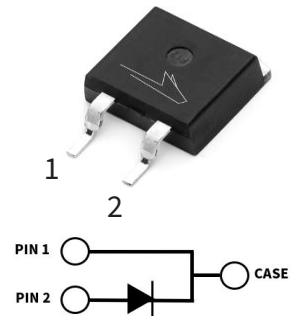


C6D20065G

6th Generation 650 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-263-2
Marking: C6D20065G

Features

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

Typical Applications

- Industrial Power Supplies
- Uninterruptible & AUX Power Supplies
- Switch Mode Power Supplies
- Solar Inverters
- Power Factor Correction
- Server/Telecom Power Supplies

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

| Parameter | Symbol | Value | Unit | Test Conditions | Notes |
|---|---------------|-------|----------------------|--|--------|
| Repetitive Peak Reverse Voltage | V_{RRM} | 650 | V | | |
| DC Blocking Voltage | V_{DC} | 650 | | | |
| Continuous Forward Current | I_F | 64 | A | $T_J = 25^\circ\text{C}$ | Fig. 3 |
| | | 32 | | $T_J = 125^\circ\text{C}$ | |
| | | 20 | | $T_J = 150^\circ\text{C}$ | |
| Repetitive Peak Forward Surge Current | I_{FRM} | 78 | A | $T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$ | Fig. 8 |
| | | 45 | | $T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$ | |
| Non-Repetitive Forward Surge Current | I_{FSM} | 135 | A | $T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$ | Fig. 8 |
| | | 111 | | $T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$ | |
| Non-Repetitive Peak Forward Surge Current | $I_{F,Max}$ | 1550 | A | $T_c = 25^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$ | |
| | | 1290 | | $T_c = 110^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$ | |
| Power Dissipation | P_{tot} | 163 | W | $T_J = 25^\circ\text{C}$ | Fig. 4 |
| | | 71 | | $T_J = 110^\circ\text{C}$ | |
| i^2t value | $\int i^2 dt$ | 91 | A^2s | $T_c = 25\text{C}, t_p = 10\text{ms}$ | |
| | | 62 | | $T_c = 110\text{C}, t_p = 10\text{ms}$ | |

Electrical Characteristics

| Parameter | Symbol | Typ. | Max. | Unit | Test Conditions | Notes |
|---------------------------|--------|------|------|---------------|---|--------|
| Forward Voltage | V_F | 1.27 | 1.50 | V | $I_F = 20 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$ | Fig. 1 |
| | | 1.37 | 1.60 | | $I_F = 20 \text{ A}, T_j = 175 \text{ }^\circ\text{C}$ | |
| Reverse Current | I_R | 5 | 30 | μA | $V_R = 650 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$ | Fig. 2 |
| | | 40 | 300 | | $V_R = 650 \text{ V}, T_j = 175 \text{ }^\circ\text{C}$ | |
| Total Capacitive Charge | Q_C | 62 | | nC | $V_R = 400 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$ | Fig. 5 |
| Total Capacitance | C | 1153 | | pF | $V_R = 0 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$ | Fig. 6 |
| | | 120 | | | $V_R = 200 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$ | |
| | | 96 | | | $V_R = 400 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$ | |
| Capacitance Stored Energy | E_C | 9.5 | | μJ | $V_R = 400 \text{ V}$ | 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) | $R_{\theta, JC (TYP)}$ | 0.76 | $^\circ\text{C} / \text{W}$ | |
| Junction Temperature | T_j | -55 to +175 | $^\circ\text{C}$ | |
| Case & Storage Temperature | T_c | -55 to +175 | | |

Electrostatic Discharge (ESD) Classifications

| Parameter | Symbol | Notes |
|---------------------|--------|------------------------------------|
| Human Body Model | HBM | Class 3B ($\geq 8000 \text{ V}$) |
| Charge Device Model | CDM | Class C3 ($\geq 1000 \text{ V}$) |

Typical Performance

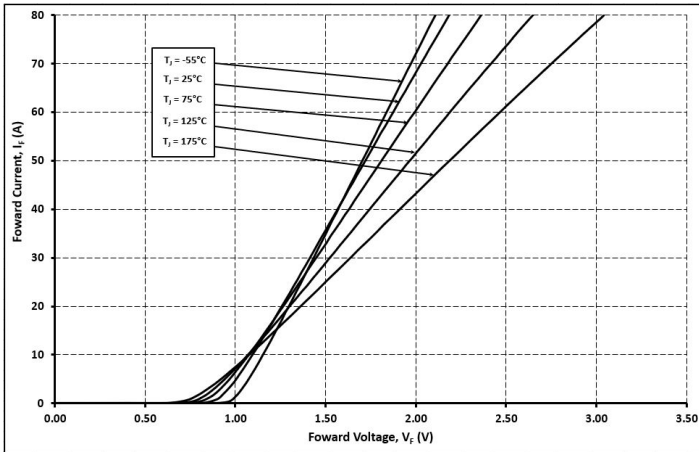


Figure 1
Forward Characteristics

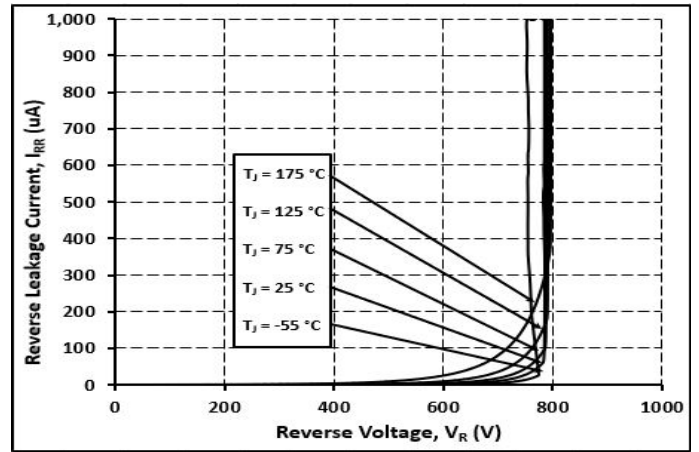


Figure 2
Reverse Characteristics

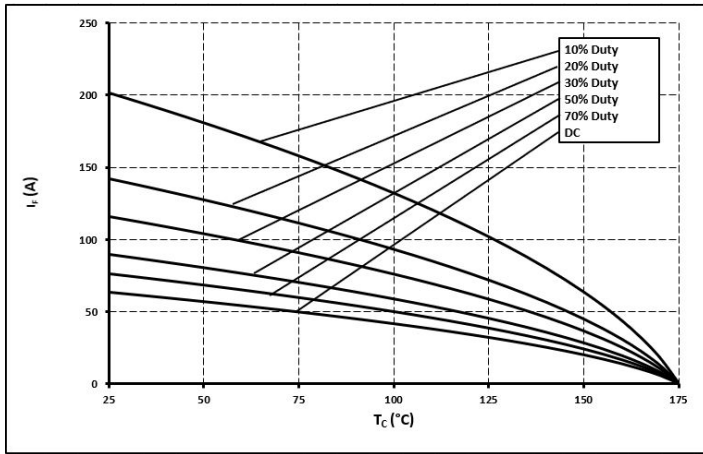


Figure 3
Current Derating

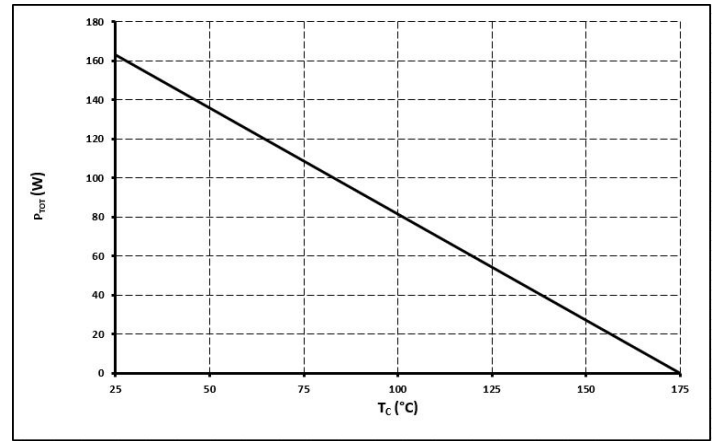


Figure 4
Power Derating

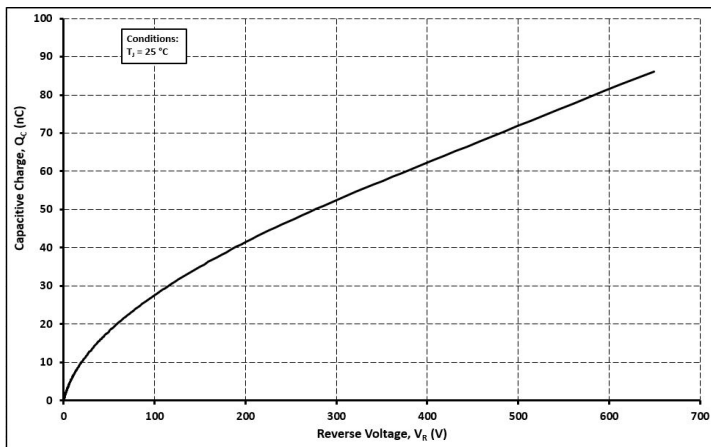


Figure 5
Total Capacitance Charge vs. Reverse Voltage

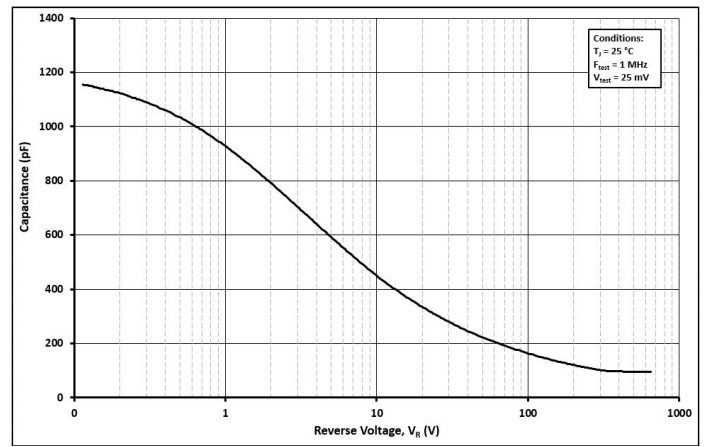


Figure 6
Capacitance vs. Reverse Voltage



Typical Performance

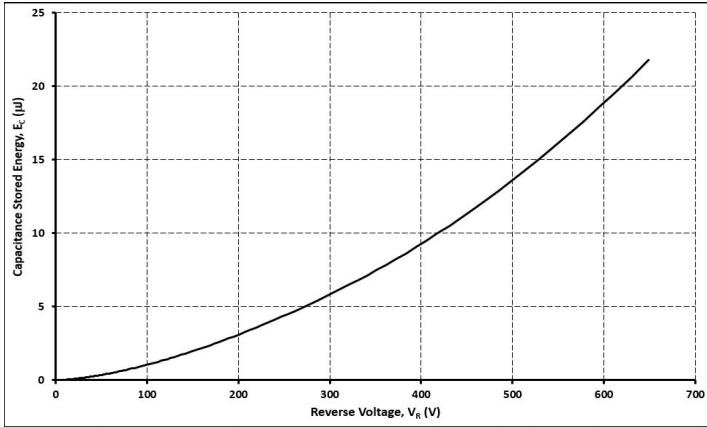


Figure 7
Capacitance Stored Energy

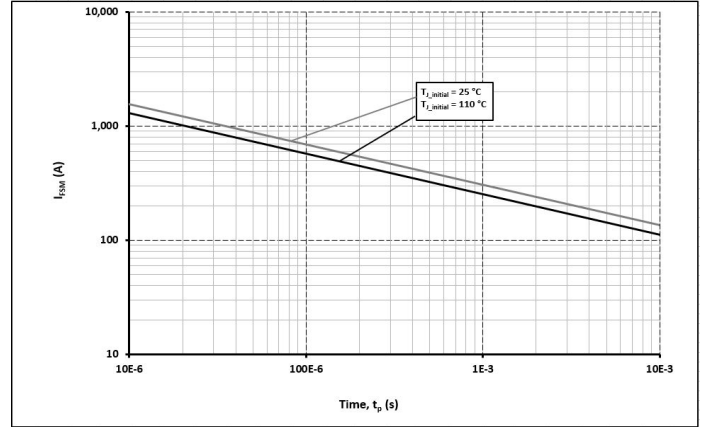


Figure 8
Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

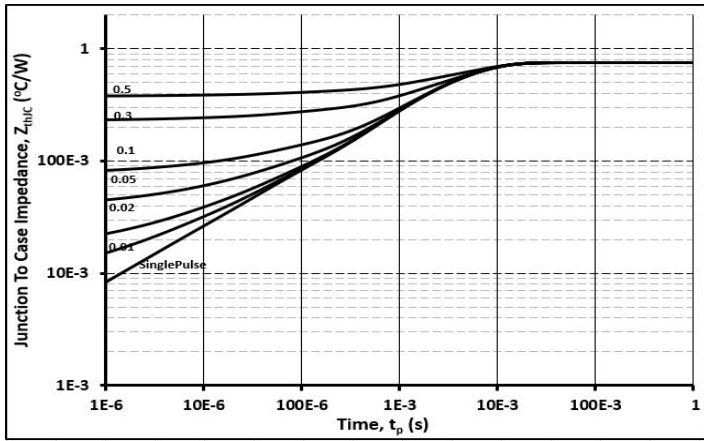
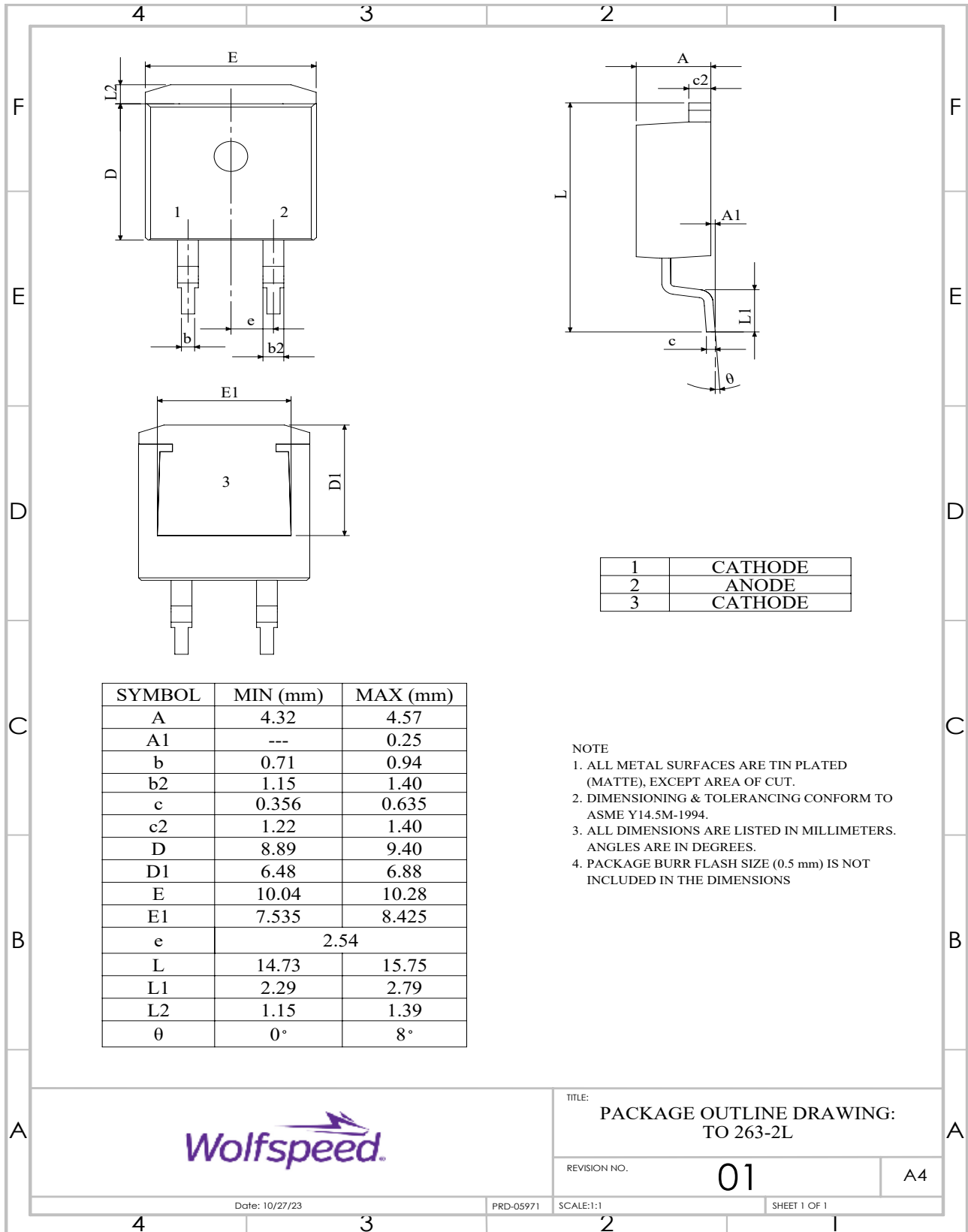


Figure 9
Transient Thermal Impedance

Package Dimensions & Pin-Out

Package: TO-263-2



TITLE: PACKAGE OUTLINE DRAWING: TO 263-2L

REVISION NO. 01 A4

Date: 10/27/23

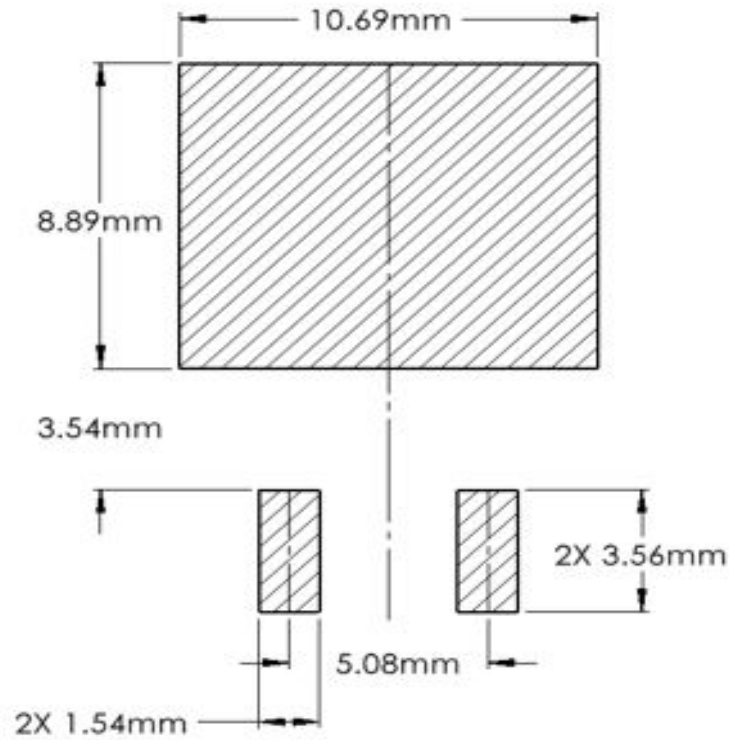
PRD-05971

SCALE:1:1

SHEET 1 OF 1

Recommended Solder Pad Layout

Primary dimensions shown in mm.



Product Ordering Information

| Order Number | Packing Type |
|--------------|---------------|
| C6D20065G | Tube |
| C6D20065G-TR | Tape and Reel |

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



Revision History

| Document Version | Date of Release | Description of Changes |
|------------------|-----------------|------------------------------------|
| 0 | March-2023 | Initial Release |
| 1 | November-2023 | Corrected Package Drawing L and L1 |
| 2 | November - 2024 | Legal Disclaimer |

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