

C3D10060G Silicon Carbide Schottky Diode Z-REC[®] RECTIFIER

V_{RRM}	=	600 V
$I_F (T_c=135^\circ\text{C})$	=	14 A
Q_c	=	24 nC

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

Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters

Package



TO-263-2



AEC-Q101 Qualified



Part Number	Package	Marking
C3D10060G	TO-263-2	C3D10060

Maximum Ratings ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	600	V		
V_{RSM}	Surge Peak Reverse Voltage	600	V		
V_{DC}	DC Blocking Voltage	600	V		
I_F	Continuous Forward Current	29 14 10	A	$T_c=25^\circ\text{C}$ $T_c=135^\circ\text{C}$ $T_c=151^\circ\text{C}$	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	44 30.5	A	$T_c=25^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Wave}$ $T_c=110^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Wave}$	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	90 71	A	$T_c=25^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Wave}$ $T_c=110^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Wave}$	Fig. 8
I_{FMax}	Non-Repetitive Peak Forward Surge Current	860 680	A	$T_c=25^\circ\text{C}, t_p=10\text{ }\mu\text{s}, \text{Pulse}$ $T_c=110^\circ\text{C}, t_p=10\text{ }\mu\text{s}, \text{Pulse}$	Fig. 8
P_{tot}	Power Dissipation	125 54	W	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-600\text{V}$	
$\int i^2 dt$	i^2t value	40.5 25	A ² s	$T_c=25^\circ\text{C}, t_p=10\text{ ms}$ $T_c=110^\circ\text{C}, t_p=10\text{ ms}$	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 2.0	1.8 2.4	V	$I_F = 10\text{ A}$, $T_J = 25^\circ\text{C}$ $I_F = 10\text{ A}$, $T_J = 175^\circ\text{C}$	Fig. 1
I_R	Reverse Current	10 20	50 200	μA	$V_R = 600\text{ V}$, $T_J = 25^\circ\text{C}$ $V_R = 600\text{ V}$, $T_J = 175^\circ\text{C}$	Fig. 2
Q_C	Total Capacitive Charge	24		nC	$V_R = 400\text{ V}$, $I_F = 10\text{ A}$ $di/dt = 500\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	460.5 44 40		pF	$V_R = 0\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 200\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 400\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$	Fig. 6
E_C	Capacitance Stored Energy	3.6		μJ	$V_R = 400\text{ V}$	Fig. 7

Note: This is a majority carrier diode, so there is no reverse recovery charge.

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.2	$^\circ\text{C}/\text{W}$	Fig. 9

Typical Performance

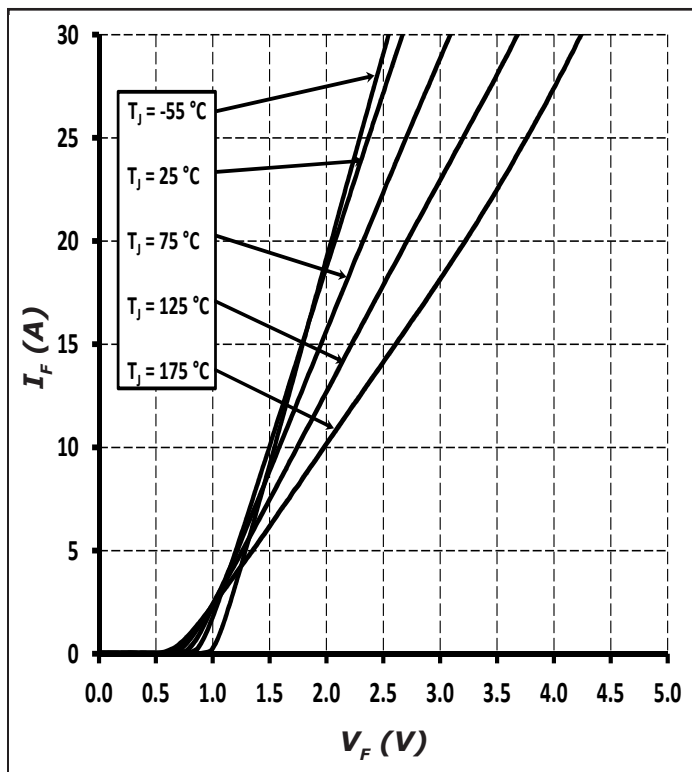


Figure 1. Forward Characteristics

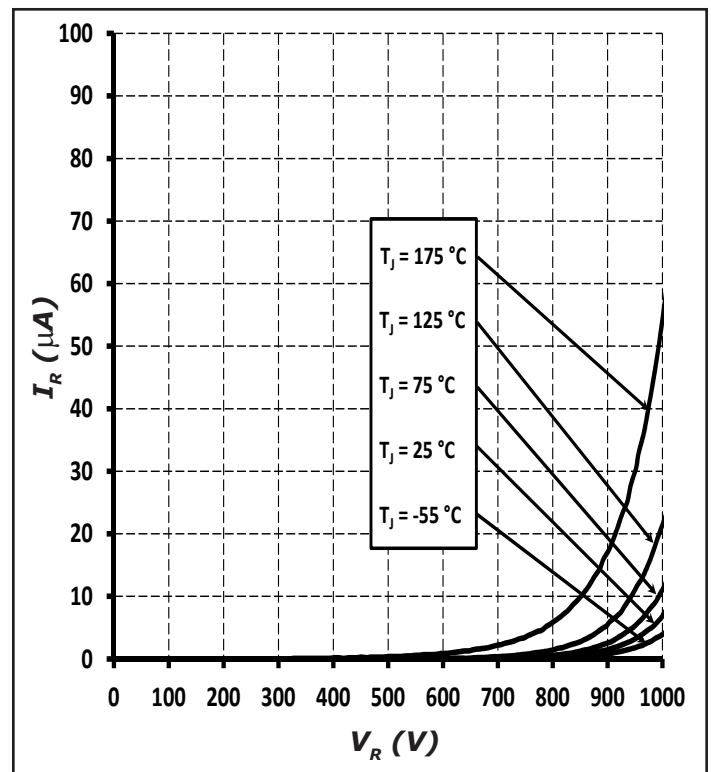


Figure 2. Reverse Characteristics

Typical Performance

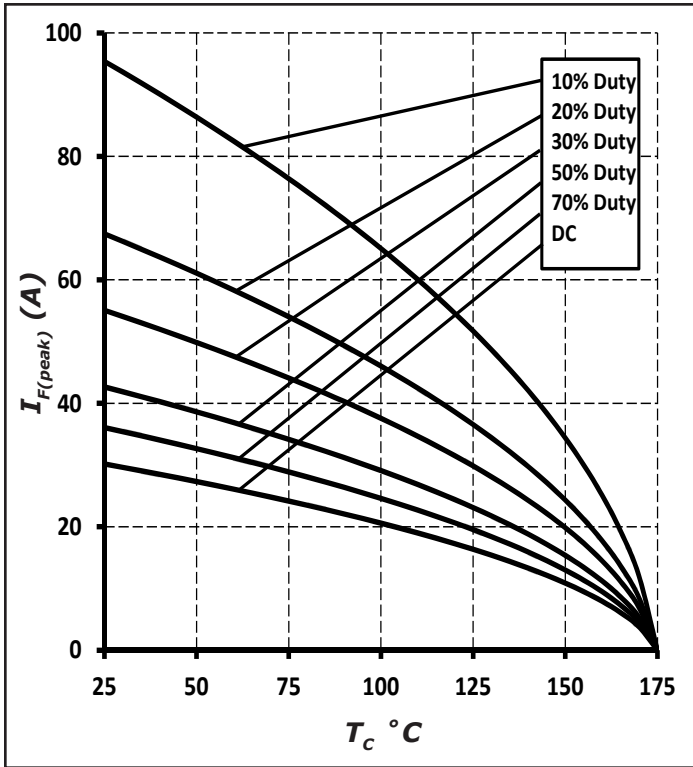


Figure 3. Current Derating

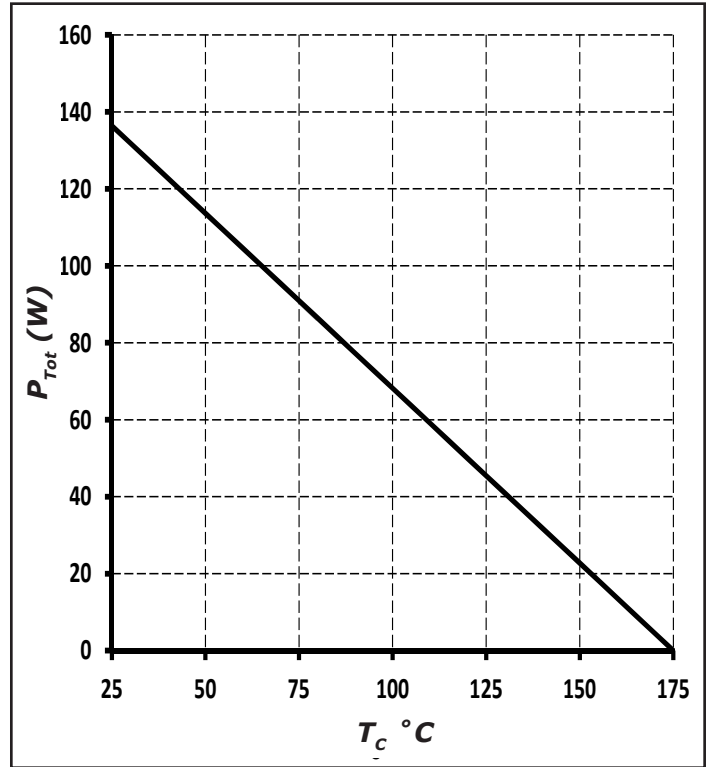


Figure 4. Power Derating

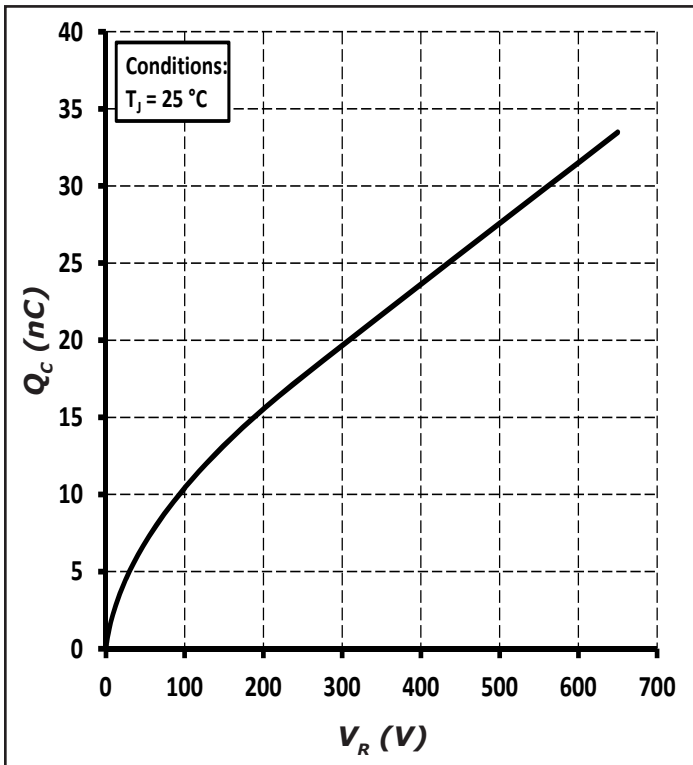


Figure 5. Total Capacitance Charge vs. Reverse Voltage

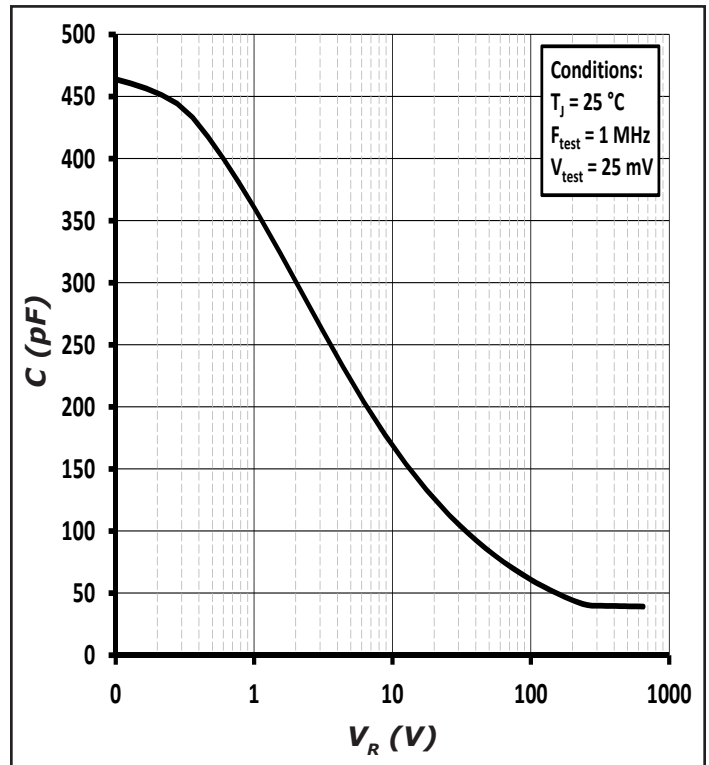


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

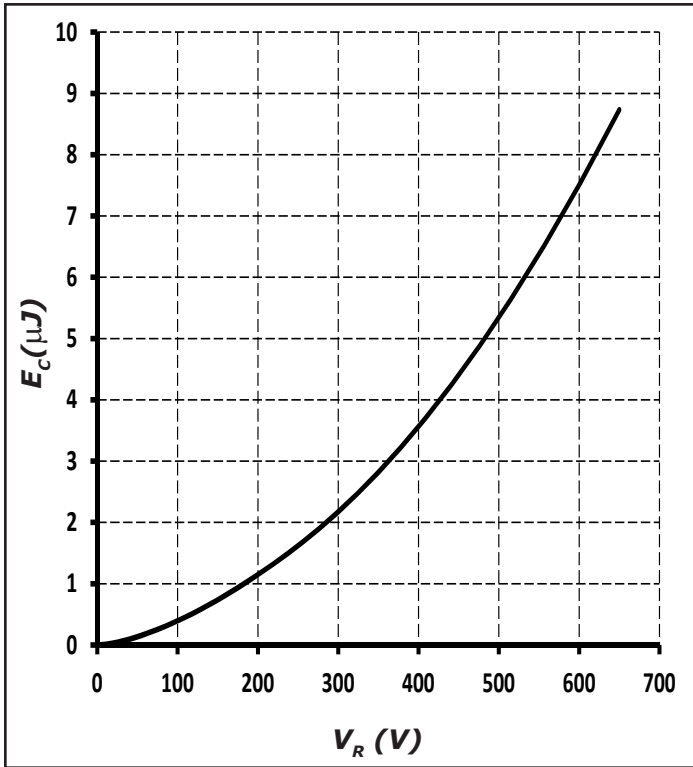


Figure 7. Capacitance Stored Energy

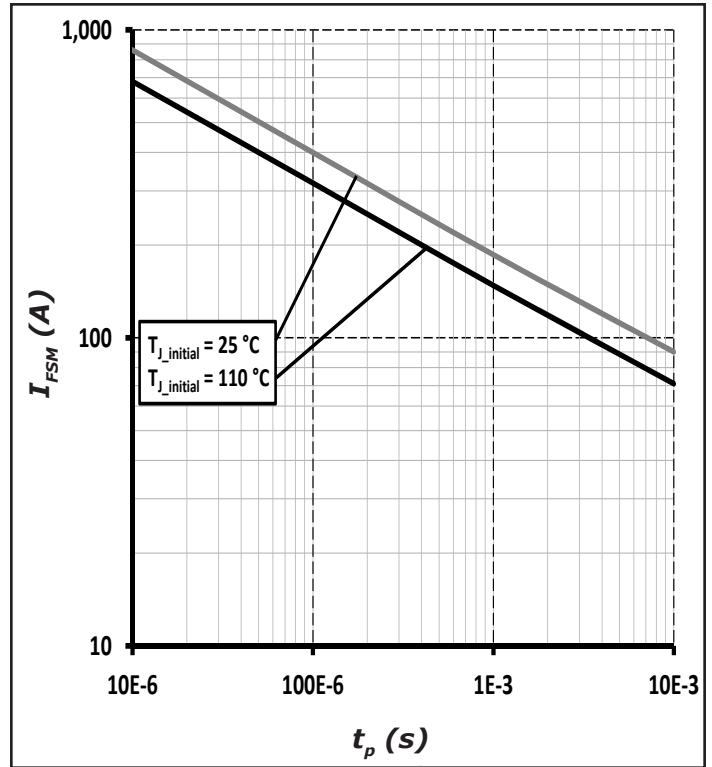


Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

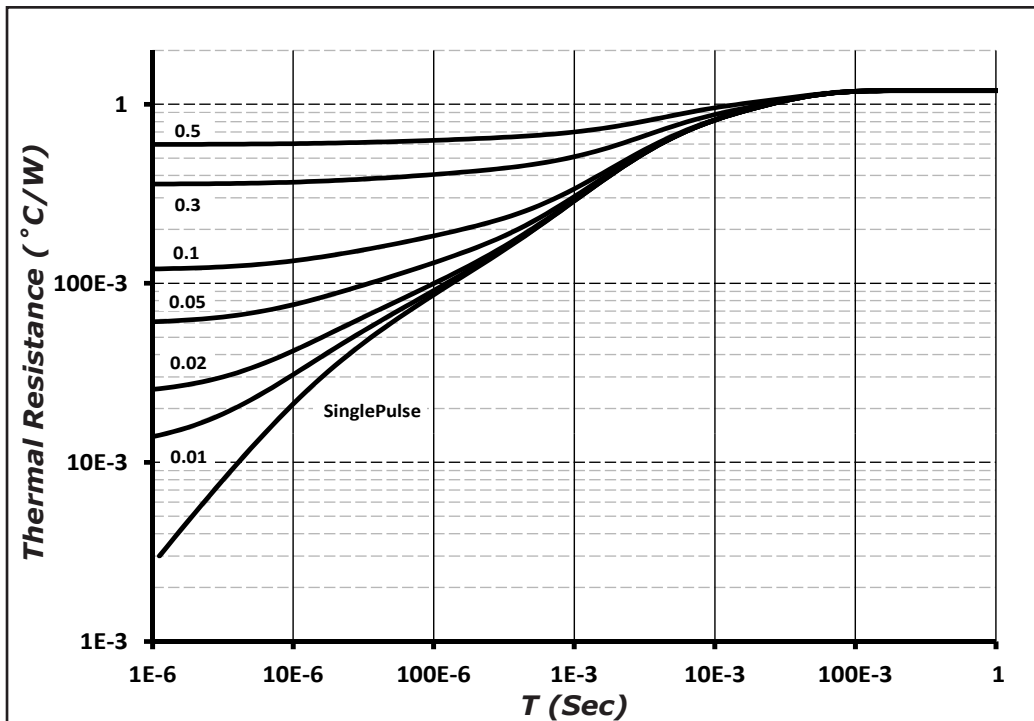
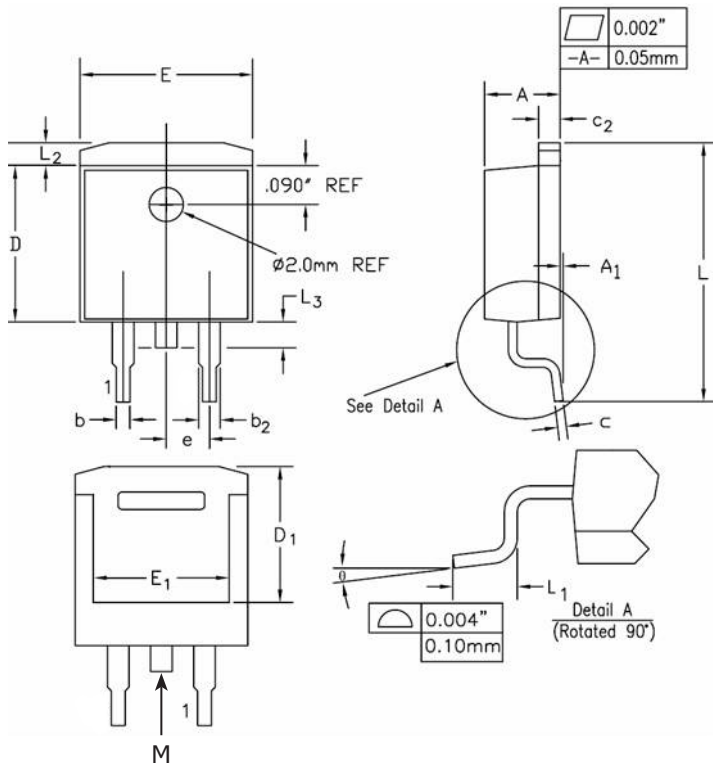


Figure 9. Transient Thermal Impedance

Package Dimensions

Package TO-263-2

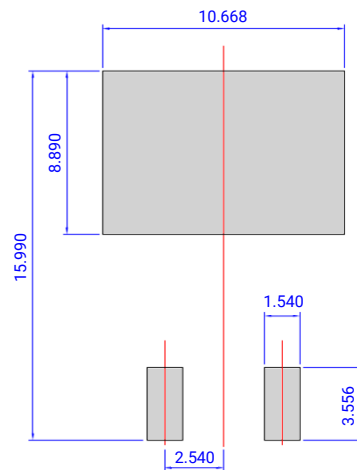


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	0.17	0.18	4.32	4.57
A1	-	0.01	-	0.25
b	0.028	0.037	0.71	0.94
b2	0.045	0.055	1.15	1.4
c	0.014	0.025	0.356	0.635
c2	0.048	0.055	1.22	1.4
D	0.35	0.37	8.89	9.4
D1	0.255	0.324	6.48	8.23
E	0.395	0.405	10.04	10.28
E1	0.31	0.318	7.88	8.08
e	0.1	BSC.	2.54	BSC.
L	0.58	0.62	14.73	15.75
L1	0.09	0.11	2.29	2.79
L2	0.045	0.055	1.15	1.39
L3	0.05	0.07	1.27	1.77
θ	0°	8°	0°	8°

Note: Tab "M" may not be present



Recommended Solder Pad Layout



Part Number	Package	Marking
C3D10060G	TO-263-2	C3D10060

Note: Recommended soldering profiles can be found in the applications note here: http://www.wolfspeed.com/power_app_notes/soldering

