

Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- 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
GC4D15120H	TO-247-2	GC4D15120

V_{RRM}	=	1200 V
$I_F(T_c=135^\circ\text{C})$	=	19 A
Q_c	=	77.5 nC



TO-247-2

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	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1300	V		
V_R	DC Peak Reverse Voltage	1200	V		
I_F	Continuous Forward Current	39 19 15	A	$T_c=25^\circ\text{C}$ $T_c=135^\circ\text{C}$ $T_c=147^\circ\text{C}$	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	64 42	A	$T_c=25^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$ $T_c=110^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$	
I_{FSM}	Non-Repetitive Forward Surge Current	87 72	A	$T_c=25^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$ $T_c=110^\circ\text{C}, t_p=10\text{ ms}, \text{Half Sine Pulse}$	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Current	900 750	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	174.5 75.5	W	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	$V_R=0-960\text{V}$	
$\int i^2 dt$	i^2t value	38 26	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	$^\circ\text{C}$		
	TO-247 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 2.3	1.8 3	V	$I_F = 15\text{ A } T_J = 25^\circ\text{C}$ $I_F = 15\text{ A } T_J = 175^\circ\text{C}$	Fig. 1
I_R	Reverse Current	35 120	200 300	μA	$V_R = 1200\text{ V } T_J = 25^\circ\text{C}$ $V_R = 1200\text{ V } T_J = 175^\circ\text{C}$	Fig. 2
Q_C	Total Capacitive Charge	77.5		nC	$V_R = 800\text{ V}, I_F = 15\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	1200 70 50		pF	$V_R = 0\text{ V}, T_J = 25^\circ\text{C}, f = 1\text{ MHz}$ $V_R = 400\text{ V}, T_J = 25^\circ\text{C}, f = 1\text{ MHz}$ $V_R = 800\text{ V}, T_J = 25^\circ\text{C}, f = 1\text{ MHz}$	Fig. 6
E_C	Capacitance Stored Energy	22		μJ	$V_R = 800\text{ V}$	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	0.86	$^\circ\text{C}/\text{W}$	Fig. 9

Typical Performance

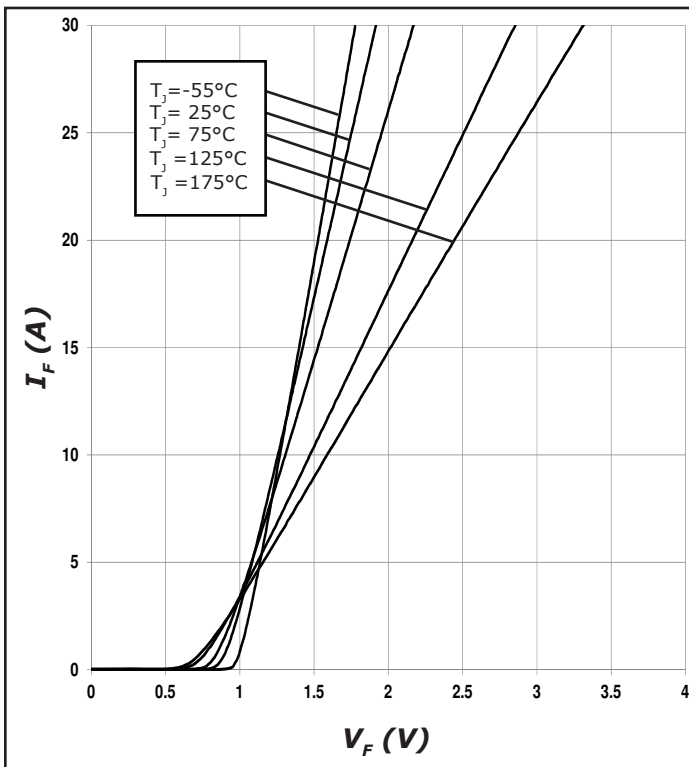


Figure 1. Forward Characteristics

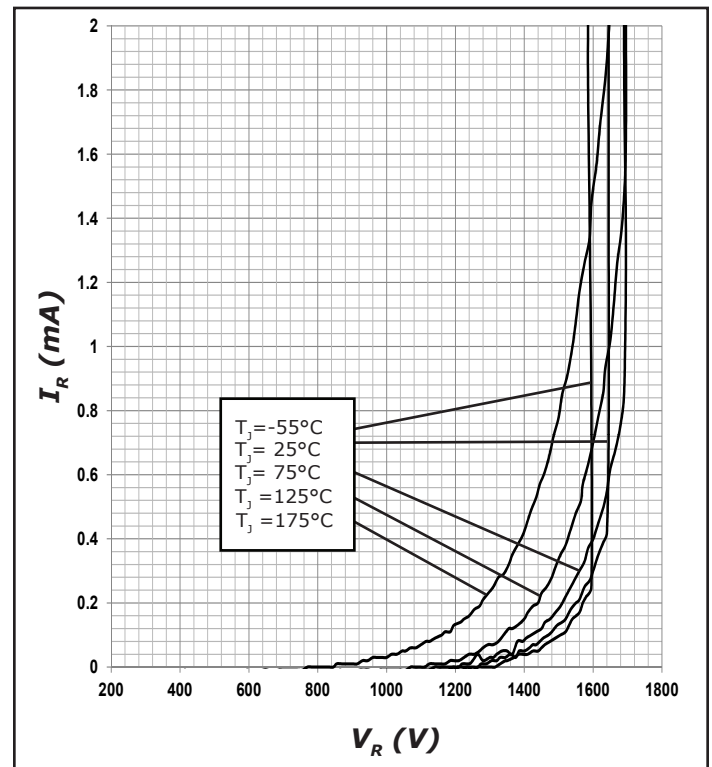


Figure 2. Reverse Characteristics

Typical Performance

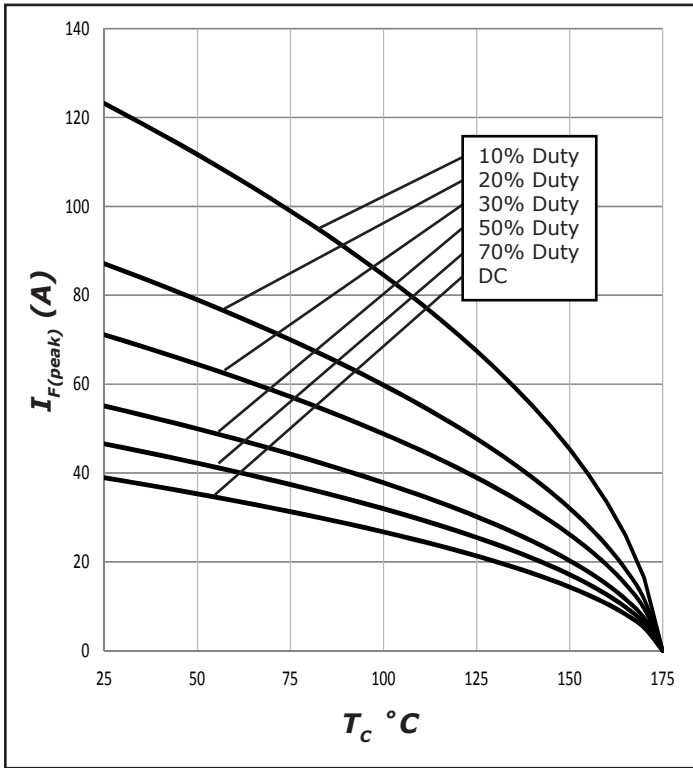


Figure 3. Current Derating

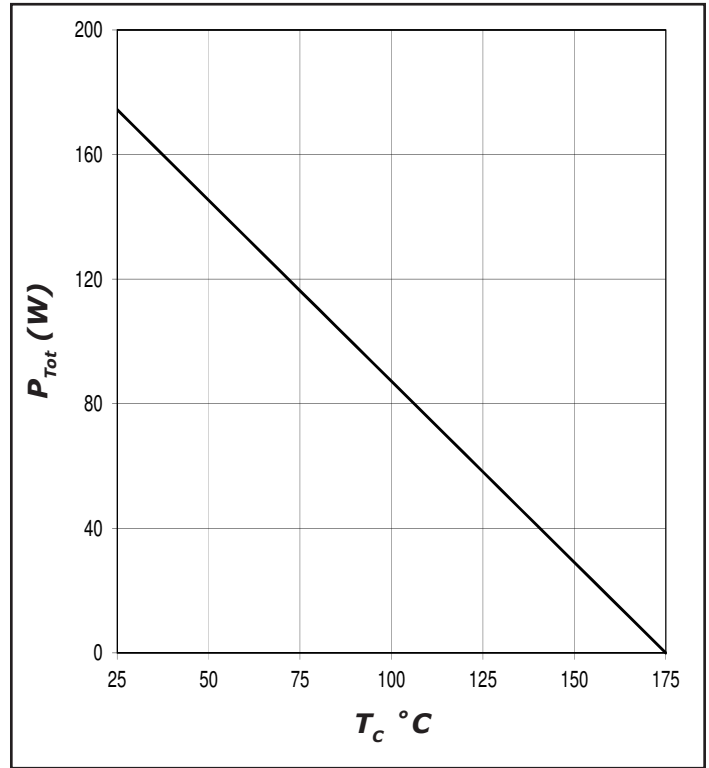


Figure 4. Power Derating

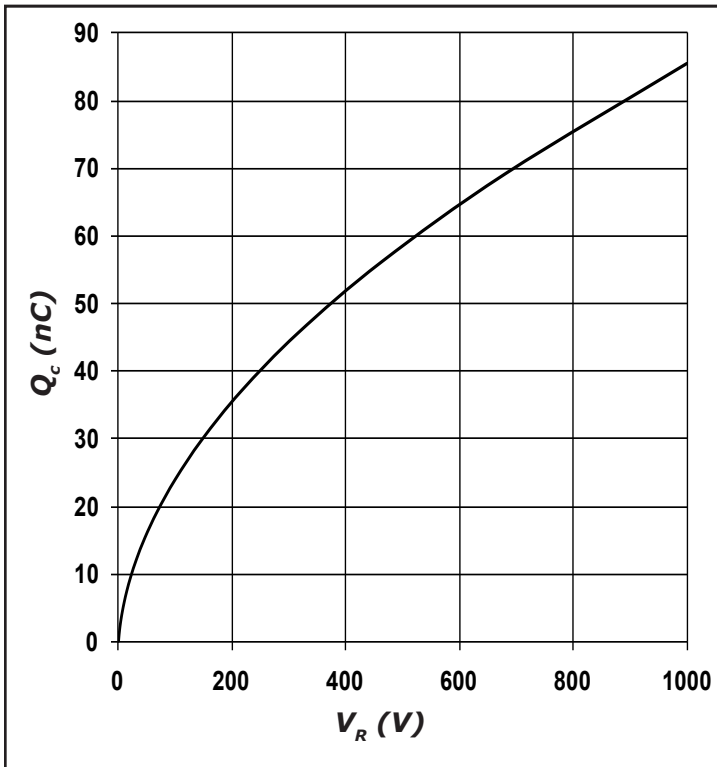


Figure 5. Recovery Charge vs. Reverse Voltage

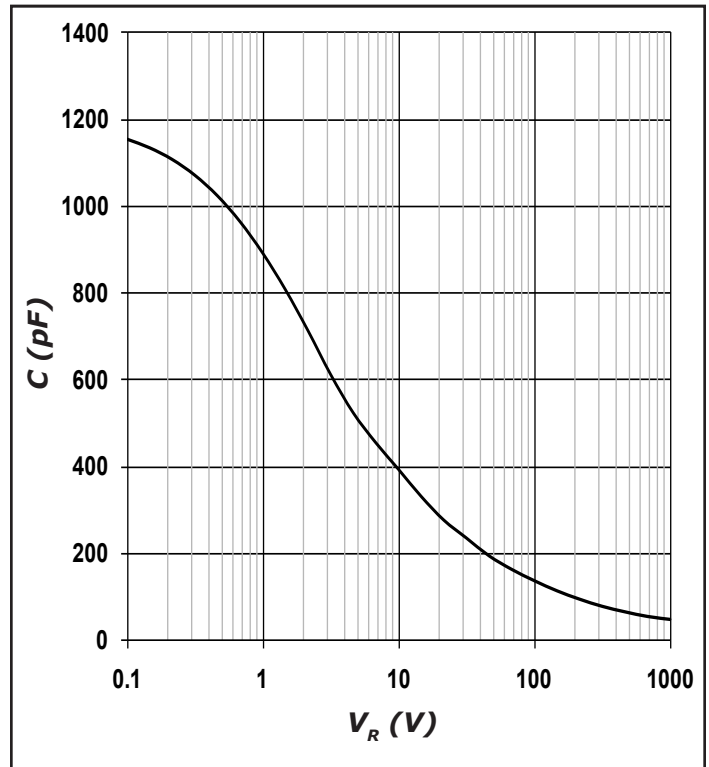


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

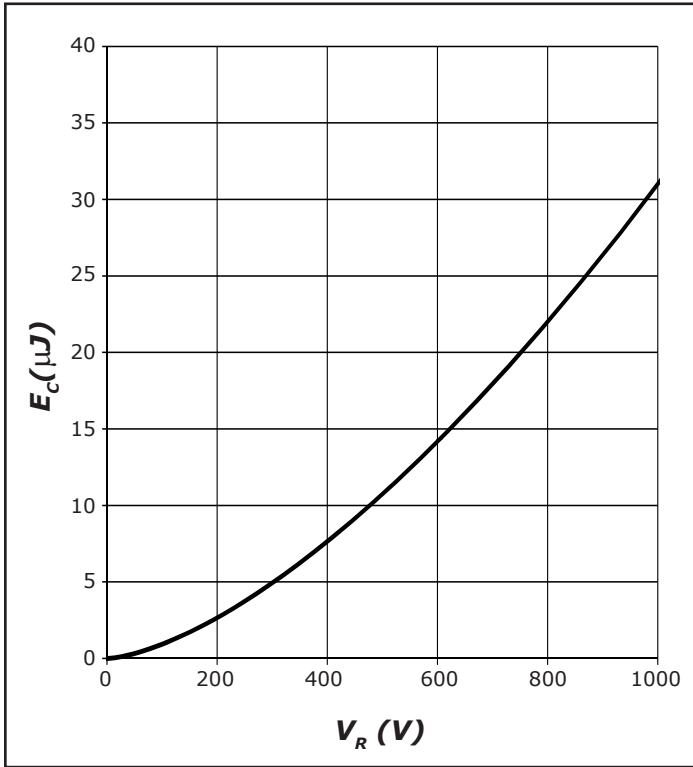


Figure 7. Typical Capacitance Stored Energy

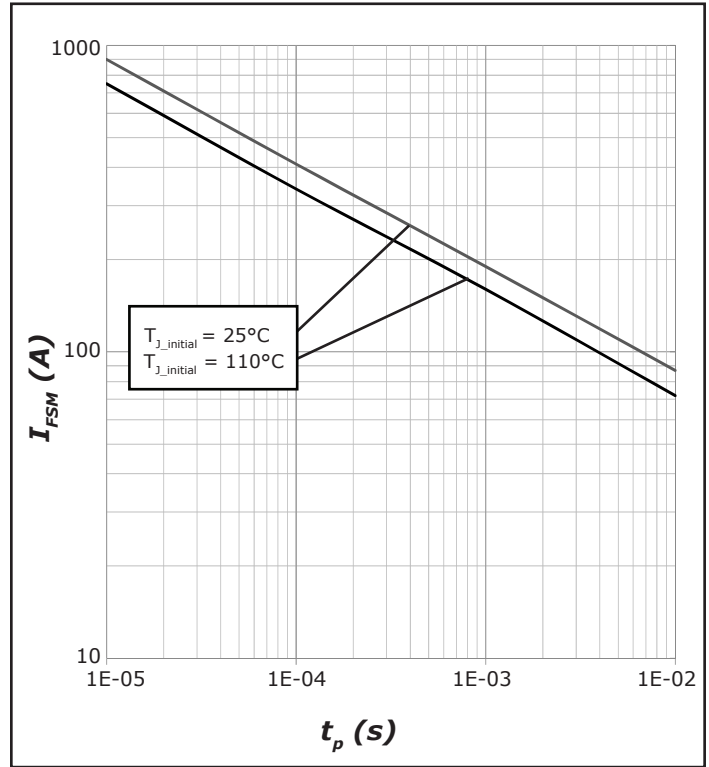


Figure 8. Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

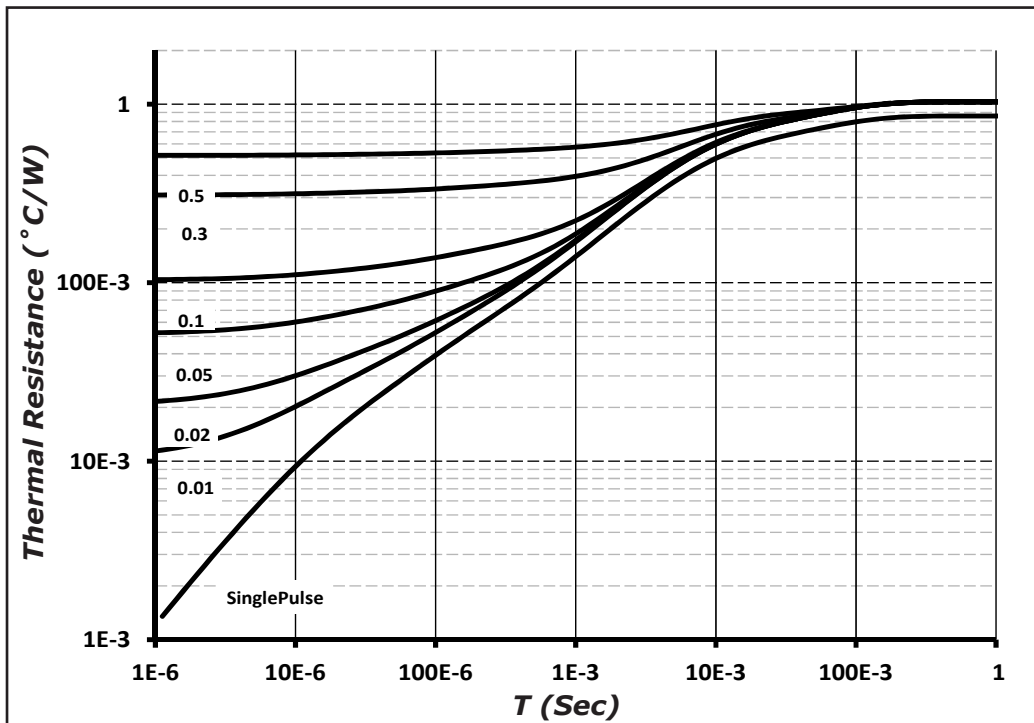
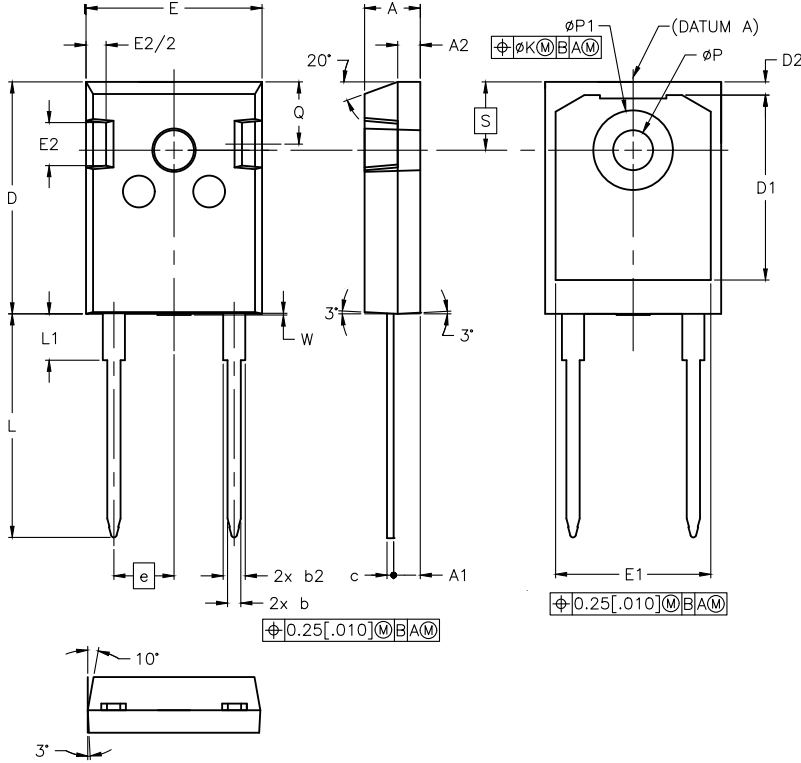


Figure 9. Transient Thermal Impedance

Package Dimensions

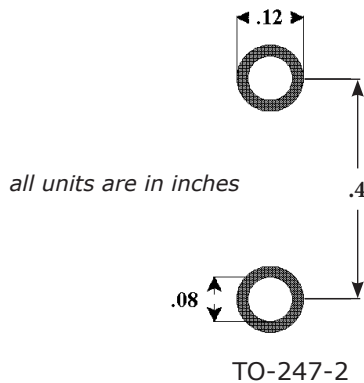
Package TO-247-2



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.70	5.31
A1	.087	.102	2.21	2.59
A2	.059	.098	1.50	2.49
b	.039	.055	0.99	1.40
b2	.065	.094	1.65	2.39
c	.015	.035	0.38	0.89
D	.819	.845	20.80	21.46
D1	.515	-	13.08	-
D2	.020	.053	0.51	1.35
E	.620	.640	15.49	16.26
E1	.530	-	13.46	-
E2	.135	.157	3.43	3.99
e	.214		5.44	
ØK	.010		0.25	
L	.780	.800	19.81	20.32
L1	-	.177	-	4.50
ØP	.140	.144	3.56	3.66
ØP1	.278	.291	7.06	7.39
Q	.212	.244	5.38	6.20
S	.243		6.17	
W	-	.006	-	0.15

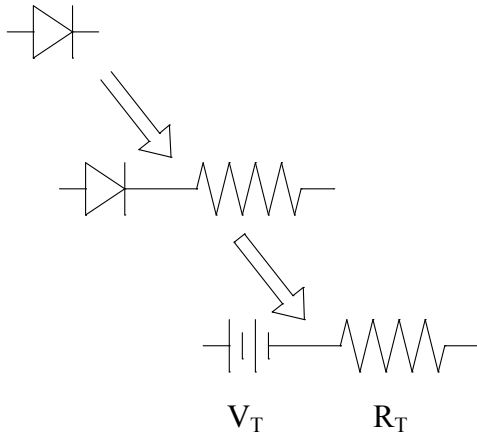


Recommended Solder Pad Layout



Part Number	Package
GC4D15120H	TO-247-2

Diode Model



$$Vf_T = V_T + If * R_T$$

$$V_T = 0.97 + (T_j * -2.12 * 10^{-3})$$

$$R_T = 0.031 + (T_j * 3.92 * 10^{-4})$$

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