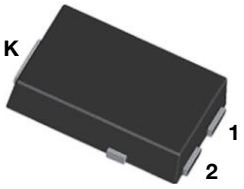
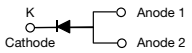
# High Current Density Surface Mount Schottky Barrier Rectifier

**eSMP® Series**




**TO-277A (SMPC)**




## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal impedance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 2 x 6.0 A |
| $V_{RRM}$ | 40 V |
| $I_{FSM}$ | 150 A |
| $E_{AS}$ | 20 mJ |
| $V_F$ at $I_F$ = 1.0 A | 0.24 V |
| $T_J$ max. | 125 °C |

## TYPICAL APPLICATIONS

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

## 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
Base P/NHM3 - halogen-free, RoHS compliant, and automotive grade

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

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

| PARAMETER | | SYMBOL | SS12P4C | UNIT |
|---|---|---|---|---|
| Device marking code | | | S124C | |
| Maximum repetitive peak reverse voltage | | $V_{RRM}$ | 40 | V |
| Maximum average forward rectified current (fig. 1) (1) | total device | $I_{F(AV)}$ | 12 | A |
| | per diode | | 6.0 | |
| Maximum average forward rectified current (2) | total device | $I_{F(AV)}$ | 3.5 | A |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load per diode | | $I_{FSM}$ | 150 | A |
| Non-repetitive avalanche energy at $T_J$ = 25 °C, L = 60 mH per diode | | $E_{AS}$ | 20 | mJ |
| Peak repetitive reverse current at $t_p$ = 2 µs, 1 kHz, at $T_J$ = 25 °C per diode | | $I_{RRM}$ | 1.0 | A |
| Operating junction and storage temperature range | | $T_J$, $T_{STG}$ | - 55 to + 125 | °C |

**Notes**

(1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink
(2) Free air, mounted on recommended copper pad area



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# SS12P4C

Vishay General Semiconductor

| ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage per diode | $I_F$ = 1 A | $T_A$ = 25 °C | $V_F$ (1) | 0.34 | - | V |
| | $I_F$ = 3 A | | | 0.40 | - | |
| | $I_F$ = 6 A | | | 0.46 | 0.52 | |
| | $I_F$ = 1 A | $T_A$ = 100 °C | | 0.24 | - | |
| | $I_F$ = 3 A | | | 0.31 | - | |
| | $I_F$ = 6 A | | | 0.40 | 0.45 | |
| Reverse current per diode | Rated $V_R$ | $T_A$ = 25 °C | $I_R$ (2) | 129 | 500 | µA |
| | | $T_A$ = 100 °C | | 11.9 | 25 | mA |
| Typical junction capacitance per diode | 4.0 V, 1 MHz | | $C_J$ | 400 | - | pF |

**Notes**

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

(4) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | SS12P4C | UNIT |
| Typical thermal resistance | $R_{\theta JA}$ (1) | 100 | °C/W |
| | $R_{\theta JM}$ (2) | 3 | |

**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 Al PCB with 50 mm x 25 mm x 100 mm fin 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 |
| SS12P4C-M3/86A | 0.10 | 86A | 1500 | 7" diameter plastic tape and reel |
| SS12P4C-M3/87A | 0.10 | 87A | 6500 | 13" diameter plastic tape and reel |
| SS12P4CHM3/86A (1) | 0.10 | 86A | 1500 | 7" diameter plastic tape and reel |
| SS12P4CHM3/87A (1) | 0.10 | 87A | 6500 | 13" diameter plastic tape and reel |

**Note**

(1) Automotive grade

## RATINGS AND CHARACTERISTICS CURVES

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

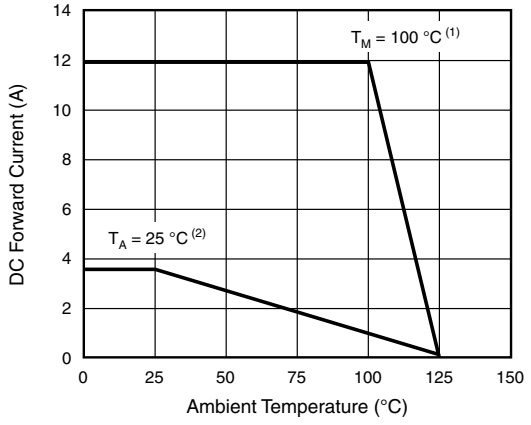


Fig. 1 - Maximum Forward Current Derating Curve

**Notes**

(1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink, $T_M$ measured at the terminal of cathode band ($R_{\theta JM}$ = 3 °C/W)

(2) Free air, mounted on recommended copper pad area ($R_{\theta JA}$ = 100 °C/W)



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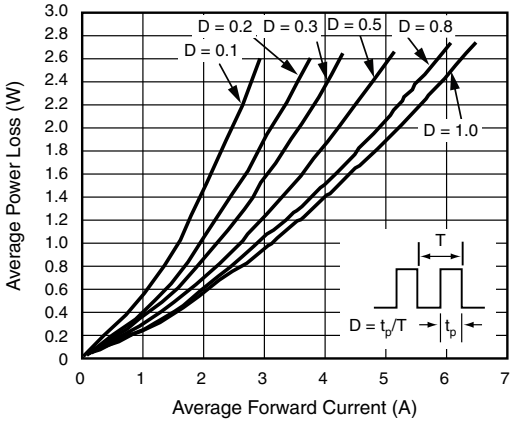


Fig. 2 - Forward Power Loss Characteristics Per Diode

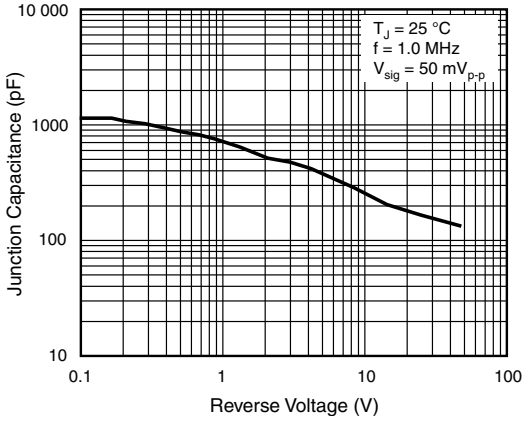


Fig. 5 - Typical Junction Capacitance Per Diode

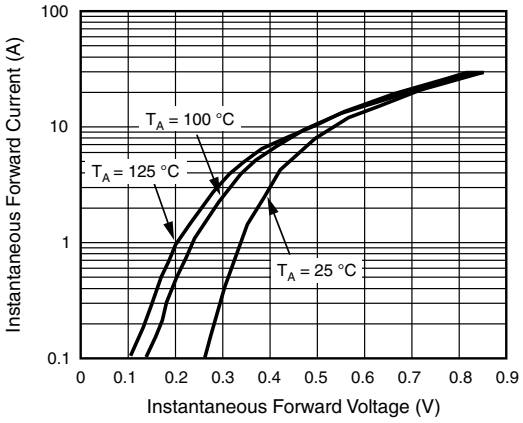


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

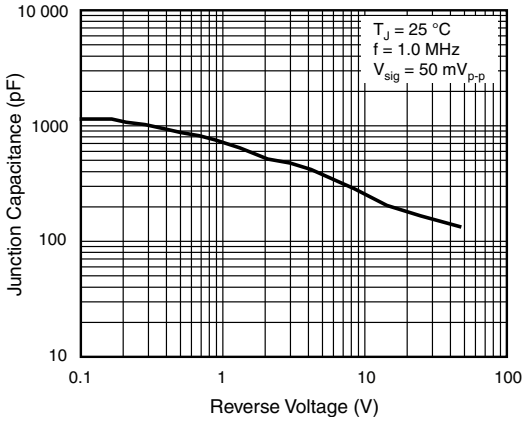


Fig. 6 - Typical Transient IThermal mpedance Per Diode

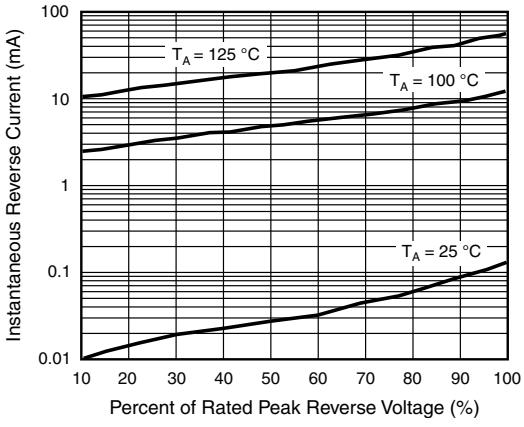


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

# SS12P4C

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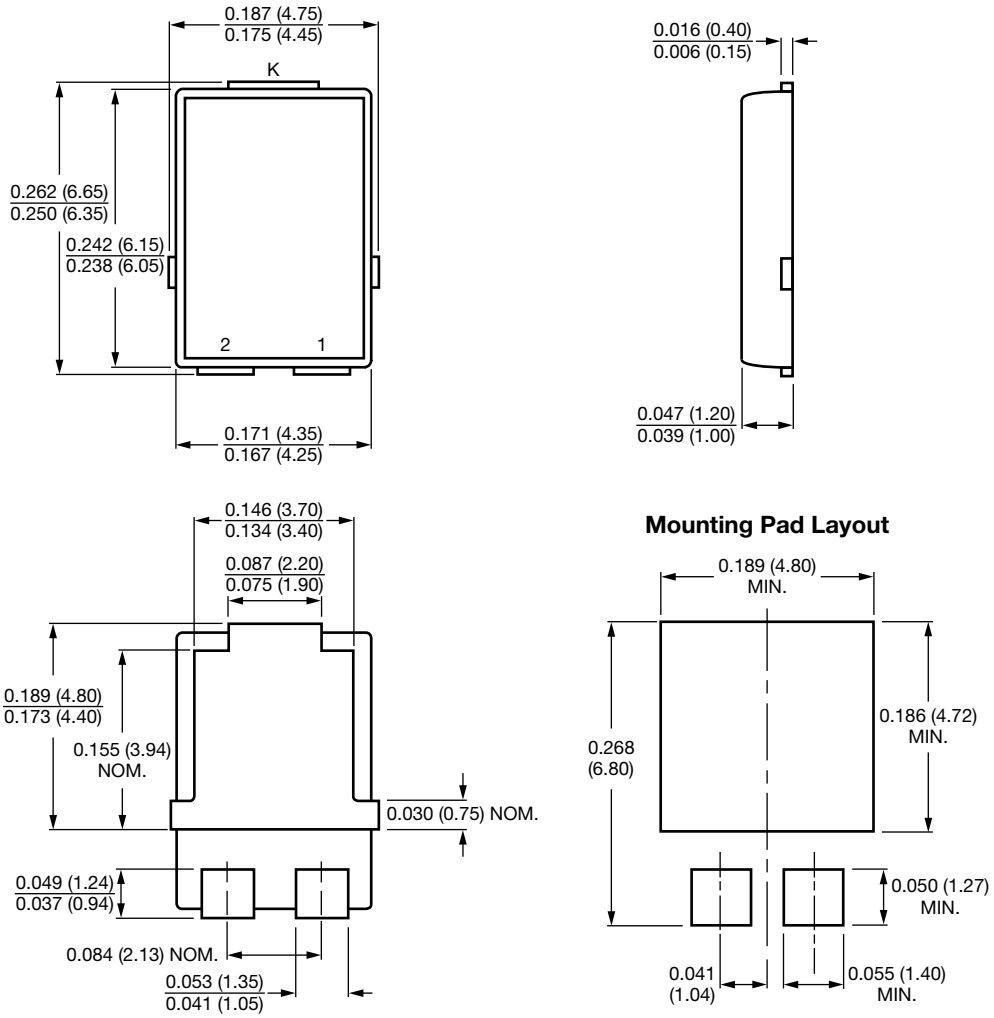
## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### TO-277A (SMPC)




### Mounting Pad Layout




Conform to JEDEC TO-277A



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