

C4D20120H

4th Generation 1200 V, 20 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 Types: TO-247-2
Marking: C4D20120H

Features

- Low Forward Voltage (V_f) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior

Applications

- Industrial Switched Mode Power Supplies
- Uninterruptible & AUX Power Supplies
- Boost for PFC & DC-DC Stages
- Solar Inverters

Maximum Ratings ($T_c = 25^\circ\text{C}$ Unless Otherwise Specified)

Parameter	Symbol	Value	Unit	Test Conditions	Notes
Repetitive Peak Reverse Voltage	V_{RRM}	1200	V		
DC Blocking Voltage	V_{DC}	1200			
Continuous Forward Current	I_F	54	A	$T_c = 25^\circ\text{C}$	Fig. 3
		26		$T_c = 135^\circ\text{C}$	
		20		$T_c = 156^\circ\text{C}$	
Repetitive Peak Forward Surge Current	I_{FRM}	86		$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
		56		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Forward Surge Current	I_{FSM}	130		$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	Fig. 8
		104		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	1150		$T_c = 25^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$	
		950		$T_c = 110^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$	
Power Dissipation	P_{tot}	246		W	$T_c = 25^\circ\text{C}$
		106.5	$T_c = 110^\circ\text{C}$		
i^2t Value	$\int i^2t$	84.5	A^2s	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}$	
		54		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}$	



Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	V_F	1.5	1.8	V	$I_F = 20 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$	Fig. 1
		2.2	3		$I_F = 20 \text{ A}, T_j = 175 \text{ }^\circ\text{C}$	
Reverse Current	I_R	35	200	μA	$V_R = 1200 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$	Fig. 2
		65	400		$V_R = 1200 \text{ V}, T_j = 175 \text{ }^\circ\text{C}$	
Total Capacitive Charge	Q_C	99		nC	$V_R = 800 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$	Fig. 5
Total Capacitance	C	1500		pF	$V_R = 0 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	Fig. 6
		93			$V_R = 400 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
		67			$V_R = 800 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
Capacitance Stored Energy	E_C	28		μJ	$V_R = 800 \text{ V}$	Fig. 7

Notes:

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

Thermal & Mechanical Characteristics

Parameter	Symbol	Value	Unit	Notes
Thermal Resistance, Junction to Case (Typical)	$R_{\theta, JC(TYP)}$	0.61	$^\circ\text{C} / \text{W}$	
Junction Temperature	T_j	-55 to +175	$^\circ\text{C}$	
Case & Storage Temperature	T_c	-55 to +150		
Maximum Processing Temperature	T_{PROC}	325		10 min max.
TO-247 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw



Typical Performance

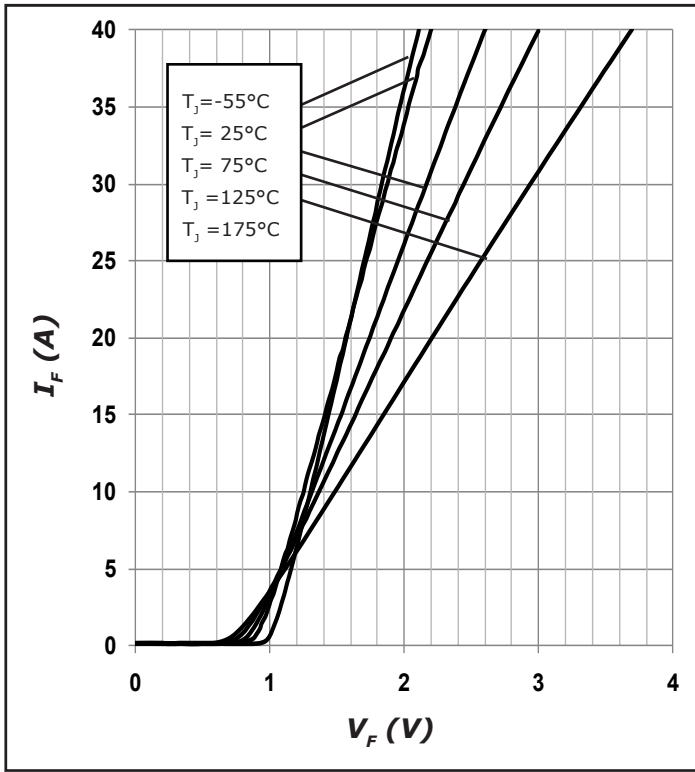


Figure 1. Forward Characteristics

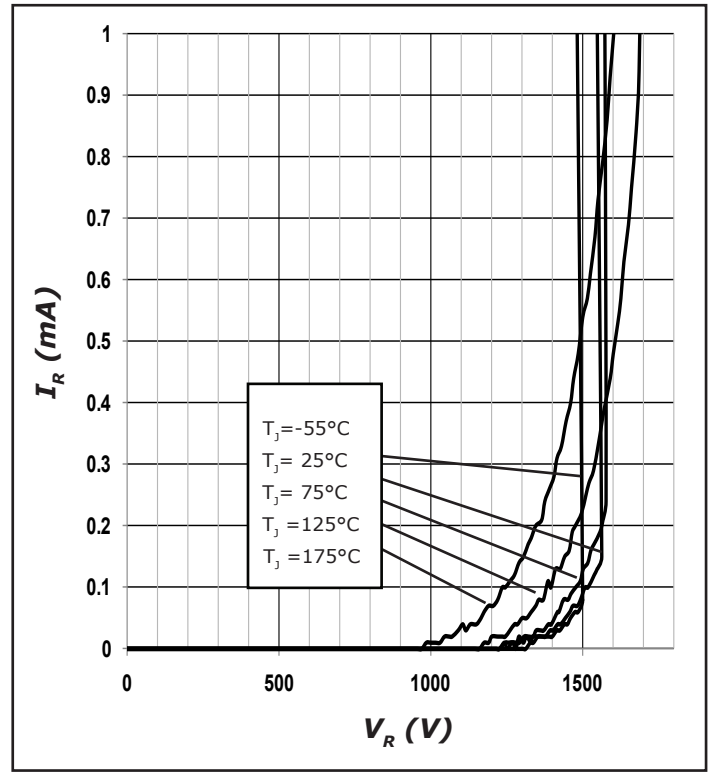


Figure 2. Reverse Characteristics

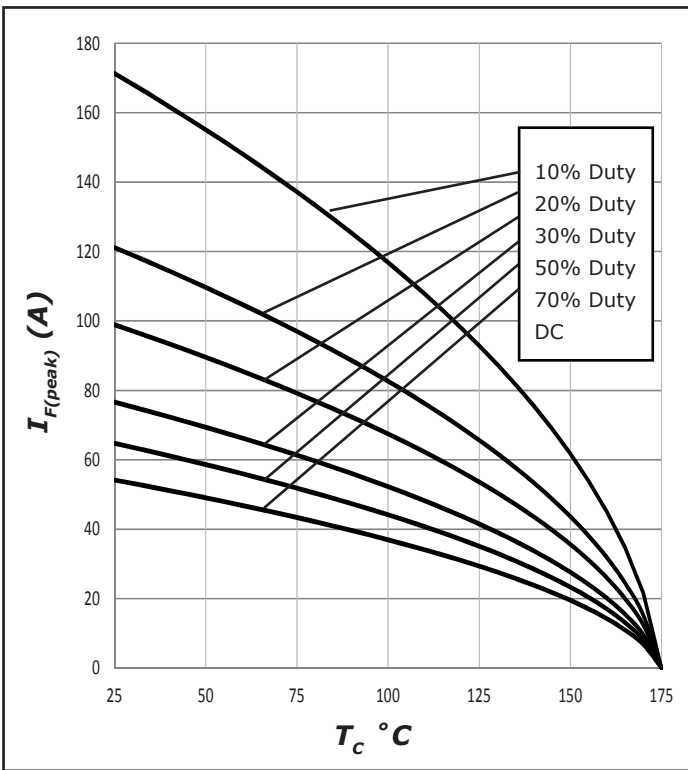


Figure 3. Current Derating

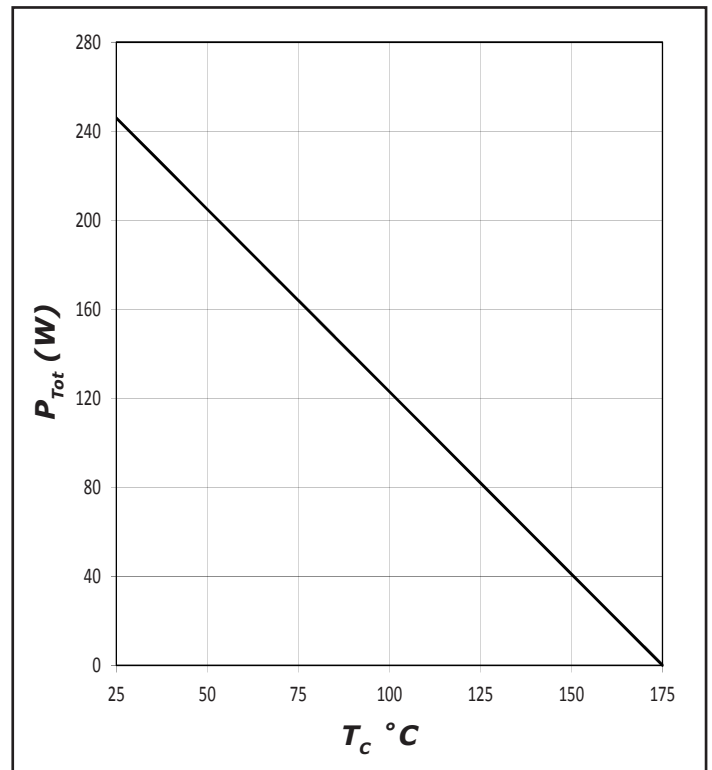


Figure 4. Power Derating



Typical Performance

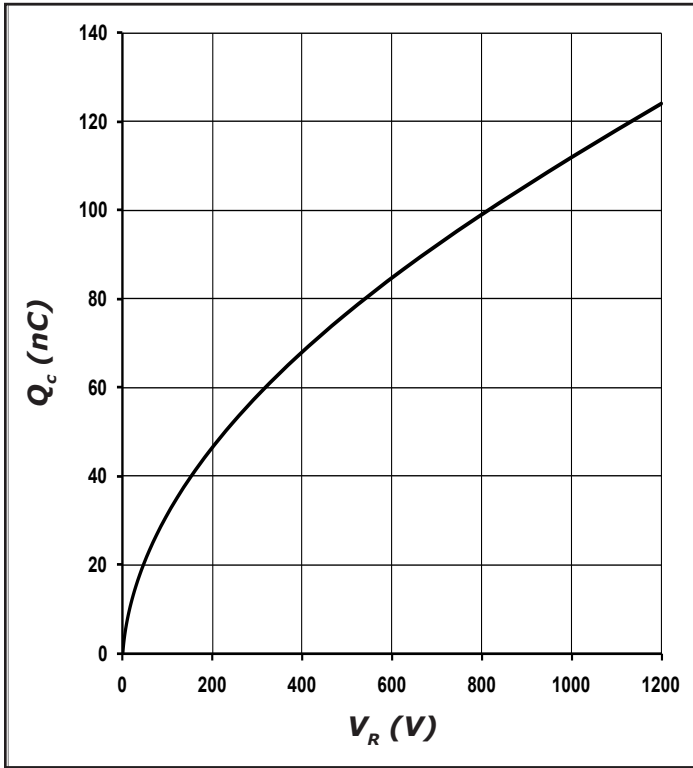


Figure 5.
Total Capacitance Charge vs. Reverse Voltage

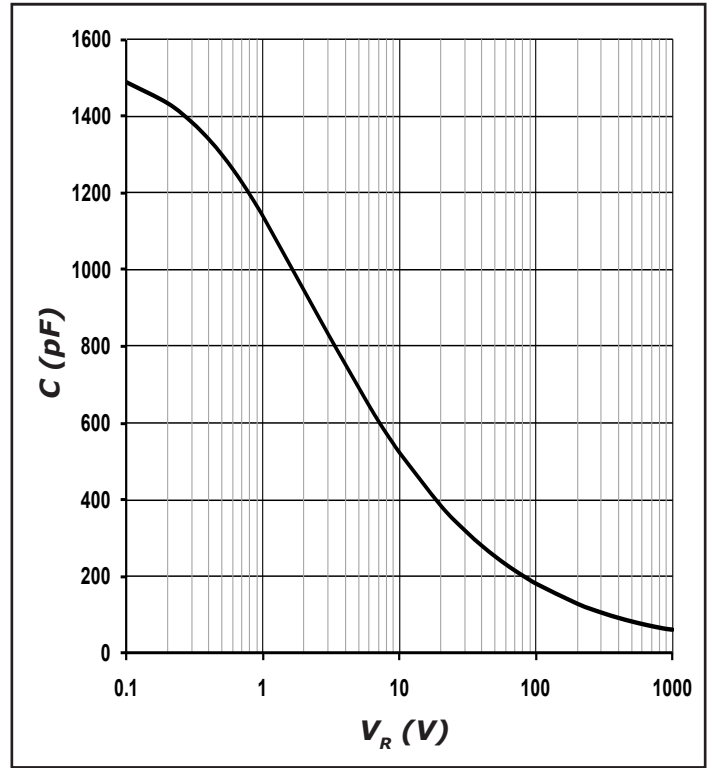


Figure 6.
Capacitance vs. Reverse Voltage

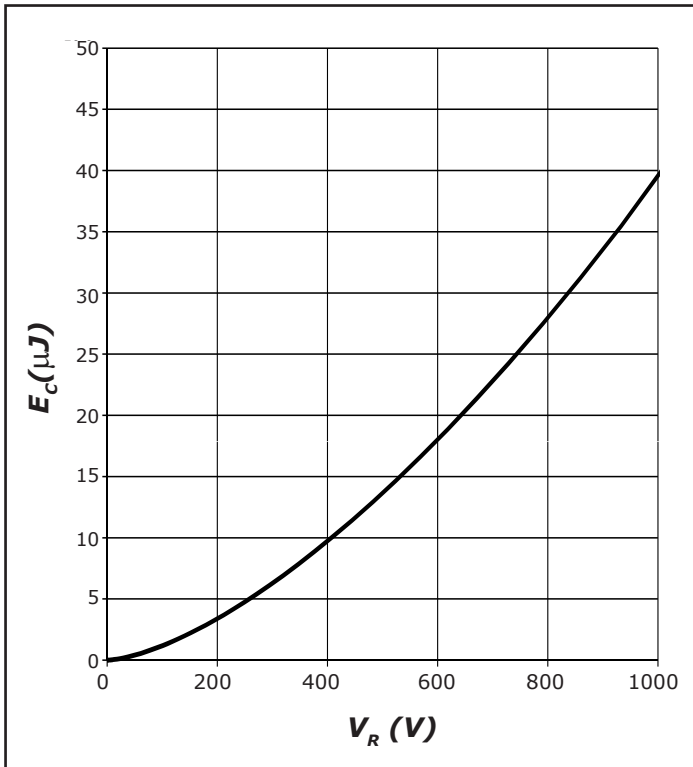


Figure 7.
Typical Capacitance Stored Energy

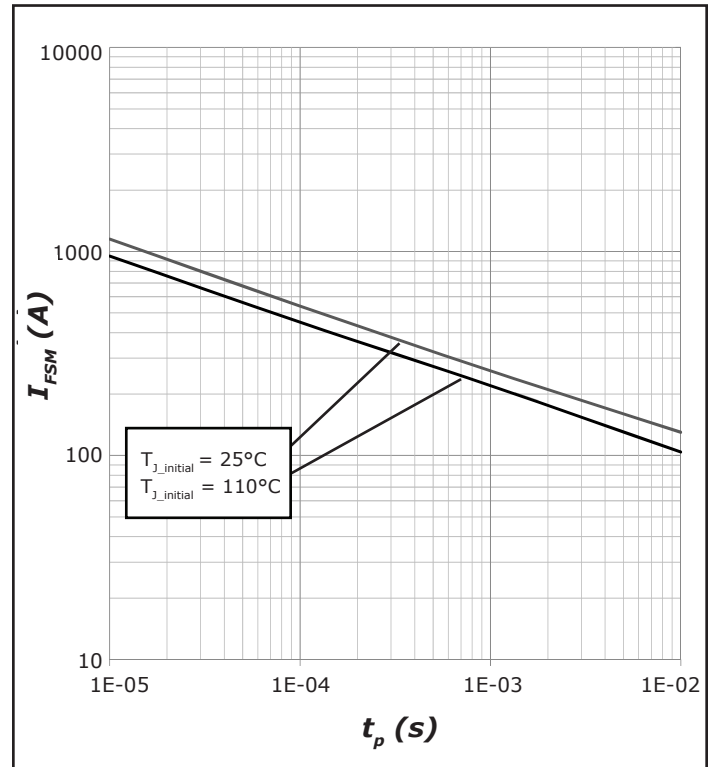


Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform)



Typical Performance

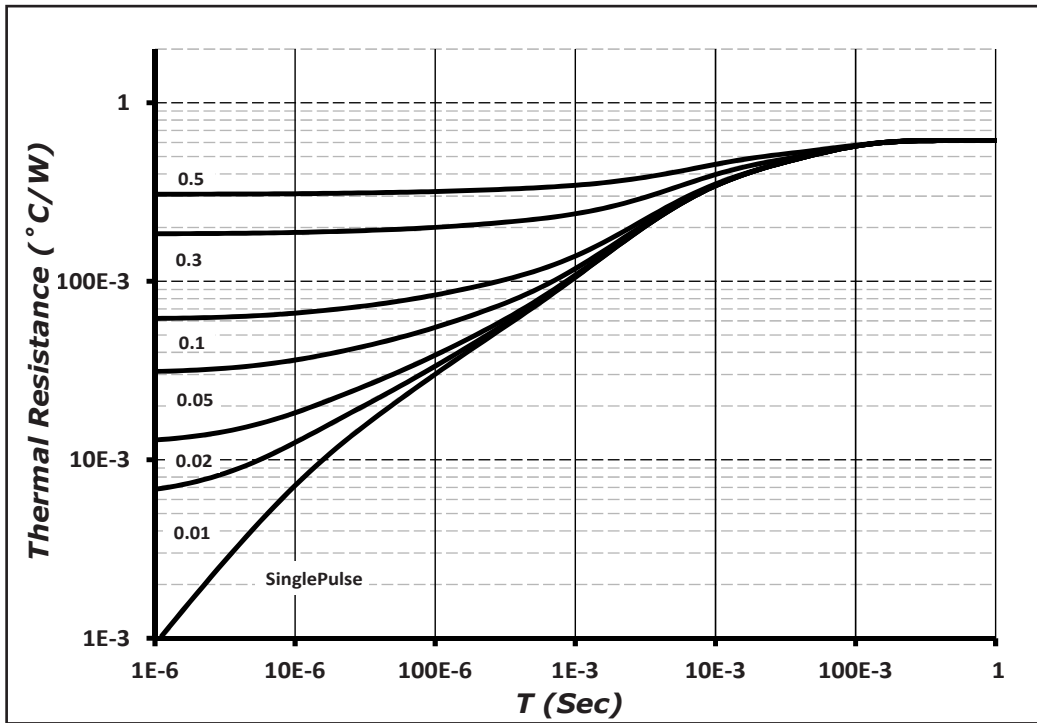
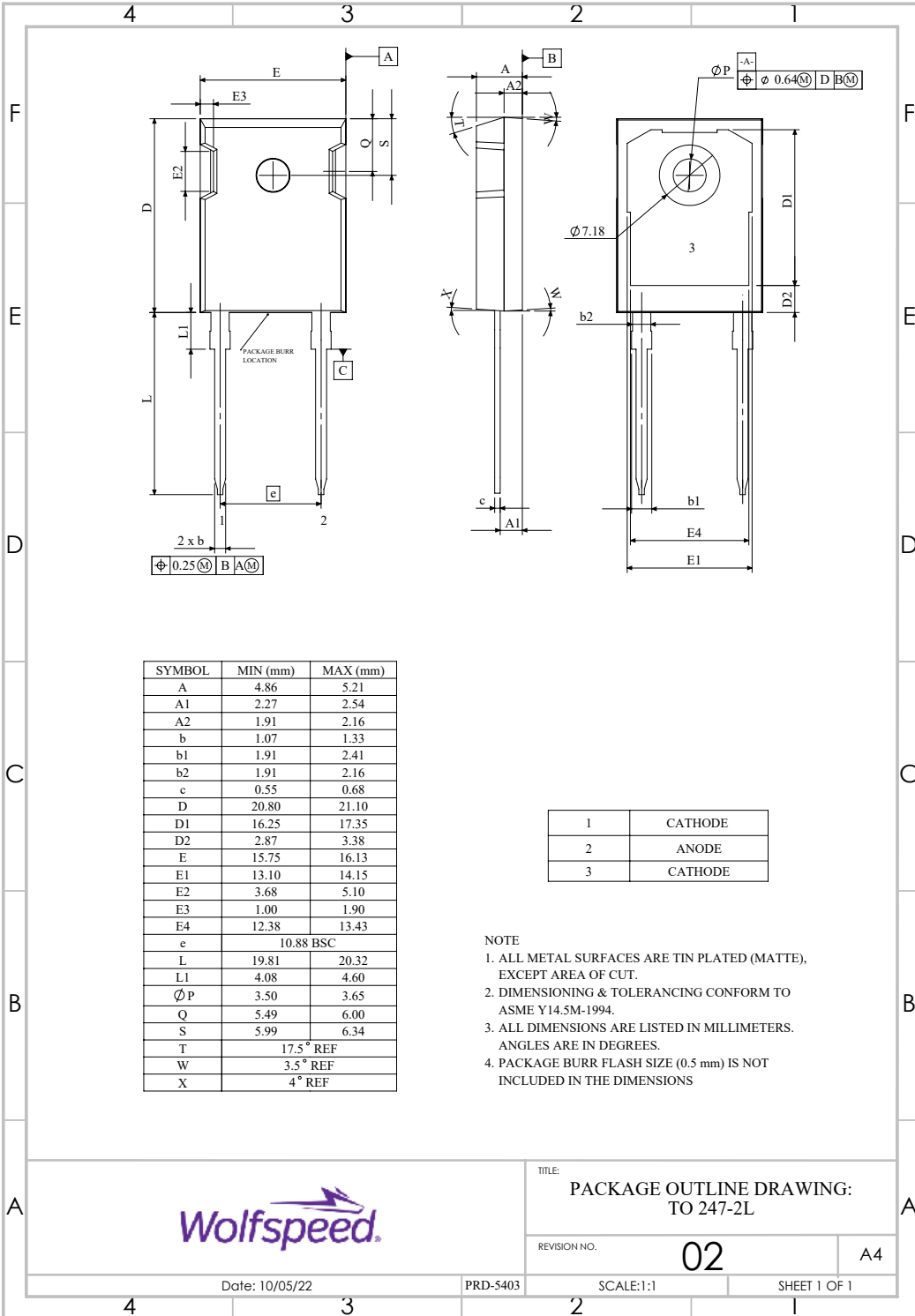


Figure 9
Transient Thermal Impedance



Package Dimensions & Pin-Out

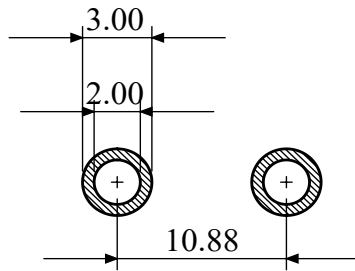
Package: TO-247-2 (All dimensions are in mm)





Recommended Solder Pad Layout

(All dimensions are in mm)



Product Ordering Information

Order Number	Packing Type
C4D20120H	Tube

REACH, RoHS, and Halogen-Free compliance documentation available for this product.



Revision History

Document Version	Date of Release	Description of changes
1	January - 2019	Initial Release
2	November-2022	Update package drawing



Notes & Disclaimer

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