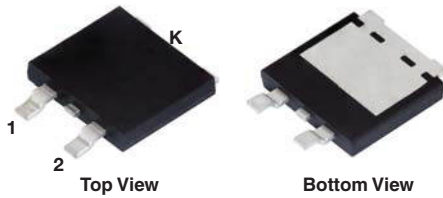
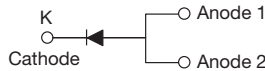


Ultrafast Rectifier, 16 A FRED Pt®


TO-263AC (SMPD)


FEATURES

- Ultrafast recovery time, reduced Q_{rr} , and soft recovery
- 175 °C maximum operating junction temperature
- For PFC CRM, snubber operation
- Low forward voltage drop
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?999912


RoHS
 COMPLIANT
 HALOGEN
FREE

DESCRIPTION / APPLICATIONS

State of the art ultrafast recovery rectifiers designed with optimized performance of forward voltage drop and ultrafast 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, lighting, in the AC/DC section of SMPS, freewheeling and clamp diodes.

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

PRODUCT SUMMARY

| Package | TO-263AC (SMPD) |
|-----------------|-----------------|
| $I_{F(AV)}$ | 16 A |
| V_R | 600 V |
| V_F at I_F | 0.91 V |
| t_{rr} | 55 ns |
| T_J max. | 175 °C |
| Diode variation | Single die |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|-----------------------------------|-------------|--|--------|-------|
| Peak repetitive reverse voltage | V_{RRM} | | 600 | V |
| Average rectified forward current | $I_{F(AV)}$ | $T_{solder\ pad} = 141\text{ °C}$ | 16 | A |
| Non-repetitive peak surge current | I_{FSM} | $T_J = 25\text{ °C}$, 6 ms square pulse | 160 | |

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 | $I_F = 16\text{ A}$ | - | 1.04 | 1.25 | |
| | | $I_F = 16\text{ A}$, $T_J = 150\text{ °C}$ | - | 0.91 | 1.1 | |
| Reverse leakage current | I_R | $V_R = V_R$ rated | - | - | 15 | μA |
| | | $T_J = 150\text{ °C}$, $V_R = V_R$ rated | - | 70 | 300 | |
| Junction capacitance | C_T | $V_R = 600\text{ V}$ | - | 16 | - | pF |

| 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} | $I_F = 1\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$ | - | 55 | - | ns |
| | | $I_F = 0.5\text{ A}$, $I_R = 1\text{ A}$, $I_{rr} = 0.25\text{ A}$ | - | - | 55 | |
| | | $T_J = 25\text{ }^\circ\text{C}$ | - | 100 | - | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 150 | - | |
| Peak recovery current | I_{RRM} | $T_J = 25\text{ }^\circ\text{C}$ | - | 20 | - | A |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 27 | - | |
| Reverse recovery charge | Q_{rr} | $T_J = 25\text{ }^\circ\text{C}$ | - | 1 | - | μC |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 2 | - | |

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | |
|--|----------------|----------------------------|---------|------|------|---------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Maximum junction and storage temperature range | T_J, T_{Stg} | | -55 | - | +175 | $^\circ\text{C}$ |
| Thermal resistance, junction to solder pad | R_{thJ-Sp} | | - | 1.2 | 1.7 | $^\circ\text{C}/\text{W}$ |
| Approximate weight | | | 0.55 | | | g |
| | | | 0.02 | | | oz. |
| Marking device | | Case style TO-263AC (SMPD) | 16EDU06 | | | |

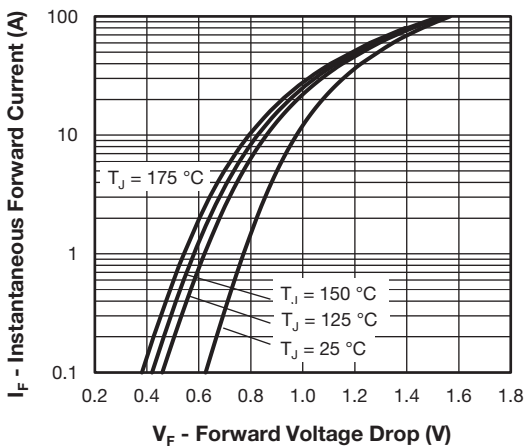


Fig. 1 - Typical Forward Voltage Drop Characteristics

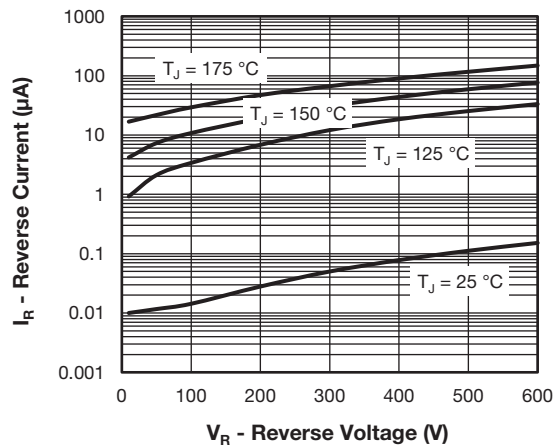


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

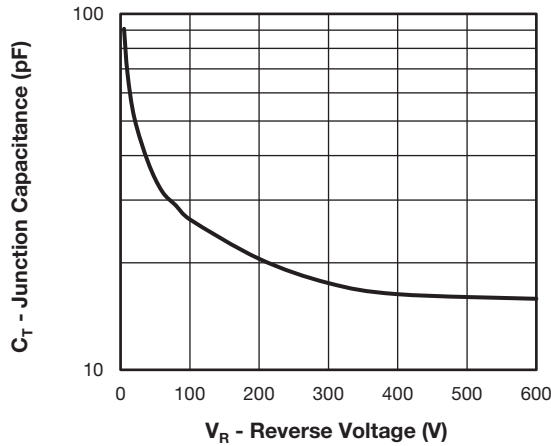


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

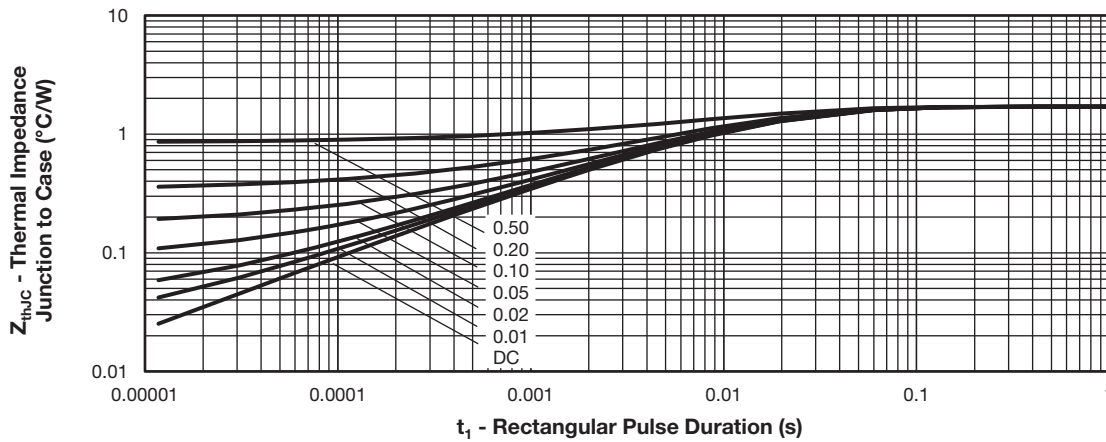


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

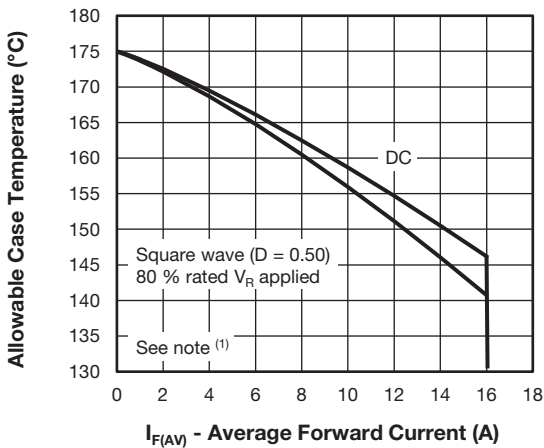


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

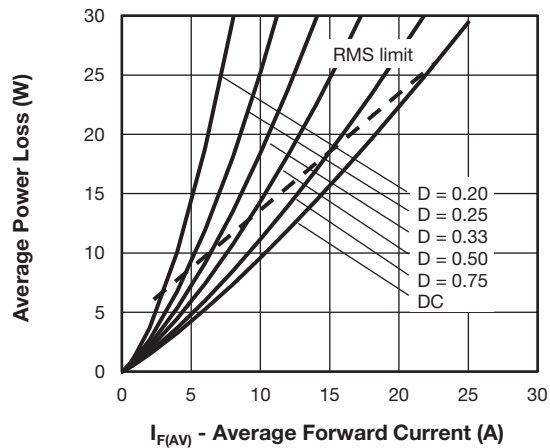


Fig. 6 - Forward Power Loss Characteristics

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 5);
 Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = rated V_R

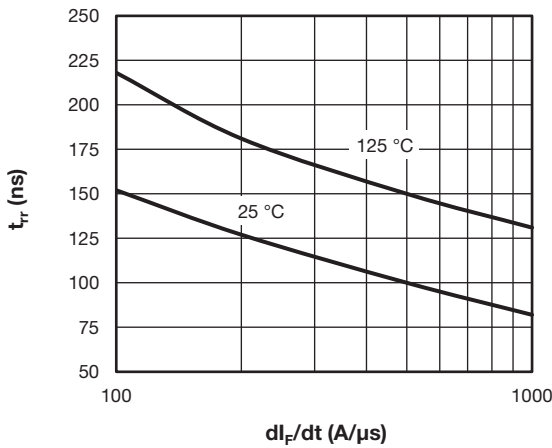


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

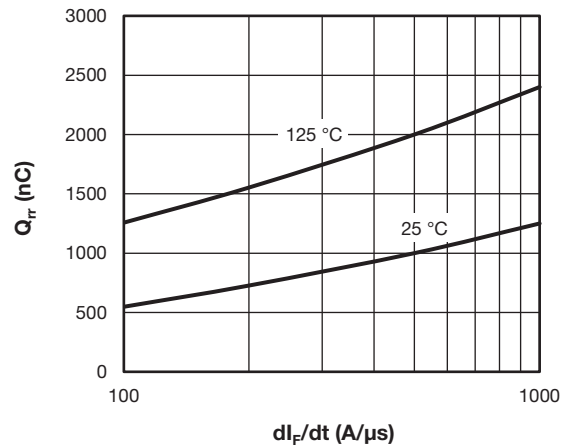
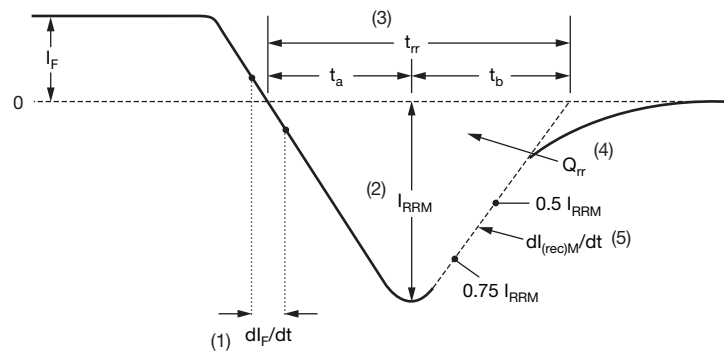


Fig. 8 - Typical Stored Charge vs. di_F/dt



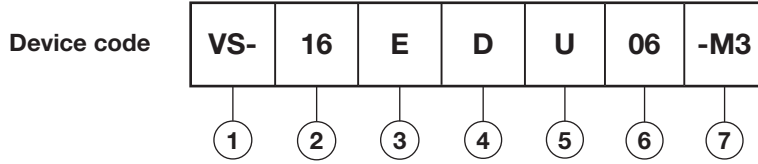
- (1) di_F/dt - rate of change of current through zero crossing
- (2) I_{RRM} - peak reverse recovery current
- (3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.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

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

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (16 A)
- 3** - Circuit configuration:
E = single die
- 4** - D = SMPD package
- 5** - Process type,
U = ultrafast recovery
- 6** - Voltage code (06 = 600 V)
- 7** - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

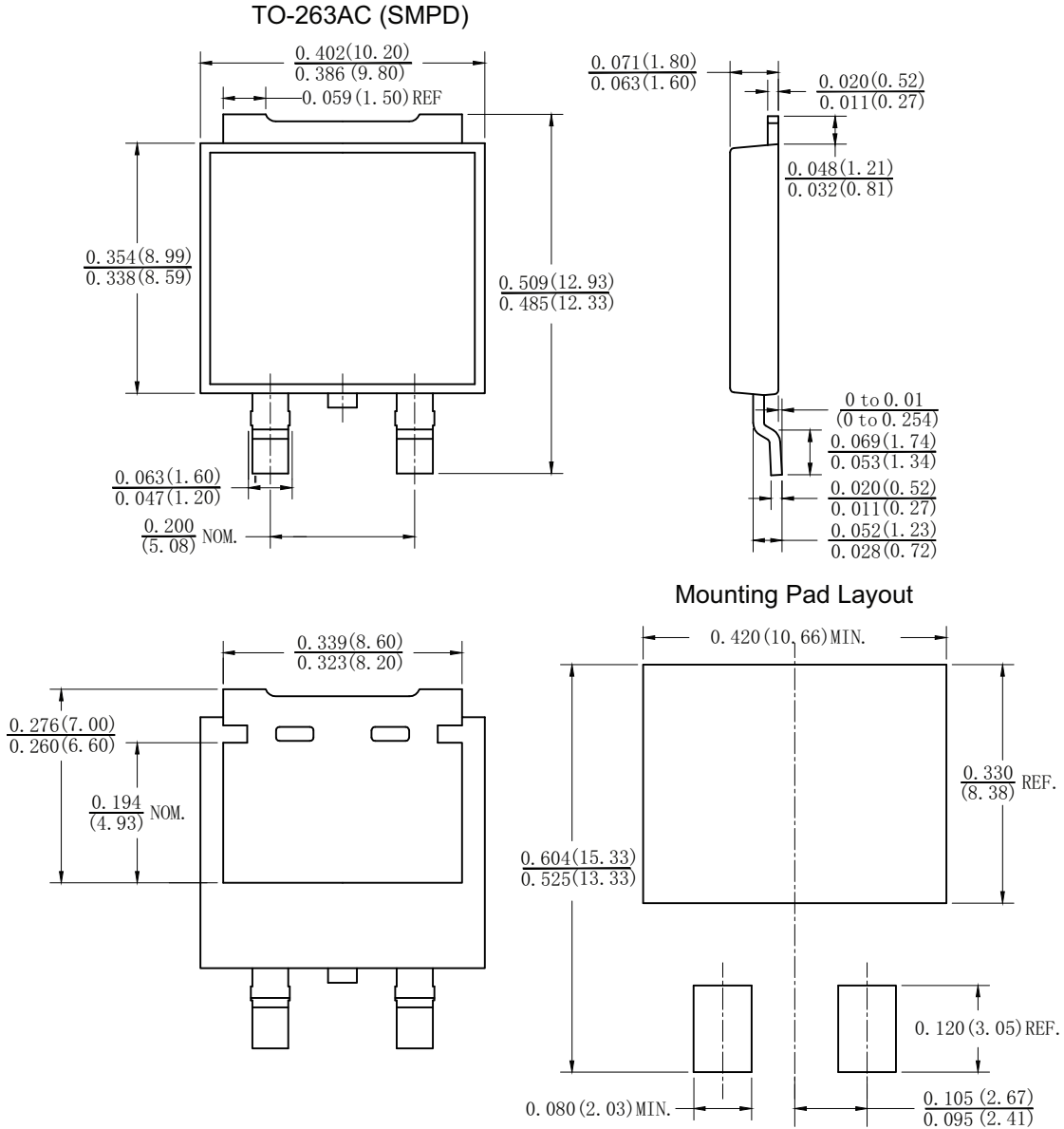
| ORDERING INFORMATION (Example) | | | |
|---------------------------------------|-------------------|------------------------|------------------------------------|
| PREFERRED P/N | QUANTITY PER REEL | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-16EDU06-M3/I | 2000 | 2000 | 13" diameter plastic tape and reel |

| LINKS TO RELATED DOCUMENTS | |
|-----------------------------------|--|
| Dimensions | www.vishay.com/doc?95604 |
| Part marking information | www.vishay.com/doc?95566 |
| Packaging information | www.vishay.com/doc?88869 |



TO-263AC (SMPD)

DIMENSIONS in inches (millimeters)





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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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- 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;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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