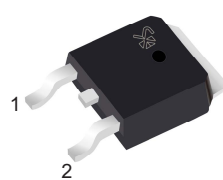
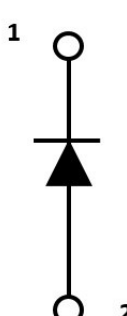


Silicon Carbide Schottky Barrier Diode

650V, 10A SiC SBD

General Description			
The Q-SSC1065 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.			
Product Summary			TO-252
V_{RRM}	650	V	
$I_F @ T_C=128^{\circ}C$	10	A	
$Q_C @ V_R=400V$	26.5	nC	
$E_C @ V_R=400V$	6.57	μJ	
Features			Graphic Symbol
<ul style="list-style-type: none"> • Temperature independent switching behavior • No reverse recovery current / No forward recovery • Excellent thermal performances • High surge current capability 			
Applications			
<ul style="list-style-type: none"> • Switch mode power supply • Power factor correction • Solar inverter • Uninterruptible power supply 			

Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	650	V
Continuous Forward Current, $D=1$	$T_C=25^{\circ}C$	23.2	A
	$T_C=128^{\circ}C$	10	
Non-Repetitive Peak Forward Surge Current, Half Sine Wave, 10ms	$T_C=25^{\circ}C$	46	A
	$T_C=150^{\circ}C$	38	
i^2t Value, 10ms	$\int i^2 dt$	10.7	A
Non-Repetitive Peak Forward Current, 10us	$I_{F,max}$	277	A
Power Dissipation	P_D	61.1	W
Storage Temperature Range	T_{STG}	-55 to 150 $^{\circ}C$	$^{\circ}C$
Operating Junction Temperature Range	T_J	-55 to 175 $^{\circ}C$	$^{\circ}C$

Thermal Characteristics

Parameter	Symbol	Conditions	Min.	Typ	Max	Unit
Maximum Junction-to-Ambient ¹	R _{thJA}	T0-252	-	1.36	2.45	°C/W
Maximum Junction-to-Case ¹	R _{thJC}	T0-252	-	-	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	50	μA
		V _R =650V, T _J =150°C	-	9	90	
		V _R =650V, T _J =175°C	-	20	200	
DYNAMIC CHARACTERISTICS						
Total Capacitive Charge	Q _C	V _R =400V, T _J =25°C $Q_C = \int_0^{V_R} C(V)dV$	-	26.5	-	nC
Total Capacitance	C	V _R =0.1V, f=1MHz, T _J =25°C	-	462	-	pF
		V _R =200V, f=1MHz, T _J =25°C	-	50.4	-	
		V _R =400V, f=1MHz, T _J =25°C	-	43.8	-	
Capacitance Stored Energy	E _C	V _R =400V, f=1MHz, T _J =25°C	-	6.57	-	μJ

Notes:

- Heat sink size: 25 x 17 x 4 cm³
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- The power dissipation is limited by 175°C junction temperature.
- 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

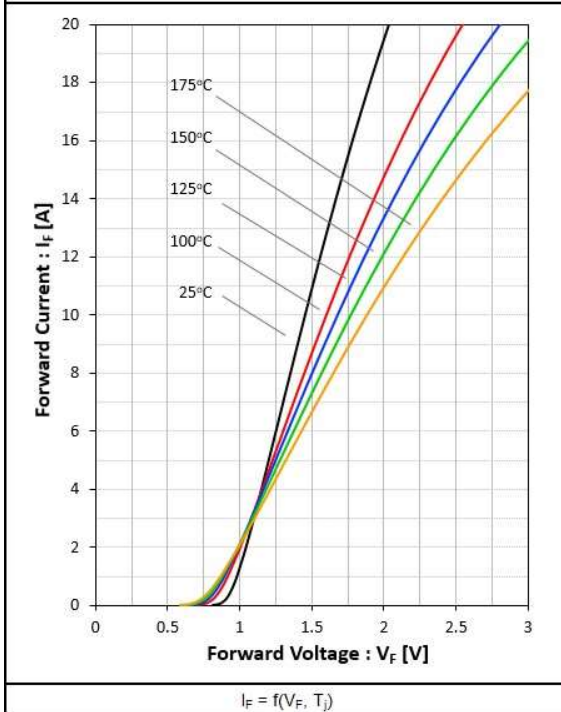


Figure 2: Typical Reverse Characteristics

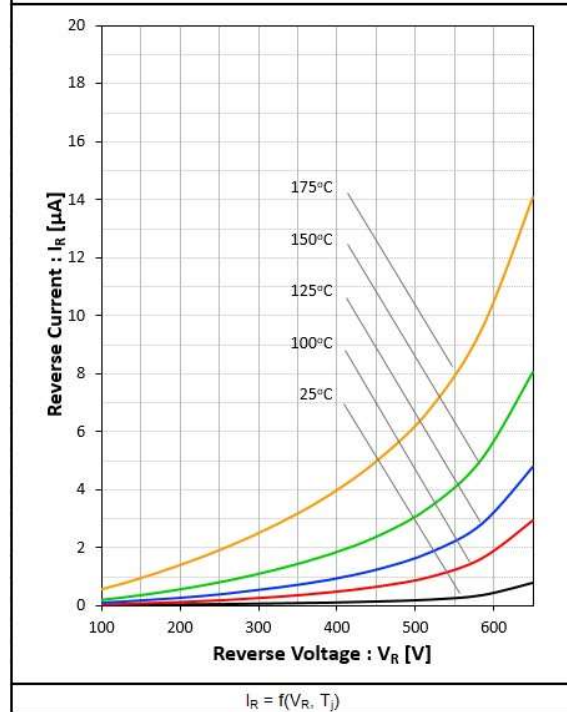


Figure 3: Power Derating Curves

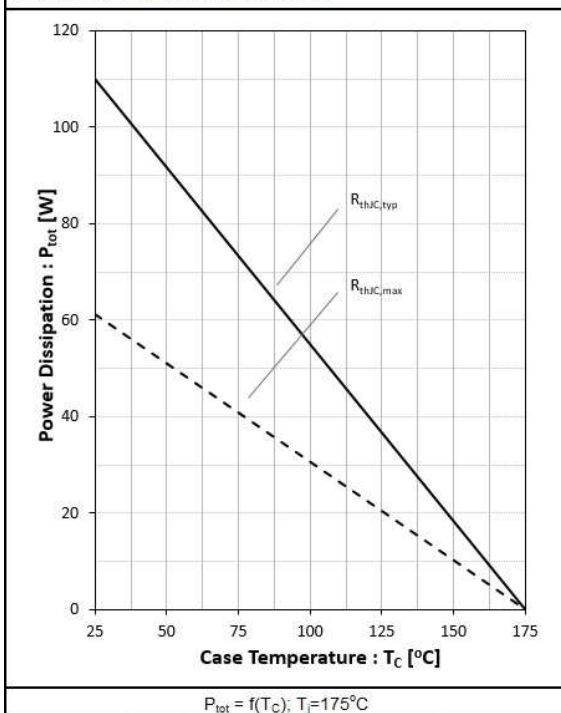
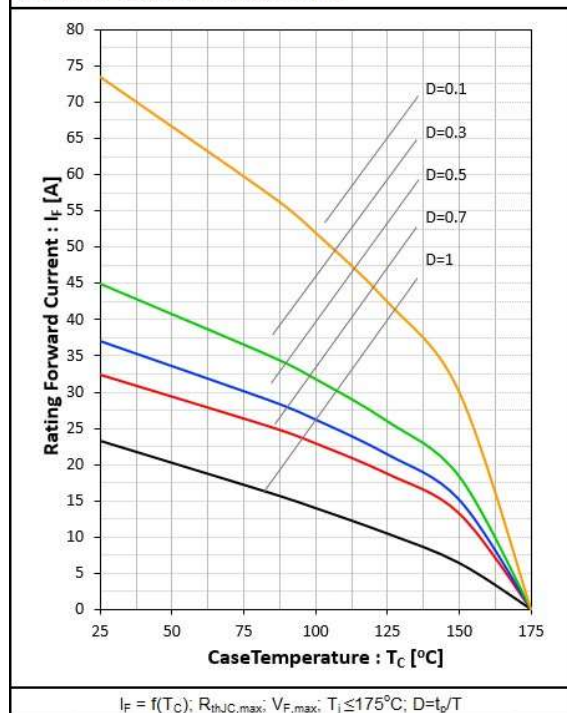
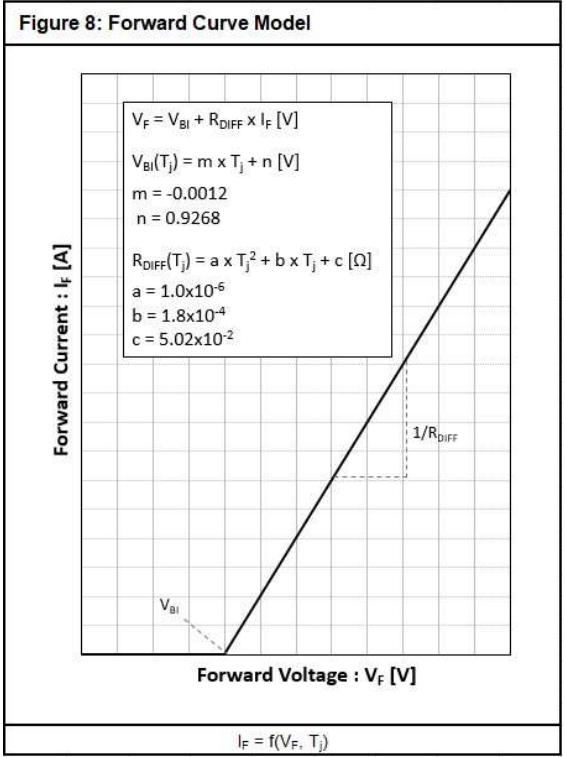
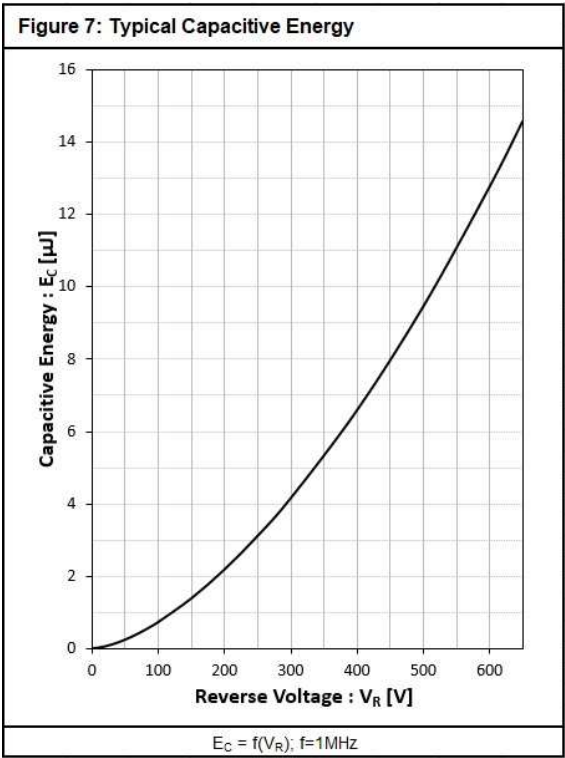
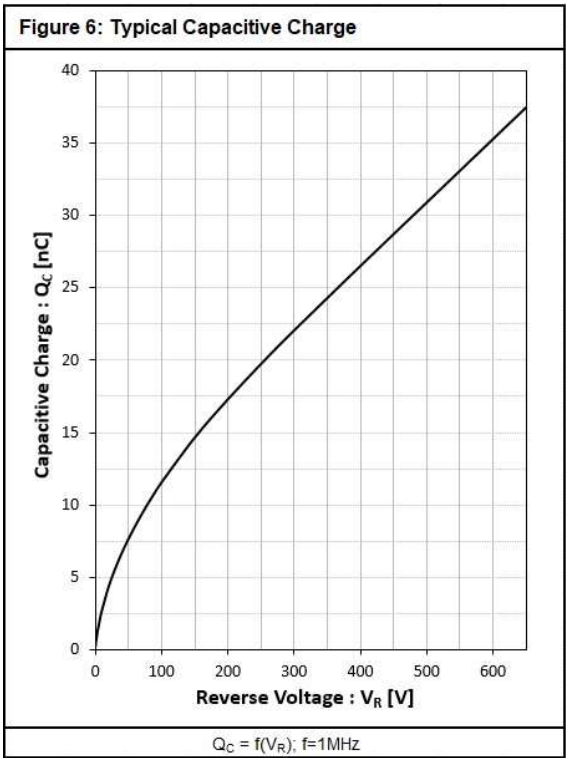
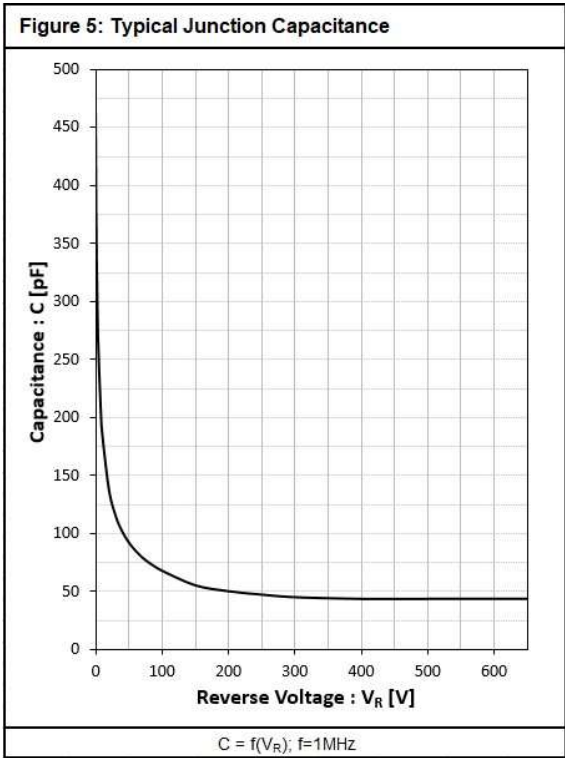


Figure 4: Current Derating Curves

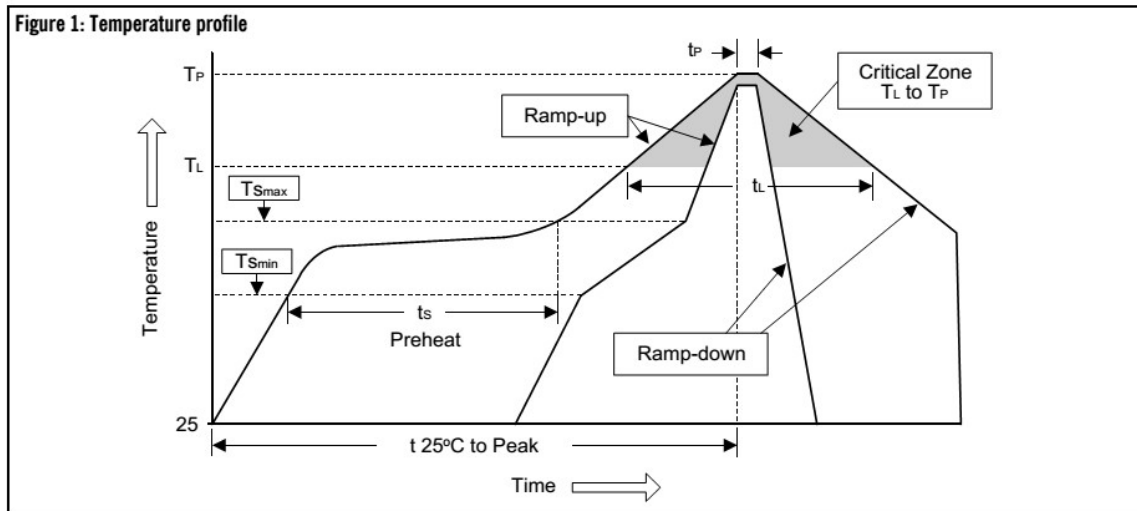


Typical Operating Characteristics (Cont.)



Soldering Methods for CW Product

1. Storage environment: Temperature=10°C to35°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) (t_s)	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