

Silicon Carbide Schottky Diode

$$V_{RRM} = 650 \text{ V}$$

$$I_F (T_C=155^\circ\text{C}) = 6 \text{ A}$$

$$Q_C = 30 \text{ nC}$$

Features

- 650V Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- 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)
- Power Factor Correction
- Motor Drives

Package



Maximum Rated Values ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V		
V_R	DC Peak Reverse Voltage	650	V		
I_F	Continuous Forward Current	21	A	$T_C=25^{\circ}\text{C}$	Fig. 3
		8.8		$T_C=135^{\circ}\text{C}$	
		6.0		$T_C=155^{\circ}\text{C}$	
I_{FRM}	Repetitive Peak Forward Surge Current	32	A	$T_C=25^{\circ}\text{C}$, $t_p=10$ ms, Half Sine Pulse	
		27.2		$T_C=110^{\circ}\text{C}$, $t_p=10$ ms, Half Sine Pulse	
I_{FSM}	Non-Repetitive Forward Surge Current	42	A	$T_C=25^{\circ}\text{C}$, $t_p=10$ ms, Half Sine Pulse	
		33.4		$T_C=110^{\circ}\text{C}$, $t_p=10$ ms, Half Sine Pulse	
$I_{F,MAX}$	Non-Repetitive Forward Surge Current	424	A	$T_C=25^{\circ}\text{C}$, $t_p=10\mu\text{s}$, Square Wave Pulse	
		400		$T_C=110^{\circ}\text{C}$, $t_p=10\mu\text{s}$, Square Wave Pulse	
P_{tot}	Power Dissipation	65	W	$T_C=25^{\circ}\text{C}$	Fig. 4
		28		$T_C=110^{\circ}\text{C}$	
T_J	Operating Temperature	-55 to +175	$^{\circ}\text{C}$		
T_{stg}	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 ($T_J=25^{\circ}\text{C}$)

Symbol	Parameter	Value			Unit	Test Conditions	Note
		Min.	Typ.	Max.			
V_F	Forward Voltage		1.45		V	$I_F=6\text{A}$, $T_J=25^{\circ}\text{C}$	Fig. 1
			1.60			$I_F=6\text{A}$, $T_J=175^{\circ}\text{C}$	
I_R	Reverse Current		1		μA	$V_R=650\text{V}$, $T_J=25^{\circ}\text{C}$	Fig. 2
			8			$V_R=650\text{V}$, $T_J=175^{\circ}\text{C}$	
Q_C	Total Capacitive Charge		30		nC	$V_R=650\text{V}$, $T_J=25^{\circ}\text{C}$	Fig. 5
C	Total Capacitance		421		pF	$V_R=0\text{V}$, $T_J=25^{\circ}\text{C}$, $f=1\text{MHz}$	Fig. 6
			38			$V_R=400\text{V}$, $T_J=25^{\circ}\text{C}$, $f=1\text{MHz}$	
			37			$V_R=650\text{V}$, $T_J=25^{\circ}\text{C}$, $f=1\text{MHz}$	
E_C	Capacitance Stored Energy		5.6		μJ	$V_R=650\text{V}$	Fig. 7

Thermal Characteristics

Symbol	Parameter	Value	Unit	Note
$R_{\theta JC}$	Thermal Resistance(Junction to Case)	2.3	$^{\circ}\text{C/W}$	Fig. 8

Typical Performance

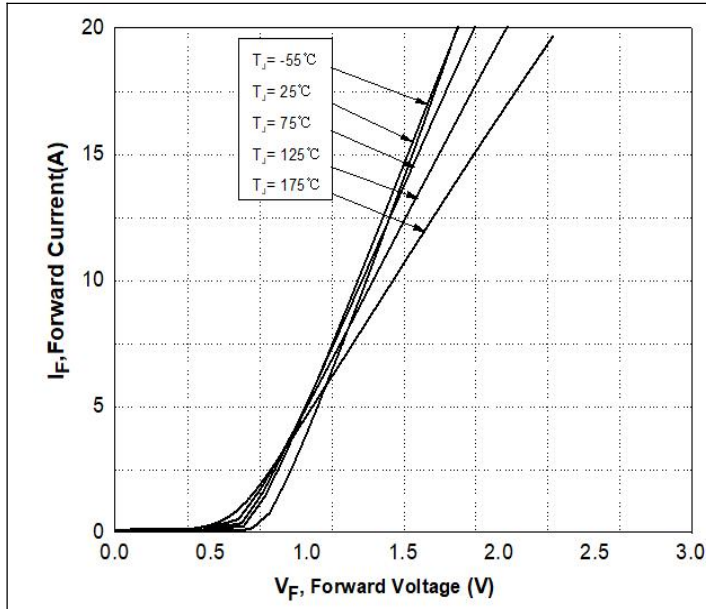


Figure 1. Forward Characteristics

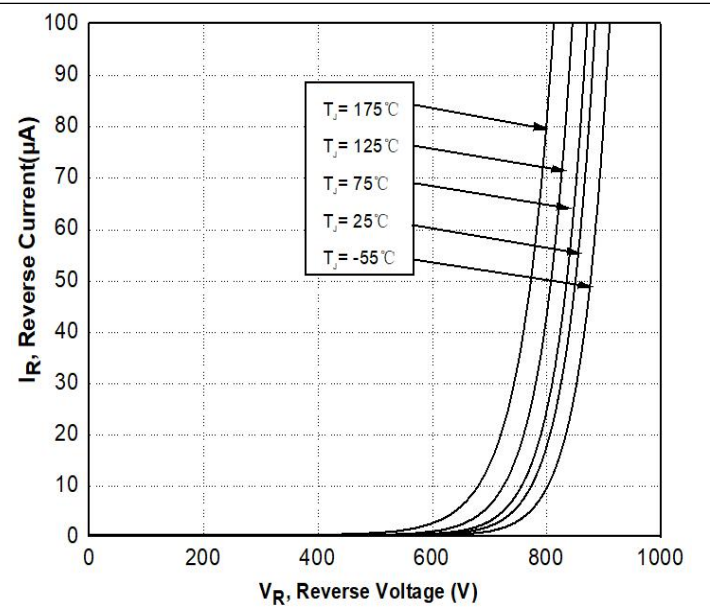


Figure 2. Reverse Characteristics

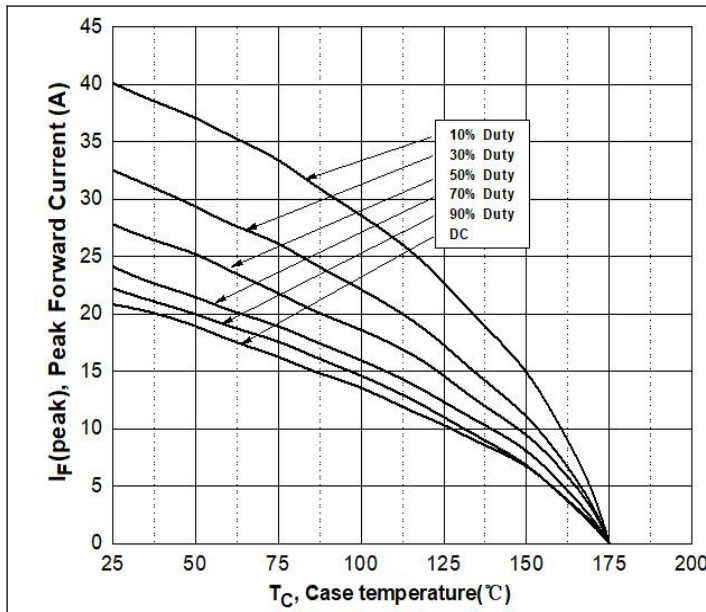


Figure 3. Current Derating

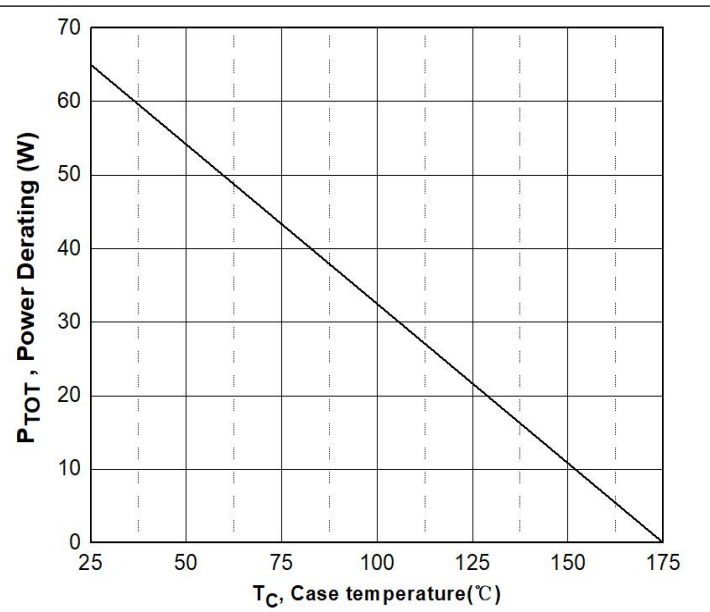


Figure 4. Power Derating

Typical Performance

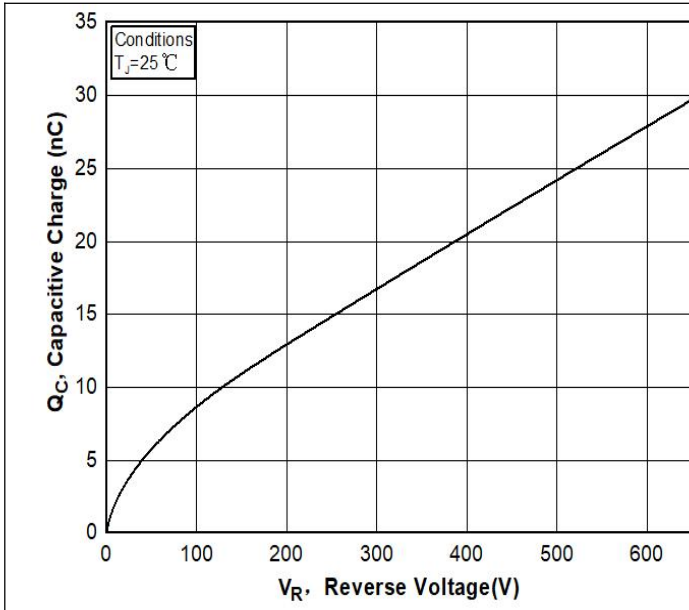


Figure 5. Capacitance Charge Vs. Reverse Voltage

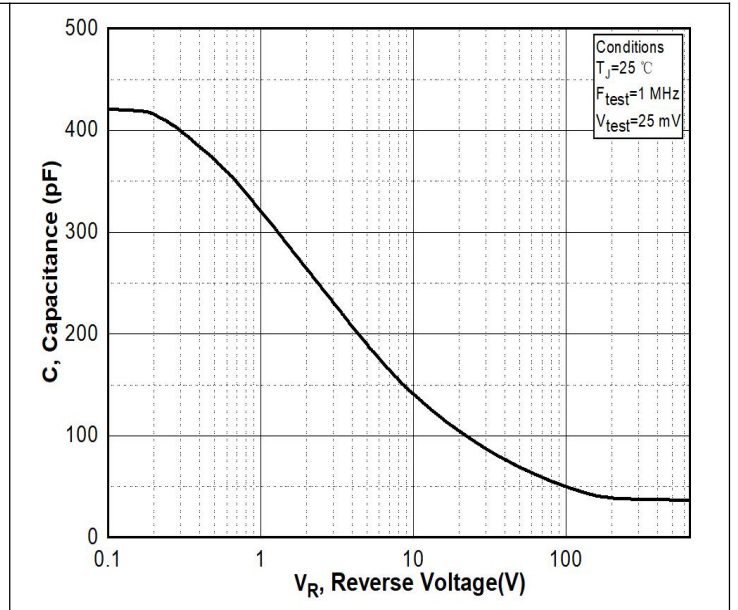


Figure 6. Capacitance Vs. Reverse Voltage

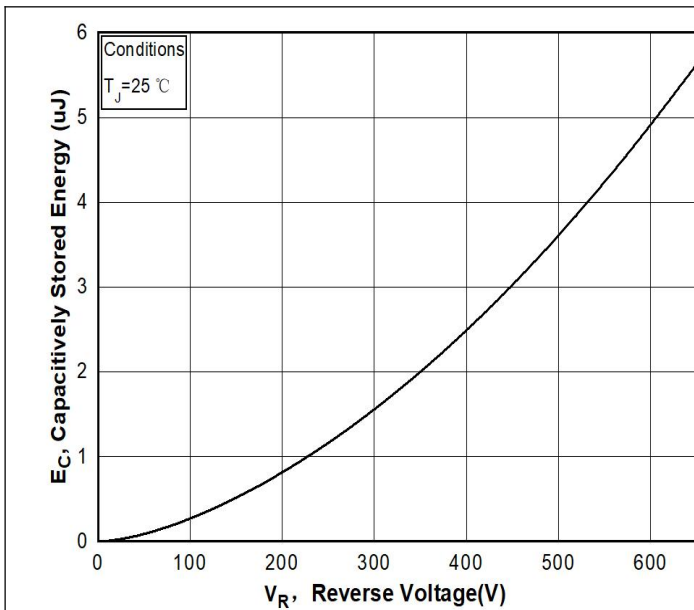


Figure 7. Capacitance Stored Energy

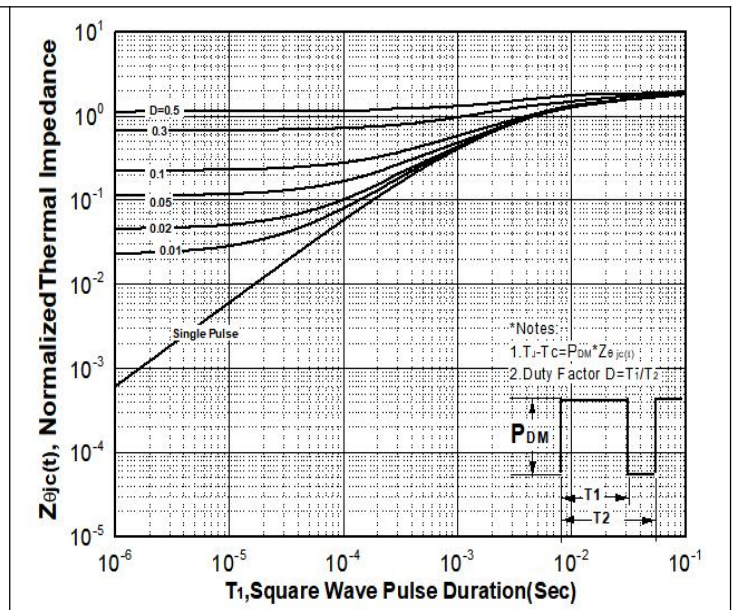
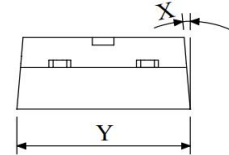
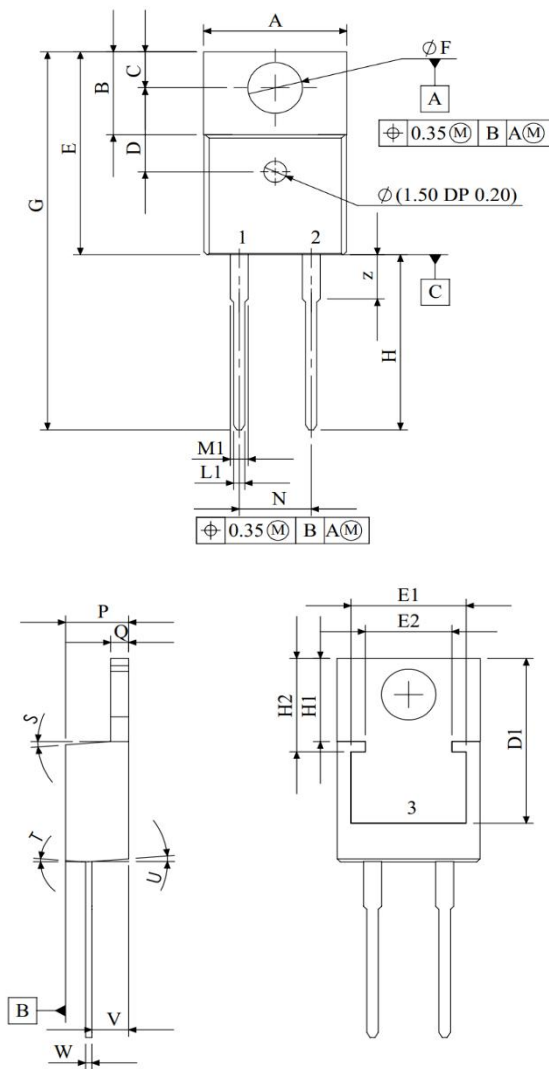


Figure 8. Transient Thermal Response Curve(Junction-to-Case)

Package Dimensions

Package TO-220-2L



SYMBOL	MIN (mm)	MAX (mm)
A	9.677	10.414
B	5.969	6.477
C	2.540	3.048
D	5.664	8.560
D1	12.450 REF	
E	14.986	15.621
E1	8.120 REF	
E2	6.100 REF	
F	3.632	3.886
G	28.067	29.134
H	12.700	13.970
H1	6.223 REF	
H2	7.040 REF	
L1	0.635	0.914
M1	1.143	1.397
N	4.953	5.207
P	4.191	4.699
Q	1.219	1.372
S	3°	6°
T	3°	6°
U	3°	6°
V	2.388	2.794
W	0.356	0.635
W1	0.356	0.520
X	3°	5.5°
Y	9.779	10.414
Z	3.302	3.810