HCW65D40D1Q

SiC Silicon Carbide Schottky Diode

650V, 40A

Description

The 650V SiC is an advanced Power Master Semiconductor's silicon carbide diode family. This technology combines the benefits of excellent low capacitive charge and robustness. Consequently, the SiC family is suitable for application requiring high power efficiency.

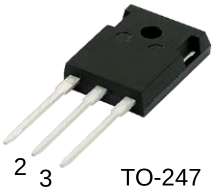
Features

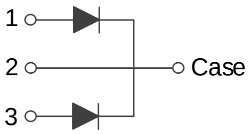
V_{RRM}	I_F	$T_{J,max}$	Q_C
650 V	20 / 40 A	175 ℃	61 nC

- No reverse recovery current
- Low capacitive charge
- 175°C Max junction temperature
- High surge current capability
- Switching behavior independent of temperature
- Pb-Free, Halogen Free and RoHS compliant

Applications

- Power Factor Correction
- Industrial Power Supplies
- Solar Inverter, UPS





Absolute Maximum Ratings (Per Leg / Device & Per Leg, T_C = 25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		650	V
I_F	Forward Current	T_C=122℃	20 / 40	A
$I_{F,SM}$	Non-Repetitive Forward Surge Current	T_C=25℃, t_p=10 ms	95	A
		T_C=150℃, t_p=10 ms	80.8	A
$I_{F,Max}$	Non-Repetitive Peak Forward Current	T_C=25℃, t_p=10 us	880	A
		T_C=150℃, t_p=10 us	748	A
I^2dt value	$\int I^2t$	T_C=25℃, t_p=10 ms	45.1	A^2s
		T_C=150℃, t_p=10 ms	32.6	A^2s
P_{tot}	Power Dissipation	T_C=25℃	107	W
T_J,T_{STG}	Operating Junction and Storage Temperature		-55 to +175	℃

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.(Per Leg / Per Device)	1.4 / 0.7	℃/W

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
HCW65D40D1Q	HCW65D40D1Q	TO-247	Tube	30 units

Electrical Characteristics (Per Leg, T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_F	Forward Voltage	I_F=20 A, T_C=25℃		1.40	1.7	V
		I_F=20 A, T_C=175℃		1.55	-	
I_R	Reverse Current	V_R=650 V, T_C=25℃		-	100	μA
		V_R=650 V, T_C=175℃		-	300	
Q_C	Total Capacitive Charge	V_R=400 V, T_C=25℃		61		nC
C	Total Capacitance	V_R=1 V, f=100 kHz		997		pF
		V_R=400 V, f=100 kHz		95		
E_C	Capacitance Stored Energy	V_R=400 V, T_C=25℃		9		μJ

Typical Performance Characteristics (Per Leg)

Figure 1. Power Derating

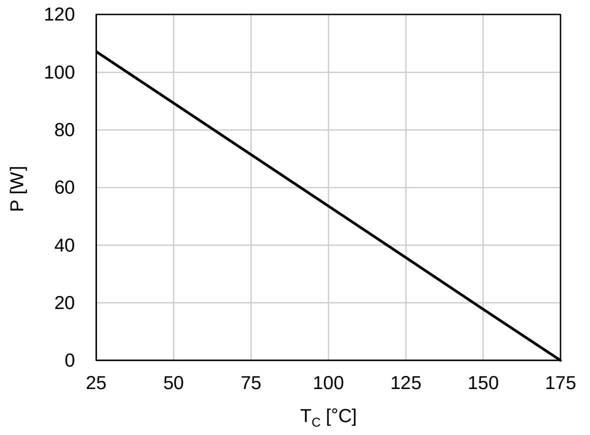


Figure 2. Current Derating

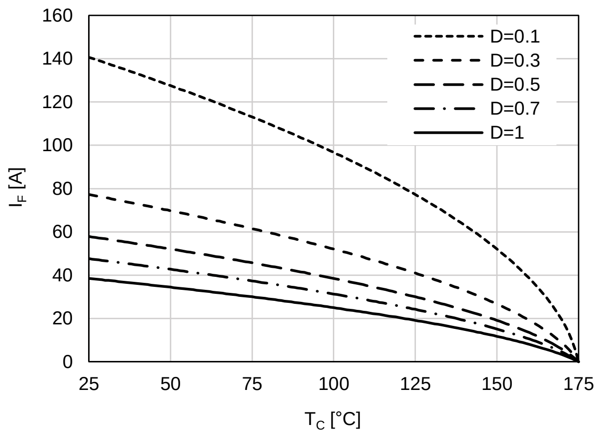


Figure 3. Forward Characteristics

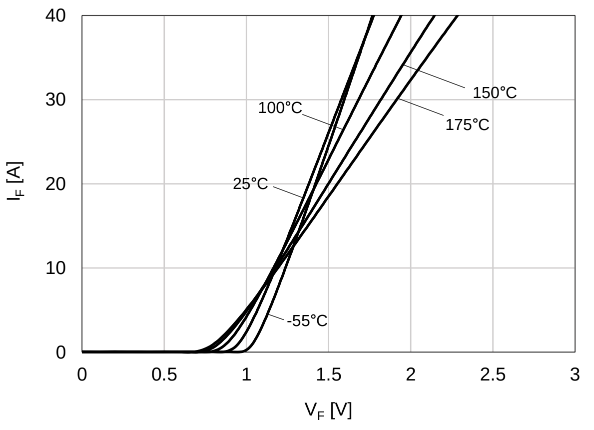


Figure 4. Reverse Characteristics

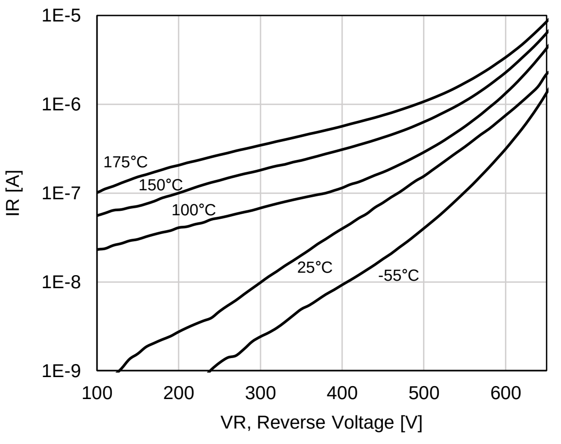


Figure 5. Capacitive Charge Characteristic

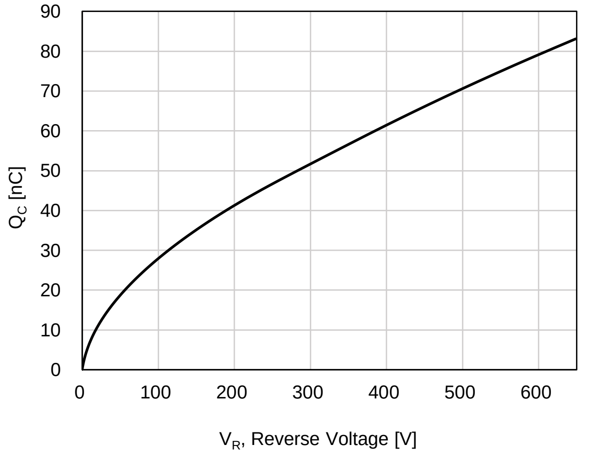
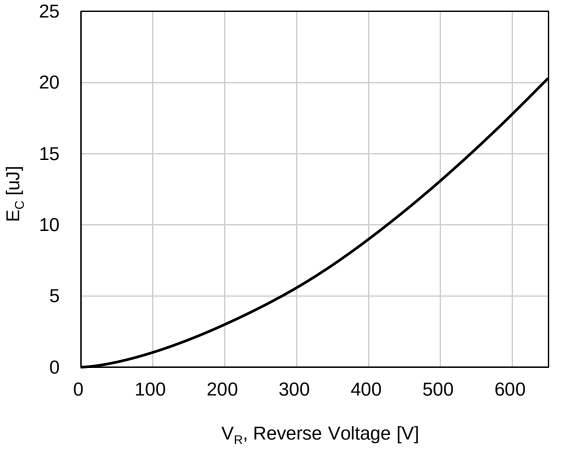


Figure 6. Capacitance Stored Energy



Typical Performance Characteristics (Per Leg)

Figure 7. Capacitance Characteristic

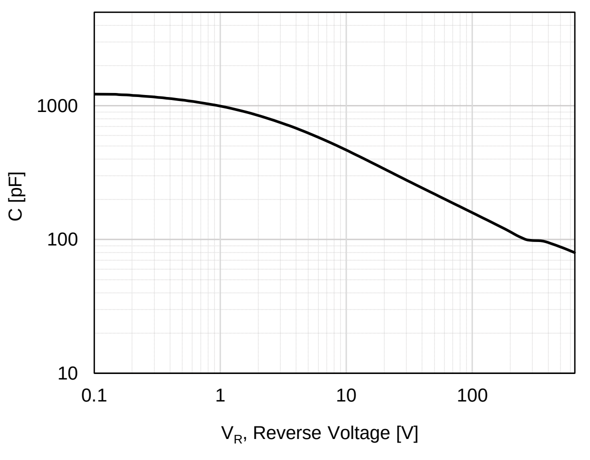
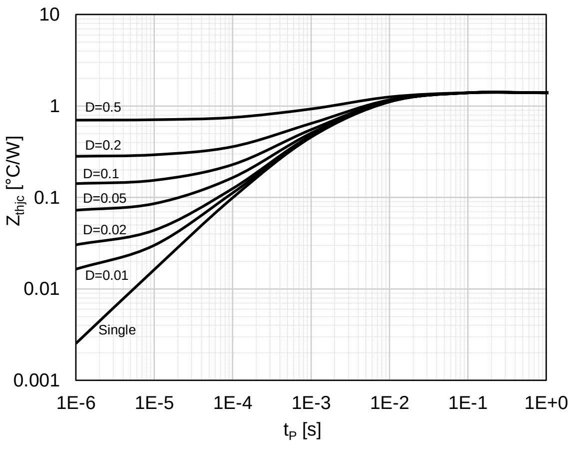
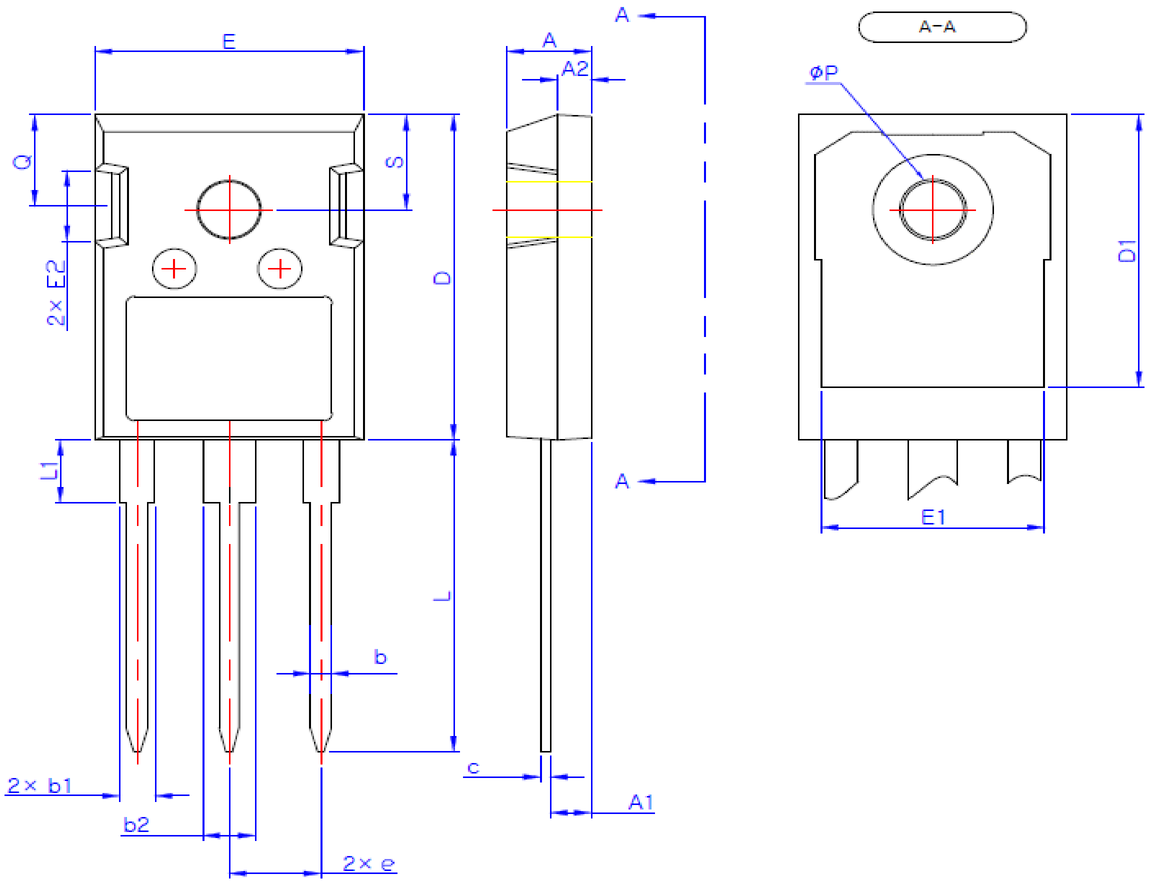


Figure 8. Transient Thermal Response Curve



Package Outlines

TO-247



SYMBOL	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.29	2.42	2.54
A2	1.90	2.00	2.10
b	1.10	1.20	1.30
b1	1.91	2.06	2.20
b2	2.92	3.06	3.20
c	0.50	0.60	0.70
D	20.80	21.07	21.34
D1	17.43	17.63	17.83
E	15.75	15.94	16.13
E1	13.06	13.26	13.46
E2	4.32	4.58	4.83
e	5.45 BSC		
L	19.85	20.05	20.25
L1	4.05	4.27	4.49
ΦP	3.55	3.60	3.65
Q	5.59	5.89	6.19
S	6.15 BSC		

* Dimensions in millimeters