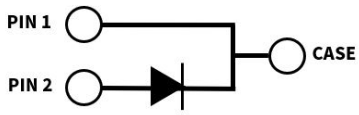
# THE DATASHEET OF

# C3D08060G-TR

# C3D08060G

## 600 V, 8 A Silicon Carbide Schottky Diode

TO-263-2




Package Types: TO-263-2
PN: C3D08060G

### Features

- 600-Volt Schottky rectifier
- Zero reverse recovery current
- Zero forward recovery voltage
- High-frequency operation
- Temperature-independent switching behavior
- Extremely fast switching
- Positive temperature coefficient on $V_F$

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)
- Boost diodes in PFC or DC/DC stages
- Free wheeling diodes in inverter stages
- AC/DC converters

### Benefits

- Replace bipolar with unipolar rectifiers
- Essentially no switching losses
- Higher efficiency
- 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 | $V_{RRM}$ | 600 | V | | |
| Surge Peak Reverse Voltage | $V_{RSM}$ | 600 | | | |
| DC Blocking Voltage | $V_{DC}$ | 600 | | | |
| Continuous Forward Current | $I_F$ | 24 | A | $T_C$ = 25 °C | Fig. 3 |
| | | 11 | | $T_C$ = 135 °C | |
| | | 8 | | $T_C$ = 152 °C | |
| Repetitive Peak Forward Surge Current | $I_{FRM}$ | 36.5 | | $T_C$ = 25 °C, $t_P$ = 10 ms, Half Sine Wave | |
| | | 25.5 | | $T_C$ = 110 °C, $t_P$ = 10 ms, Half Sine Wave | |
| Non-Repetitive Peak Forward Surge Current | $I_{FSM}$ | 71 | | $T_C$ = 25 °C, $t_P$ = 10 ms, Half Sine Wave | Fig. 8 |
| | | 60 | | $T_C$ = 110 °C, $t_P$ = 10 ms, Half Sine Wave | |
| Non-Repetitive Peak Forward Surge Current | $I_{FSM}$ | 650 | | $T_C$ = 25 °C, $t_P$ = 10 µs, Pulse | Fig. 8 |
| | | 530 | | $T_C$ = 110 °C, $t_P$ = 10 µs, Pulse | |
| Power Dissipation | $P_{tot}$ | 107 | W | $T_C$ = 25 °C | Fig. 4 |
| | | 46.5 | | $T_C$ = 110 °C | |
| Diode dV/dt Ruggedness | dV/dt | 200 | V/ns | $V_R$ = 0-600 V | |
| i²t Value | $\int i^2dt$ | 25 | $A^2s$ | $T_C$ = 25 °C, $t_P$ = 10 ms | |
| | | 18 | | $T_C$ = 110 °C, $t_P$ = 10 ms | |
| 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 | $V_F$ | 1.5 | 1.8 | V | $I_F$ = 8 A, $T_J$ = 25 °C | Fig. 1 |
| | | 2.1 | 2.4 | | $I_F$ = 8 A, $T_J$ = 175 °C | |
| Reverse Current | $I_R$ | 8.5 | 42.5 | µA | $V_R$ = 600 V, $T_J$ = 25 °C | Fig. 2 |
| | | 17 | 170 | | $V_R$ = 600 V, $T_J$ = 175 °C | |
| Total Capacitive Charge | $Q_C$ | 20 | | nC | $V_R$ = 400 V, $I_F$ = 8 A<br>di/dt = 500 A/µS<br>$T_J$ = 25 °C | Fig. 5 |
| Total Capacitance | C | 395 | | pF | $V_R$ = 0 V, $T_J$ = 25 °C, f = 1 MHz | Fig. 6 |
| | | 37 | | | $V_R$ = 200 V, $T_J$ = 25 °C, f = 1 MHz | |
| | | 32 | | | $V_R$ = 400 V, $T_J$ = 25 °C, f = 1 MHz | |
| Capacitance Stored Energy | $E_C$ | 3.0 | | 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 | $R_{\theta JC}$ | 1.4 | °C/W | Fig. 9 |

## Typical Performance

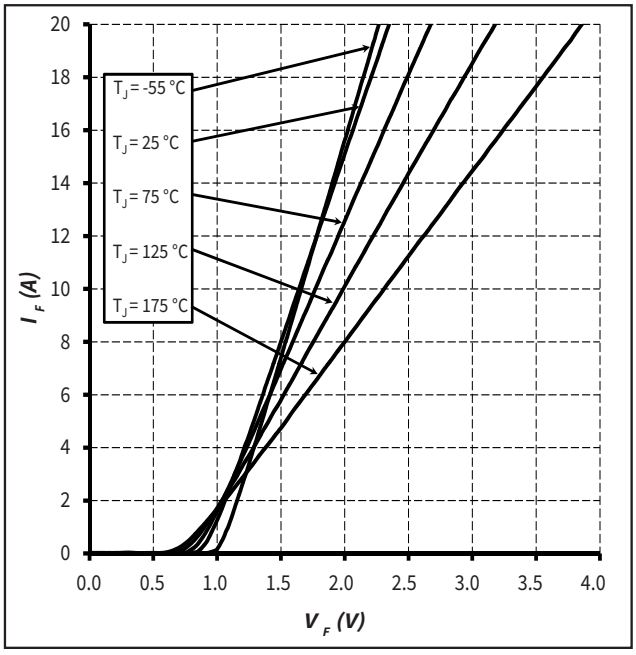



Figure 1. Forward Characteristics

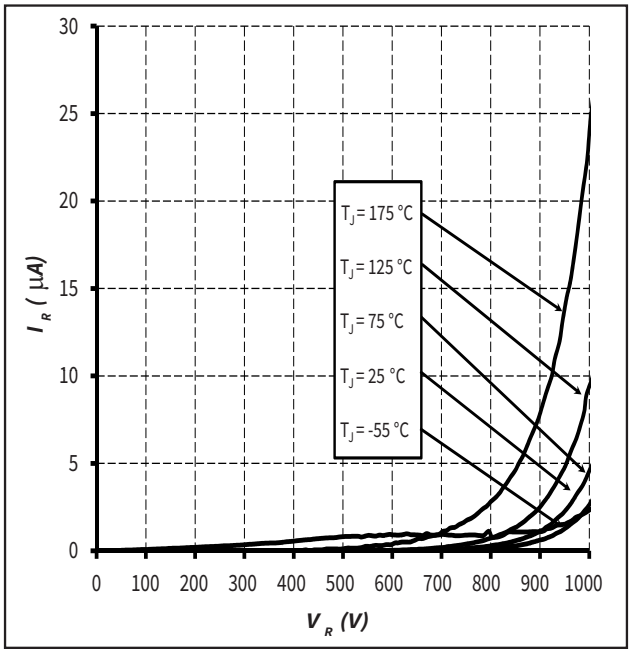



Figure 2. Reverse Characteristics

## Typical Performance

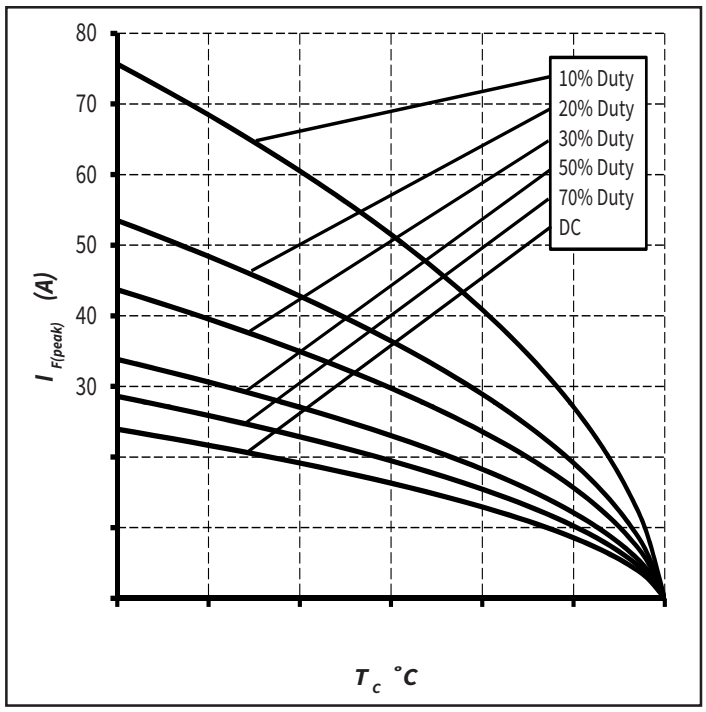



Figure 3. Current Derating

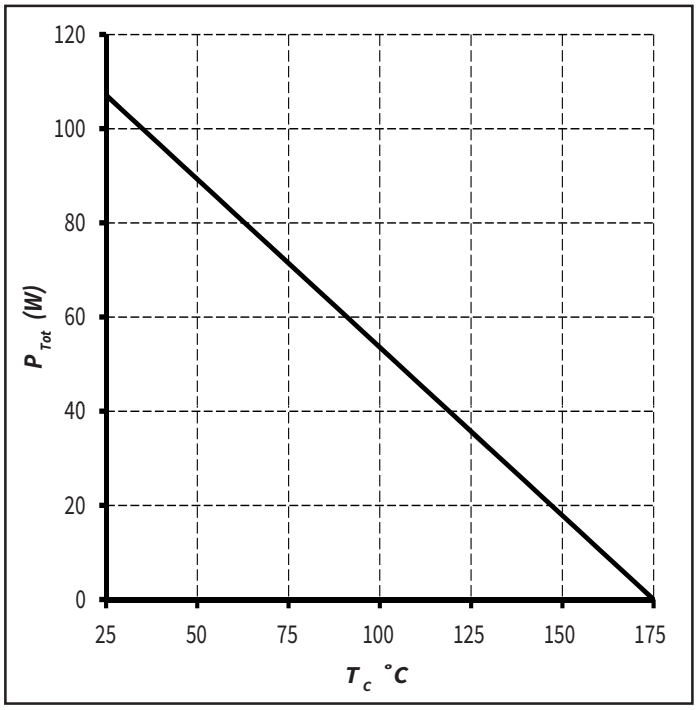



Figure 4. Power Derating

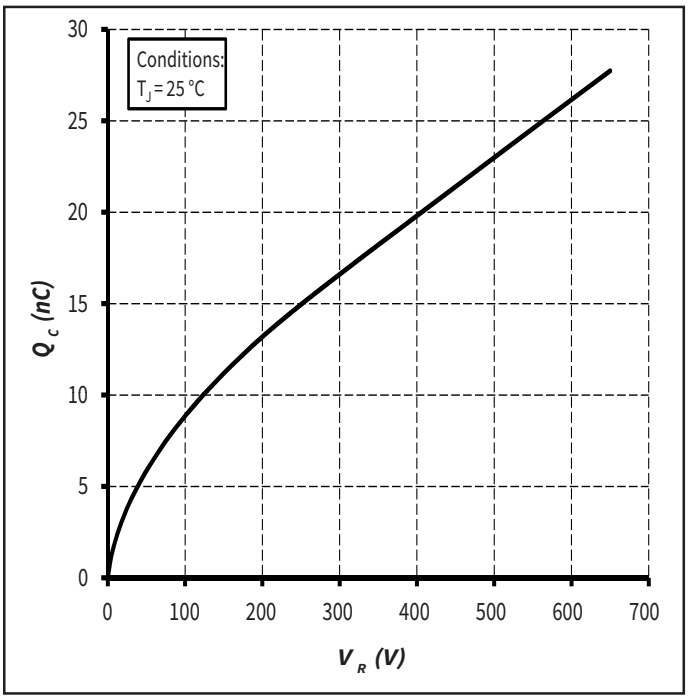



Figure 5. Total Capacitance Charge vs. Reverse Voltage

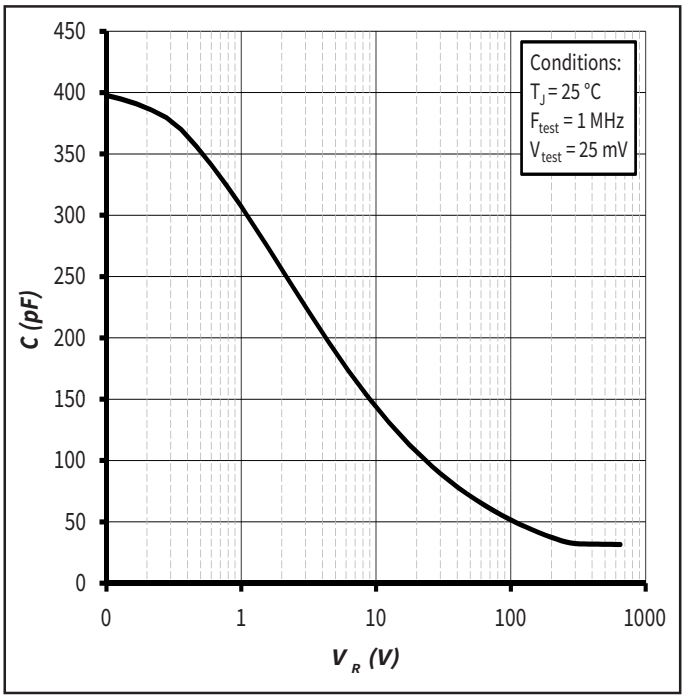



Figure 6. Capacitance vs. Reverse Voltage

## Typical Performance

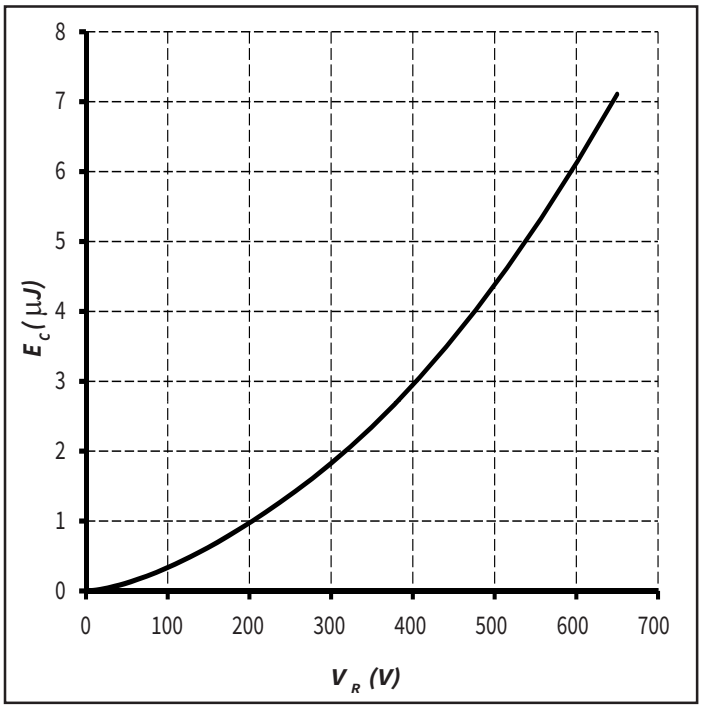



Figure 7. Capacitance Stored Energy

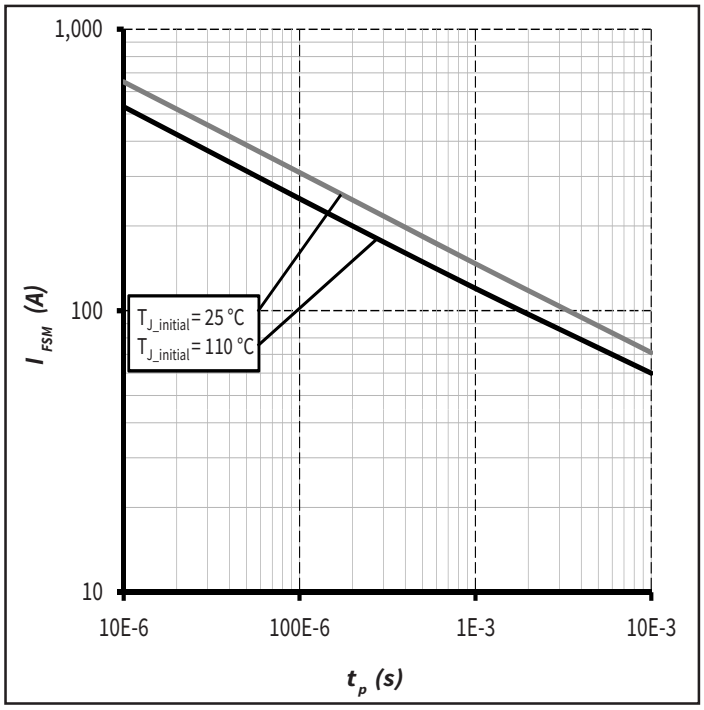



Figure 8. Non-Repetitive Peak Forward Surge Current Versus Pulse Duration (Sinusoidal Waveform)

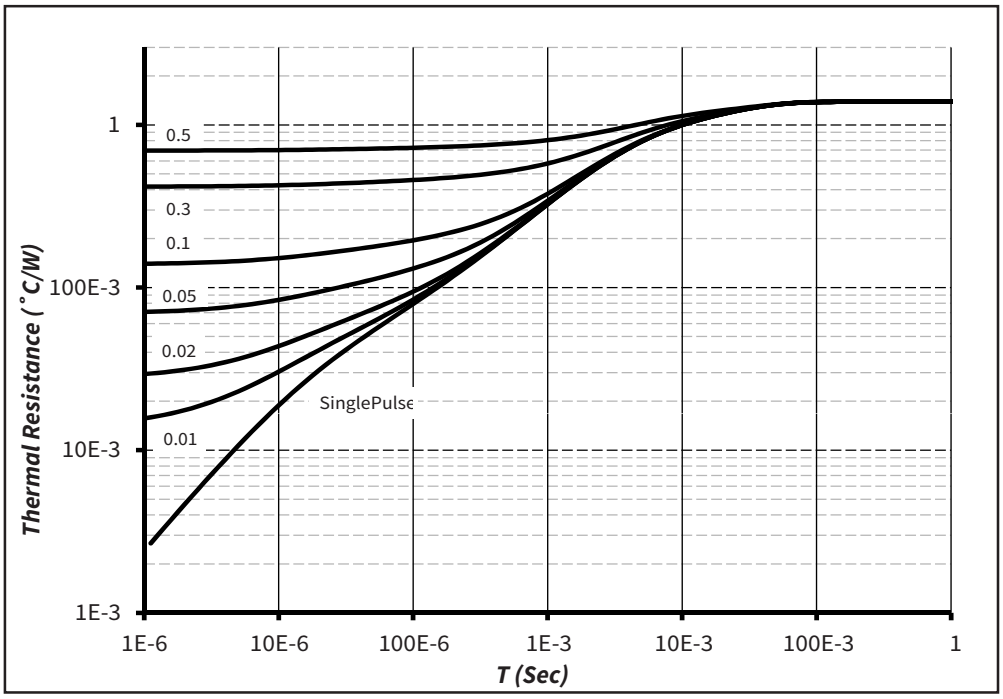
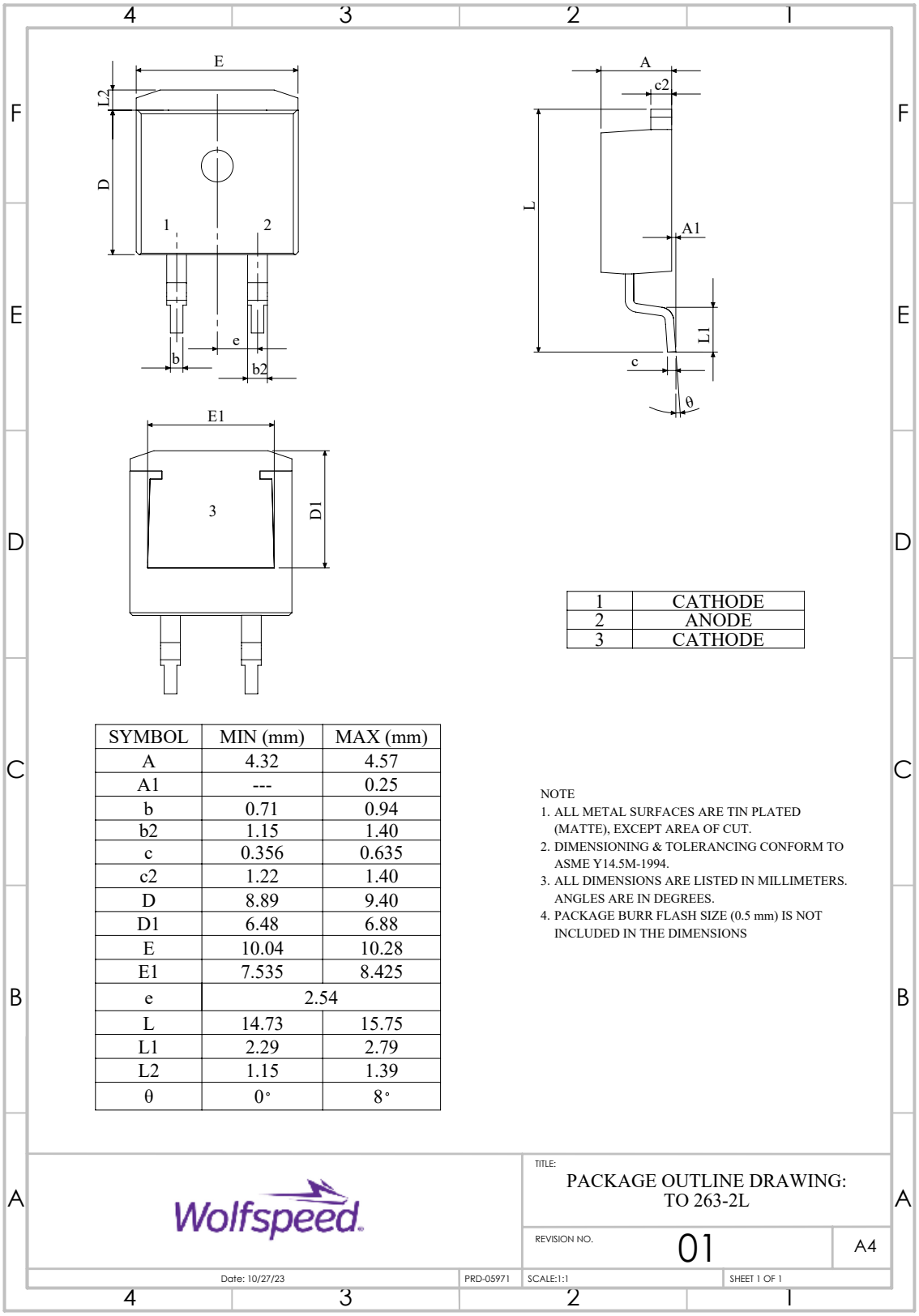



Figure 9. Transient Thermal Impedance

## Package Dimensions

Package: TO-263-2




| | |
|---|---|
| 1 | CATHODE |
| 2 | ANODE |
| 3 | CATHODE |

| SYMBOL | MIN (mm) | MAX (mm) |
|---|---|---|
| A | 4.32 | 4.57 |
| A1 | --- | 0.25 |
| b | 0.71 | 0.94 |
| b2 | 1.15 | 1.40 |
| c | 0.356 | 0.635 |
| c2 | 1.22 | 1.40 |
| D | 8.89 | 9.40 |
| D1 | 6.48 | 6.88 |
| E | 10.04 | 10.28 |
| E1 | 7.535 | 8.425 |
| e | 2.54 | |
| L | 14.73 | 15.75 |
| L1 | 2.29 | 2.79 |
| L2 | 1.15 | 1.39 |
| θ | 0° | 8° |

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

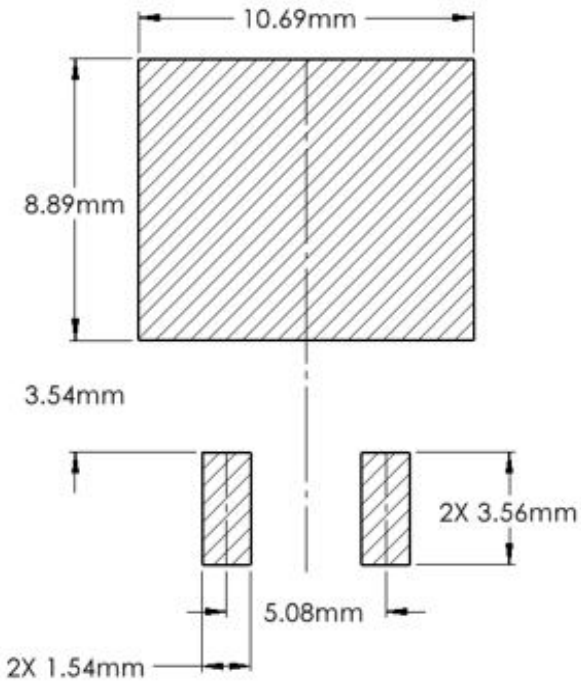
Wolfspeed

TITLE: PACKAGE OUTLINE DRAWING: TO 263-2L

REVISION NO. 01 | A4

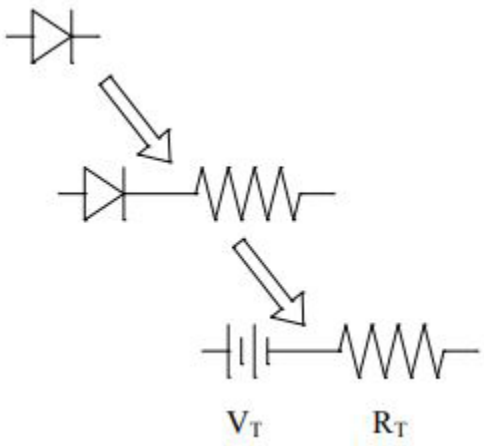
Date: 10/27/23 | PRD-05971 | SCALE:1:1 | SHEET 1 OF 1

## Recommended Solder Pad Layout




| Part Number | Package | Marking |
|---|---|---|
| C3D08060G | TO-263-2 | C3D08060 |

## Diode Model




$$Vf_T = V_T + If * R_T$$

$$V_T = 0.95 + (T_J * -1.2 * 10^{-3})$$
$$R_T = 0.054 + (T_J * 5.5 * 10^{-4})$$

**Note: $T_J$ = Diode Junction Temperature In Degrees Celsius valid from 25°C to 175°C**

## Revision History

| Current Revision | Date of Release | Description of Changes |
|---|---|---|
| H | January-2018 | Initial Release |
| 11 | October-2023 | Updated Wolfspeed branding, package drawing, package image, and solder pad layout (Not Released) |
| 12 | November-2023 | Corrected Package Drawing L and L1 |

## Notes & Disclaimer

This document and the information contained herein are subject to change without notice. Any such change shall be evidenced by the publication of an updated version of this document by Wolfspeed. No communication from any employee or agent of Wolfspeed or any third party shall effect an amendment or modification of this document. No responsibility is assumed by Wolfspeed for any infringement of patents or other rights of third parties which may result from use of the information contained herein. No license is granted by implication or otherwise under any patent or patent rights of Wolfspeed.

Notwithstanding any application-specific information, guidance, assistance, or support that Wolfspeed may provide, the buyer of this product is solely responsible for determining the suitability of this product for the buyer's purposes, including without limitation for use in the applications identified in the next bullet point, and for the compliance of the buyers' products, including those that incorporate this product, with all applicable legal, regulatory, and safety-related requirements.

This product has not been designed or tested for use in, and is not intended for use in, applications in which failure of the product would reasonably be expected to cause death, personal injury, or property damage, including but not limited to equipment implanted into the human body, life-support machines, cardiac defibrillators, and similar emergency medical equipment, aircraft navigation, communication, and control systems, aircraft power and propulsion systems, air traffic control systems, and equipment used in the planning, construction, maintenance, or operation of nuclear facilities.

**RoHS Compliance**

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Wolfspeed representative or from the Product Documentation sections of www.wolfspeed.com.

**REACh Compliance**

REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact your Wolfspeed representative to ensure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

**Contact info:**

4600 Silicon Drive
Durham, NC 27703 USA
Tel: +1.919.313.5300
www.wolfspeed.com/power





© 2023 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- View C3D08060G-TR on WIN SOURCE
- Cree/Wolfspeed Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

- Global Sourcing Solution
- Obsolete Management
- Cost Control Management
- Shortage Management
- Alternative Solution
- Excess Inventory Management