# High Current Density Surface-Mount TMBS ${ }^{\circledR}$ (Trench MOS Barrier Schottky) Rectifier 

Ultra Low $\mathrm{V}_{\mathrm{F}}=0.50 \mathrm{~V}$ at $\mathrm{I}_{\mathrm{F}}=5 \mathrm{~A}$



SMPC (TO-277A)


DESIGN SUPPORT TOOLS
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Models
Available

| PRIMARY CHARACTERISTICS |  |
| :---: | :---: |
| $\mathrm{I}_{\mathrm{F}(\mathrm{AV})}$ | 10 A |
| $\mathrm{~V}_{\mathrm{RRM}}$ | 100 V |
| $\mathrm{I}_{\mathrm{FSM}}$ | 180 A |
| $\mathrm{~V}_{\mathrm{F}}$ at $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~A}\left(125^{\circ} \mathrm{C}\right)$ | 0.61 V |
| $\mathrm{~T}_{\mathrm{J}}$ max. | $175^{\circ} \mathrm{C}$ |
| Package | SMPC (TO-277A) |
| Circuit configuration | Single |

## FEATURES

- Very low profile - typical height of 1.1 mm
- 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 $260^{\circ} \mathrm{C}$ Available


RoHS COMPLIANT HALOGEN FREE

- AEC-Q101 qualified available
- Automotive ordering code; base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

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

| MAXIMUM RATINGS ( $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ unless otherwise noted) |  |  |  |
| :---: | :---: | :---: | :---: |
| PARAMETER | SYMBOL | V10PM10 | UNIT |
| Device marking code |  | 10M10 |  |
| Maximum repetitive peak reverse voltage | $\mathrm{V}_{\text {RRM }}$ | 100 | V |
| Maximum DC forward current | $\mathrm{IF}_{\text {(AV }}{ }^{(1)}$ | 10 | A |
|  | $\mathrm{I}_{\mathrm{F}(\mathrm{AV})}{ }^{(2)}$ | 4 |  |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $\mathrm{I}_{\text {FSM }}$ | 180 | A |
| Operating junction temperature range | $\mathrm{T}_{\mathrm{J}}{ }^{3}$ | -40 to +175 | ${ }^{\circ} \mathrm{C}$ |
| Storage temperature range | $\mathrm{T}_{\text {STG }}$ | -55 to +175 | ${ }^{\circ} \mathrm{C}$ |

## Notes

(1) Mounted on $30 \mathrm{~mm} \times 30 \mathrm{~mm}$ pad areas aluminum PCB
(2) Free air, mounted on recommended pad area
(3) The heat generated must be less than the thermal conductivity from junction to ambient: $d P_{D} / d T_{J}<1 / R_{\theta J A}$

ELECTRICAL CHARACTERISTICS $\left(\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}\right.$ unless otherwise noted)

| PARAMETER | TEST CONDITIONS |  | SYMBOL | TYP. | MAX. | UNIT |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Instantaneous forward voltage | $\mathrm{I}_{\mathrm{F}}=5 \mathrm{~A}$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ | $V_{F}{ }^{(1)}$ | 0.57 | - | V |
|  | $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~A}$ |  |  | 0.68 | 0.75 |  |
|  | $\mathrm{I}_{\mathrm{F}}=5 \mathrm{~A}$ | $\mathrm{T}_{\mathrm{A}}=125^{\circ} \mathrm{C}$ |  | 0.50 | - |  |
|  | $\mathrm{I}_{\mathrm{F}}=10 \mathrm{~A}$ |  |  | 0.60 | 0.66 |  |
| Reverse current | $\mathrm{V}_{\mathrm{R}}=70 \mathrm{~V}$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ | $\mathrm{I}_{\mathrm{R}}{ }^{(2)}$ | 0.01 | - | mA |
|  | $V_{R}=70 \mathrm{~V}$ | $\mathrm{T}_{\mathrm{A}}=125^{\circ} \mathrm{C}$ |  | 2.0 | - |  |
|  | $\mathrm{V}_{\mathrm{R}}=100 \mathrm{~V}$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ |  | - | 0.12 |  |
|  |  | $\mathrm{T}_{\mathrm{A}}=125^{\circ} \mathrm{C}$ |  | 4 | 14 |  |
| Typical junction capacitance | $4.0 \mathrm{~V}, 1 \mathrm{MHz}$ |  | $\mathrm{C}_{J}$ | 1180 | - | pF |

## Notes

(1) Pulse test: $300 \mu$ s pulse width, $1 \%$ duty cycle
(2) Pulse test: Pulse width $\leq 5 \mathrm{~ms}$

| THERMAL CHARACTERISTICS $\left(T_{A}=25^{\circ} \mathrm{C}\right.$ unless otherwise specified $)$ |  |  |  |
| :--- | :---: | :---: | :---: |
| PARAMETER | SYMBOL | V10PM10 | UNIT |
| Typical thermal resistance | $\mathrm{R}_{\theta \mathrm{JA}}{ }^{(1)(2)}$ | 75 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

## Notes

${ }^{(1)}$ The heat generated must be less than the thermal conductivity from junction to ambient: $\mathrm{dP}_{\mathrm{D}} / \mathrm{dT}_{J}<1 / \mathrm{R}_{\theta J \mathrm{AA}}$
${ }^{(2)}$ Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance $R_{\theta J A}$ - junction to ambient
(3) Units mounted on $30 \mathrm{~mm} \times 30 \mathrm{~mm}$ aluminum PCB, thermal resistance $R_{\theta J M}$ - junction to mount

## ORDERING INFORMATION (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| :--- | :---: | :---: | :---: | :---: |
| V10PM10-M3/H | 0.10 | H | 1500 | $7^{\prime \prime}$ diameter plastic tape and reel |
| V10PM10-M3/I | 0.10 | I | 6500 | $13^{\prime \prime}$ diameter plastic tape and reel |
| V10PM10HM3/H | $(1)$ | 0.10 | H | 1500 |
| " $^{(1)}$ diameter plastic tape and reel |  |  |  |  |
| V10PM10HM3/I ${ }^{(1)}$ | 0.10 | I | 6500 | $13^{\prime \prime}$ diameter plastic tape and reel |

## Note

(1) AEC-Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES $\left(\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}\right.$ unless otherwise specified)



Fig. 1 - Maximum Forward Current Derating Curve


Fig. 2 - Forward Power Loss Characteristics


Fig. 3 - Typical Instantaneous Forward Characteristics


Fig. 4 - Typical Reverse Characteristics


Fig. 5 - Typical Junction Capacitance


Fig. 6 - Typical Transient Thermal Impedance

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## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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