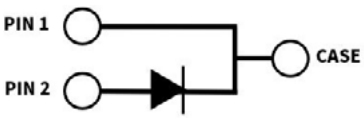
C6D04065E

650 V, 4 A Silicon Carbide Schottky Diode

TO-252-2



Package Types: TO-252-2
Marking: C6D04065

Wolfspeed, Inc. is in the process of rebranding its products and related materials pursuant to the entity name change from Cree, Inc. to Wolfspeed, Inc. During this transition period, products received may be marked with either the Cree name and/or logo or the Wolfspeed name and/or logo.

Features

- New 6th generation technology
- Low forward voltage drop (V_F)
- Zero reverse recovery current
- Zero forward recovery voltage
- Low leakage current (I_r)
- Temperature-independent switching behavior
- Positive temperature coefficient on V_F

Typical Applications

- Switch mode power supplies (SMPS)
- Server/telecom power supplies
- Industrial power supplies
- Solar
- UPS

Benefits

- Higher system level efficiency
- Increase system power density
- Reduction of heat sink requirements
- Parallel devices without thermal runaway

Maximum Ratings (T_C = 25 °C Unless Otherwise Specified)

Parameter	Symbol	Value	Unit	Test Conditions	Note
Repetitive Peak Reverse Voltage	V_{RRM}	650	V		
DC Blocking Voltage	V_{DC}	650			
Continuous Forward Current	I_F	16	A	T_C = 25 °C	Fig. 3
		8		T_C = 125 °C	
		4		T_C = 155 °C	
Repetitive Peak Forward Surge Current	I_{FRM}	17		T_C = 25 °C, t_P = 10 ms, Half Sine Wave	
		11		T_C = 110 °C, t_P = 10 ms, Half Sine Wave	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	29		T_C = 25 °C, t_P = 10 ms, Half Sine Wave	Fig. 8
		25		T_C = 110 °C, t_P = 10 ms, Half Sine Wave	
	$I_{F, Max}$	261		T_C = 25 °C, t_P = 10 µs, Pulse	Fig. 8
		180		T_C = 110 °C, t_P = 10 µs, Pulse	
Power Dissipation	P_{tot}	52	W	T_C = 25 °C	Fig. 4
		22		T_C = 110 °C	
Operating Junction and Storage Temperature	T_J, T_{stg}	-55 to +175	°C		

Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Note
Forward Voltage	V_F	1.27	1.50	V	I_F = 4 A, T_J = 25 °C	Fig. 1
		1.37	1.60		I_F = 4 A, T_J = 175 °C	
Reverse Current	I_R	2	20	µA	V_R = 650 V, T_J = 25 °C	Fig. 2
		12	80		V_R = 650 V, T_J = 175 °C	
Total Capacitive Charge	Q_C	16		nC	V_R = 400 V, T_J = 25 °C	Fig. 5
Total Capacitance	C	256		pF	V_R = 0 V, T_J = 25 °C, f = 1 MHz	Fig. 6
		32			V_R = 200 V, T_J = 25 °C, f = 1 MHz	
		27			V_R = 400 V, T_J = 25 °C, f = 1 MHz	
Capacitance Stored Energy	E_C	2.6		µJ	V_R = 400 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	$R_{\theta JC}$	2.89	°C/W	Fig. 9

Typical Performance

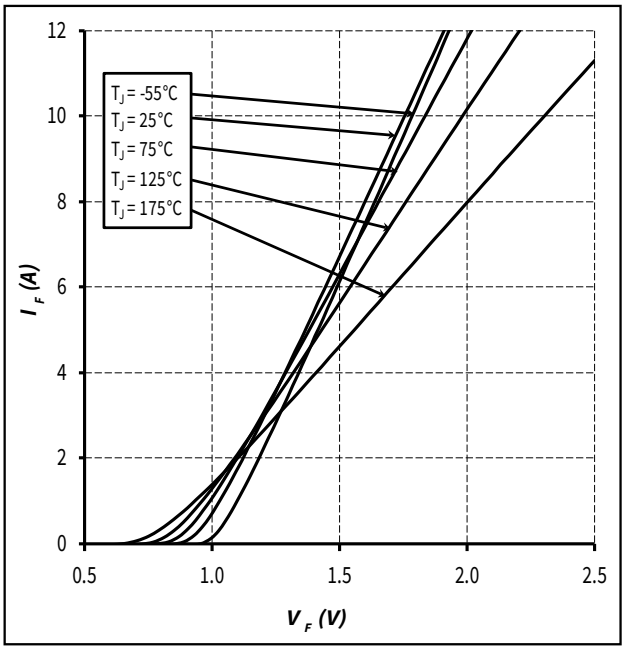


Figure 1. Forward Characteristics

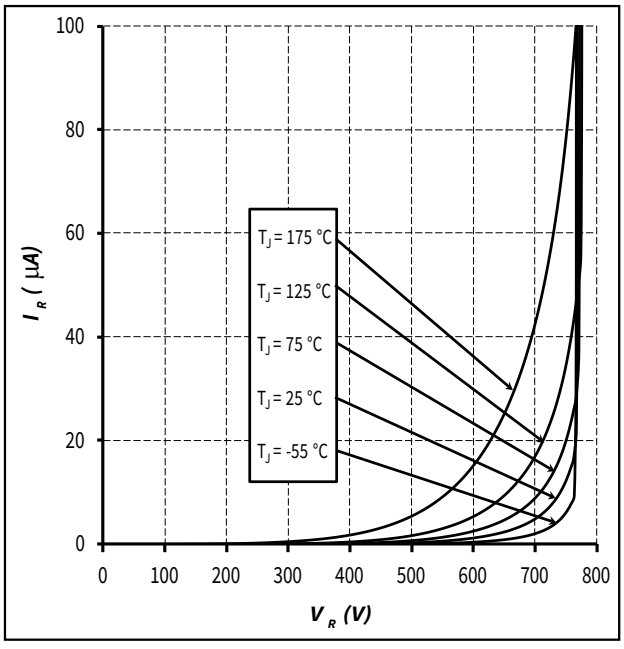


Figure 2. Reverse Characteristics

Typical Performance

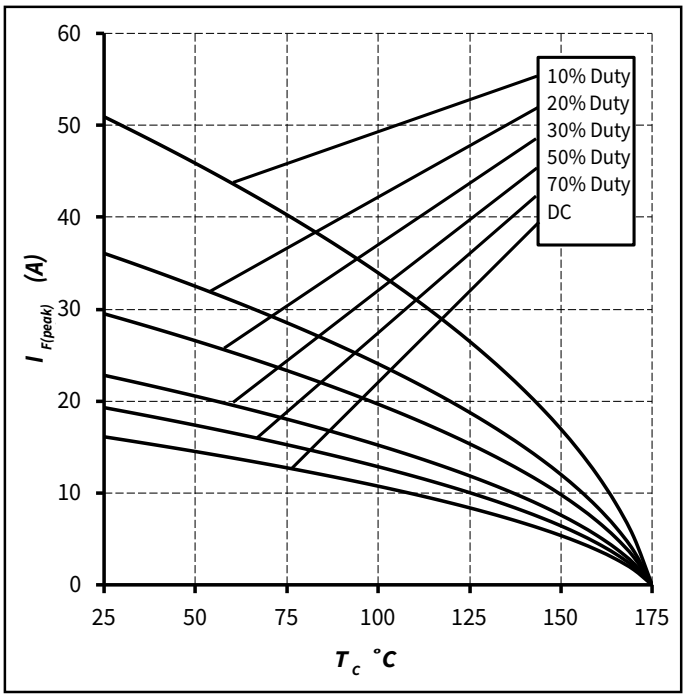


Figure 3. Current Derating

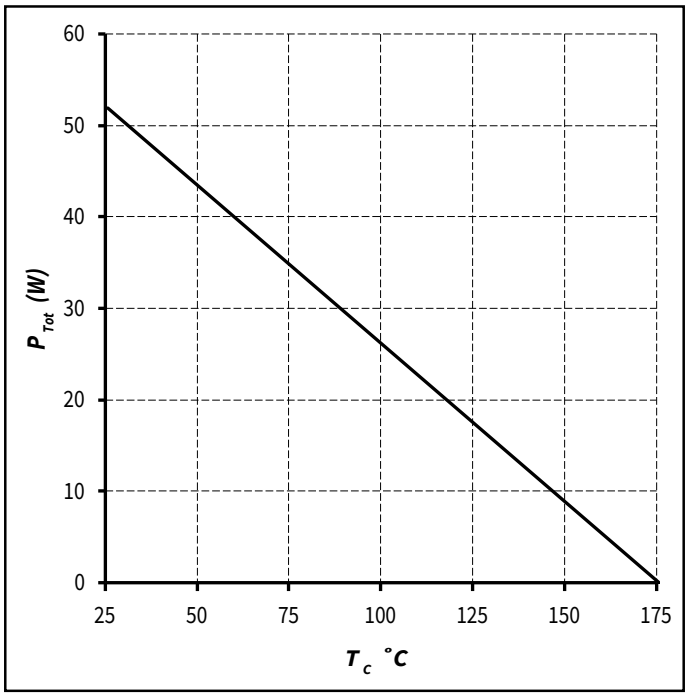


Figure 4. Power Derating

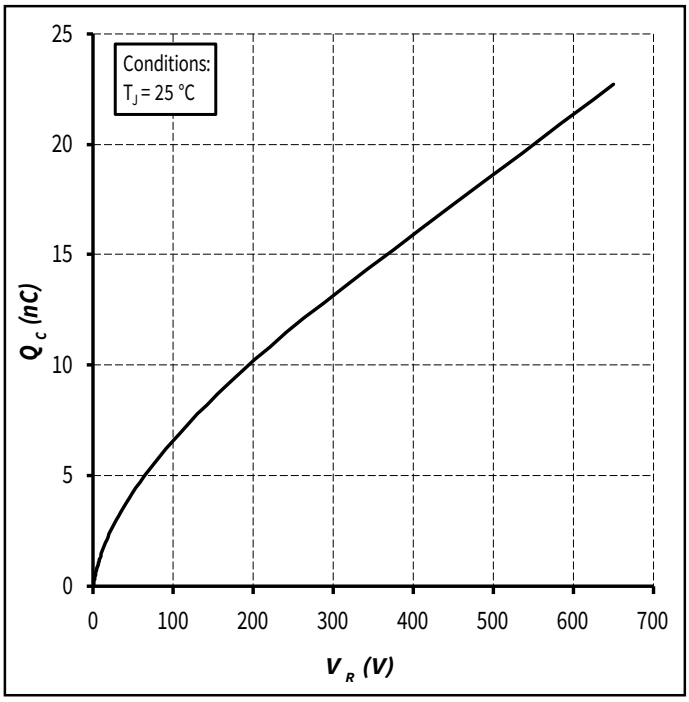


Figure 5. Total Capacitance Charge vs. Reverse Voltage

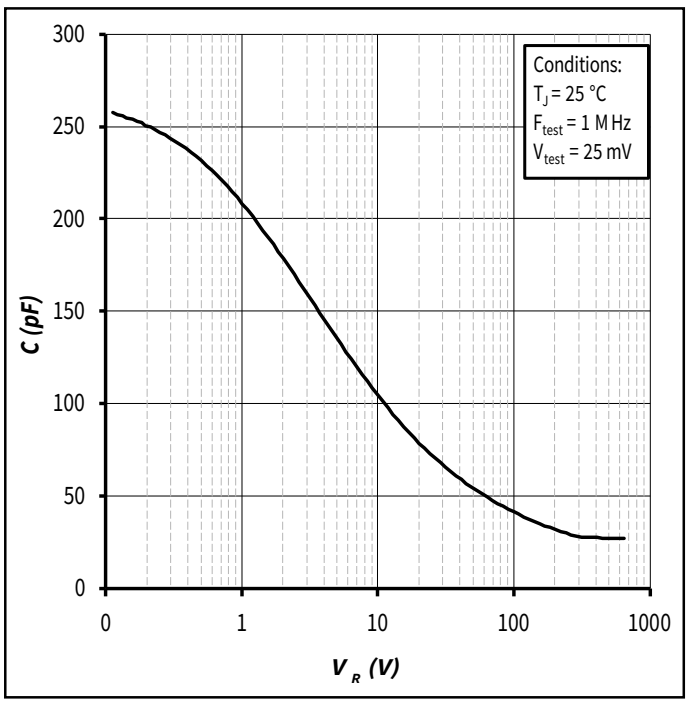


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

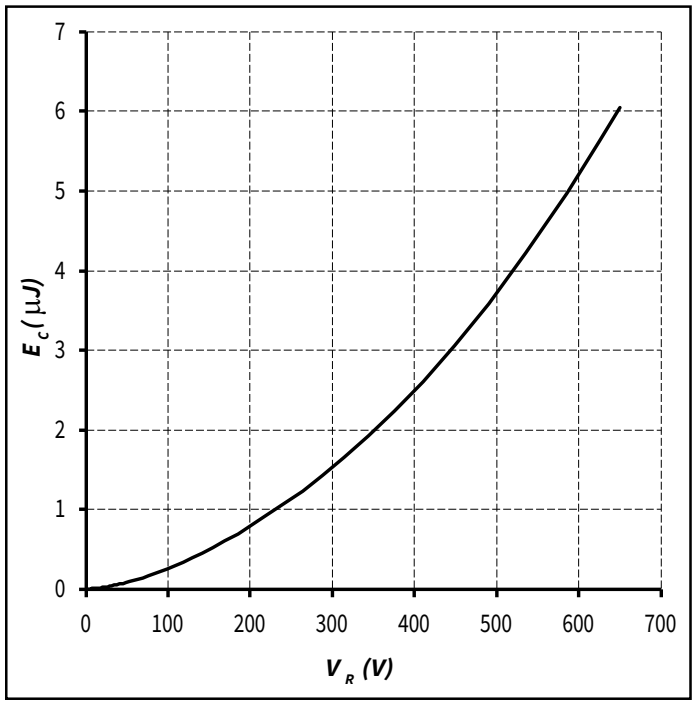


Figure 7. Capacitance Stored Energy

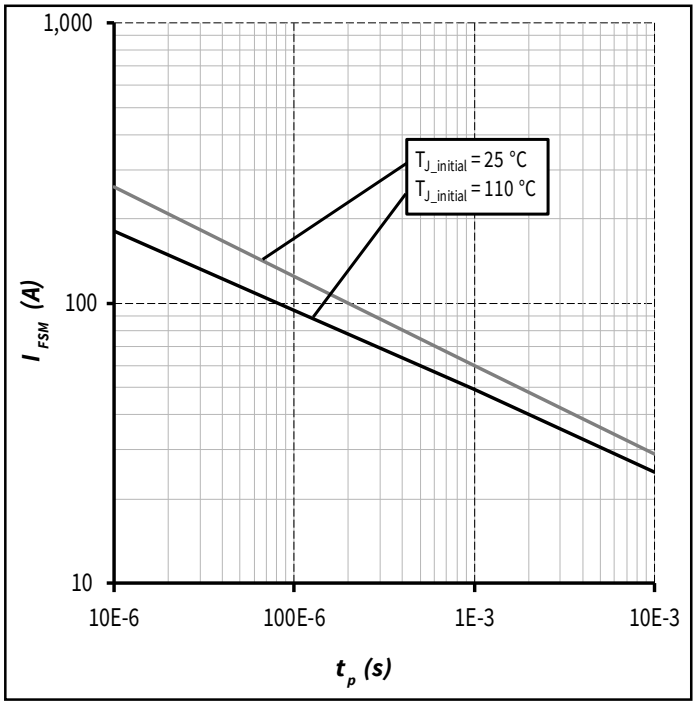


Figure 8. Non-Repetitive Peak Forward Surge Current Versus Pulse Duration (Sinusoidal Waveform)

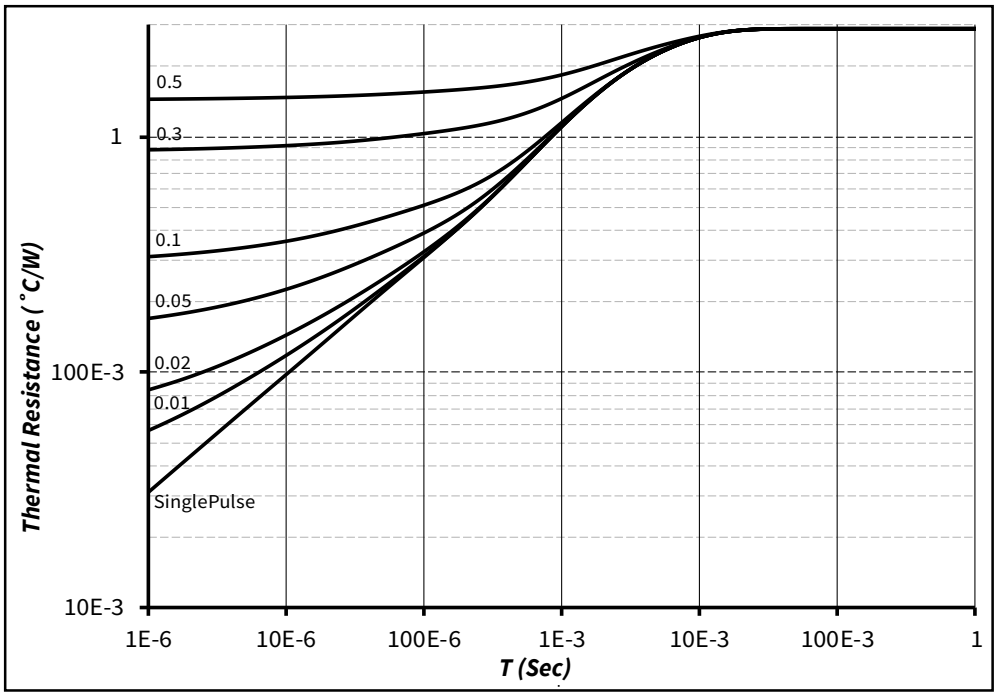
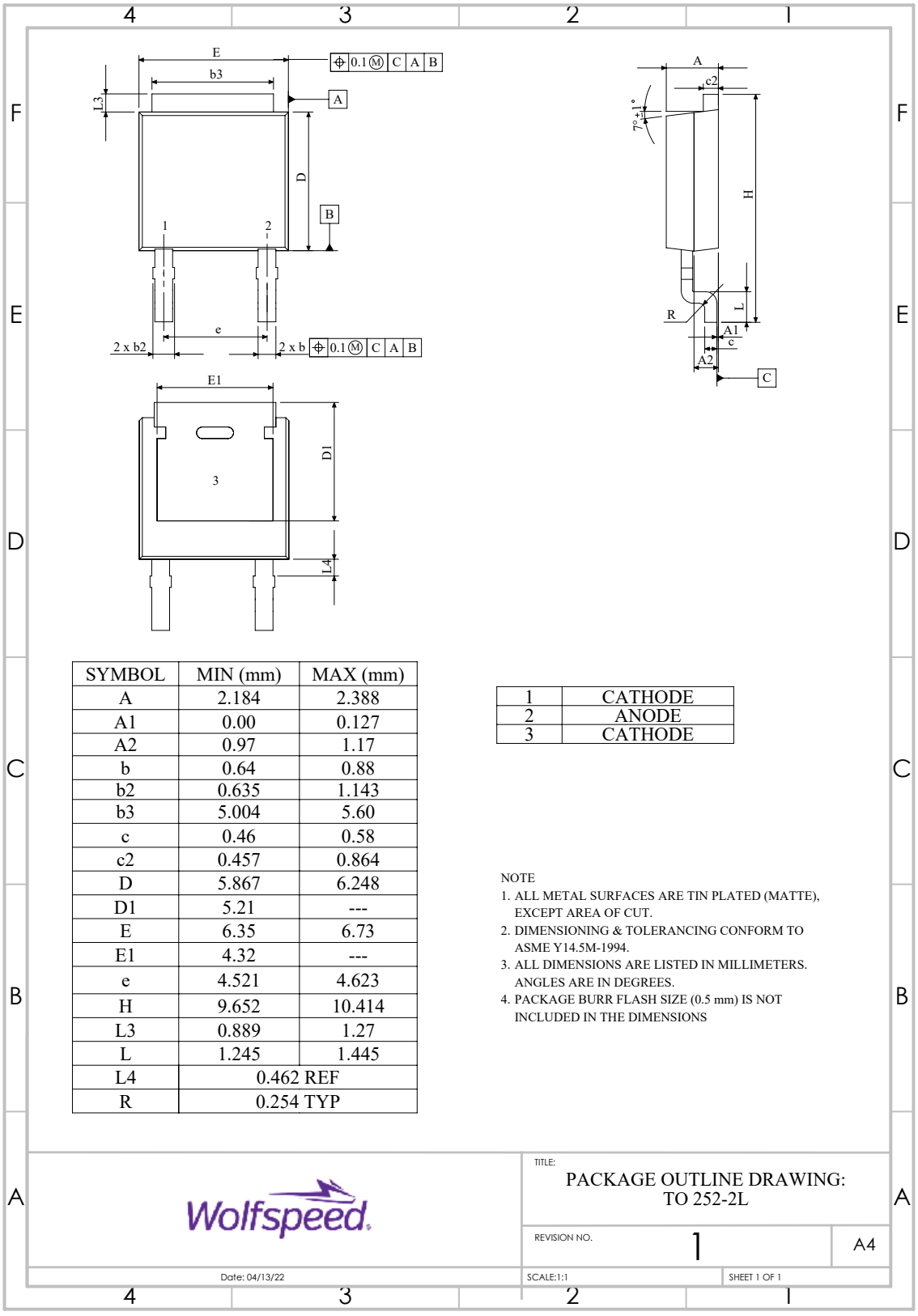


Figure 9. Transient Thermal Impedance

Package Dimensions

Package: TO-252-2



SYMBOL	MIN (mm)	MAX (mm)
A	2.184	2.388
A1	0.00	0.127
A2	0.97	1.17
b	0.64	0.88
b2	0.635	1.143
b3	5.004	5.60
c	0.46	0.58
c2	0.457	0.864
D	5.867	6.248
D1	5.21	---
E	6.35	6.73
E1	4.32	---
e	4.521	4.623
H	9.652	10.414
L3	0.889	1.27
L	1.245	1.445
L4	0.462 REF	
R	0.254 TYP	

1	CATHODE
2	ANODE
3	CATHODE

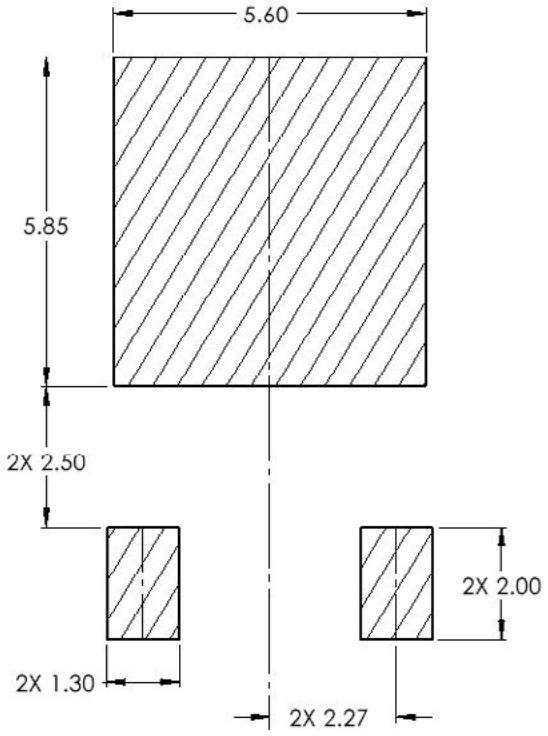
NOTE
1. ALL METAL SURFACES ARE TIN PLATED (MATTE), EXCEPT AREA OF CUT.
2. DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE LISTED IN MILLIMETERS. ANGLES ARE IN DEGREES.
4. PACKAGE BURR FLASH SIZE (0.5 mm) IS NOT INCLUDED IN THE DIMENSIONS

TITLE: PACKAGE OUTLINE DRAWING: TO 252-2L

REVISION NO. 1 | A4

Date: 04/13/22 | SCALE:1:1 | SHEET 1 OF 1

Recommended Solder Pad Layout



Part Number	Package	Marking
C6D04065E	TO-252-2	C6D04065

Revision History

Current Revision	Date of Release	Description of Changes
2	September-2023	Updated Wolfspeed branding, package drawing, and solder pad layout
3	October-2023	Corrected solder pad layout, removed incorrect diode model
4	November - 2024	Legal Disclaimer

Notes & Disclaimer

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