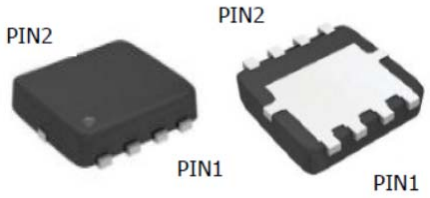
HMC8N65Q

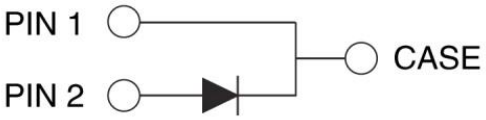
650V SiC Schottky Diode

1. Descriptions

PDFN5X6



SiC Schottky Diode



Key Performance Parameters

Parameters	Value	Unit
V_{DC}	650	V
I_F (T_C ≤135°C)	14	A
Q_C	21	nC

Features

- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on V_F
- Temperature Independent Switching Behavior
- 175℃ Operating junction temperature

Applications

- Switch Mode Power Supply
- Power Factor Correction
- Motor Drive, PV Inverter, Wind Power Station

Type/Ordering Code	Package	Marking	Related Links
HMC8N65Q	PDFN5X6	HMC8N65Q YYWW	See Appendix A

2. Maximum Ratings

Table 1. Maximum Ratings

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
V_{RRM}	Repetitive Peak Reverse Voltage	650	-	-	V	T_C=25°C
I_F	Forward Current	- - -	- - -	31 14 8	A	T_C<=25°C T_C<=135°C T_C<=156°C
I_{FSM}	Non-Repetitive Forward Surge Current	-	-	70	A	T_C=25°C, t_P=8.3ms, Half Sine Wave
P_{tot}	Power Dissipation	-	-	107	W	T_C=25°C
T_J, T_{stg}	Operating and Storage Temperature	-55	-	175	°C	–
	TO-220-2 Mounting Torque			1	Nm	M3 Screw

3. Thermal Characteristics

Table 2. Thermal Characteristics

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
R_{thJC}	Thermal Resistance, Junction - Case	-	1.4	-	°C/W	T_C = 25°C
R_{thJA}	Thermal Resistance, Junction - Ambient	-	80	-	°C/W	T_C = 25°C
T_{sold}	Soldering Temperature, Wavesoldering Only Allowed at Leads	-	260	-	°C	Soldering, 10 sec

4. Electrical Characteristics

At T_J= 25°C, unless otherwise specified

Table 3. Static Characteristics

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
V_F	Forward Voltage	- -	1.27 1.38	1.5 1.6	V	I_F=8A, T_J=25°C I_F=8A, T_J=175°C
I_R	Reverse Current	- -	5 25	50 200	μA	V_R=650V, T_J=25°C V_R=650V, T_J=175°C
C	Total Capacitance	- - -	530 54 39	- - -	pF	V_R=0V, T_J=25°C, f=1MHz V_R=200V, T_J=25°C, f=1MHz V_R=400V, T_J=25°C, f=1MHz
Q_C	Total Capacitive Charge	-	21	-	nC	V_R=400V, I_F=8A di/dt=200A/μs, T_J=25°C

5. Electrical Characteristics Diagrams

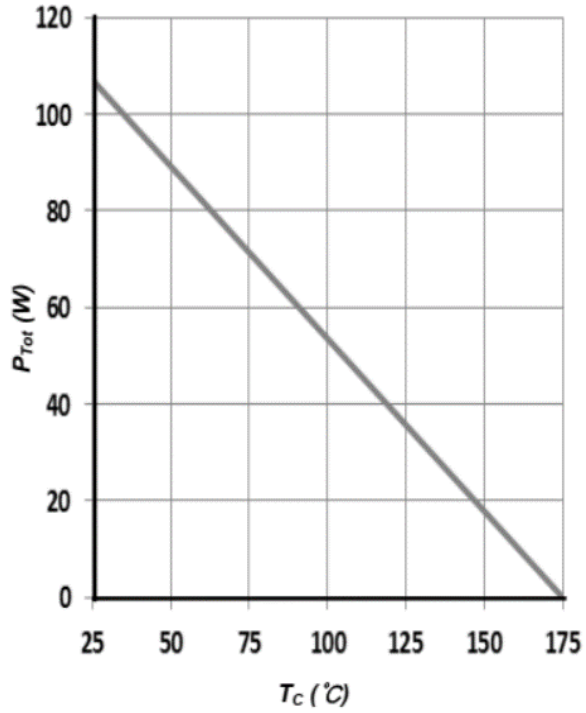
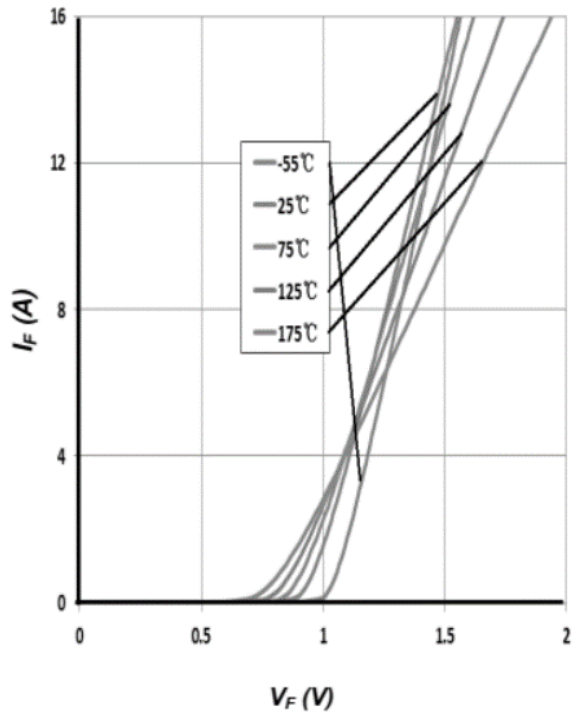
Diagram 1: Power Dissipation	Diagram 2: Typical Forward Characteristics
	
$P_{tot}=f(T_C)$	$I_F=f(V_F)$; Parameter: T

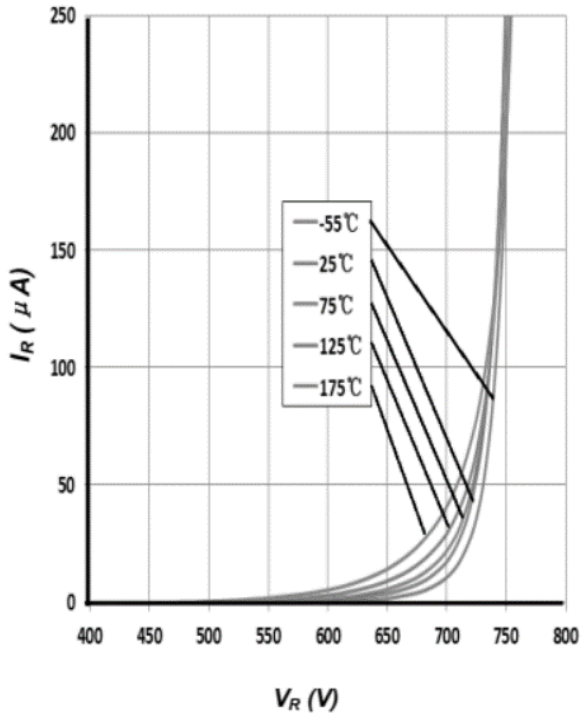
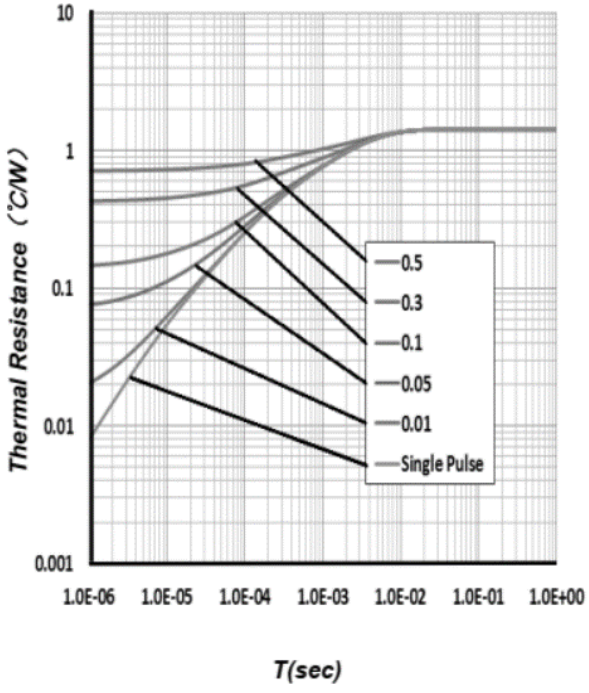
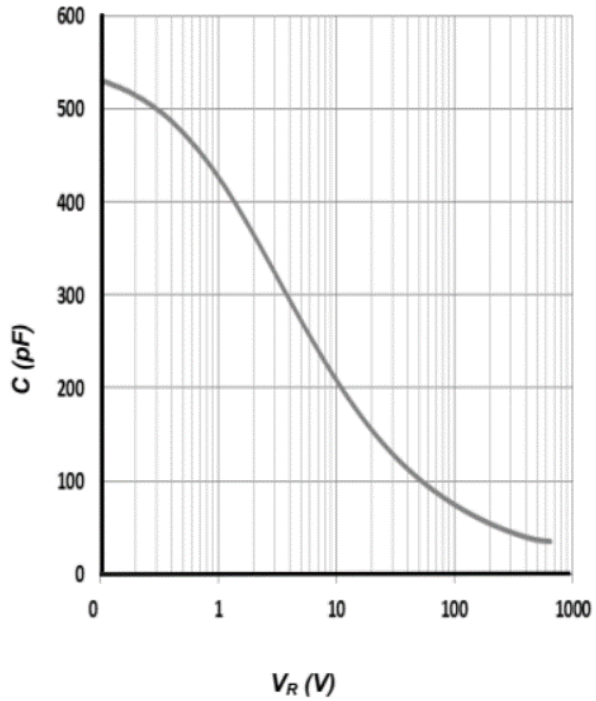
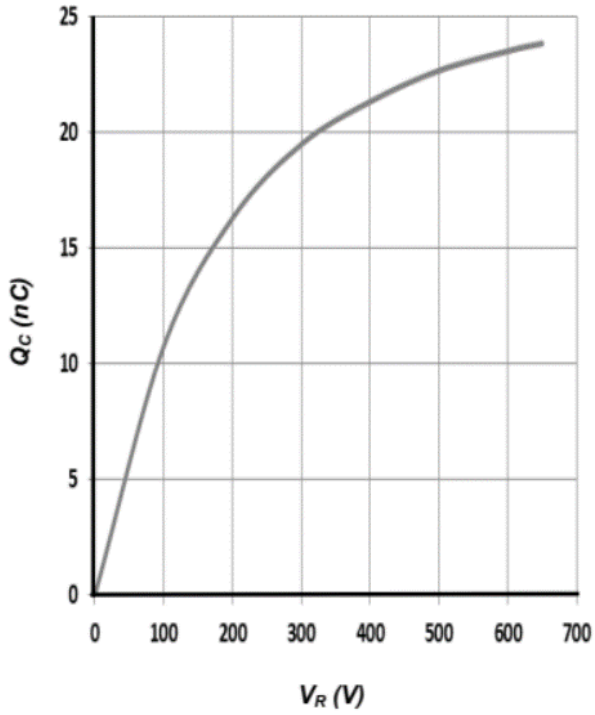
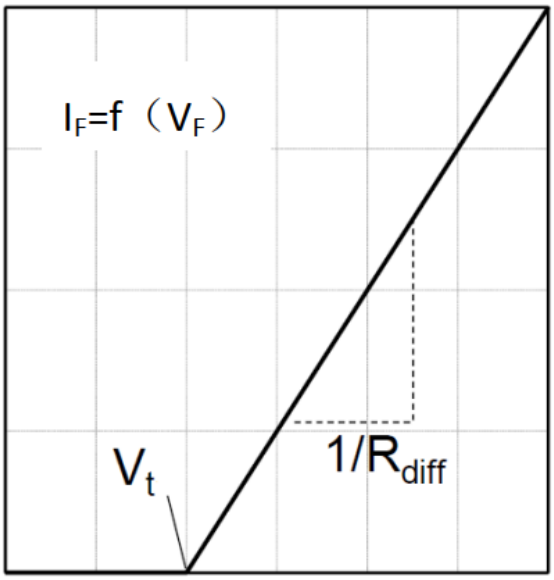
Diagram 3: Typical Reverse Characteristics	Diagram 4: Transient Thermal Impedance
	
$I_R=f(V_R)$; Parameter: T	$Z_{th,jc}=f(t_P)$; Parameter: $D=t_P/T$

Diagram 5: Total Capacitance	Diagram 6: Total Capacitive Charge
	
$C=f(V_R)$; T_J=25°C; f=1 MHz	$Q_C=f(V_R)$;

6. Simplified Forward Characteristics Model

Equivalent IV Curve for Model



Mathematical Equation

$$V_F=V_t+I_F\times R_{diff}$$

$V_t = -0.001\times T_j + 0.99$ [V]

$R_{diff} = 8.7\times10^{-7}\times T_j^2 + 5.4\times10^{-5}\times T_j + 0.35$ [Ω]

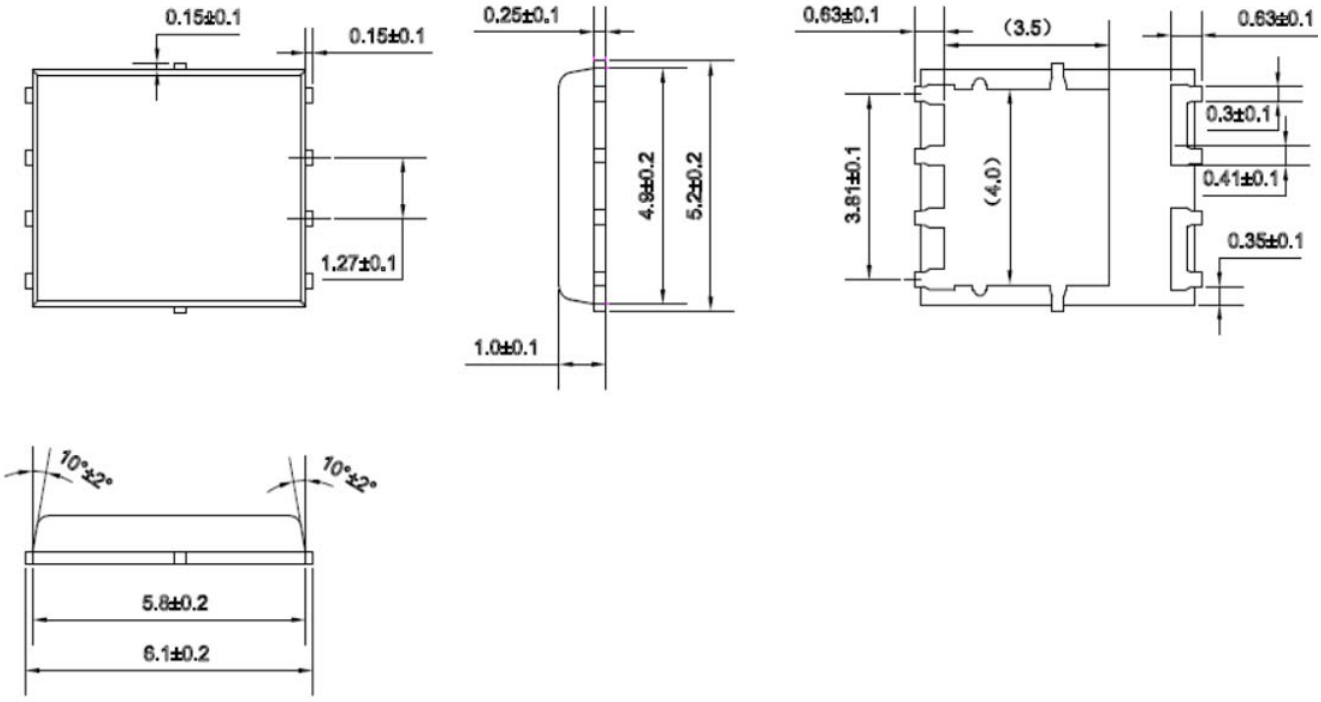
Note:

Tj = Diode Junction Temperature In Degrees Celsius,
valid from 25°C to 175°C

I_F= Forward Current
Less than 16A

7. Package Outlines

Mechanical Dimensions:



Revision History

Revison	Date	Major changes
1.0		Release of formal version.

Warnings

Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximun ratings of the device.

1. When installing the heatsink, please pay attention to the torsional moment and the smoothness of the heatsink.
2. This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, or air traffic control systems.