MCRK2201200SG3

Silicon Carbide Schottky Diode

V_{RRM} = 1200 V

$I_{F;\ T_C<135°C}$ = 26 A

Q_c = 99 nC

Benefits

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

General Features

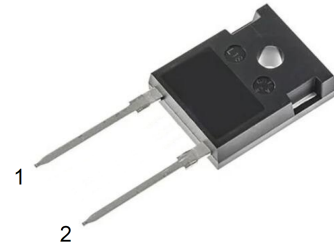- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching
- Positive Temperature Coefficient on VF
- Increased Creepage/Clearance Distance

Application

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

Package   TO-247-2

Equivalent Circuit

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Repetitive Peak Reverse Voltage		V_{RRM}	1200	V
Surge Peak Reverse Voltage		V_{RSM}	1300	V
DC Blocking Voltage		V_{DC}	1200	V
Forward Current(Fig.3)	T_C ≤ 25 ℃	I_F	54	A
	T_C ≤ 135 ℃		26	
	T_C ≤ 156 ℃		20	
Non-Repetitive Forward Surge Current(Fig.8)	T_C=25°C, t_P=10 ms, Half Sine Pulse T_C=110°C, t_P=10 ms, Half Sine Pulse	I_{FSM}	130 104	A
Repetitive Peak Forward Surge Current	T_C=25°C, t_P=10 ms, Half Sine Pulse T_C=110°C, t_P=10 ms, Half Sine Pulse	I_{FRM}	86 56	A
Non-Repetitive Peak Forward Current(Fig.8)	T_C=25°C, t_P=10 us, Pulse T_C=110°C, t_P=10us, Pulse	$I_{F,max}$	1150 650	A
Power Dissipation(Fig.4)	T_C =25℃ T_C =110 ℃	P_{tot}	246 106.5	W
Diode dV/dt ruggedness	V_R=0-960V	dV/dt	200	V/ns
I_2t value	T_C=25°C, t_P=10 ms T_C=110°C, t_P=10 ms	$\int i^2 dt$	84.5 54	A²S
Operating Junction and Storage Temperature		T_J, T_{stg}	-55 ~+175	℃
TO-247 Mounting Torque	M3 Screw 6-32 Screw		1 8.8	Nm lbf-in

Electrical Characteristics

| Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_F	Forward Voltage(Fig.1)	I_F = 20A, T_J= 25℃	--	1.5	1.8	V
		I_F = 20A, T_J = 175℃	--	2.2	3.0	V
I_R	Reverse Current(Fig.2)	V_R = 1200V, T_J = 25℃	--	35	200	uA
		V_R = 1200V, T_J = 175℃	--	65	400	uA
Q_C	Total Capacitive Charge(Fig.5)	V_R = 800V, I_F = 20A di/dt = 200A/µs, T_J = 25℃	--	99	--	nC
C	Total Capacitance(Fig.6)	V_R = 0V, T_J = 25℃, f = 1MHz	--	1500	--	pF
		V_R = 400V, T_J = 25℃, f = 1MHz	--	93	--	pF
		V_R = 800V, T_J = 25℃, f = 1MHz	--	67	--	pF
$R_{θJC}$	Thermal Resistance from Junction to Case (Fig.9)		--	0.61	--	℃/W
E_C	Capacitance Stored Energy(Fig.7)	V_R = 800V	--	28	--	uJ

Typical Performance
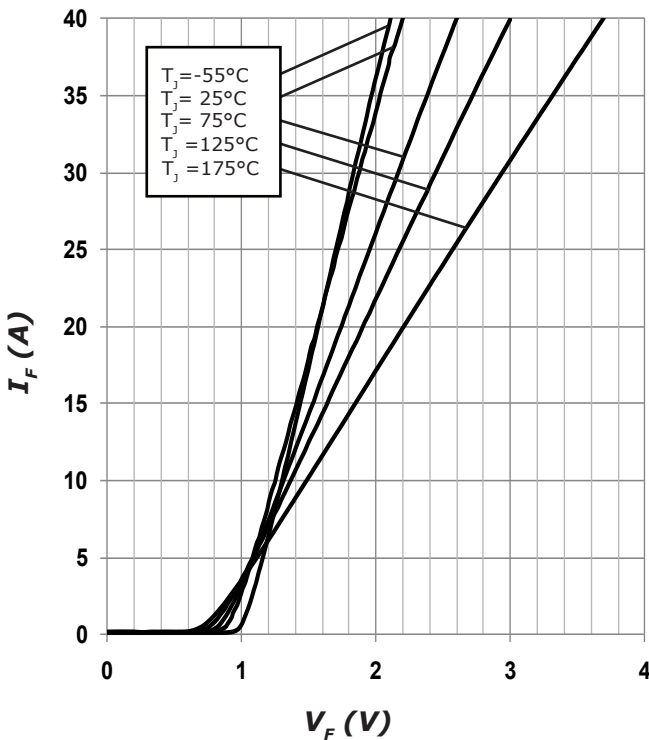
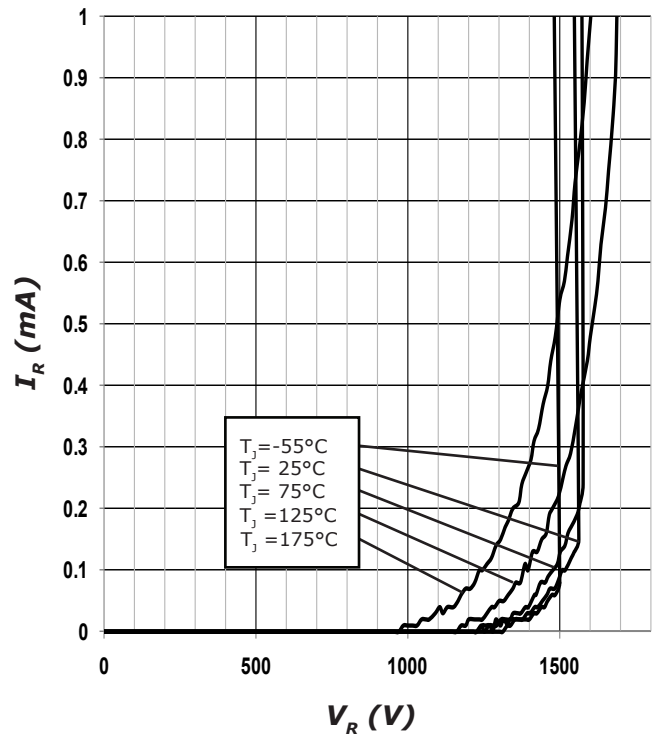Figure 1. Forward Characteristics

Figure 2. Reverse Characteristics

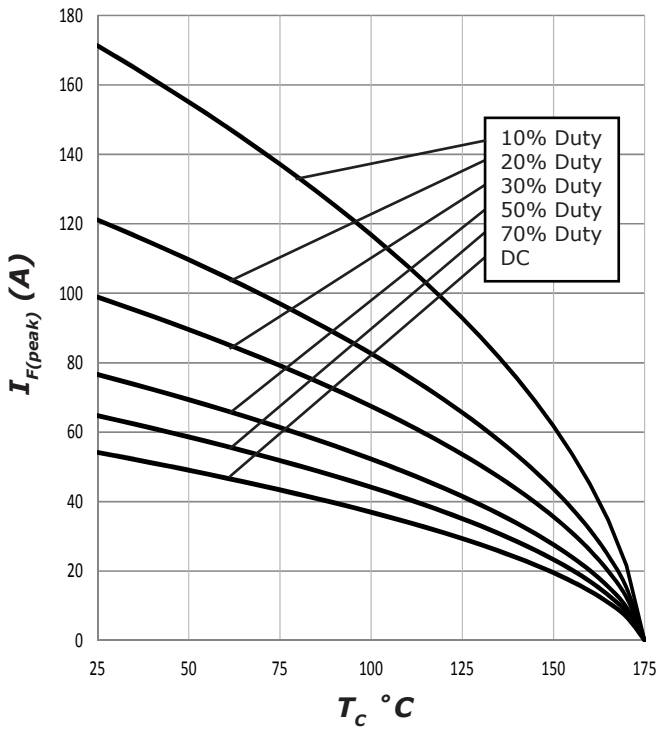## ■ Typical Performance

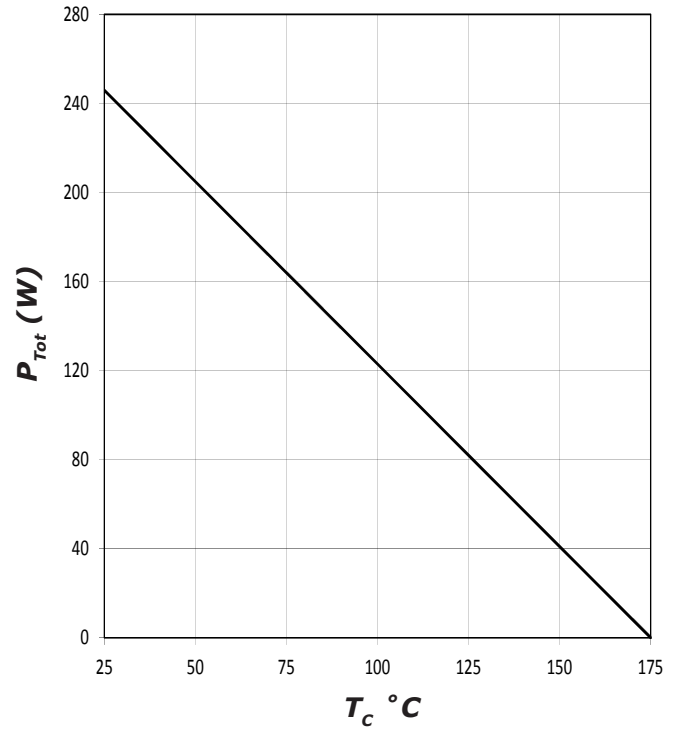Figure 3. Current Derating

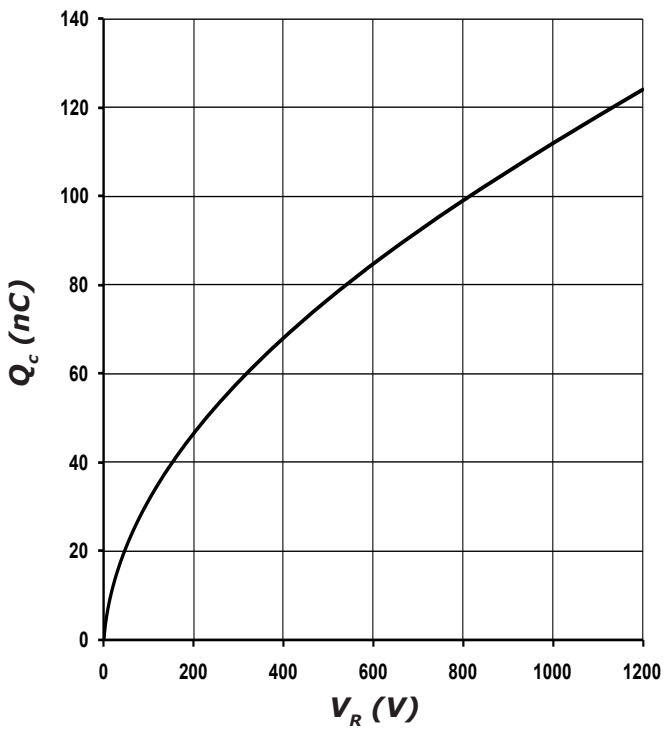Figure 4. Power Derating

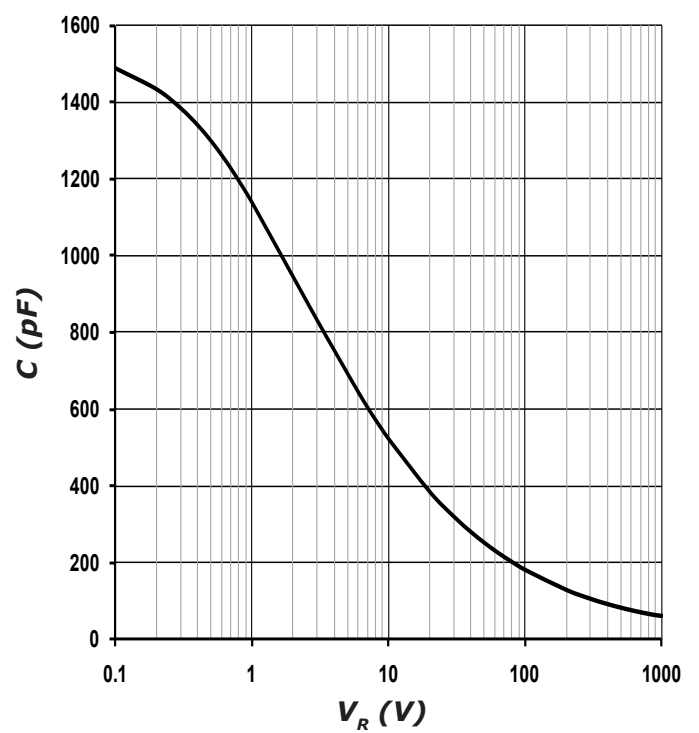Figure 5. Recovery Charge vs. Reverse Voltage

Figure 6. Capacitance vs. Reverse Voltage
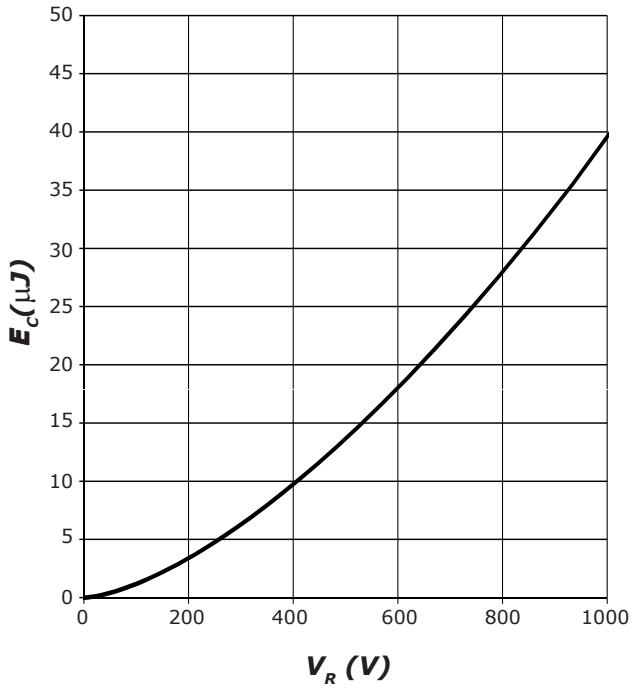
■ Typical Performance
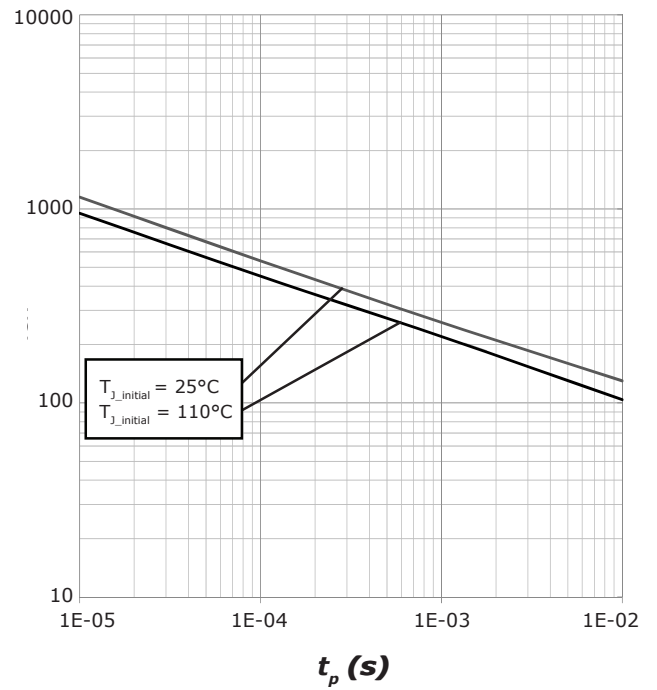

Figure 7. Typical Capacitance Stored Energy

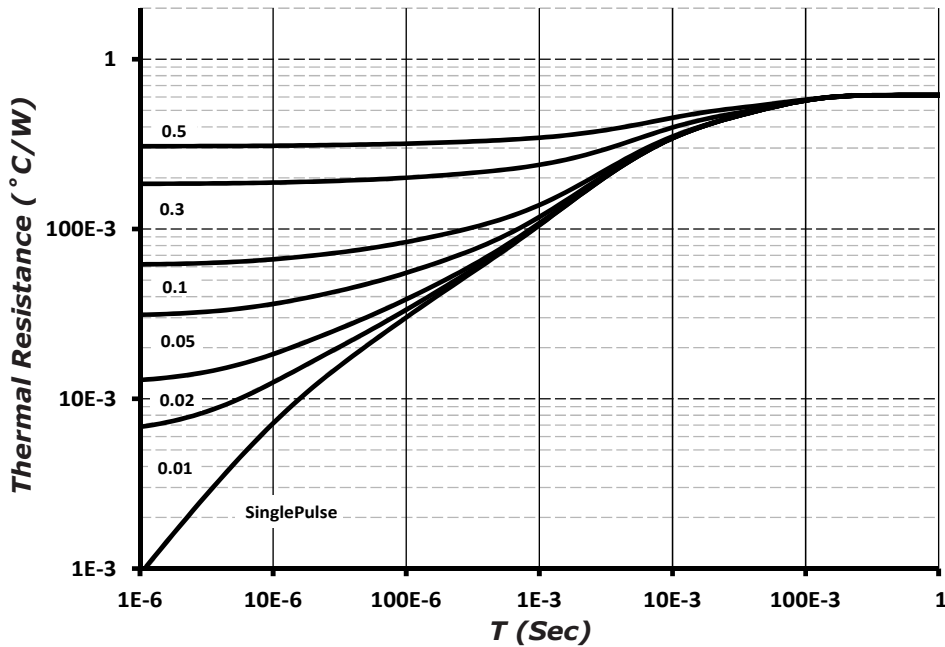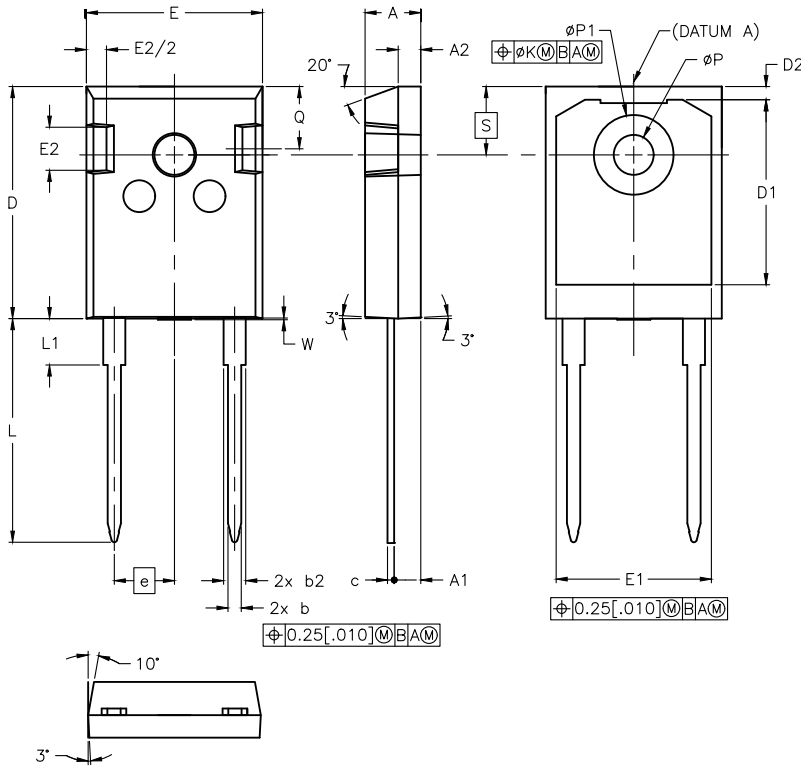Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform)


Figure 9. Transient Thermal Impedance

Outlitne Drawing

TO-247-2 Package Outline Dimensions

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

all units are in inches

TO-247-2
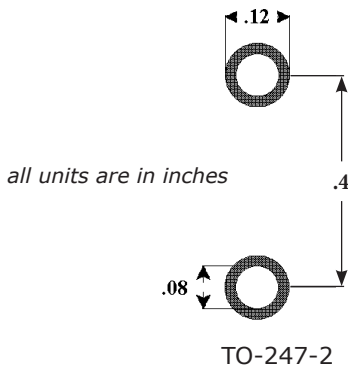
Diode Model
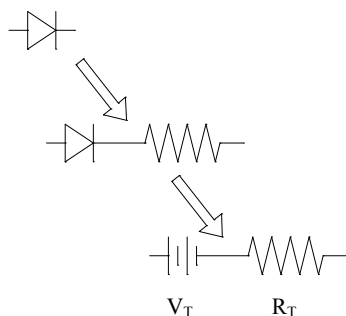
$$Vf_T = V_T + If * R_T$$

$$V_T = 0.97 + (T_J * -1.40*10^{-3})$$
$$R_T = 0.023 + (T_J * 2.71*10^{-4})$$

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

V_T R_T