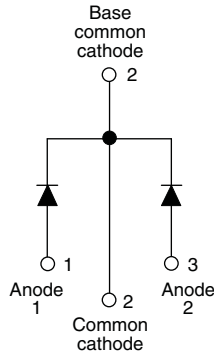


Ultrafast Rectifier, 2 x 15 A FRED Pt®

TO-247AC

FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)



| PRODUCT SUMMARY | |
|-----------------|--------------------|
| Package | TO-247AC |
| $I_{F(AV)}$ | 2 x 15 A |
| V_R | 200 V |
| V_F at I_F | 1.05 V |
| t_{rr} typ. | See Recovery table |
| T_J max. | 175 °C |
| Diode variation | Common cathode |

DESCRIPTION/APPLICATIONS

VS-MUR3020WT... is the state of the art ultrafast recovery rectifier specifically designed with optimized performance of forward voltage drop and ultrafast recovery time.

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 the output rectification stage of SMPS, UPS, DC/DC converters as well as freewheeling diode in low voltage inverters and chopper motor drives.

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

| ABSOLUTE MAXIMUM RATINGS | | | | |
|---|-------------------|---|------------------------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MAX. | UNITS |
| Peak repetitive reverse voltage | V_{RRM} | | 200 | V |
| Average rectified forward current | $I_{F(AV)}$ | per leg | 15 | A |
| | | total device | Rated V_R , $T_C = 150$ °C | |
| Non-repetitive peak surge current per leg | I_{FSM} | | 200 | |
| Peak repetitive forward current per leg | I_{FM} | Rated V_R , square wave, 20 kHz, $T_C = 150$ °C | 30 | |
| Operating junction and storage temperatures | T_J , T_{Stg} | | - 65 to 175 | °C |

| ELECTRICAL SPECIFICATIONS ($T_J = 25$ °C unless otherwise specified) | | | | | | |
|---|------------------|--|------|------|------|---------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Breakdown voltage, blocking voltage | V_{BR} , V_R | $I_R = 100$ μ A | 200 | - | - | V |
| | | | | | | |
| Forward voltage | V_F | $I_F = 15$ A | - | - | 1.05 | V |
| | | | | | | |
| Reverse leakage current | I_R | $V_R = V_R$ rated $T_J = 150$ °C, $V_R = V_R$ rated | - | - | 10 | μ A |
| | | | | | 500 | |
| Junction capacitance | C_T | $V_R = 200$ V | - | 55 | - | pF |
| Series inductance | L_S | Measured lead to lead 5 mm from package body | - | 12 | - | 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} | $I_F = 1.0\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$ | - | - | 35 | ns |
| | | $T_J = 25\text{ }^\circ\text{C}$ | - | 22 | - | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 39 | - | |
| Peak recovery current | I_{RRM} | $T_J = 25\text{ }^\circ\text{C}$ | - | 1.6 | - | A |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 4.1 | - | |
| Reverse recovery charge | Q_{rr} | $T_J = 25\text{ }^\circ\text{C}$ | - | 19 | - | nC |
| | | $T_J = 125\text{ }^\circ\text{C}$ | - | 90 | - | |

| 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 per leg | R_{thJC} | | - | - | 1.5 | $^\circ\text{C}/\text{W}$ |
| Thermal resistance, junction to ambient per leg | R_{thJA} | Typical socket mount | - | - | 40 | |
| Thermal resistance, case to heatsink | R_{thCS} | Mounting surface, flat, smooth and greased | - | 0.5 | - | |
| Weight | | | - | 6.0 | - | g |
| | | | - | 0.21 | - | oz. |
| Mounting torque | | | 6.0 (5.0) | - | 12 (10) | kgf · cm (lbf · in) |
| Marking device | | Case style TO-247AC | MUR3020WT | | | |

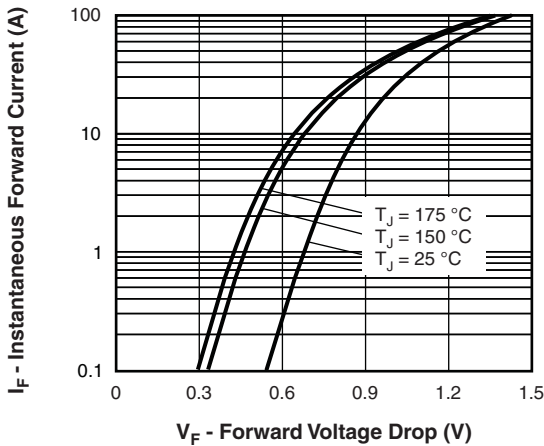


Fig. 1 - Typical Forward Voltage Drop Characteristics

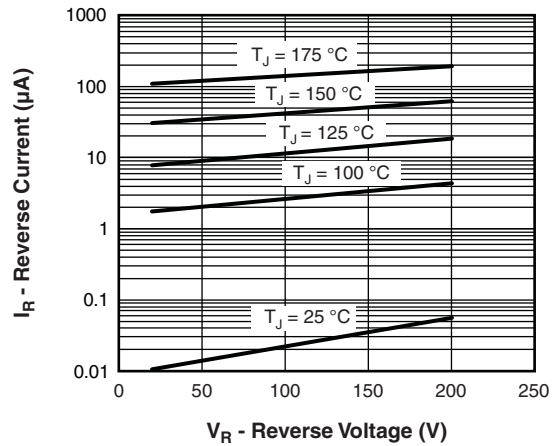


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

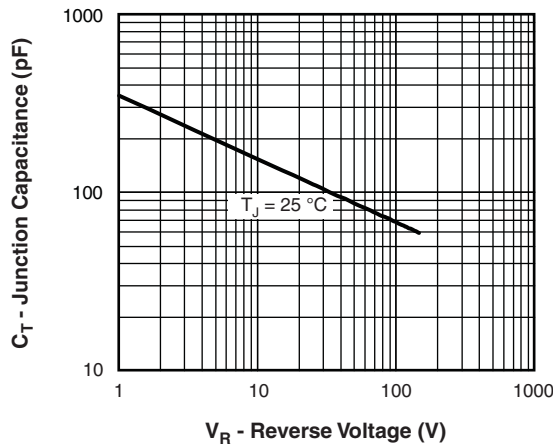


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

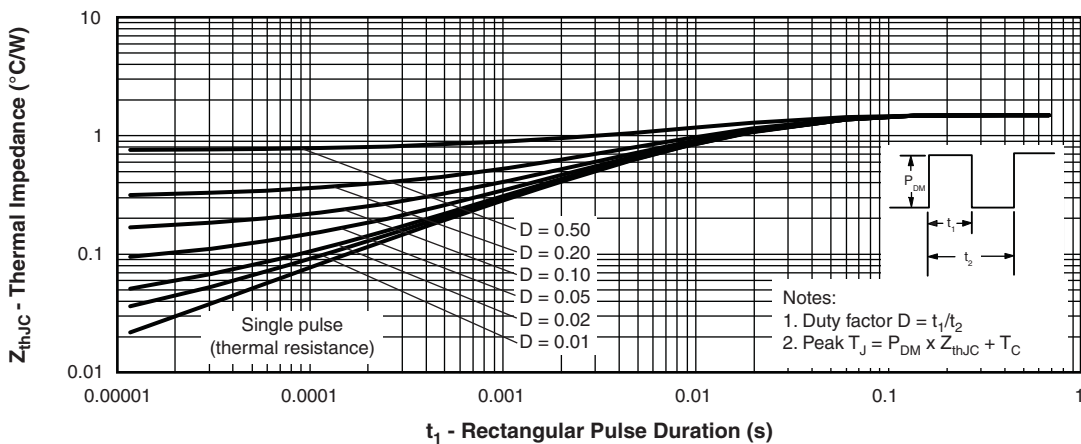


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

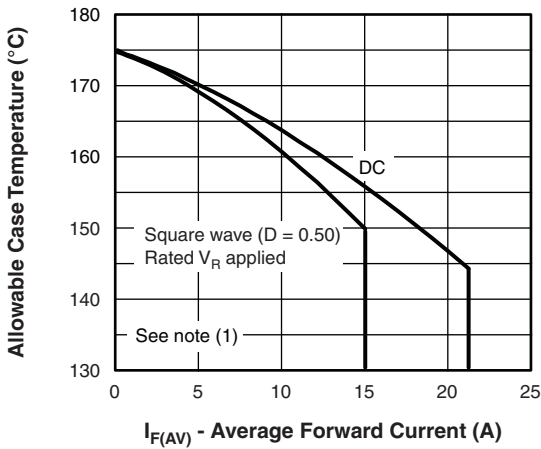


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

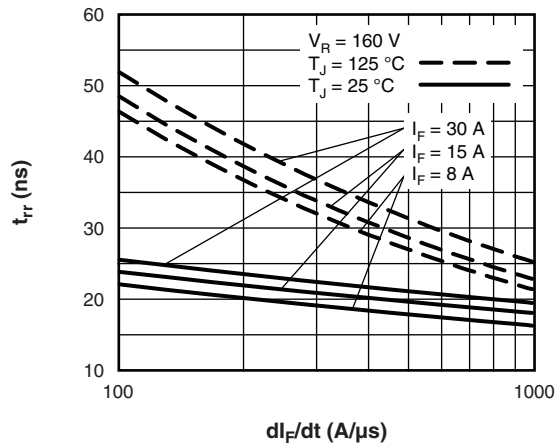


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

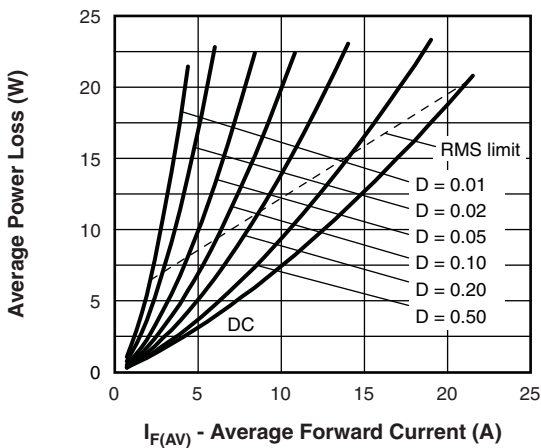


Fig. 6 - Forward Power Loss Characteristics

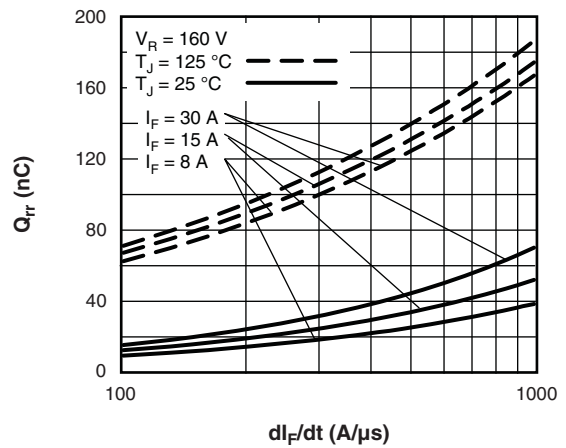


Fig. 8 - Typical Stored Charge vs. di_F/dt

Note

- (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. 6);
- Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

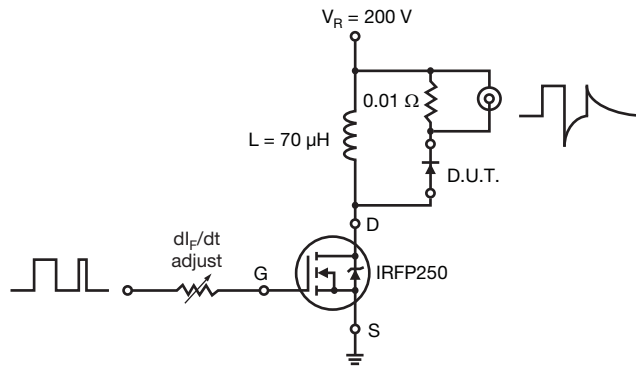


Fig. 9 - Reverse Recovery Parameter Test Circuit

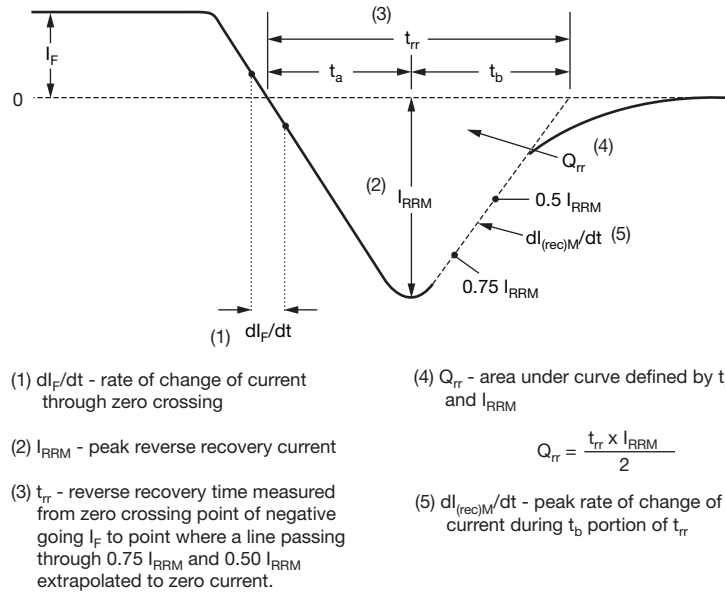
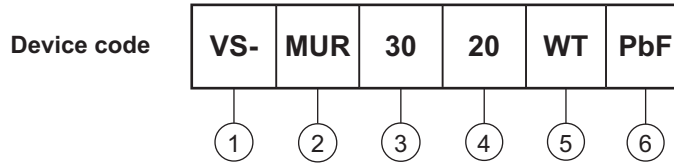


Fig. 10 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
 - 2** - Ultrafast MUR series (TO-247AC)
 - 3** - Current rating (30 = 30 A)
 - 4** - Voltage rating (20 = 200 V)
 - 5** - WT = Center tap (dual) TO-247
 - 6** - Environmental digit:
- PbF = Lead (Pb)-free and RoHS compliant
 -N3 = Halogen-free, RoHS compliant and totally lead (Pb)-free

| ORDERING INFORMATION (Example) | | | |
|--------------------------------|------------------|------------------------|-------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-MUR3020WTPbF | 25 | 500 | Antistatic plastic tube |
| VS-MUR3020WT-N3 | 25 | 500 | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS | | |
|----------------------------|-------------|--|
| Dimensions | | www.vishay.com/doc?95223 |
| Part marking information | TO-247ACPbF | www.vishay.com/doc?95226 |
| | TO-247AC-N3 | www.vishay.com/doc?95007 |



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



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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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