GC6D08065A

Silicon Carbide Schottky Diode

Features

- Low Forward Voltage Drop (V_F)
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Low Leakage Current (I_r)
- Temperature-Independent Switching Behavior
- Positive Temperature Coefficient on V_F

V_{RRM}	=	650 V
I_F (T_C=155˚C)	=	8 A
Q_c	=	29 nC

Benefits

- Higher System Level Efficiency
- Increase System Power Density
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switch Mode Power Supplies (SMPS)
- Server/Telecom Power Supplies
- Industrial Power Supplies
- Solar
- UPS

TO-220-2

Package

Part Number	Package	Marking
GC6D08065A	TO-220-2	GC6D08065

Maximum Ratings (T_C = 25 ˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V		
V_{DC}	DC Blocking Voltage	650	V		
I_F	Continuous Forward Current	30 16 8	A	T_C=25˚C T_C=125˚C T_C=155˚C	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	37 22	A	T_C=25˚C, t_P = 10 ms, Half Sine Wave T_C=110˚C, t_P=10 ms, Half Sine Wave	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	69 63	A	T_C=25˚C, t_p = 10 ms, Half Sine Wave T_C=110˚C, t_p = 10 ms, Half Sine Wave	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Surge Current	860 790	A	T_C=25˚C, t_P = 10 µs, Pulse T_C=110˚C, t_P = 10 µs, Pulse	Fig. 8
P_{tot}	Power Dissipation	92.6 40.1	W	T_C=25˚C T_C=110˚C	Fig. 4
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C		
	TO-220 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

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Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.27 1.37	1.50 1.60	V	I_F = 8 A T_J=25°C I_F = 8 A T_J=175°C	Fig. 1
I_R	Reverse Current	2 15	40 160	μA	V_R = 650 V T_J=25°C V_R = 650 V T_J=175°C	Fig. 2
Q_C	Total Capacitive Charge	29		nC	V_R = 400 V, I_F = 8A T_J = 25°C	Fig. 5
C	Total Capacitance	518 57 45		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 200 V, T_J = 25°C, f = 1 MHz V_R = 400 V, T_J = 25°C, f = 1 MHz	Fig. 6
E_C	Capacitance Stored Energy	4.4		μJ	V_R = 400 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	1.62	°C/W	Fig. 9

Typical Performance

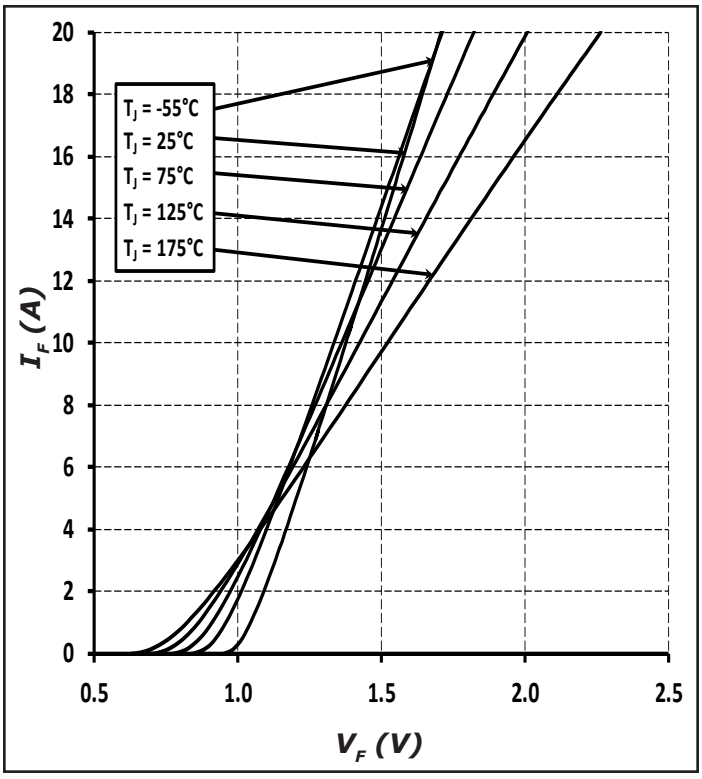

Figure 1. Forward Characteristics

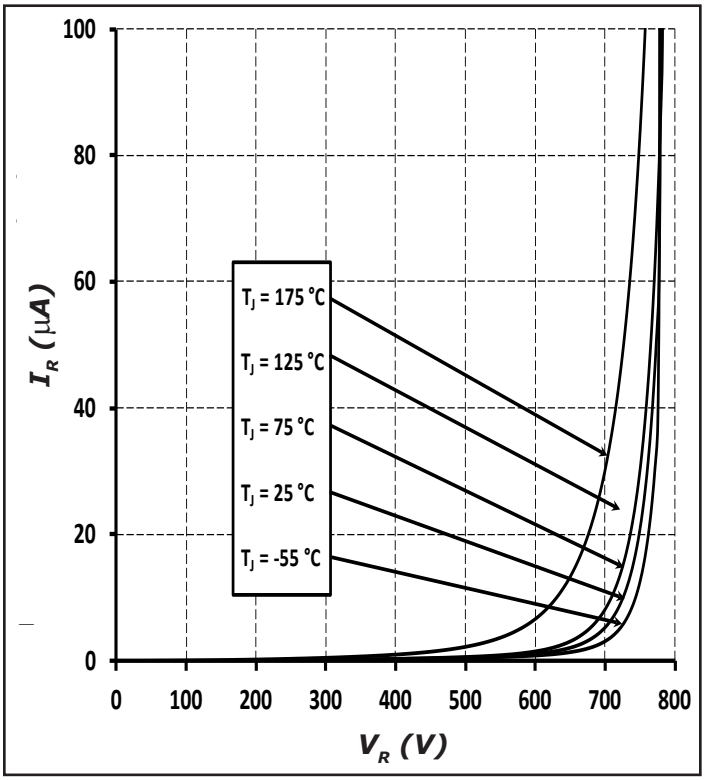

Figure 2. Reverse Characteristics

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Typical Performance

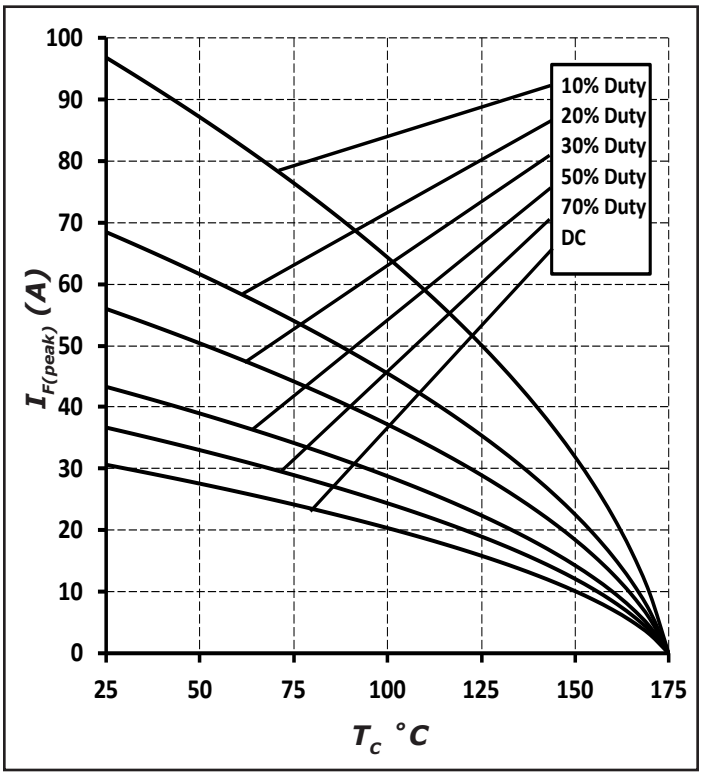

Figure 3. Current Derating

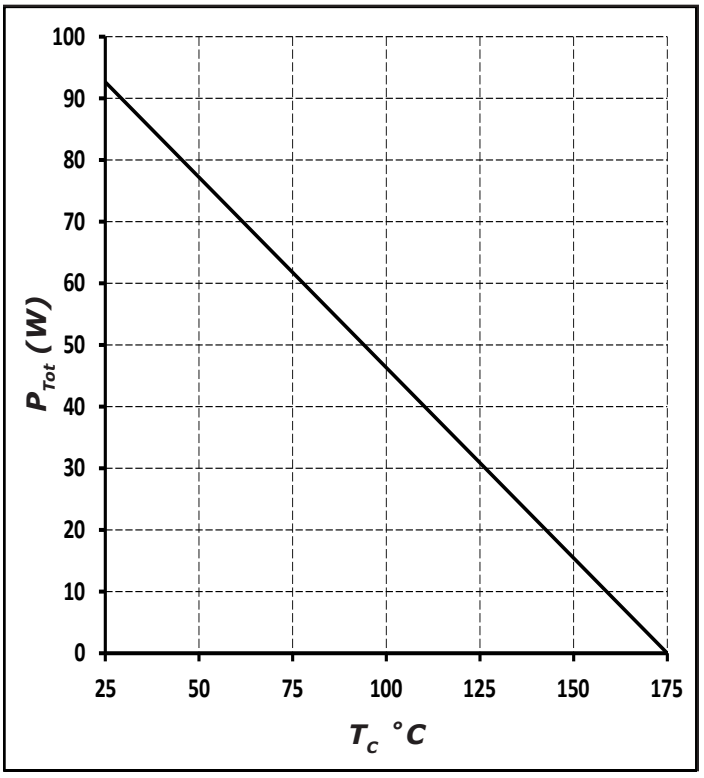

Figure 4. Power Derating

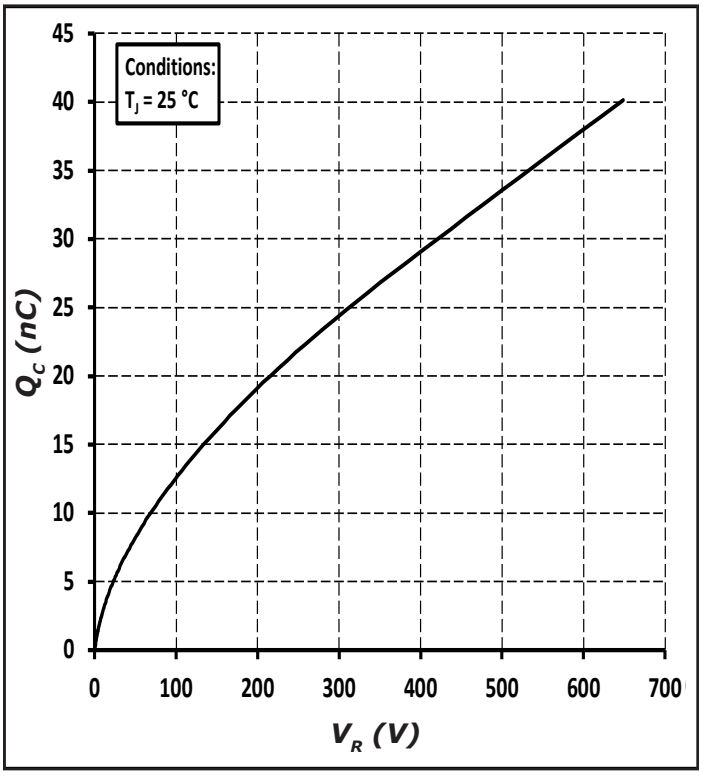

Figure 5. Total Capacitance Charge vs. Reverse Voltage

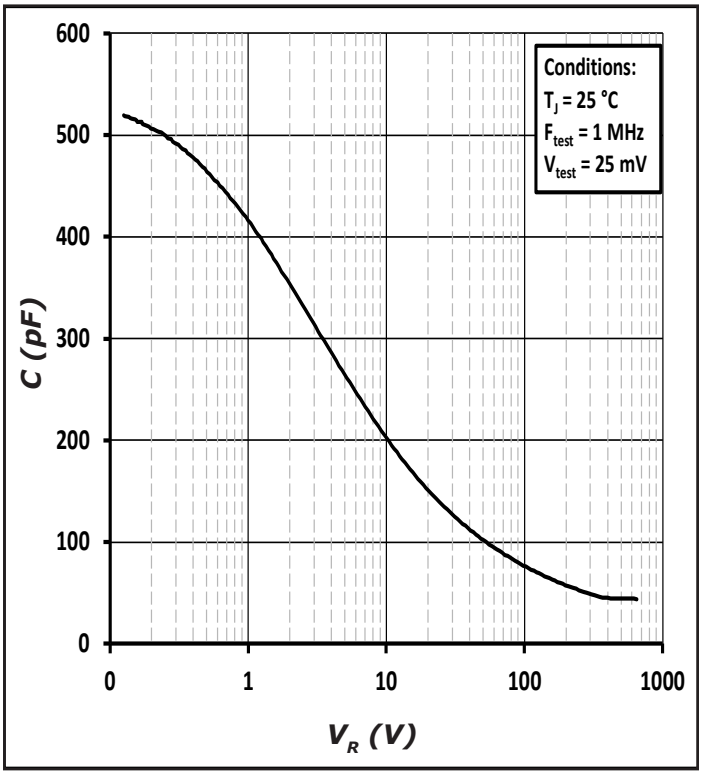

Figure 6. Capacitance vs. Reverse Voltage

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Typical Performance

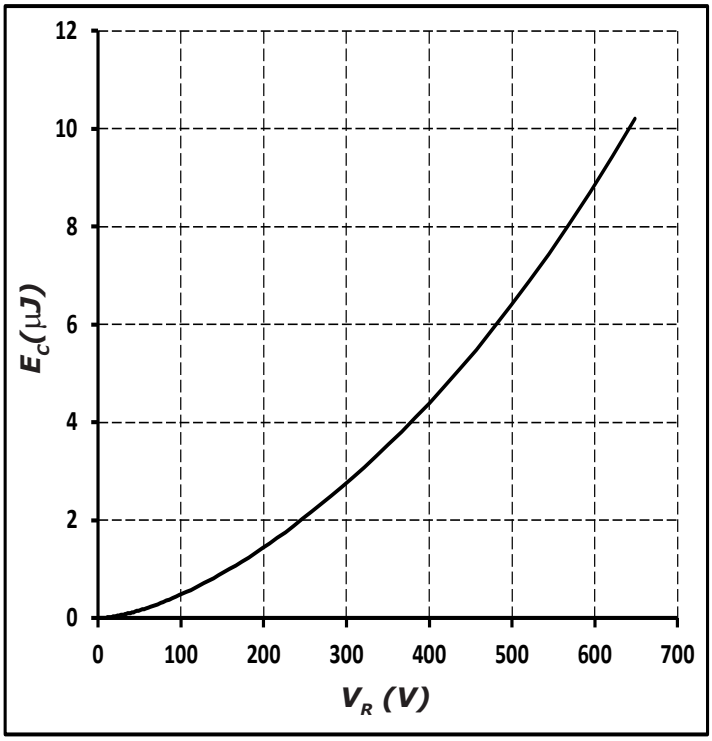

Figure 7. Capacitance Stored Energy

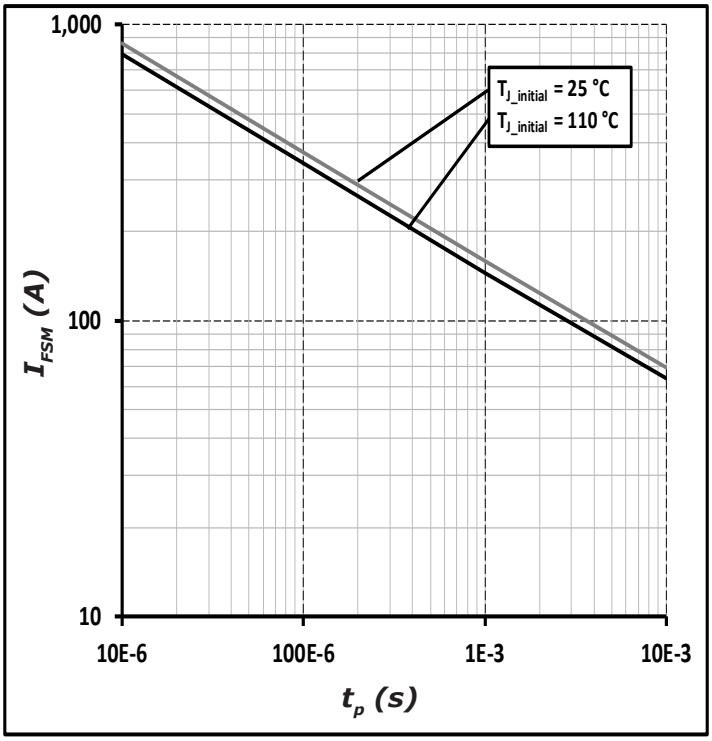

Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

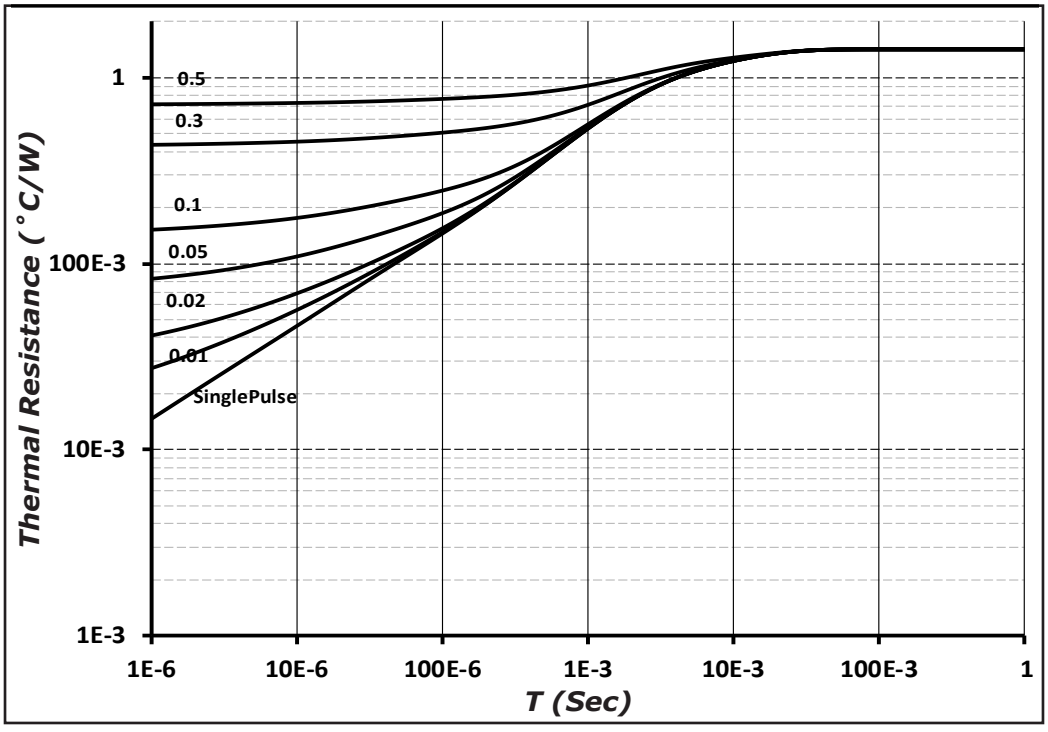

Figure 9. Transient Thermal Impedance

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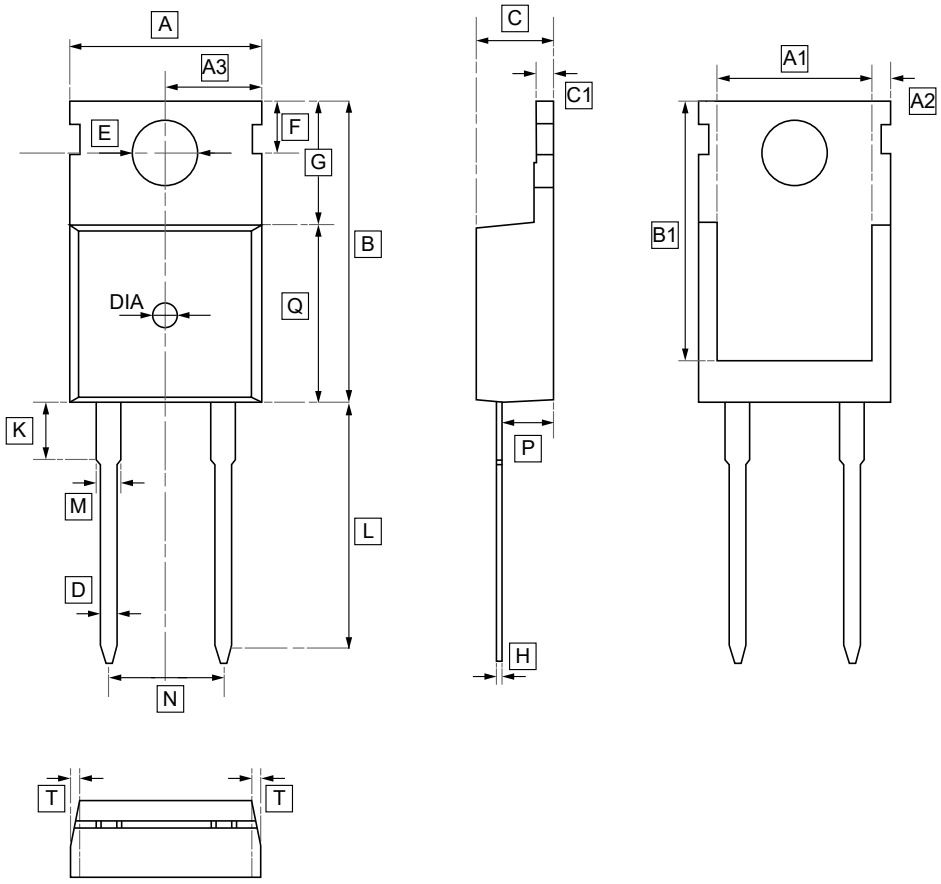
Package Dimensions

Package TO-220-2



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	C	C1	D	E	F	G
Min	9.7	8.44	1.05	4.8	15.4	12.9	4.28	1.1	0.6	3.4	2.65	5.2
Max	10.3	8.84	1.25	5.2	16.2	13.5	4.68	1.5	1.0	3.8	3.25	5.8

Symbol	H	K	L	L1	M	N	P	Q	T	DIA
Min	0.4	2.9	12.8	2.7	1.15	4.98	2.1	8.7	W:0.35	⊙1.5 (deep 0.2)
Max	0.6	3.3	13.6	3.3	1.35	5.18	2.7	9.3		

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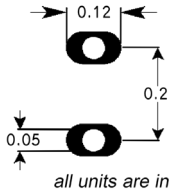
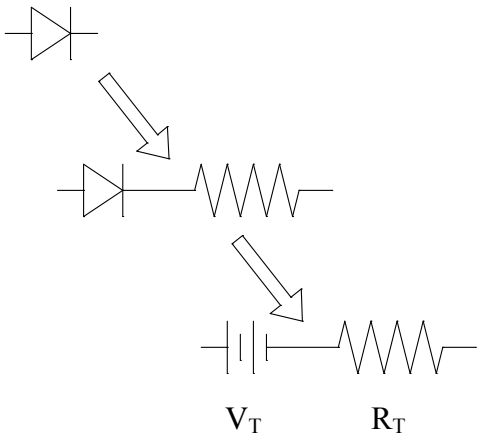
Recommended Solder Pad Layout



TO-220-2

Part Number	Package
GC6D08065A	TO-220-2

Diode Model



$$Vf_T = V_T + If * R_T$$

$$V_T = 0.95 + (T_J * -1.2*10^{-3})$$
$$R_T = 0.054 + (T_J * 5.5*10^{-4})$$

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

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