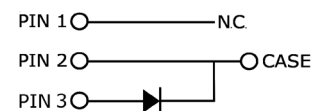
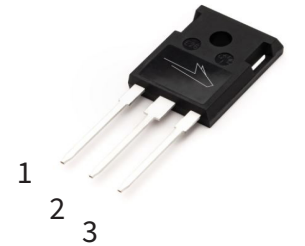


C3D16065D1

3rd Generation 650 V, 16 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-247-3
Marking: C3D16065D1

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
- Battery Charging Systems
- Switch Mode Power Supplies
- AC/DC Converters
- 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	43	A	$T_c = 25^\circ\text{C}$	Fig. 3
		20		$T_c = 135^\circ\text{C}$	
		16		$T_c = 147^\circ\text{C}$	
Repetitive Peak Forward Surge Current	I_{FRM}	57		$T_c = 25^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave	
		33		$T_c = 110^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	160		$T_c = 25^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave	Fig. 8
		148		$T_c = 110^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave	
Power Dissipation	P_{tot}	173	W	$T_c = 25^\circ\text{C}$	Fig. 4
		75		$T_c = 110^\circ\text{C}$	
i^2t value	$\int i^2 dt$	128	A^2s	$T_c = 25^\circ\text{C}$, $t_p = 10$ ms	
		110		$T_c = 110^\circ\text{C}$, $t_p = 10$ ms	



Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	V_F	1.5	1.8	V	$I_F = 16\text{ A}, T_j = 25\text{ }^{\circ}\text{C}$	Fig. 1
		2.0	2.4		$I_F = 16\text{ A}, T_j = 175\text{ }^{\circ}\text{C}$	
Reverse Current	I_R	18	95	μA	$V_R = 650\text{ V}, T_j = 25\text{ }^{\circ}\text{C}$	Fig. 2
		38	378		$V_R = 650\text{ V}, T_j = 175\text{ }^{\circ}\text{C}$	
Total Capacitive Charge	Q_C	40		nC	$V_R = 400\text{ V}, T_j = 25\text{ }^{\circ}\text{C}, I_F = 16\text{ A}$	Fig. 5
Total Capacitance	C	740		pF	$V_R = 0\text{ V}, T_j = 25\text{ }^{\circ}\text{C}, f = 1\text{ MHz}$	Fig. 6
		74			$V_R = 200\text{ V}, T_j = 25\text{ }^{\circ}\text{C}, f = 1\text{ MHz}$	
		68			$V_R = 400\text{ V}, T_j = 25\text{ }^{\circ}\text{C}, f = 1\text{ MHz}$	
Capacitance Stored Energy	E_C	6		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)	$R_{\theta, JC (TYP)}$	0.86	$^{\circ}\text{C} / \text{W}$	
Junction Temperature	T_j	-55 to +175	$^{\circ}\text{C}$	
Case & Storage Temperature	T_c	-55 to +175		
TO-247 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw

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

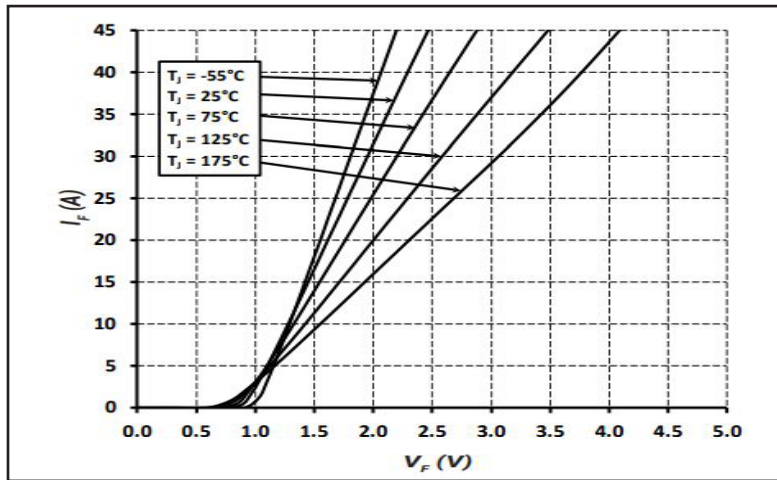


Figure 1

Forward Characteristics

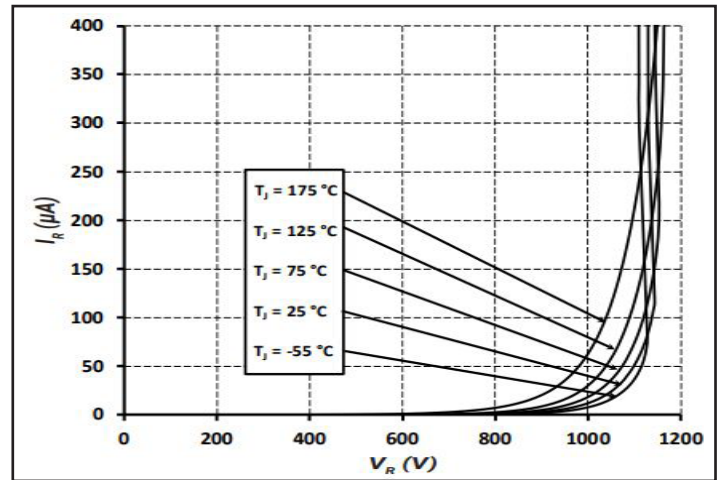


Figure 2

Reverse Characteristics

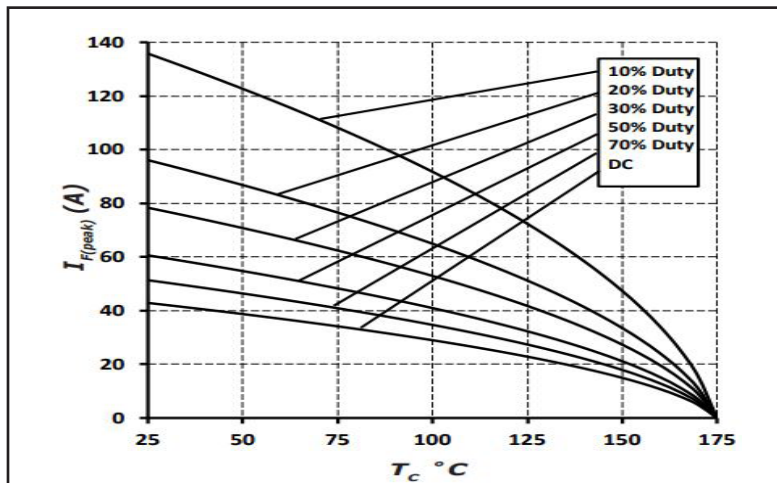


Figure 3

Current Derating

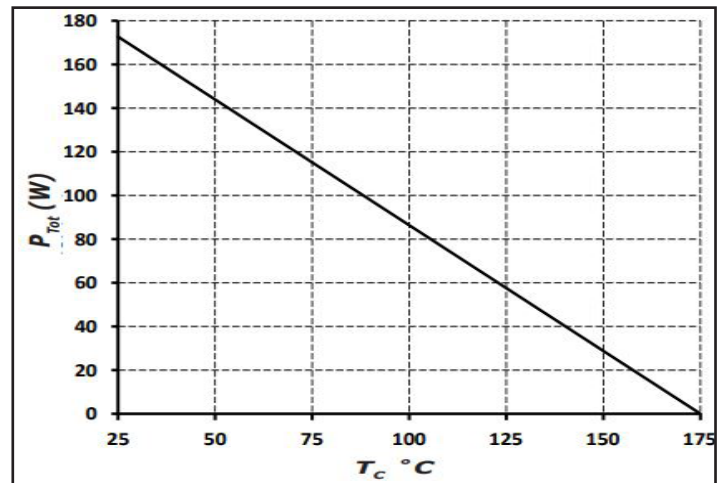


Figure 4

Power Derating

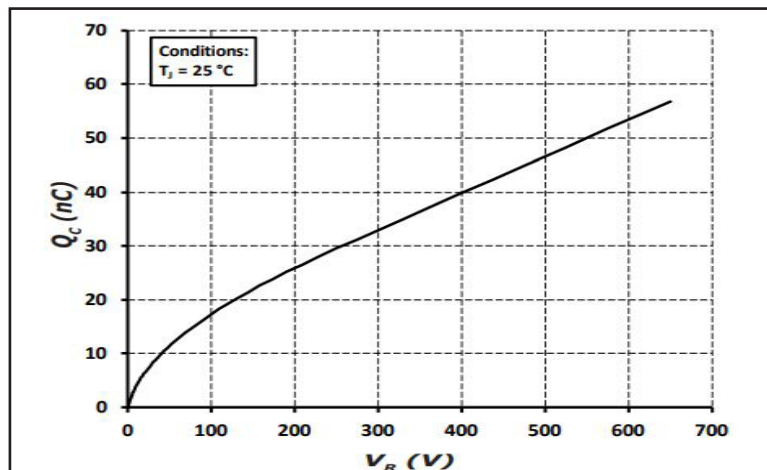


Figure 5

Total Capacitance Charge vs. Reverse Voltage

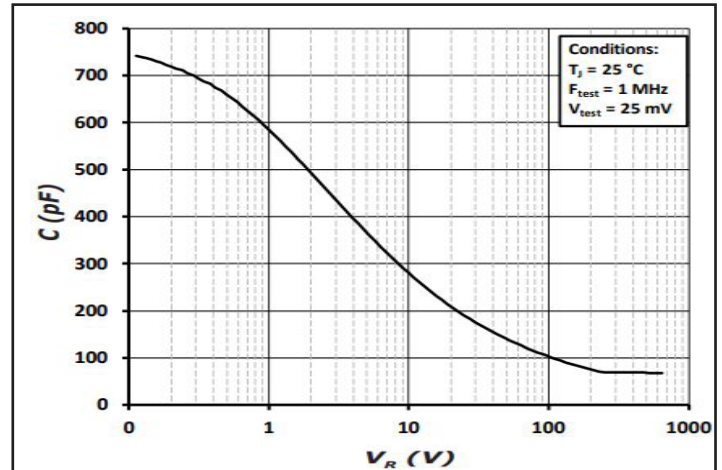


Figure 6

Capacitance vs. Reverse Voltage

Typical Performance

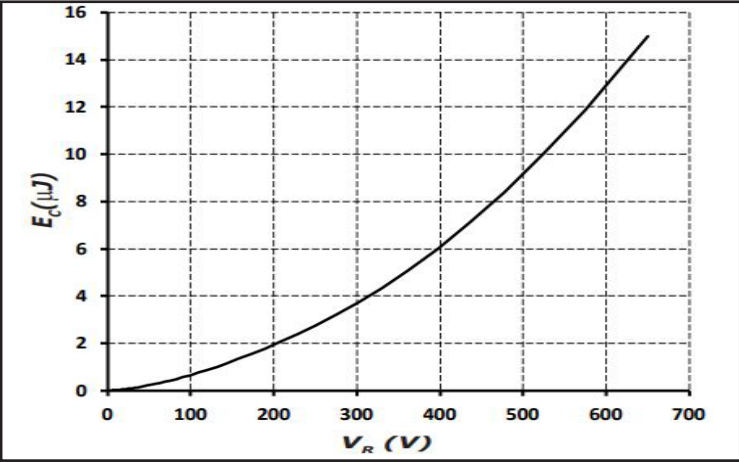


Figure 7
Capacitance Stored Energy

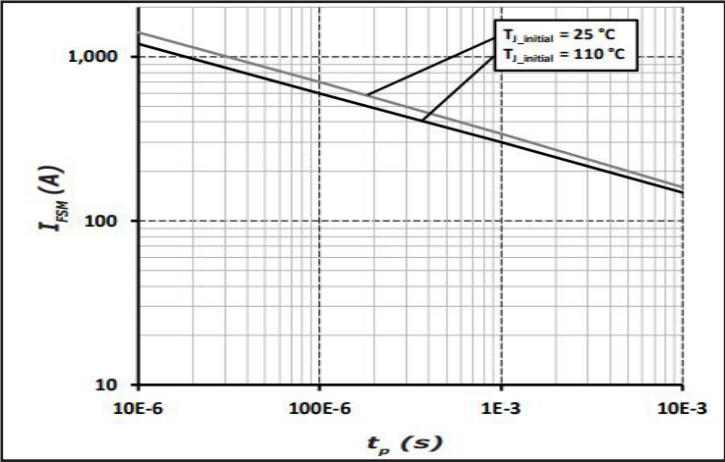


Figure 8
Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

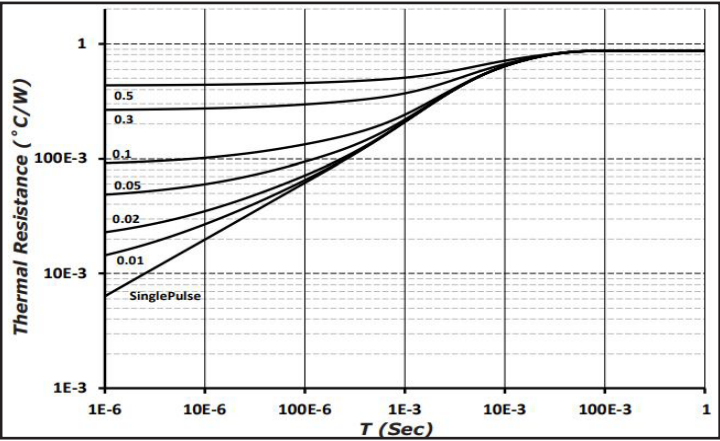
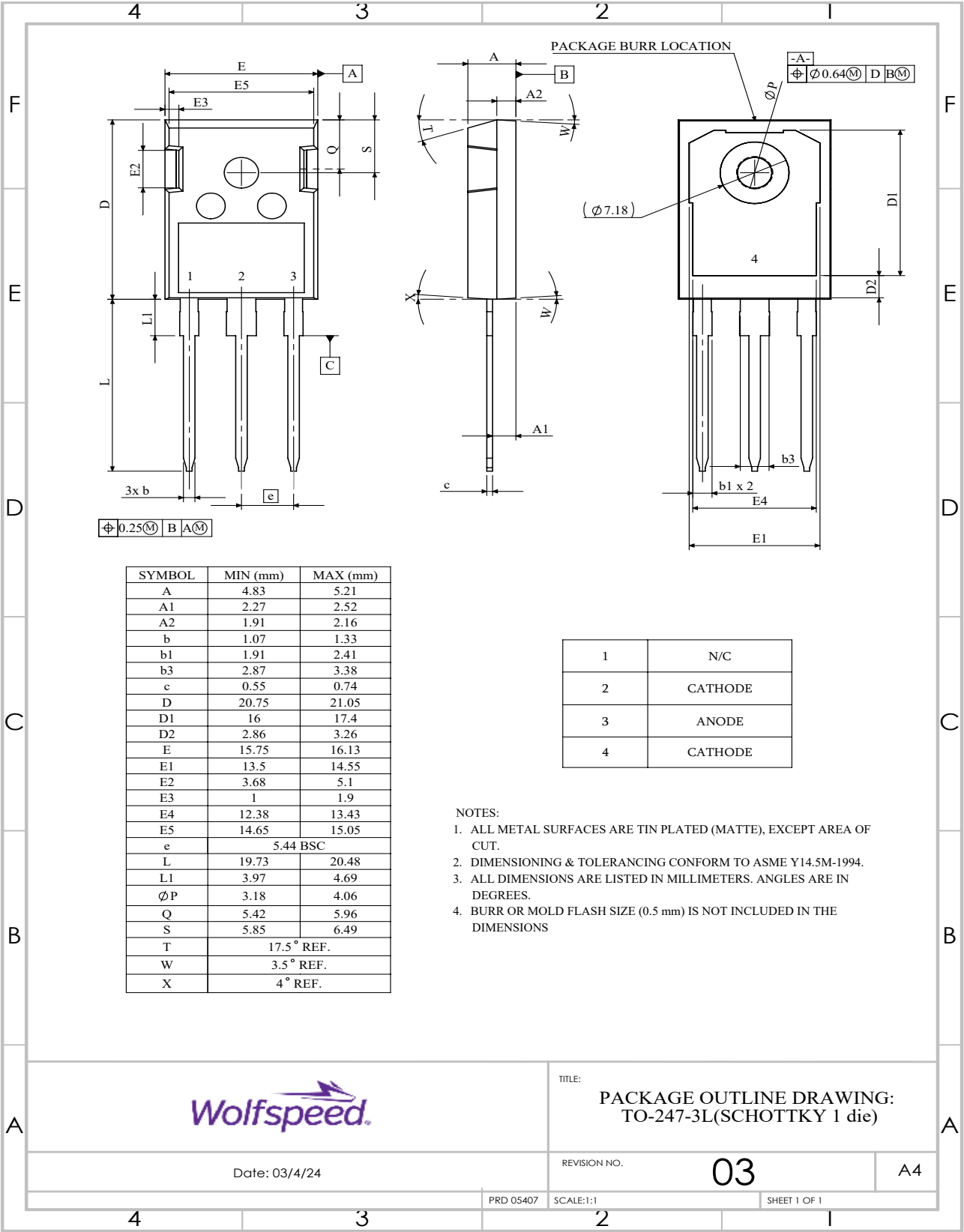


Figure 9
Transient Thermal Impedance

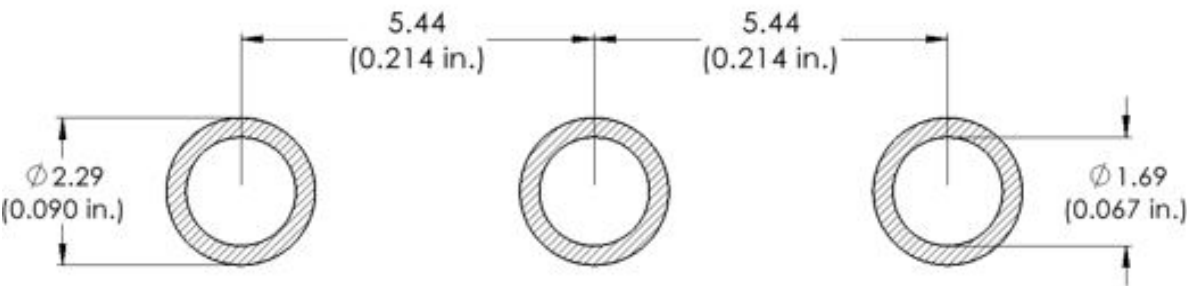
Package Dimensions & Pin-Out

Package: TO-247-3

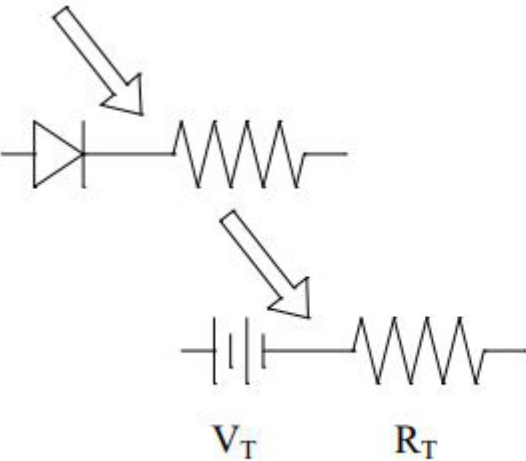


Recommended Solder Pad Layout

Primary dimensions shown in mm.



Diode Model



$$V_{fT} = V_T + I_f * R_T$$

$$V_T = 0.97 + (T_J * -1.0 * 10^{-3})$$

$$R_T = 0.024 + (T_J * 3.0 * 10^{-4})$$

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

Product Ordering Information

Order Number	Packing Type
C3D16065D1	Tube

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



Revision History

Document Version	Date of Release	Description of Changes
0	August-2019	Initial Release
1	November-2023	Updated Branding, POD, Package Image, Solder Pad Layout
2	September - 2024	Legal Disclaimer and POD Updated

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