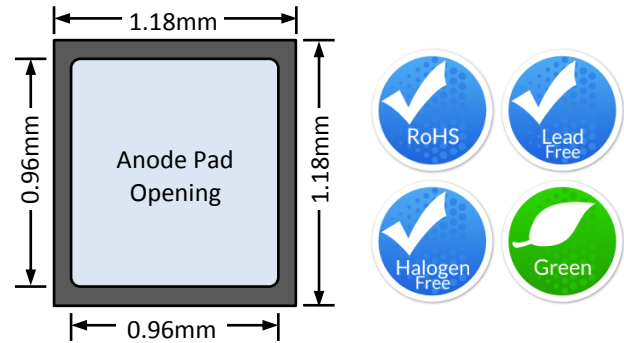


Description

United Silicon Carbide, Inc. offers the xR series of high performance SiC Schottky diodes. With zero reverse recovery charge and 175°C maximum junction temperature, USCi's diodes are ideally suited for high frequency and high efficiency power systems with minimum cooling requirements.



Part Number	Package
UJD06506	Undiced wafer
UJD06506Z	Die on tape

Features

- ◆ Positive temperature coefficient for safe operation and ease of paralleling
- ◆ 175°C maximum operating junction temperature
- ◆ Extremely fast switching not dependent on temperature
- ◆ Essentially no reverse or forward recovery
- ◆ RoHS compliant

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 ⁽¹⁾	I_F	$T_C = 153^\circ\text{C}$	6	A
Non-repetitive forward surge current ⁽¹⁾ sine halfwave	I_{FSM}	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$	45	A
		$T_C = 110^\circ\text{C}, t_p = 10\text{ms}$	36	
Repetitive forward surge current ⁽¹⁾ sine halfwave, $D=0.1$	I_{FRM}	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$	30.6	A
		$T_C = 110^\circ\text{C}, t_p = 10\text{ms}$	18	
Non-repetitive peak forward current ⁽¹⁾	$I_{F,max}$	$T_C = 25^\circ\text{C}, t_p = 10\mu\text{s}$	310	A
		$T_C = 110^\circ\text{C}, t_p = 10\mu\text{s}$	279	
Non-repetitive avalanche energy ⁽¹⁾	E_{AS}	$T_j = 25^\circ\text{C}, L = 5\text{mH}, I_{pk}=4.25\text{A}, V_{DD}=100\text{V}$	50	mJ
Maximum junction temperature	$T_{J,max}$		175	$^\circ\text{C}$
Operating and storage temperature	T_J, T_{STG}		-55 to 175	$^\circ\text{C}$

(1) Assumes a maximum junction-to-case thermal resistance of 1.6°C/W.

Electrical Characteristics

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

Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Forward voltage	V_F	$I_F = 6\text{A}, T_J = 25^\circ\text{C}$	-	1.5	1.7	V
		$I_F = 6\text{A}, T_J = 150^\circ\text{C}$	-	1.8	2.1	
		$I_F = 6\text{A}, T_J = 175^\circ\text{C}$	-	2	2.25	
Reverse current	I_R	$V_R = 650\text{V}, T_J = 25^\circ\text{C}$	-	15	200	μA
		$V_R = 650\text{V}, T_J = 175^\circ\text{C}$	-	30	640	
Total capacitive charge ⁽²⁾	Q_C	$V_R = 400\text{V}$		12.7		nC
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$		179		pF
		$V_R = 300\text{V}, f = 1\text{MHz}$		21		
		$V_R = 600\text{V}, f = 1\text{MHz}$		18		
Capacitance stored energy	E_C	$V_R = 400\text{V}$		1.9		μJ

(2) See Figure 4, Q_C is independent on T_J , di_F/dt , and I_F as shown in the application note USCi_AN0011.

Typical Performance

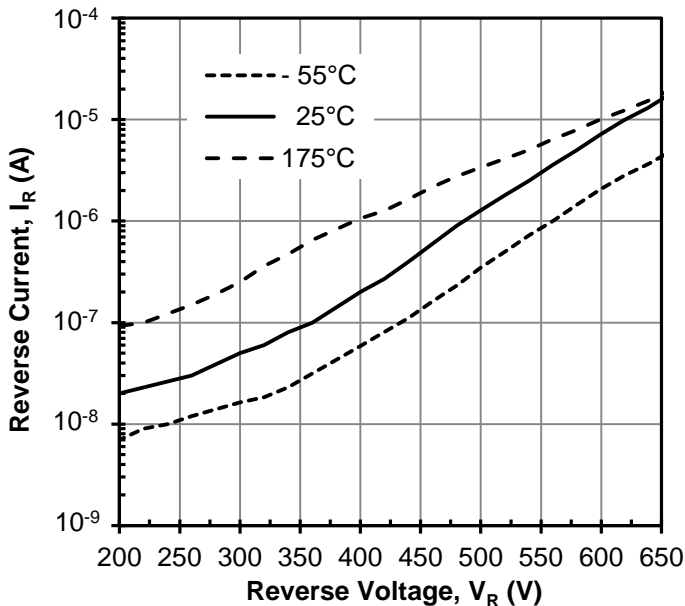


Figure 1 Typical reverse characteristics

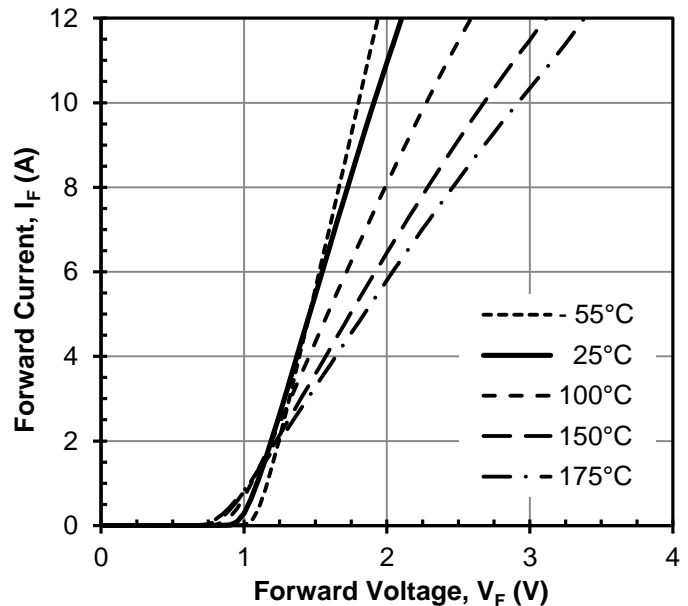


Figure 2 Typical forward characteristics

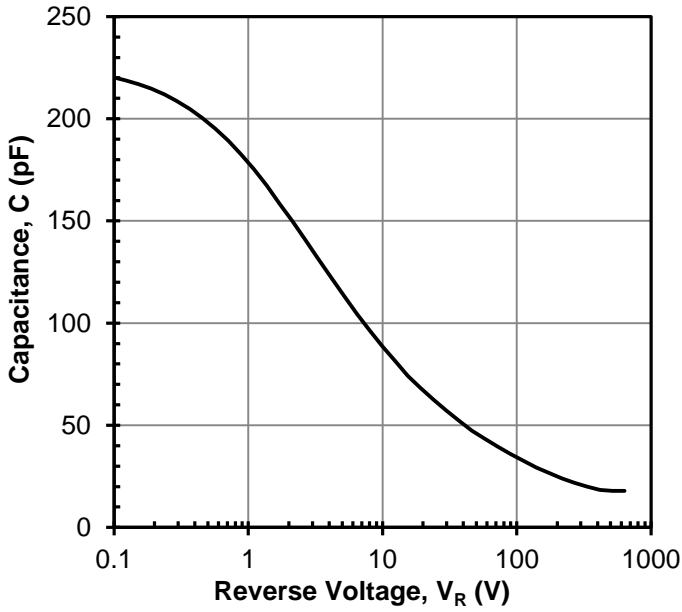


Figure 3 Capacitance vs. reverse voltage

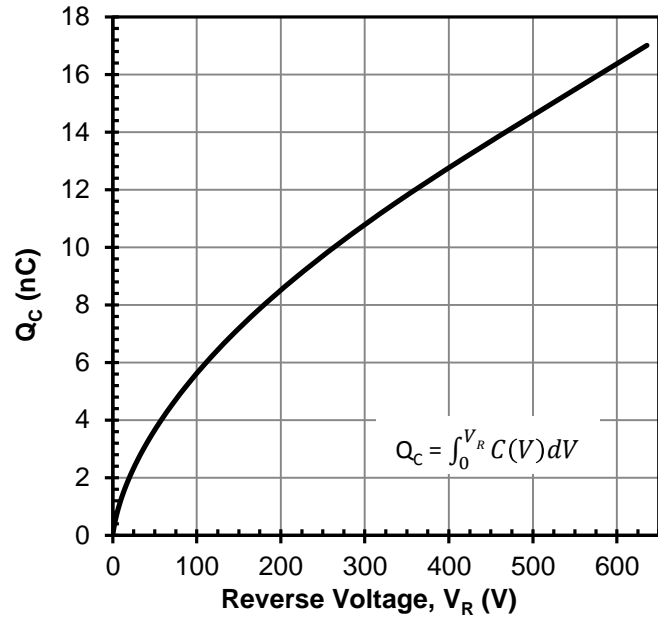


Figure 4 Typical capacitive charge vs. reverse voltage

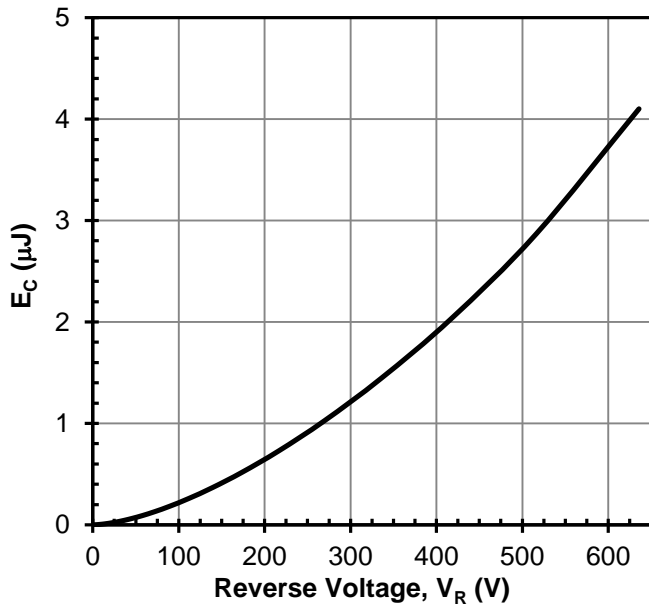


Figure 5 Typical capacitance stored energy vs. reverse voltage

Mechanical Characteristics

Parameter	Typical Value	Units
Die Dimensions with Scribe Line (L x W)	1.18 x 1.18	mm
Scribe Line width	80	μm
Top Anode Pad Opening (L x W)	0.96 x 0.96	mm
Anode Metallization (AlCu)	5	μm
Cathode Metallization (Ti/Ni/Au)	0.07/0.1/0.1	μm
Frontside Passivation BCB	5.5	μm
Wafer Size	100	mm
Die Thickness	100	μm
Gross Die Per Wafer	4337	

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