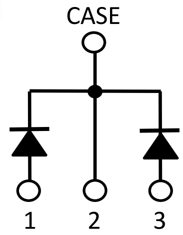
Gen-III | 60A - 650V SiC Schottky Diode | UJ3D06560KS

Datasheet

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
UJ3D06560KS	TO-247-3L	UJ3D06560KS

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 (Leg/Device)	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 = 140°C	30/60	A
Non-repetitive forward surge current sine halfwave	I_{FSM}	T_C = 25°C, t_p = 10ms	165/330	A
		T_C = 110°C, t_p =10ms	150/300	
Repetitive forward surge current sine halfwave, D=0.1	I_{FRM}	T_C = 25°C, t_p = 10ms	107.2/214.4	A
		T_C = 110°C, t_p =10ms	66.1/132.2	
Non-repetitive peak forward current	$I_{F,max}$	T_C = 25°C, t_p =10µs	1250/2500	A
		T_C = 110°C, t_p =10µs	1250/2500	
i^2t value	$\int i^2dt$	T_C = 25°C, t_p =10ms	136/544	A^2s
		T_C = 110°C, t_p =10ms	112/448	
Power dissipation	P_{Tot}	T_C = 25°C	288.5/577	W
		T_C = 140°C	67.3/134.6	
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 (Leg/Device)			Units
			Min	Typ	Max	
Forward voltage	V_F	I_F = 30/60A, T_J = 25°C	-	1.5	1.7	V
		I_F = 30/60A, T_J =150°C	-	1.77	2.1	
		I_F = 30/60A, T_J =175°C	-	1.85	2.25	
Reverse current	I_R	V_R=650V, T_j=25°C	-	30/60	370/740	μA
		V_R=650V, T_j=175°C	-	390/780		
Total capacitive charge [1]	Q_C	V_R=400V		72/144		nC
Total capacitance	C	V_R=1V, f=1MHz		990/1980		pF
		V_R=300V, f=1MHz		117/234		
		V_R=600V, f=1MHz		101/202		
Capacitance stored energy	E_C	V_R=400V		10.5/21		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 (Leg/Device)			Units
			Min	Typ	Max	
Thermal resistance	$R_{\theta JC}$			0.4/0.2	0.52/0.26	°C/W

Typical Performance

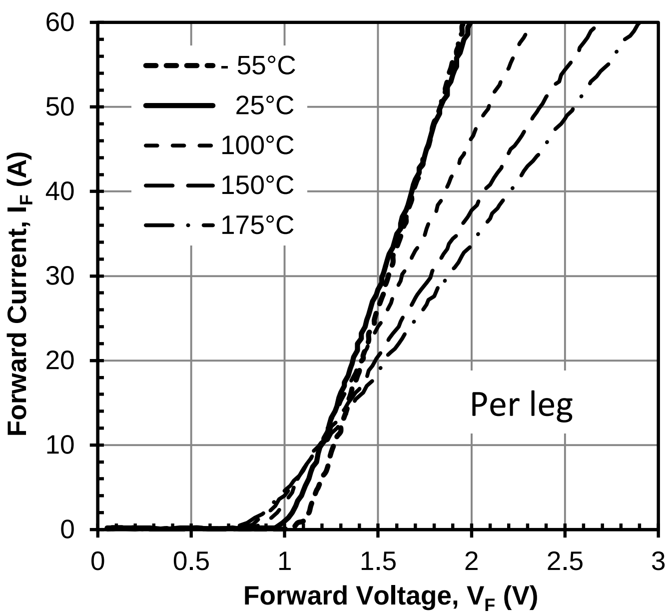


Figure 1 Typical forward characteristics per leg

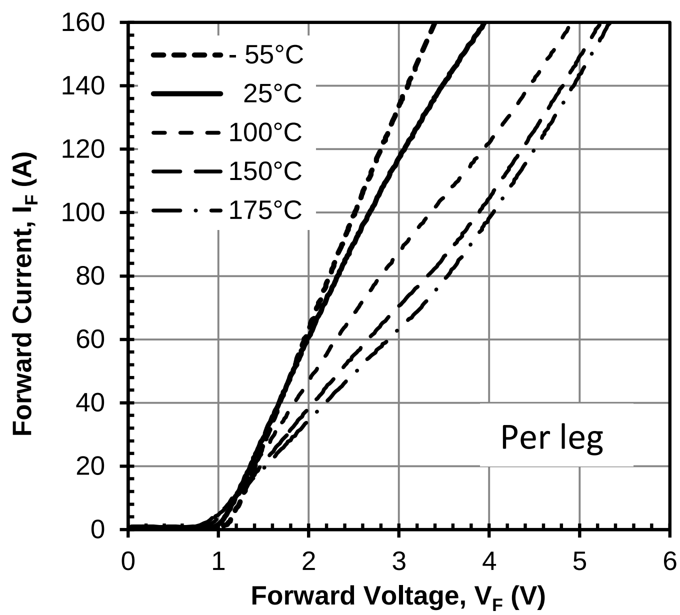


Figure 2 Typical forward characteristics in surge current per leg

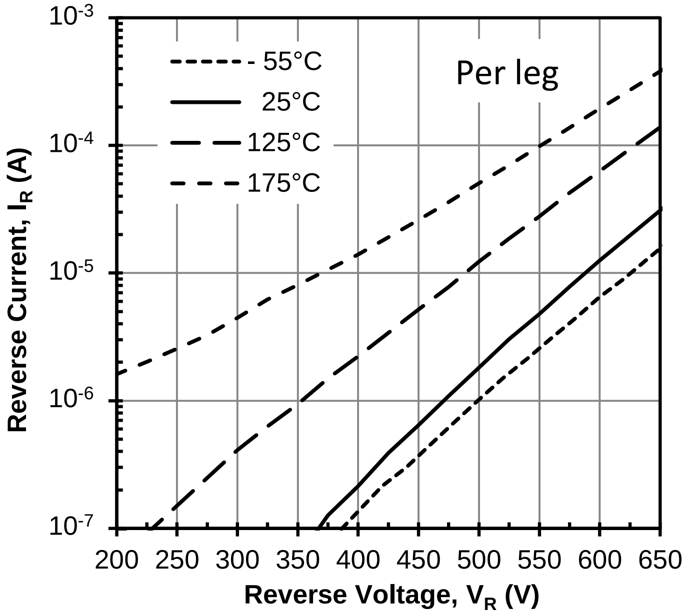


Figure 3 Typical reverse characteristics per leg

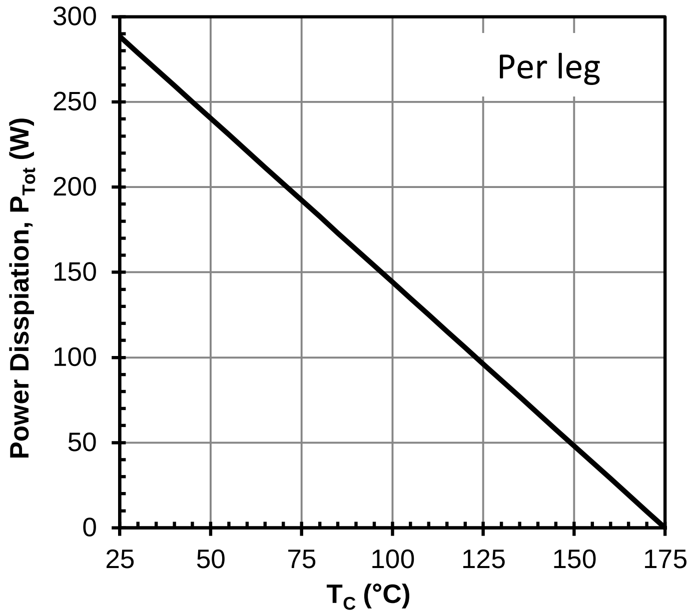


Figure 4 Power dissipation per leg

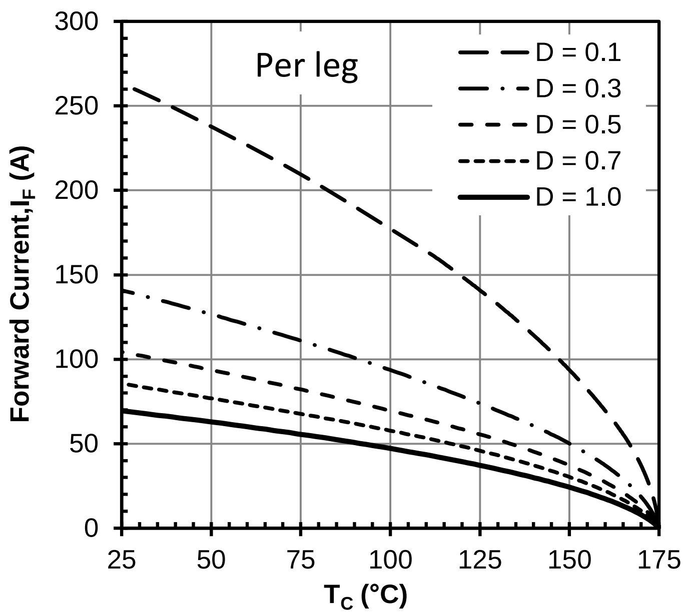


Figure 5 Diode forward current per leg

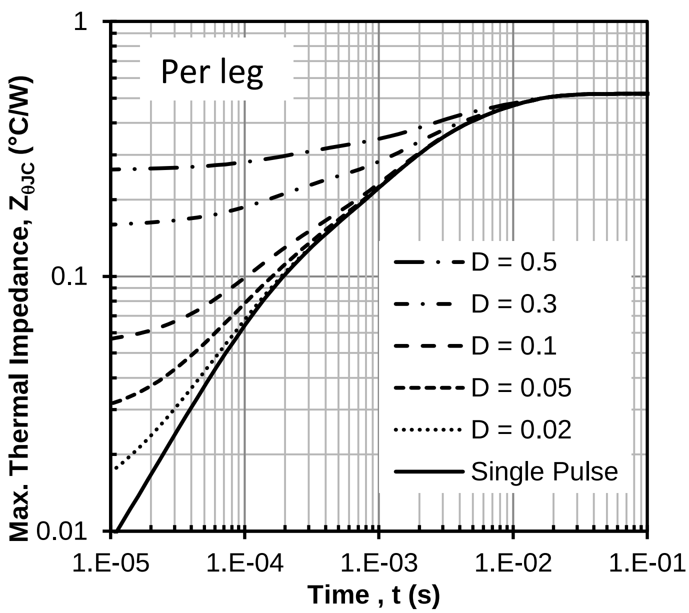


Figure 6 Maximum transient thermal impedance per leg

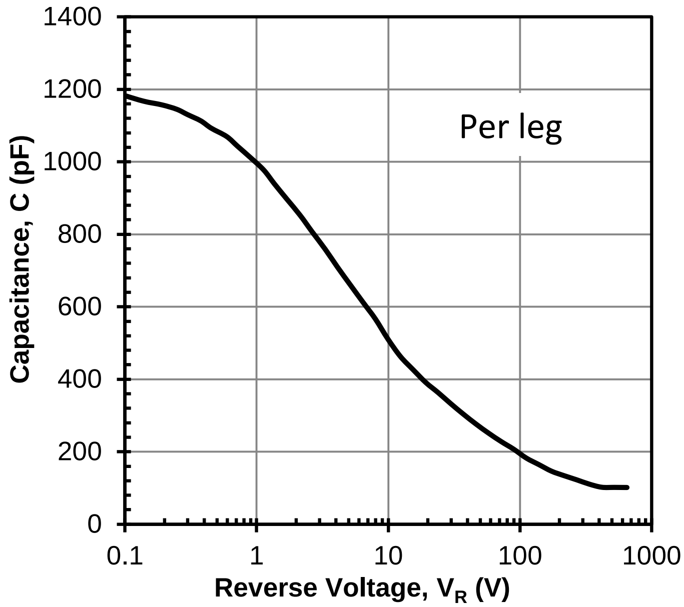


Figure 7 Capacitance per leg vs. reverse voltage at 1MHz

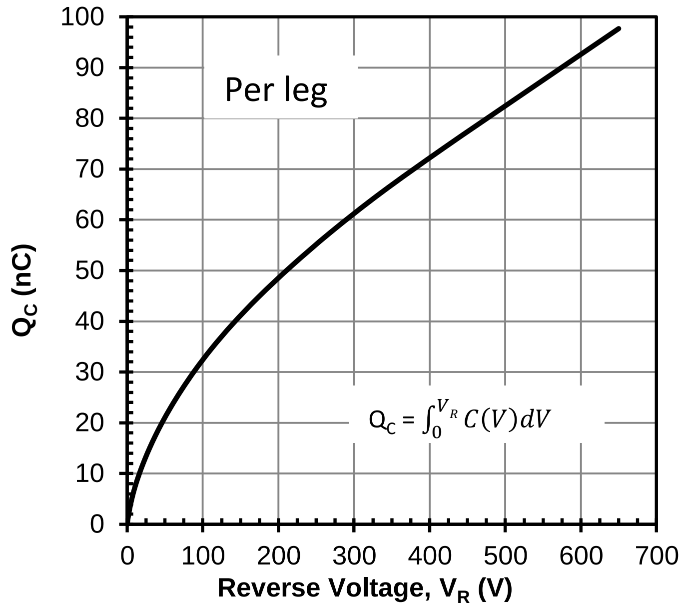


Figure 8 Typical capacitive charge per leg vs. reverse voltage

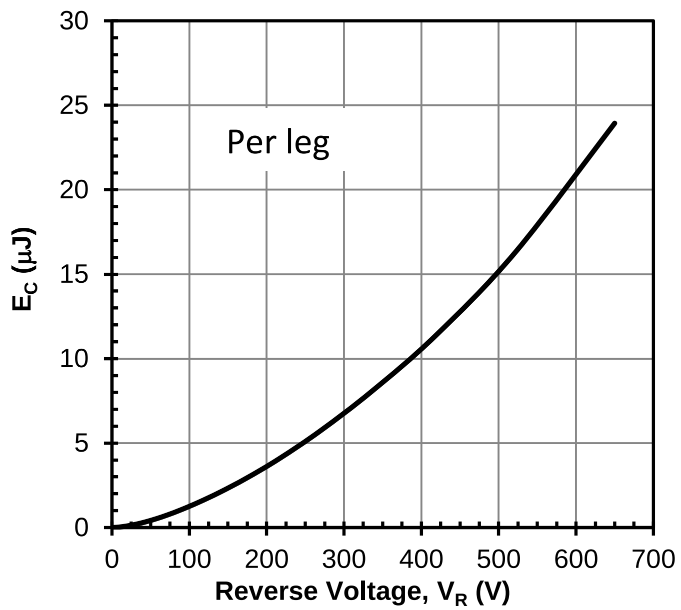


Figure 9 Typical capacitance stored energy per leg vs. reverse voltage

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