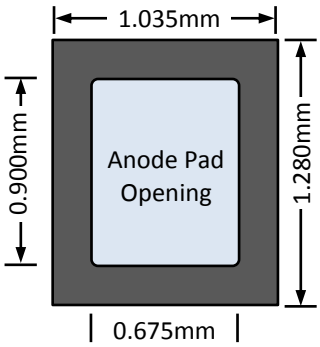
Description

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
UJ3D1202	Undiced wafer
UJ3D1202Z	Die on tape

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
- 100% UIS tested
- AEC-Q101 qualified in TO-220 packaged devices

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		1200	V
Repetitive peak reverse voltage, T_j=25°C	V_{RRM}		1200	V
Surge peak reverse voltage	V_{RSM}		1200	V
Maximum DC forward current (1)	I_F	T_C = 164°C	2	A
Non-repetitive forward surge current (1) sine halfwave	I_{FSM}	T_C = 25°C, t_p = 10ms	30	A
		T_C = 110°C, t_p =10ms	27	
Repetitive forward surge current (1) sine halfwave, D=0.1	I_{FRM}	T_C = 25°C, t_p = 10ms	14.8	A
		T_C = 110°C, t_p =10ms	8.8	
Non-repetitive peak forward current (1)	$I_{F,max}$	T_C = 25°C, t_p =10µs	250	A
		T_C = 110°C, t_p =10µs	250	
i^2t value	$\int i^2dt$	T_C = 25°C, t_p =10ms	4.5	A^2s
		T_C = 110°C, t_p =10ms	3.6	
Maximum junction temperature (2)	$T_{J,max}$		175	°C
Operating and storage temperature	T_J, T_{STG}		-55 to 175	°C

(1) Assumes a maximum junction-to-case thermal resistance of 2°C/W.

(2) Package limited

Electrical Characteristics

T_J = +25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Forward voltage	V_F	I_F = 2A, T_J = 25°C	-	1.4	1.6	V
		I_F = 2A, T_J =150°C	-	1.85	2.3	
		I_F = 2A, T_J =175°C	-	2	2.6	
Reverse current	I_R	V_R=1200V, T_j=25°C	-	20	95	μA
		V_R=1200V, T_J=175°C	-	200		
Total capacitive charge (3)	Q_C	V_R=800V		12		nC
Total capacitance	C	V_R=1V, f=1MHz		109		pF
		V_R=400V, f=1MHz		11.5		
		V_R=800V, f=1MHz		9.8		
Capacitance stored energy	E_C	V_R=800V		3.6		μJ

(3) Q_c is independent on T_j, di_F/dt, and I_F as shown in the application note USCi_AN0011.

Typical Performance

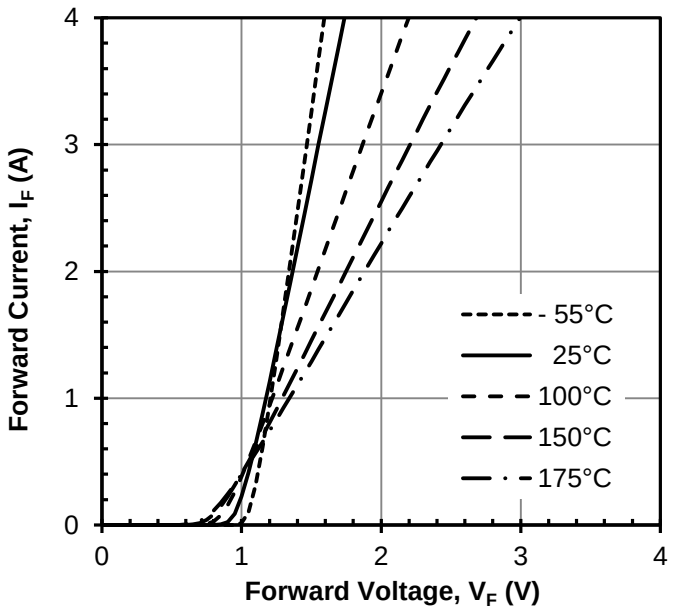


Figure 1 Typical forward characteristics

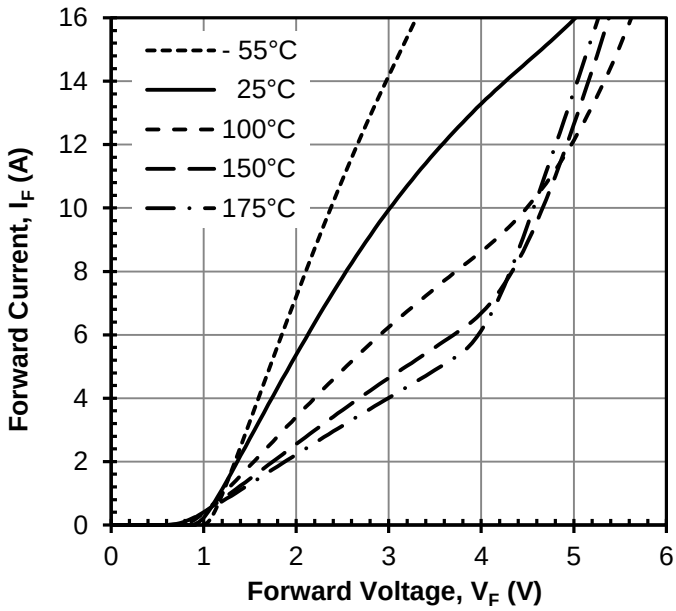


Figure 2 Typical forward characteristics in surge current

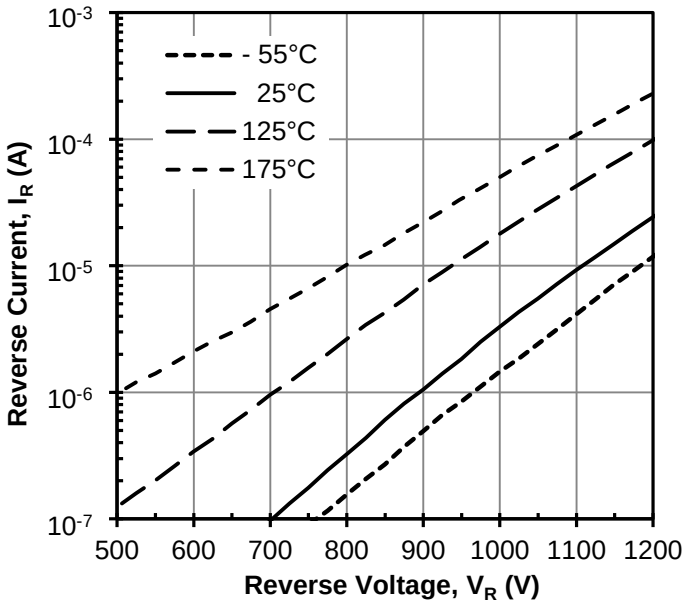


Figure 3 Typical reverse characteristics

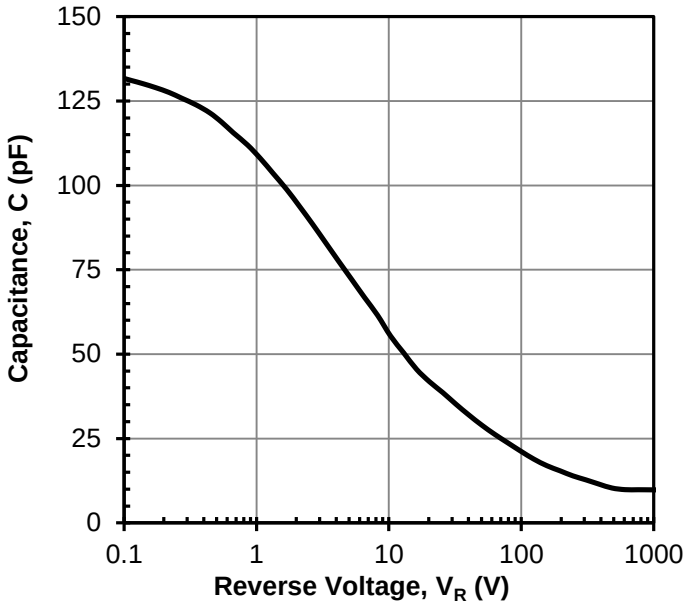


Figure 4 Capacitance vs. reverse voltage at 1MHz

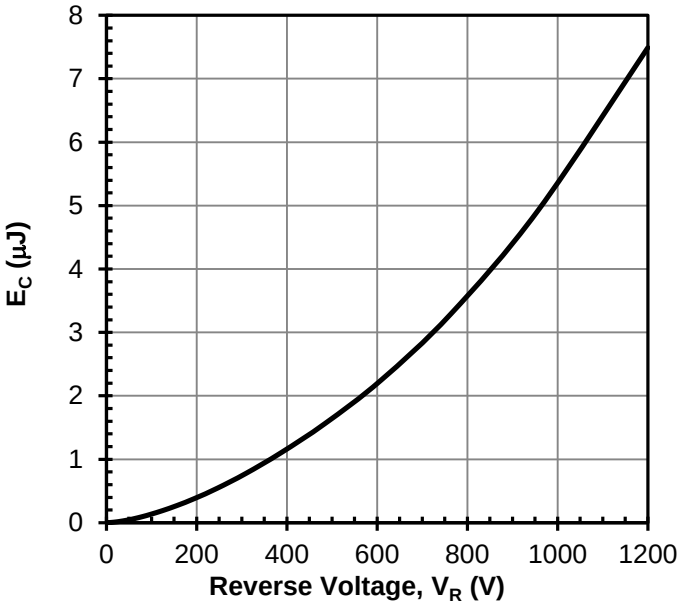


Figure 5 Typical capacitance stored energy vs. reverse voltage

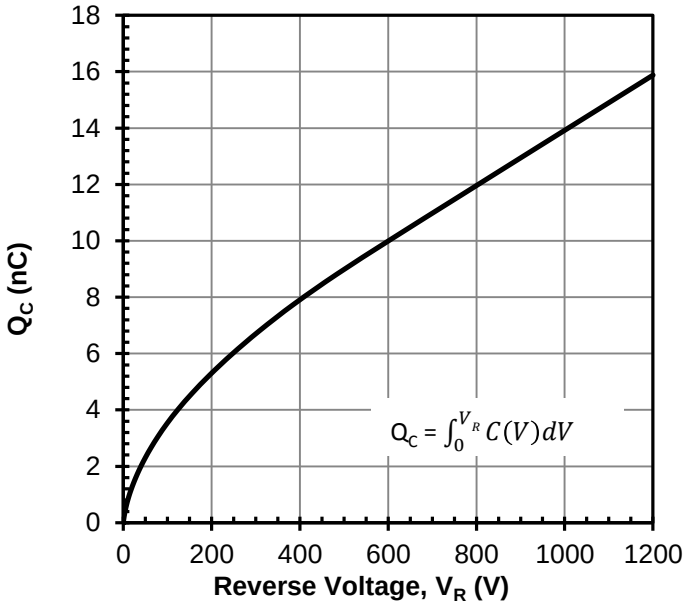


Figure 6 Typical capacitive charge vs. reverse voltage

Mechanical Characteristics

Parameter	Typical Value	Units
Die Dimensions with Scribe Line (L x W)	1.035 x 1.280	mm
Scribe Line Width	80	μm
Top Anode Pad Opening (L x W)	0.675 x 0.900	mm
Anode Metallization (AlCu)	5	μm
Cathode Metallization (Ti/Ni/Ag)	0.1/0.2/1	μm
Frontside Passivation	Polyimide	
Wafer Size	150	mm
Die Thickness	150	μm
Gross Die Per Wafer	10,954	

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