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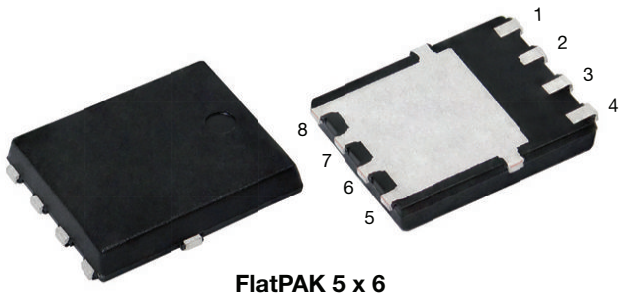
VISHAY
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# V10K170C

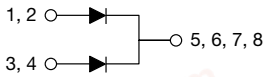
Vishay General Semiconductor

## High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F$ = 0.59 V at $I_F$ = 2.5 A




**FlatPAK 5 x 6**




### FEATURES

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

### LINKS TO ADDITIONAL RESOURCES

3D Models

### TYPICAL APPLICATIONS

For use in low voltage high frequency DC/DC converters, freewheeling diodes, and polarity protection applications.

### MECHANICAL DATA

**Case:** FlatPAK 5 x 6
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant
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
M3 and HM3 suffix meets JESD 201 class 2 whisker test

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 2 x 5 A |
| $V_{RRM}$ | 170 V |
| $I_{FSM}$ | 90 A |
| $V_F$ at $I_F$ = 5 A ($T_J$ = 125 °C) | 0.66 V |
| $T_J$ max. | 150 °C |
| Package | FlatPAK 5 x 6 |
| Circuit configuration | Common cathode |

| MAXIMUM RATINGS ($T_A$ = 25 °C unless otherwise noted) | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **V10K170C** | **UNIT** |
| Device marking code | | V1017C | |
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 170 | V |
| Maximum DC forward current per device | $I_{F(AV)}$ (1) | 10 | A |
| | $I_{F(AV)}$ (2) | 2.8 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$ | 90 | A |
| Operating junction temperature range | $T_J$ (3) | -40 to +150 | °C |
| Storage temperature range | $T_{STG}$ | -55 to +150 | °C |

**Notes**

(1) With infinite heatsink
(2) Free air, mounted on recommended pad area
(3) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$


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| ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage per diode | $I_F$ = 2.5 A | $T_J$ = 25 °C | $V_F$ (1) | 0.75 | - | V |
| | $I_F$ = 5 A | | | 0.82 | 0.87 | |
| | $I_F$ = 2.5 A | $T_J$ = 125 °C | | 0.59 | - | |
| | $I_F$ = 5 A | | | 0.66 | 0.71 | |
| Reverse current per diode | $V_R$ = 140 V | $T_J$ = 25 °C | $I_R$ (2) | 0.0001 | - | mA |
| | | $T_J$ = 125 °C | | 0.3 | - | |
| | $V_R$ = 170 V | $T_J$ = 25 °C | | - | 0.015 | |
| | | $T_J$ = 125 °C | | 0.5 | 3 | |
| Typical junction capacitance per diode | 4.0 V, 1 MHz | | $C_J$ | 290 | - | pF |

**Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: pulse width ≤ 5 ms

| THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | | |
|---|---|---|---|---|
| PARAMETER | SYMBOL | TYP. | MAX. | UNIT |
| Thermal resistance per device | $R_{\theta JA}$ (1)(2) | 75 | - | °C/W |
| | $R_{\theta JM}$ (3) | 2.5 | 3.5 | |

**Notes**

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

(2) Free air, mounted on recommended copper pad area; thermal resistance $R_{\theta JA}$ - junction-to-ambient

(3) Mounted on infinite heat sink; thermal resistance $R_{\theta JM}$ - junction-to-mount

| ORDERING INFORMATION (Example) | | | | |
|---|---|---|---|---|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| V10K170C-M3/H | 0.10 | H | 1500 | 7" diameter plastic tape and reel |
| V10K170C-M3/I | 0.10 | I | 6000 | 13" diameter plastic tape and reel |
| V10K170CHM3/H (1) | 0.10 | H | 1500 | 7" diameter plastic tape and reel |
| V10K170CHM3/I (1) | 0.10 | I | 6000 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified



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

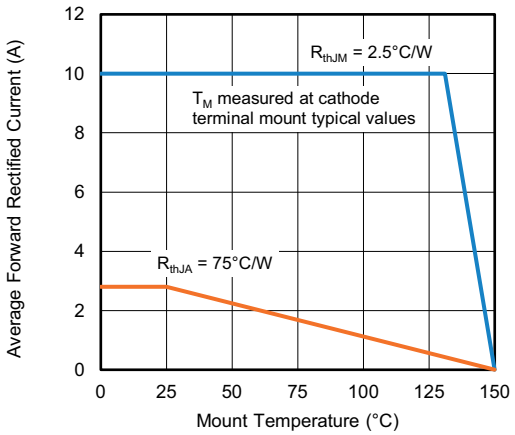



Fig. 1 - Maximum Forward Current Derating Curve

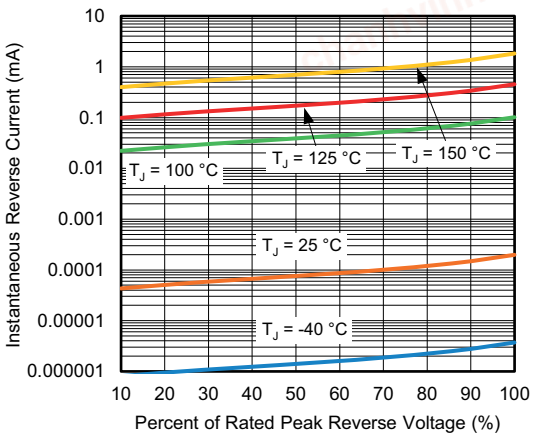



Fig. 4 - Typical Reverse Leakage Characteristics

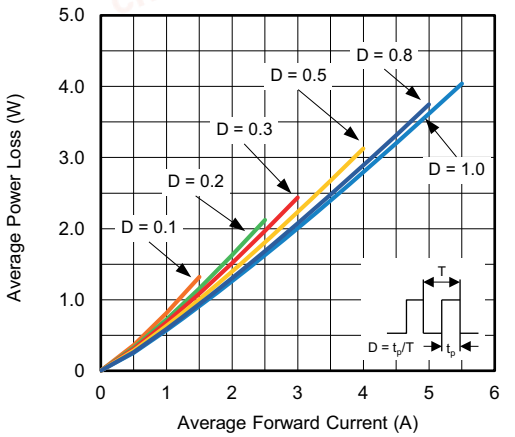



Fig. 2 - Forward Power Loss Characteristics

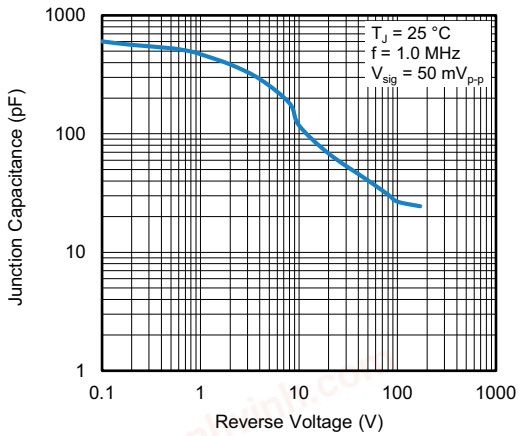



Fig. 5 - Typical Junction Capacitance

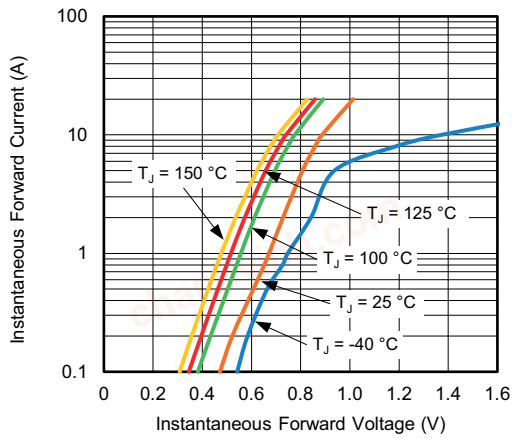



Fig. 3 - Typical Instantaneous Forward Characteristics

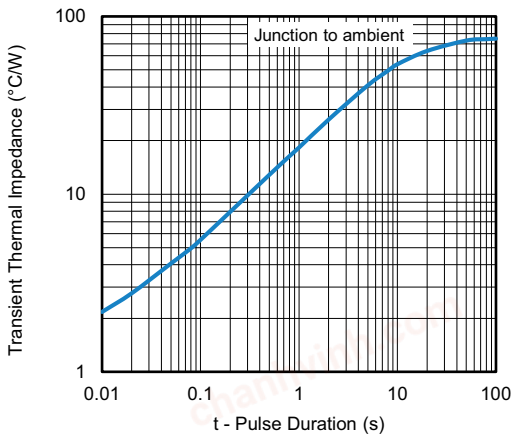



Fig. 6 - Typical Transient Thermal Impedance

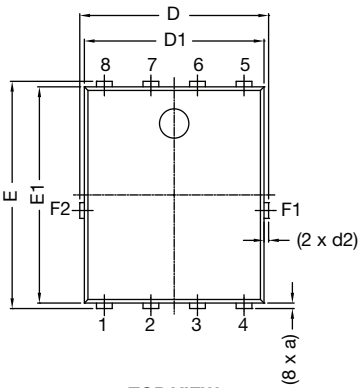

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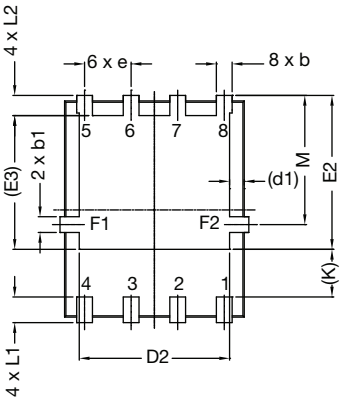


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

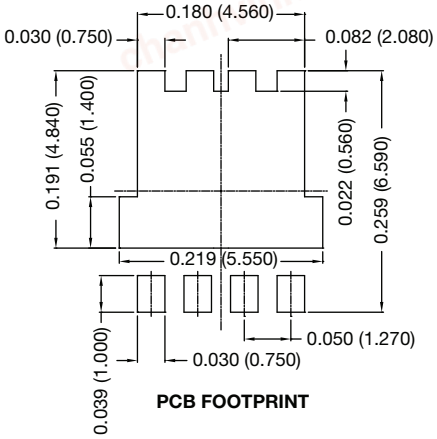
### FlatPAK 5 x 6



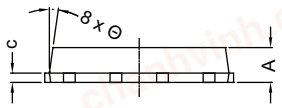

TOP VIEW




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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