

## 650V Silicon Carbide Schottky Diode

### DESCRIPTION :

- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- Excellent Surge Current Capability
- Positive Temperature Coefficient on  $V_F$
- High Frequency Operation
- RoHS Compliant

$V_{RRM}$	650V
$I_F$	10A ( $T_c=155^\circ\text{C}$ )
$Q_C$	38nC



TO-263

### TYPICAL APPLICATIONS :

- Switch Mode Power Supplies, Power Factor Correction
- Uninterruptible Power Supplies
- Motor Drivers

### 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
Continuous Forward Current	$T_c=25^\circ\text{C}$ $T_c=155^\circ\text{C}$	$I_F$	43 10	A
Non-Repetitive Forward Surge Current	$T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half sine pulse	$I_{FSM}$	85	A
$i^2t$ value	$T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$	$\int i^2 dt$	36	$\text{A}^2\text{S}$
Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	$P_{tot}$	168 73	W
Operation Junction temperature		$T_J$	-55~+175	$^\circ\text{C}$
Storage temperature		$T_{STG}$	-55~+175	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Typical	Unit
Thermal resistance, junction to case		$R_{th(j-c)}$	0.89	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
DC Blocking Voltage	$V_{DC}$	650			V
Forward Voltage IF = 10A, $T_J = 25^\circ\text{C}$ IF = 10A, $T_J = 175^\circ\text{C}$	$V_F$		1.29 1.43	1.45 1.78	V
Reverse Current VR = 650V, $T_J = 25^\circ\text{C}$ VR = 650V, $T_J = 175^\circ\text{C}$	$I_R$		1 9	50 200	$\mu\text{A}$
Total Capacitive Charge VR = 400V	$Q_C$		38		nC
Total capacitance VR = 1V, f = 1MHz VR = 300V, f = 1MHz VR = 600V, f = 1MHz	C		551 63 57		pF
Capacitance Stored Energy VR = 400 V	$E_C$		5.7		$\mu\text{J}$

Typical Performance

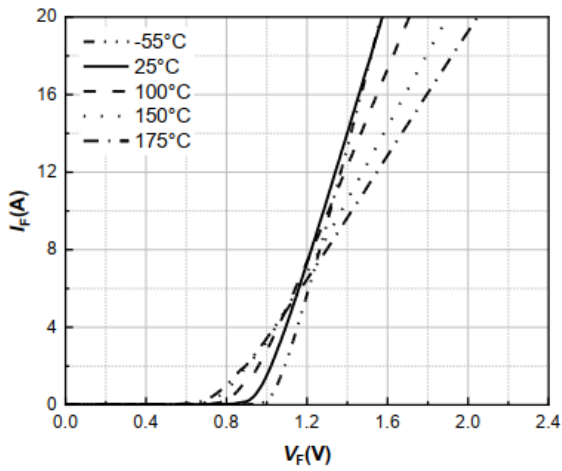


Figure 1. Forward characteristics

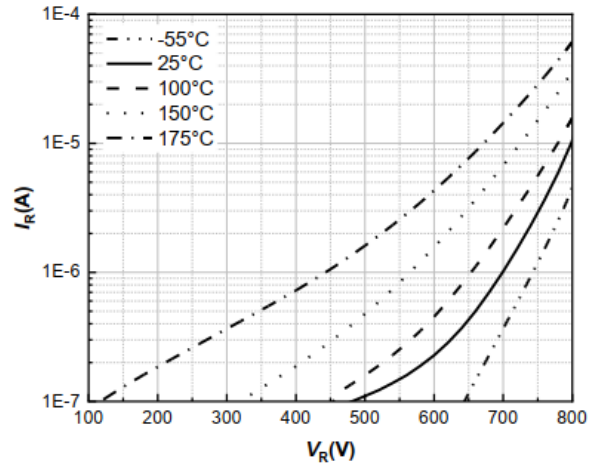


Figure 2. Reverse characteristics

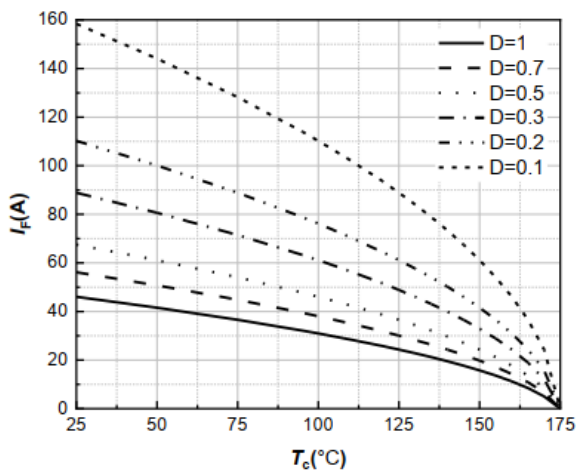


Figure 3. Diode forward current as function of temperature, D=duty cycle

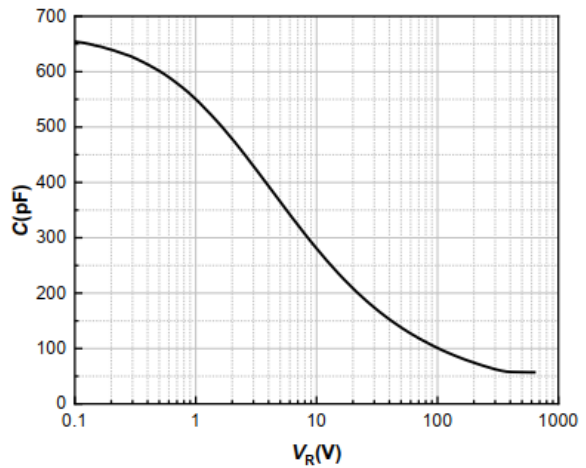


Figure 4. Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_j=25^\circ\text{C}$ ;  $f=1\text{ MHz}$

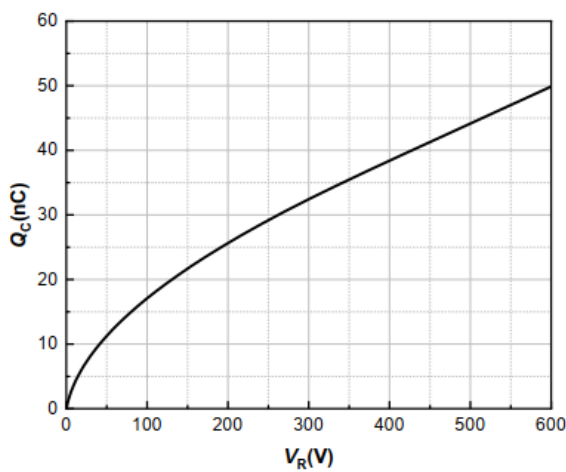


Figure 5. Typical reverse charge as function of reverse voltage

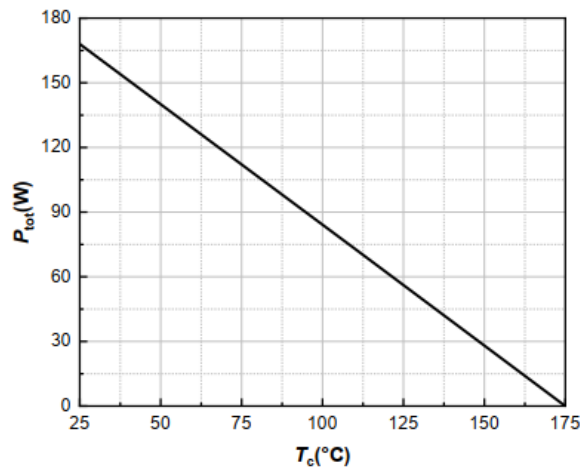


Figure 6. Power dissipation as function of case temperature

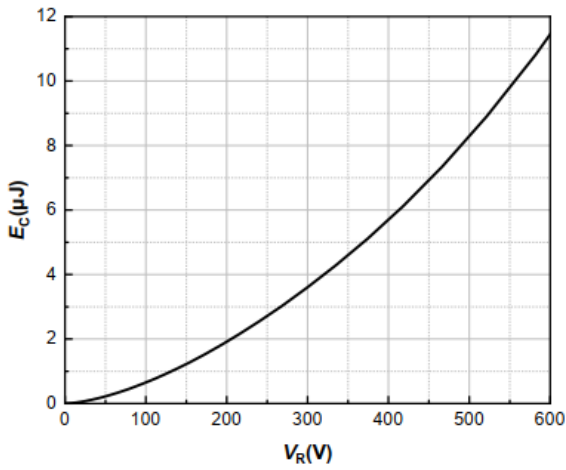


Figure 7. Capacitance Stored Energy

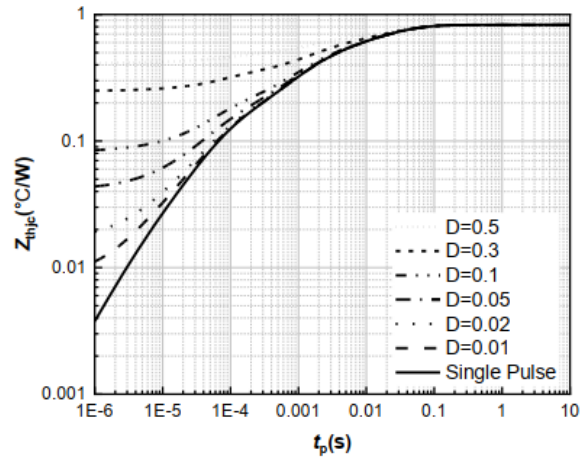
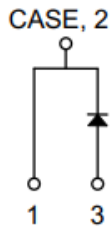
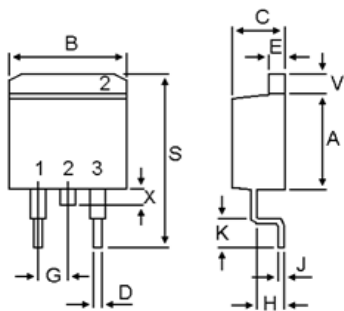


Figure 8. Max. transient thermal impedance,  $Z_{th(jc)} = f(t_p)$ , parameter:  $D = t_p/T$

• Circuit diagram



• Package outlines : Dimensions in (mm)



DIM	MILLIMETERS	
	MIN	MAX
A	8.30	9.20
B	9.80	10.40
C	4.30	4.80
D	0.65	0.95
E	1.17	1.43
G	2.39	2.69
H	2.68	3.32
J	0.35	0.65
K	2.29	2.90
S	14.60	15.88
V	1.10	1.50
X	---	2.00

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