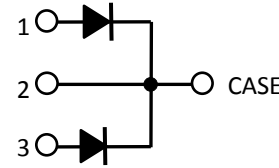


Description

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	Marking
UJ2D1220K	TO-247-3L	UJ2D1220K

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 (Leg/Device)	Units
DC blocking voltage	V_R		1200	V
Repetitive peak reverse voltage, $T_j=25^\circ\text{C}$	V_{RRM}		1200	V
Surge peak reverse voltage	V_{RSM}		1200	V
Maximum DC forward current	I_F	$T_C = 142^\circ\text{C}$	10/20	A
Non-repetitive forward surge current sine halfwave	I_{FSM}	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$	75/150	A
		$T_C = 110^\circ\text{C}, t_p = 10\text{ms}$	60/120	
Repetitive forward surge current sine halfwave, $D=0.1$	I_{FRM}	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$	35/70	A
		$T_C = 110^\circ\text{C}, t_p = 10\text{ms}$	21.8/43.6	
Non-repetitive avalanche energy	E_{AS}	$T_j = 25^\circ\text{C}, L = 10\text{mH},$ $I_{pk}=4.1\text{A/Leg},$ $V_{DD}=100\text{V}$	88/176	mJ
Power dissipation	P_{Tot}	$T_C = 25^\circ\text{C}$	136/272	W
		$T_C = 142^\circ\text{C}$	30/60	
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 (Leg/Device)			Units
			Min	Typ	Max	
Forward voltage	V_F	$I_F = 20\text{A}, T_J = 25^\circ\text{C}$	-	1.5	1.7	V
		$I_F = 20\text{A}, T_J = 175^\circ\text{C}$	-	2.5	3	
Reverse current	I_R	$V_R = 1200\text{V}, T_J = 25^\circ\text{C}$	-	30/60	250/500	μA
		$V_R = 1200\text{V}, T_J = 175^\circ\text{C}$	-	60/120	800/1600	
Total capacitive charge ⁽¹⁾	Q_C	$V_R = 800\text{V}$		47/94		nC
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$		500/1000		pF
		$V_R = 400\text{V}, f = 1\text{MHz}$		45/90		
		$V_R = 800\text{V}, f = 1\text{MHz}$		35/70		
Capacitance stored energy	E_C	$V_R = 800\text{V}$		12.2/24.4		μJ

(1) See Figure 8, 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 (Leg/Device)			Units
			Min	Typ	Max	
Thermal resistance	$R_{\theta JC}$			0.83/0.415	1.1/0.55	$^\circ\text{C/W}$

Typical Performance (Per Leg)

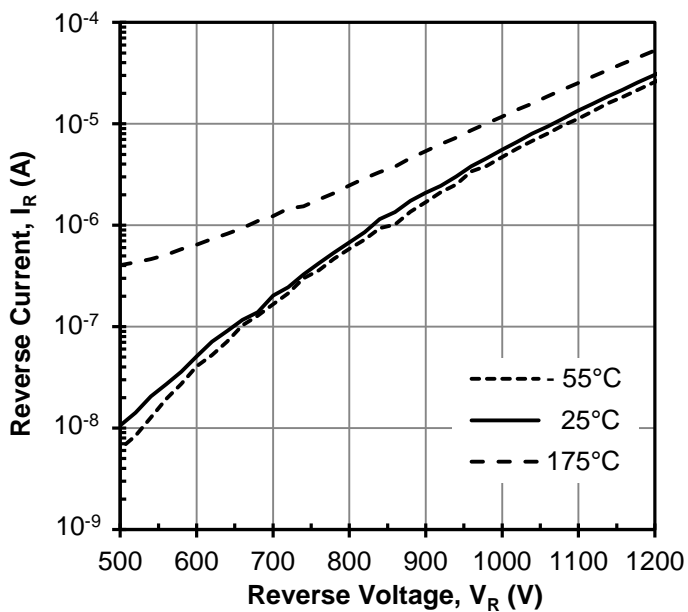


Figure 1 Typical reverse characteristics

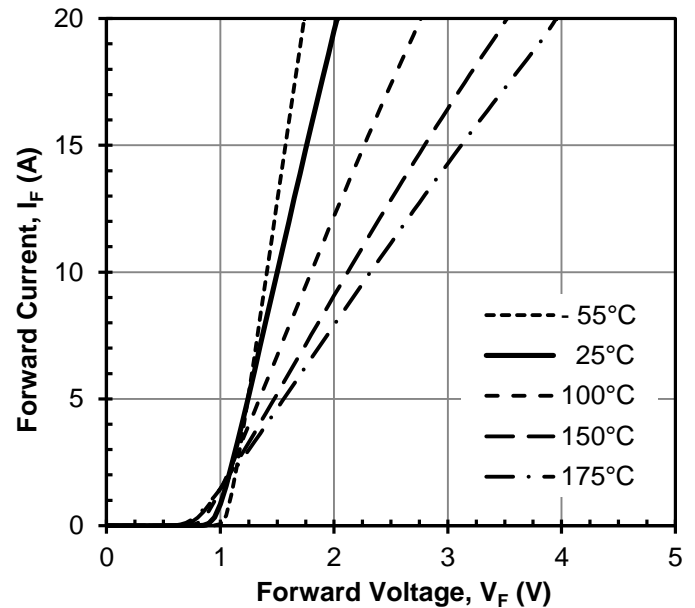


Figure 2 Typical forward characteristics

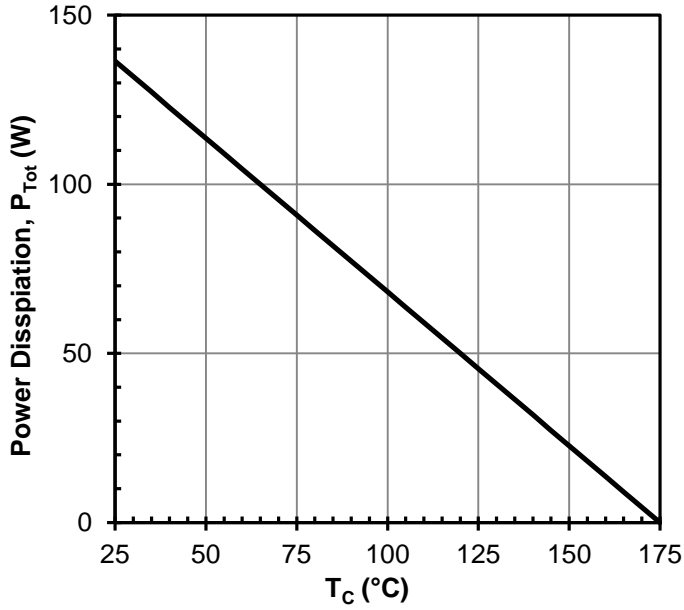


Figure 3 Power dissipation

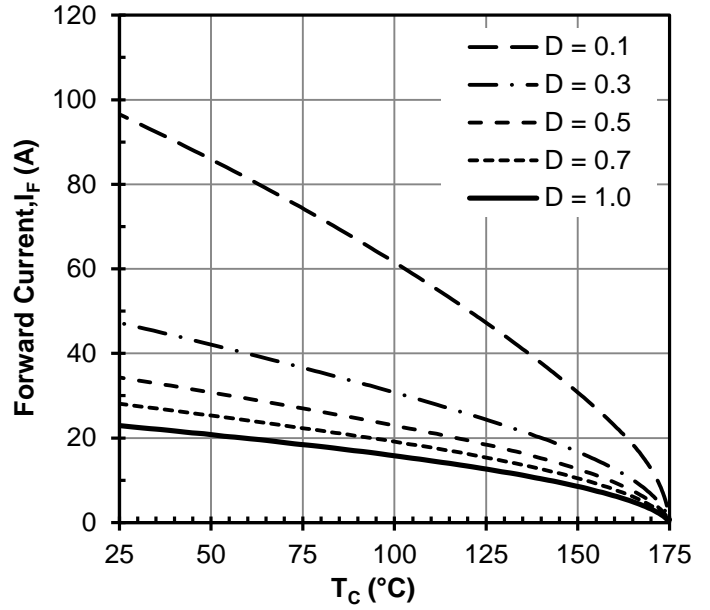


Figure 4 Diode forward current

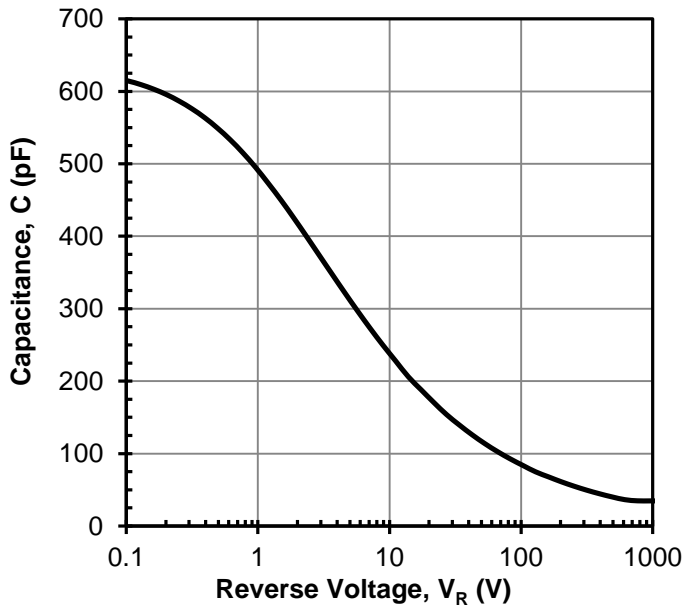


Figure 5 Capacitance vs. reverse voltage

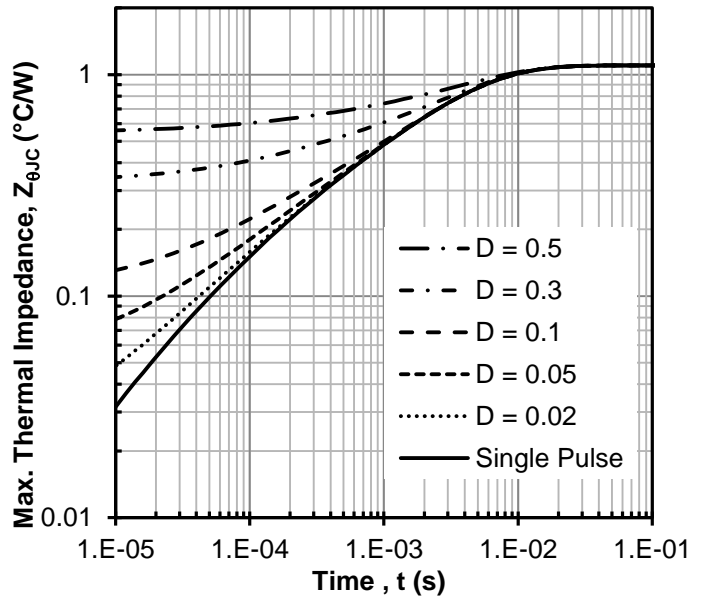


Figure 6 Maximum transient thermal impedance

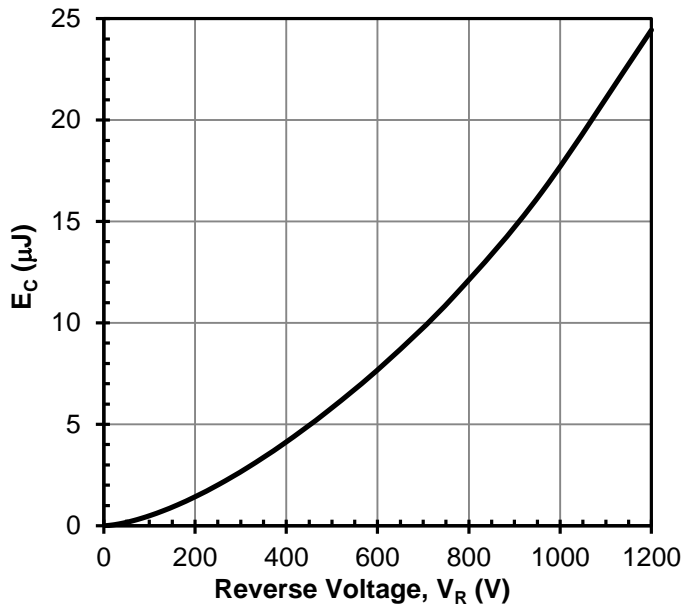


Figure 7 Typical capacitance stored energy vs. reverse voltage

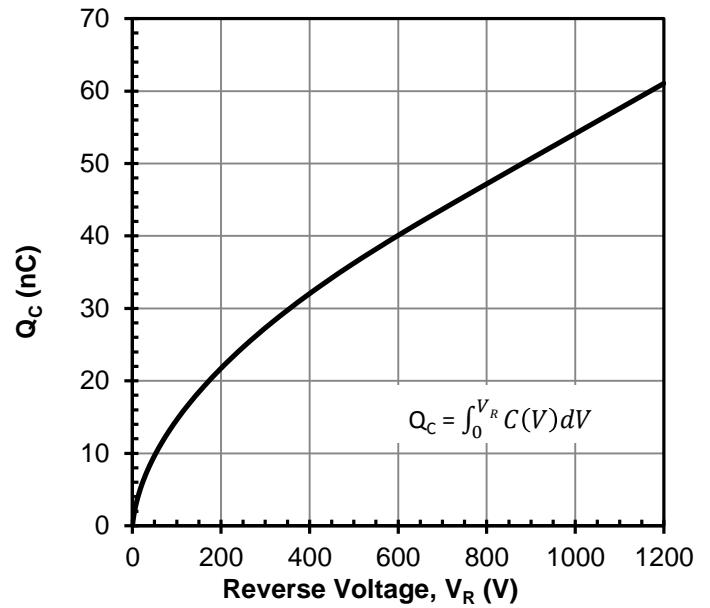


Figure 8 Typical capacitive charge vs. reverse voltage

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