

C3D03060E

Silicon Carbide Schottky Diode

Z-REC[®] RECTIFIER

V_{RRM}	=	600 V
$I_F (T_C=135^\circ\text{C})$	=	5 A
Q_c	=	7.6 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

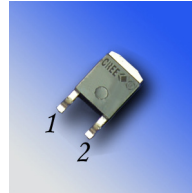
Benefits

- 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-252-2



AEC-Q101 Qualified



Part Number	Package	Marking
C3D03060E	TO-252-2	C3D03060

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	11 5 3	A	$T_C=25^\circ\text{C}$ $T_C=135^\circ\text{C}$ $T_C=158^\circ\text{C}$	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	18 13.5	A	$T_C=25^\circ\text{C}$, $t_p=10$ mS, Half Sine Wave D=0.3 $T_C=110^\circ\text{C}$, $t_p=10$ mS, Half Sine Wave D=0.3	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	26 23	A	$T_C=25^\circ\text{C}$, $t_p=10$ mS, Half Sine Wave D=0.3 $T_C=110^\circ\text{C}$, $t_p=10$ mS, Half Sine Wave D=0.3	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	100	A	$T_C=25^\circ\text{C}$, $t_p=10$ μS , Pulse	
P_{tot}	Power Dissipation	47 20	W	$T_C=25^\circ\text{C}$ $T_C=110^\circ\text{C}$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-600\text{V}$	
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 1.8	1.7 2.4	V	$I_F = 3\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 3\text{ A}$ $T_J = 175^\circ\text{C}$	Fig. 1
I_R	Reverse Current	4 8	20 80	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	7.6		nC	$V_R = 400\text{ V}$, $I_F = 3\text{ A}$ $di/dt = 500\text{ A}/\mu\text{S}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	166 14 11		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	1.1		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	3.2	$^\circ\text{C}/\text{W}$	Fig. 8

Typical Performance

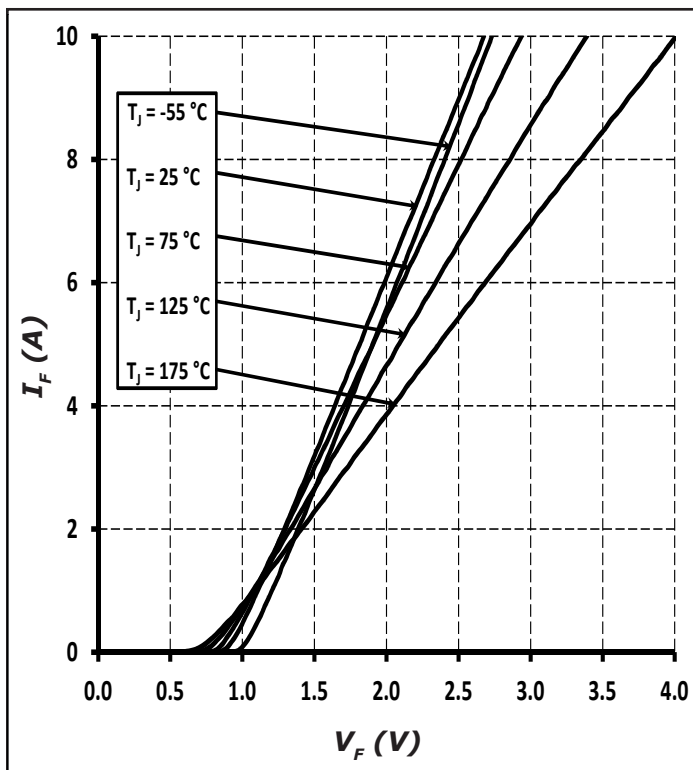


Figure 1. Forward Characteristics

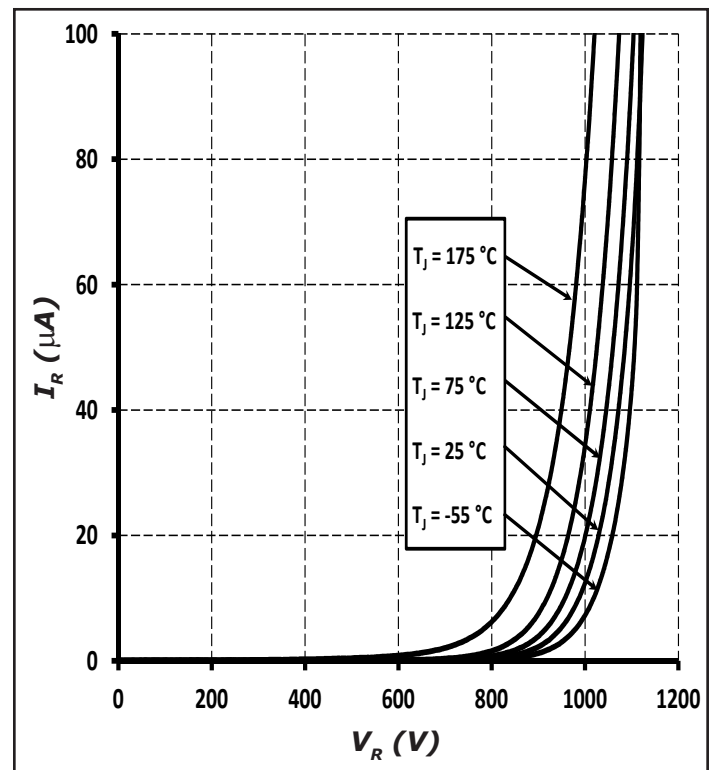


Figure 2. Reverse Characteristics

Typical Performance

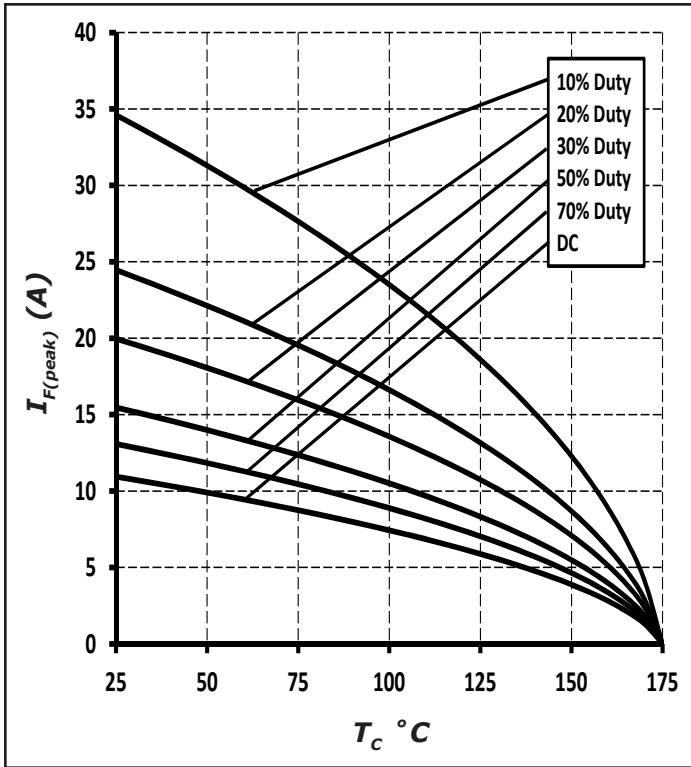


Figure 3. Current Derating

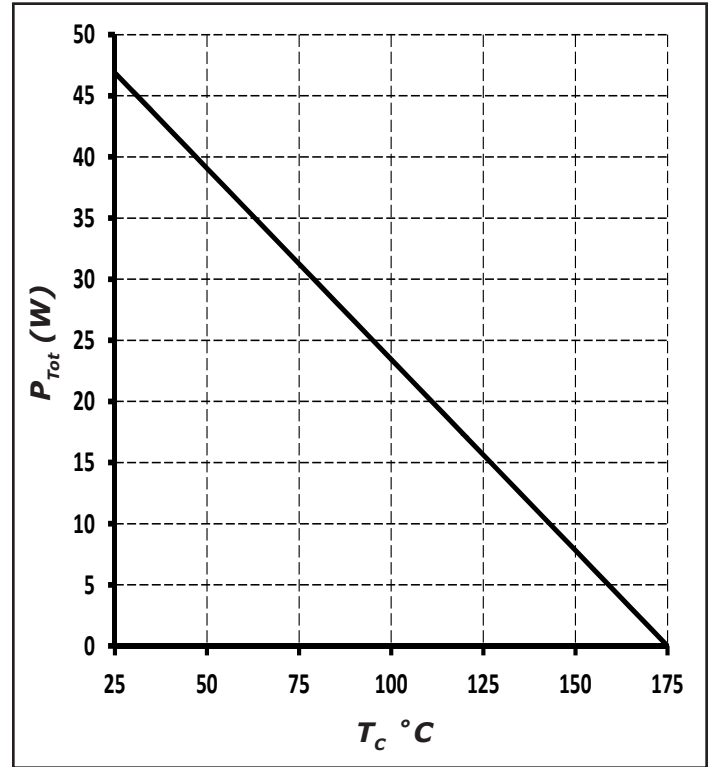


Figure 4. Power Derating

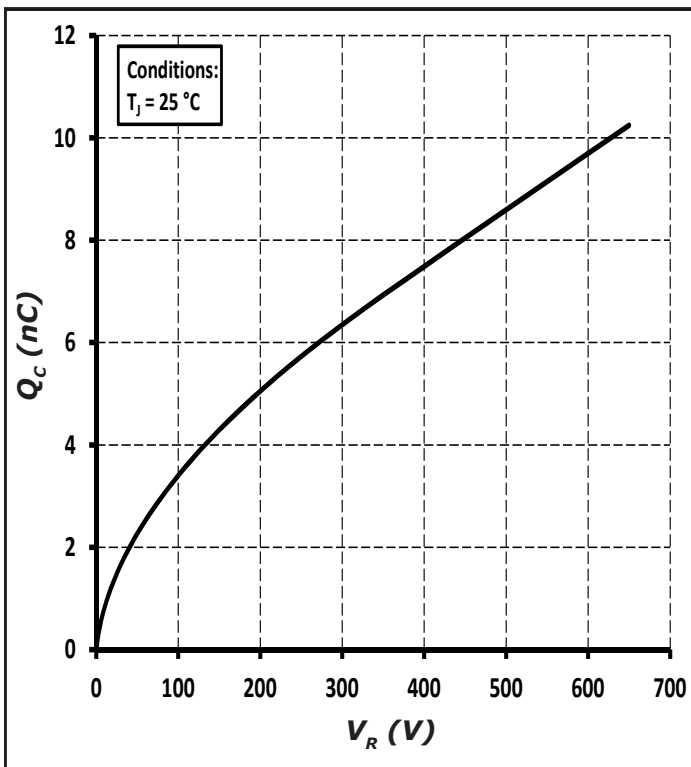


Figure 5. Total Capacitance Charge vs. Reverse Voltage

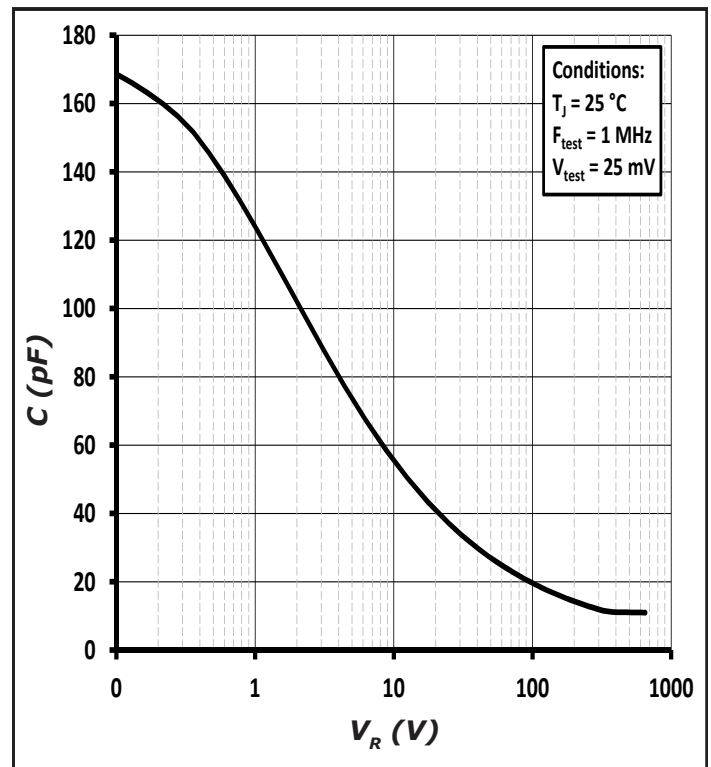


Figure 6. Capacitance vs. Reverse Voltage

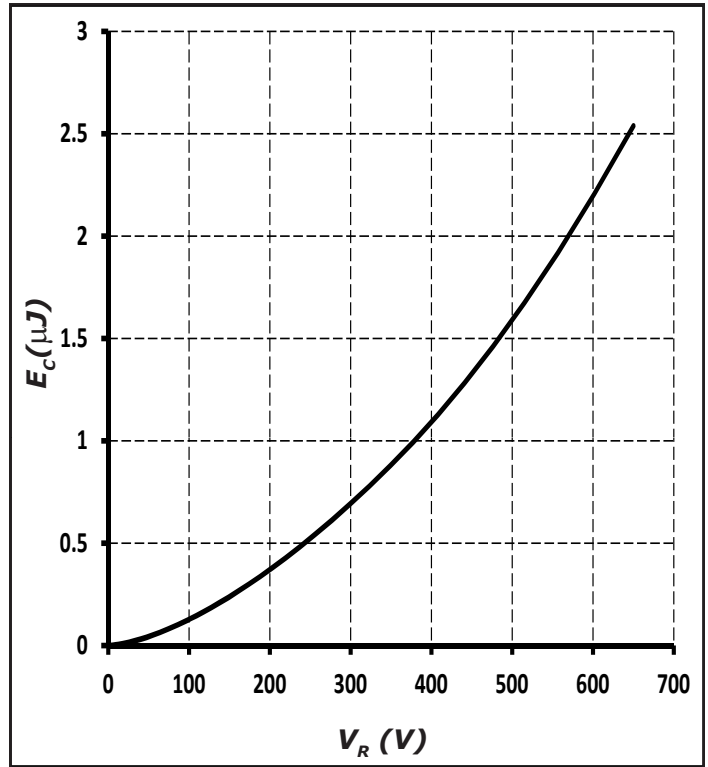


Figure 7. Capacitance Stored Energy

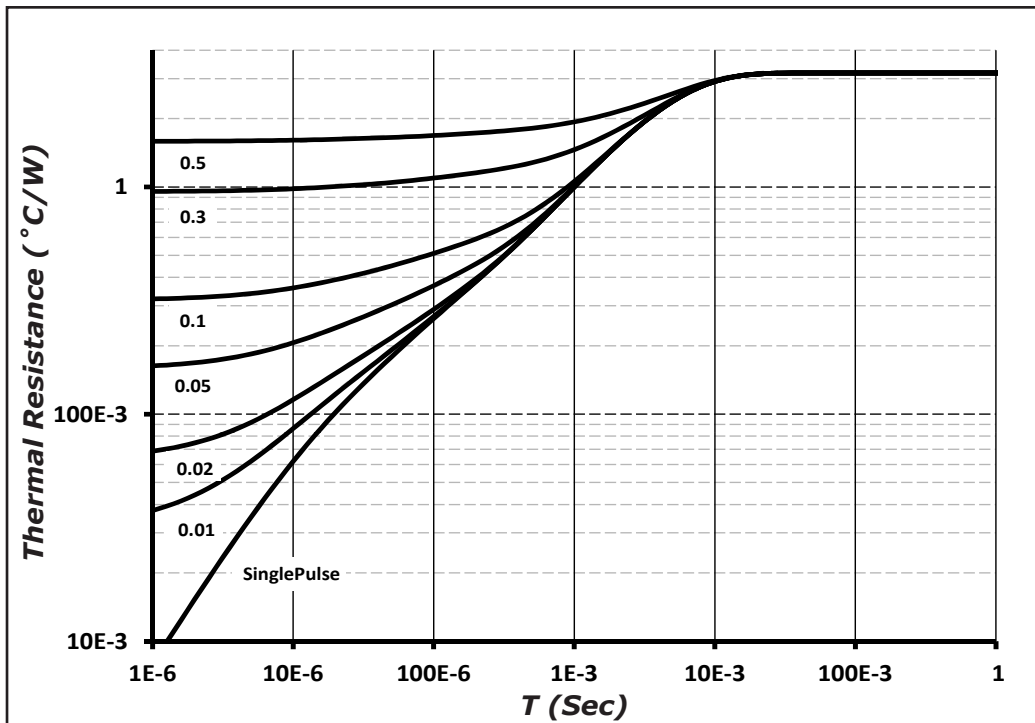
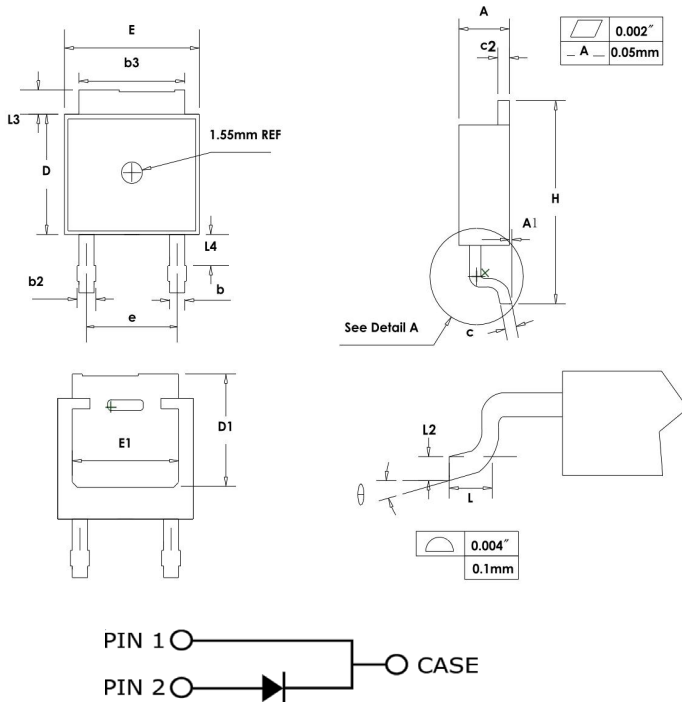


Figure 8. Transient Thermal Impedance

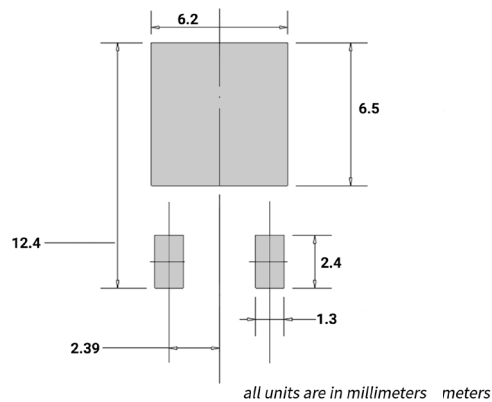
Package Dimensions

Package TO-252-2



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.159	2.413
A1	0	0.13
b	0.64	0.89
b2	0.653	1.143
b3	5.004	5.6
c	0.457	0.61
c2	0.457	0.864
D	5.867	6.248
D1	5.21	-
E	6.35	7.341
E1	4.32	-
e	4.58 BSC	
H	9.65	10.414
L	1.106	1.78
L2	0.51 BSC	
L3	0.889	1.27
L4	0.64	1.01
θ	0°	8°

Recommended Solder Pad Layout



TO-252-2

Part Number	Package	Marking
C3D03060E	TO-252-2	C3D03060

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

