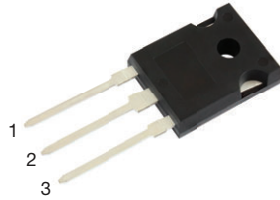
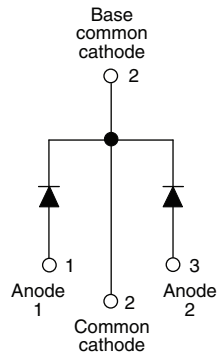


Ultrafast Soft Recovery Diode, 2 x 30 A FRED Pt® Gen 4



TO-247AD 3L



FEATURES

- Gen 4 FRED Pt® technology
- Low I_{RRM} and reverse recovery charge
- Very low forward voltage drop
- Polyimide passivated chip for high reliability standard
- 175 °C operating junction temperature
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



DESCRIPTION

Gen 4 Fred technology, state of the art, ultralow V_F , soft switching optimized for Discontinuous (Critical) Mode (DCM) and IGBT F/W diode.

The minimized conduction loss, 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-247AD 3L |
| $I_{F(AV)}$ | 2 x 30 A |
| V_R | 600 V |
| V_F at I_F | 1.19 V |
| t_{rr} typ. | See Recovery table |
| T_J max. | 175 °C |
| Diode variation | Single die |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | MAX. | UNITS |
|--|----------------|---|-------------|-------|
| Peak repetitive reverse voltage | V_{RRM} | | 600 | V |
| Average rectified forward current | $I_{F(AV)}$ | $T_C = 131\text{ °C}$ | 30 | A |
| Non-repetitive peak surge current, per leg | I_{FSM} | $T_C = 25\text{ °C}$, $t_p = 8.3\text{ ms}$, half sine wave | 240 | |
| Operating junction and storage temperature | T_J, T_{Stg} | | -55 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 | $I_R = 100\text{ }\mu\text{A}$ | 600 | - | - | V |
| Forward voltage | V_F | $I_F = 30\text{ A}$ | - | 1.36 | 1.6 | |
| | | $I_F = 60\text{ A}$ | - | 1.6 | - | |
| | | $I_F = 30\text{ A}, T_J = 125\text{ °C}$ | - | 1.23 | - | |
| | | $I_F = 60\text{ A}, T_J = 125\text{ °C}$ | - | 1.5 | - | |
| | | $I_F = 30\text{ A}, T_J = 150\text{ °C}$ | - | 1.19 | 1.35 | |
| | | $I_F = 60\text{ A}, T_J = 150\text{ °C}$ | - | 1.48 | - | |
| Reverse leakage current | I_R | $V_R = V_R$ rated | - | - | 50 | μA |
| | | $T_J = 125\text{ °C}, V_R = V_R$ rated | - | - | 500 | |
| Junction capacitance | C_T | $V_R = 600\text{ V}$ | - | 18.3 | - | 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} | $T_J = 25\text{ }^\circ\text{C}$ | $I_F = 30\text{ A}$ $di_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}$ | - | 65 | - | ns |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | - | 90 | - | |
| Peak recovery current | I_{RRM} | $T_J = 25\text{ }^\circ\text{C}$ | | - | 18 | - | A |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | - | 32 | - | |
| Reverse recovery charge | Q_{rr} | $T_J = 25\text{ }^\circ\text{C}$ | | - | 850 | - | nC |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | - | 1850 | - | |

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | | | |
|--|------------|------------------------|--|------------|------|------------|---------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNITS |
| Thermal resistance, junction to case | R_{thJC} | | | - | - | 1 | $^\circ\text{C}/\text{W}$ |
| Thermal resistance, case to heat sink | R_{thCS} | | | - | 0.4 | - | |
| Weight | | | | - | 6.0 | - | g |
| | | | | - | 0.21 | - | oz. |
| Mounting torque | | | | 6.0 (5) | - | 12 (10) | kgf · cm (lbf · in) |
| Marking device | | Case style TO-247AD 3L | | C4PU3006L | | | |

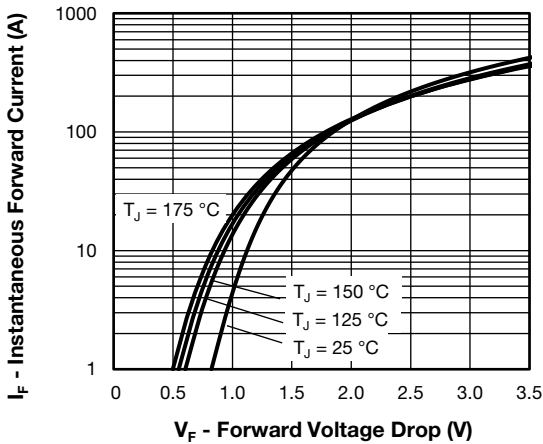


Fig. 1 - Typical Forward Voltage Drop Characteristics

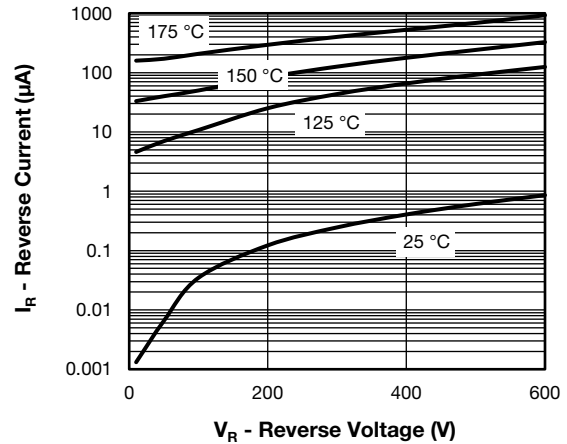


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

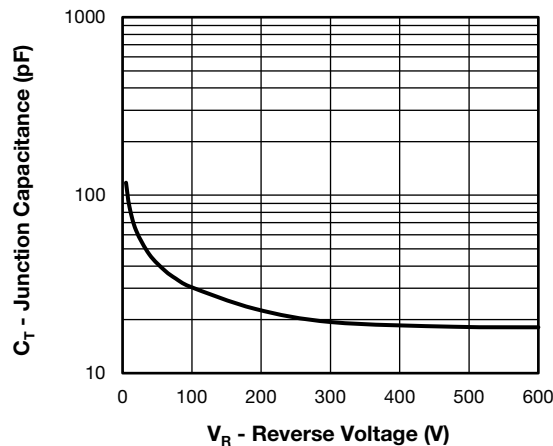


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

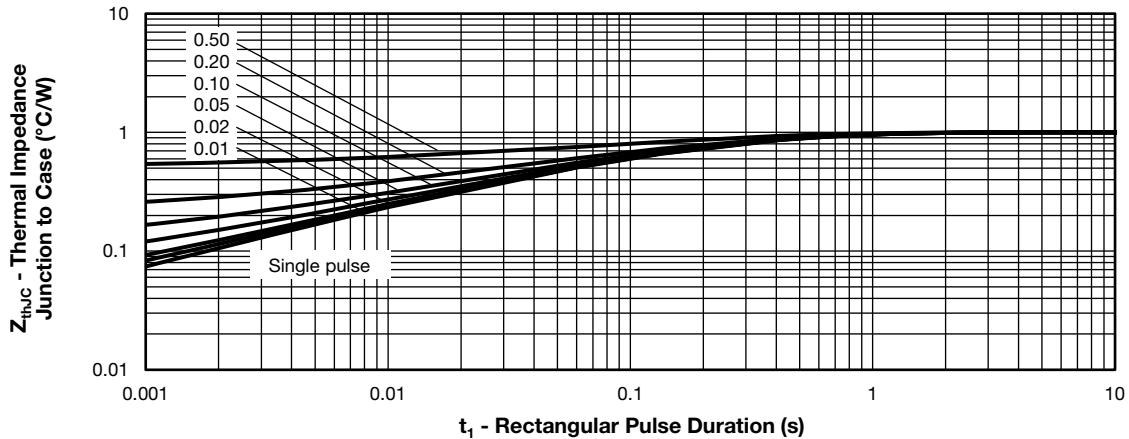


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

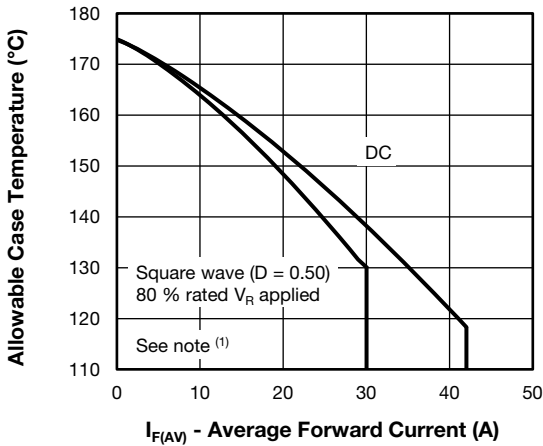


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

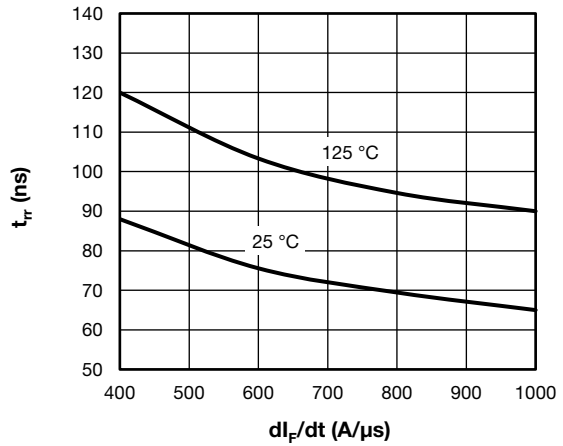


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

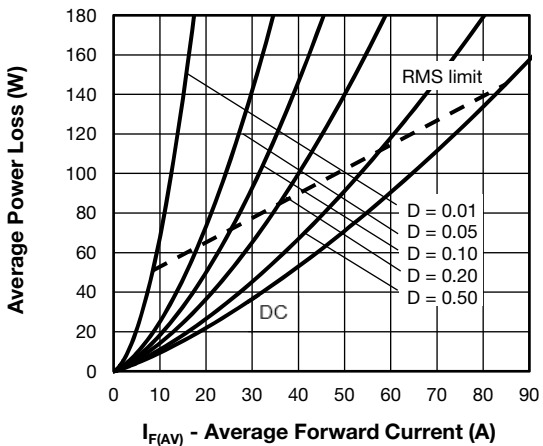


Fig. 6 - Forward Power Loss Characteristics

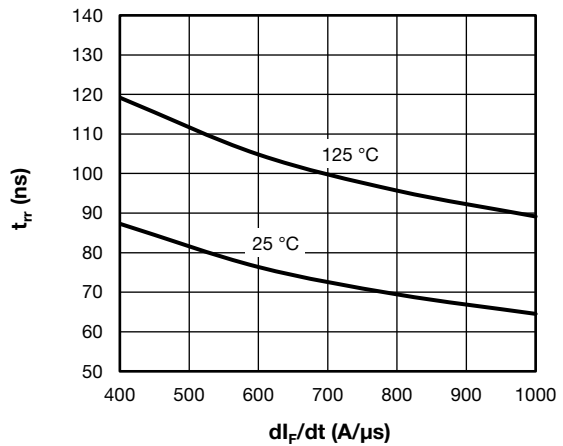


Fig. 8 - Typical Reverse Recovery Time vs. dI_F/dt

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see Fig.5)
 P_{dREV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_R = rated V_R

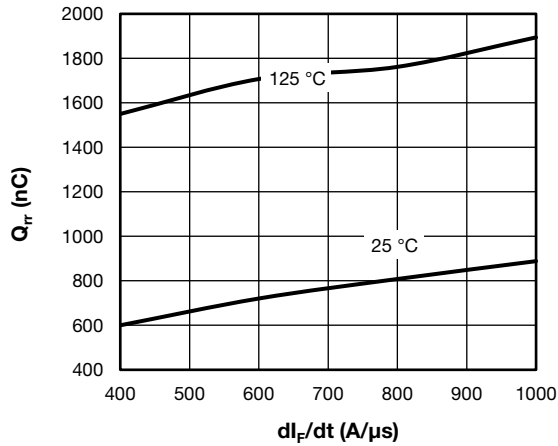


Fig. 9 - Typical Stored Charge vs. dI_F/dt

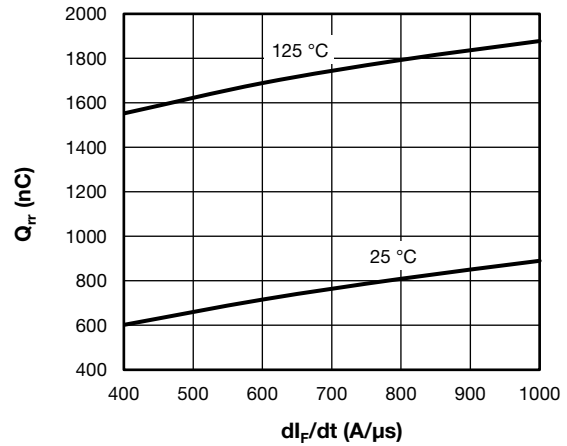


Fig. 10 - Typical Stored Charge vs. dI_F/dt

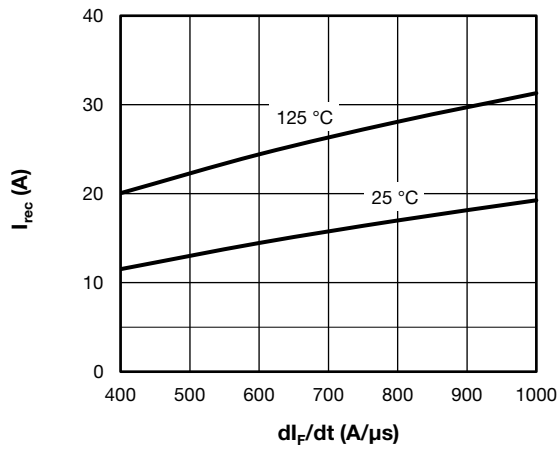
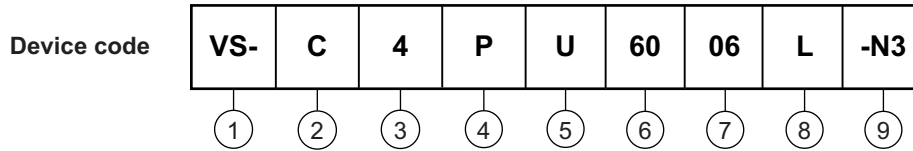


Fig. 11 - Typical Reverse Current vs. dI_F/dt



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Circuit configuration:
C = common diode
- 3** - FRED Pt Gen 4
- 4** - P = TO-247 package
- 5** - Process type:
U = ultrafast recovery
- 6** - Current rating (60 = 2 x 30 A)
- 7** - Voltage rating (06 = 600 V)
- 8** - Package: L = long lead
- 9** - Environmental digit:
-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-C4PU6006L-N3 | 25 | 500 | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS | | |
|----------------------------|-------------|--|
| Dimensions | TO-247AD 3L | www.vishay.com/doc?95626 |
| Part marking information | TO-247AD 3L | www.vishay.com/doc?95007 |



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