GC4D15120D

Silicon Carbide Schottky Diode

V_{RRM}	=	1200 V
I_F (T_C=135˚C)	=	24 A**
Q_c	=	74 nC**

Features

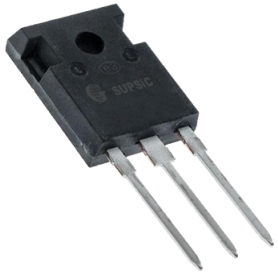
- 1.2-KVolt Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Positive Temperature Coefficient on V_F

Benefits

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

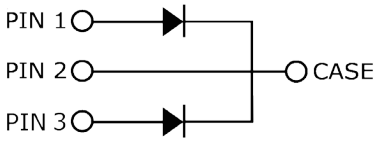
Applications

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



TO-247-3

Package



Part Number	Package
GC4D15120D	TO-247-3

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

Symbol	Parameter	Value		Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1300	V		
V_{DC}	DC Blocking Voltage	1200	V		
I_F	Continuous Forward Current (Per Leg/Device)	24.5/49 12/24 7.5/15	A	T_C=25˚C T_C=135˚C T_C=157˚C	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	38* 25*	A	T_C=25˚C, t_P=10 ms, Half Sine Pulse T_C-110˚C, t_P=10 ms, Half Sine Pulse	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	66* 49.5*	A	T_C=25˚C, t_P=10 ms, Half Sine Pulse T_C=110˚C, t_P=10 ms, Half Sine Pulse	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Current	600* 480*	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(Per Leg/Device)	135/270 58.5/117	W	T_C=25˚C T_C=110˚C	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	V_R=0-960V	
$\int i^2dt$	i^2t value	20.5* 12.25*	A^2s	T_C=25˚C, t_P=10 ms T_C=110˚C, t_P=10 ms	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C		
	TO-247 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

Electrical Characteristics (Per Leg)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 2.2	1.8 3	V	I_F = 8 A T_J=25°C I_F = 8 A T_J=175°C	Fig. 1
I_R	Reverse Current	35 100	250 350	μA	V_R = 1200 V T_J=25°C V_R = 1200 V T_J=175°C	Fig. 2
Q_C	Total Capacitive Charge	37		nC	V_R = 800 V, I_F = 8 A di/dt = 200 A/μs T_J = 25°C	Fig. 5
C	Total Capacitance	560 37 27		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 400 V, T_J = 25°C, f = 1 MHz V_R = 800 V, T_J = 25°C, f = 1 MHz	Fig. 6
E_C	Capacitance Stored Energy	10.5		μJ	V_R = 800 V	Fig. 7

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

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.11* 0.56**		°C/W	Fig. 9

* Per Leg, ** Per Device

Typical Performance

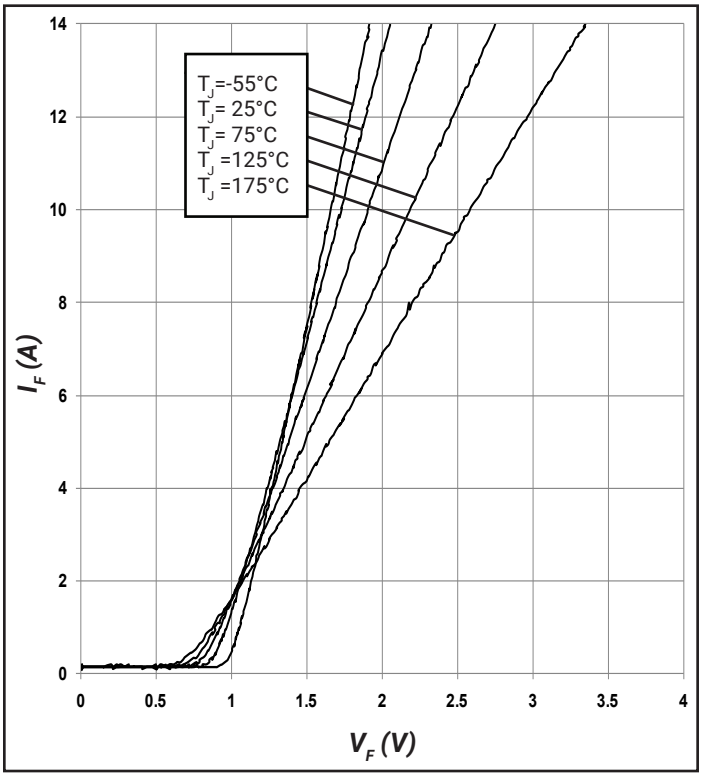


Figure 1. Forward Characteristics

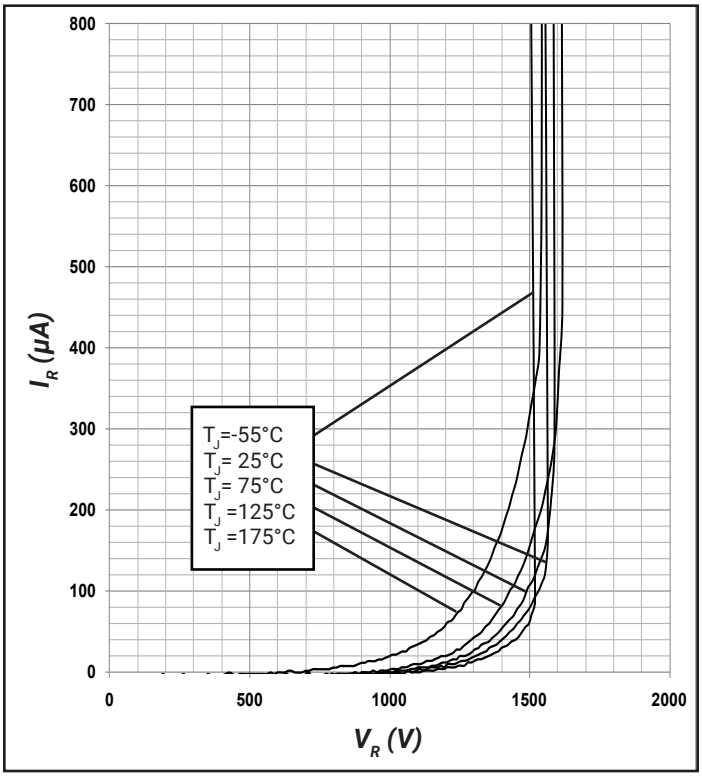


Figure 2. Reverse Characteristics

Typical Performance (Per Leg)

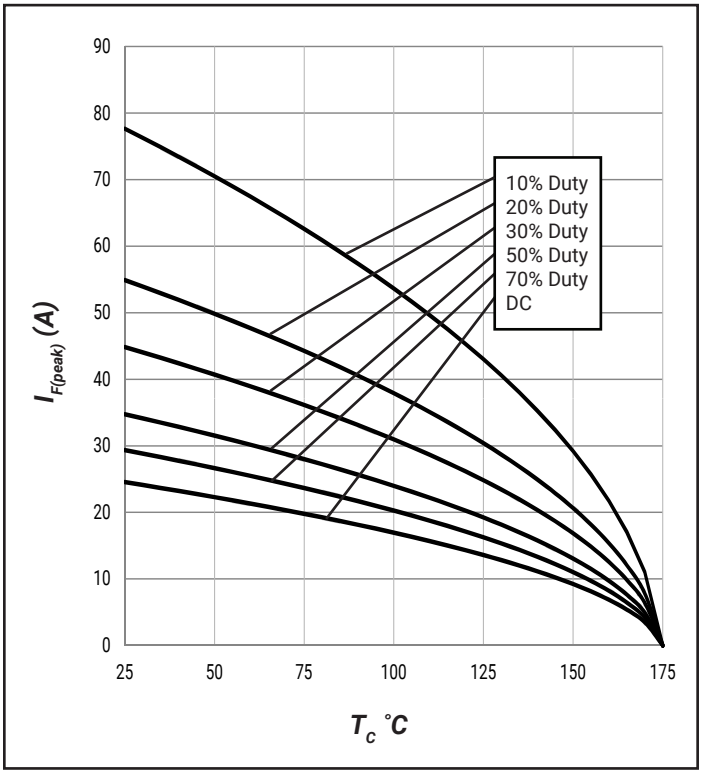


Figure 3. Current Derating

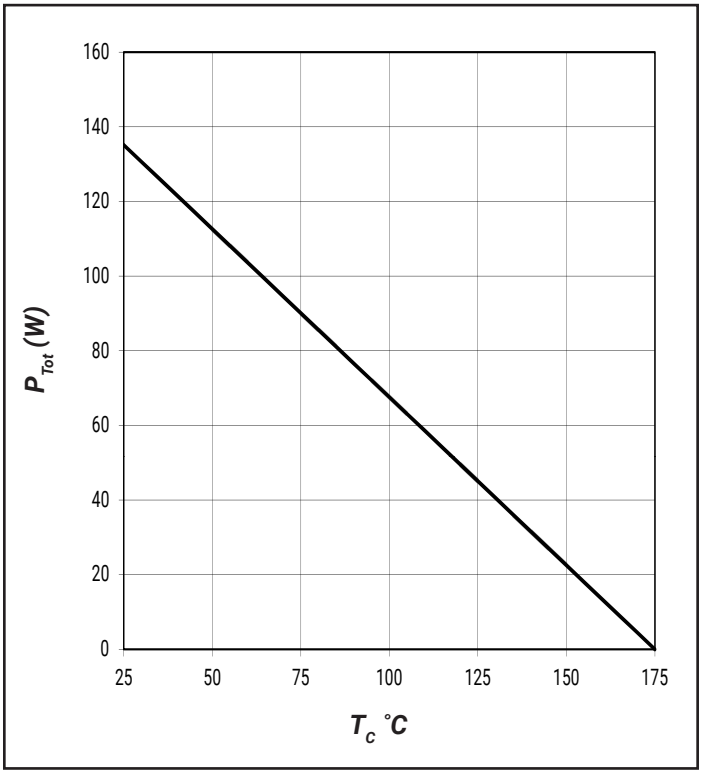


Figure 4. Power Derating

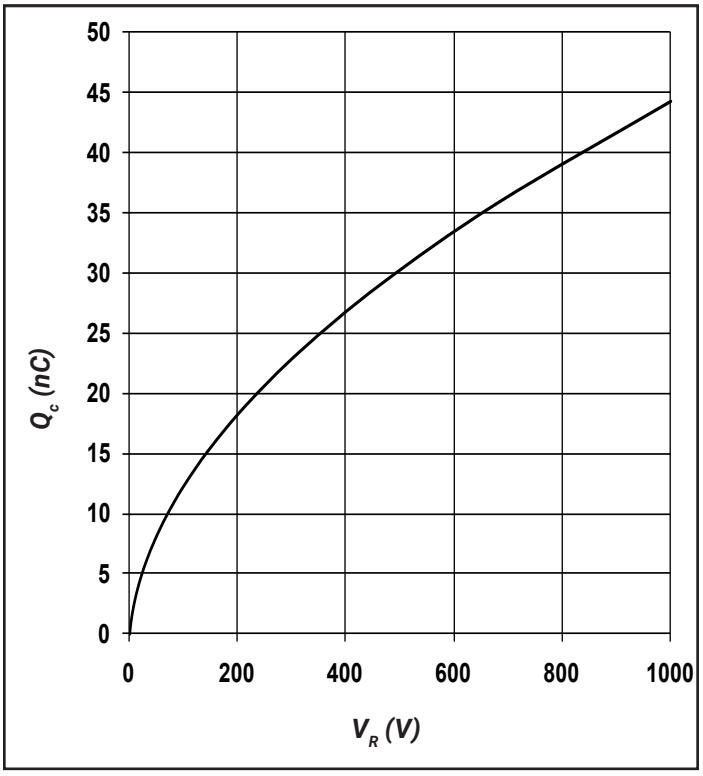


Figure 5. Recovery Charge vs. Reverse Voltage

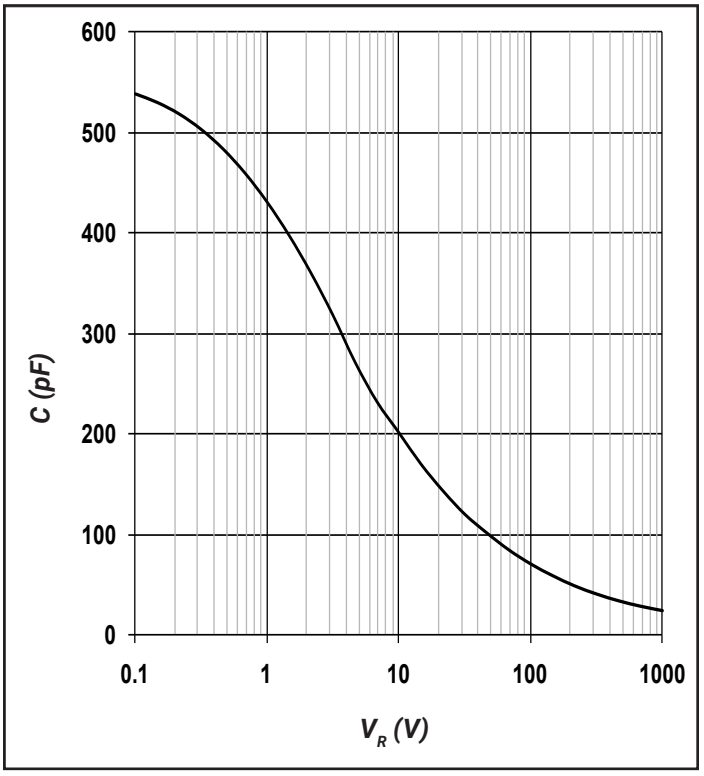


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

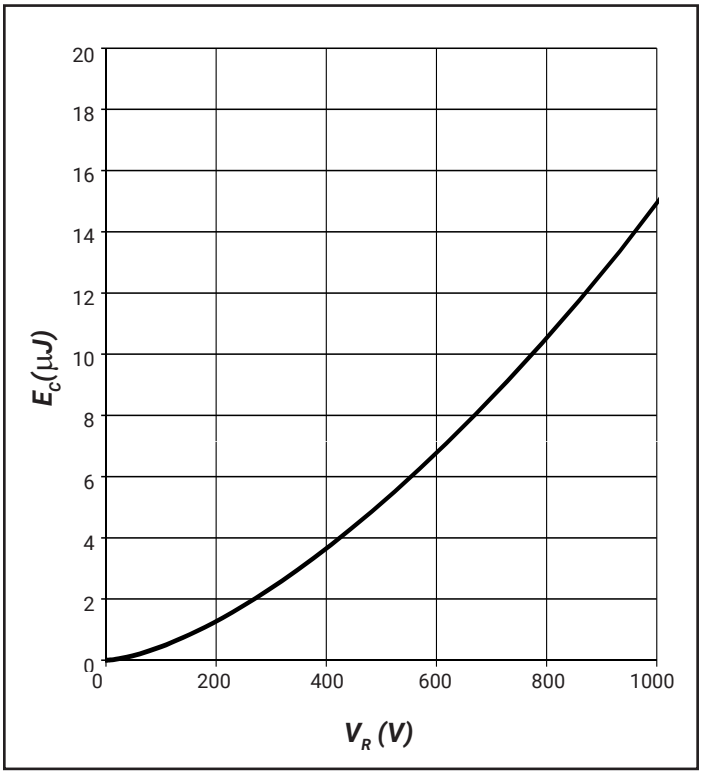


Figure 7. Typical Capacitance Stored Energy, per leg

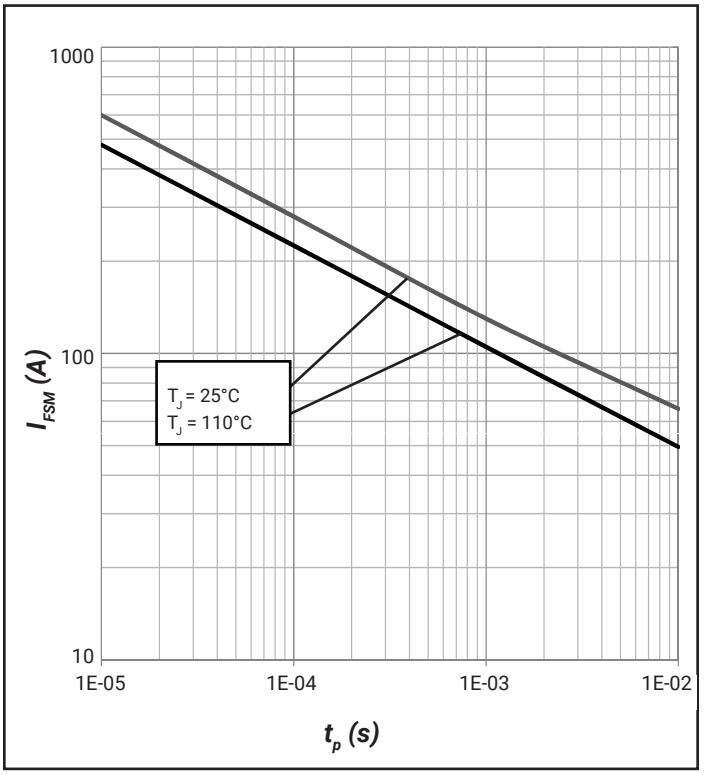


Figure 8. Non-repetitive Peak Forward Surge Current vs. Pulse Duration (sinusoidal waveform), per leg

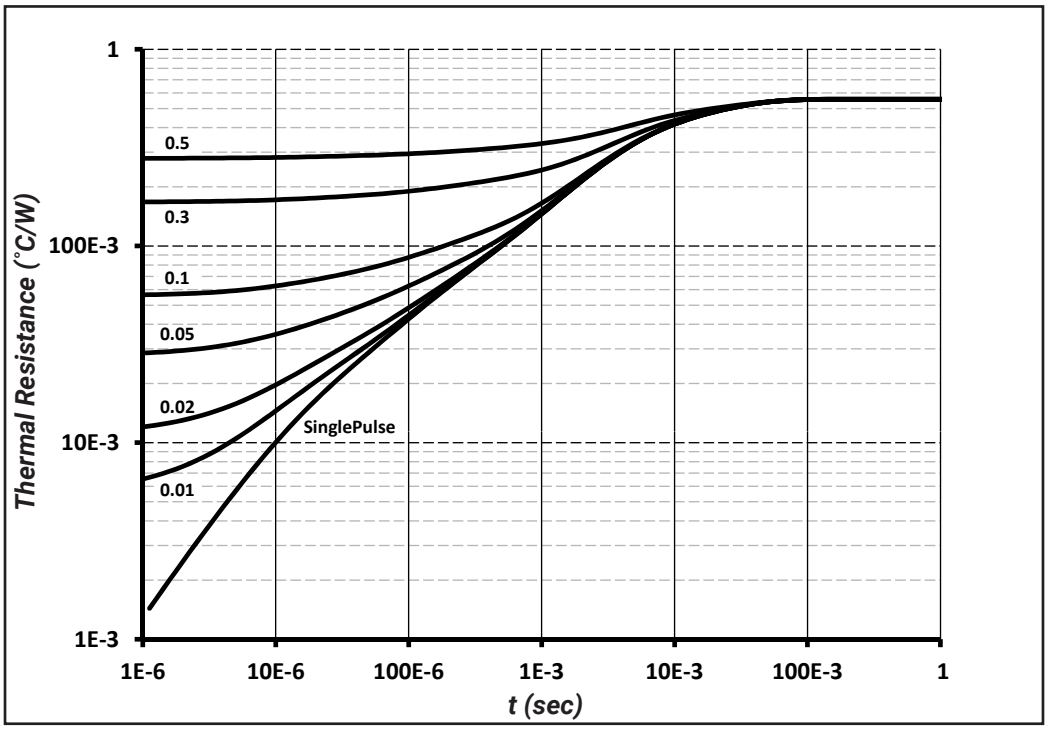
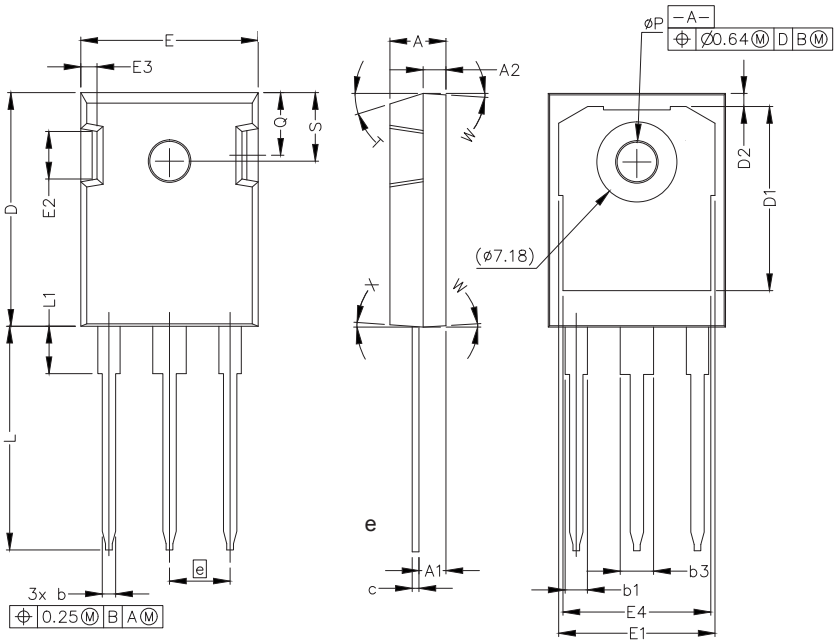
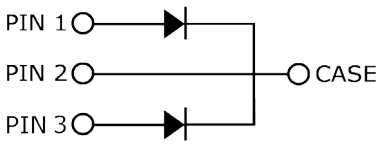


Figure 9. Device Transient Thermal Impedance

Package Dimensions

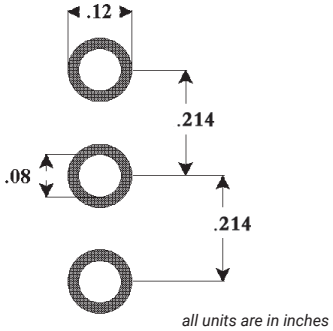
Package TO-247-3





POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b3	.113	.133	2.87	3.38
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
N	3			
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	17.5° REF			
W	3.5° REF			
X	4° REF			

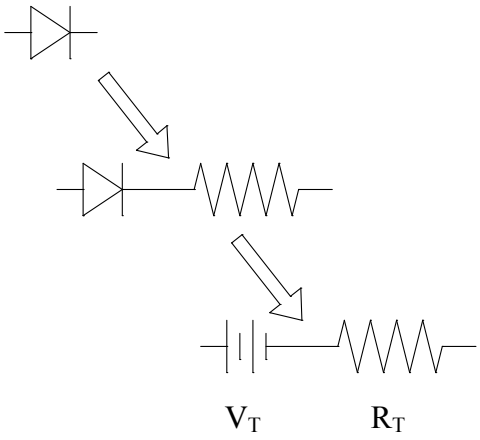
Recommended Solder Pad Layout



TO-247-3

Part Number	Package
GC4D15120D	TO-247-3

Diode Model



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

$$V_T = 0.96 + (T_J * -2.1*10^{-3})$$
$$R_T = 0.06 + (T_J * 8.0*10^{-4})$$

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

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