

QORVO

SiC JFET Division

Is Now Part of

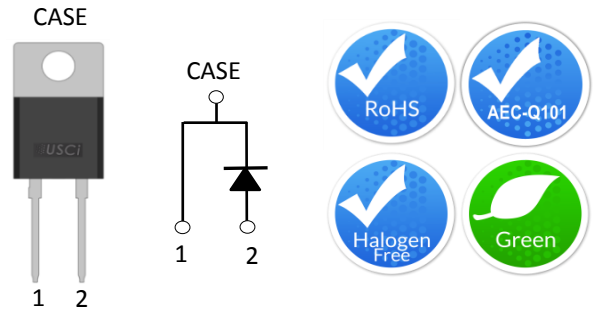
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Description

United Silicon Carbide, Inc. offers the 3rd generation of high performance SiC Merged-PiN-Schottky (MPS) diodes. With zero reverse recovery charge and 175°C maximum junction temperature, these diodes are ideally suited for high frequency and high efficiency power systems with minimum cooling requirements.



| Part Number | Package | Marking |
|-------------|-----------|-------------|
| UJ3D06508TS | TO-220-2L | UJ3D06508TS |

Features

- ◆ 175°C maximum operating junction temperature
- ◆ Easy paralleling
- ◆ Extremely fast switching not dependent on temperature
- ◆ No reverse or forward recovery
- ◆ Enhanced surge current capability, MPS structure
- ◆ Excellent thermal performance, Ag sintered
- ◆ 100% UIS tested
- ◆ AEC-Q101 qualified

Typical Applications

- ◆ Power converters
- ◆ Industrial motor drives
- ◆ Switching-mode power supplies
- ◆ Power factor correction modules

Maximum Ratings

| Parameter | Symbol | Test Conditions | Value | Units |
|---|----------------|--|------------|----------------------|
| DC blocking voltage | V_R | | 650 | V |
| Repetitive peak reverse voltage, $T_j=25^\circ\text{C}$ | V_{RRM} | | 650 | V |
| Surge peak reverse voltage | V_{RSM} | | 650 | V |
| Maximum DC forward current | I_F | $T_C = 152^\circ\text{C}$ | 8 | A |
| Non-repetitive forward surge current sine halfwave | I_{FSM} | $T_C = 25^\circ\text{C}, t_p = 10\text{ms}$ | 55 | A |
| | | $T_C = 110^\circ\text{C}, t_p = 10\text{ms}$ | 50 | |
| Repetitive forward surge current sine halfwave, $D=0.1$ | I_{FRM} | $T_C = 25^\circ\text{C}, t_p = 10\text{ms}$ | 36.6 | A |
| | | $T_C = 110^\circ\text{C}, t_p = 10\text{ms}$ | 22.6 | |
| Non-repetitive peak forward current | $I_{F,max}$ | $T_C = 25^\circ\text{C}, t_p = 10\mu\text{s}$ | 370 | A |
| | | $T_C = 110^\circ\text{C}, t_p = 10\mu\text{s}$ | 370 | |
| i^2t value | $\int i^2 dt$ | $T_C = 25^\circ\text{C}, t_p = 10\text{ms}$ | 15 | A^2s |
| | | $T_C = 110^\circ\text{C}, t_p = 10\text{ms}$ | 12.5 | |
| Power dissipation | P_{Tot} | $T_C = 25^\circ\text{C}$ | 115.4 | W |
| | | $T_C = 152^\circ\text{C}$ | 17.7 | |
| Maximum junction temperature | $T_{J,max}$ | | 175 | $^\circ\text{C}$ |
| Operating and storage temperature | T_J, T_{STG} | | -55 to 175 | $^\circ\text{C}$ |
| Soldering temperatures, wavesoldering only allowed at leads | T_{sold} | 1.6mm from case for 10s | 260 | $^\circ\text{C}$ |

Electrical Characteristics

$T_J = +25^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Test Conditions | Value | | | Units |
|--|--------|--|-------|-----|------|---------------|
| | | | Min | Typ | Max | |
| Forward voltage | V_F | $I_F=8\text{A}, T_J=25^\circ\text{C}$ | - | 1.5 | 1.7 | V |
| | | $I_F=8\text{A}, T_J=150^\circ\text{C}$ | - | 1.8 | 2.1 | |
| | | $I_F=8\text{A}, T_J=175^\circ\text{C}$ | - | 1.9 | 2.25 | |
| Reverse current | I_R | $V_R=650\text{V}, T_J=25^\circ\text{C}$ | - | 8 | 50 | μA |
| | | $V_R=650\text{V}, T_J=175^\circ\text{C}$ | - | 29 | | |
| Total capacitive charge ⁽¹⁾ | Q_C | $V_R=400\text{V}$ | | 19 | | nC |
| Total capacitance | C | $V_R=1\text{V}, f=1\text{MHz}$ | | 250 | | pF |
| | | $V_R=300\text{V}, f=1\text{MHz}$ | | 31 | | |
| | | $V_R=600\text{V}, f=1\text{MHz}$ | | 28 | | |
| Capacitance stored energy | E_C | $V_R=400\text{V}$ | | 2.8 | | μJ |

(1) Q_C is independent on T_J , di_F/dt , and I_F as shown in the application note USCi_AN0011.

Thermal characteristics

| Parameter | symbol | Test Conditions | Value | | | Units |
|-------------------------------------|-----------------|-----------------|-------|-----|-----|---------------------------|
| | | | Min | Typ | Max | |
| Thermal resistance, junction - case | $R_{\theta JC}$ | | | 1.0 | 1.3 | $^\circ\text{C}/\text{W}$ |

Typical Performance

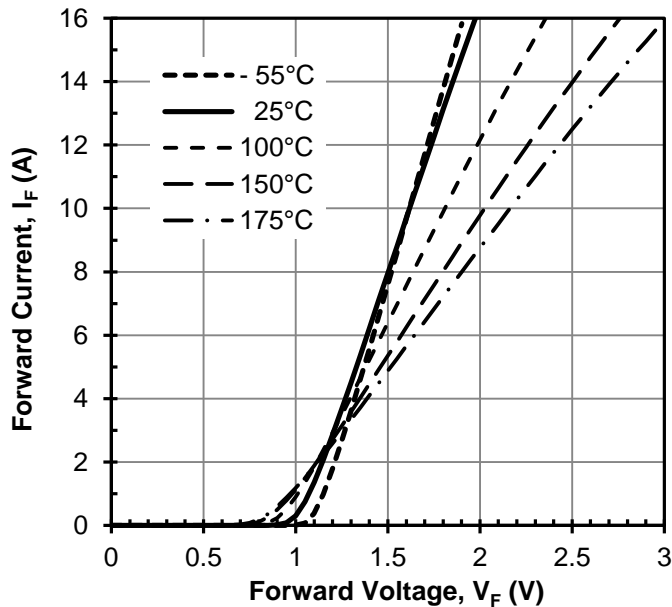


Figure 1 Typical forward characteristics

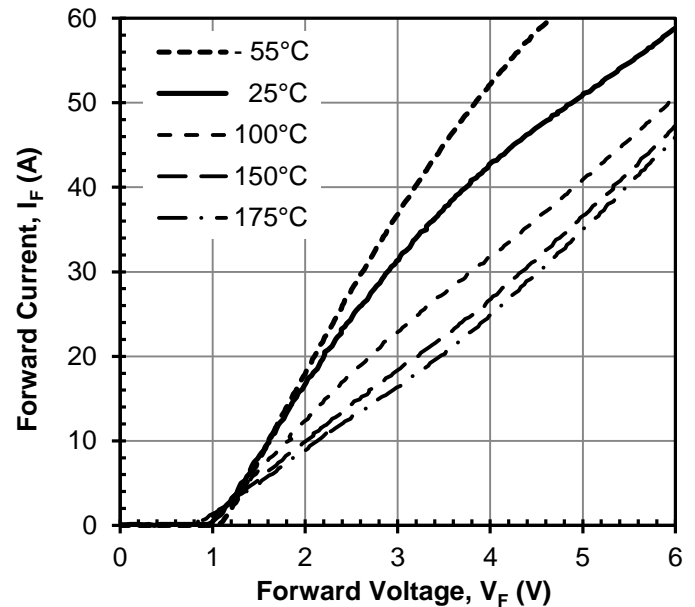


Figure 2 Typical forward characteristics in surge current

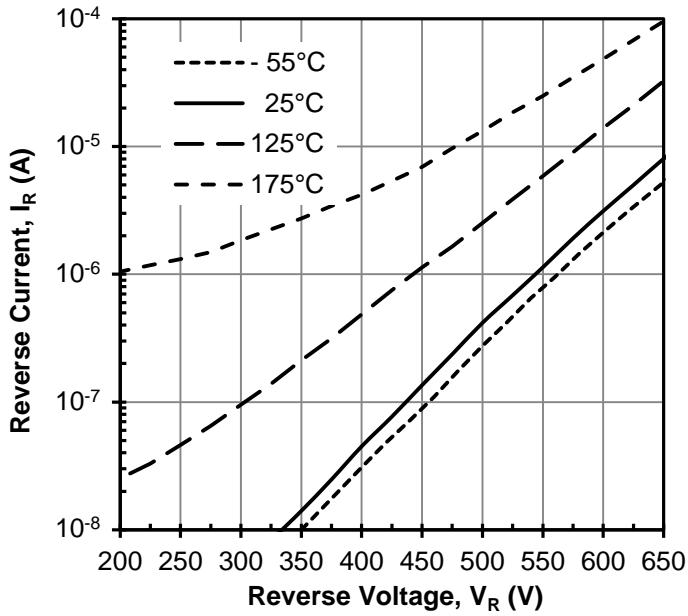


Figure 3 Typical reverse characteristics

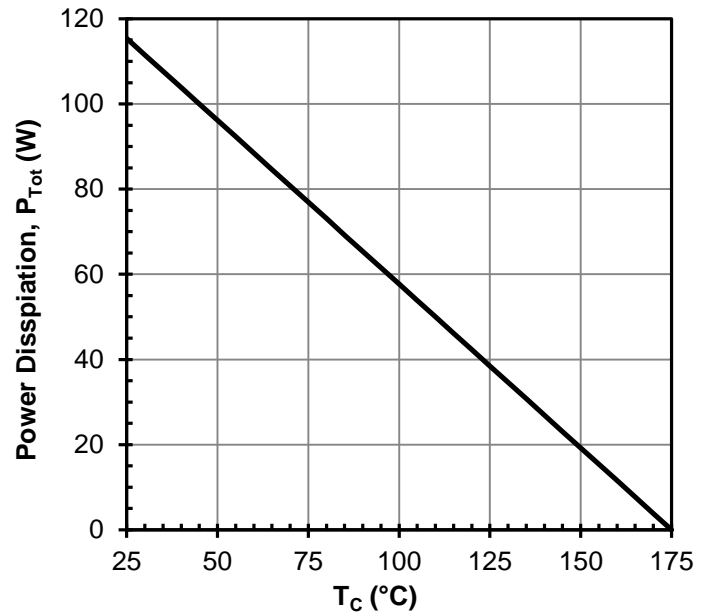


Figure 4 Power dissipation

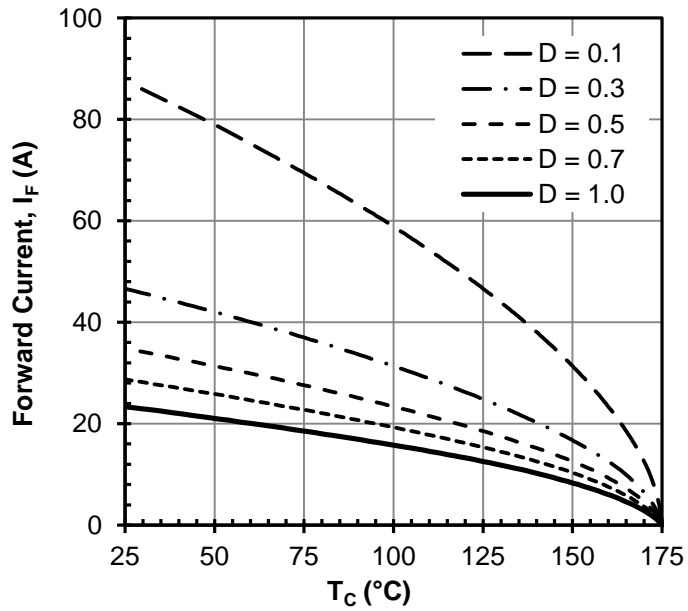


Figure 5 Diode forward current

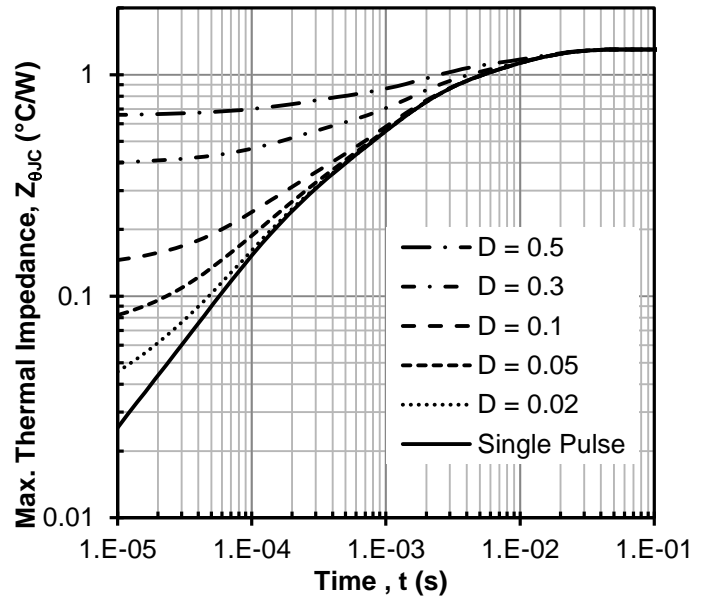


Figure 6 Maximum transient thermal impedance

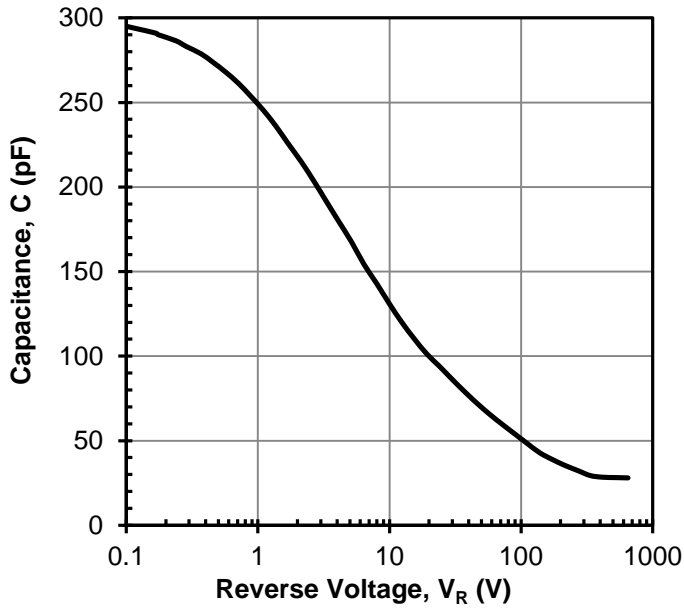


Figure 7 Capacitance vs. reverse voltage at 1MHz

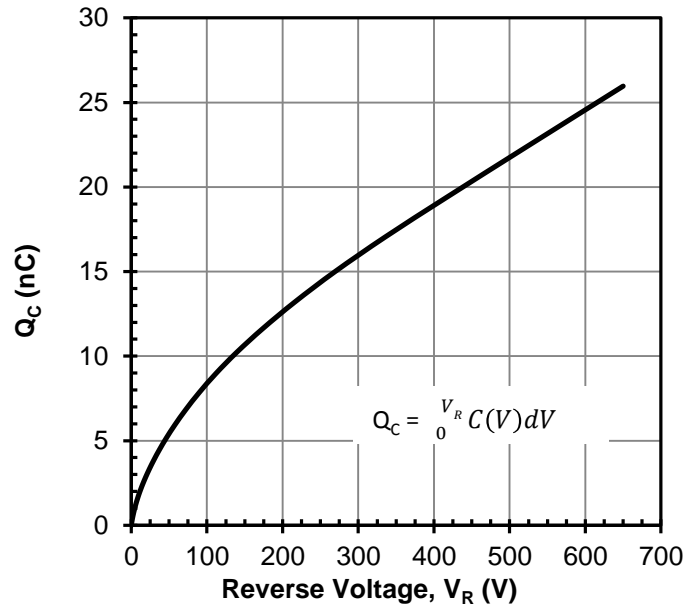


Figure 8 Typical capacitive charge vs. reverse voltage

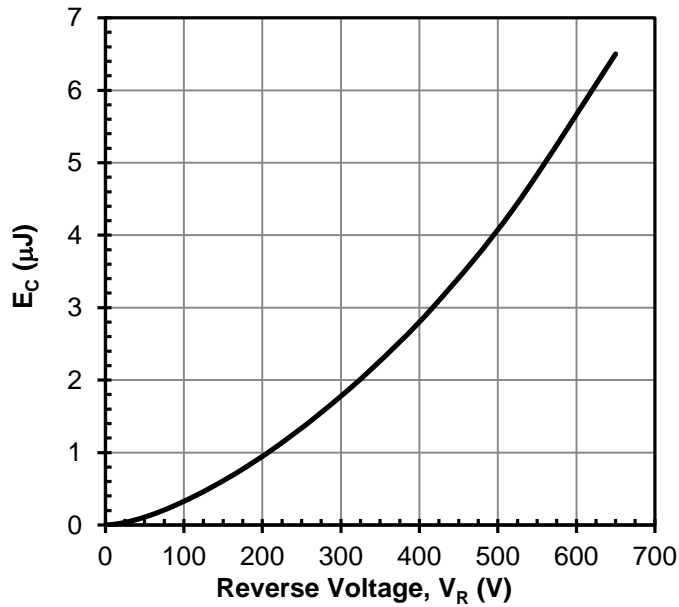


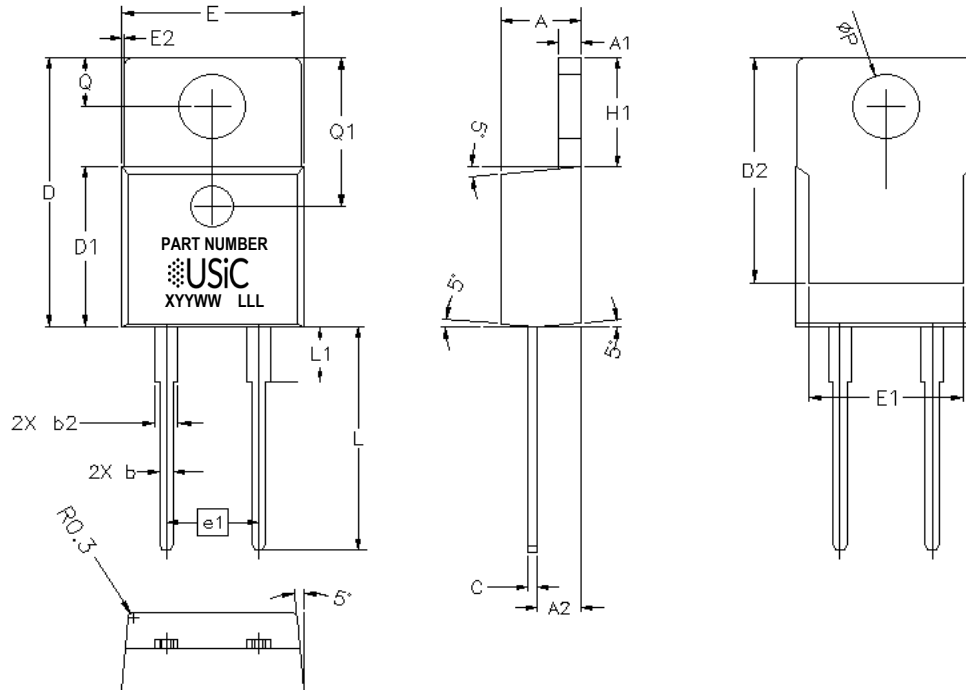
Figure 9 Typical capacitance stored energy vs. reverse voltage

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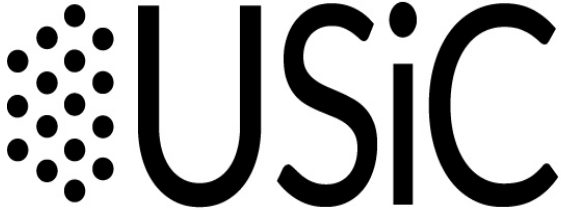
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PACKAGE OUTLINE


| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.140 | 0.190 | 3.56 | 4.83 |
| A1 | 0.020 | 0.055 | 0.51 | 1.40 |
| A2 | 0.080 | 0.115 | 2.03 | 2.92 |
| b | 0.015 | 0.040 | 0.38 | 1.02 |
| b2 | 0.040 | 0.070 | 1.02 | 1.78 |
| C | 0.014 | 0.030 | 0.36 | 0.76 |
| D | 0.560 | 0.650 | 14.22 | 16.51 |
| D1 | 0.330 | 0.370 | 8.38 | 9.40 |
| D2 | 0.480 | 0.517 | 12.19 | 13.13 |
| E | 0.380 | 0.420 | 9.65 | 10.67 |
| e1 | 0.200 BSC | | 5.08 BSC | |
| E1 | 0.270 | 0.350 | 6.86 | 8.89 |
| E2 | - | 0.030 | | 0.76 |
| L | 0.495 | 0.580 | 12.57 | 14.73 |
| L1 | - | 0.250 | - | 6.35 |
| ØP | 0.139 | 0.161 | 3.53 | 4.09 |
| H | 0.230 | 0.270 | 5.84 | 6.86 |
| Q | 0.100 | 0.135 | 2.54 | 3.43 |
| Q1 | 0.330 | 0.340 | 8.38 | 8.64 |

PART MARKING

PART NUMBER

XYYWW LLL

PART NUMBER = REFER TO
DS_PN DECODER FOR DETAILS

X = ASSEMBLY SITE

YY = YEAR

WW = WORK WEEK

LLL = LOT ID

PACKING TYPE

ANTI-STATIC TUBE

QUANTITY /TUBE : 50 UNITS

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