

650V Silicon Carbide Schottky Diode

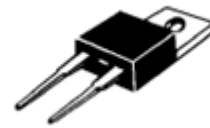
DESCRIPTION :

- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- High frequency operation
- High temperature operation
- RoHS Compliant

V_{RRM}	650V
$I_F (T_c = 161^\circ\text{C})$	6A
Q_c	21nC

TYPICAL APPLICATIONS :

- Solar application, UPS, EV/HEV
- PFC
- Switch mode power supplies (SMPS)
- Motor drives, Wind turbine, Rail traction



TO-220AC

MAXIMUM RATINGS (at $T_J = 25^\circ\text{C}$, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Repetitive Peak Reverse Voltage		V_{RRM}	650	V
Surge Peak Reverse Voltage		V_{RSM}	650	V
Continuous Forward Current	$T_c=25^\circ\text{C}$ $T_c=135^\circ\text{C}$ $T_c=161^\circ\text{C}$	I_F	24.7 11.6 6.0	A
Repetitive Peak Forward Surge Current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, Half sine pulse	I_{FRM}	30	A
Non-Repetitive Forward Surge Current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, Half sine pulse	I_{FSM}	60	A
i^2t value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, Half sine pulse	$\int i^2 dt$	18	A^2S
Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	P_{tot}	105 45	W
Operation Junction temperature		T_J	-55~+175	$^\circ\text{C}$
Storage temperature		T_{STG}	-55~+175	$^\circ\text{C}$
Mounting torque	M3 screw	M	1	Nm

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Typical	Unit
Thermal resistance, junction - case		$R_{th(j-c)}$	1.43	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS (at $T_J = 25^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
DC Blocking Voltage	V_{DC}	650			V
Forward Voltage IF = 6A, Tc = 25 $^{\circ}\text{C}$ IF = 6A, Tc = 175 $^{\circ}\text{C}$	V_F		1.32 1.60	1.5 1.8	V
Reverse Current VR = 650V, Tc = 25 $^{\circ}\text{C}$ VR = 650V, Tc = 175 $^{\circ}\text{C}$	I_R		0.12 0.91	50 100	μA
Total Capacitive Charge VR = 400V	Q_C		21		nC
Total capacitance VR = 0V, f = 1MHz VR = 200V, f = 1MHz VR = 400V, f = 1MHz	C		395 42 41		pF
Capacitance Stored Energy VR = 400 V	E_c		5		μJ

Typical Characteristics Curves

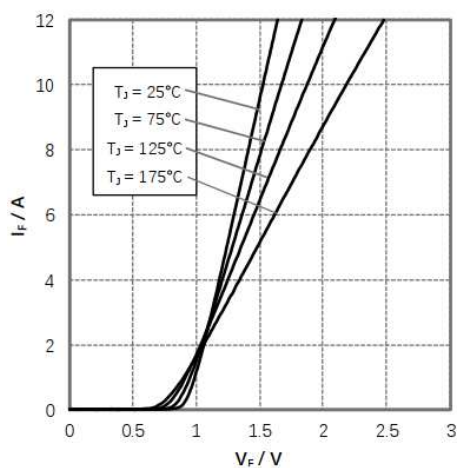


Figure 1. Forward characteristics

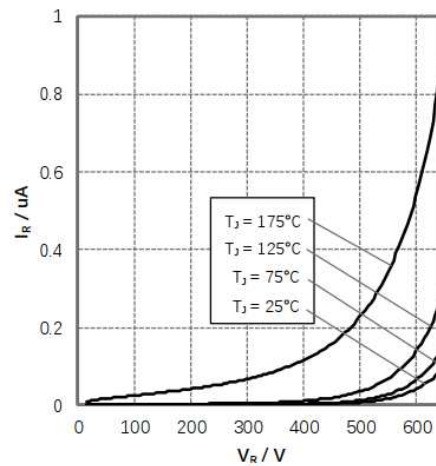


Figure 2. Reverse characteristics

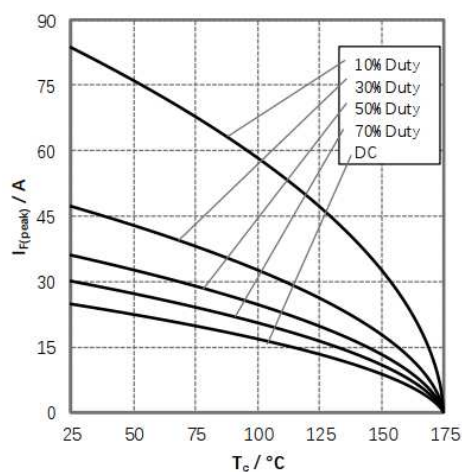


Figure 3. Current Derating

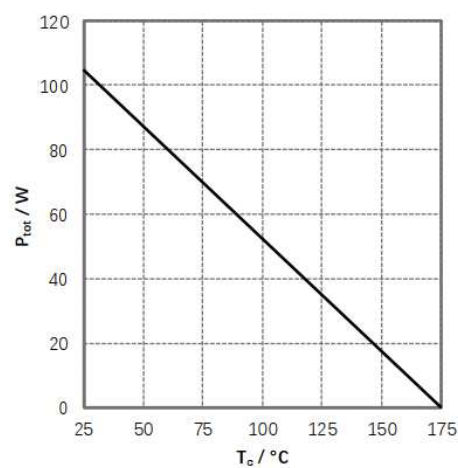


Figure 4. Power Dissipation

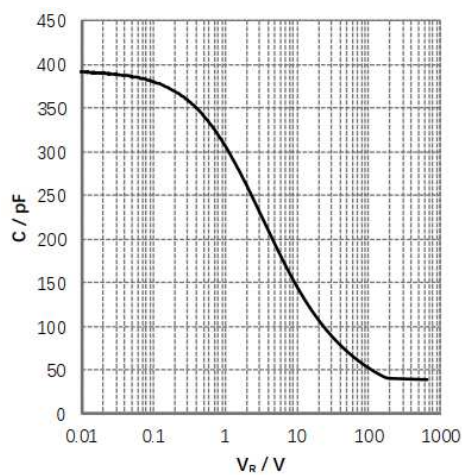


Figure 5. Capacitance vs. Reverse Voltage

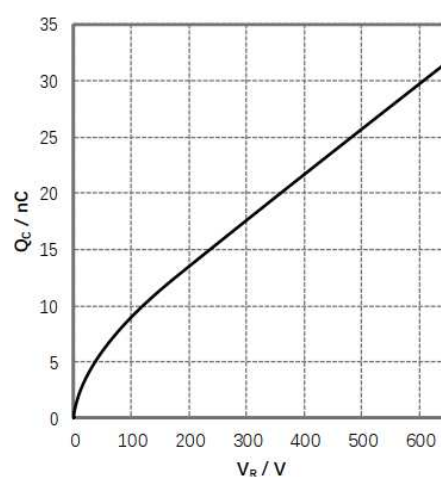


Figure 6. Capacitance Charge vs. Reverse Voltage

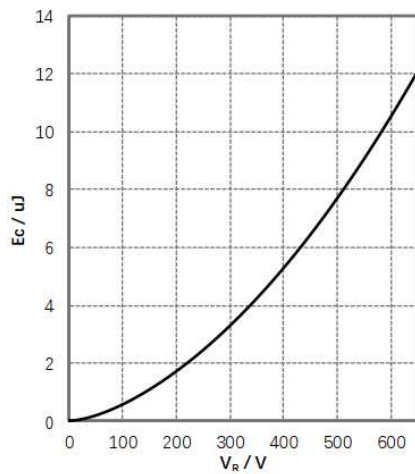


Figure 7. Capacitance Stored Energy

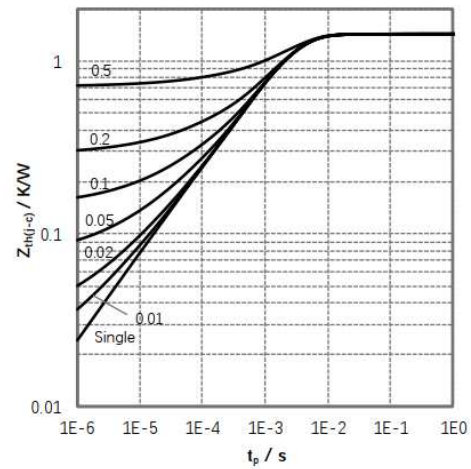
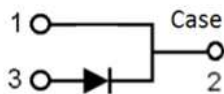
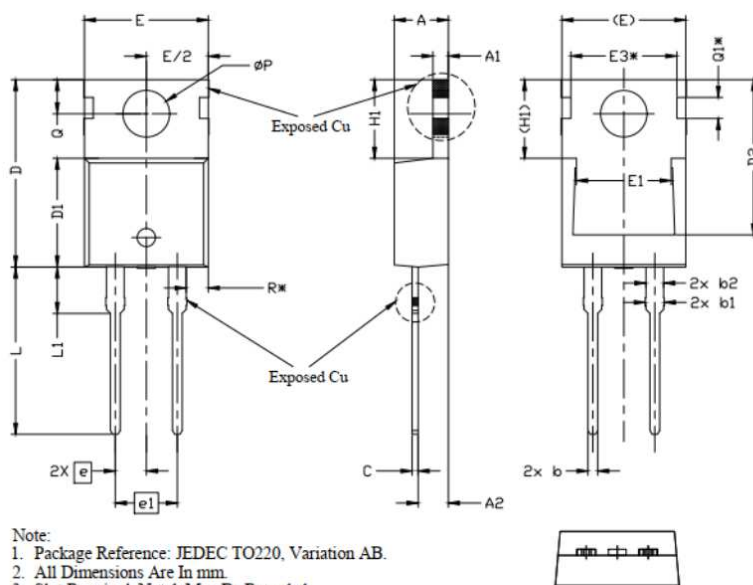


Figure 8. Transient Thermal Impedance

• Circuit diagram



• TO-220AC Package outlines : Dimensions in (mm)



Note:

1. Package Reference: JEDEC TO220, Variation AB.
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 Dimensions E, H1, D2 & E1.
6. Dimension E2 & H1 Define A Zone Where Stamping And Singulation Irregularities Are Allowed.
7. "REF" is reference.

SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4.24	4.44	4.64	
A1	1.15	1.27	1.40	
A2	2.30	2.48	2.70	
b	0.70	0.80	0.90	
b1	1.20	1.55	1.75	
b2	1.20	1.45	1.70	
c	0.40	0.50	0.60	
D	14.70	15.37	16.00	4
D1	8.82	8.92	9.02	
D2	12.63	12.73	12.83	5
E	9.96	10.16	10.36	4,5
E1	6.86	7.77	8.89	5
E3*	8.70REF.			
e	2.54BSC			
e1	5.08BSC			
H1	6.30	6.45	6.60	5,6
L	13.47	13.72	13.97	
L1	3.60	3.80	4.00	
ϕP	3.75	3.84	3.93	
Q	2.60	2.80	3.00	
Q1*	1.73REF.			
R*	1.82REF.			

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