

## 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

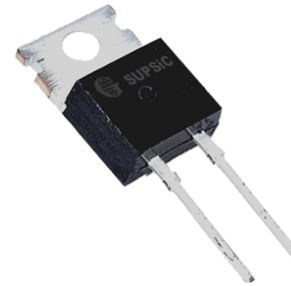
- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

## Applications

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

Part Number	Package	Marking
GC3D03060A	TO-220-2	GC3D03060

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



TO-220-2

## Package



## 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	$T_c=25^\circ\text{C}$ , $t_p=10$ $\mu\text{S}$ , 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	$^\circ\text{C}$		
	TO-220 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

### 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	$\mu\text{A}$	$V_R = 600\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 600\text{ V}$ $T_J = 175^\circ\text{C}$	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		$\mu\text{J}$	$V_R = 400\text{ V}$	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

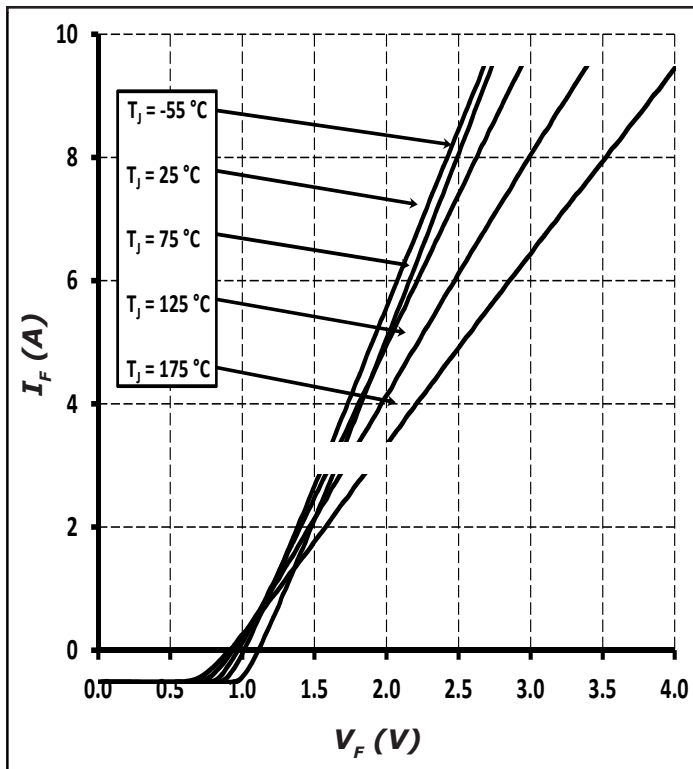


Figure 1. Forward Characteristics

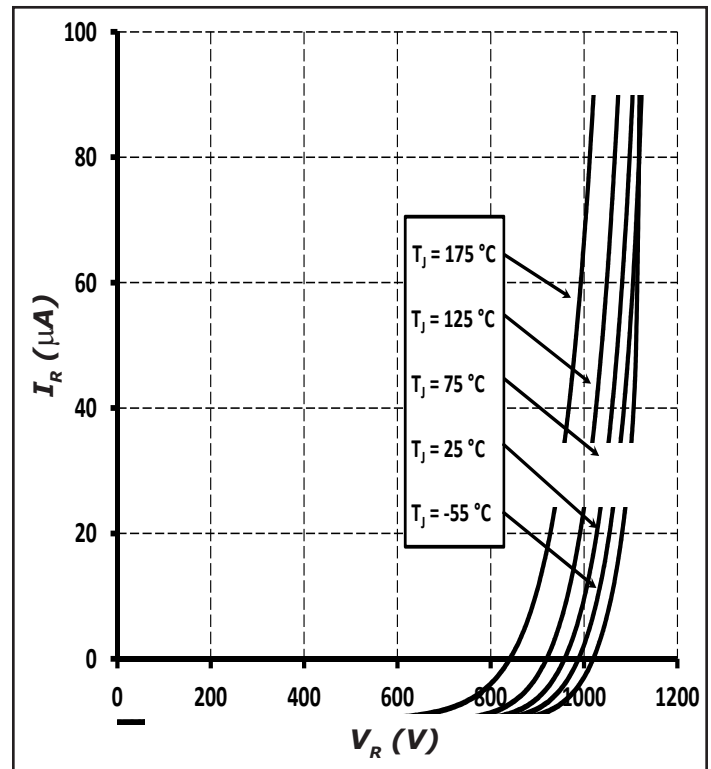


Figure 2. Reverse Characteristics

Typical Performance

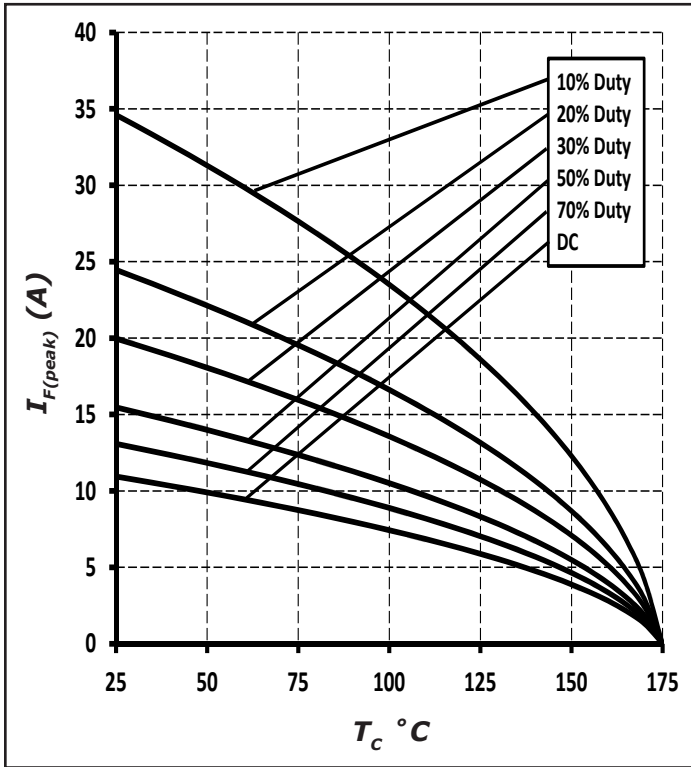


Figure 3. Current Derating

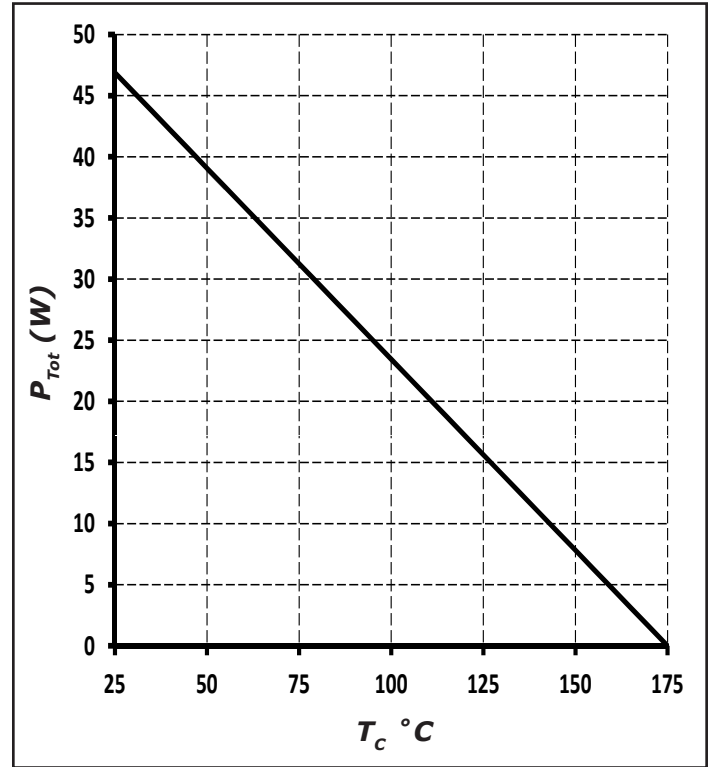


Figure 4. Power Derating

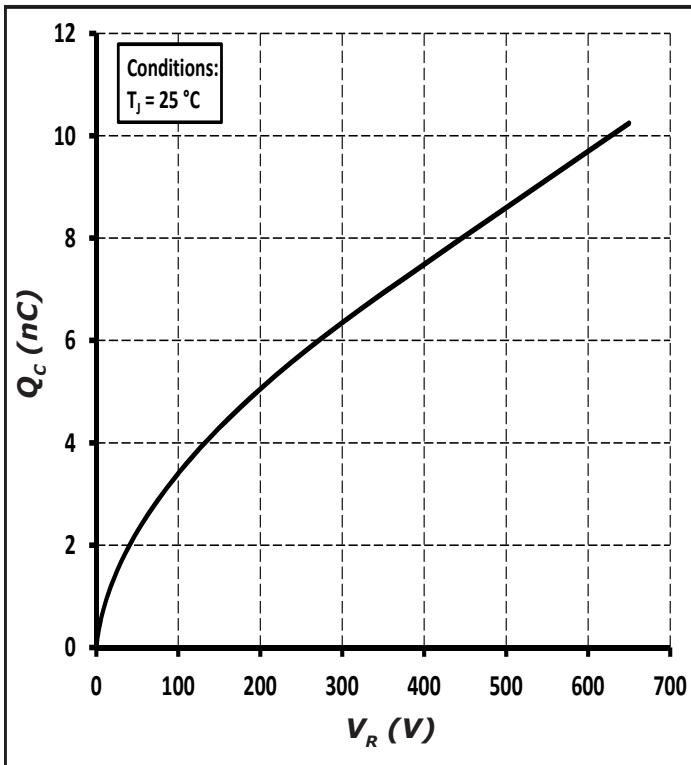


Figure 5. Total Capacitance Charge vs. Reverse Voltage

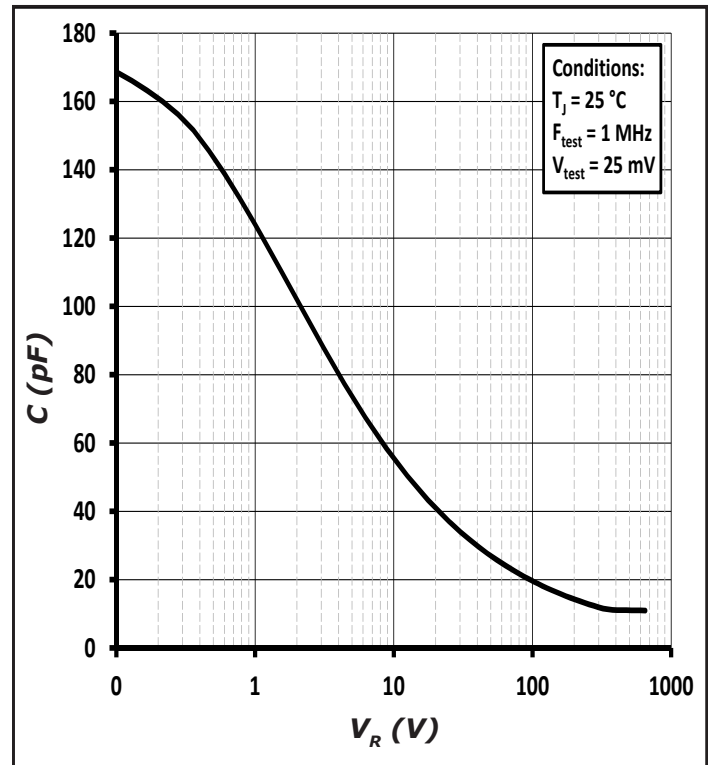


Figure 6. Capacitance vs. Reverse Voltage

**Typical Performance**

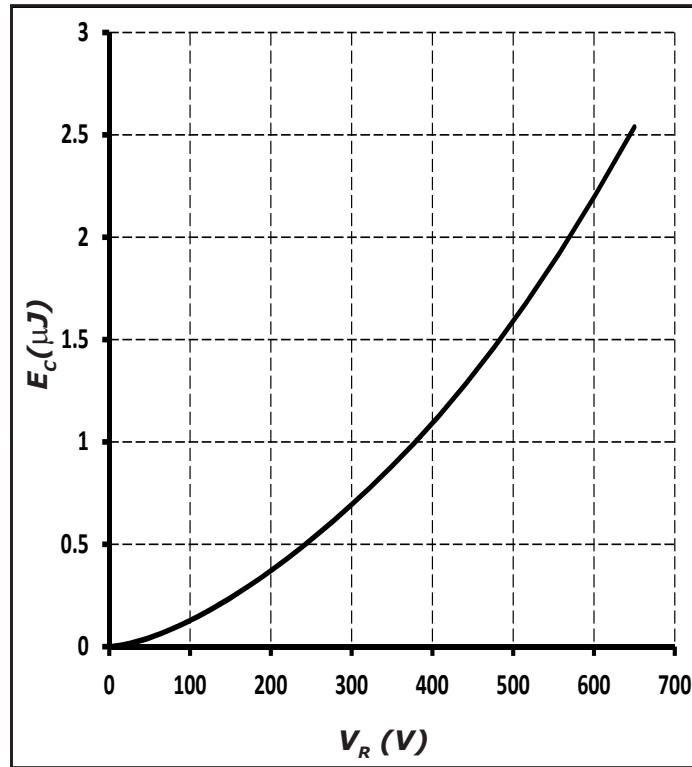


Figure 7. Capacitance Stored Energy

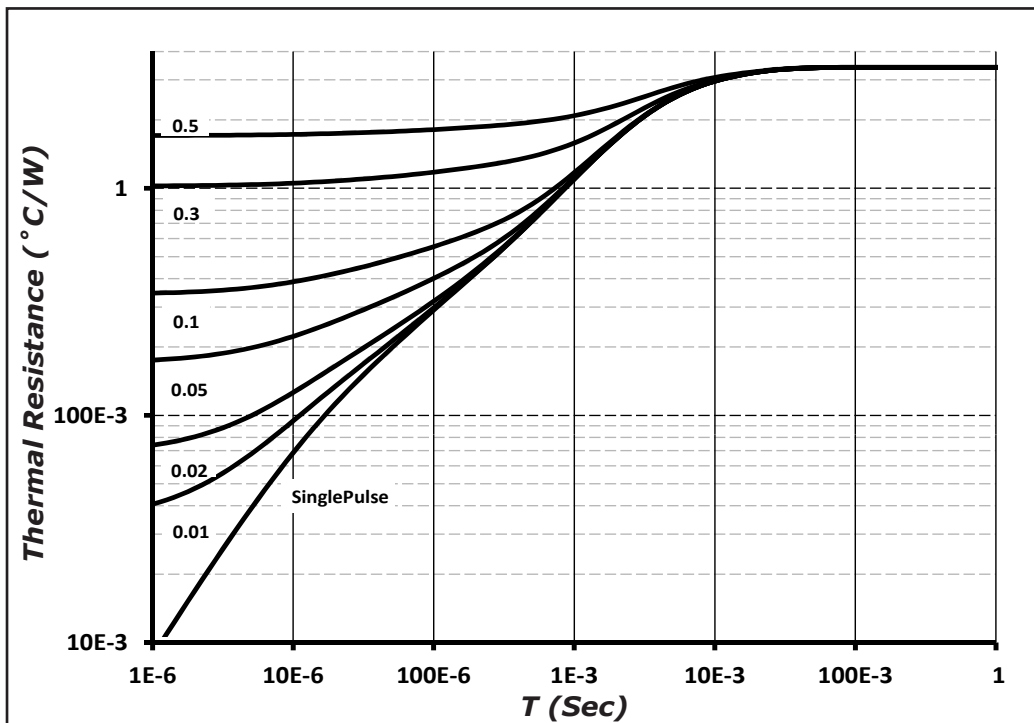
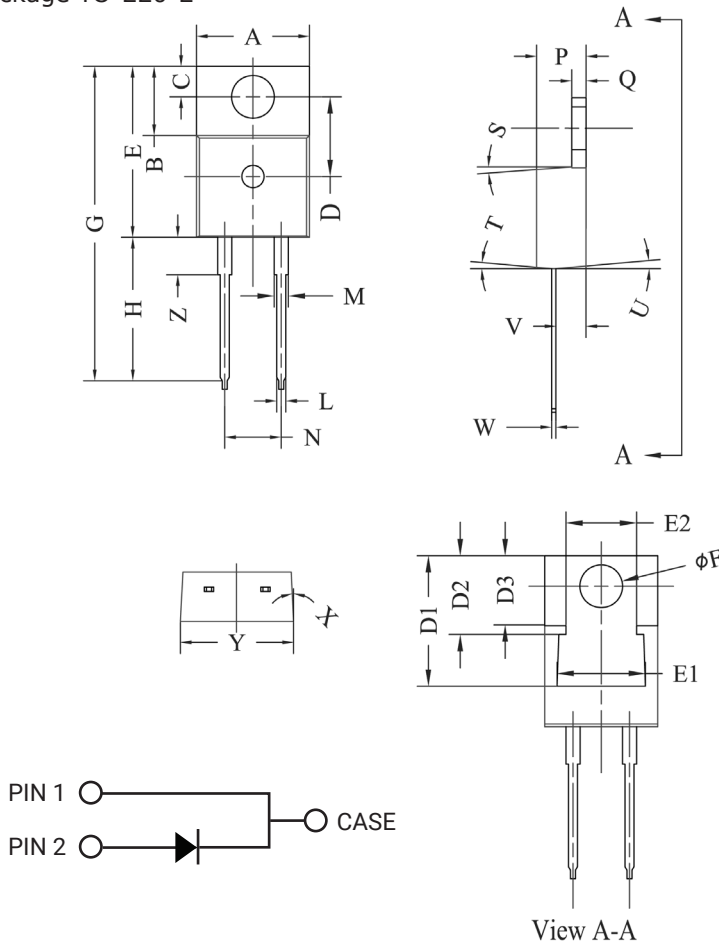


Figure 8. Transient Thermal Impedance

## Package Dimensions

Package TO-220-2

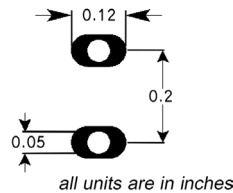


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
D1	.457-.490		11.60-12.45 typ	
D2	.277-.303 typ		7.04-7.70 typ	
D3	.244-.252 typ		6.22-6.4 typ	
E	.590	.615	14.986	15.621
E1	.302	.326	7.68	8.28
E2	.227	.251	5.77	6.37
F	.143	.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	.500	.550	12.700	13.970
L	.025	.036	.635	.914
M	.045	.055	1.143	1.550
N	.195	.205	4.953	5.207
P	.165	.185	4.191	4.699
Q	.048	.054	1.219	1.372
S	3°	6°	3°	6°
T	3°	6°	3°	6°
U	3°	6°	3°	6°
V	.094	.110	2.388	2.794
W	.014	.025	.356	.635
X	3°	5.5°	3°	5.5°
Y	.385	.410	9.779	10.414
Z	.130	.150	3.302	3.810

NOTE:

1. Dimension L, M, W apply for Solder Dip Finish

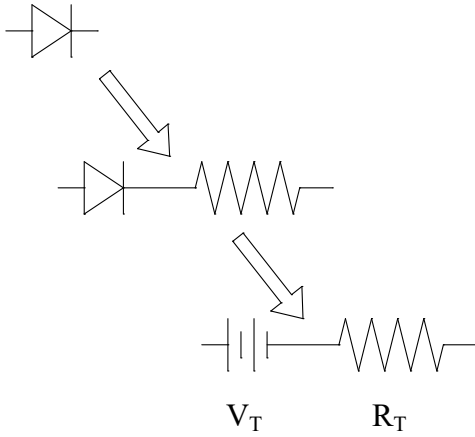
## Recommended Solder Pad Layout



TO-220-2

Part Number	Package
GC3D03060A	TO-220-2

**Diode Model**



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

$$V_T = 0.96 + (T_j * -1.1 * 10^{-3})$$

$$R_T = 0.145 + (T_j * 9.5 * 10^{-4})$$

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