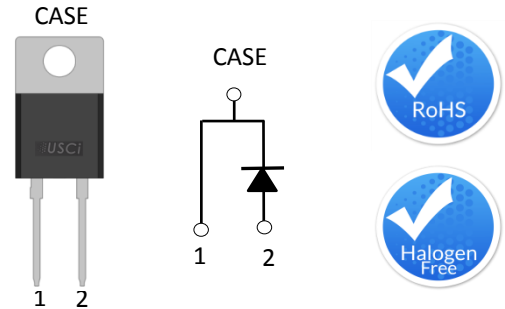


## Description

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
UJD06504TS	TO-220-2L	UJD06504TS

## 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
- ◆ Enhanced surge capability
- ◆ 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	$I_F$	$T_C = 156^\circ\text{C}$	4	A
Non-repetitive forward surge current sine halfwave	$I_{FSM}$	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$	30	A
		$T_C = 110^\circ\text{C}, t_p = 10\text{ms}$	24	
Repetitive forward surge current sine halfwave, $D=0.1$	$I_{FRM}$	$T_C = 25^\circ\text{C}, t_p = 10\text{ms}$	21.5	A
		$T_C = 110^\circ\text{C}, t_p = 10\text{ms}$	12.4	
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25^\circ\text{C}, t_p = 10\mu\text{s}$	235	A
		$T_C = 110^\circ\text{C}, t_p = 10\mu\text{s}$	212	
Non-repetitive avalanche energy	$E_{AS}$	$T_j = 25^\circ\text{C}, L = 5\text{mH}, I_{pk}=3.55\text{A}, V_{DD}=100\text{V}$	33	mJ
Power dissipation	$P_{Tot}$	$T_C = 25^\circ\text{C}$	71	W
		$T_C = 156^\circ\text{C}$	9	
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

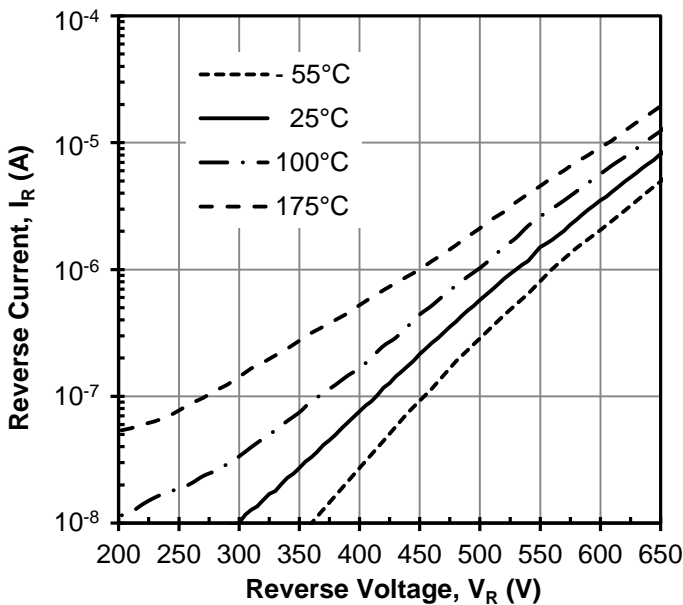
Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Forward voltage	$V_F$	$I_F = 4\text{A}, T_J = 25^\circ\text{C}$	-	1.5	1.7	V
		$I_F = 4\text{A}, T_J = 150^\circ\text{C}$	-	1.8	2.1	
		$I_F = 4\text{A}, T_J = 175^\circ\text{C}$	-	2	2.25	
Reverse current	$I_R$	$V_R = 650\text{V}, T_J = 25^\circ\text{C}$	-	10	170	$\mu\text{A}$
		$V_R = 650\text{V}, T_J = 175^\circ\text{C}$	-	20	550	
Total capacitive charge <sup>(1)</sup>	$Q_C$	$V_R = 400\text{V}$		9.3		nC
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$		125		pF
		$V_R = 300\text{V}, f = 1\text{MHz}$		16		
		$V_R = 600\text{V}, f = 1\text{MHz}$		13		
Capacitance stored energy	$E_C$	$V_R = 400\text{V}$		1.3		$\mu\text{J}$

(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.

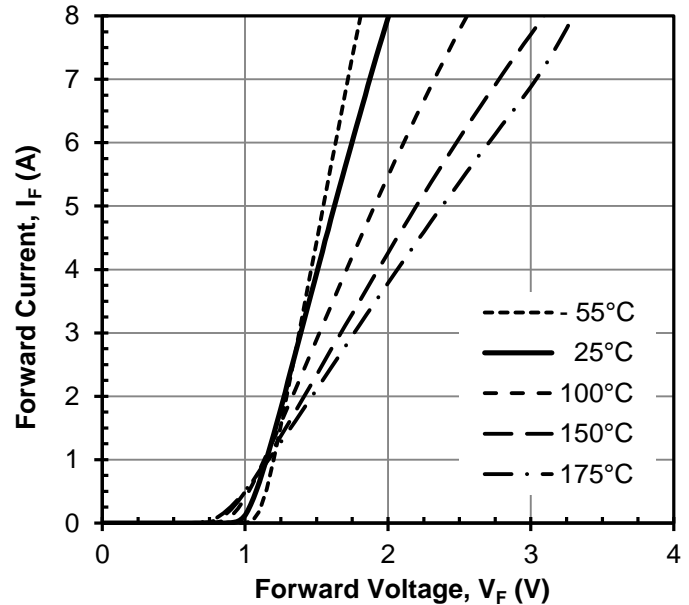
**Thermal characteristics**

Parameter	symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Thermal resistance	$R_{\theta JC}$			1.57	2.1	$^\circ\text{C}/\text{W}$

**Typical Performance**



**Figure 1 Typical reverse characteristics**



**Figure 2 Typical forward characteristics**

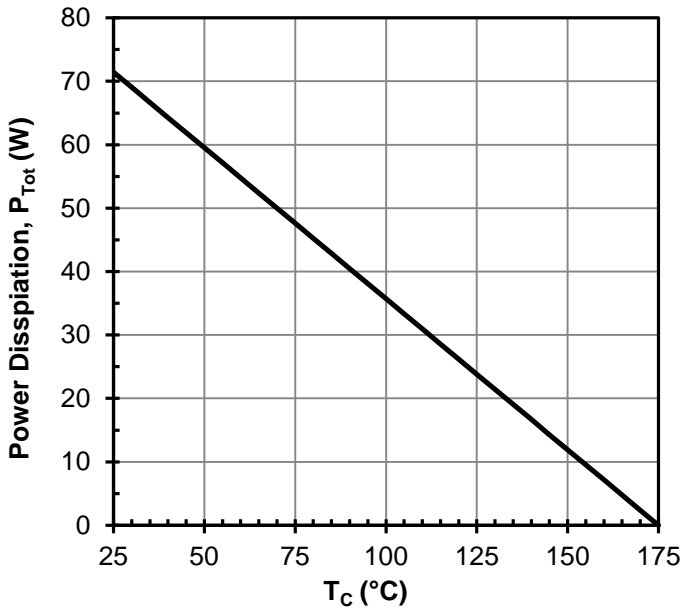


Figure 3 Power dissipation

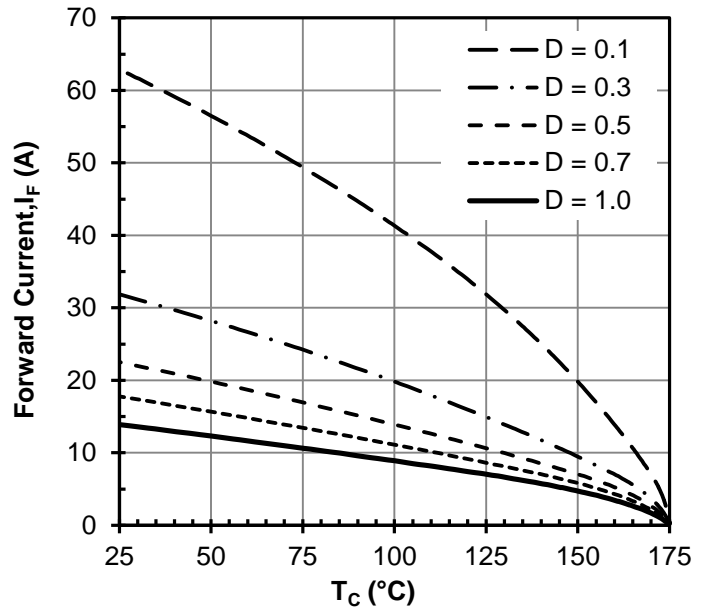


Figure 4 Diode forward current

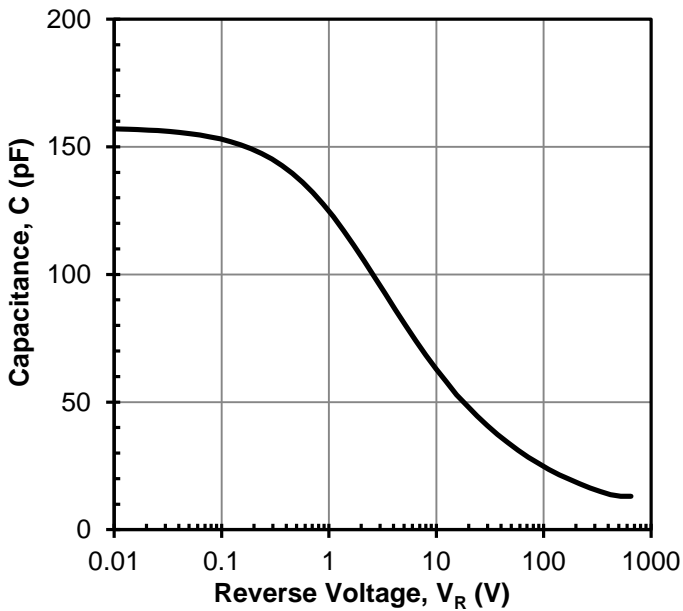


Figure 5 Capacitance vs. reverse voltage

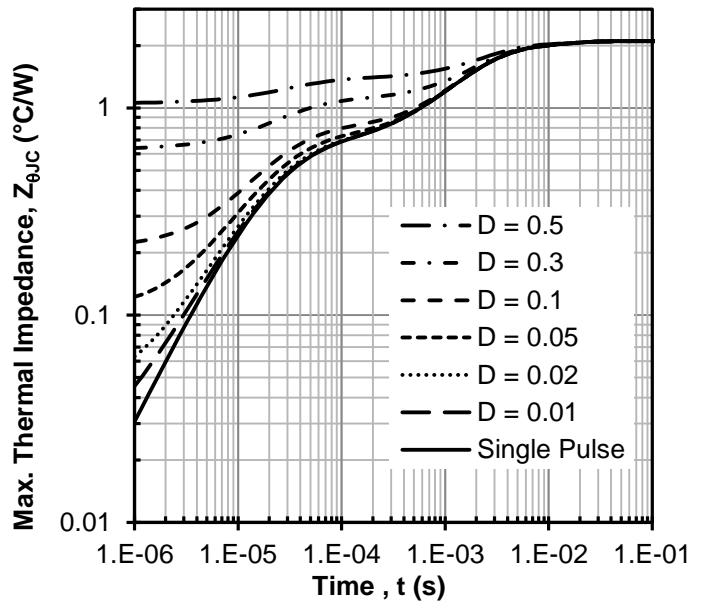
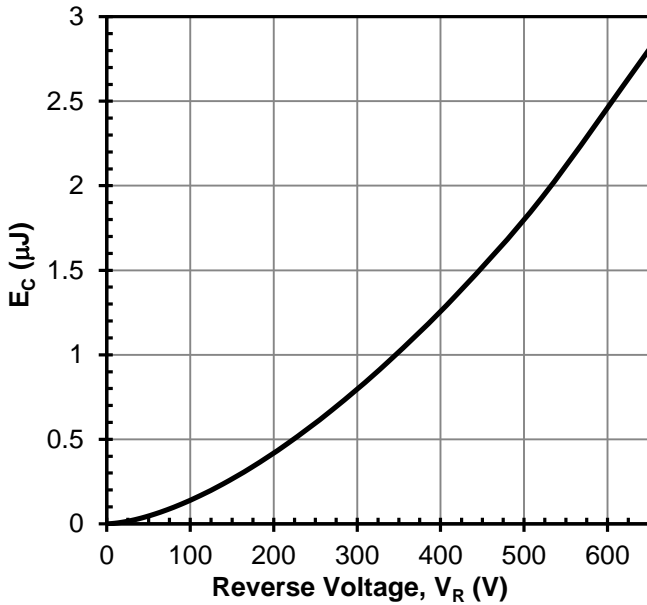
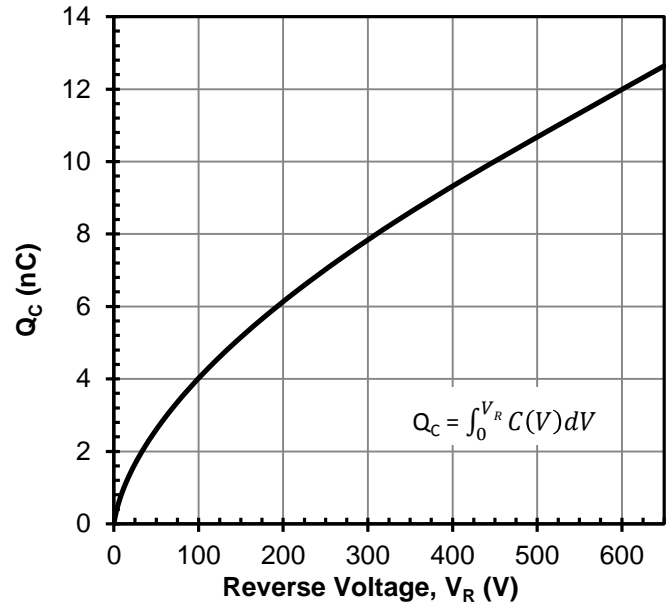


Figure 6 Maximum transient thermal impedance



**Figure 7 Typical capacitance stored energy vs. reverse voltage**



**Figure 8 Typical capacitive charge vs. reverse voltage**

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