



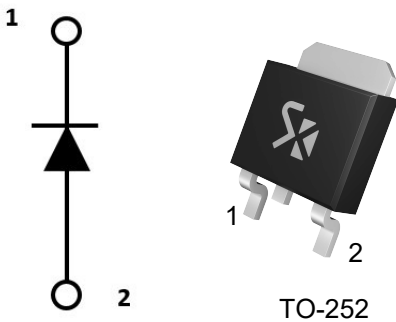
Silicon Carbide Schottky Barrier Diode

650V, 15A SiC SBD

Features

- Temperature independent switching behavior
- No reverse recovery current / No forward recovery
- Excellent thermal performances
- High surge current capability

V_{RRM}	650V
I_F	15A (TC=127°C)
Q_C	37.9nC



Applications

- Switch mode power supply
- Power factor correction
- Solar inverter
- Uninterruptible power supply

Marking	Package
Q-SSC1565	TO-252

Maximum Ratings (TA=25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Repetitive Peak Reverse Voltage		V_{RRM}	650	V
Continuous Forward Current, D=1	TC=25°C	I_F	32.2	A
	TC=127°C		15	
Non-Repetitive Peak Forward Surge Current, Half Sine Wave, 10ms	TC=25°C	$I_{F,SM}$	63	A
	TC=150°C		52	
i^2t Value, 10ms		$\int i^2 dt$	19.8	A
Non-Repetitive Peak Forward Current, 10us		$I_{F,max}$	378	A
Power Dissipation		P_D	81.2	W
Storage Temperature Range		T_{STG}	-55 to 150°C	°C
Operating Junction Temperature Range		T_J	-55 to 175°C	°C

**Thermal Characteristics**

Parameter	Symbol	Conditions	Min.	Typ	Max	Unit
Maximum Junction-to-Ambient ¹	R _{thJA}	TO-252	-	1.02	1.84	°C/W
Maximum Junction-to-Case ¹	R _{thJC}	TO-252	-	-	60	°C/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC CHARACTERISTICS						
DC Blocking Voltage	V _R	I _R =100uA, T _J =25°C	650	-	-	V
		I _R =100uA, T _J =175°C	650	-	-	
Forward Voltage	V _F	I _F =10A, T _J =25°C	-	1.4	1.7	V
		I _F =10A, T _J =150°C	-	1.8	2.2	
		I _F =10A, T _J =175°C	-	1.9	2.4	
Reverse Current	I _R	V _R =650V, T _J =25°C	-	1.1	55	μA
		V _R =650V, T _J =150°C	-	11	110	
		V _R =650V, T _J =175°C	-	25	250	
DYNAMIC CHARACTERISTICS						
Total Capacitive Charge	Q _C	V _R =400V, T _J =25°C $Q_C = \int_0^{V_R} C(V) dV$	-	37.9	-	nC
Total Capacitance	C	V _R =0.1V, f=1MHZ, T _J =25°C	-	668	-	pF
		V _R =200V, f=1MHZ, T _J =25°C	-	72.7	-	
		V _R =400V, f=1MHZ, T _J =25°C	-	63.2	-	
Capacitance Stored Energy	E _C	V _R =400V, f=1MHZ, T _J =25°C	-	9.36	-	μJ

Notes:

1. Heat sink size: 25 x 17 x 4 cm³
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. The power dissipation is limited by 175°C junction temperature.
4. The data is theoretically the same as I_F and I_{FSM} in real applications, should be limited by total power dissipation.

Typical Operating Characteristics

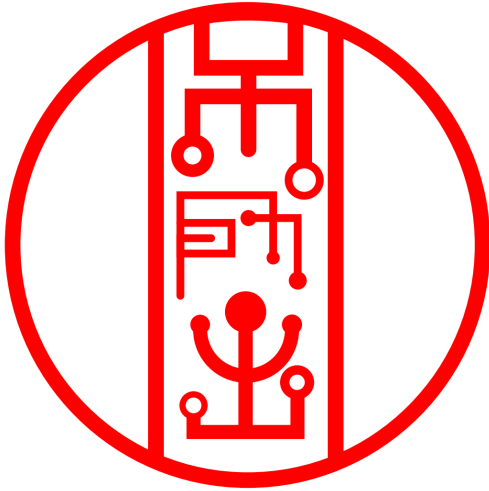
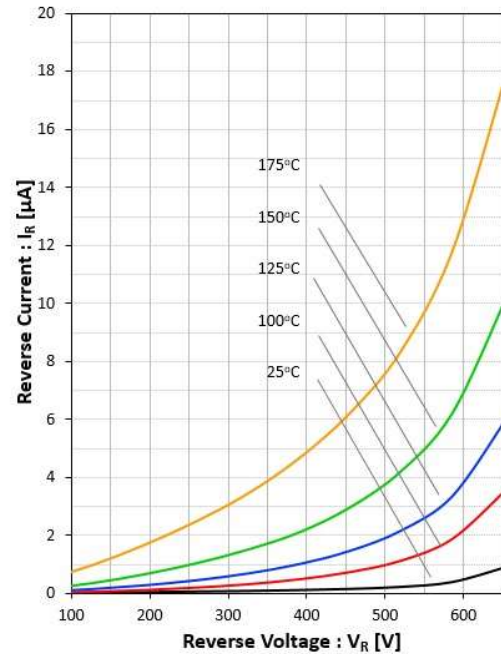
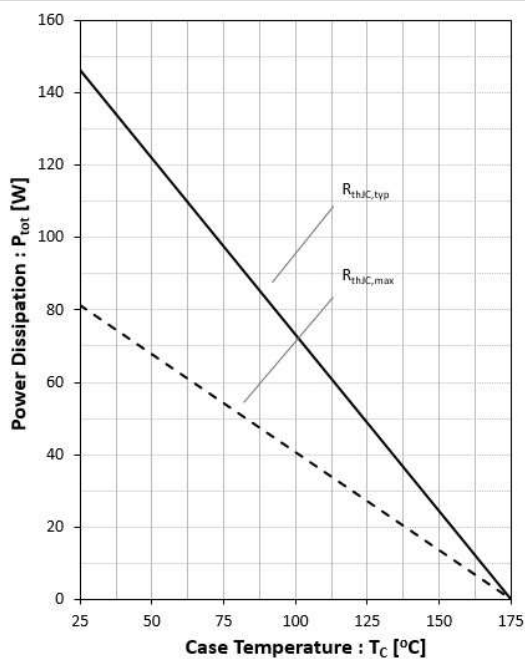


Figure 2: Typical Reverse Characteristics



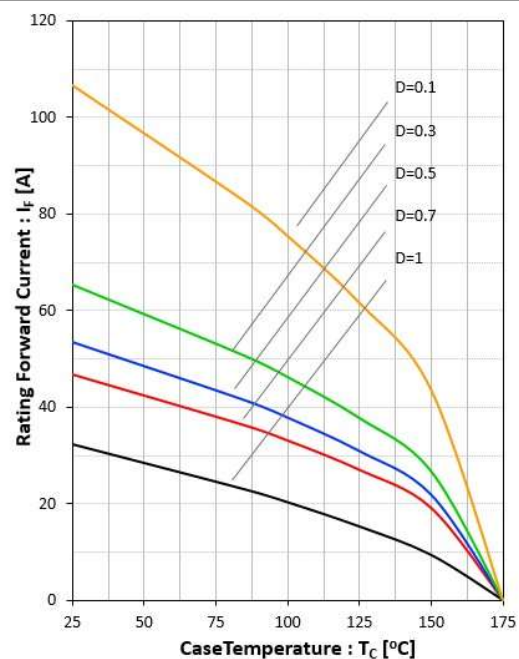
$$I_R = f(V_R, T_j)$$

Figure 3: Power Derating Curves



$$P_{tot} = f(T_C); T_j = 175^\circ C$$

Figure 4: Current Derating Curves



$$I_F = f(T_C); R_{thJC,max}; V_F,max; T_j \leq 175^\circ C; D = t_p/T$$

Typical Operating Characteristics (Cont.)

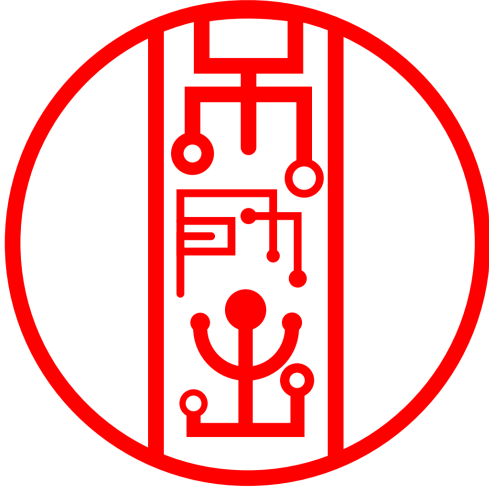
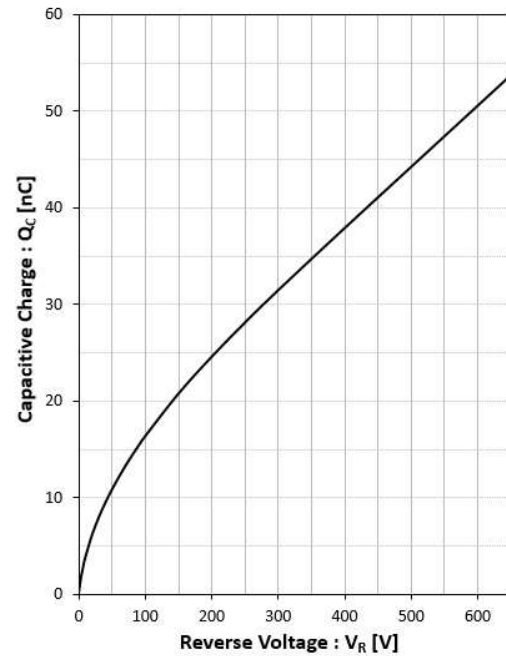
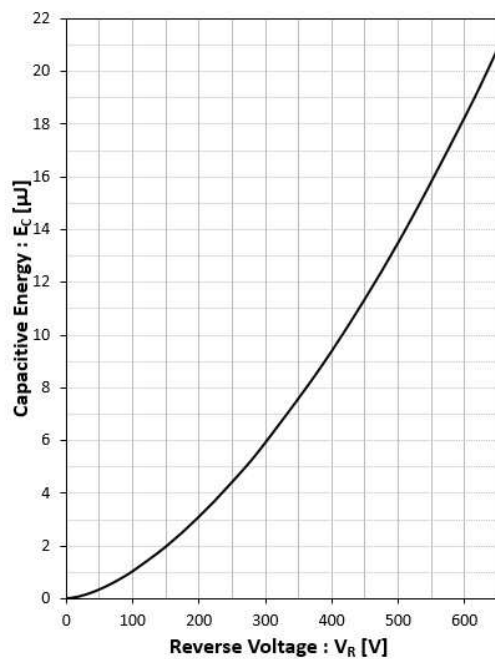


Figure 6: Typical Capacitive Charge



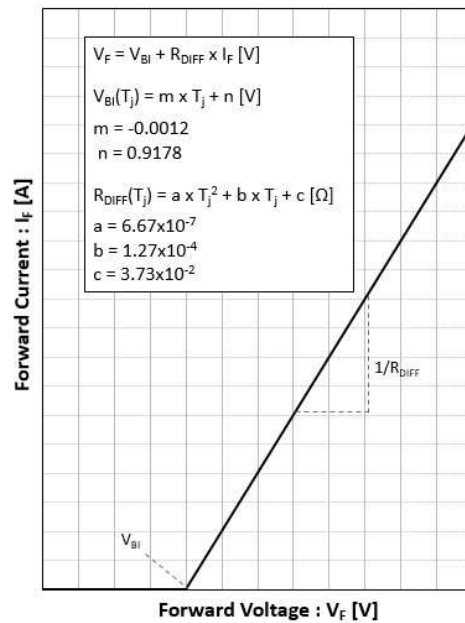
$$Q_C = f(V_R); f=1\text{MHz}$$

Figure 7: Typical Capacitive Energy



$$E_C = f(V_R); f=1\text{MHz}$$

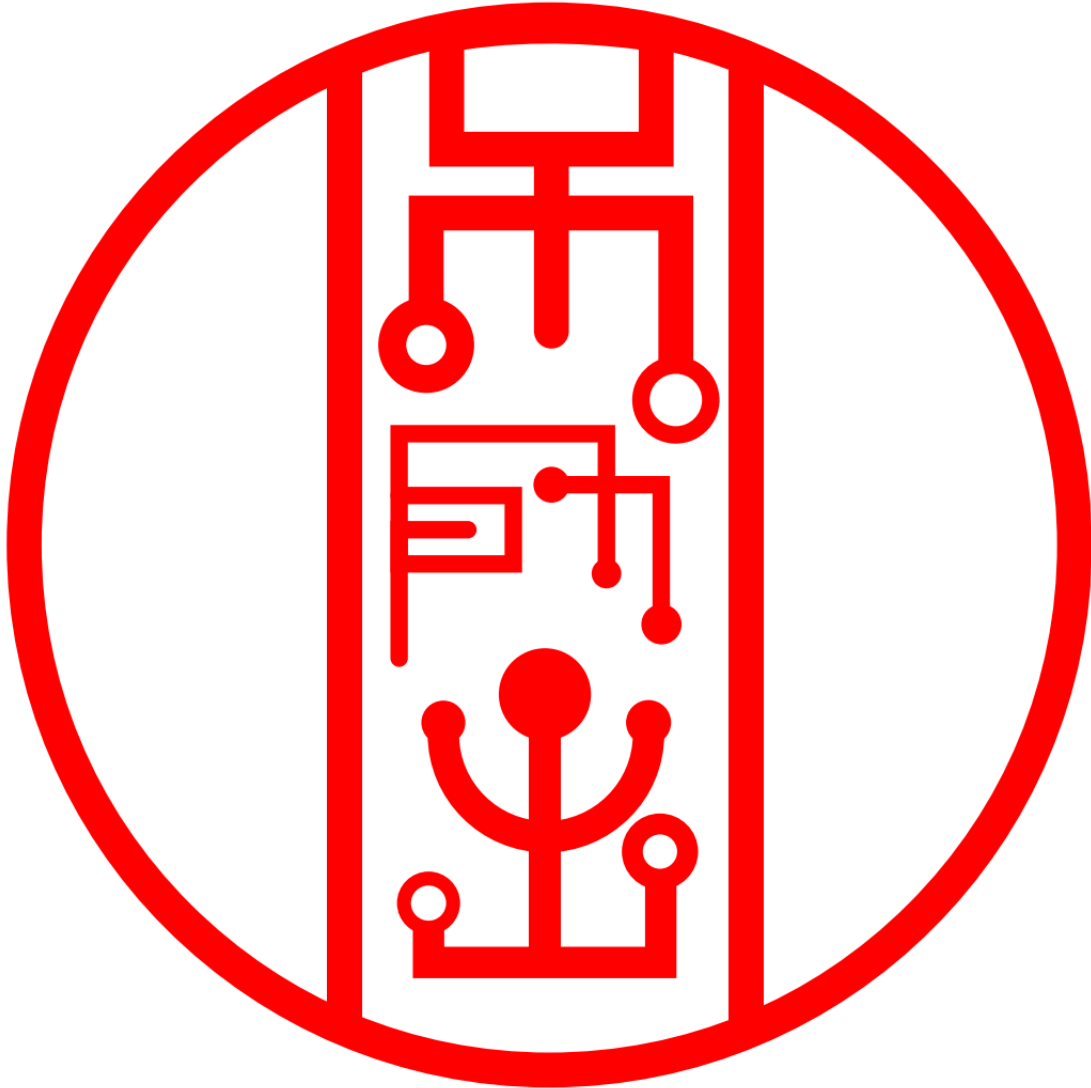
Figure 8: Forward Curve Model



$$I_F = f(V_F, T_j)$$

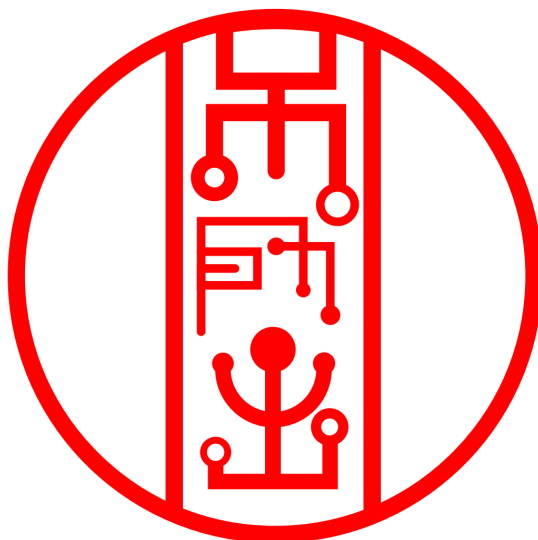
Soldering Methods for CW Product

1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices



PACKAGE OUTLINE

TO-252(D-PAK)



TO-252(D-PAK) mechanical data

UNIT		A	B	b	C	D	E	F	G	H	L	L1	L2	L3	S	M	N	J	K	T
mm	max	6.7	5.5	0.8	2.5	6.3	0.6	1.8	2.29	0.55	3.1	1.2	1.0	1.75	0.1	1.8	1.3	3.16	1.80	4.83
	min	6.3	5.1	0.3	2.1	5.9	0.4	1.3	TYPICAL	0.45	2.7	0.8	0.6	1.40	0.0	TYPICAL	TYPICAL	ref.	ref.	ref.
mil	max	264	217	31	98	248	24	71	90	22	122	47	39	69	4	71	51	124	71	190
	min	248	201	12	83	232	16	51	TYPICAL	18	106	31	24	55	0	TYPICAL	TYPICAL	ref.	ref.	ref.