

C6D06065E

650 V, 6 A, Silicon Carbide Schottky Diode

Features

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



TO-252-2



Package Types: TO-252-2

Marking: C6D06065

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.

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 ($T_C = 25\text{ }^\circ\text{C}$ 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 | 23 | A | $T_C = 25\text{ }^\circ\text{C}$ | Fig. 3 |
| | | 12 | | $T_C = 125\text{ }^\circ\text{C}$ | |
| | | 6 | | $T_C = 155\text{ }^\circ\text{C}$ | |
| Repetitive Peak Forward Surge Current | I_{FRM} | 25 | A | $T_C = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave | Fig. 8 |
| | | 15 | | $T_C = 110\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave | |
| Non-Repetitive Peak Forward Surge Current | I_{FSM} | 46 | A | $T_C = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave | Fig. 8 |
| | | 42 | | $T_C = 110\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave | |
| | $I_{F,Max}$ | 472 | | $T_C = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ }\mu\text{s}$, Pulse | Fig. 8 |
| | | 427 | | $T_C = 110\text{ }^\circ\text{C}$, $t_p = 10\text{ }\mu\text{s}$, Pulse | |
| Power Dissipation | P_{tot} | 68 | W | $T_C = 25\text{ }^\circ\text{C}$ | Fig. 4 |
| | | 30 | | $T_C = 110\text{ }^\circ\text{C}$ | |
| 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 | 1.27 | 1.50 | V | $I_F = 6 \text{ A}, T_J = 25^\circ\text{C}$ | Fig. 1 |
| | | 1.37 | 1.60 | | $I_F = 6 \text{ A}, T_J = 175^\circ\text{C}$ | |
| Reverse Current | I_R | 2 | 30 | μA | $V_R = 650 \text{ V}, T_J = 25^\circ\text{C}$ | Fig. 2 |
| | | 15 | 120 | | $V_R = 650 \text{ V}, T_J = 175^\circ\text{C}$ | |
| Total Capacitive Charge | Q_C | 23 | | nC | $V_R = 400 \text{ V}, T_J = 25^\circ\text{C}$ | Fig. 5 |
| Total Capacitance | C | 394 | | pF | $V_R = 0 \text{ V}, T_J = 25^\circ\text{C}, f = 1 \text{ MHz}$ | Fig. 6 |
| | | 44 | | | $V_R = 200 \text{ V}, T_J = 25^\circ\text{C}, f = 1 \text{ MHz}$ | |
| | | 37 | | | $V_R = 400 \text{ V}, T_J = 25^\circ\text{C}, f = 1 \text{ MHz}$ | |
| Capacitance Stored Energy | E_C | 3.5 | | μJ | $V_R = 400 \text{ V}$ | 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 | $R_{\theta JC}$ | 2.19 | $^\circ\text{C/W}$ | Fig. 9 |

Typical Performance

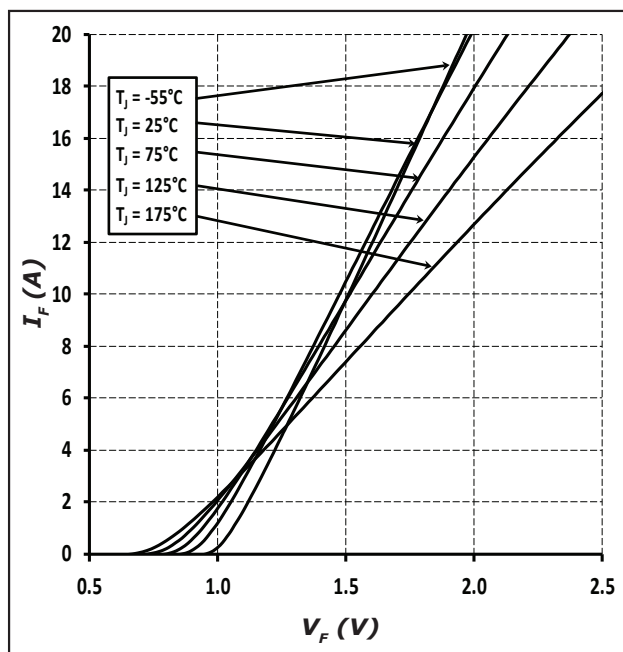


Figure 1. Forward Characteristics

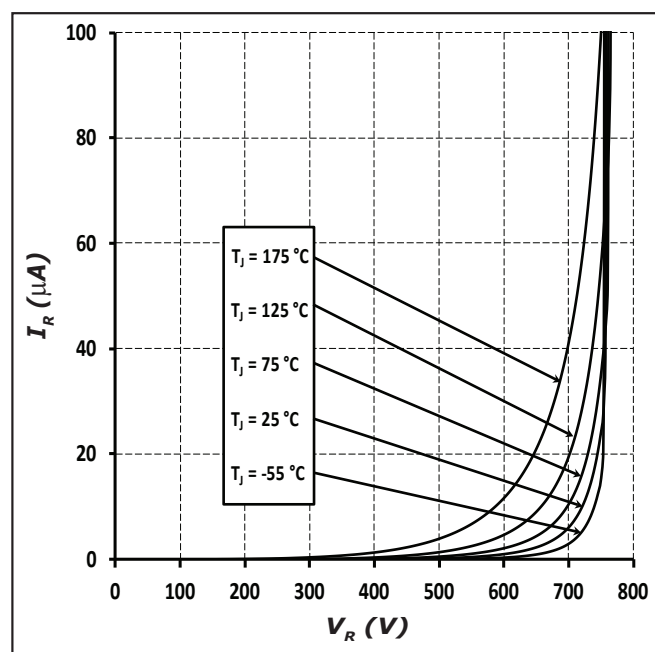


Figure 2. Reverse Characteristics



Typical Performance

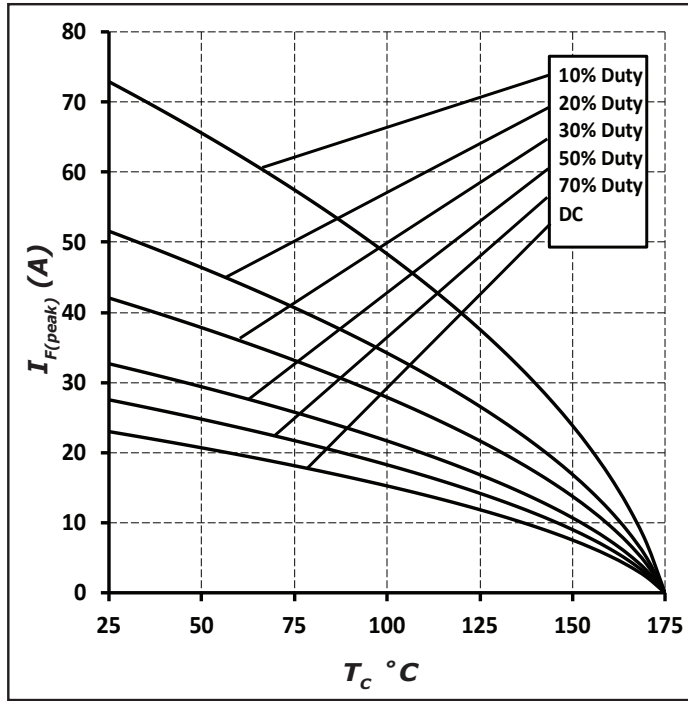


Figure 3. Current Derating

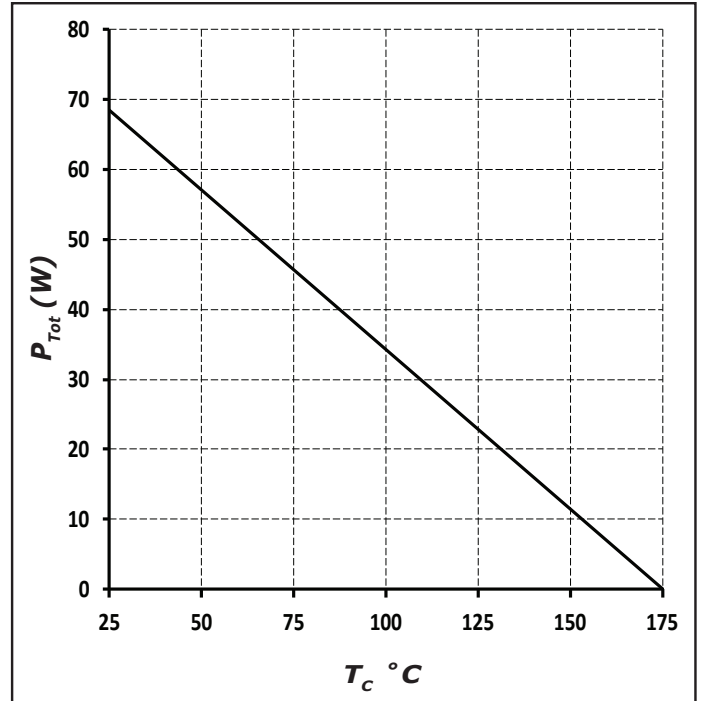


Figure 4. Power Derating

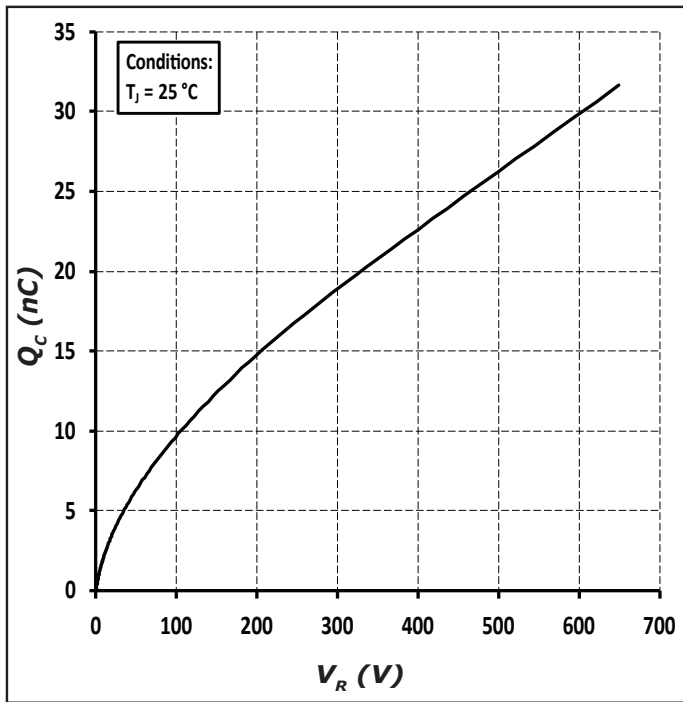


Figure 5. Total Capacitance Charge vs. Reverse Voltage

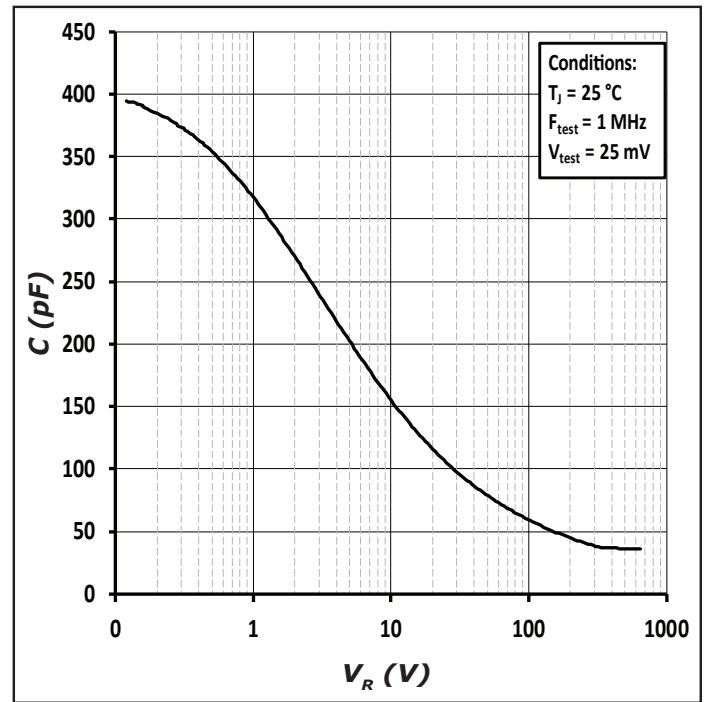


Figure 6. Capacitance vs. Reverse Voltage



Typical Performance

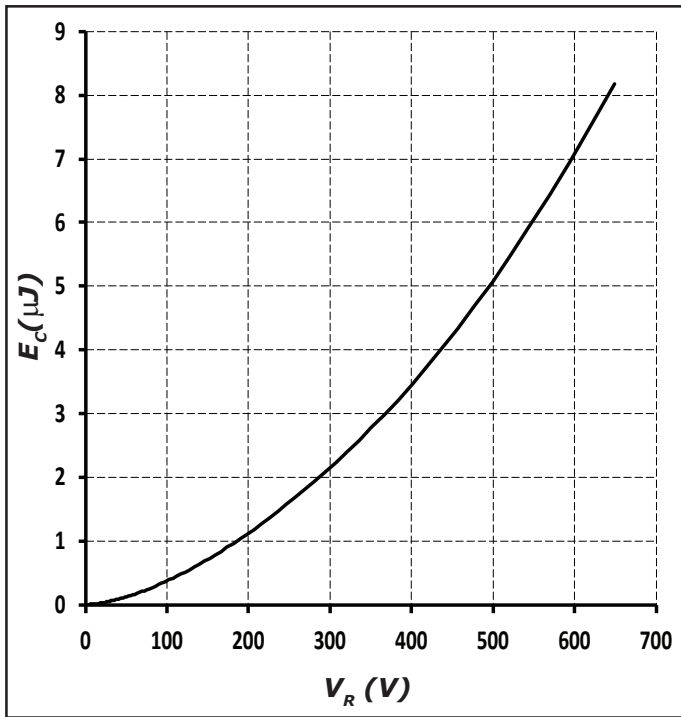


Figure 7. Capacitance Stored Energy

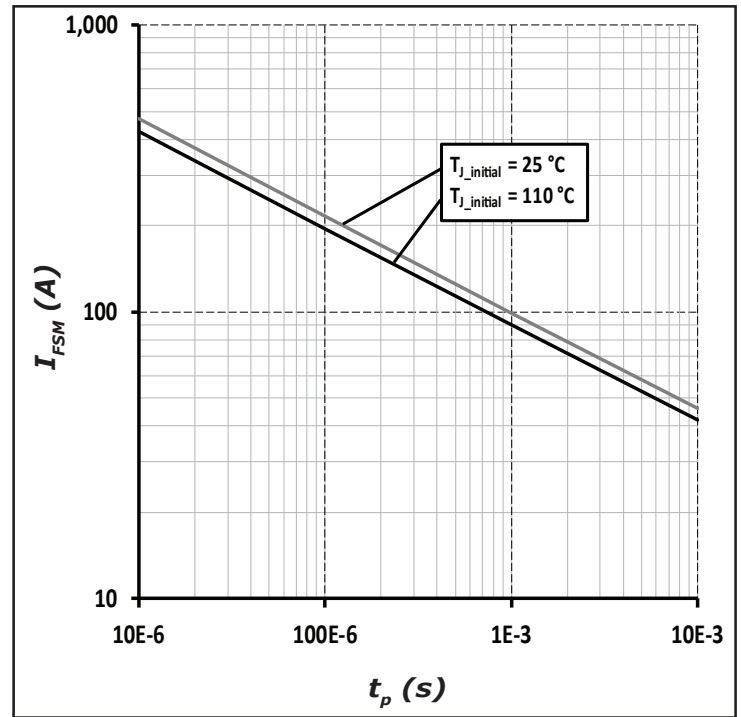


Figure 8. Non-Repetitive Peak Forward Surge Current Versus Pulse Duration (Sinusoidal Waveform)

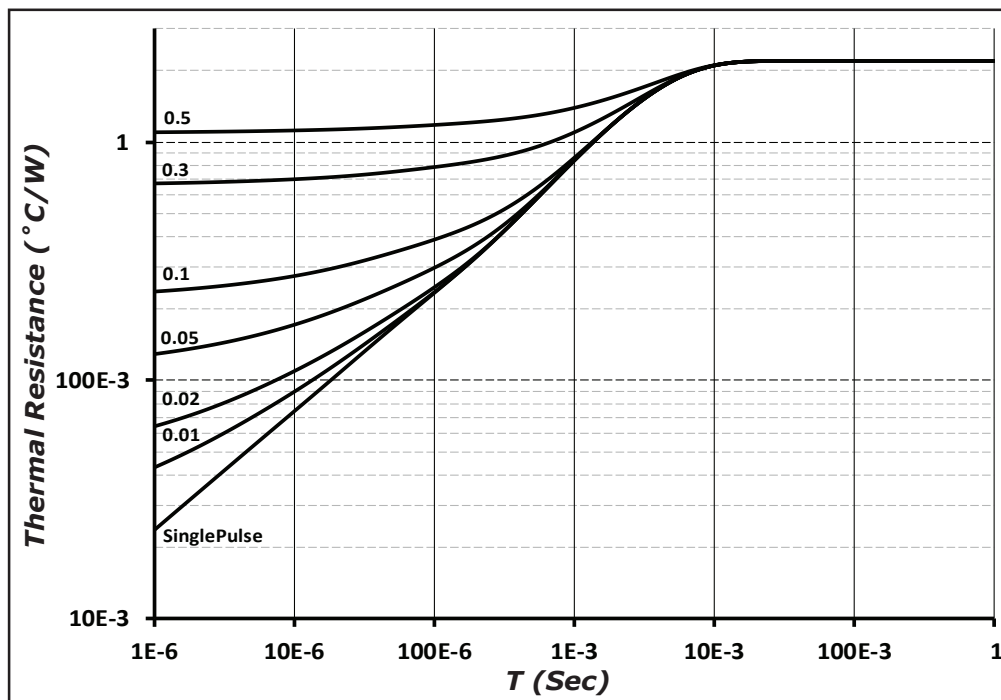
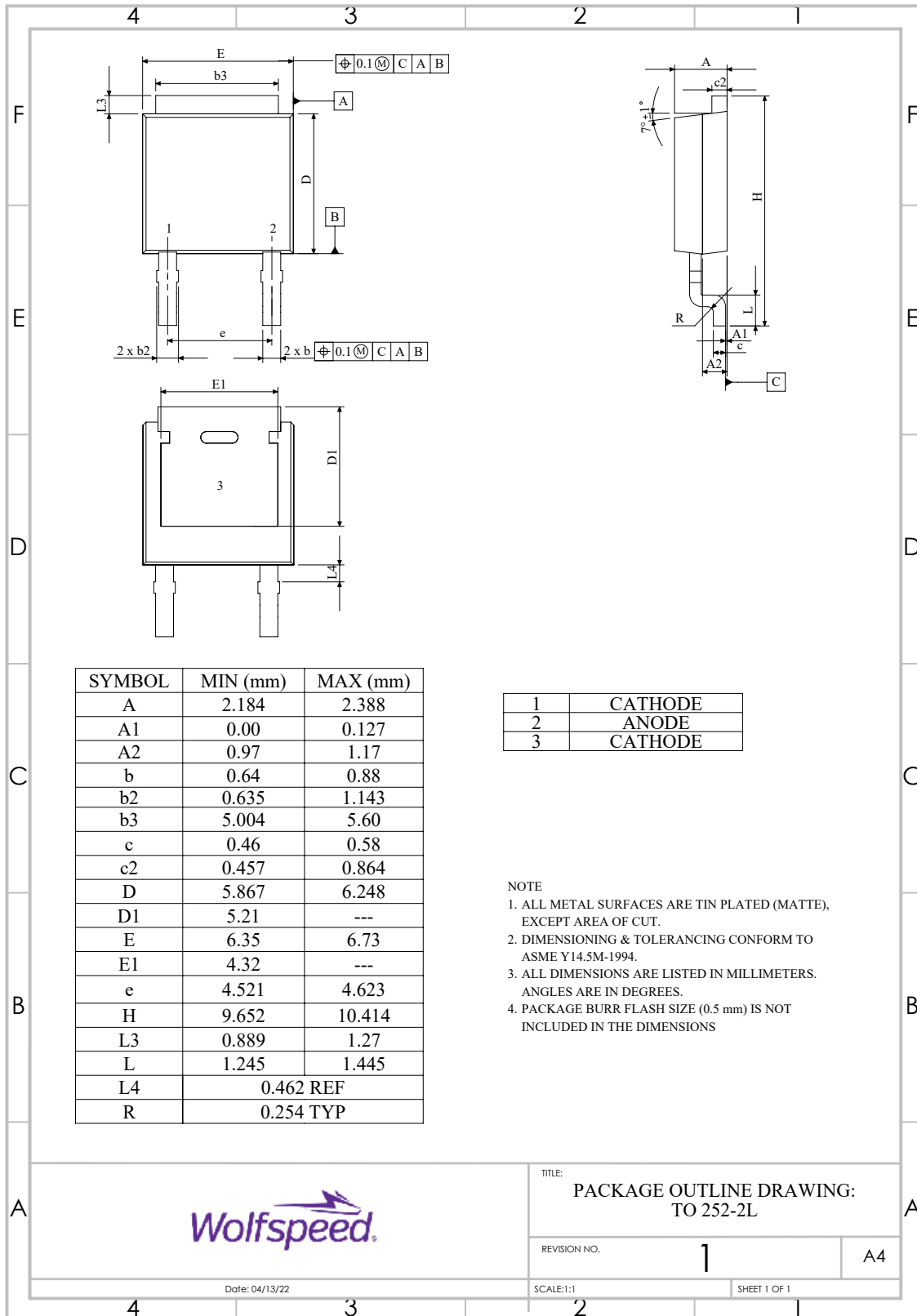


Figure 9. Transient Thermal Impedance



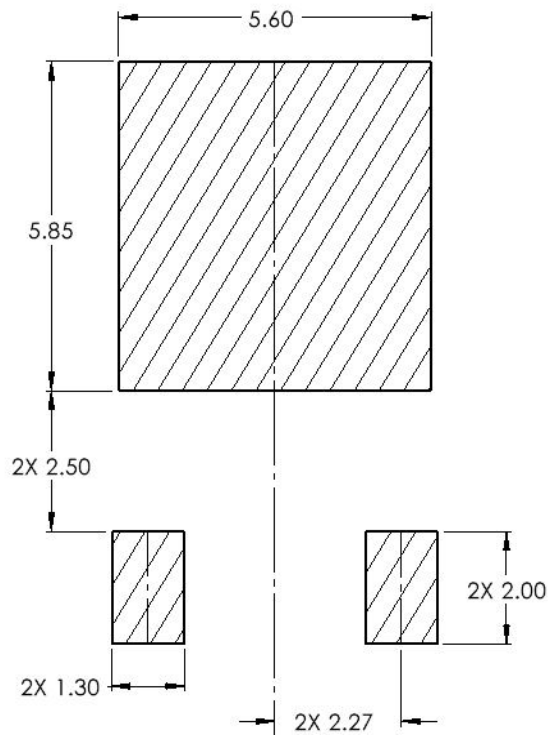
Package Dimensions

Package: TO-252-2





Recommended Solder Pad Layout



| Part Number | Package | Marking |
|-------------|----------|----------|
| C6D06065E | TO-252-2 | C6D06065 |



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 |



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