GC4D60120D

Silicon Carbide Schottky Diode

V_{RRM}	=	1200 V
I_F (T_C=135˚C)	=	76A
Q_c	=	198nC

Features

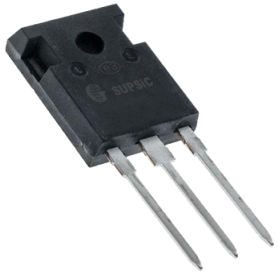
- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching

Benefits

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

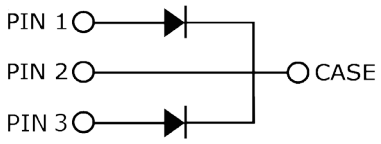
Applications

- 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	Marking
GC4D60120D	TO-247-3	GC4D60120

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

Parameter	Symbol	Conditions	Values	Unit	Note
Repetitive Peak Reverse Voltage (Per Leg)	V_{RRM}		1200	V	
Continuous Forward Current (Per Leg / Per Device)	I_F	T_C = 100°C, D = 1 T_C = 135°C, D = 1 T_C = 148°C, D = 1	55 / 110 38 / 76 30 / 60	A	
Non-Repetitive Peak Forward Surge Current, Half Sine Wave (Per Leg)	$I_{F,SM}$	T_C = 25°C, t_P = 10 ms T_C = 150°C, t_P = 10 ms	240 192	A	
Repetitive Peak Forward Surge Current, Half Sine Wave (Per Leg)	$I_{F,RM}$	T_C = 25°C, t_P = 10 ms T_C = 150°C, t_P = 10 ms	145 100	A	
Non-Repetitive Peak Forward Surge Current (Per Leg)	$I_{F,MAX}$	T_C = 25°C, t_P = 10 µs	1200	A	
i^2t Value (Per Leg)	$\int i^2dt$	T_C = 25°C, t_P = 10 ms	288	A^2s	
Non-Repetitive Avalanche Energy (Per Leg)	E_{AS}	L = 0.6 mH, I_{AS} = 30 A	271	mJ	
Diode Ruggedness (Per Leg)	dV/dt	V_R = 0 ~ 960 V	200	V/ns	
Power Dissipation (Per Leg / Per Device)	P_{TOT}	T_C = 25°C	313 / 626	W	
Operating and Storage Temperature	T_j , T_{stg}		-55 to 175	°C	

Electrical Characteristics (Per Leg)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 1.9	1.8 2.5	V	I_F = 30 A T_J=25°C I_F = 30 A T_J=175°C	
I_R	Reverse Current	2 20	20	μA	V_R = 1200 V T_J=25°C V_R = 1200 V T_J=175°C	
Q_C	Total Capacitive Charge	98		nC	V_R = 800 V, I_F = 30A di/dt = 200 A/μs T_J = 25°C	
C	Total Capacitance	1101 64		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 800 V, T_J = 25°C, f = 1 MHz	

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.48	°C/W	

Forward Curve Model Equation:

$I_F = (V_F - V_{BI})/R_{DIFF}$ (A)

Built-In Voltage (V_{BI}):

$V_{BI}(T_j) = m \times T_j + n$ (V)

m = -0.00119 (V/°C)

n = 1.01 (V)

Differential Resistance (R_{DIFF}):

$R_{DIFF}(T_j) = a \times T_j^2 + b \times T_j + c$ (Ω)

a = 3.97e-07 (Ω/°C^2)

b = 5.5e-05 (Ω/°C)

c = 0.0163 (Ω)

Forward Power Loss Equation:

$P_{LOSS} = V_{BI}(T_j) \times I_{AVG} + R_{DIFF}(T_j) \times I_{RMS}^2$