

E4D20120G

1200 V, 20 A Silicon Carbide Schottky Diode

Features

- 4th generation SiC merged PIN Schottky technology
- Zero reverse recovery current
- High-frequency operation
- Temperature-independent switching behavior
- AEC-Q101 qualified and PPAP capable
- Humidity resistant



TO-263-2



Package Types: TO-263-2

PN: E4D20120G

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Applications

- Boost diodes in PFC or DC/DC stages
- Free wheeling diodes in inverter stages
- AC/DC converters
- Automotive and traction power conversion
- PV inverters

Benefits

- Replace bipolar with unipolar rectifiers
- Essentially no switching losses
- Higher efficiency
- Reduction of heat sink requirements
- Parallel devices without thermal runaway
- Ideal for outdoor environments

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 Peak Reverse Voltage	V_R	1200			
Continuous Forward Current	I_F	56	A	$T_c = 25^\circ\text{C}$	Fig. 3
		27		$T_c = 135^\circ\text{C}$	
		20		$T_c = 150^\circ\text{C}$	
Power Dissipation	P_{tot}	250	W	$T_c = 25^\circ\text{C}$	Fig. 4
		108		$T_c = 110^\circ\text{C}$	
Repetitive Peak Forward Surge Current	I_{FRM}	83	A	$T_c = 25^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Pulse	
		47		$T_c = 110^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Pulse	
Diode dV/dt Ruggedness	dV/dt	250	V/ns	$V_R = 0\text{--}960\text{ V}$	
Operating Junction and Storage Temperature	T_J, T_{stg}	-55 to +175	$^\circ\text{C}$		



Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Note
Forward Voltage	V_F	1.5	1.8	V	$I_F = 20 \text{ A}$, $T_J = 25^\circ\text{C}$	Fig. 1
		2.2			$I_F = 20 \text{ A}$, $T_J = 175^\circ\text{C}$	
Reverse Current	I_R	35	200	μA	$V_R = 1200 \text{ V}$, $T_J = 25^\circ\text{C}$	Fig. 2
		65			$V_R = 1200 \text{ V}$, $T_J = 175^\circ\text{C}$	
Total Capacitive Charge	Q_C	110		nC	$V_R = 800 \text{ V}$, $I_F = 20 \text{ A}$	Fig. 5
					$di/dt = 200 \text{ A}/\mu\text{s}$	
					$T_J = 25^\circ\text{C}$	
Total Capacitance	C	1474		pF	$V_R = 0 \text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1 \text{ MHz}$	Fig. 6
		100			$V_R = 400 \text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1 \text{ MHz}$	
		76			$V_R = 800 \text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1 \text{ MHz}$	
Capacitance Stored Energy	E_C	33		μJ	$V_R = 800 \text{ V}$	Fig. 7

Note: This is a majority carrier diode, so there is no reverse recovery charge.

Thermal Characteristics

Parameter	Symbol	Typ.	Unit	Note
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.6	$^\circ\text{C}/\text{W}$	Fig. 8

Typical Performance

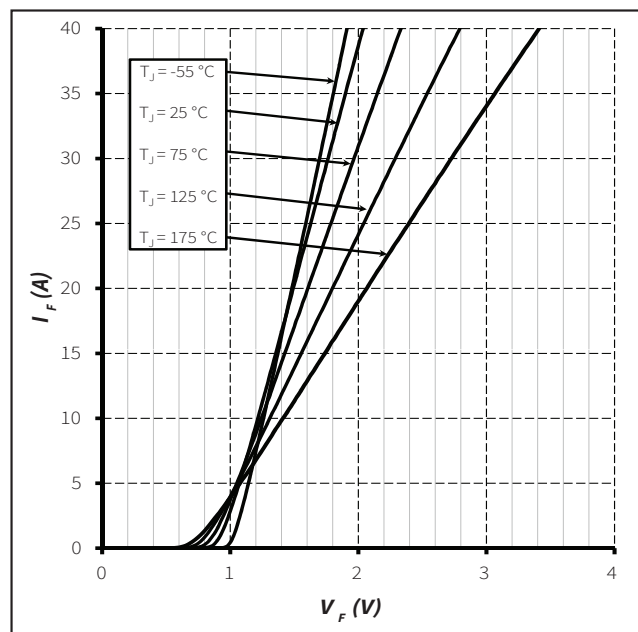


Figure 1. Forward Characteristics

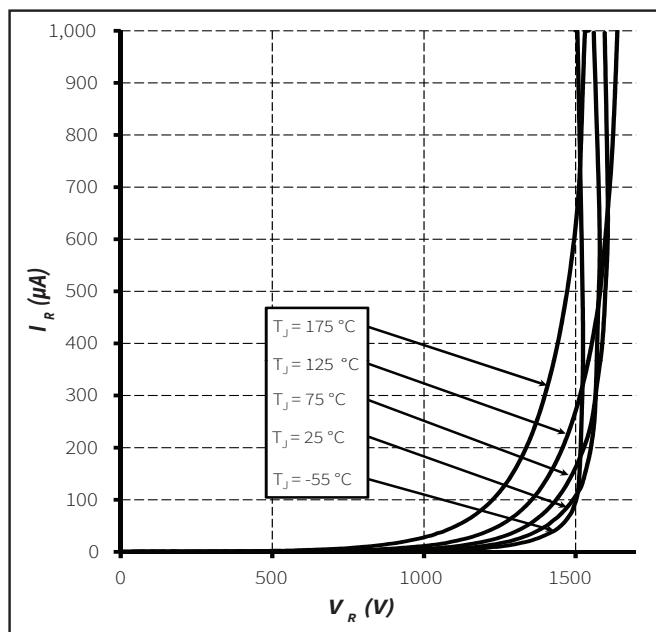


Figure 2. Reverse Characteristics



Typical Performance

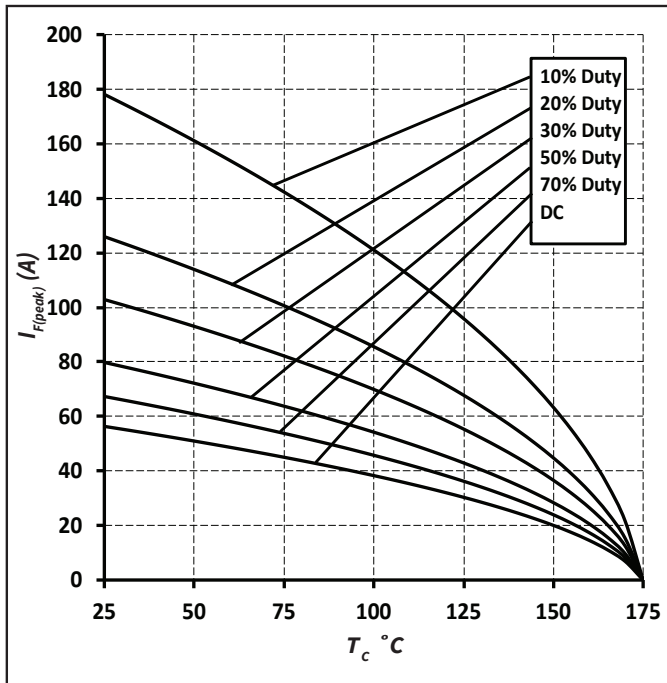


Figure 3. Current Derating

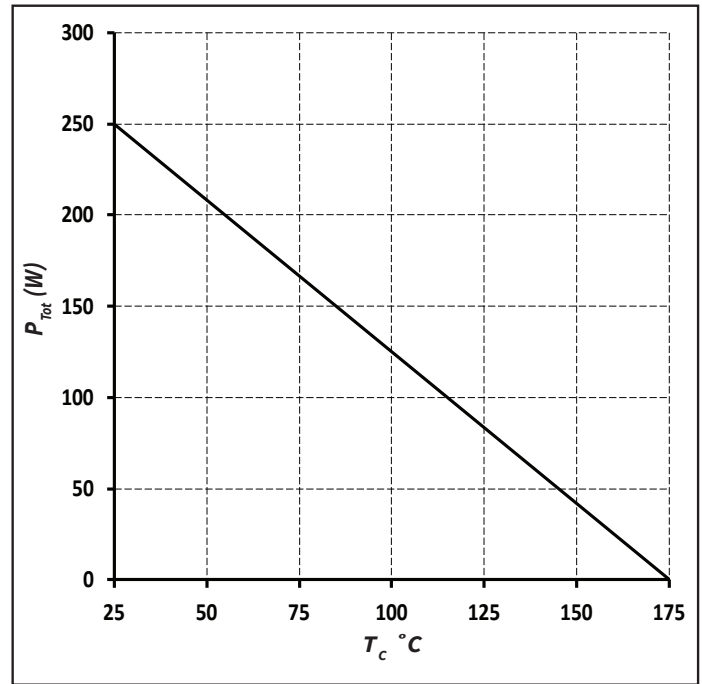


Figure 4. Power Derating

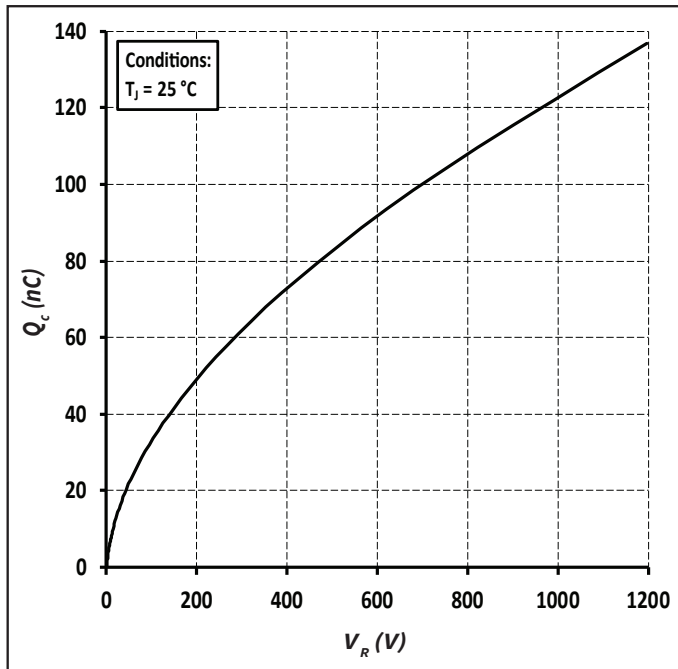


Figure 5. Recovery Charge vs. Reverse Voltage

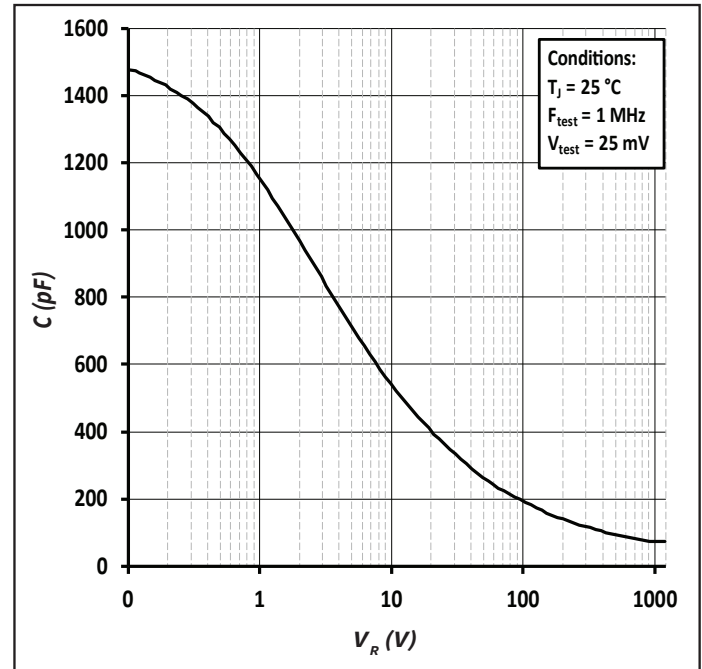


Figure 6. Capacitance vs. Reverse Voltage



Typical Performance

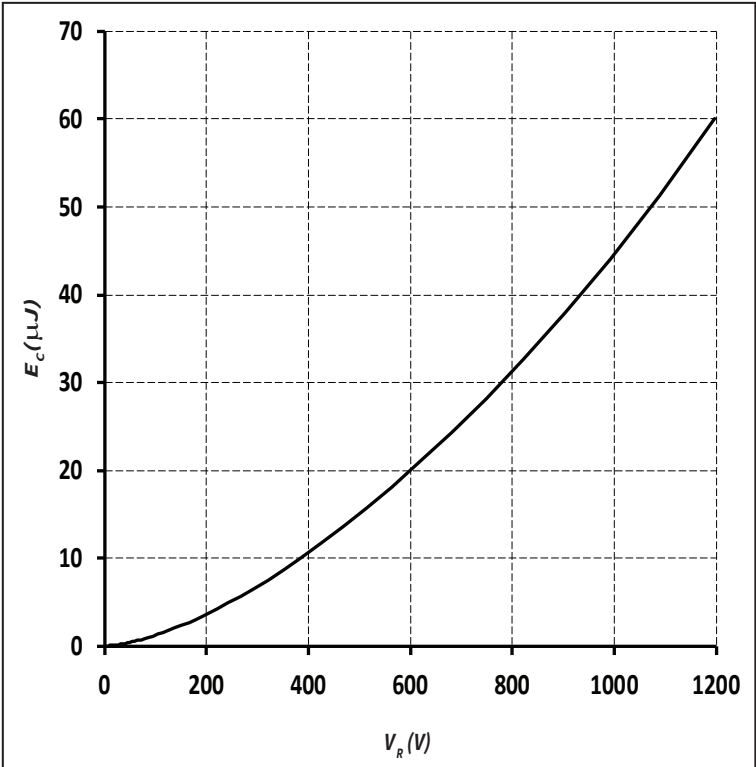


Figure 7. Typical Capacitance Stored Energy

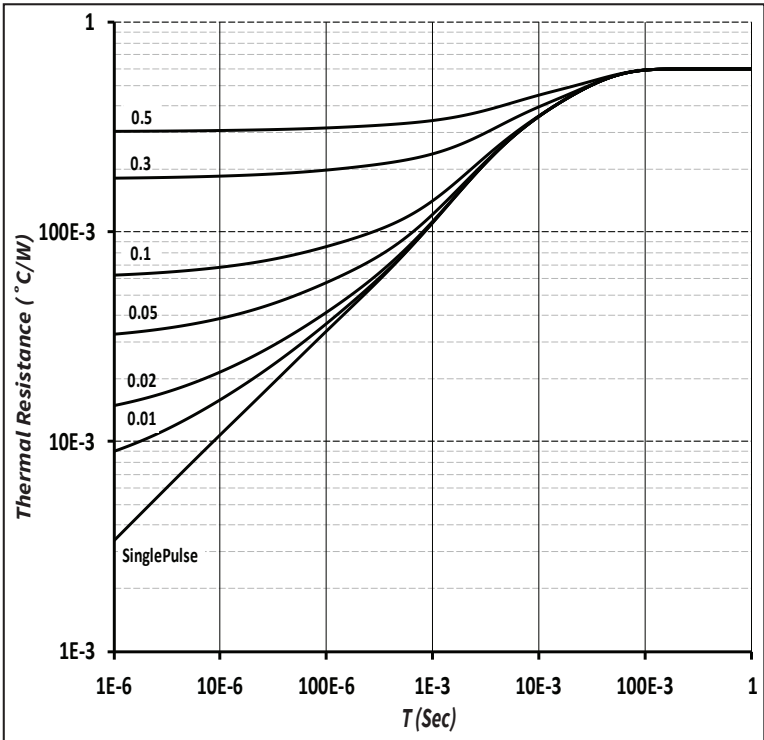
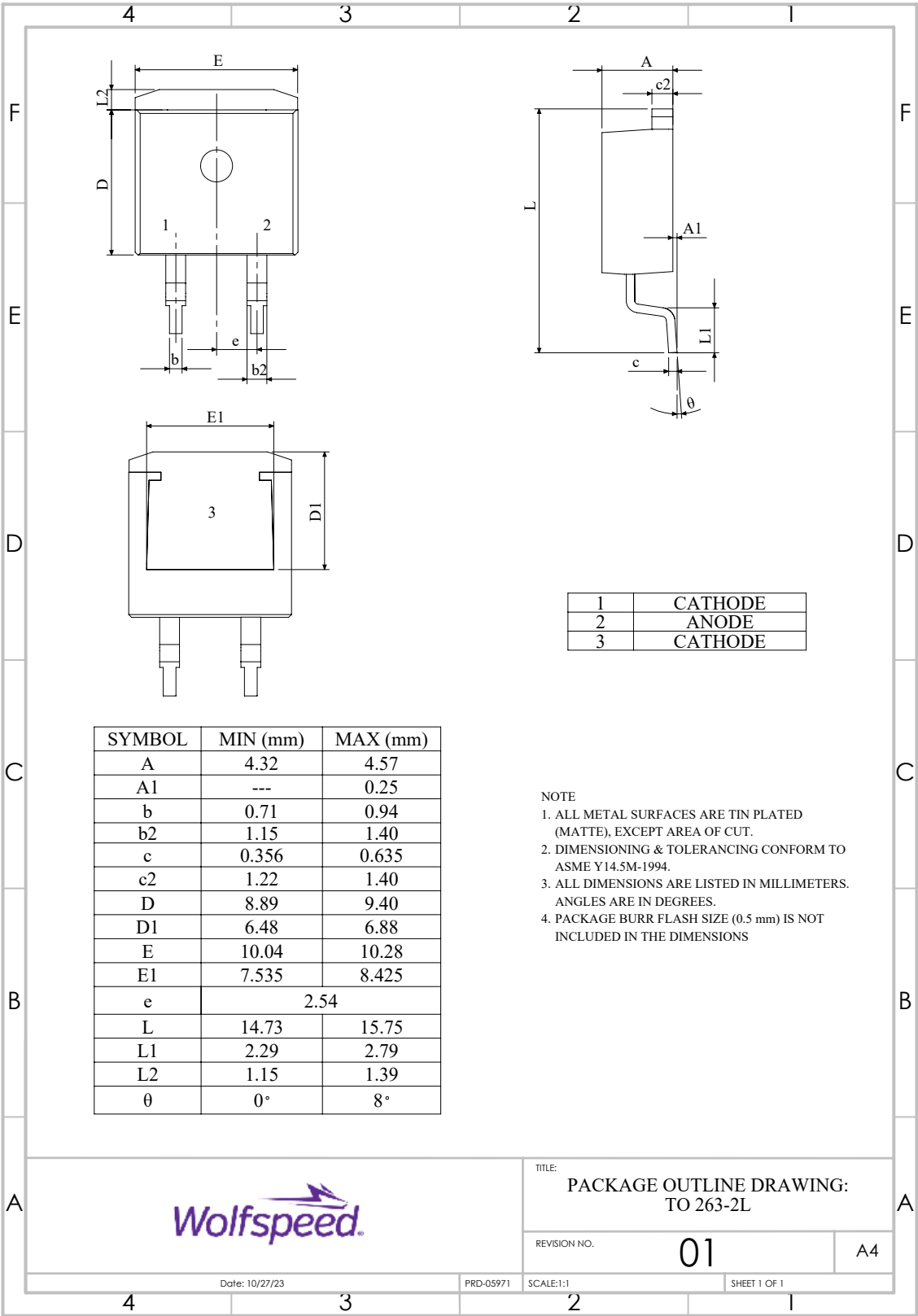


Figure 8. Transient Thermal Impedance



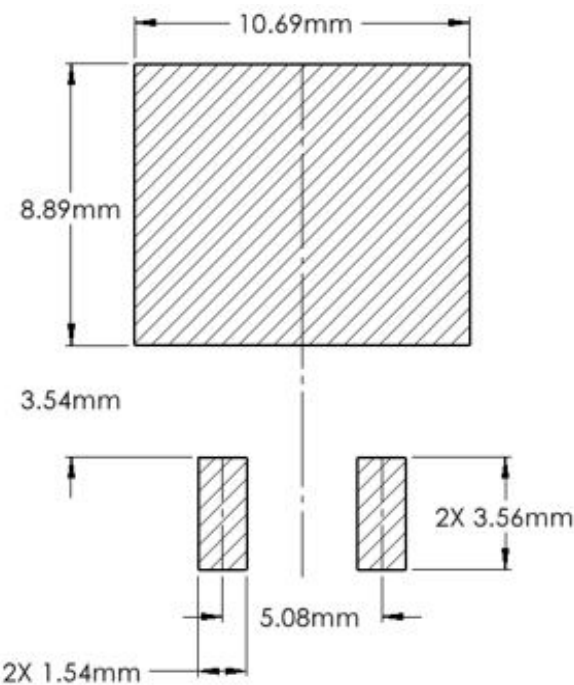
Package Dimensions

Package: TO-263-2





Recommended Solder Pad Layout



Part Number	Package	Marking
E4D20120G	TO-263-2	E4D20120



Revision History

Current Revision	Date of Release	Description of Changes
1	August-2020	Initial Release
2	October-2020	Updated Wolfspeed branding, package drawing, and solder pad layout (Not Released)
3	November-2023	Corrected Package Drawing L and L1



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