SUPSiC®

无锡国晶微半导体技术有限公司
Wuxi Gwok Semiconductor Co.,Ltd

GC3D16065A

Silicon Carbide Schottky Diode

Features

- 650 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

V_{RRM} = 650 V
I_F (T_c=135˚C) = 18 A
Q_c = 44.5 nC

Benefits

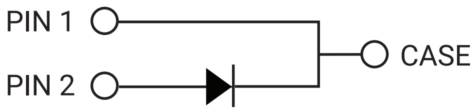
- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

TO-220-2

Applications

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

Package



Part Number	Package	Marking
GC3D16065A	TO-220-2	GC3D16065

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

Symbol	Parameter	Value		Test Conditions
V_{RRM}	Repetitive Peak Reverse Voltage	650	V	
V_{RSM}	Surge Peak Reverse Voltage	650	V	
V_{DC}	DC Blocking Voltage	650	V	
I_F	Continuous Forward Current	39 18 16	A	T_C=25˚C T_C=135˚C T_C=142˚C
I_{FRM}	Repetitive Peak Forward Surge Current	66 46	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	162 150	A	T_C=25˚C, t_P=10 ms, Half Sine Pulse T_C=110˚C, t_P=10 ms, Half Sine Pulse
$I_{F,Max}$	Non-Repetitive Peak Forward Current	1400 1200	A	T_C=25˚C, t_P=10 µs, Pulse T_C=110˚C, t_P=10 µs, Pulse
P_{tot}	Power Dissipation	150 65	W	T_C=25˚C T_C=110˚C
dV/dt	Diode dV/dt ruggedness	200	V/ns	V_R=0-600V
$\int i^2dt$	i^2t value	131 112.5	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-220 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_F	Forward Voltage	1.5 2.0	1.8 2.4	V	I_F = 16 A T_J=25°C I_F = 16 A T_J=175°C
I_R	Reverse Current	18.5 38.5	95 378	μA	V_R = 650 V T_J=25°C V_R = 650 V T_J=175°C
Q_C	Total Capacitive Charge	44.5		nC	V_R = 400 V, I_F = 16 A di/dt = 500 A/μs T_J = 25°C
C	Total Capacitance	877.5 80 64		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
E_C	Capacitance Stored Energy	6.2		μJ	V_R = 400 V

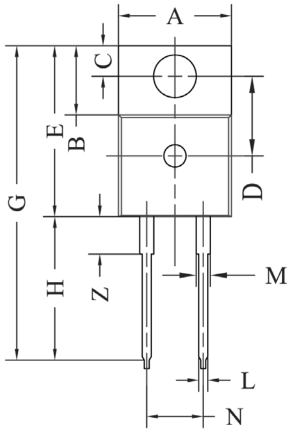
Note:This is a majority carrier diode, so there is no reverse recovery charge.

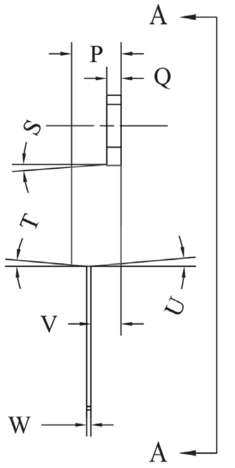
Thermal Characteristics

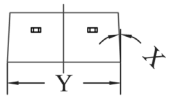
Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1	°C/W

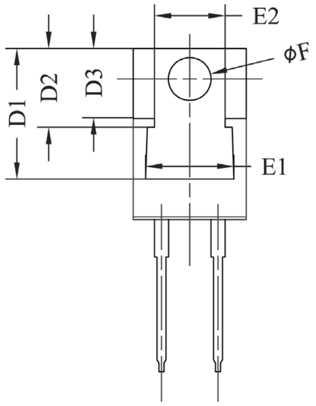
Package Dimensions

Package TO-220-2

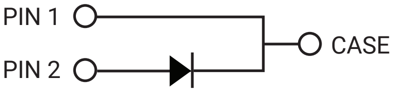








View A-A

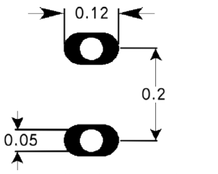


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
D1	.457-.490		11.60-12.45 typ	
D2	.277-.303 typ		7.04-7.70 typ	
D3	.244-.252 typ		6.22-6.4 typ	
E	.590	.615	14.986	15.621
E1	.302	.326	7.68	8.28
E2	.227	251	5.77	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

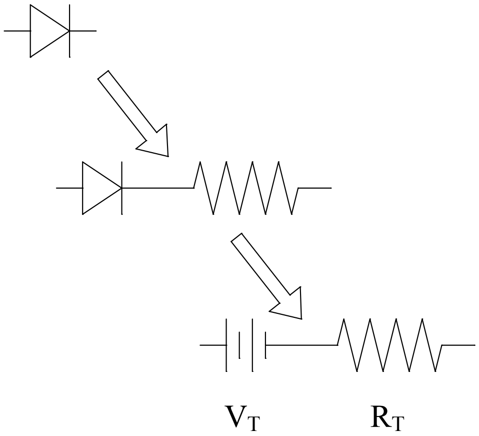


all units are in inches

TO-220-2

Part Number	Package
GC3D16065A	TO-220-2

Diode Model



$$Vf_T = V_T + If * R_T$$

$$V_T = 0.94 + (T_J * -1.0*10^{-3})$$
$$R_T = 0.027 + (T_J * 2.8*10^{-4})$$

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