HALOGEN

FREE



## Vishay General Semiconductor

# Trench MOS Barrier Schottky Rectifier for PV Solar Cell Bypass Protection

Ultra Low  $V_F = 0.30 \text{ V}$  at  $I_F = 5.0 \text{ A}$ 



| PRIMARY CHARACTERISTICS                  |                |  |  |  |
|--|----------------|--|--|--|
| I <sub>F(AV)</sub>                       | 2 x 15 A       |  |  |  |
| $V_{RRM}$                                | 45 V           |  |  |  |
| I <sub>FSM</sub>                         | 200 A          |  |  |  |
| V <sub>F</sub> at I <sub>F</sub> = 15 A  | 0.39 V         |  |  |  |
| T <sub>OP</sub> max. (AC mode)           | 150 °C         |  |  |  |
| T <sub>J</sub> max. (DC forward current) | 200 °C         |  |  |  |
| Package                                  | ITO-220AB      |  |  |  |
| Circuit configuration                    | Common cathode |  |  |  |

PIN 3 O-

#### **FEATURES**

- Trench MOS Schottky technology
- · Low forward voltage drop, low power losses

High efficiency operation

• Solder dip 275 °C max. 10 s, per JESD 22-B106

T<sub>J</sub> 200 °C max. in solar bypass mode application

 Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

## **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: ITO-220AB

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

Polarity: as marked

Mounting Torque: 10 in-lbs maximum

| MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)                         |                                      |             |      |  |  |
|---|--------------------------------------|-------------|------|--|--|
| PARAMETER   | SYMBOL                               | VFT3045CBP  | UNIT |  |  |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$                            | 45          | V    |  |  |
| Maximum average forward rectified current (fig. 1)                                      | rice (1)                             | 30          | А    |  |  |
| per dio   | de I <sub>F(AV)</sub> <sup>(1)</sup> | 15          |      |  |  |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated per diode | oad I <sub>FSM</sub>                 | 200         | А    |  |  |
| Isolation voltage from terminal to heatsink, t = 1 min                                  | V <sub>AC</sub>                      | 1500        | V    |  |  |
| Operating junction and storage temperature range (AC mode)                              | T <sub>OP</sub> , T <sub>STG</sub>   | -40 to +150 | °C   |  |  |
| Junction temperature in DC forward current without reverse bias, $t \leq 1\ h$          | T <sub>J</sub> <sup>(2)</sup>        | ≤ 200       | °C   |  |  |

#### Notes

(2) Meets the requirements of IEC 61215 ed. 2 bypass diode thermal test

| <b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted) |  |                         |                                 |      |      |      |
|---|--|-------------------------|---------------------------------|------|------|------|
| PARAMETER   | TEST CO                                | NDITIONS                | SYMBOL                          | TYP. | MAX. | UNIT |
| Instantaneous forward voltage per diode   | I <sub>F</sub> = 5 A                   | T <sub>A</sub> = 25 °C  | - V <sub>F</sub> <sup>(1)</sup> | 0.42 | -    | V    |
|   | $I_F = 7.5 A$                          |                         |                                 | 0.44 | -    |      |
|   | I <sub>F</sub> = 15 A                  |                         |                                 | 0.49 | 0.57 |      |
|   | I <sub>F</sub> = 5 A                   | T <sub>A</sub> = 125 °C |                                 | 0.30 | =    |      |
|   | I <sub>F</sub> = 7.5 A                 |                         |                                 | 0.33 | =    |      |
|   | I <sub>F</sub> = 15 A                  |                         |                                 | 0.39 | 0.48 |      |
| Reverse current per diode   | V <sub>R</sub> = 45 V                  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup>   | -    | 2000 | μΑ   |
|   | V <sub>R</sub> = 45 V T <sub>A</sub> = | T <sub>A</sub> = 125 °C |                                 | 17   | 50   | mA   |

### Notes

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

(2) Pulse test: Pulse width ≤ 40 ms

<sup>(1)</sup> With heatsink



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| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                   |               |      |      |  |
|---|-------------------|---------------|------|------|--|
| PARAMETER   | SYMBOL VFT3045CBP |               | UNIT |      |  |
| Typical thermal resistance  | per diode         | $R_{	hetaJC}$ | 6.0  | °C/W |  |
|   | per device        |               | 4.0  |      |  |

| ORDERING INFORMATION (Example) |  |      |              |               |               |  |  |
|--------------------------------|--|------|--------------|---------------|---------------|--|--|
| PACKAGE                        | PREFERRED P/N UNIT WEIGHT (g) PACKAGE CO |      | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |  |  |
| ITO-220AB                      | VFT3045CBP-M3/4W                         | 1.76 | 4W           | 50/tube       | Tube          |  |  |

## RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)

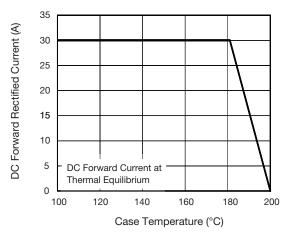


Fig. 1 - Maximum Forward Current Derating Curve

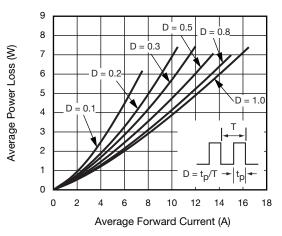


Fig. 2 - Forward Power Loss Characteristics Per Diode

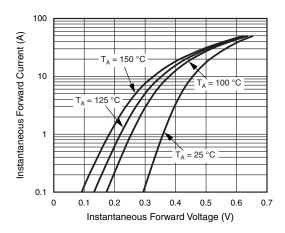


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

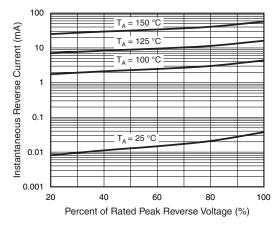


Fig. 4 - Typical Reverse Characteristics Per Diode



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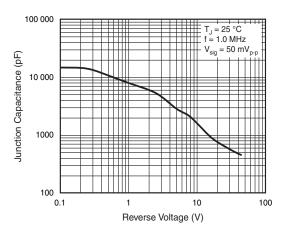


Fig. 5 - Typical Junction Capacitance Per Diode

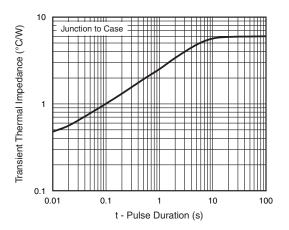
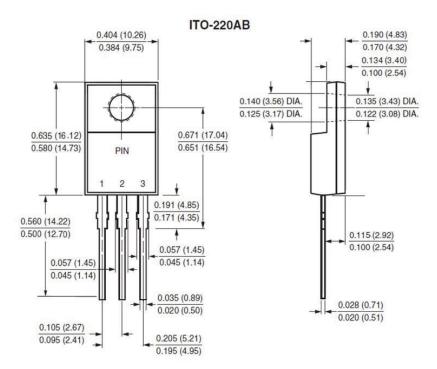


Fig. 6 - Typical Transient Thermal Impedance Per Diode

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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