



DONGGUAN NANJING ELECTRONICS LTD.,

TO-220-2 Silicon Carbide Schottky Diode

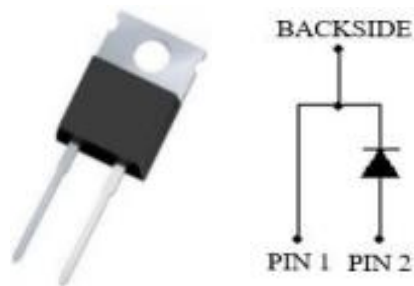
NJ65C10T2 SiC Diode 650 V, 10 A, 38nC

General Description

This product family offers state of the art performance. It is designed for high frequency applications where high efficiency and high reliability are required.

Features

- Zero Forward/Reverse Recovery Current
- High Blocking Voltage
- High Frequency Operation
- Positive Temperature Coefficient on VF
- Temperature Independent Switching Behavior



TO-220-2
Pin definition

Applications

- Motor Drives
- Solar
- AC/DC converters
- DC/DC converters
- Uninterruptable power supplies

Benefits

- Higher System Efficiency
- Parallel Device Convenience without thermal runaway
- Higher Temperature Application
- No Switching loss
- Hard Switching & Higher Reliability
- Environmental Protection

Key performance parameters

Type	V_R	I_F $T_C=150^\circ\text{C}$	Q_C
NJ65C10T2	650 V	10A	38 nC

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handling procedures.

Typical Characteristics

Maximum Ratings

$T_C=25^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	650	V
Peak Reverse Surge Voltage	V_{RSM}	650	V
DC Blocking Voltage	V_R	650	V

Maximum Ratings

$T_C=25^{\circ}\text{C}$, unless otherwise specified

Symbol	Parameter	Test conditions	Value	Unit
V_{RRM}	Repetitive peak reverse voltage		650	V
I_F	Continuous forward current	$T_C=25^{\circ}\text{C}$ $T_C=160^{\circ}\text{C}$	43 10	A
I_{FSM}	Non-Repetitive forward surge current	$T_C=25^{\circ}\text{C}$, $t_p=10\text{ms}$, Half Sine Wave	85	A
$\int i^2 dt$	i^2t value	$T_C=25^{\circ}\text{C}$, $t_p=10\text{ms}$	36	A^2S
P_{tot}	Power dissipation	$T_C=25^{\circ}\text{C}$ $T_C=110^{\circ}\text{C}$	176 76	W
T_j	Operating junction temperature		-55~175	$^{\circ}\text{C}$
T_{stg}	Storage temperature		-55~175	$^{\circ}\text{C}$

Thermal Resistance

Parameter	Symbol	Typ.	Max	Unit
Thermal resistance, junction-case	R_{thJC}	0.85		$^{\circ}\text{C/W}$

Typical Characteristics

Electrical Characteristic

$T_C = 25^{\circ}\text{C}$, unless otherwise specified

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_j = 25^{\circ}\text{C}$	650			V
V_F	Diode forward voltage	$I_F = 10\text{A}, T_j = 25^{\circ}\text{C}$ $I_F = 10\text{A}, T_j = 135^{\circ}\text{C}$ $I_F = 10\text{A}, T_j = 175^{\circ}\text{C}$		1.29 1.31 1.43	1.42 1.54 1.74	V
I_R	Reverse current	$V_R = 650\text{V}, T_j = 25^{\circ}\text{C}$ $V_R = 650\text{V}, T_j = 175^{\circ}\text{C}$		1 9	50 200	μA

AC Characteristic

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R = 400\text{V}, T_j = 25^{\circ}\text{C}$ $Q_C = \int_0^V R_C(V) dV$		38		nC
C	Total capacitance	$V_R = 1\text{V}, f = 1\text{MHz}$ $V_R = 300\text{V}, f = 1\text{MHz}$ $V_R = 600\text{V}, f = 1\text{MHz}$		551 63 57		pF
E_C	Capacitance stored energy	$V_R = 400\text{V}$		5.7		μJ

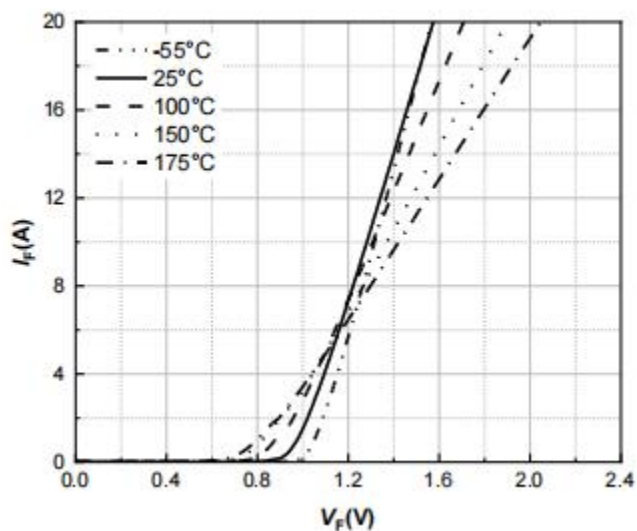


Figure 1. Typical forward characteristics

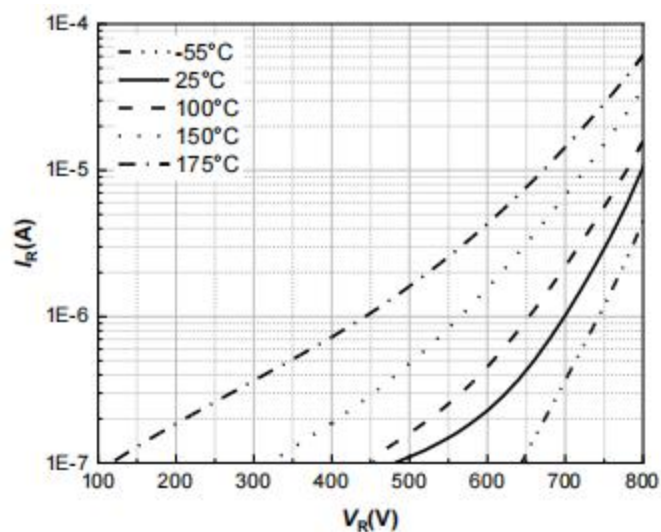


Figure 2. Typical reverse current as function of reverse voltage

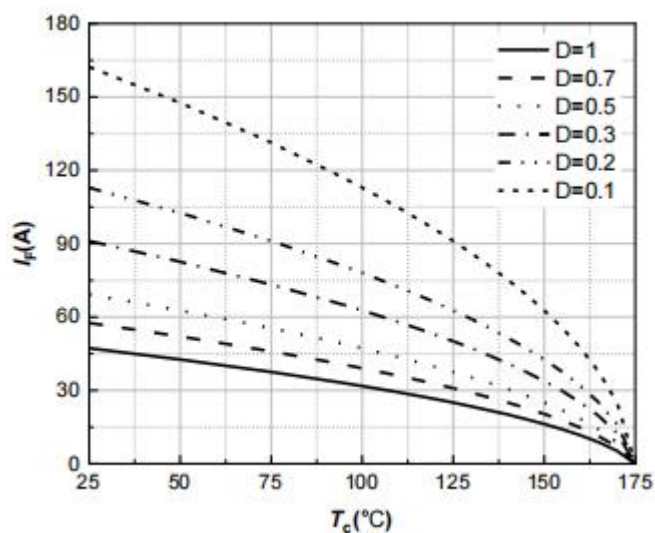


Figure 3. Diode forward current as function of temperature, D=duty cycle

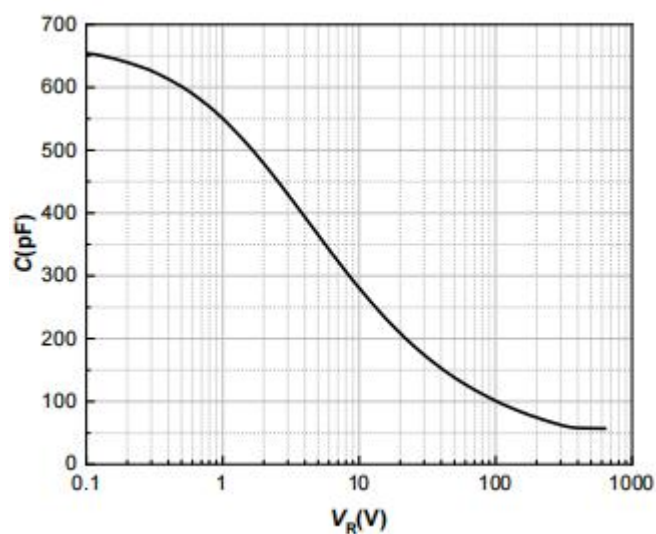


Figure 4. Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^\circ\text{C}$; $f=1\text{ MHz}$

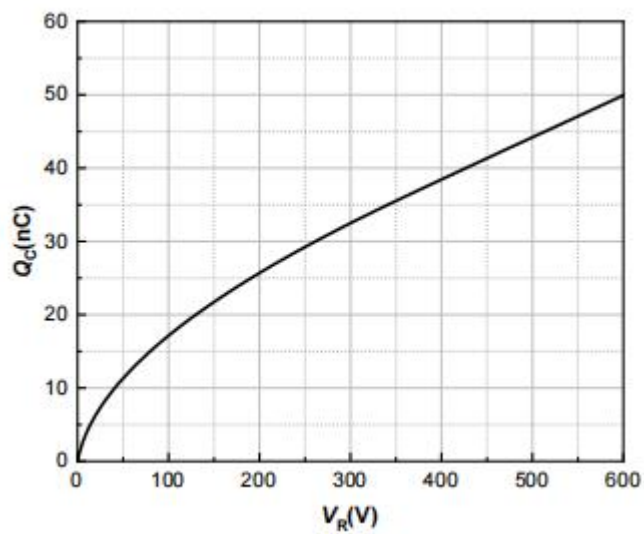


Figure 5. Typical reverse charge as function of reverse voltage

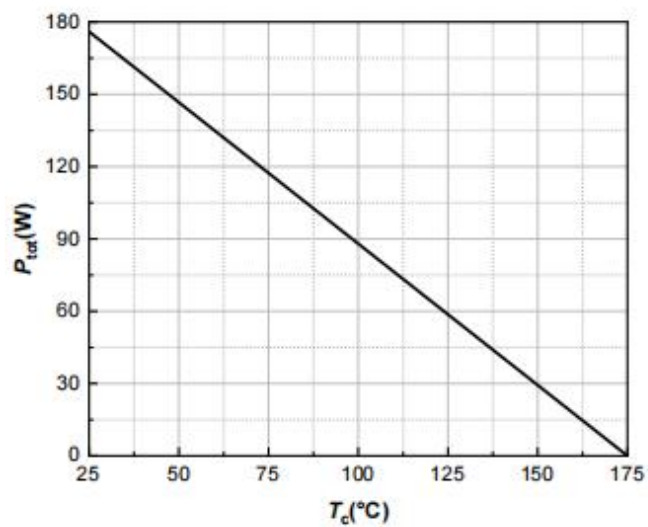


Figure 6. Power dissipation as function of case temperature

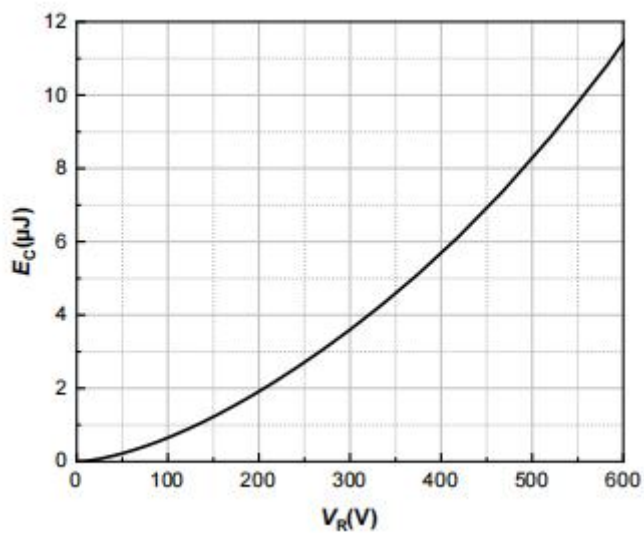


Figure 7. Capacitance stored energy

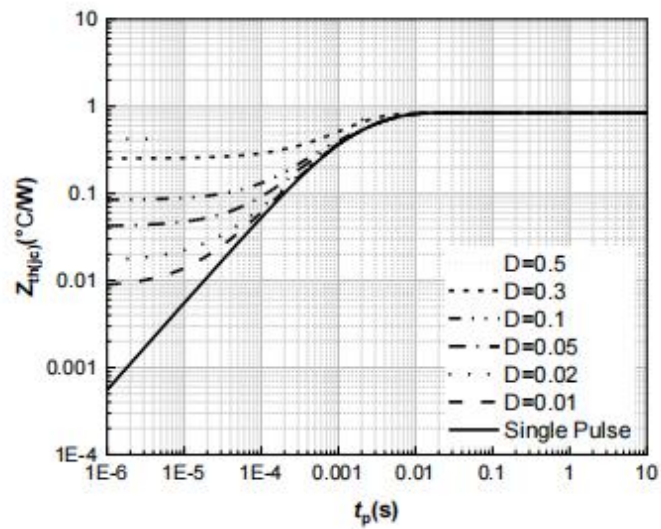
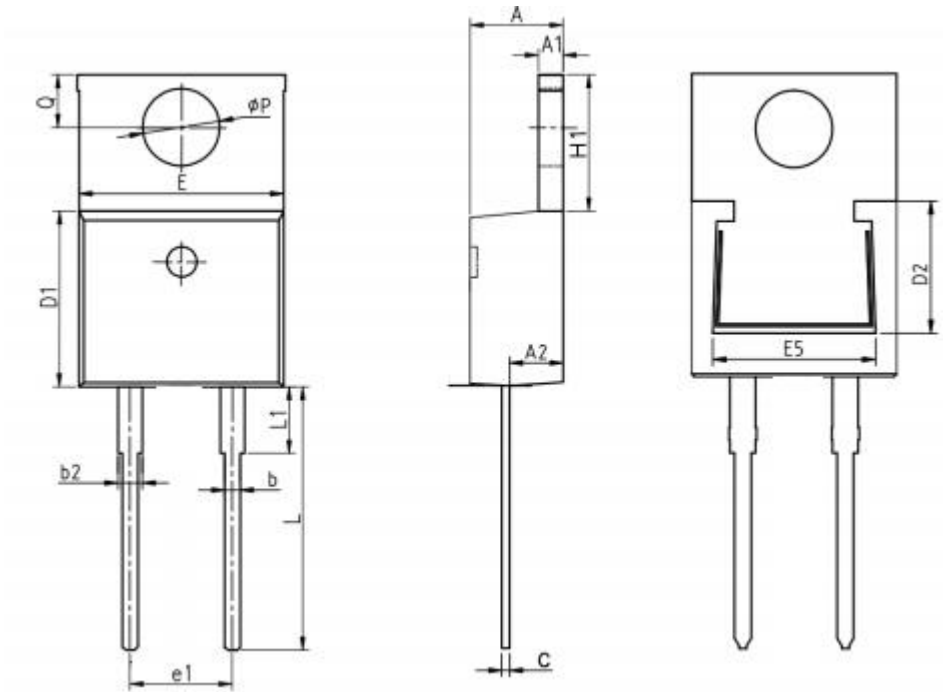


Figure 8. Max. transient thermal impedance, $Z_{th(jc)}=f(t_p)$, parameter: $D=t_p/T$

Package Outline: TO-220-2



COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
b	0.75	0.81	0.96
b2	1.22	1.27	1.47
c	0.30	0.38	0.48
D1	8.50	8.70	8.90
D2	5.20	-	-
E	9.66	10.16	10.36
E5	7.06	-	-
e1	5.08 BSC		
H1	6.10	6.30	6.50
L	13.10	13.40	13.70
L1	-	3.75	4.10
ϕP	3.70	3.84	3.99
Q	2.54	2.74	2.94