MCRK2101700SG3

Silicon Carbide Schottky Diode

Benefits

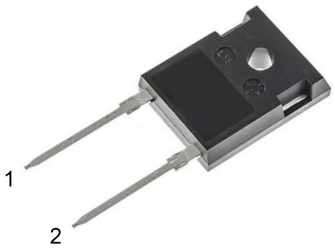
- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

V_{RRM}= 1700 V

$I_{F;\ T_C<135^{\circ}C}$=14.4A

Q_c= 96 nC

Package TO-247-2



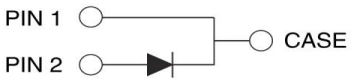
General Features

- 1700-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Halogen-Free; RoHS Compliant

Application

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

Equivalent Circuit



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

Parameter		Symbol	Value	Unit
Repetitive Peak Reverse Voltage		V_{RRM}	1700	V
Surge Peak Reverse Voltage		V_{RSM}	1700	V
DC Blocking Voltage		V_{DC}	1700	V
Forward Current	$T_C \le 135$ ℃	I_F	14.4	A
Non-Repetitive Forward Surge Current	T_C=25˚C, t_P=10 ms, Half Sine Wave,D=1 T_C=110˚C, t_P=10 ms, Half Sine Wave,D=1	I_{FSM}	55 41	A
Repetitive Peak Forward Surge Current	T_C=25˚C, t_P=10 ms, Half Sine Wave,D=1 T_C=110˚C, t_P=10 ms, Half Sine Wave,D=1	I_{FRM}	45 26	A
Power Dissipation	T_C =25 ℃ T_C =110 ℃	P_{tot}	231 100	W
Maximum Case Temperature		T_C	135	℃
Operating Junction Range		T_J	-55 ~+175	℃
Storage Temperature Range		T_{stg}	-55 ~+135	℃
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	I_F = 10A, T_J= 25℃	--	1.7	2.0	V
		I_F = 10A, T_J = 175℃	--	3.0	3.5	V
I_R	Reverse Current	V_R = 1700V, T_J = 25℃	--	20	60	uA
		V_R = 1700V, T_J = 175℃	--	100	300	uA
Q_C	Total Capacitive Charge	V_R = 1700V, I_F = 10A di/dt = 200A/μs, T_J = 25℃	--	96	--	nC
C	Total Capacitance	V_R = 0V, T_J = 25℃, f = 1MHz	--	827	--	pF
		V_R = 200V, T_J = 25℃, f = 1MHz	--	78	--	pF
		V_R = 800V, T_J = 25℃, f = 1MHz	--	41	--	pF
$R_{\theta JC}$	Thermal Resistance from Junction to Case		--	0.65	--	℃/W

Typical Performance

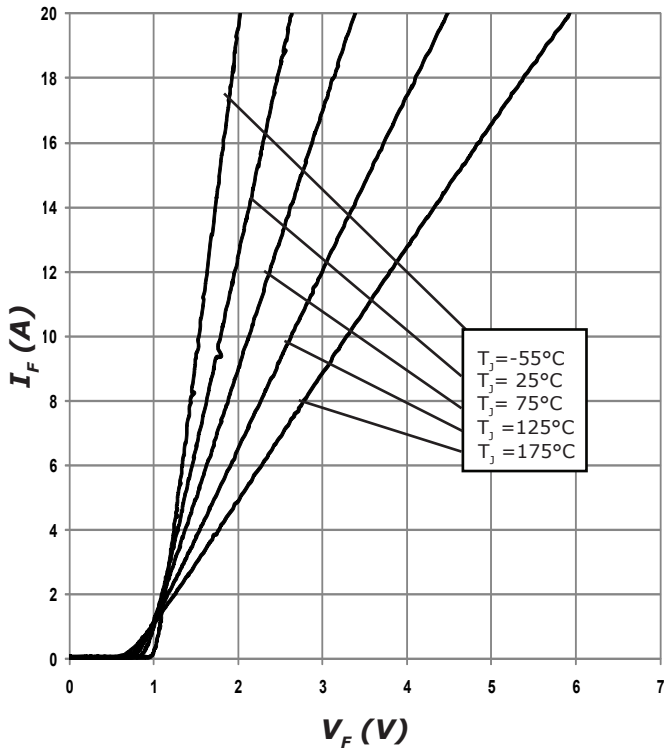


Figure 1. Forward Characteristics

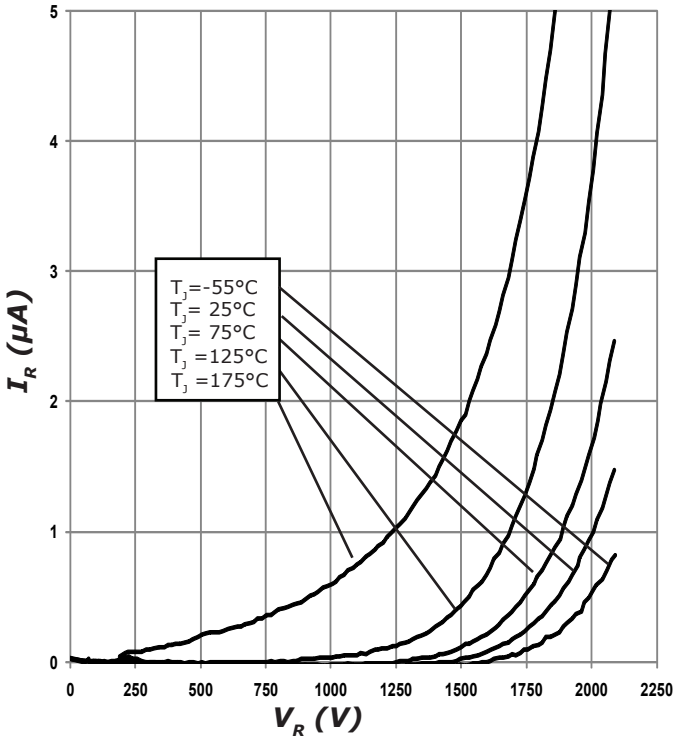


Figure 2. Reverse Characteristics

Typical Performance

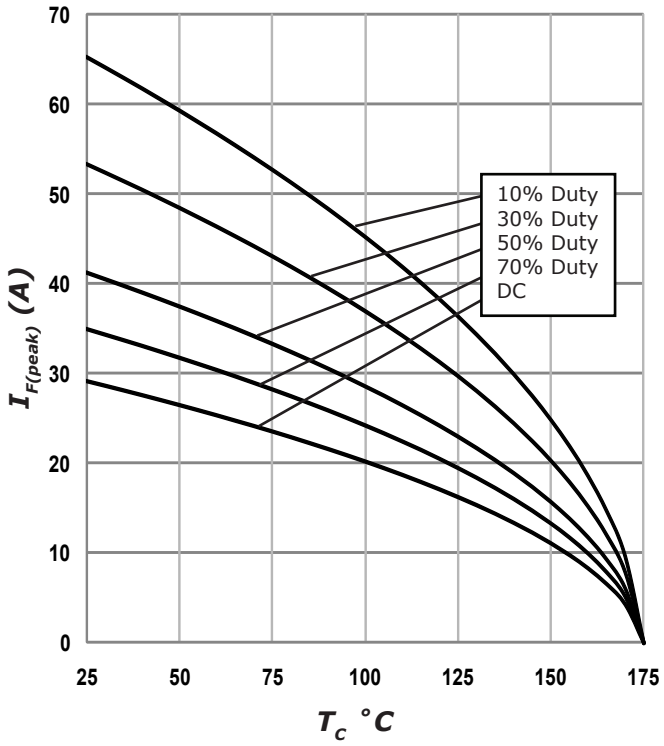


Figure 3. Current Derating

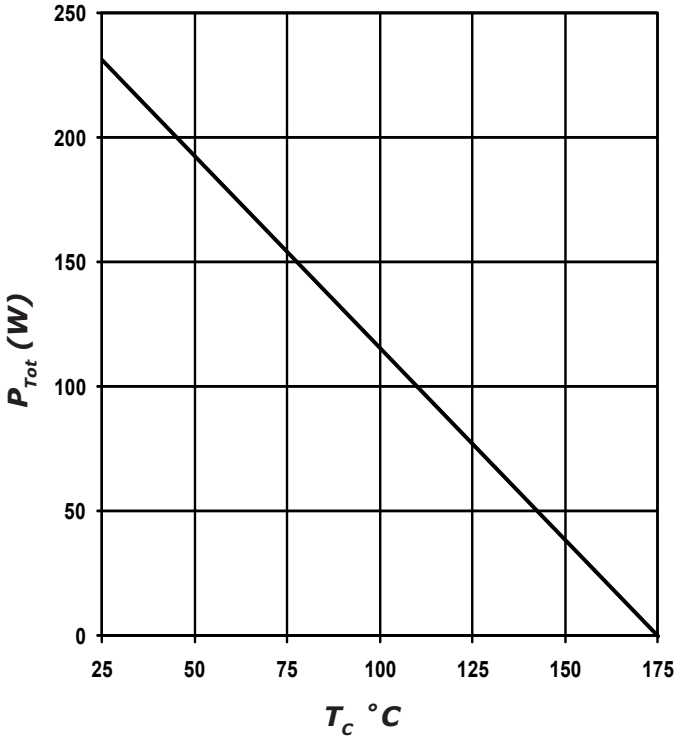


Figure 4. Power Derating

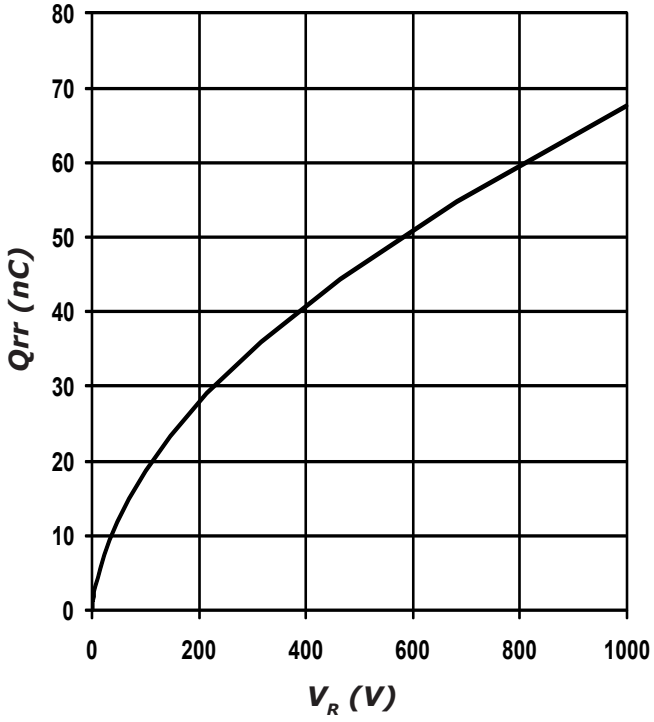


Figure 5. Recovery Charge vs. Reverse Voltage

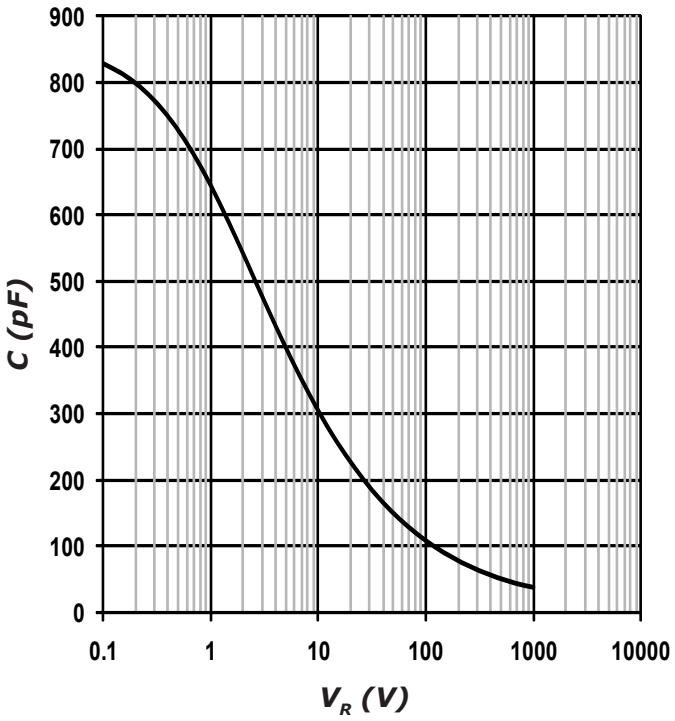


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

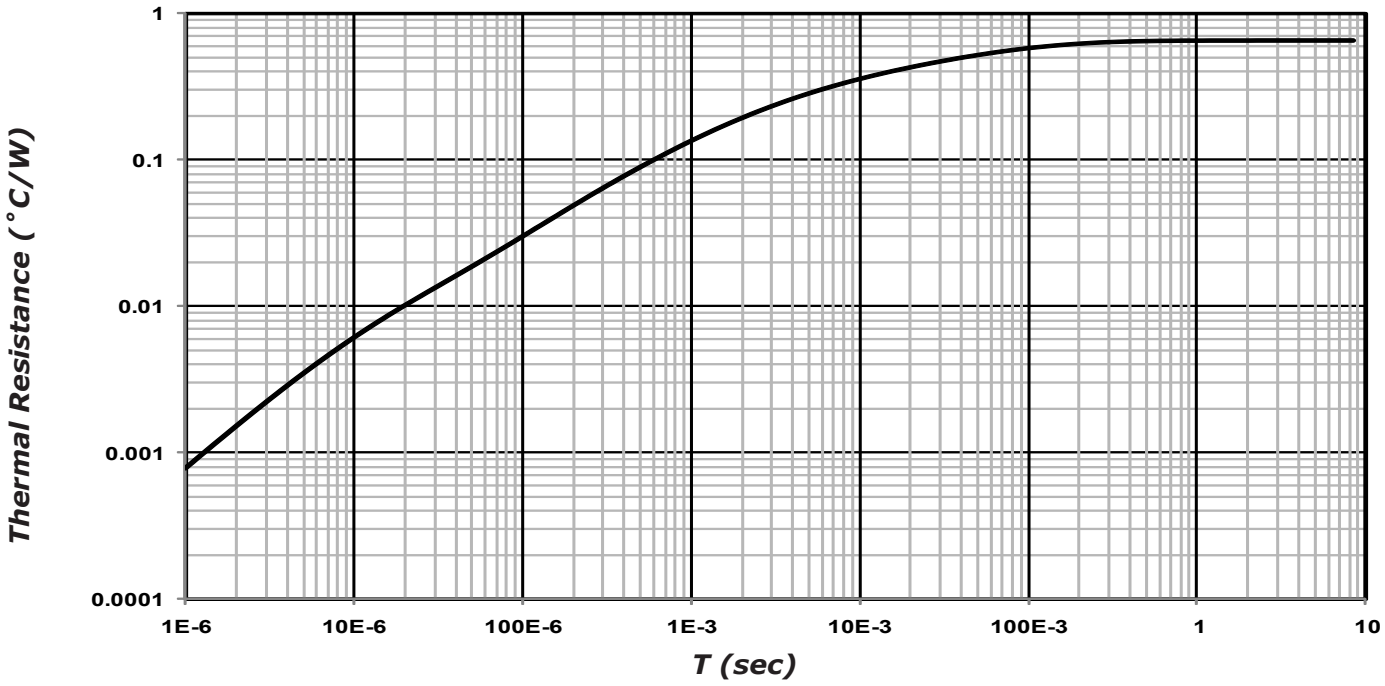
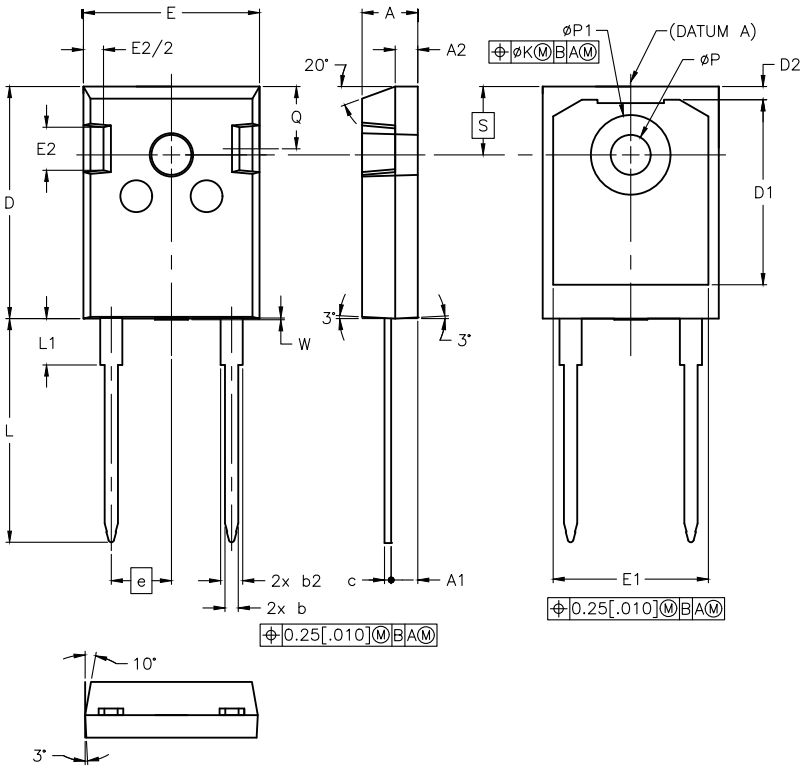


Figure 7. Transient Thermal Impedance

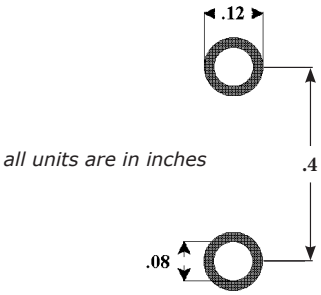
Outlitne Drawing

TO-247-2 Package Outline Dimensions



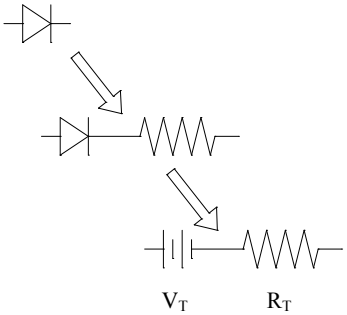
POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.70	5.31
A1	.087	.102	2.21	2.59
A2	.059	.098	1.50	2.49
b	.039	.055	0.99	1.40
b2	.065	.094	1.65	2.39
c	.015	.035	0.38	0.89
D	.819	.845	20.80	21.46
D1	.515	-	13.08	-
D2	.020	.053	0.51	1.35
E	.620	.640	15.49	16.26
E1	.530	-	13.46	-
E2	.135	.157	3.43	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



TO-247-2

Diode Model



$Vf_T = V_T + If * R_T$

$V_T = 0.975 + (T_J * -1.71*10^{-3})$
$R_T = 0.053 + (T_J * 1.1*10^{-3})$

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