



Silicon Carbide Schottky Barrier Diode

650V, 10A SiC SBD

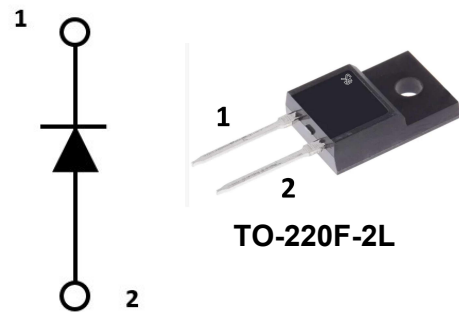
Features

- 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

V_{RRM}	650V
I_F	10A (TC=119°C)
Q_C	26.5nC



Marking	Package
Q-SSC1065-TF	TO-220F-2L

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	I_F	20.6	A
		10	
Non-Repetitive Peak Forward Surge Current, Half Sine Wave, 10ms	$I_{F,SM}$	46	A
		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	51.7	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}	T0-220F-2L	-	1.61	2.90	°C/W
Maximum Junction-to-Case ¹	R _{thJC}	T0-220F-2L	-	-	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:

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

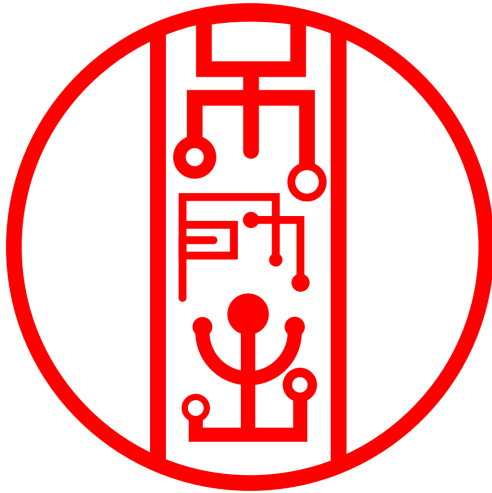
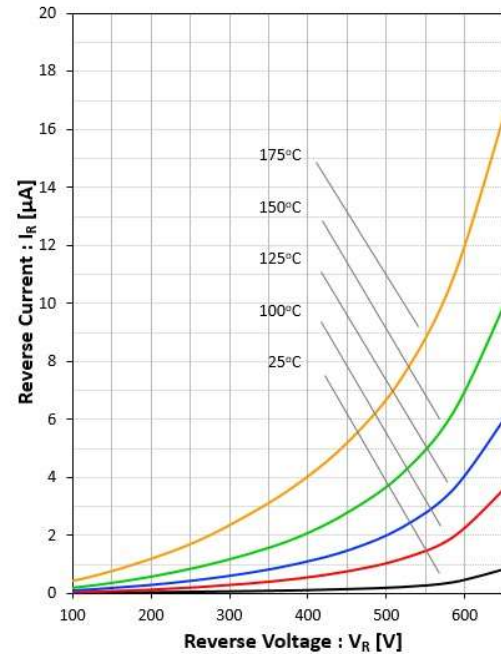
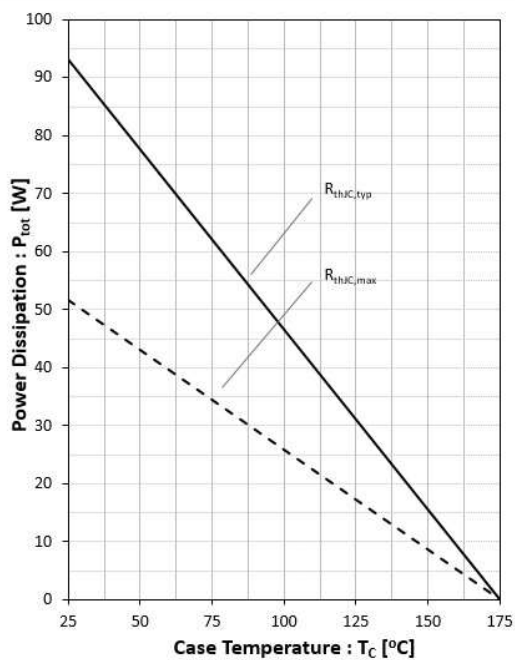


Figure 2: Typical Reverse Characteristics



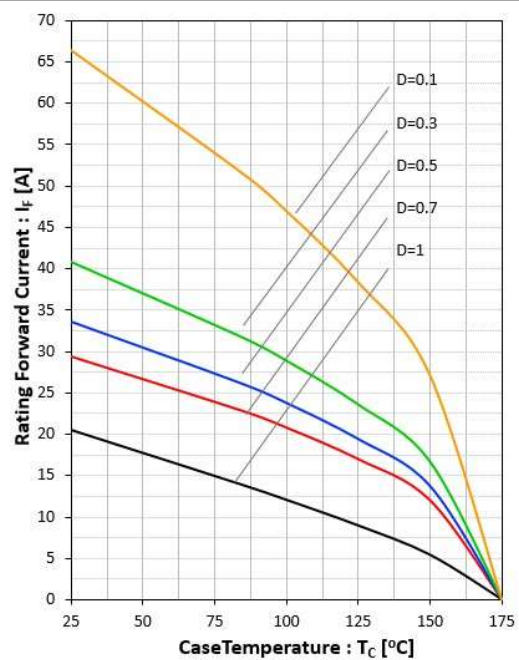
$$I_R = f(V_R, T_j)$$

Figure 3: Power Derating Curves



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

Figure 4: Current Derating Curves



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

Typical Operating Characteristics (Cont.)

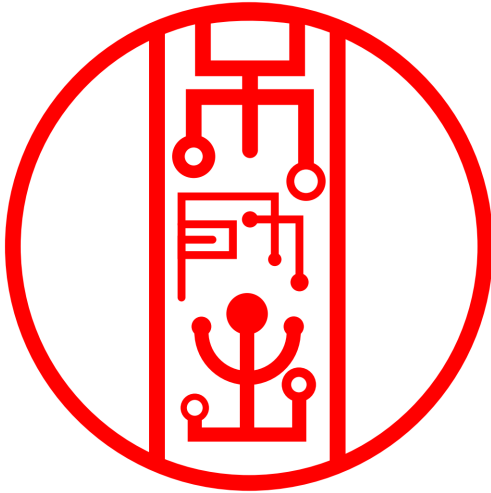
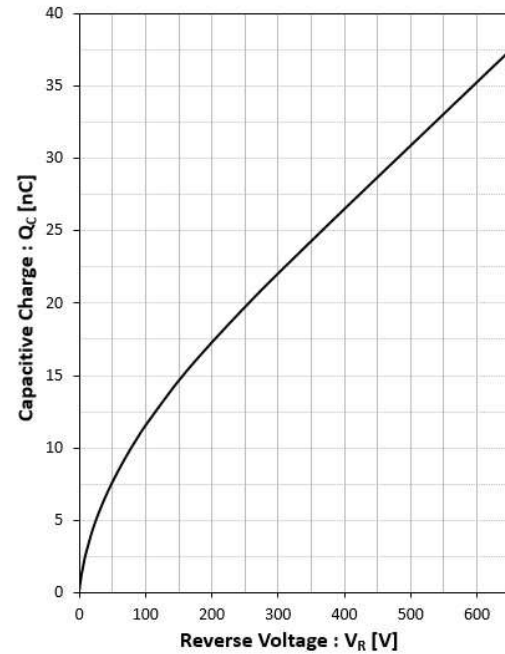
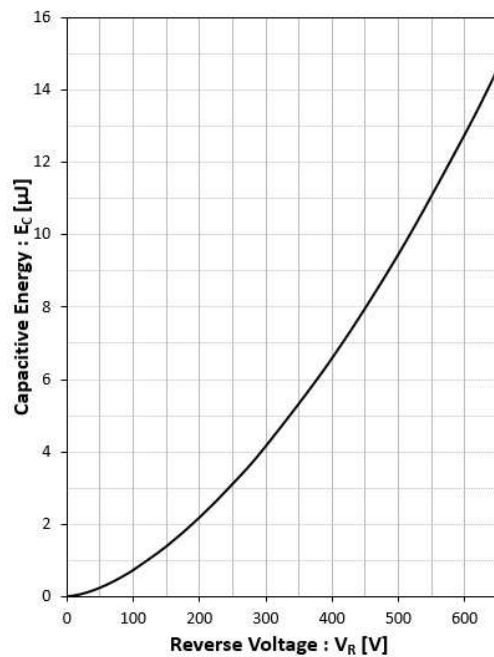


Figure 6: Typical Capacitive Charge



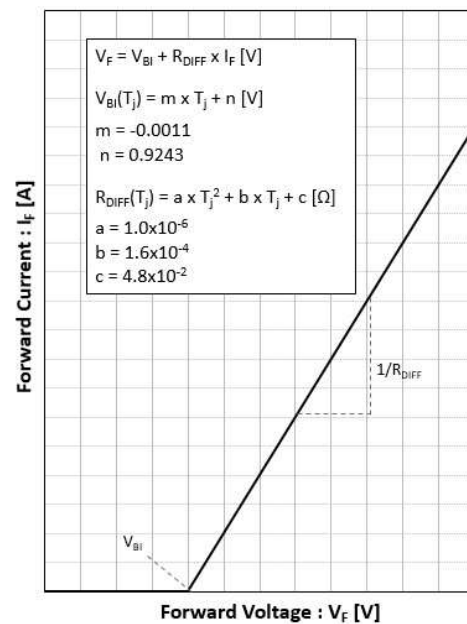
$$Q_C = f(V_R); f=1\text{MHz}$$

Figure 7: Typical Capacitive Energy



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

Figure 8: Forward Curve Model

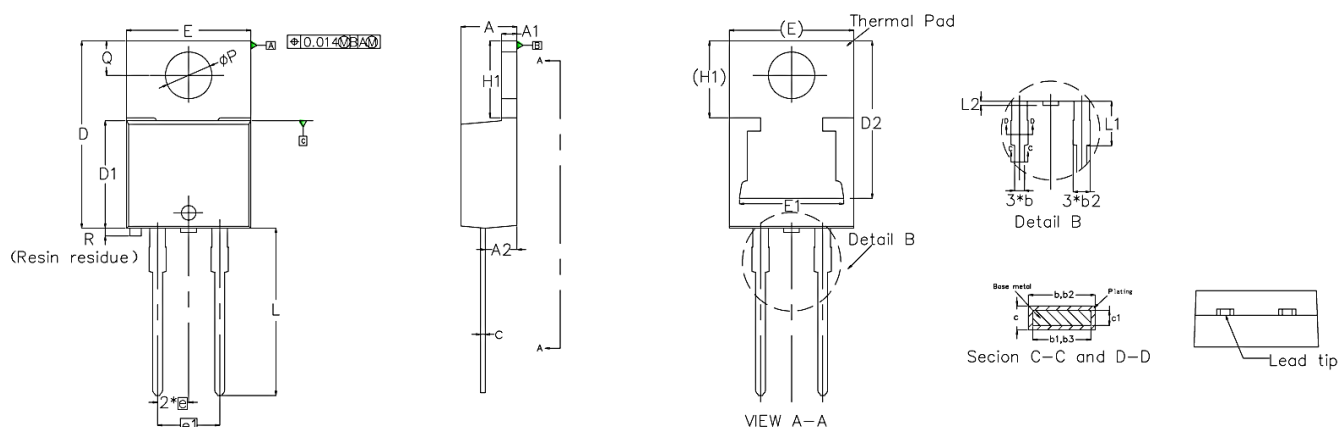


$$I_F = f(V_F, T_j)$$



Package Dimensions

To-220-2



SYMBOL	MILLIMETERS			NOTES		SYMBOL	MILLIMETERS			NOTES
	Normal	MIN.	MAX.				Normal	MIN.	MAX.	
A	4.55	4.44	4.65			E1	8.57	8.25	8.89	
A1	1.27	1.14	1.39			e	2.54	2.41	2.67	
A2	2.60	2.54	2.79			e1	5.08	4.95	5.20	
b	0.85	0.69	0.94			H1	6.20	6.09	6.40	
b1	0.83	0.38	0.97			L	13.60	13.52	14.00	
b2	1.33	1.20	1.45			L1	3.60	3.56	3.80	
b3	1.33	1.20	1.45			L2	—	0	0.35	
c	0.50	0.36	0.56			ϕP	3.80	3.70	3.91	
c1	0.48	0.36	0.56			Q	2.80	2.62	2.87	
D	15.25	14.95	15.32			R			0.2	
D1	8.75	8.50	8.89							
D2	12.85	12.20	13.30							
E	10.18	10.11	10.40							