SiC JFET Division

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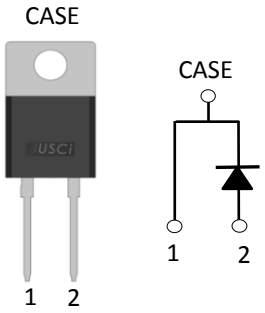
Description

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
UJ3D06516TS	TO-220-2L	UJ3D06516TS

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°C	V_{RRM}		650	V
Surge peak reverse voltage	V_{RSM}		650	V
Maximum DC forward current	I_F	T_C = 152°C	16	A
Non-repetitive forward surge current sine halfwave	I_{FSM}	T_C = 25°C, t_p = 10ms	100	A
		T_C = 110°C, t_p =10ms	90	
Repetitive forward surge current sine halfwave, D=0.1	I_{FRM}	T_C = 25°C, t_p = 10ms	65.9	A
		T_C = 110°C, t_p =10ms	40.7	
Non-repetitive peak forward current	$I_{F,max}$	T_C = 25°C, t_p =10µs	550	A
		T_C = 110°C, t_p =10µs	550	
i^2t value	$\int i^2dt$	T_C = 25°C, t_p =10ms	50	A^2s
		T_C = 110°C, t_p =10ms	40	
Power dissipation	P_{Tot}	T_C = 25°C	230.8	W
		T_C = 152°C	35.4	
Maximum junction temperature	$T_{J,max}$		175	°C
Operating and storage temperature	T_J, T_{STG}		-55 to 175	°C
Soldering temperatures, wavesoldering only allowed at leads	T_{sold}	1.6mm from case for 10s	260	°C

Electrical Characteristics

T_J = +25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Forward voltage	V_F	I_F=16A, T_J=25°C	-	1.5	1.7	V
		I_F=16A, T_J=150°C	-	1.8	2.1	
		I_F=16A, T_J=175°C	-	1.9	2.25	
Reverse current	I_R	V_R=650V, T_j=25°C	-	16	100	µA
		V_R=650V, T_J=175°C	-	58		
Total capacitive charge (1)	Q_C	V_R=400V		38		nC
Total capacitance	C	V_R=1V, f=1MHz		500		pF
		V_R=300V, f=1MHz		62		
		V_R=600V, f=1MHz		56		
Capacitance stored energy	E_C	V_R=400V		5.6		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	$R_{\theta JC}$			0.5	0.65	°C/W

Typical Performance

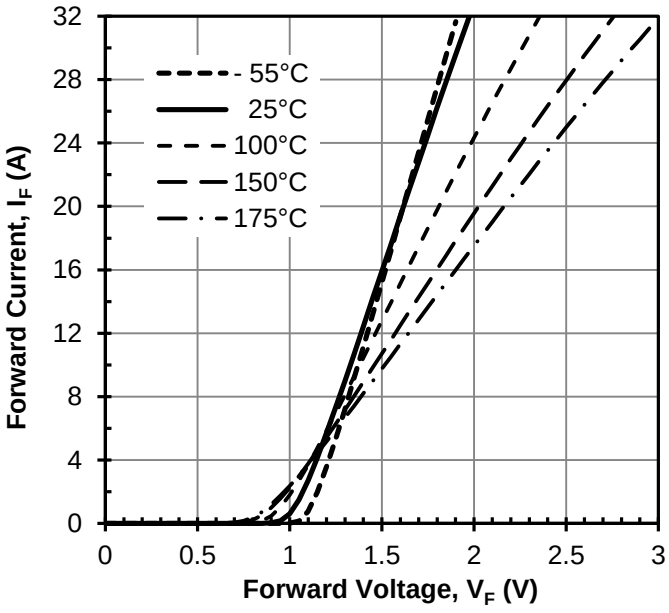


Figure 1 Typical forward characteristics

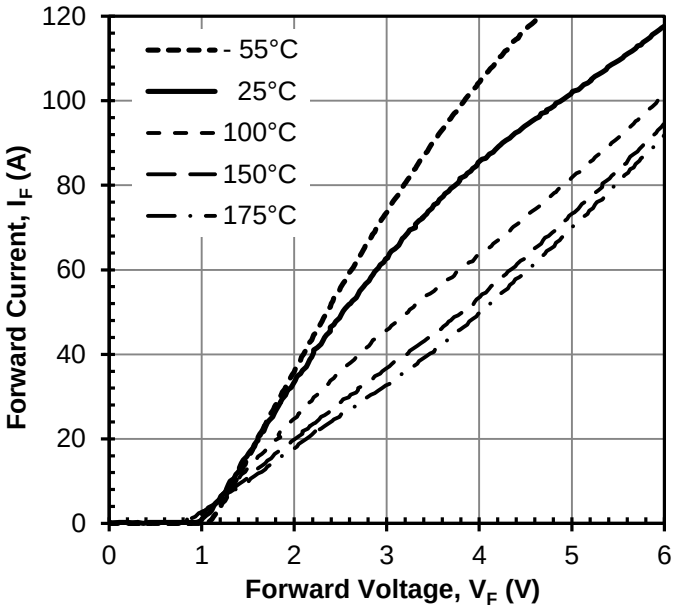


Figure 2 Typical forward characteristics in surge current

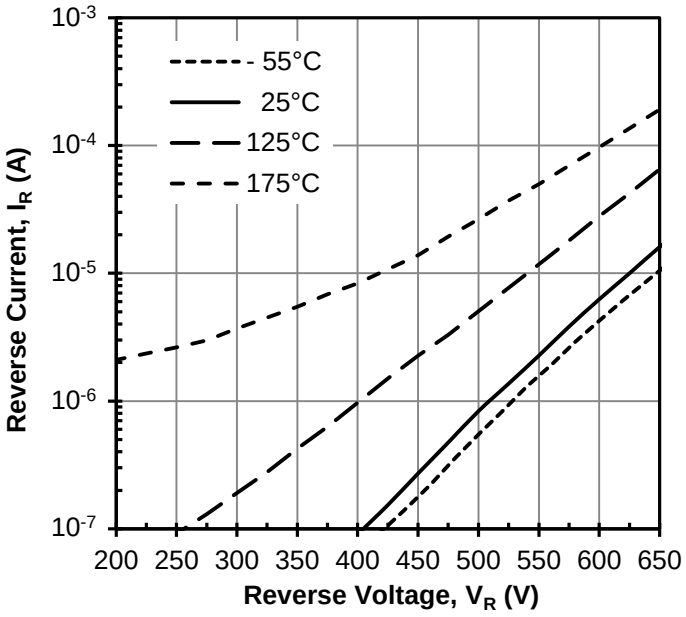


Figure 3 Typical reverse characteristics

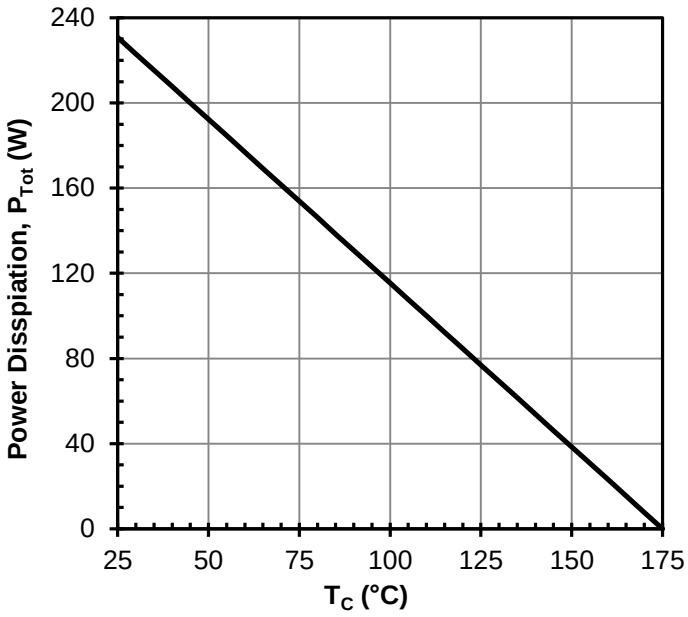


Figure 4 Power dissipation

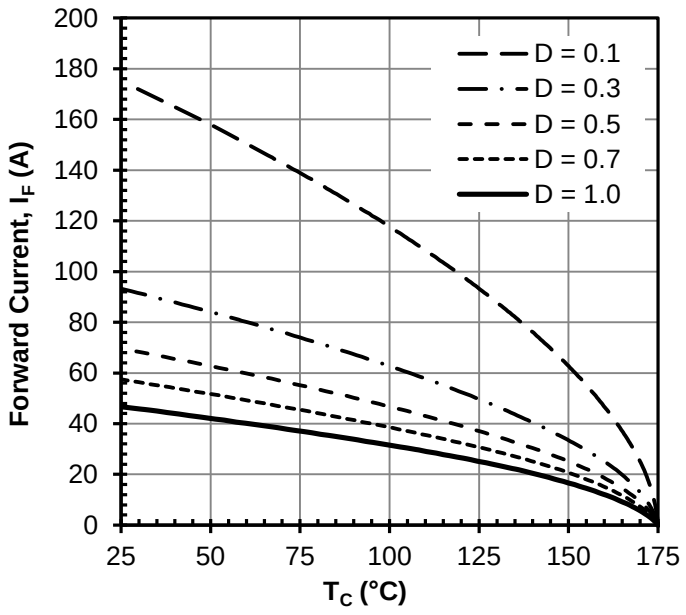


Figure 5 Diode forward current

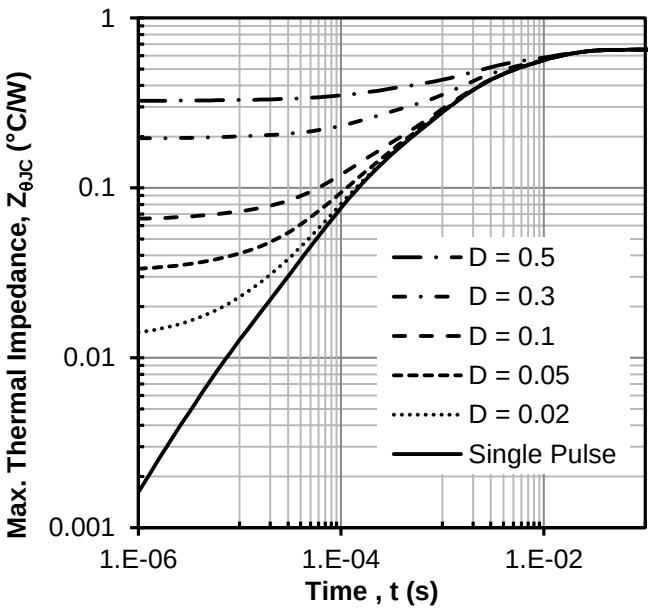


Figure 6 Maximum transient thermal impedance

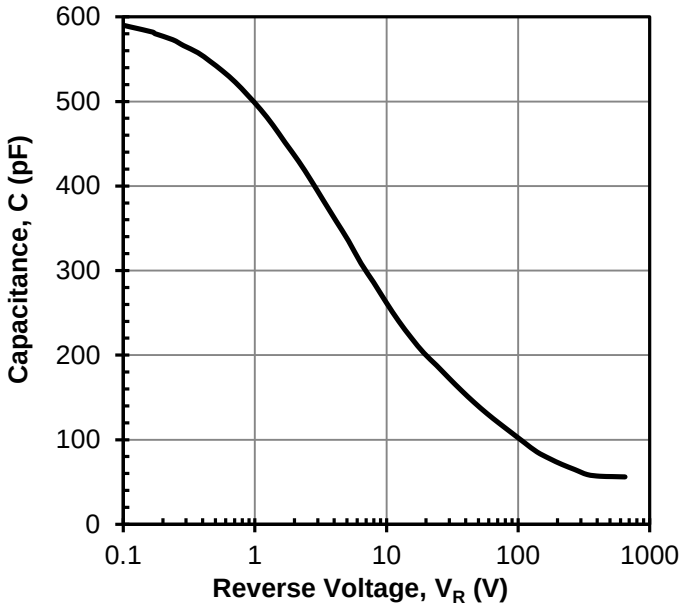


Figure 7 Capacitance vs. reverse voltage at 1MHz

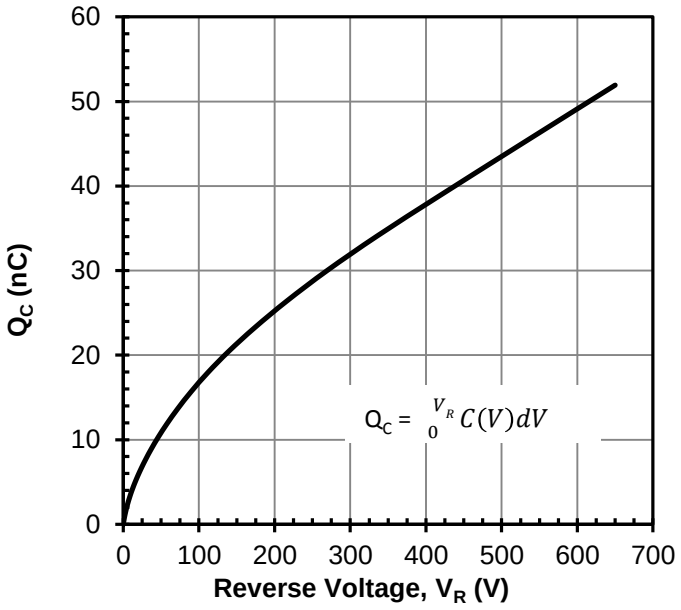


Figure 8 Typical capacitive charge vs. reverse voltage

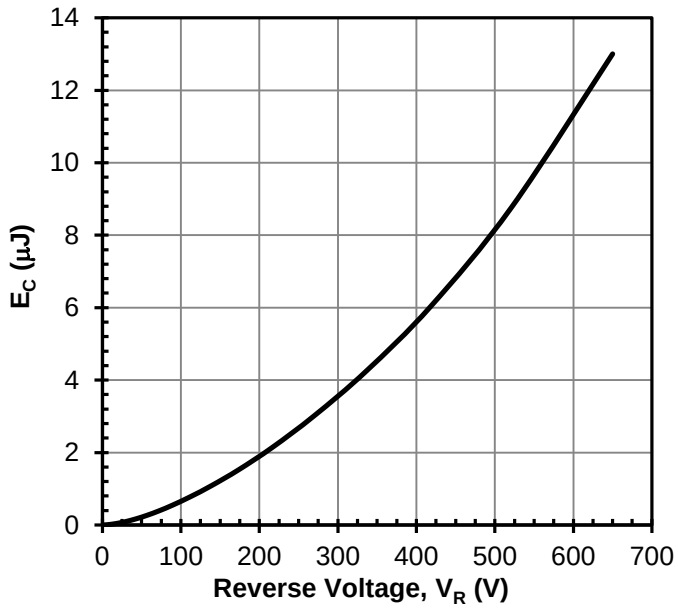


Figure 9 Typical capacitance stored energy vs. reverse voltage

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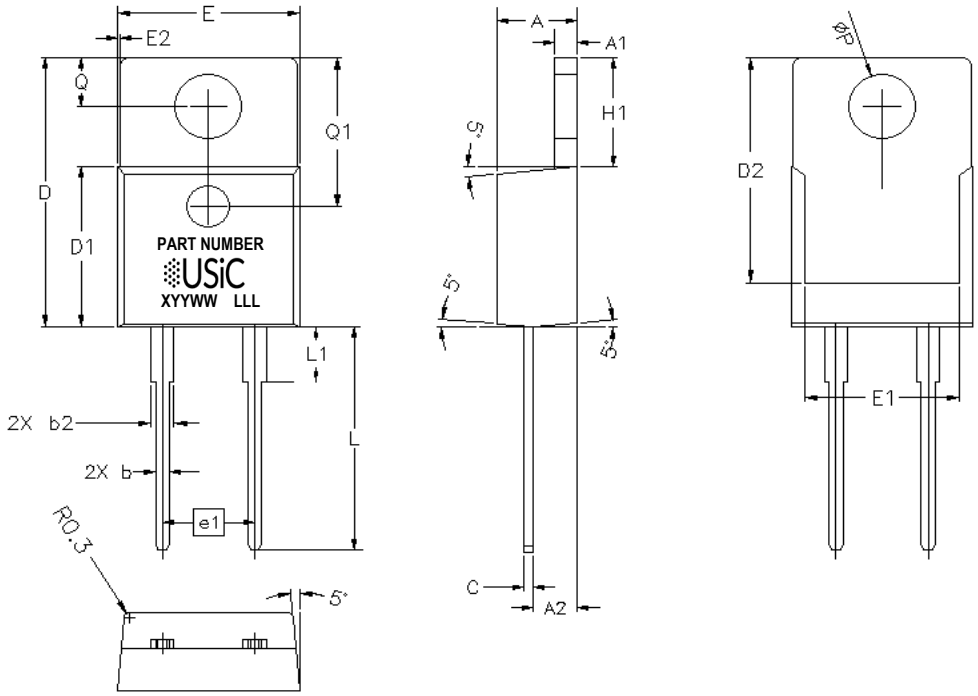
TO-220-2L PACKAGE OUTLINE, PART MARKING AND TUBE SPECIFICATIONS

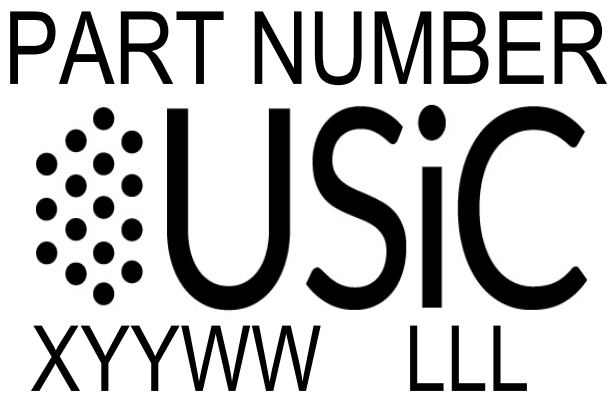
PACKAGE OUTLINE



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

TO-220-2L PACKAGE OUTLINE, PART MARKING AND TUBE SPECIFICATIONS

PART MARKING



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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