

E4D02120E

4th Generation 1200 V, 2 A Silicon Carbide Schottky Diode

Description

With the performance advantages of a Silicon Carbide (SiC) Schottky Barrier diode, power electronics systems can expect to meet higher efficiency standards than Si-based solutions, while also reaching higher frequencies and power densities. SiC diodes can be easily paralleled to meet various application demands, without concern of thermal runaway. In combination with the reduced cooling requirements and improved thermal performance of SiC products, SiC diodes are able to provide lower overall system costs in a variety of diverse applications.



Package Type: TO-252-2
Marking: E4D02120

Features

- Low Forward Voltage (V_f) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- AEC-Q101 + HV-H3TRB Qualified, PPAP Capable

Applications

- Bootstrap Diode
- Boost Diodes in PFC
- Automotive Power Conversion
- PV Inverters
- Outdoor Power Conversion

Maximum Ratings ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit	Test Conditions	Note
Repetitive Peak Reverse Voltage	V_{RRM}	1200	V		
DC Blocking Voltage	V_{DC}	1200			
Continuous Forward Current	I_F	8	A	$T_J = 25^\circ\text{C}$	Fig. 3
		4		$T_J = 135^\circ\text{C}$	
		2		$T_J = 160^\circ\text{C}$	
Repetitive Peak Forward Surge Current	I_{FRM}	11		$T_c = 25^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave	
		7		$T_c = 110^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave	
Power Dissipation	P_{tot}	50	W	$T_J = 25^\circ\text{C}$	Fig. 4
		21		$T_J = 110^\circ\text{C}$	



Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Units	Test Conditions	Note
Forward Voltage	V_F	1.4	1.8	V	$I_F = 2 \text{ A}, T_J = 25 \text{ }^\circ\text{C}$	Fig. 1
		1.9			$I_F = 2 \text{ A}, T_J = 175 \text{ }^\circ\text{C}$	
Reverse Current	I_R	10	50	μA	$V_R = 1200 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$	Fig. 2
		40			$V_R = 1200 \text{ V}, T_J = 175 \text{ }^\circ\text{C}$	
Total Capacitive Charge	Q_C	16		nC	$V_R = 800 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$	Fig. 5
Total Capacitance	C	153		pF	$V_R = 0 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	Fig. 6
		17			$V_R = 400 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
		14			$V_R = 800 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
Capacitance Stored Energy	E_C	5.6		μJ	$V_R = 800 \text{ V}$	Fig. 7

Note:

SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

Thermal & Mechanical Characteristics

Parameter	Symbol	Value	Units	Note
Thermal Resistance, Junction to Case (Typ.)	$R_{\theta,JC}$	2.99	$^\circ\text{C} / \text{W}$	
Operating Junction & Storage Temperature	T_J, T_{stg}	-55 to +175	$^\circ\text{C}$	Fig. 8
Maximum Processing Temperature	T_{PROC}	325		
Moisture Sensitivity Level	MSL	MSL 3		

Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Value
Human Body Model	HBM	Class 3B ($\geq 8000 \text{ V}$)
Charge Device Model	CDM	Class C3 ($\geq 1000 \text{ V}$)



Typical Performance

Figure 1. Forward Characteristics

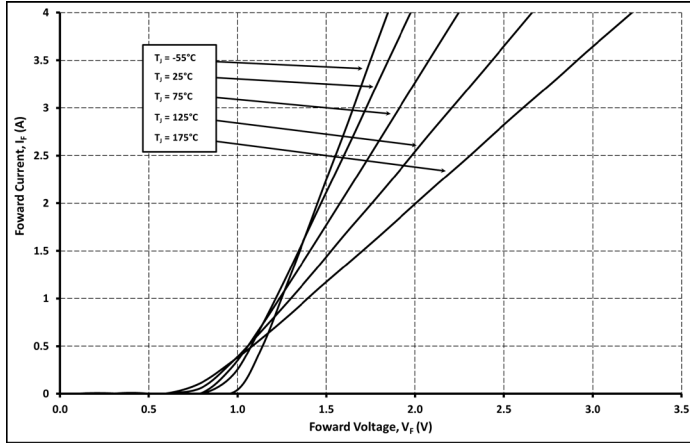


Figure 2. Reverse Characteristics

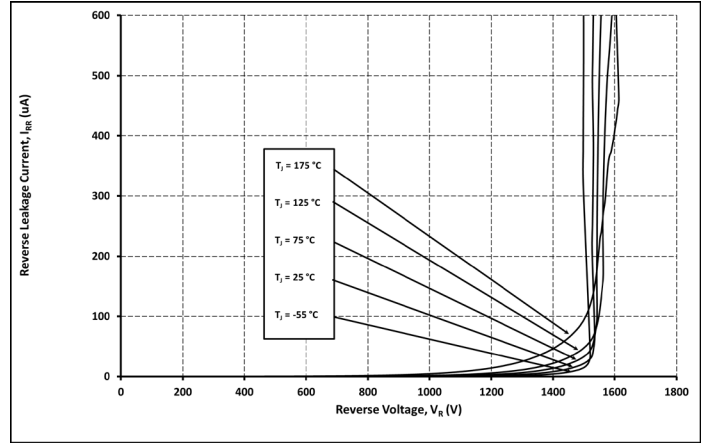


Figure 3. Current Derating

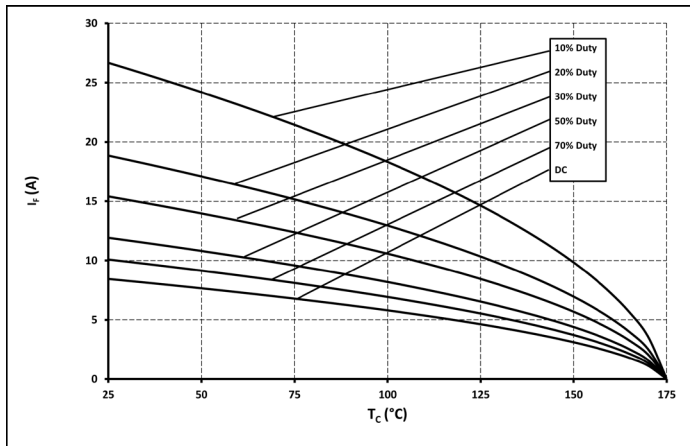


Figure 4. Power Derating

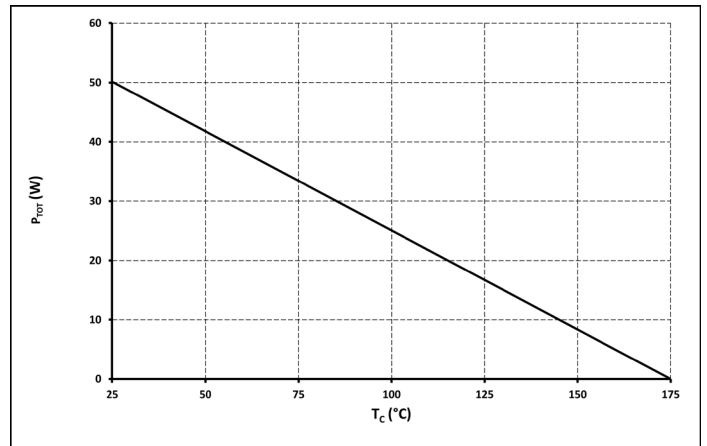


Figure 5. Total Capacitance Charge vs. Reverse Voltage

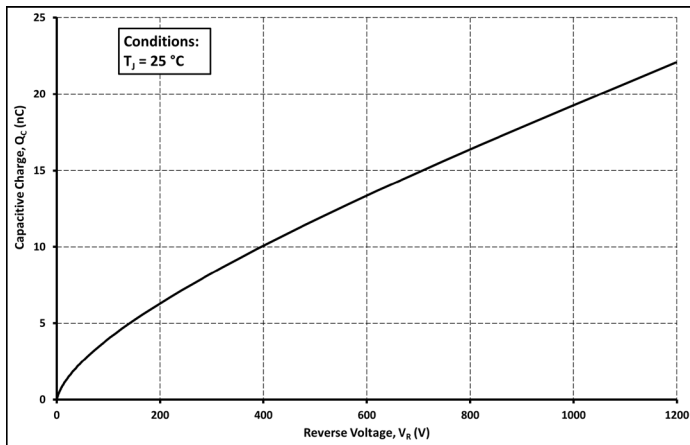
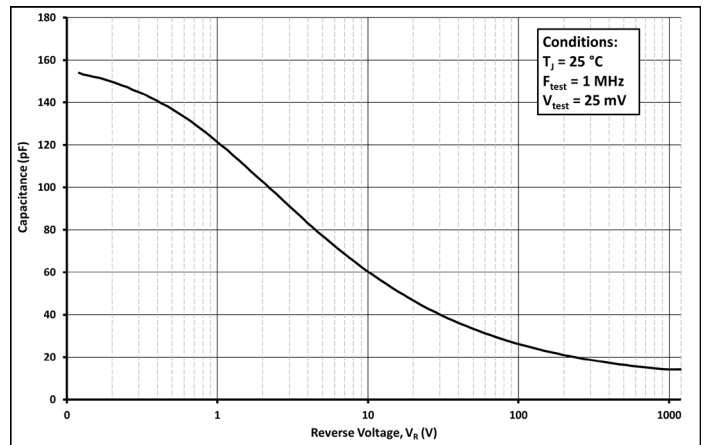


Figure 6. Capacitance vs. Reverse Voltage





Typical Performance

Figure 7. Capacitance Stored Energy

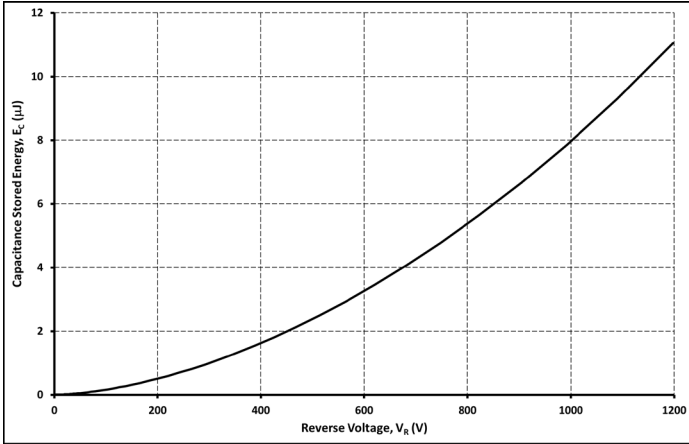
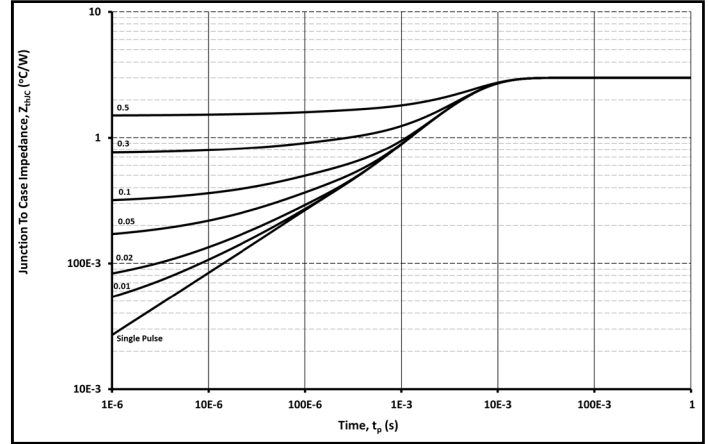


Figure 8. Transient Thermal Impedance

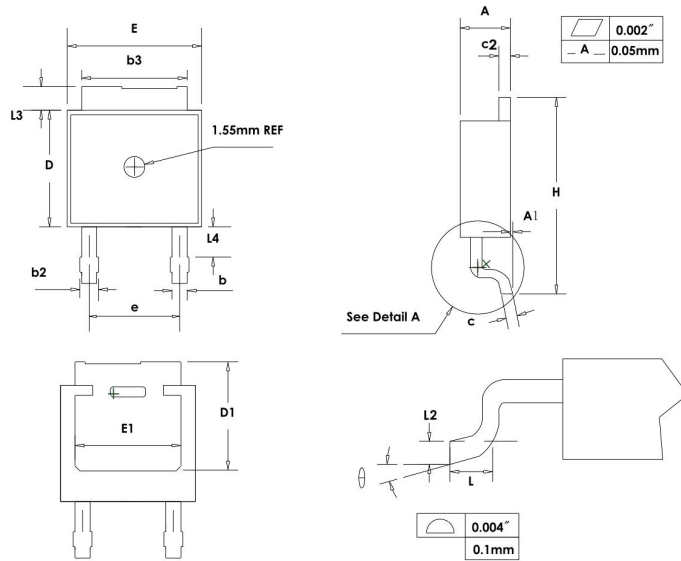




Package Dimensions

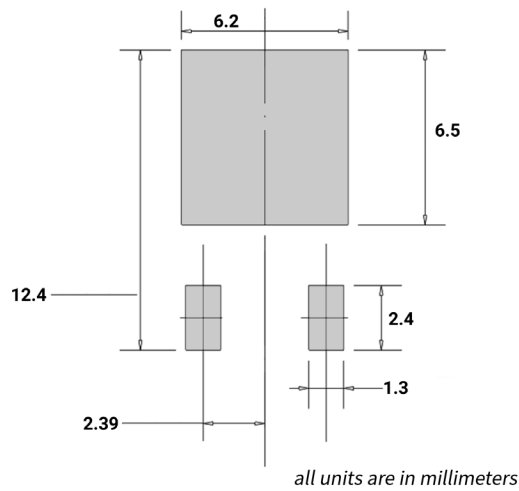
Package: TO-252-2

All dimensions in mm.



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.159	2.413
A1	0	0.13
b	0.64	0.89
b2	0.653	1.143
b3	5.004	5.6
c	0.457	0.61
c2	0.457	0.864
D	5.867	6.248
D1	5.21	-
E	6.35	7.341
E1	4.32	-
e	4.58 BSC	
H	9.65	10.414
L	1.106	1.78
L2	0.51 BSC	
L3	0.889	1.27
L4	0.64	1.01
θ	0°	8°

Recommended Solder Pad Layout



Learn more about recommended soldering profiles in [this application note](#).



Notes

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