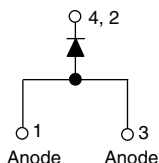




Hyperfast Rectifier, 30 A FRED Pt®



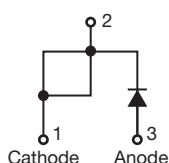
TO-247AC



VS-APH3006-F3
VS-APH3006-N3



TO-247AC modified



VS-EPH3006-F3
VS-EPH3006-N3

FEATURES

- Low forward voltage drop
- Hyperfast soft recovery time
- 175 °C operating junction temperature
- Designed and qualified according to JEDEC-JESD47
- Material categorization:
For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
Available

DESCRIPTION/APPLICATIONS

Hyperfast recovery rectifiers designed with optimized performance of forward voltage drop, hyperfast recovery time, and soft recovery.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in PFC Boost stage in the AC/DC section of SMPS, inverters or as freewheeling diodes.

The extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

PRODUCT SUMMARY

| | |
|-----------------|---|
| Package | TO-247AC, TO-247AC modified (2 pins) |
| $I_{F(AV)}$ | 30 A |
| V_R | 600 V |
| V_F at I_F | 2.65 V |
| t_{rr} typ. | 27 ns |
| T_J max. | 175 °C |
| Diode variation | Single die |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | MAX. | UNITS |
|---|----------------|-----------------------|-------------|-------|
| Repetitive peak reverse voltage | V_{RRM} | | 600 | V |
| Average rectified forward current | $I_{F(AV)}$ | $T_C = 112\text{ °C}$ | 30 | A |
| Non-repetitive peak surge current | I_{FSM} | $T_C = 25\text{ °C}$ | 220 | |
| Operating junction and storage temperatures | T_J, T_{Stg} | | - 65 to 175 | °C |

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|-------------------------------------|---------------|--|------|------|------|---------|
| Breakdown voltage, blocking voltage | V_{BR}, V_R | $I_R = 100\ \mu A$ | 600 | - | - | V |
| Forward voltage | V_F | $I_F = 30\text{ A}$ | - | 2.0 | 2.65 | |
| | | $I_F = 30\text{ A}, T_J = 150\text{ °C}$ | - | 1.4 | 1.8 | |
| Reverse leakage current | I_R | $V_R = V_R$ rated | - | - | 30 | μA |
| | | $T_J = 150\text{ °C}, V_R = V_R$ rated | - | - | 300 | |
| Junction capacitance | C_T | $V_R = 600\text{ V}$ | - | 20 | - | pF |
| Series inductance | L_S | Measured lead to lead 5 mm from package body | - | 8.0 | - | nH |



| DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified) | | | | | | |
|---|-----------|--|------|------|------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Reverse recovery time | t_{rr} | $I_F = 1\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$ | - | 26 | 35 | ns |
| | | $T_J = 25\text{ }^\circ\text{C}$ | - | 26 | - | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 70 | - | |
| Peak recovery current | I_{RRM} | $T_J = 25\text{ }^\circ\text{C}$ | - | 3.5 | - | A |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 7.6 | - | |
| Reverse recovery charge | Q_{rr} | $T_J = 25\text{ }^\circ\text{C}$ | - | 50 | - | nC |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 280 | - | |

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | |
|---|----------------|--|-------------|------|-------------|---------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Maximum junction and storage temperature range | T_J, T_{Stg} | | - 65 | - | 175 | $^\circ\text{C}$ |
| Thermal resistance, junction to case | R_{thJC} | | - | 0.7 | 1.1 | $^\circ\text{C}/\text{W}$ |
| Thermal resistance, junction to ambient per leg | R_{thJA} | Typical socket mount | - | - | 70 | |
| Thermal resistance, case to heatsink | R_{thCS} | Mounting surface, flat, smooth and greased | - | 0.5 | - | |
| Weight | | | - | 5.5 | - | g |
| | | | - | 0.2 | - | oz. |
| Mounting torque | | | 1.2 (10) | - | 2.4 (20) | kgf · cm (lbf · in) |
| Marking device | | Case style TO-247AC | APH3006 | | | |
| | | Case style TO-247AC modified | EPH3006 | | | |

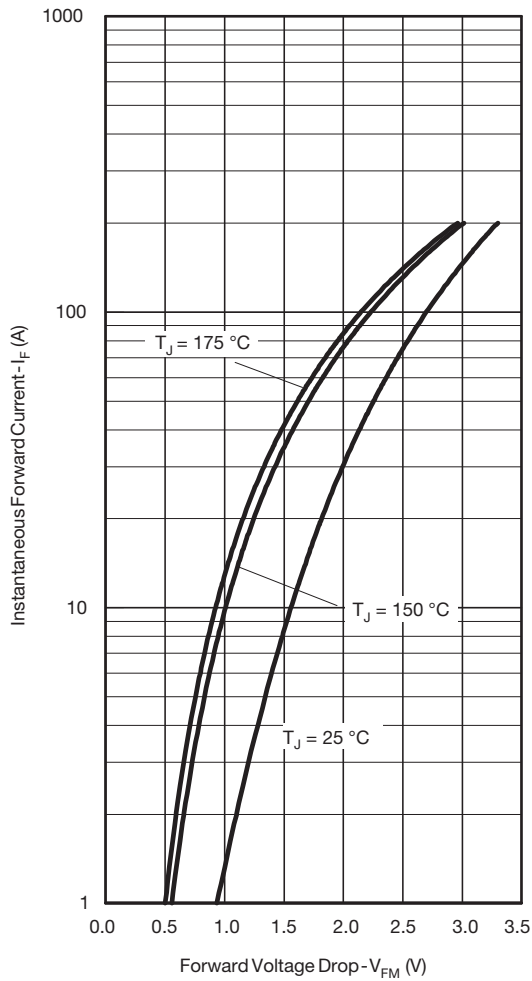


Fig. 1 - Typical Forward Voltage Drop Characteristics

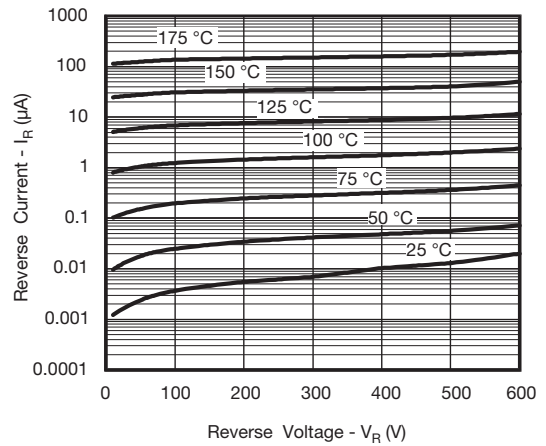


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

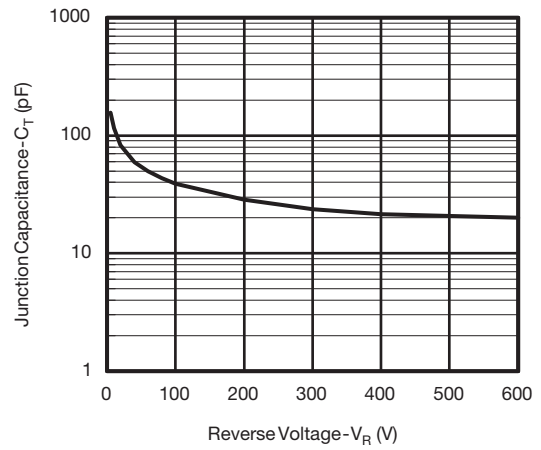


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

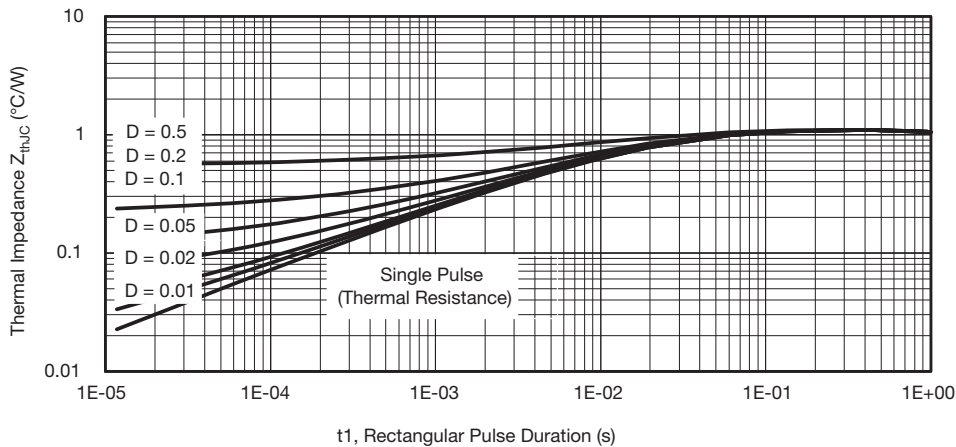


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

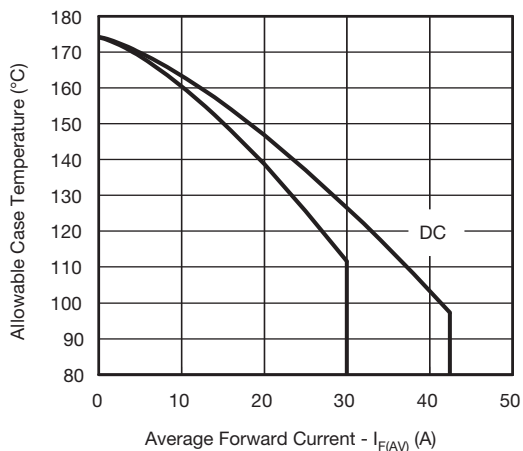


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

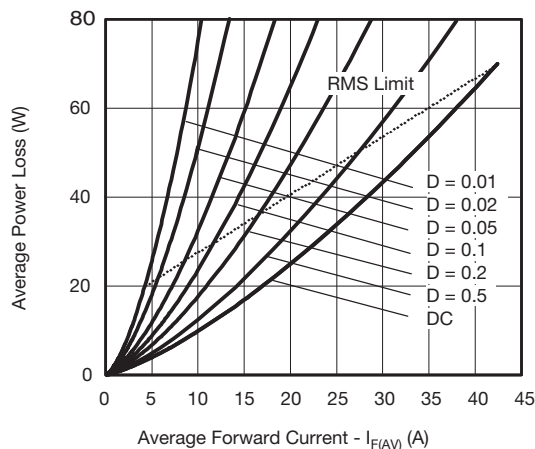


Fig. 6 - Forward Power Loss Characteristics

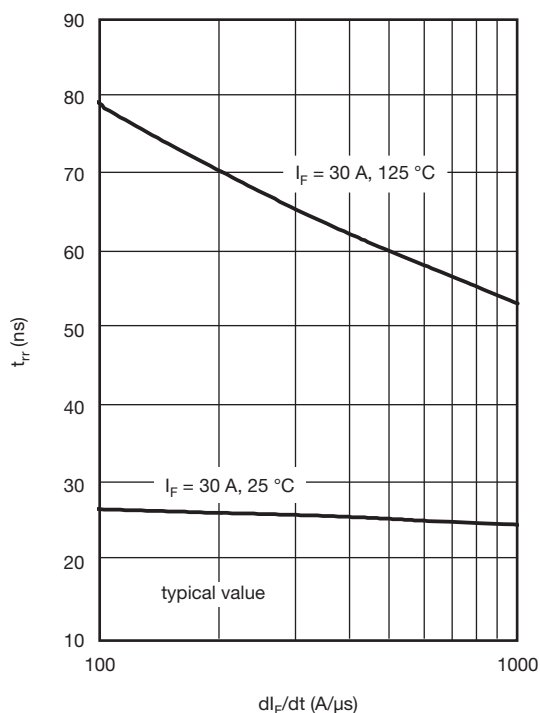


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

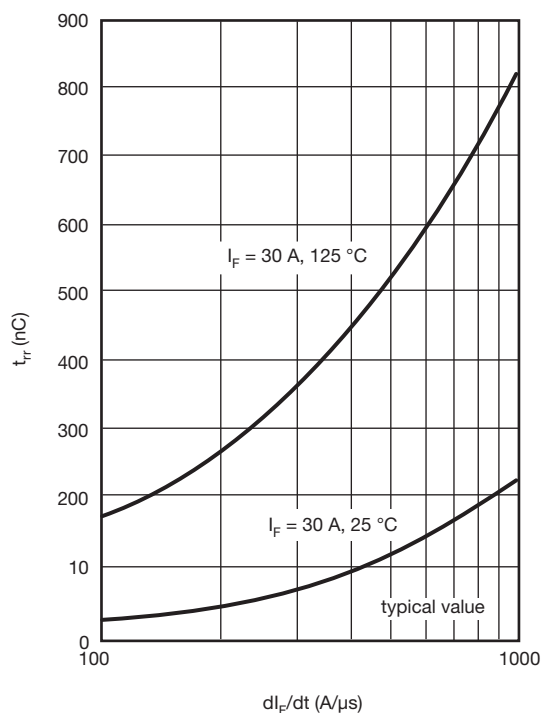


Fig. 8 - Typical Stored Charge vs. di_F/dt

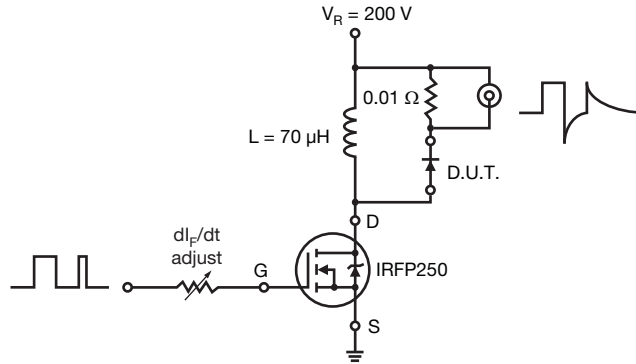
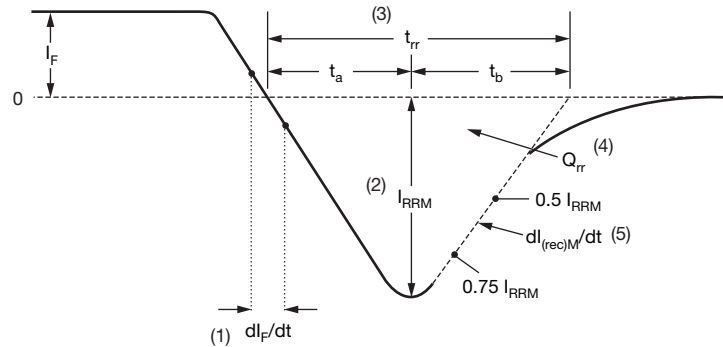


Fig. 9 - Reverse Recovery Parameter Test Circuit



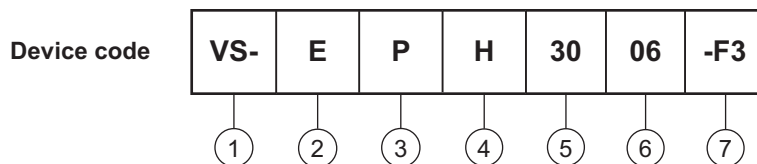
- (1) dI_F/dt - rate of change of current through zero crossing
- (2) I_{RRM} - peak reverse recovery current
- (3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.
- (4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}
- (5) $dI_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

Fig. 10 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Ultrafast MUR series
 - A = Single diode
 - E = Single diode (modified)
- 3** - P = TO-247AC
- 4** - H = Hyperfast recovery time
- 5** - Current code (30 = 30 A)
- 6** - Voltage code (06 = 600 V)
- 7** - Environmental digit:
 - F3 = RoHS compliant and totally lead (Pb)-free
 - N3 = Halogen-free, RoHS compliant and totally lead (Pb)-free

| ORDERING INFORMATION (Example) | | | |
|---------------------------------------|-------------------|------------------------|-------------------------|
| PREFERRED P/N | QUANTITY PER TUBE | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-APH3006-F3 | 25 | 500 | Antistatic plastic tube |
| VS-APH3006-N3 | 25 | 500 | Antistatic plastic tube |
| VS-EPH3006-F3 | 25 | 500 | Antistatic plastic tube |
| VS-EPH3006-N3 | 25 | 500 | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS | | |
|-----------------------------------|-------------------|--|
| Dimensions | TO-247AC | www.vishay.com/doc?95223 |
| | TO-247AC modified | www.vishay.com/doc?95253 |
| Part marking information | TO-247AC | www.vishay.com/doc?95007 |
| | TO-247AC modified | www.vishay.com/doc?95442 |



DIMENSIONS in millimeters and inches



Lead assignments

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

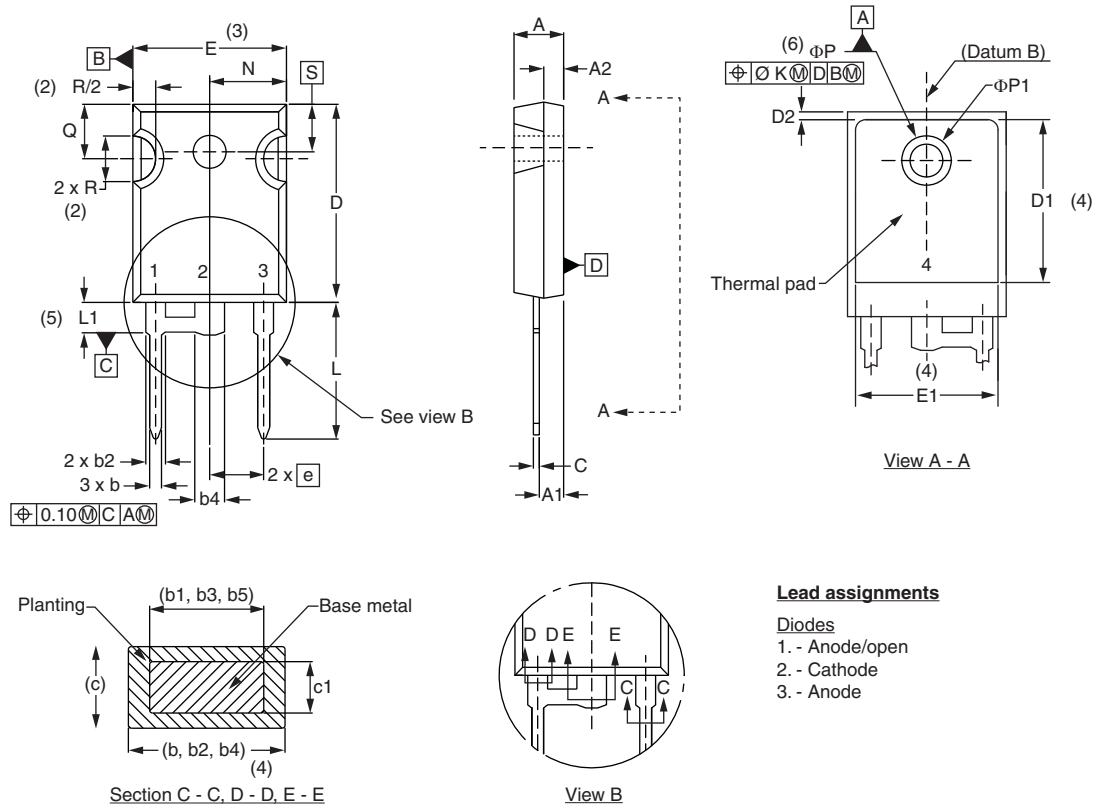
| SYMBOL | MILLIMETERS | | INCHES | | NOTES | SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|--------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | | | MIN. | MAX. | MIN. | MAX. | |
| A | 4.65 | 5.31 | 0.183 | 0.209 | | D2 | 0.51 | 1.30 | 0.020 | 0.051 | |
| A1 | 2.21 | 2.59 | 0.087 | 0.102 | | E | 15.29 | 15.87 | 0.602 | 0.625 | 3 |
| A2 | 1.50 | 2.49 | 0.059 | 0.098 | | E1 | 13.72 | - | 0.540 | - | |
| b | 0.99 | 1.40 | 0.039 | 0.055 | | e | 5.46 BSC | | 0.215 BSC | | |
| b1 | 0.99 | 1.35 | 0.039 | 0.053 | | FK | 2.54 | | 0.010 | | |
| b2 | 1.65 | 2.39 | 0.065 | 0.094 | | L | 14.20 | 16.10 | 0.559 | 0.634 | |
| b3 | 1.65 | 2.37 | 0.065 | 0.094 | | L1 | 3.71 | 4.29 | 0.146 | 0.169 | |
| b4 | 2.59 | 3.43 | 0.102 | 0.135 | | N | 7.62 BSC | | 0.3 | | |
| b5 | 2.59 | 3.38 | 0.102 | 0.133 | | ΦP | 3.56 | 3.66 | 0.14 | 0.144 | |
| c | 0.38 | 0.86 | 0.015 | 0.034 | | ΦP1 | - | 6.98 | - | 0.275 | |
| c1 | 0.38 | 0.76 | 0.015 | 0.030 | | Q | 5.31 | 5.69 | 0.209 | 0.224 | |
| D | 19.71 | 20.70 | 0.776 | 0.815 | 3 | R | 4.52 | 5.49 | 1.78 | 0.216 | |
| D1 | 13.08 | - | 0.515 | - | 4 | S | 5.51 BSC | | 0.217 BSC | | |

Notes

- (1) Dimensioning and tolerancing 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) Ø P 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



DIMENSIONS in millimeters and inches



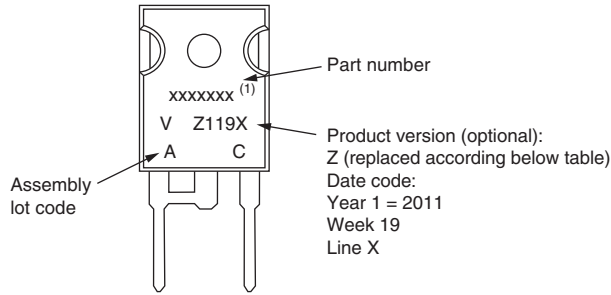
| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
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| D1 | 13.08 | - | 0.515 | - | 4 |
| D2 | 0.51 | 1.30 | 0.020 | 0.051 | |
| E | 15.29 | 15.87 | 0.602 | 0.625 | 3 |
| E1 | 13.72 | - | 0.540 | - | |
| e | 5.46 BSC | | 0.215 BSC | | |
| ΦK | 2.54 | | 0.010 | | |
| 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 | |
| ΦP1 | - | 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

- Dimensioning and tolerance per ASME Y14.5M-1994
- Contour of slot optional
- 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
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- Lead finish uncontrolled in L1
- 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")
- Outline conforms to JEDEC outline TO-247 with exception of dimension c



TO-247AC modified E



Example: This is a xxxxxxxx ⁽¹⁾ with assembly lot code AC, assembled on WW 19, 2011 in the assembly line "X"

Note

⁽¹⁾ If part number contain "H" as last digit, product is AEC-Q101 qualified

| ENVIRONMENTAL NAMING CODE (Z) | PRODUCT DEFINITION |
|-------------------------------|---|
| A | Termination lead (Pb)-free |
| B | Totally lead (Pb)-free |
| E | RoHS compliant and termination lead (Pb)-free |
| F | RoHS compliant and totally lead (Pb)-free |
| M | Halogen-free, RoHS compliant and termination lead (Pb)-free |
| N | Halogen-free, RoHS compliant and totally lead (Pb)-free |
| G | Green |



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Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.



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Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.