

# E4D02120E

## 4<sup>th</sup> 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		$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
		7		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Power Dissipation	$P_{tot}$	50	W	$T_c = 25^\circ\text{C}$	Fig. 4
		21		$T_c = 110^\circ\text{C}$	



## 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	$\mu\text{A}$	$V_R = 1200 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$	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		$\mu\text{J}$	$V_R = 800 \text{ V}$	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

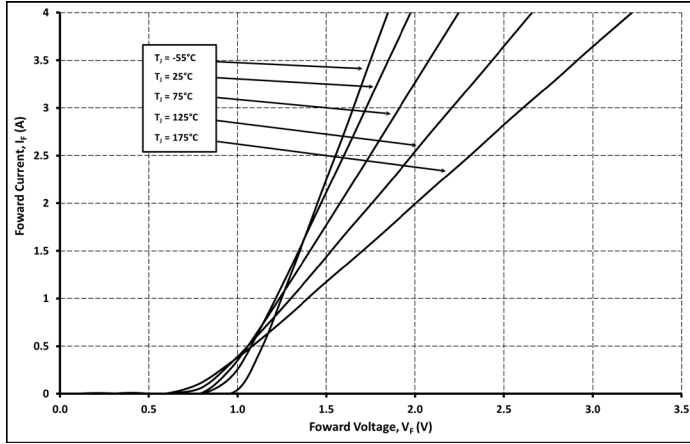


Figure 2. Reverse Characteristics

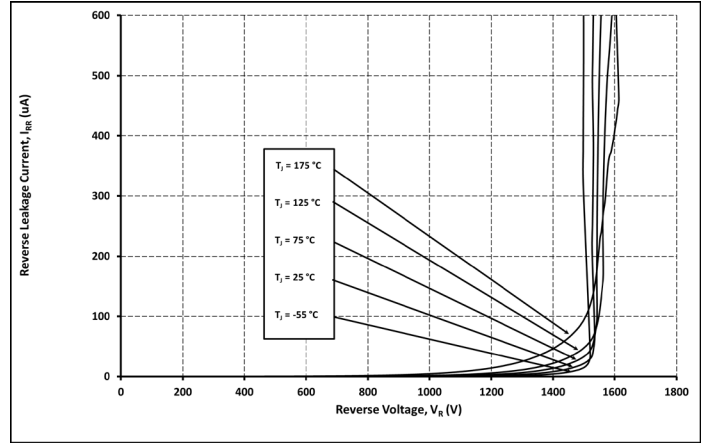


Figure 3. Current Derating

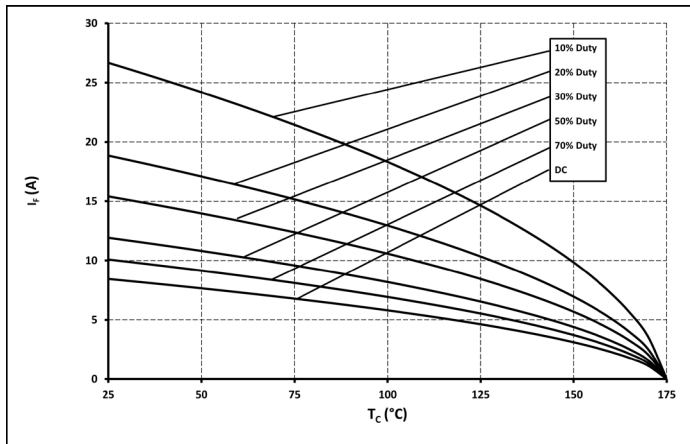


Figure 4. Power Derating

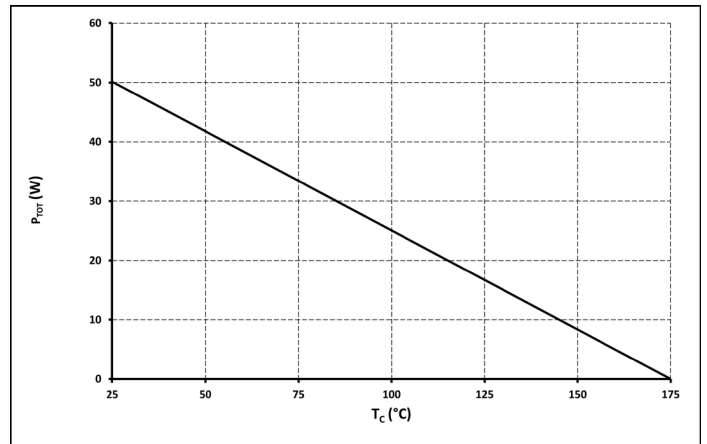


Figure 5. Total Capacitance Charge vs. Reverse Voltage

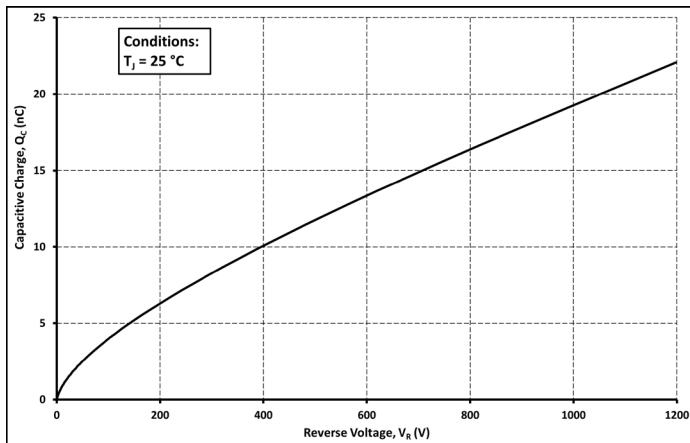
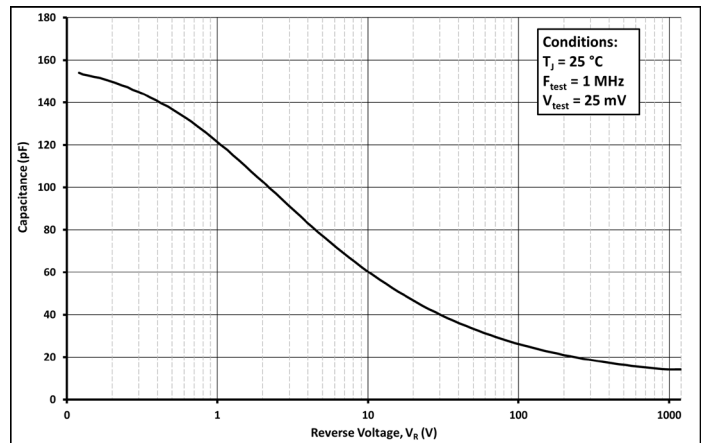


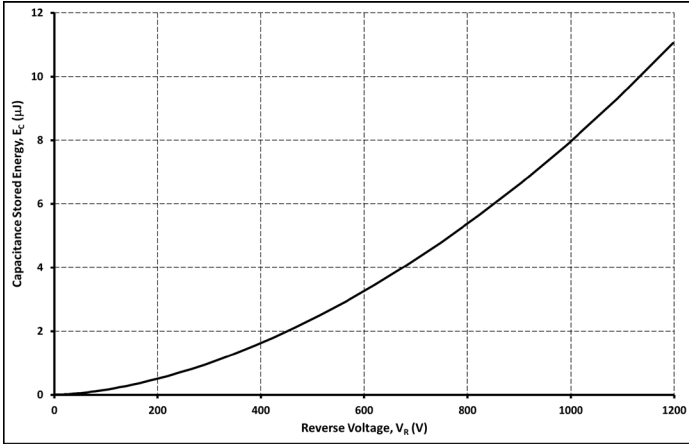
Figure 6. Capacitance vs. Reverse Voltage



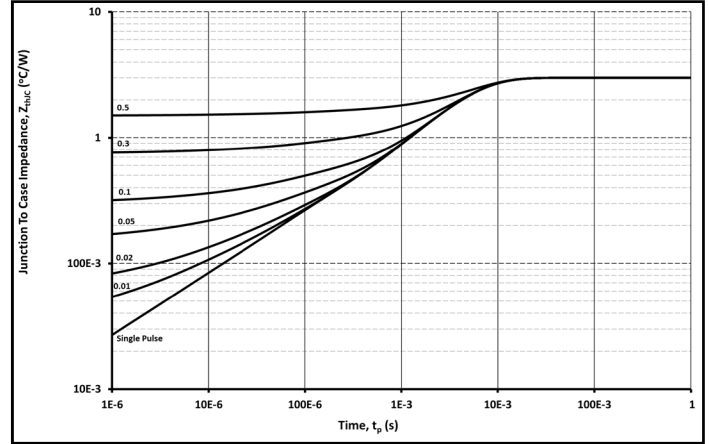


### Typical Performance

#### Figure 7. Capacitance Stored Energy



#### Figure 8. Transient Thermal Impedance

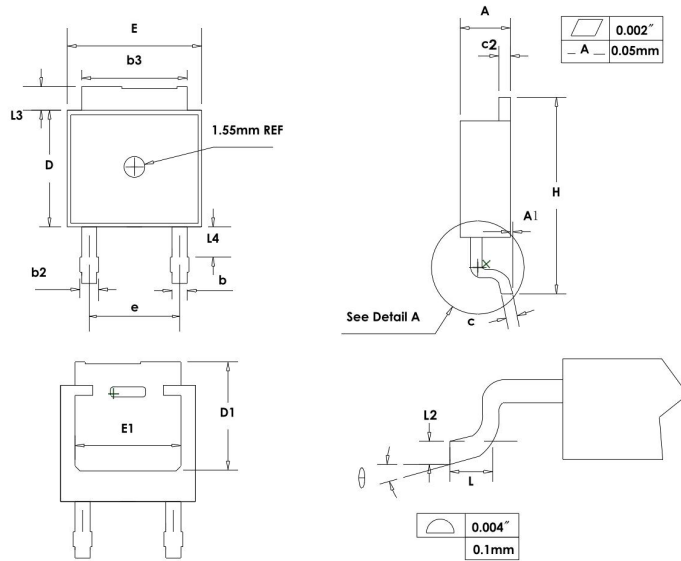




### Package Dimensions

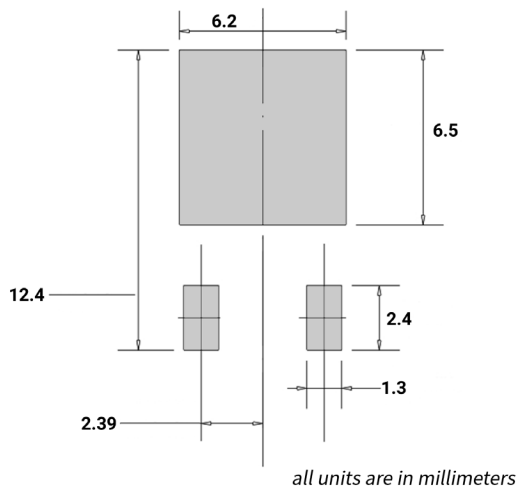
Package: TO-252-2

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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