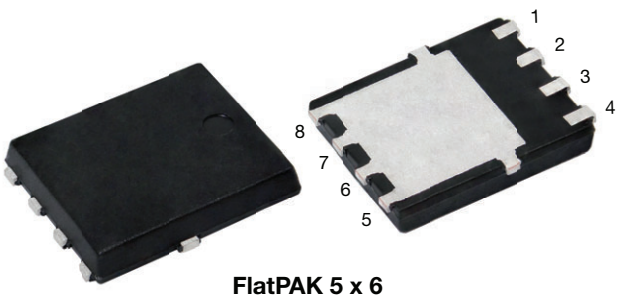
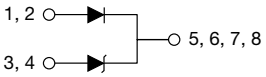
## Two-in-One Solution Surface-Mount




**FlatPAK 5 x 6**




### FEATURES

- Automotive two-in-one solution for rectifier and TRANSZORB® TVS
- Oxide planar chip junction
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

### TYPICAL APPLICATIONS

Secondary protection for sensor units, distributed airbag modules and low power DC / DC converters under power distributer

### MECHANICAL DATA

**Case:** FlatPAK 5 x 6

Molding compound meets UL 94 V-0 flammability rating

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HM3 suffix meets JESD 201 class 2 whisker test

### LINKS TO ADDITIONAL RESOURCES

3D Models

| PRIMARY CHARACTERISTICS | | |
|---|---|---|
| Standard Rectifier | $I_{F(AV)}$ | 3 A |
| | $V_{RRM}$ | 600 V |
| | $I_{FSM}$ | 40 A |
| | $V_F$ at $I_F$ = 3A ($T_J$ = 125 °C | 0.86 V |
| Transient Voltage Suppressors | $V_{BR}$ | 27 V |
| | $V_{WM}$ | 23.1 V |
| | $P_{PPM}$ | 200 W |
| $T_J$ max. | 175 °C | |
| Package | FlatPAK 5 x 6 | |
| Circuit configuration | Common cathode | |

| MAXIMUM RATINGS ($T_A$ = 25 °C unless otherwise noted) | | | | |
|---|---|---|---|---|
| **TECHNOLOGY** | **PARAMETER** | **SYMBOL** | **R3T2FPHM3** | **UNIT** |
| | Device marking code | | R3T2FP | |
| Standard Rectifier | Maximum repetitive peak reverse voltage | $V_{RRM}$ | 600 | V |
| | Maximum DC forward current | $I_{F(AV)}$ (1) | 3 | A |
| | | $I_{F(AV)}$ (2) | 2 | |
| | Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$ | 40 | A |
| Transient Voltage Suppressors | Peak pulse power dissipation with a 10/1000 µs waveform (3) | $P_{PPM}$ | 200 | W |
| | Peak pulse current with a 10/1000 µs waveform (3) | $I_{PPM}$ | 5.3 | A |
| Operating junction temperature range | | $T_J$ (4) | -55 to +175 | °C |
| Storage temperature range | | $T_{STG}$ | -55 to +175 | °C |

**Notes**

(1) Mounted on 3 x 3 cm aluminum pad area

(2) Free air mounted on recommended pad area

(3) Non-repetitive current pulse per Fig.10 and derated above $T_A$ = 25 °C per Fig.8

(4) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$

| **ELECTRICAL CHARACTERISTICS** ($T_J$ = 25 °C unless otherwise noted) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **TECHNOLOGY** | **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Standard Rectifier | Instantaneous forward voltage | $I_F$ = 1.5 A | $T_J$ = 25 °C | $V_F$ (1) | - | 0.91 | - | V |
| | | $I_F$ = 3A | $T_J$ = 25 °C | | - | 0.97 | 1.1 | |
| | | $I_F$ = 1.5 A | $T_J$ = 125 °C | | - | 0.79 | - | |
| | | $I_F$ = 3 A | $T_J$ = 125 °C | | - | 0.86 | 0.98 | |
| | Reverse current | Rated $V_R$ | $T_J$ = 25 °C | $I_R$ (2) | - | - | 10 | µA |
| | | | $T_J$ = 125 °C | | - | 13 | 100 | |
| | Typical reverse recovery time | $I_F$ = 0.5 A, $I_R$ = 1.0 A, $I_{rr}$ = 0.25 A | | $t_{rr}$ | - | 1.5 | - | µs |
| | Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | - | 19 | - | pF |
| Transient Voltage Suppressors | Breakdown Voltage (3) | $I_T$ =1.0 mA | | $V_{BR}$ | 25.7 | 27.0 | 28.4 | V |
| | Stand-off Voltage | | | $V_{WM}$ | - | 23.1 | - | V |
| | Maximum Reverse Leakage | Rated $V_{WM}$ | | $I_D$ | - | - | 0.5 | µA |
| | Maximum Clamping Voltage | $I_{PPM}$ = 5.3 A, 10/1000 µs waveform | | $V_C$ | - | - | 37.5 | V |
| | Typical junction capacitance | 0 V | | $C_J$ | | 330 | | pF |
| | Typical junction capacitance | 23.1 V | | $C_J$ | | 95 | | pF |

**Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle
(2) Pulse test: pulse width ≤ 5 ms
(3) Pulse test: $t_p$ ≤ 50 ms

| **IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS** ($T_A$ = 25 °C unless otherwise noted) | | | | | |
|---|---|---|---|---|---|
| **STANDARD** | **TEST TYPE** | **TEST CONDITIONS** | **SYMBOL** | **CLASS** | **VALUE** |
| AEC-Q101-001 | Human body model (contact mode) | C = 100 pF, R = 1.5 kΩ | $V_C$ | H3B | > 8 kV |
| AEC-Q101-005 | Charged device model (CDM) | V = 500 V | | C3 | > 1 kV |
| IEC 61000-4-2 (2) | Contact mode | C = 150 pF, R = 330 Ω | | 4 | > 8 kV |
| | Air-discharge mode (1) | C = 150 pF, R = 330 Ω | | 4 | > 15 kV |

**Notes**

(1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance > 30 kV
(2) System ESD standard

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | |
|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Thermal resistance per diode | $R_{\theta JA}$ (1)(2) | 80 | - | °C/W |
| | $R_{\theta JM}$ (3) | 3.0 | 4.0 | |

**Notes**

(1) The heat generated must be less than thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$
(2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint
(3) Thermal resistance junction-to-mount to follow JEDEC® 51-14 transient dual interface test method (TDIM)

| **ORDERING INFORMATION** (Example) | | | | |
|---|---|---|---|---|
| **PREFERRED P/N** | **UNIT WEIGHT (g)** | **PREFERRED PACKAGE CODE** | **BASE QUANTITY** | **DELIVERY MODE** |
| R3T2FPHM3/I (1) | 0.10 | I | 6000 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES FOR RECTIFIERS ($T_A$ = 25 °C unless otherwise noted)

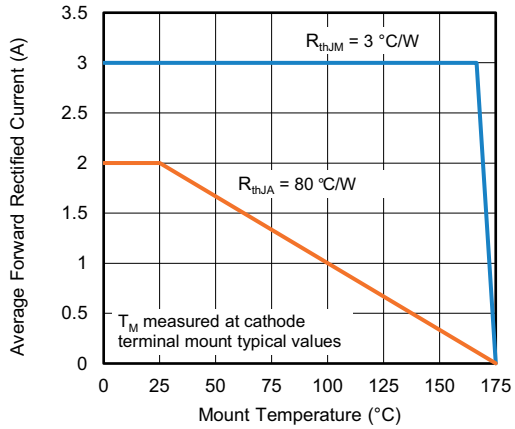



Fig. 1 - Maximum Forward Derating Curve

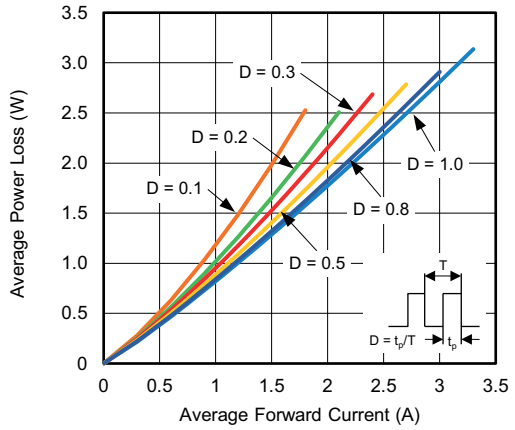



Fig. 2 - Forward Power Loss Characteristics

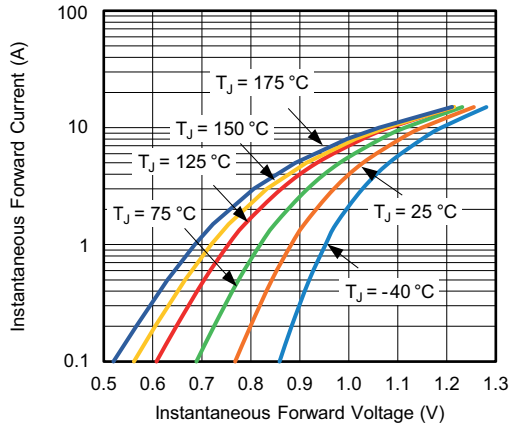



Fig. 3 - Typical Instantaneous Forward Characteristics

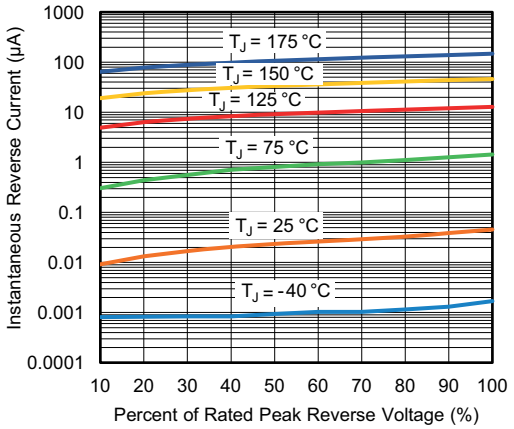



Fig. 4 - Typical Reverse Leakage Characteristics

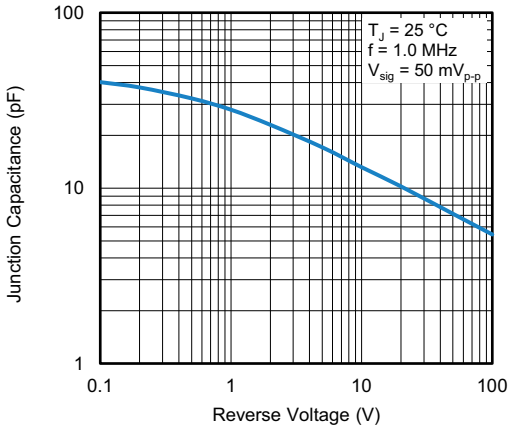



Fig. 5 - Typical Junction Capacitance

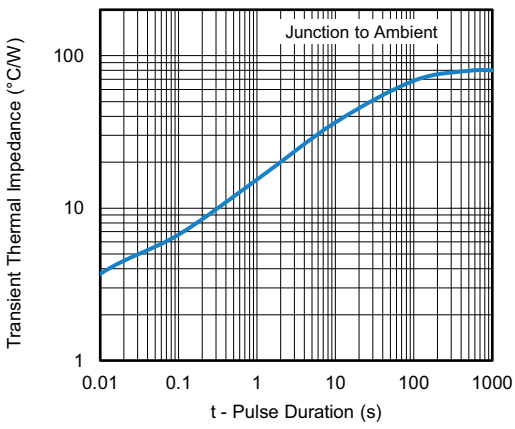



Fig. 6 - Typical Transient Thermal Impedance

## RATINGS AND CHARACTERISTICS CURVES FOR TVS ($T_A$ = 25 °C unless otherwise noted)

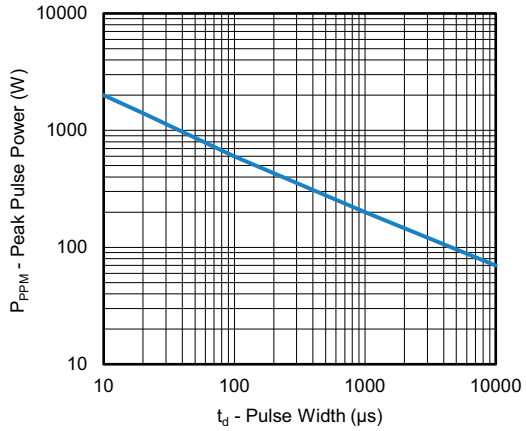



Fig. 7 - Peak Pulse Power Derating Curve

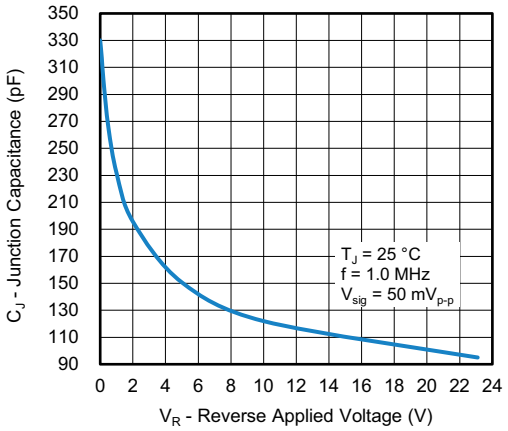



Fig. 9 - Typical Junction Capacitance

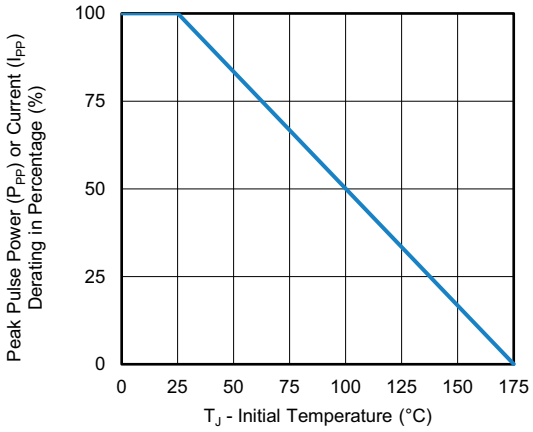



Fig. 8 - Pulse Power or Current vs. Initial Junction Temperature

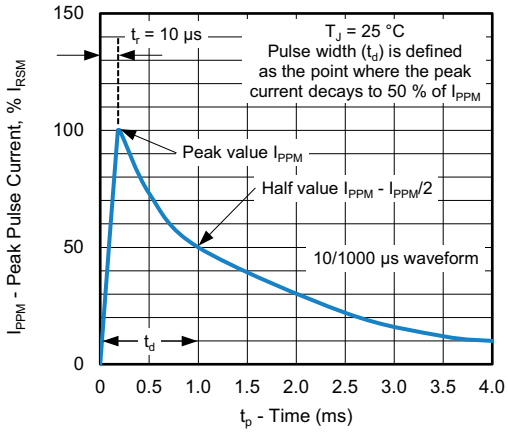
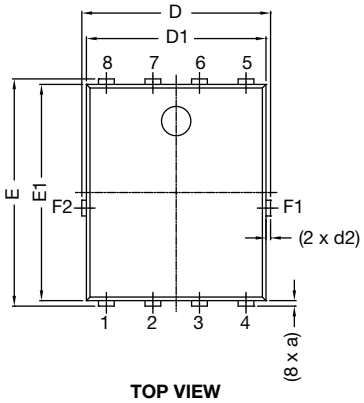


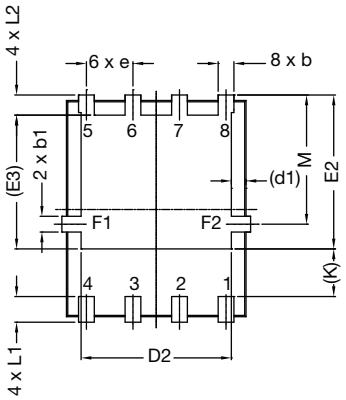

Fig. 10 - Pulse Waveform

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

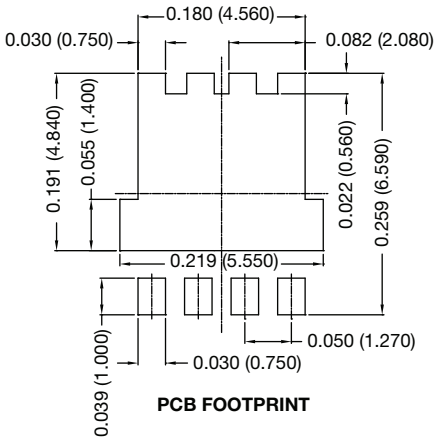
## FlatPAK 5 x 6



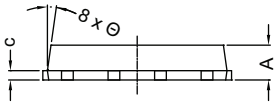

TOP VIEW




BOTTOM VIEW




PCB FOOTPRINT




SIDE VIEW

| DIM. | INCHES | | | MILLIMETERS | | |
|---|---|---|---|---|---|---|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.035 | 0.039 | 0.043 | 0.89 | 0.99 | 1.09 |
| (a) | - | 0.006 | - | - | 0.15 | - |
| b | 0.013 | 0.017 | 0.020 | 0.32 | 0.43 | 0.52 |
| b1 | 0.013 | 0.017 | 0.020 | 0.32 | 0.43 | 0.52 |
| c | 0.008 | - | 0.014 | 0.20 | - | 0.35 |
| D | 0.197 | 0.203 | 0.209 | 5.00 | 5.15 | 5.30 |
| D1 | 0.189 | 0.193 | 0.197 | 4.80 | 4.90 | 5.00 |
| D2 | 0.154 | 0.161 | 0.169 | 3.90 | 4.10 | 4.30 |
| (d1) | - | 0.016 | - | - | 0.40 | - |
| (d2) | - | 0.005 | - | - | 0.125 | - |
| E | 0.238 | 0.244 | 0.250 | 6.05 | 6.20 | 6.35 |
| E1 | 0.228 | 0.232 | 0.236 | 5.80 | 5.90 | 6.00 |
| E2 | 0.157 | 0.165 | 0.173 | 4.00 | 4.20 | 4.40 |
| (E3) | - | 0.144 | - | - | 3.65 | - |
| e | 0.050 BSC | | | 1.27 BSC | | |
| (K) | 0.039 | - | - | 1.00 | - | - |
| L1 | 0.019 | - | 0.043 | 0.48 | - | 1.10 |
| L2 | 0.012 | - | 0.031 | 0.30 | - | 0.80 |
| M | 0.128 | 0.138 | 0.148 | 3.25 | 3.50 | 3.75 |
| Θ | 0° | - | 10° | 0° | - | 10° |

**Notes**

- Dimensioning and tolerancing per ASME Y14.5-2009
- Dimensions D1 and E1 do not include mold flash or gate burrs
- Dimension (XX) means reference only

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