Watt |

(1) When mounted on FR-4 PC board using 2 oz copper with recommended minimum foot print

**Powermite 3™**




## KEY FEATURES

- Very low thermal resistance package
- RoHS Compliant with e3 suffix part number
- Guard-ring-die construction for transient protection
- Efficient heat path with Integral locking bottom metal tab
- Low forward voltage
- Full metallic bottom eliminates flux entrapment
- Compatible with automatic insertion
- Low profile-maximum height of 1mm
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, and JANTXV are available by adding MQ, MX, or MV prefixes respectively to part numbers. For example, designate MXUPS540e3 for a JANTX (consult factory for Tin-Lead plating).
- Optional 100% avionics screening available by adding MA prefix for 100% temperature cycle, thermal impedance and 24 hours HTRB (consult factory for Tin-Lead plating)

## APPLICATIONS/BENEFITS

- Switching and Regulating Power Supplies.
- Silicon Schottky (hot carrier) rectifier for minimal reverse voltage recovery
- Elimination of reverse-recovery oscillations to reduce need for EMI filtering
- Charge Pump Circuits
- Reduces reverse recovery loss with low $I_{RM}$
- Small foot print
  190 X 270 mils (1:1 Actual size)
  See mounting pad details on pg 3

## MECHANICAL & PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy compound meeting UL94V-0
- FINISH: Annealed matte-Tin plating over copper and readily solderable per MIL-STD-750 method 2026 (consult factory for Tin-Lead plating)
- POLARITY: See figure (left)
- MARKING: S540•
- WEIGHT: 0.072 gram (approx.)
- Package dimension on last page
- Tape & Reel option: 16 mm tape per Standard EIA-481-B, 5000 on 13" reel

| ELECTRICAL PARAMETERS @ 25°C (unless otherwise specified) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Conditions** | **Min** | **Typ.** | **Max** | **Units** |
| Forward Voltage (Note 1) | $V_F$ | $I_F$ = 5 A , $T_j$ = 25 °C<br>$I_F$ = 5 A , $T_j$ = 125 °C<br>$I_F$ = 10 A , $T_j$ = 25 °C<br>$I_F$ = 10 A , $T_j$ = 125 °C | | 0.47<br>0.45<br>0.62<br>0.59 | 0.54 | V |
| Reverse Break Down Voltage (Note 1) | $V_{BR}$ | $I_R$ = 0.5 mA | 40 | | | V |
| Reverse Current (Note1) | $I_F$ | $V_R$ = 40 V, $T_j$ = 25°C<br>$V_R$ = 40 V, $T_j$ =125 °C | | 0.030<br>2.5 | 0.5<br>20 | mA |
| Capacitance | $C_T$ | $V_R$ = 4 V; F = 1 MHz | | 250 | | pF |

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

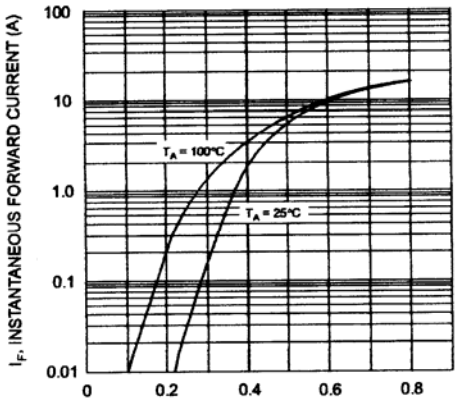


Fig. 1 Typical Forward Characteristics

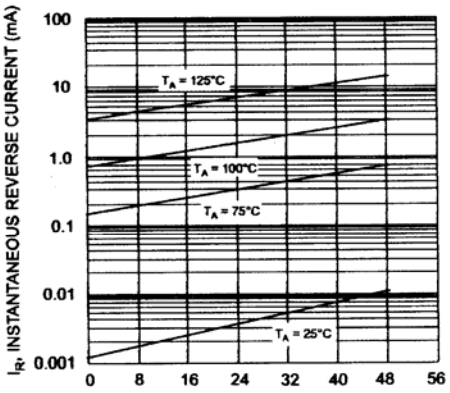


Fig. 2 Typical Reverse Characteristics

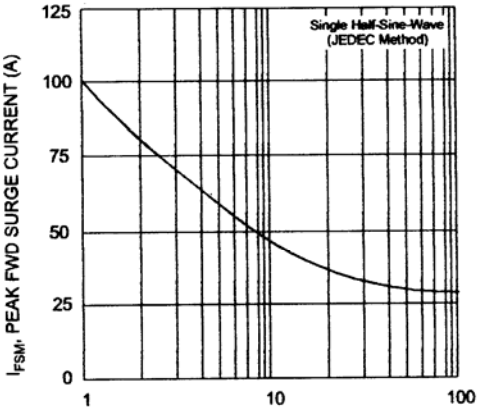


Fig. 3 Max Non-Repetitive Peak Fwd Surge Current

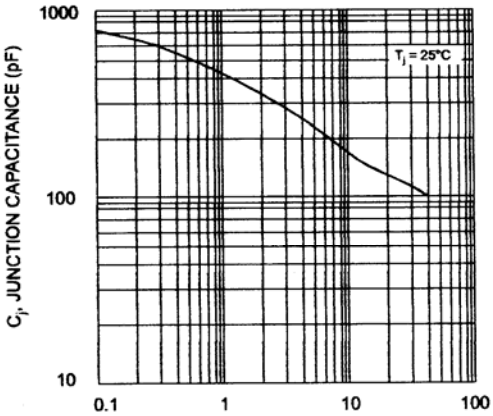


Fig. 4 Typical Junction Capacitance

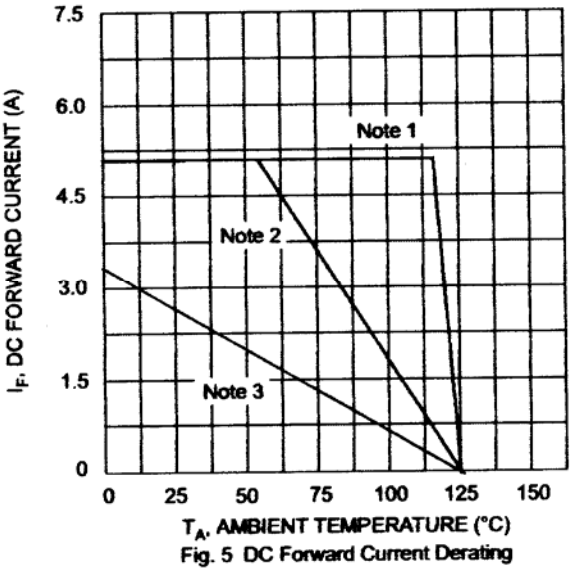



Fig. 5 DC Forward Current Derating

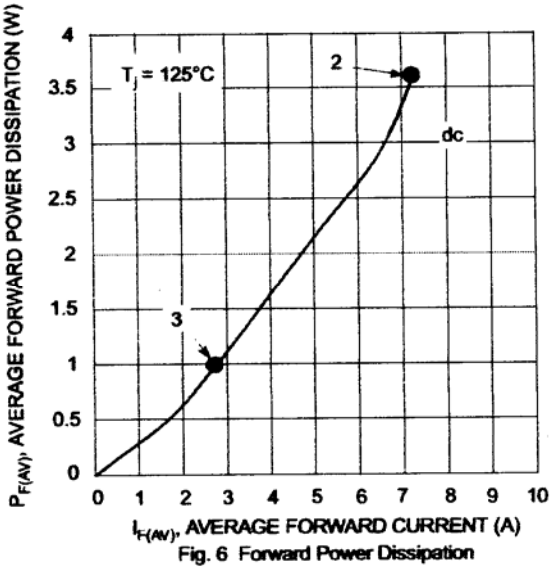
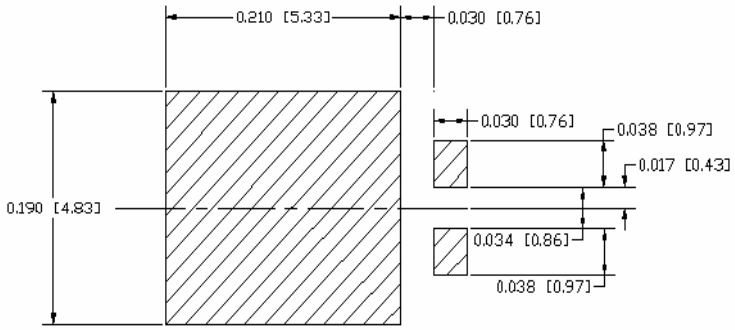


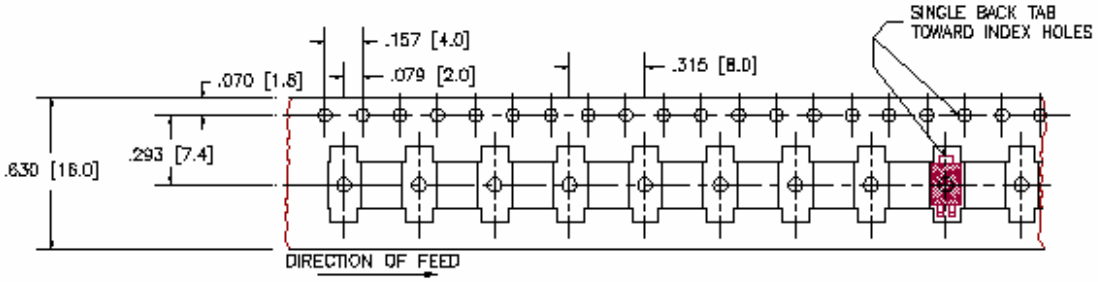

Fig. 6 Forward Power Dissipation

Notes: 1. $T_A = T_{SOLDERING\ POINT}$, $R_{\Theta JS}$=3.2°C/W, $R_{\Theta sa}$ = 0º C/W.
2. Device mounted on GETEK substrate, 2" x 2", 2 oz. copper , double-sided , cathode pad dimensions 0.75" x 1.0", anode pad dimensions 0.25" x 1.0". $R_{\Theta JA}$ in range of 15-30° C/W.
3. Device mounted on FRA-4 substrate, 2" x 2", 2 oz. copper, single-sided, pad layout $R_{\Theta JA}$ in range of 65° C/W. See mounting pad below.

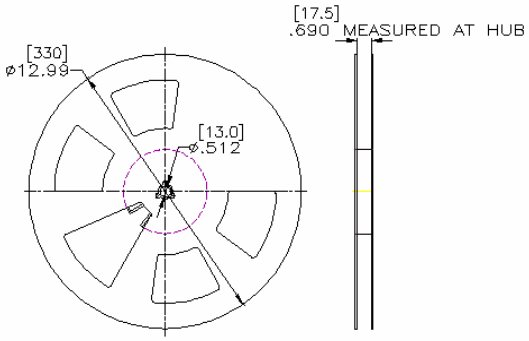



Mounting Pad Dimensions: inches [mm]

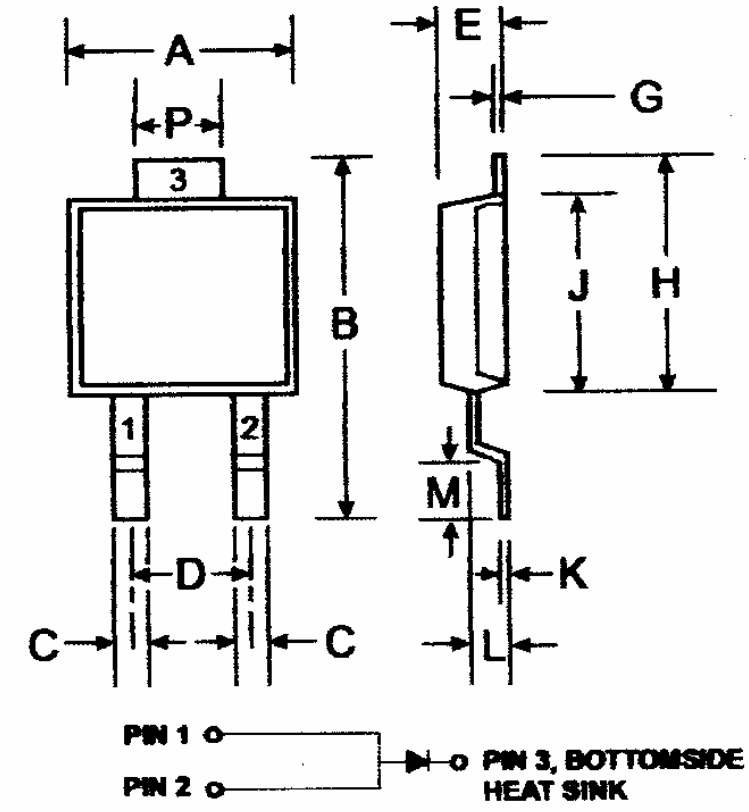
16 mm TAPE




13 INCH REEL



## DIMENSIONS




Note: Pins 1 & 2 must be electrically connected at the printed circuit board.

| POWERMITE®3 | | |
|---|---|---|
| Dim | Min | Max |
| A | 4.03 | 4.09 |
| B | 6.40 | 6.61 |
| C | .889 NOM | |
| D | 1.83 NOM | |
| E | 1.10 | 1.14 |
| G | .178 NOM | |
| H | 5.01 | 5.17 |
| J | 4.37 | 4.43 |
| K | .178 NOM | |
| L | .71 | .77 |
| M | .36 | .46 |
| P | 1.73 | 1.83 |
| All Dimensions in mm | | |

NOTES: