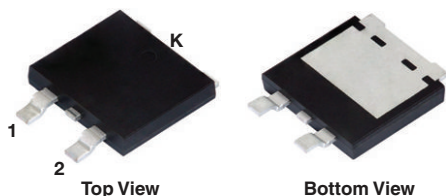


# Dual Low-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.37\text{ V}$  at  $I_F = 5.0\text{ A}$

## eSMP® Series SMPD (TO-263AC)



## LINKS TO ADDITIONAL RESOURCES



## FEATURES

- Trench MOS Schottky technology
- Very low profile - typical height of 1.7 mm
- Ideal for automated placement
- 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

## TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

## MECHANICAL DATA

**Case:** SMPD (TO-263AC)

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 meet JESD 201 class 2 whisker test

**Polarity:** as marked

| PRIMARY CHARACTERISTICS                                |                 |
|--|-----------------|
| $I_{F(AV)}$  | 2 x 10 A        |
| $V_{RRM}$  | 60 V            |
| $I_{FSM}$  | 120 A           |
| $V_F$ at $I_F = 10\text{ A}$ ( $T_J = 125\text{ °C}$ ) | 0.49 V          |
| $T_J$ max.   | 150 °C          |
| Package  | SMPD (TO-263AC) |
| Circuit configuration                                  | Common cathode  |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                               |                 |             |      |
|--|-----------------|-------------|------|
| PARAMETER  | SYMBOL          | V20DL63C    | UNIT |
| Device marking code  |                 | V20DL63C    |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$       | 60          | V    |
| Maximum average forward rectified current  | $I_{F(AV)}$ (1) | 20          | A    |
| per device<br>(fig. 1)   |                 | 10          |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$       | 120         | A    |
| Operating junction temperature range   | $T_J$ (2)       | -40 to +150 | °C   |
| Storage temperature range  | $T_{STG}$       | -55 to +150 |      |

## Notes

(1) Mounted on infinite heatsink

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

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER   | TEST CONDITIONS       |                         | SYMBOL                        | TYP. | MAX. | UNIT |
|---|-----------------------|-------------------------|-------------------------------|------|------|------|
| Instantaneous forward voltage per diode           | I <sub>F</sub> = 5 A  | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.46 | -    | V    |
|   | I <sub>F</sub> = 10 A |                         |                               | 0.53 | 0.61 |      |
|   | I <sub>F</sub> = 5 A  | T <sub>J</sub> = 125 °C |                               | 0.37 | -    |      |
|   | I <sub>F</sub> = 10 A |                         |                               | 0.49 | 0.56 |      |
| Reverse current at rated V <sub>R</sub> per diode | V <sub>R</sub> = 60 V | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 0.18 | mA   |
|   |                       | T <sub>J</sub> = 125 °C |                               | 6.5  | 16   |      |
| Typical junction capacitance per diode            | 4.0 V, 1 MHz          |                         | C <sub>J</sub>                | 1450 | -    | pF   |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 5\text{ ms}$ **THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                             | SYMBOL                   | V20DL63C | UNIT                 |
|---------------------------------------|--------------------------|----------|----------------------|
| Typical thermal resistance per device | $R_{\theta JC}^{(1)}$    | 1.8      | $^{\circ}\text{C/W}$ |
|                                       | $R_{\theta JA}^{(2)(3)}$ | 58       |                      |

**Notes**

(1) Mounted on infinite heatsink

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

(3) Free air, without heatsink

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|------------------------------|-----------------|--------------|---------------|------------------------------------|
| V20DL63C-M3/I                | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |
| V20DL63CHM3/I <sup>(1)</sup> | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

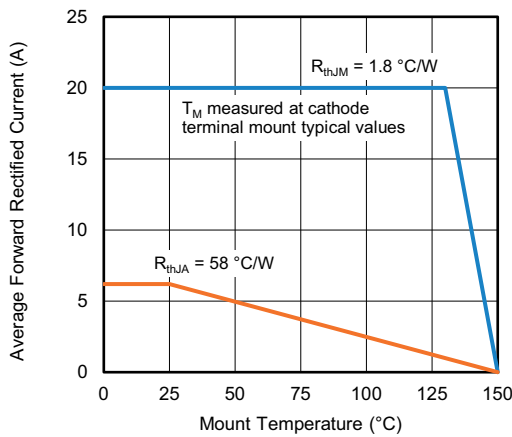
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

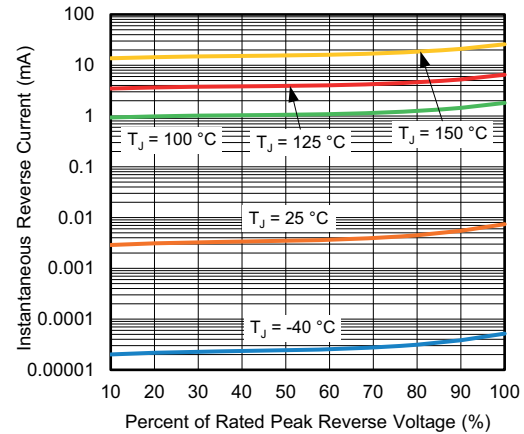


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

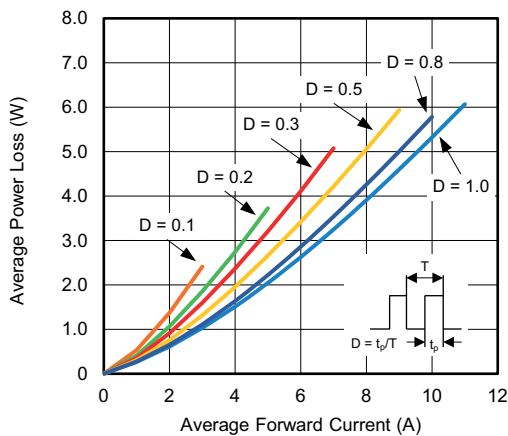


Fig. 2 - Average Power Loss Characteristics Per Diode

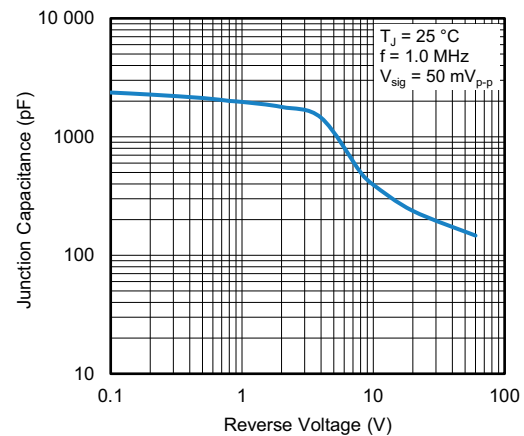


Fig. 5 - Typical Junction Capacitance Per Diode

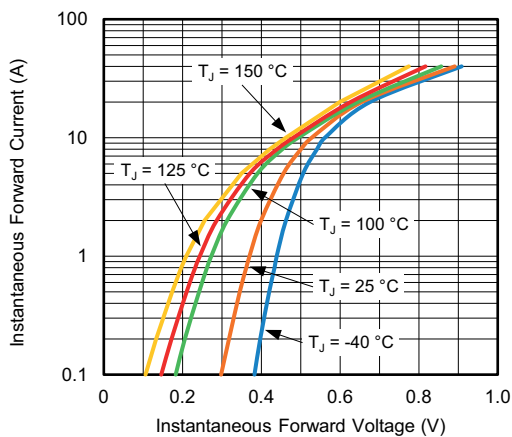


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

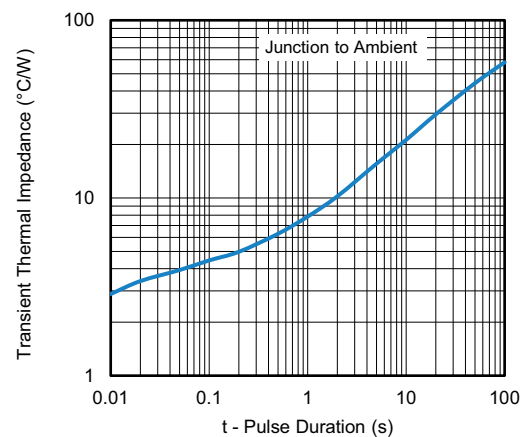


Fig. 6 - Typical Transient Thermal Impedance

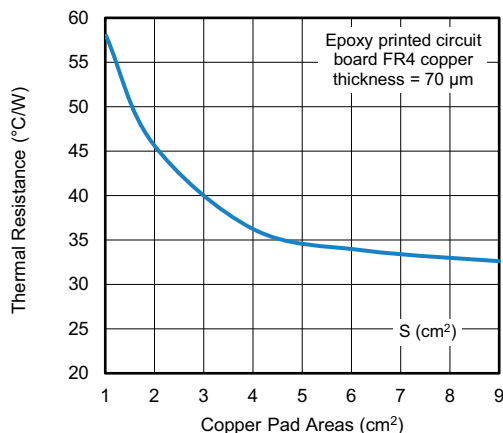
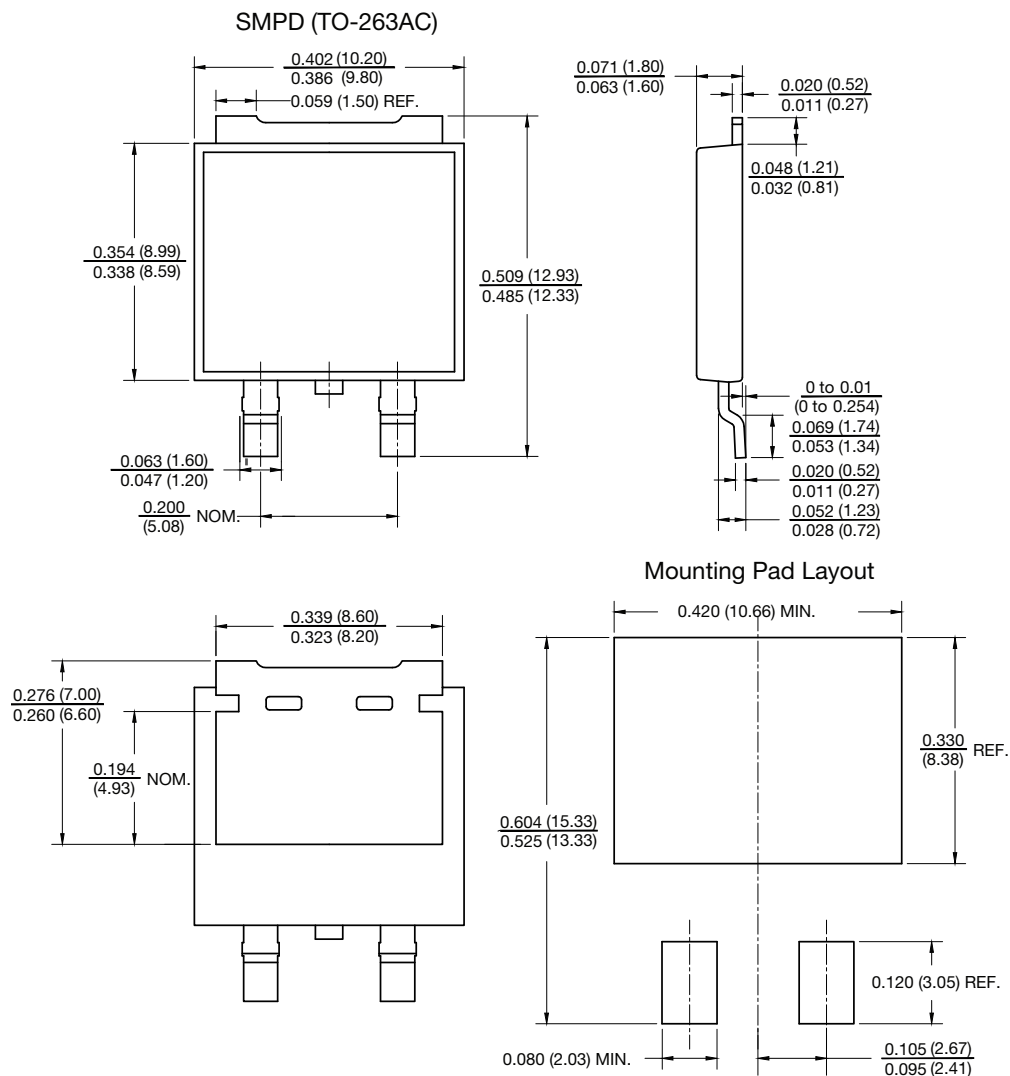


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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