

HCA65S20D1QA

SiC Automotive Silicon Carbide Schottky Diode

650V, 20A

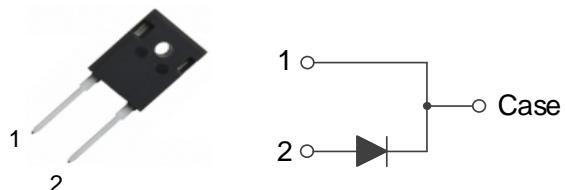
Description

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 A	175 °C	62 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 (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 =128°C	20	A
I _{F,SM}	Non-Repetitive Forward Surge Current	T _C =25°C, t _p =10 ms	95	A
		T _C =150°C, t _p =10 ms	80.8	A
I _{F,Max}	Non-Repetitive Peak Forward Current	T _C =25°C, t _p =10 us	880	A
		T _C =150°C, t _p =10 us	748	A
I ² dt value	J I ² t	T _C =25°C, t _p =10 ms	45.1	A ² s
		T _C =150°C, t _p =10 ms	32.6	A ² s
P _{tot}	Power Dissipation	T _C =25°C	121	W
T _J , T _{STG}	Operating Junction and Storage Temperature		-55 to +175	°C

Thermal Characteristics

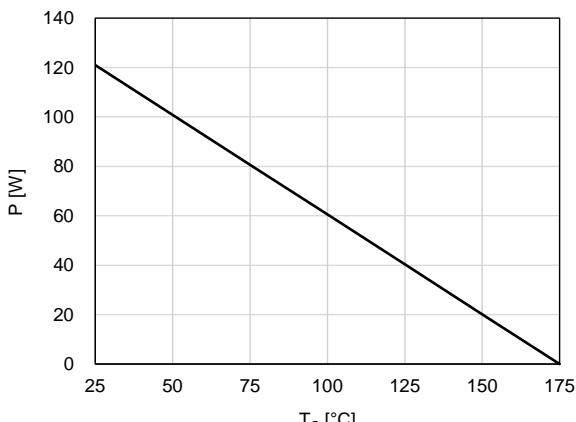
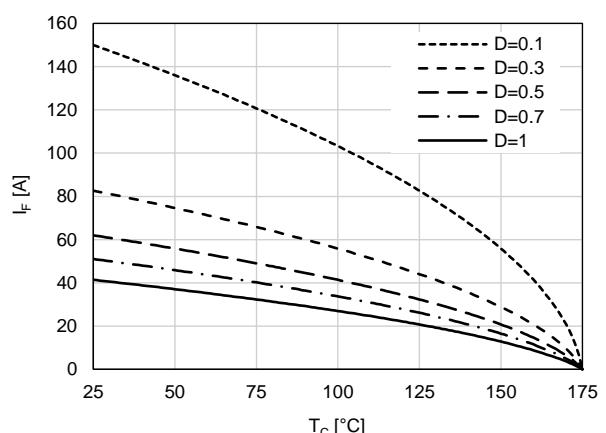
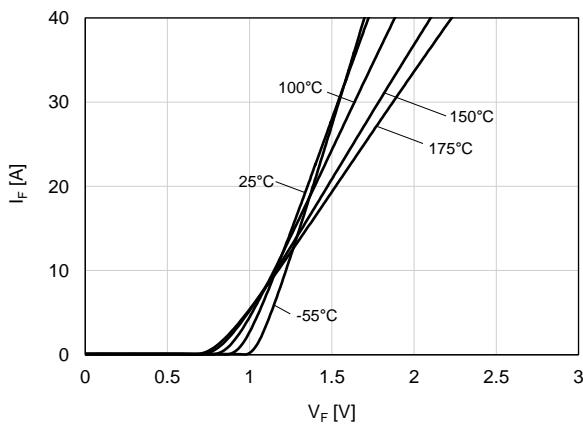
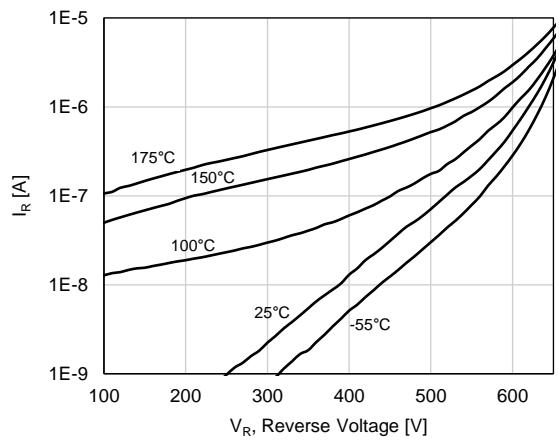
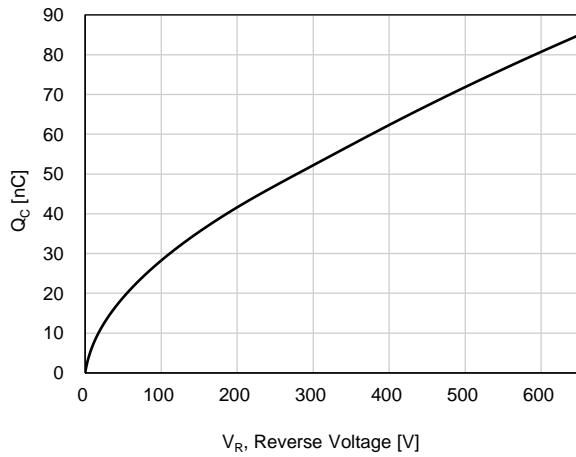
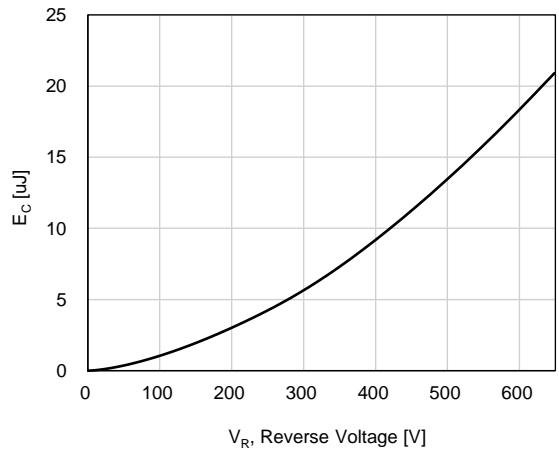
Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction to Case, Max.	1.24	°C/W

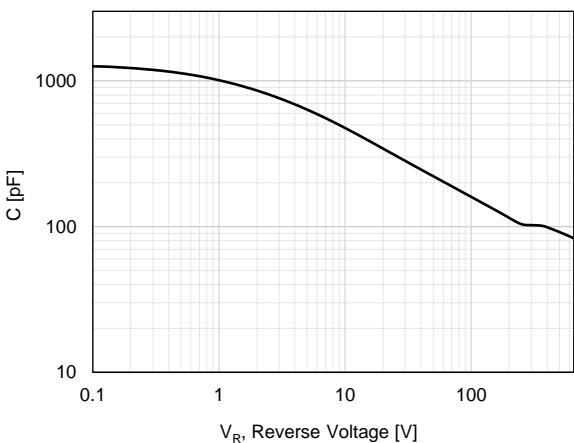
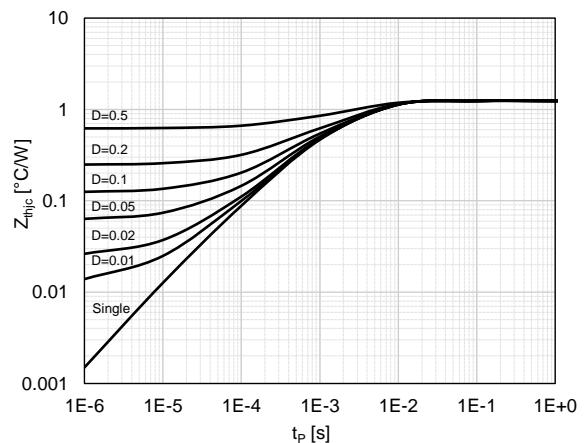
Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
HCA65S20D1QA	HCA65S20D1QA	TO-247-2L	Tube	30 units

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

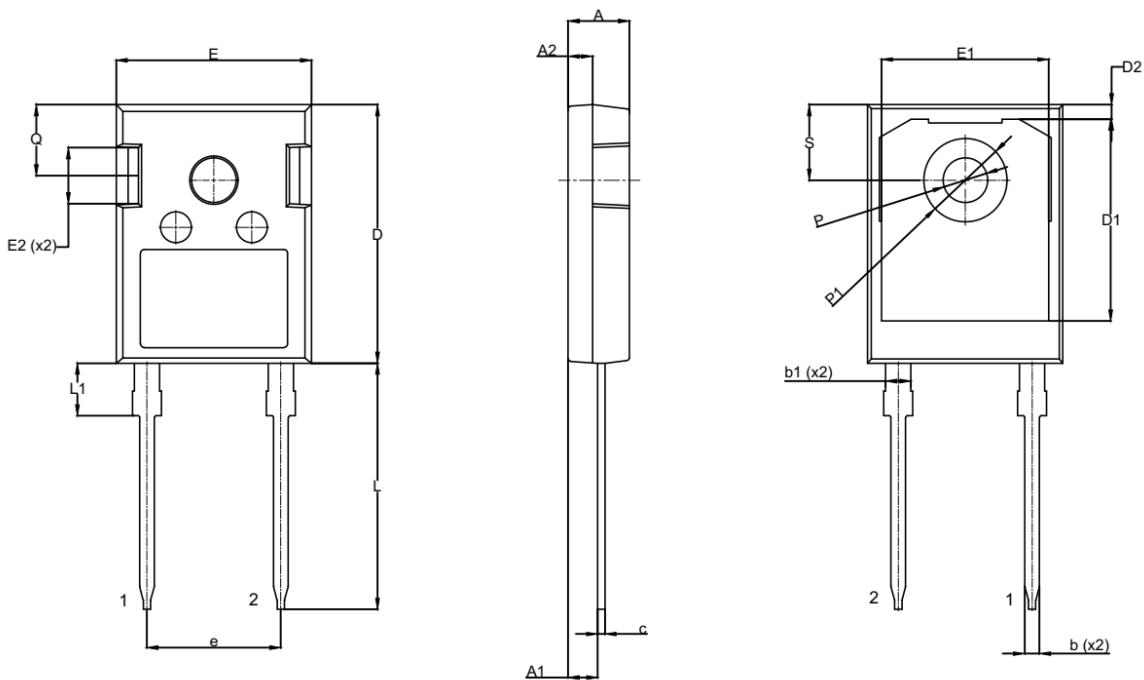
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_F	Forward Voltage	$I_F=20 \text{ A}, T_C=25^\circ\text{C}$		1.40	1.7	V
		$I_F=20 \text{ A}, T_C=175^\circ\text{C}$		1.55	-	
I_R	Reverse Current	$V_R=650 \text{ V}, T_C=25^\circ\text{C}$		-	100	μA
		$V_R=650 \text{ V}, T_C=175^\circ\text{C}$		-	300	
Q_C	Total Capacitive Charge	$V_R=400 \text{ V}, T_C=25^\circ\text{C}$		62		nC
C	Total Capacitance	$V_R=1 \text{ V}, f=100 \text{ kHz}$		1010		pF
		$V_R=400 \text{ V}, f=100 \text{ kHz}$		99		
E_C	Capacitance Stored Energy	$V_R=400 \text{ V}, T_C=25^\circ\text{C}$		9.2		μJ

Typical Performance Characteristics**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**Figure 7. Capacitance Characteristic****Figure 8. Transient Thermal Response Curve**

Package Outlines

TO-247-2L



SY M BO L	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
c	0.50	0.60	0.70
D	20.80	21.07	21.34
D1	16.26	16.46	16.66
D2	0.97	1.17	1.37
E	15.75	15.94	16.13
E1	13.46	13.66	13.86
E2	4.32	4.58	4.83
e	10.92 BSC.		
L	19.85	20.05	20.25
L1	4.05	4.27	4.48
P	3.56	3.61	3.66
P1	6.75	6.80	6.85
Q	5.38	5.79	6.20
S	6.15 BSC.		