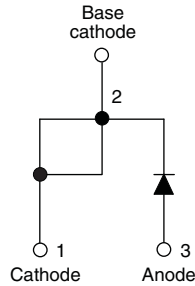


High Voltage, Input Rectifier Diode, 40 A



TO-247AC modified



FEATURES

- Very low forward voltage drop
- 150 °C max. operating junction temperature
- Designed and qualified according to JEDEC-JESD47
- Compliant to RoHS Directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Input rectification
- Vishay Semiconductors switches and output rectifiers which are available in identical package outlines

DESCRIPTION

High voltage rectifiers optimized for very low forward voltage drop with moderate leakage.

These devices are intended for use in main rectification (single or three phase bridge).

PRODUCT SUMMARY

| | |
|-----------------|----------------------------|
| Package | TO-247AC modified (2 pins) |
| $I_{F(AV)}$ | 40 A |
| V_R | 800 V, 1200 V |
| V_F at I_F | 1.1 V |
| I_{FSM} | 475 A |
| T_J max. | 150 °C |
| Diode variation | Single die |

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-------------|----------------------------|-------------|-------|
| $I_{F(AV)}$ | Sinusoidal waveform | 40 | A |
| V_{RRM} | Range | 800/1200 | V |
| I_{FSM} | | 475 | A |
| V_F | 40 A, $T_J = 25\text{ °C}$ | 1.1 | V |
| T_J | | - 40 to 150 | °C |

VOLTAGE RATINGS

| PART NUMBER | V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I_{RRM} AT 150 °C mA |
|------------------------------|--|---|------------------------------|
| VS-40EPS08PbF, VS-40EPS08-M3 | 800 | 900 | 1 |
| VS-40EPS12PbF, VS-40EPS12-M3 | 1200 | 1300 | |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---------------|--|--------|-------------------|
| Maximum average forward current | $I_{F(AV)}$ | $T_C = 105\text{ °C}$, 180° conduction half sine wave | 40 | A |
| Maximum peak one cycle non-repetitive surge current | I_{FSM} | 10 ms sine pulse, rated V_{RRM} applied | 400 | |
| | | 10 ms sine pulse, no voltage reapplied | 475 | |
| Maximum I^2t for fusing | I^2t | 10 ms sine pulse, rated V_{RRM} applied | 800 | A ² s |
| | | 10 ms sine pulse, no voltage reapplied | 1131 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1\text{ ms to }10\text{ ms}$, no voltage reapplied | 11 310 | A ² √s |

**ELECTRICAL SPECIFICATIONS**

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---------------------------------|-------------|--------------------------------|-------------------------------|--------|------------|
| Maximum forward voltage drop | V_{FM} | 20 A, $T_J = 25^\circ\text{C}$ | | 1.0 | V |
| | | 40 A, $T_J = 25^\circ\text{C}$ | | 1.1 | |
| Forward slope resistance | r_t | $T_J = 150^\circ\text{C}$ | | 7.16 | m Ω |
| Threshold voltage | $V_{F(TO)}$ | | | 0.74 | V |
| Maximum reverse leakage current | I_{RM} | $T_J = 25^\circ\text{C}$ | $V_R = \text{Rated } V_{RRM}$ | 0.1 | mA |
| | | $T_J = 150^\circ\text{C}$ | | 1.0 | |

THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|----------------|--|-------------|------------------------|
| Maximum junction and storage temperature range | T_J, T_{Stg} | | - 40 to 150 | $^\circ\text{C}$ |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation | 0.6 | $^\circ\text{C/W}$ |
| Maximum thermal resistance, junction to ambient | R_{thJA} | | 40 | |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, flat, smooth and greased | 0.2 | |
| Approximate weight | | | 6 | g |
| | | | 0.21 | oz. |
| Mounting torque | minimum | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style TO-247AC modified (JEDEC) | 40EPS08 | |
| | | | 40EPS12 | |

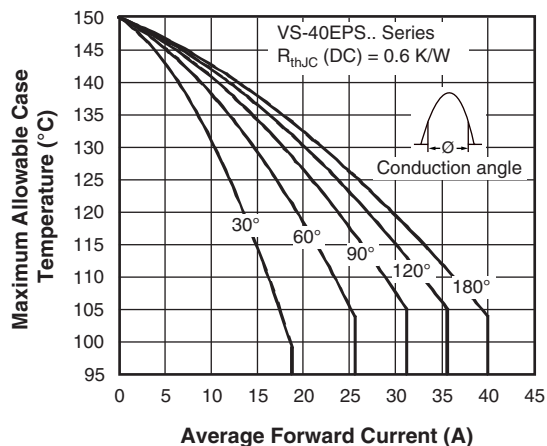


Fig. 1 - Current Rating Characteristics

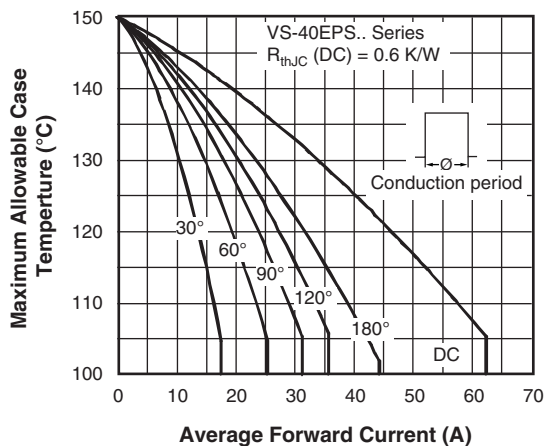


Fig. 2 - Current Rating Characteristics

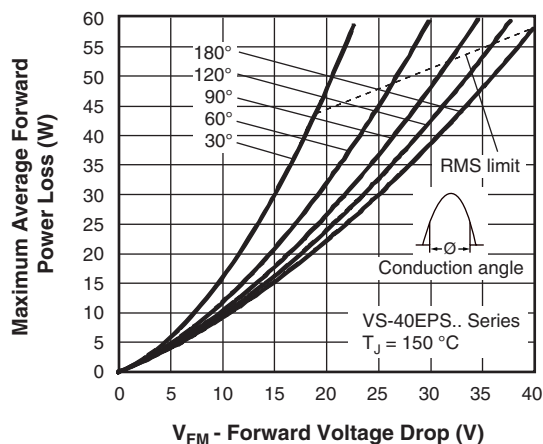


Fig. 3 - Forward Power Loss Characteristics

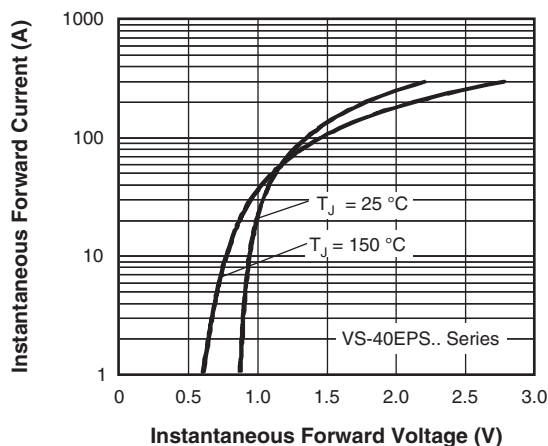


Fig. 5 - Forward Voltage Drop Characteristics

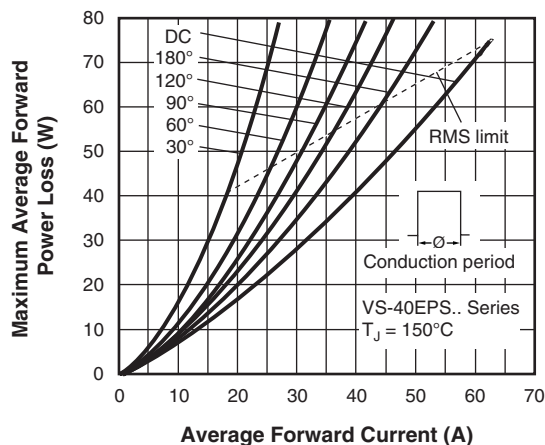


Fig. 4 - Forward Power Loss Characteristics

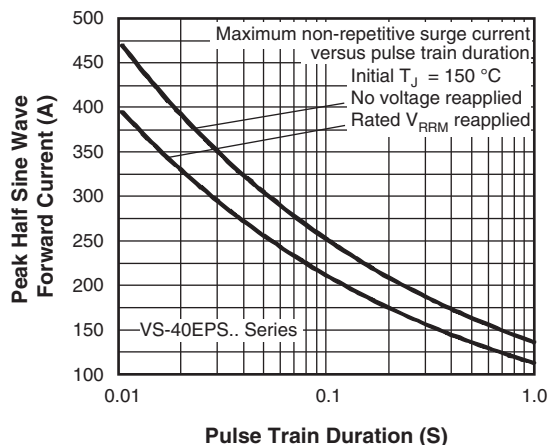


Fig. 6 - Maximum Non-Repetitive Surge Current

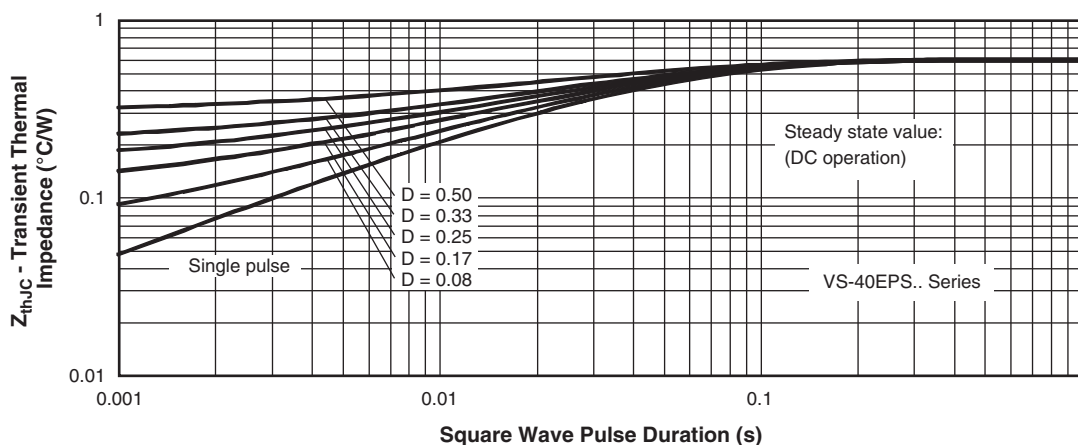


Fig. 7 - Thermal Impedance Z_{thJC} Characteristics

**ORDERING INFORMATION TABLE**

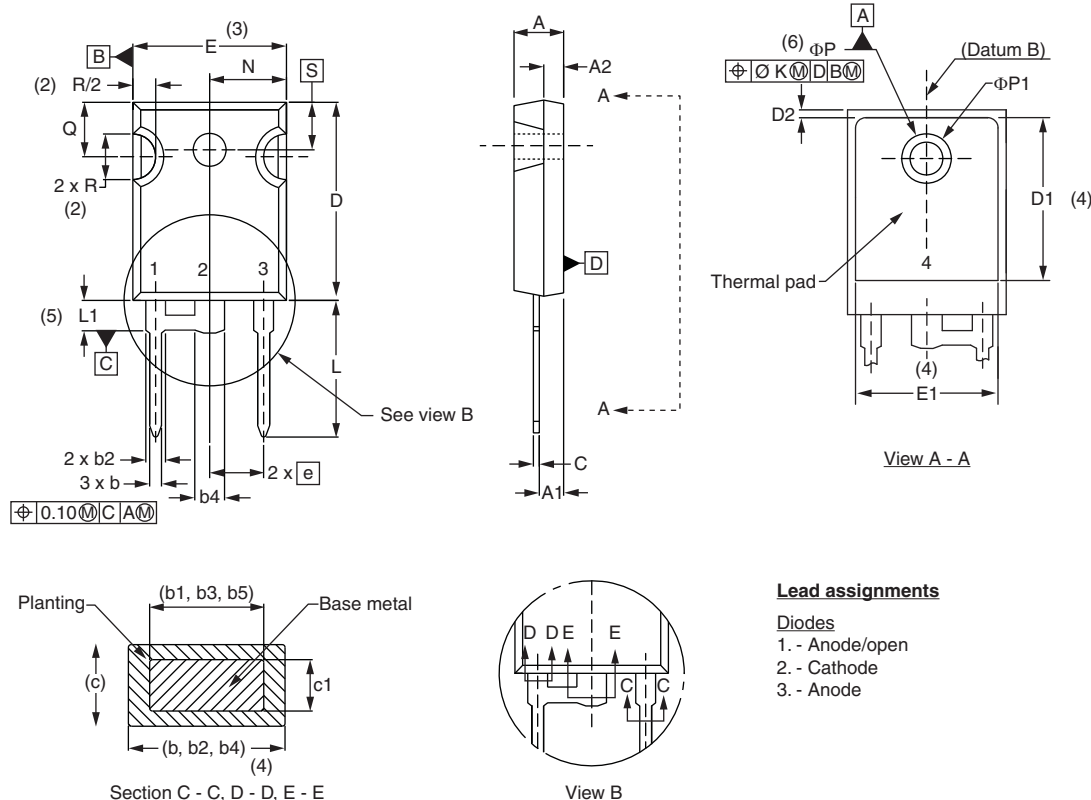
| | | | | | | | |
|-------------|------------|---|----------|----------|----------|-----------|---------------------------|
| Device code | VS- | 40 | E | P | S | 12 | PbF |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | 1 | - Vishay Semiconductors product | | | | | |
| | 2 | - Current rating (40 = 40 A) | | | | | |
| | 3 | - Circuit configuration: E = Single diode | | | | | |
| | 4 | - Package: P = TO-247AC modified | | | | | |
| | 5 | - Type of silicon: S = Standard recovery rectifier | | | | | |
| | 6 | - Voltage rating | | | | | 08 = 800 V 12 = 1200 V |
| | 7 | - Environmental digit: PbF = Lead (Pb)-free and RoHS compliant -M3 = Halogen-free, RoHS compliant and terminations lead (Pb)-free | | | | | |

| ORDERING INFORMATION (Example) | | | |
|---------------------------------------|-------------------------|-------------------------------|------------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-40EPS08PbF | 25 | 500 | Antistatic plastic tubes |
| VS-40EPS08-M3 | 25 | 500 | Antistatic plastic tubes |
| VS-40EPS12PbF | 25 | 500 | Antistatic plastic tubes |
| VS-40EPS12-M3 | 25 | 500 | Antistatic plastic tubes |

| LINKS TO RELATED DOCUMENTS | | |
|-----------------------------------|-----------------------|--|
| Dimensions | | www.vishay.com/doc?95253 |
| Part marking information | TO-247AC modified PbF | www.vishay.com/doc?95255 |
| | TO-247AC modified -M3 | www.vishay.com/doc?95442 |



DIMENSIONS in millimeters and inches



Lead assignments

Diodes

1. - Anode/open
2. - Cathode
3. - Anode

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 4.65 | 5.31 | 0.183 | 0.209 | |
| A1 | 2.21 | 2.59 | 0.087 | 0.102 | |
| A2 | 1.50 | 2.49 | 0.059 | 0.098 | |
| b | 0.99 | 1.40 | 0.039 | 0.055 | |
| b1 | 0.99 | 1.35 | 0.039 | 0.053 | |
| b2 | 1.65 | 2.39 | 0.065 | 0.094 | |
| b3 | 1.65 | 2.37 | 0.065 | 0.094 | |
| b4 | 2.59 | 3.43 | 0.102 | 0.135 | |
| b5 | 2.59 | 3.38 | 0.102 | 0.133 | |
| c | 0.38 | 0.86 | 0.015 | 0.034 | |
| c1 | 0.38 | 0.76 | 0.015 | 0.030 | |
| D | 19.71 | 20.70 | 0.776 | 0.815 | 3 |
| D1 | 13.08 | - | 0.515 | - | 4 |

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|-----------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| D2 | 0.51 | 1.30 | 0.020 | 0.051 | |
| E | 15.29 | 15.87 | 0.602 | 0.625 | 3 |
| E1 | 13.72 | - | 0.540 | - | |
| e | 5.46 BSC | | 0.215 BSC | | |
| ΦK | 2.54 | | 0.010 | | |
| L | 14.20 | 16.10 | 0.559 | 0.634 | |
| L1 | 3.71 | 4.29 | 0.146 | 0.169 | |
| N | 7.62 BSC | | 0.3 | | |
| ΦP | 3.56 | 3.66 | 0.14 | 0.144 | |
| $\Phi P1$ | - | 6.98 | - | 0.275 | |
| Q | 5.31 | 5.69 | 0.209 | 0.224 | |
| R | 4.52 | 5.49 | 1.78 | 0.216 | |
| S | 5.51 BSC | | 0.217 BSC | | |

Notes

- (1) Dimensioning and tolerance per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) ΦP to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC outline TO-247 with exception of dimension c



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