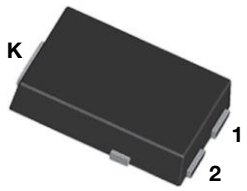
# V10P45S

Vishay General Semiconductor

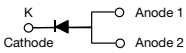
# SMD Photovoltaic Solar Cell Protection Schottky Rectifier

Ultra Low $V_F$ = 0.34 V at $I_F$ = 5 A

**TMBS® eSMP® Series**




**TO-277A (SMPC)**




## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

RoHS COMPLIANT
HALOGEN FREE

## TYPICAL APPLICATIONS

For use in solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

## MECHANICAL DATA

**Case:** TO-277A (SMPC)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS compliant, and commercial grade

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 1A whisker test

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 10 A |
| $V_{RRM}$ | 45 V |
| $I_{FSM}$ | 180 A |
| $V_F$ at $I_F$ = 10 A | 0.41 V |
| $T_{OP}$ max. | 150 °C |

**MAXIMUM RATINGS** ($T_A$ = 25 °C unless otherwise noted)

| PARAMETER | SYMBOL | V10P45S | UNIT |
|---|---|---|---|
| Device marking code | | 1045S | |
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 45 | V |
| Maximum DC forward current | $I_F$ (1) | 10 | A |
| | $I_F$ (2) | 4.4 | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 180 | A |
| Junction temperature in DC forward current without reverse bias, t ≤ 1 h | $T_J$ (3) | ≤ 200 | °C |
| Operating junction temperature range | $T_{OP}$ | - 40 to + 150 | °C |
| Storage temperature range | $T_{STG}$ | - 40 to + 175 | °C |

**Notes**

(1) Mounted on 30 mm x 30 mm aluminum PCB
(2) Free air, mounted on recommended copper pad area
(3) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test


For technical questions within your region, please contact one of the following:
DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

# V10P45S

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| ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | $I_F$ = 5.0 A | $T_A$ = 25 °C | $V_F$ (1) | 0.42 | - | V |
| | $I_F$ = 10 A | | | 0.48 | 0.57 | |
| | $I_F$ = 5.0 A | $T_A$ = 125 °C | | 0.34 | - | |
| | $I_F$ = 10 A | | | 0.41 | 0.50 | |
| Reverse current | $V_R$ = 45 V | $T_A$ = 25 °C | $I_R$ (2) | 21 | 800 | µA |
| | | $T_A$ = 125 °C | | 9 | 35 | mA |

**Notes**

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

(2) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | V10P45S | UNIT |
| Typical thermal resistance | $R_{\theta JA}$ (1) | 75 | °C/W |
| | $R_{\theta JM}$ (2) | 4 | |

**Notes**

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

(2) Mounted on 30 mm x 30 mm aluminum PCB; thermal resistance $R_{\theta JM}$ - junction to mount

| ORDERING INFORMATION (Example) | | | | |
|---|---|---|---|---|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| V10P45S-M3/86A | 0.10 | 86A | 1500 | 7" diameter plastic tape and reel |
| V10P45S-M3/87A | 0.10 | 87A | 6500 | 13" diameter plastic tape and reel |

## RATINGS AND CHARACTERISTICS CURVES

($T_A$ = 25 °C unless otherwise noted)

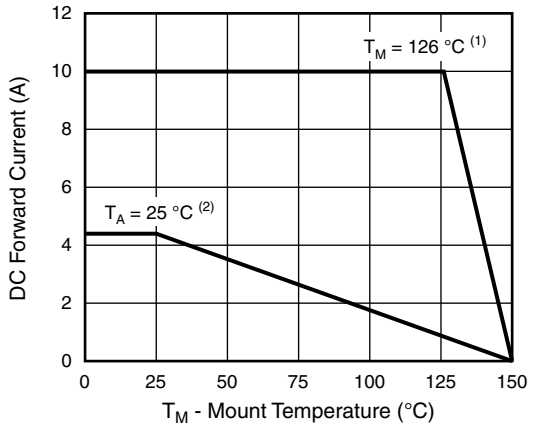


Fig. 1 - Forward Current Derating Curve

**Notes**

(1) Mounted on 30 mm x 30 mm aluminum PCB; $T_M$ measured at the terminal of cathode band ($R_{\theta JM}$ = 4 °C/W)

(2) Free air, mounted on recommended copper pad area ($R_{\theta JA}$ = 75 °C/W)



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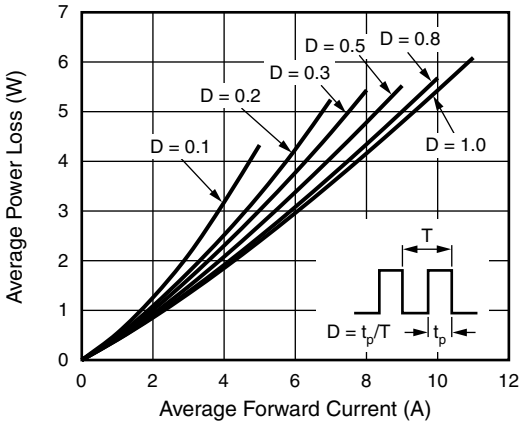



Fig. 2 - Forward Power Loss Characteristics

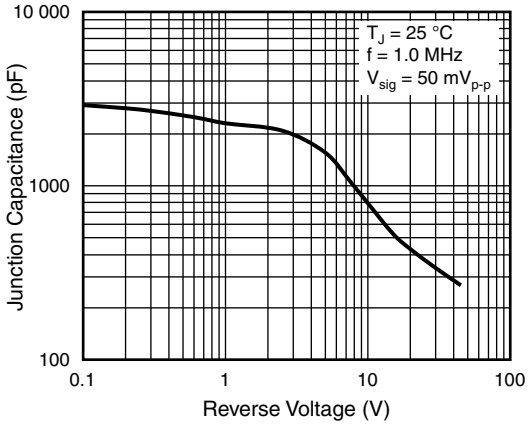



Fig. 5 - Typical Junction Capacitance

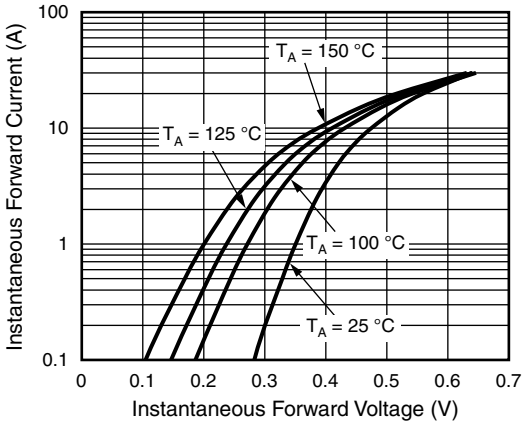



Fig. 3 - Typical Instantaneous Forward Characteristics

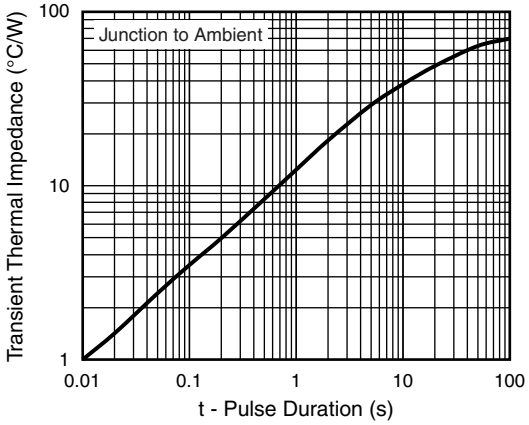



Fig. 6 - Typical Transient Thermal Impedance

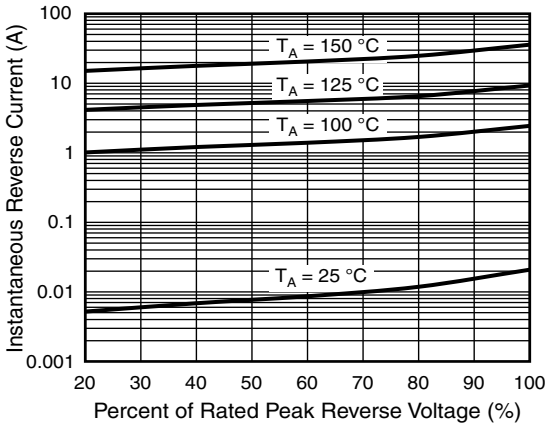
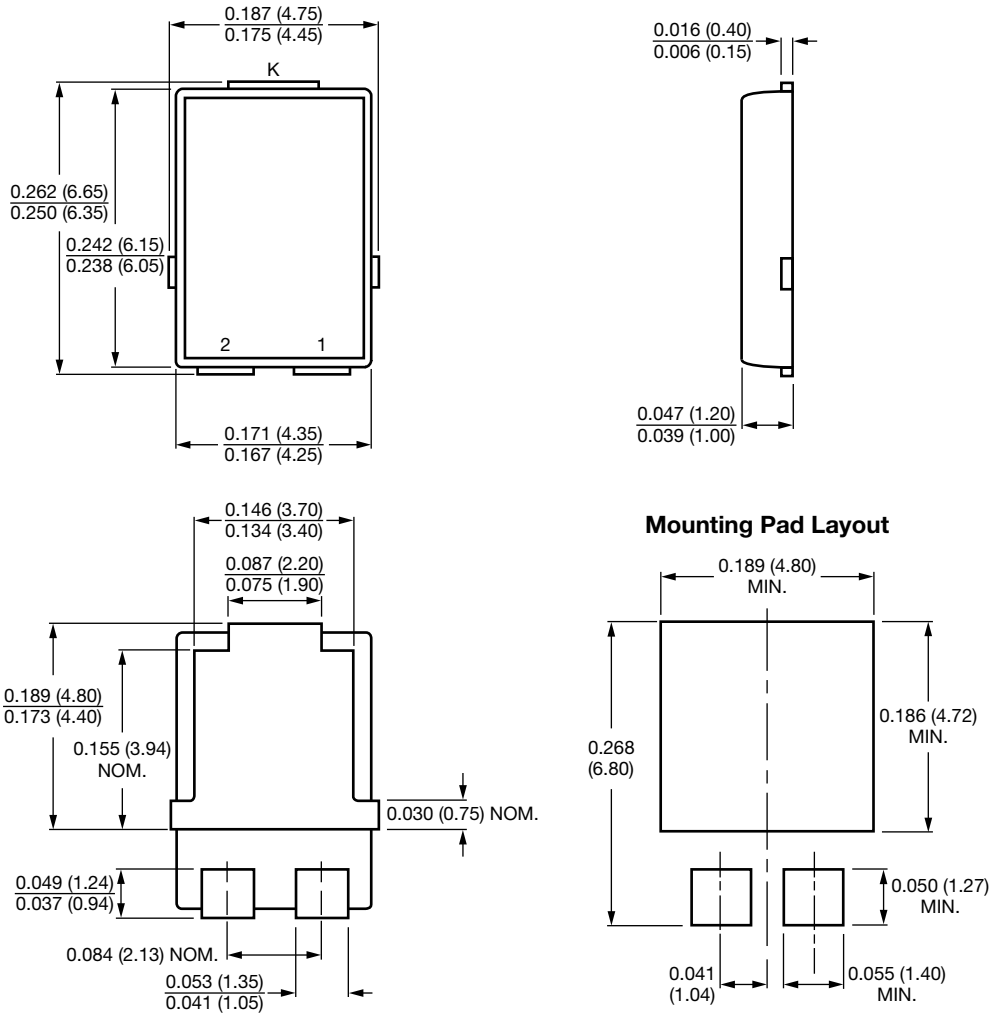



Fig. 4 - Typical Reverse Leakage Characteristics

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

### TO-277A (SMPC)




### Mounting Pad Layout




Conform to JEDEC TO-277A



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