



Silicon Carbide Schottky Barrier Diode

650V, 8A SiC SBD

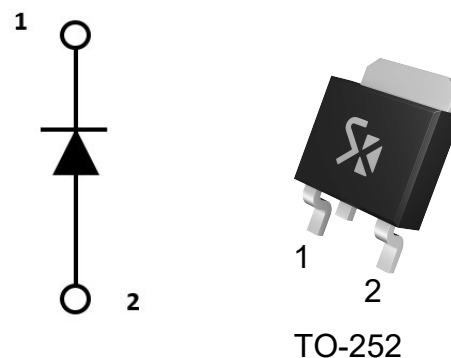
General Description

The SSC0865 uses a completely new technology and designs to provide superior switching performances and higher reliability. This device is suitable for use in power factor correction (PFC), switch mode power supplies (SMPS) and general purpose applications.

V_{RRM}	650V
I_F	8A (TC=133°C)
Q_C	24.5nC

Features

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



Applications

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

Marking	Package
SSC0865	TO-252

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

Parameter		Symbol	Value	Unit
Repetitive Peak Reverse Voltage		V_{RRM}	650	V
Continuous Forward Current, D=1	T _C =25°C	I_F	19.5	A
	T _C =133°C		8	
Non-Repetitive Peak Forward Surge Current, Half Sine Wave, 10ms	T _C =25°C	$I_{F,SM}$	42	A
	T _C =150°C		35	
i ² t Value, 10ms		$\int i^2 dt$	8.82	A
Non-Repetitive Peak Forward Current, 10us		$I_{F,max}$	252	A
Power Dissipation		P_D	56.3	W
Storage Temperature Range		T _{STG}	-55 to 150°C	°C
Operating Junction Temperature Range		T _J	-55 to 175°C	°C

**Thermal Characteristics**

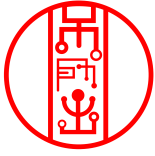
Parameter	Symbol	Conditions	Min.	Typ	Max	Unit
Maximum Junction-to-Ambient ¹	R _{thJA}	TO-252	-	1.48	2.66	°C/W
Maximum Junction-to-Case ¹	R _{thJC}	TO-252	-	-	60	°C/W

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	45	μA
		V _R =650V, T _J =150°C	-	7	70	
		V _R =650V, T _J =175°C	-	15	150	
DYNAMIC CHARACTERISTICS						
Total Capacitive Charge	Q _C	V _R =400V, T _J =25°C $Q_C = \int_0^{V_R} C(V)dV$	-	24.5	-	nC
Total Capacitance	C	V _R =0.1V, f=1MHz, T _J =25°C	-	357	-	pF
		V _R =200V, f=1MHz, T _J =25°C	-	39.4	-	
		V _R =400V, f=1MHz, T _J =25°C	-	34.2	-	
Capacitance Stored Energy	E _C	V _R =400V, f=1MHz, T _J =25°C	-	5.02	-	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 1: Typical Forward Characteristics

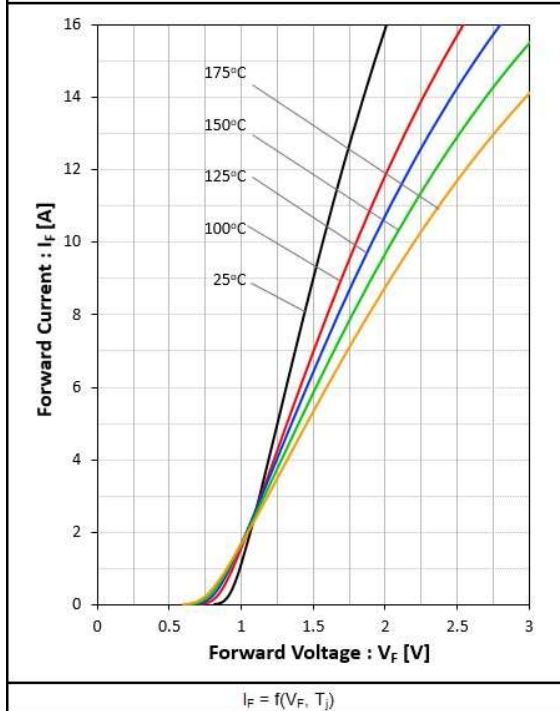


Figure 2: Typical Reverse Characteristics

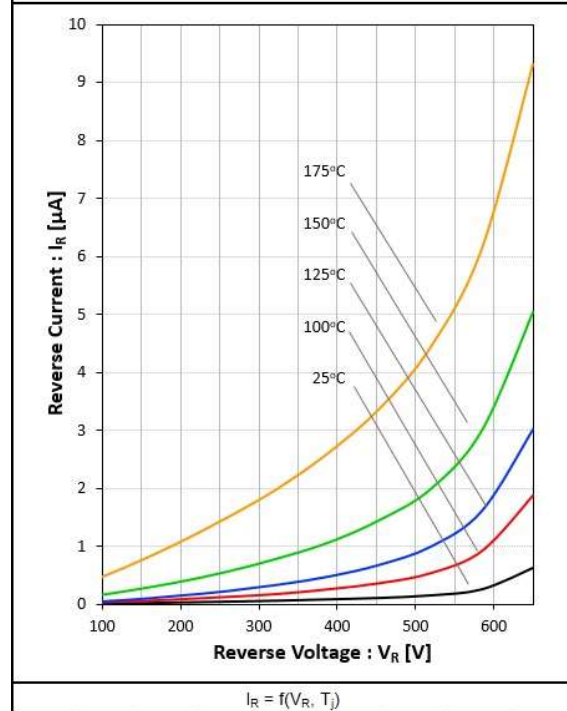


Figure 3: Power Derating Curves

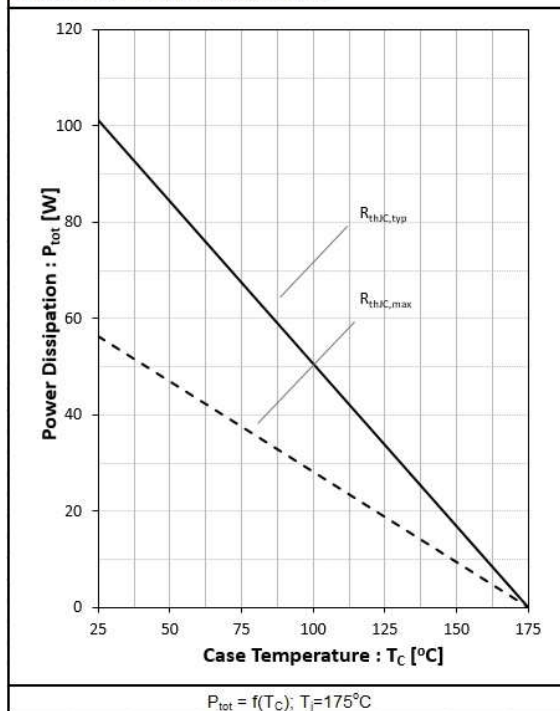
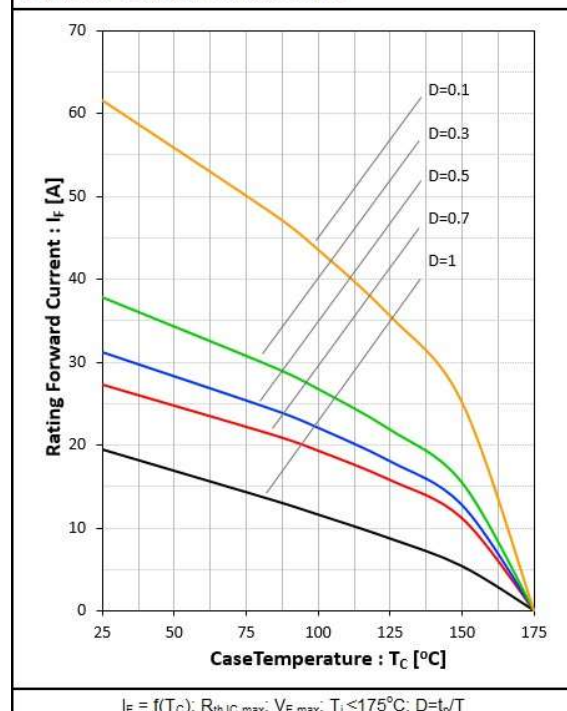
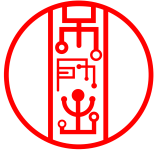


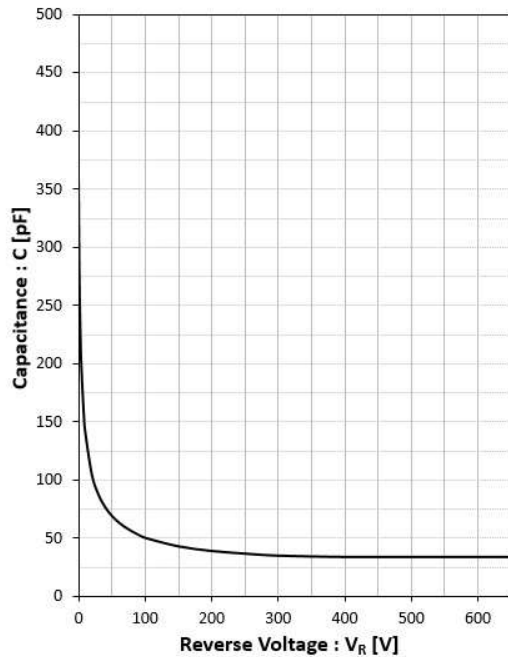
Figure 4: Current Derating Curves





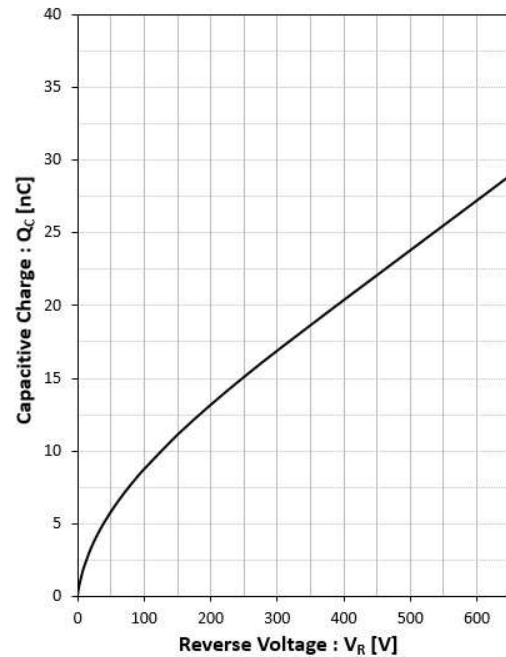
Typical Operating Characteristics (Cont.)

Figure 5: Typical Junction Capacitance



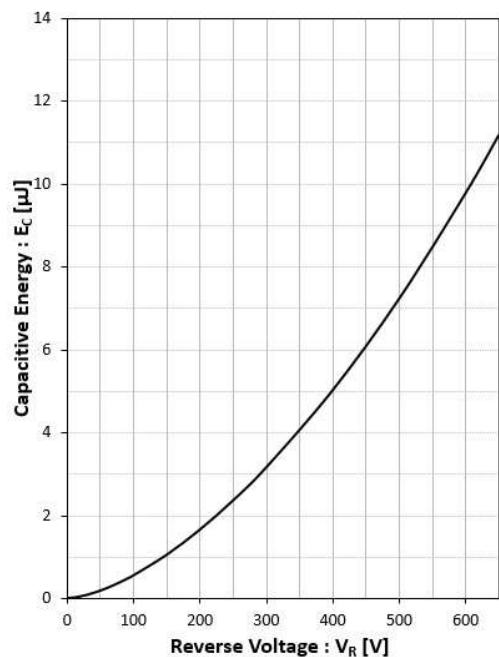
$$C = f(V_R); f=1\text{MHz}$$

Figure 6: Typical Capacitive Charge



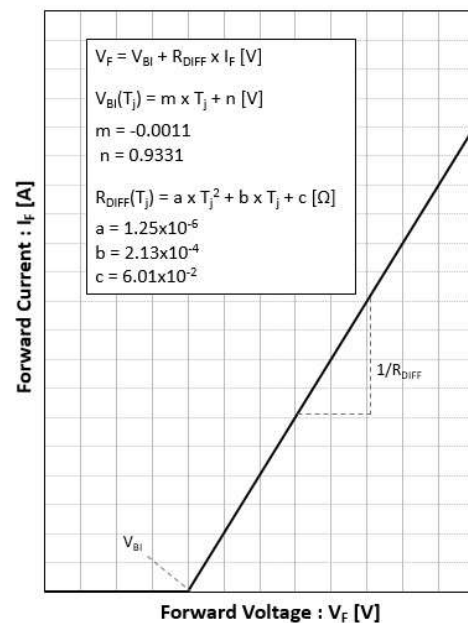
$$Q_C = f(V_R); f=1\text{MHz}$$

Figure 7: Typical Capacitive Energy



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

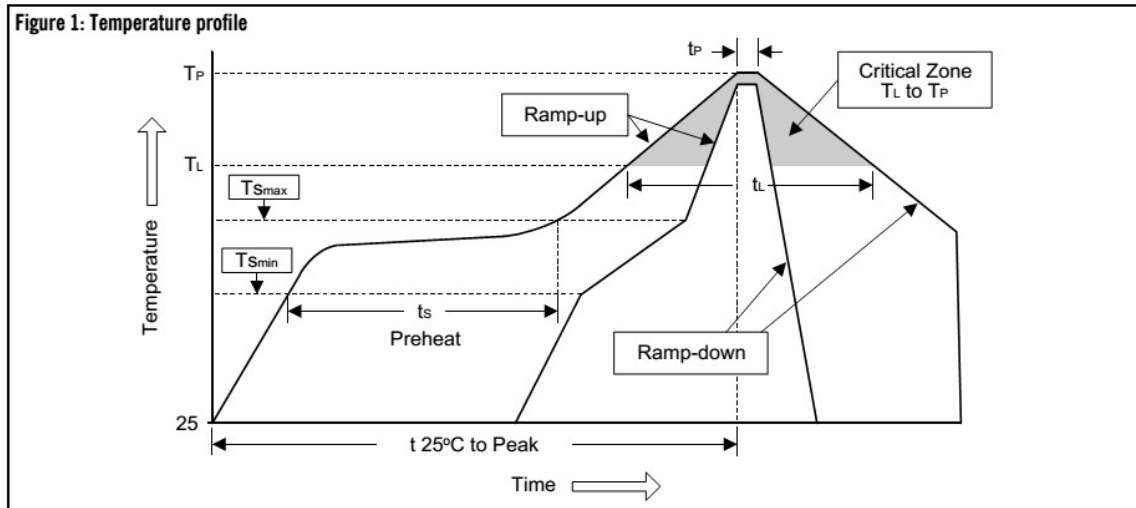
Figure 8: Forward Curve Model



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

**Soldering Methods for CW Product**

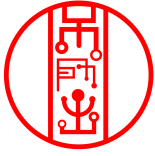
1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T _L to T _P)	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min (T _{Smin})	100°C	150°C
- Temperature Max (T _{Smax})	150°C	200°C
- Time (min to max) (ts)	60 to 120 sec	60 to 180 sec
T _{Smax} to T _L		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature (T _L)	183°C	217°C
- Time (t _L)	60 to 150 sec	60 to 150 sec
Peak Temperature (T _P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t _P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

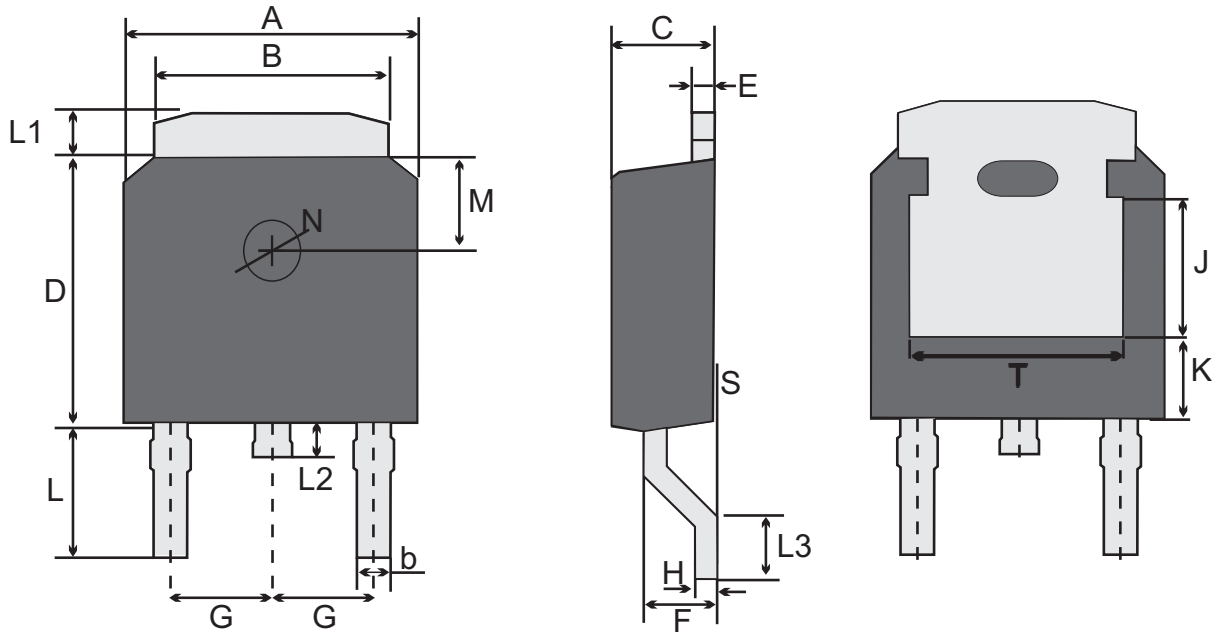
3. Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec



Package Outline

TO-252



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 TYPICAL	0.55	3.1	1.2	1.0	1.75	0.23	1.8 TYPICAL	1.3 TYPICAL	3.16 ref.	1.80 ref.	4.83 ref.
	typ	6.6	5.3	0.7	2.3	6.1	0.5	1.5		0.50	2.8	1.0	0.8	1.30	0.15					
	min	6.3	5.1	0.3	2.1	5.9	0.4	1.3		0.45	2.7	0.8	0.6	1.00	0.0					
mil	max	264	217	31	98	248	24	71	90 TYPICAL	22	122	47	39	69	9	71 TYPICAL	51 TYPICAL	124 ref.	71 ref.	190 ref.
	typ	260	209	28	90	240	20	59		20	110	39	31	51	6					
	min	248	201	12	83	232	16	51		18	106	31	24	55	0					