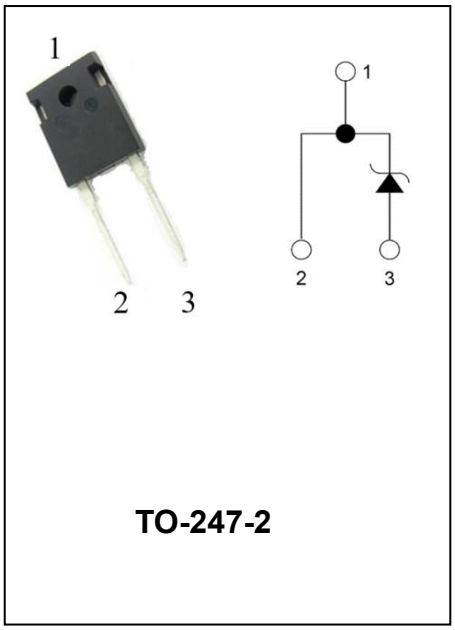
Silicon Carbide Schottky Diode

Product Summary

V_R = 650 V
I_F = 40A (T_C=130°C)
Qc = 83nC (V_R=400V)



TO-247-2

Features

- Zero Forward/Reverse Recovery Current
- High Blocking Voltage
- High Frequency Operation
- Positive Temperature Coefficient on V_F
- Temperature Independent Switching Behavior

Benefits

- Higher System Efficiency
- Parallel Device Convenience without thermal runaway
- Higher Temperature Application
- No Switching loss
- Hard Switching & Higher Reliability
- Environmental Protection

Applications

- Motor Drives
- Solar / Wind Inverters
- AC/DC converters
- DC/DC converters
- Uninterruptable power supplies

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

Parameter	Symbol	Test conditions	Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}		650	V
Peak Reverse Surge Voltage	V_{RSM}		650	V
DC Blocking Voltage	V_R		650	V
Continuous Forward Current	I_F	T_C=25°C T_C=120°C T_C=130°C	80 45 40	A
Non repetitive Forward Surge Current	I_{FSM}	T_C = 25°C, t_p=10 ms, Half Sine Pulse T_C = 150°C, t_p=10 ms, Half Sine Pulse	180 170	A
Repetitive peak Forward Surge Current	I_{FRM}	T_C = 25°C, t_p=10 ms, Freq = 0.1Hz, 100 cycles, Half Sine Pulse T_C = 150°C, t_p=10 ms, Freq = 0.1Hz, 100 cycles, Half Sine Pulse	165 155	A
Total power dissipation	P_D	T_C=25°C T_C=110°C	250 108	W
Diode dv/dt ruggedness	dv/dt	V_R = 0-650V	60	V/ns
Operating Junction Temperature	T_J		-55 to 175	°C
Storage Temperature	T_{STG}		-55 to 175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Electrical Characteristics

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
DC Blocking Voltage	V_{DC}	T_J = 25°C	650			V
Forward Voltage	V_F	I_F = 40A, T_J = 25°C		1.55	1.8	V
		I_F = 40A, T_J = 125°C		1.65		V
		I_F = 40A, T_J = 175°C		1.8		V
Reverse Current	I_R	V_R = 650V, T_J = 25°C		10	200	uA
		V_R = 650V, T_J = 125°C		100		uA
		V_R = 650V, T_J = 175°C		150		uA
Total Capacitive Charge	Q_C	V_R = 400V, T_J = 25°C		83		nC
Total Capacitance	C	V_R = 1V, T_J = 25°C, Freq = 1MHz		1440		pF
		V_R = 200V, T_J = 25°C, Freq = 1MHz		156		
		V_R = 400V, T_J = 25°C, Freq = 1MHz		117		

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

Thermal Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Thermal Resistance	$R_{th(j-c)}$	junction-case		0.6		^{0}C/W

Typical Electrical Curves

Figure 1. Forward Characteristics

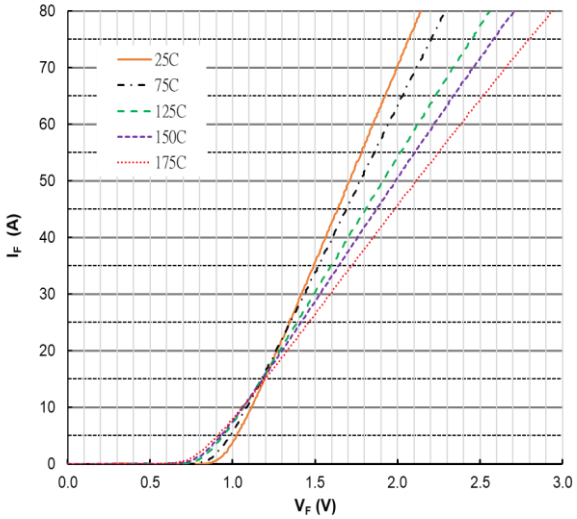


Figure 2. Forward Characteristics

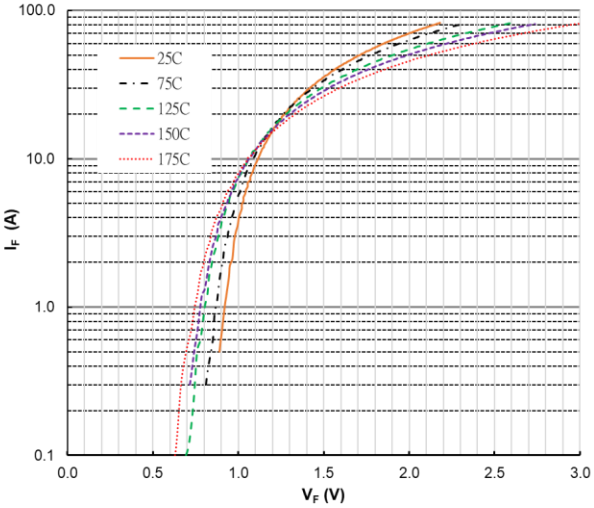


Figure 3. Reverse Characteristics

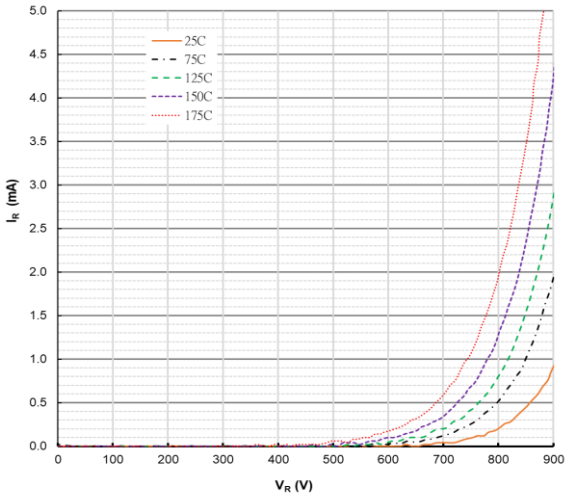


Figure 4. Power Derating

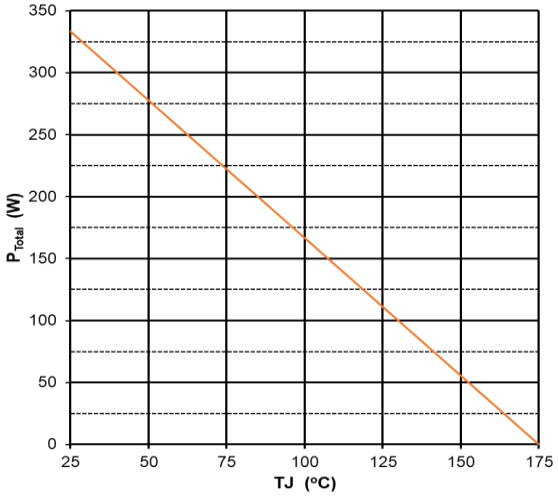


Figure 5. Capacitance vs Reverse Voltage

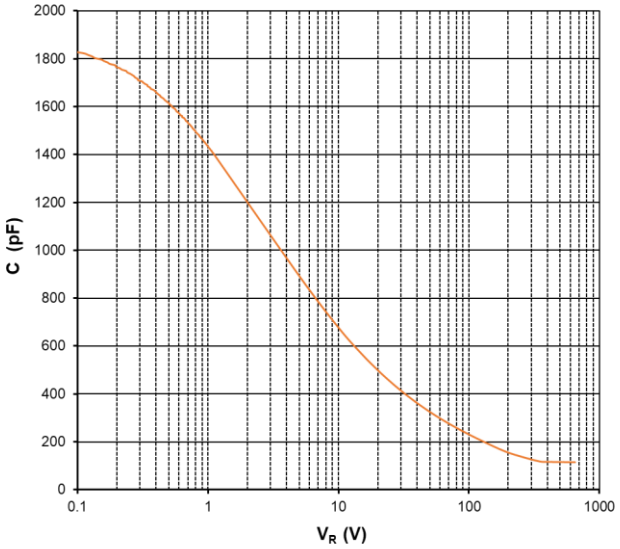
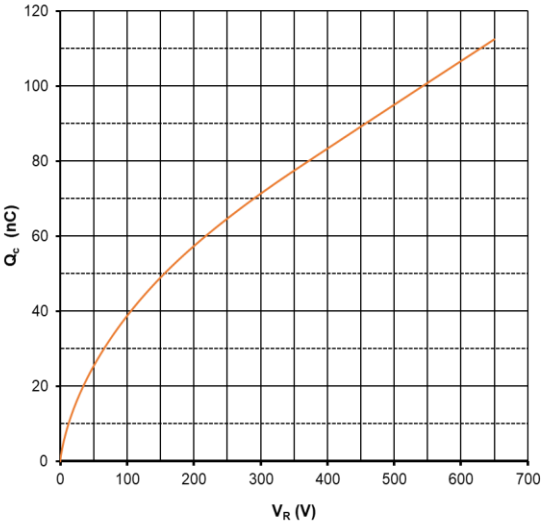
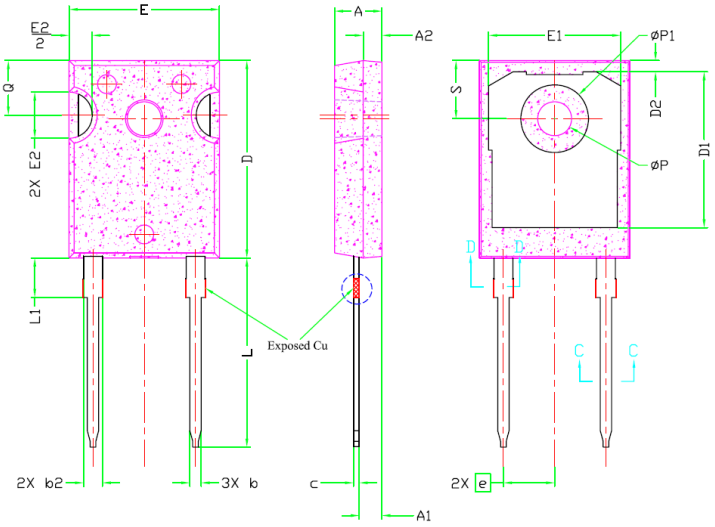


Figure 6. Recovery Charge vs Reverse Voltage

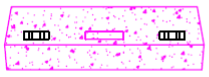


Package Dimensions

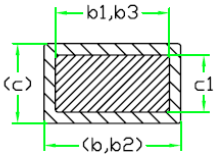
(TO-247-2 Package)



SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.50	2.00	2.49	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
c	0.55	0.60	0.69	6
c1	0.55	0.60	0.65	
D	20.80	20.95	21.10	4
D1	16.25	16.55	17.65	5
D2	0.51	1.19	1.35	
E	15.75	15.94	16.13	4
E1	13.46	14.02	14.16	5
E2	4.32	4.91	5.49	3
e	5.44BSC			
L	19.81	20.07	20.32	
L1	4.10	4.19	4.40	6
ØP	3.56	3.61	3.65	7
ØP1	7.19REF.			
Q	5.39	5.79	6.20	
S	6.04	6.17	6.30	



Note:
1. Package Reference: JEDEC TO247, Variation AD.
2. All Dimensions Are In mm.
3. Slot Required, Notch May Be Rounded
4. Dimension D & E Do Not Include Mold Flash. Mold Flash Shall Not Exceed 0.127mm Pre Side. These Dimensions Are Measured At The Outermost Extreme Of The Plastic Body.
5. Thermal Pad Contour Optional Within Dimension D1 & E1.
6. Lead Finish Uncontrolled In L1.
7. ØP To Have A Maximum Draft Angle Of 1.5° To The Top Of The Part With A Maximum Hole Diameter Of 3.91mm.
8. Dimension "b2" And "b4" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.10mm Total In Excess Of "b2" And "b4" Dimension At Maximum Material Condition.



Section C–C,D–D