

HCW65D40D1A

SiC Automotive Silicon Carbide Schottky Diode

650V, 40A

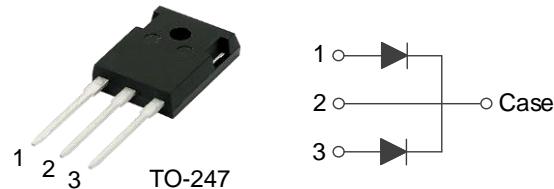
Description

The 650V SiC is an advanced Power Master Semiconductor's silicon carbide diode family. This technology combines the benefits of excellent low forward voltage 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 °C	77 nC

- No reverse recovery current
- Low forward voltage
- 175°C Max junction temperature
- High surge current capability
- Switching behavior independent of temperature
- AEC Q101 Qualified
- Pb-Free, Halogen Free and RoHS compliant



Applications

- OBC (On Board Charger)
- DC/DC Converter for EV/HEV
- Wireless Charger

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

Symbol	Parameter		Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage		650	V
I _F	Forward Current	T _C =132°C	20 / 40	A
I _{F,SM}	Non-Repetitive Forward Surge Current	T _C =25°C, t _p =10 ms	97	A
		T _C =150°C, t _p =10 ms	78	A
I _{F,Max}	Non-Repetitive Peak Forward Current	T _C =25°C, t _p =10 us	910	A
		T _C =150°C, t _p =10 us	770	A
I ² dt value	$\int I^2 dt$	T _C =25°C, t _p =10 ms	47	A ² s
		T _C =150°C, t _p =10 ms	30	A ² s
P _{tot}	Power Dissipation	T _C =25°C	125	W
T _J , T _{STG}	Operating Junction and Storage Temperature		-55 to +175	°C

Thermal Characteristics

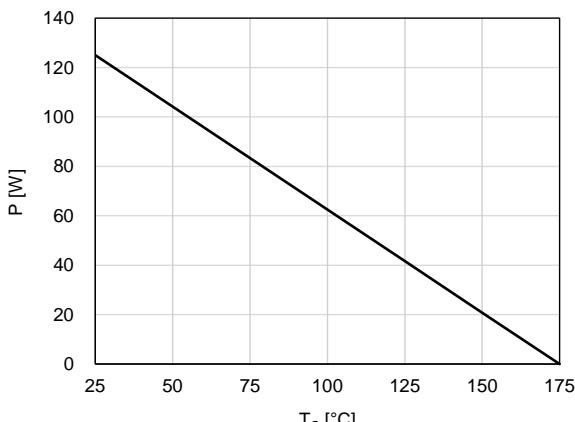
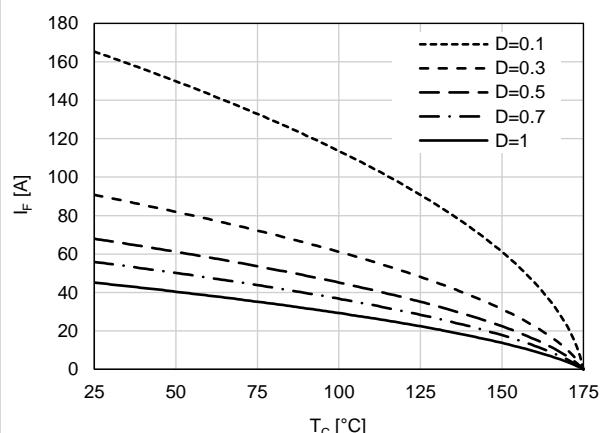
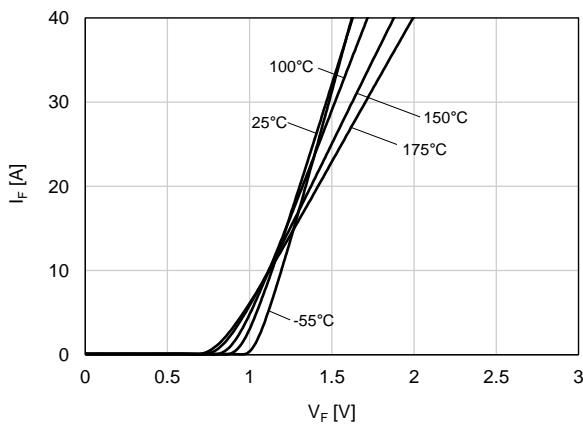
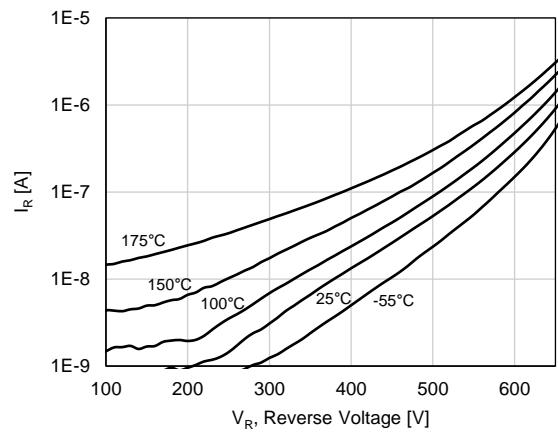
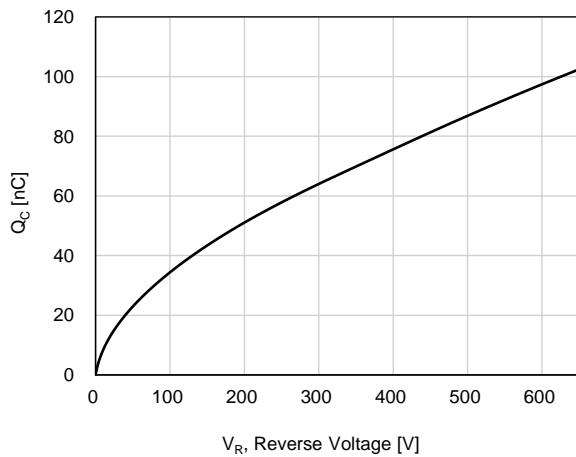
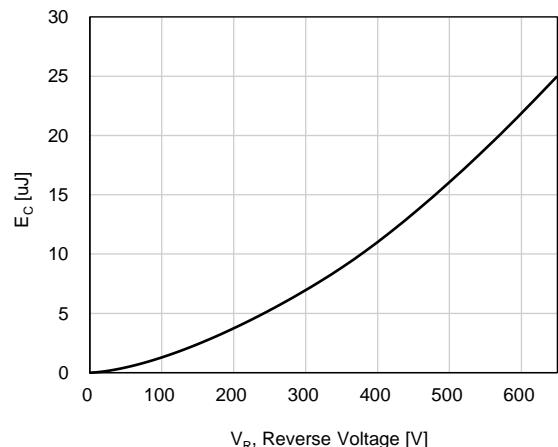
Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction to Case, Max.(Per Leg / Per Device)	1.2 / 0.6	°C/W

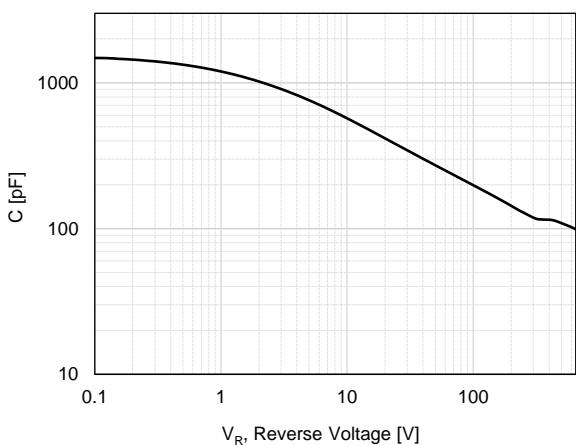
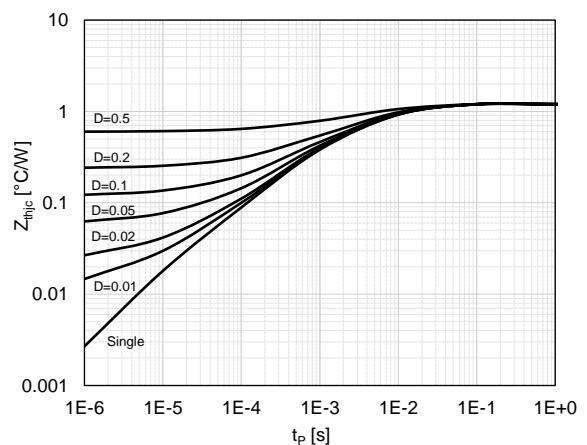
Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
HCW65D40D1A	HCW65D40D1A	TO-247	Tube	30 units

Electrical Characteristics (Per Leg, $T_C = 25^\circ\text{C}$ unless otherwise noted)

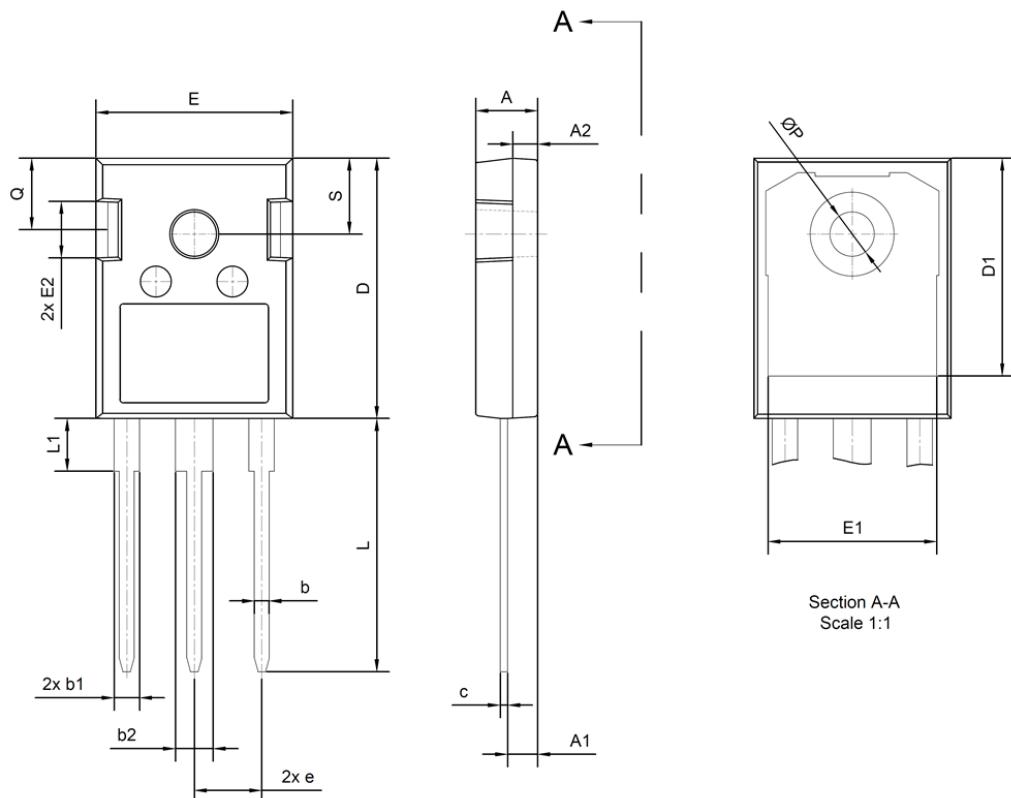
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_F	Forward Voltage	$I_F=20 \text{ A}, T_C=25^\circ\text{C}$		1.30	1.6	V
		$I_F=20 \text{ A}, T_C=175^\circ\text{C}$		1.45	-	
I_R	Reverse Current	$V_R=650 \text{ V}, T_C=25^\circ\text{C}$		-	100	μA
		$V_R=650 \text{ V}, T_C=175^\circ\text{C}$		-	300	
Q_C	Total Capacitive Charge	$V_R=400 \text{ V}, T_C=25^\circ\text{C}$,		77		nC
C	Total Capacitance	$V_R=1 \text{ V}, f=100 \text{ kHz}$		1208		pF
		$V_R=400 \text{ V}, f=100 \text{ kHz}$		113		
E_C	Capacitance Stored Energy	$V_R=400 \text{ V}, T_C=25^\circ\text{C}$		11		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



Section A-A
Scale 1:1

SYMBOL	Common		
	DIMENSIONS MILLIMETER		
	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	17.23	17.63	18.03
E	15.75	15.94	16.13
E1	13.46	13.66	13.86
E2	4.32	4.58	4.83
e	5.46 BSC		
L	19.85	20.05	20.25
L1	4.05	4.27	4.48
ØP	3.56	3.61	3.66
Q	5.38	5.79	6.20
S	6.15 BSC		