DONGGUAN NANJING ELECTRONICS LTD.,

TO-247-4 Silicon Carbide Power MOSFET

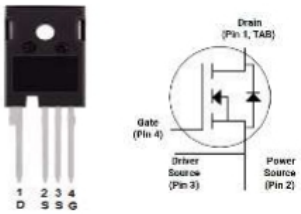
NJ030P065Q SiC MOSFET 650V, 75A, 30mΩ

General Description

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

Features

- High Blocking Voltage
- High Frequency Operation
- Low on-resistance
- Fast intrinsic diode with low reverse recovery



TO-247-4
Pin definition

Applications

- Motor Drives
- Solar / Wind inverters
- On board EV Charger
- Energy Storage
- Server
- Telecom
- SMPS
- Uninterruptable power supplies

Benefits

- Higher System Efficiency
- Parallel Device Convenience without thermal runaway
- High Temperature Application
- Hard Switching & Higher Reliability
- Easy to drive

Key performance parameters

Type	V_{DS}	I_D T_C=25℃	$R_{DS(ON)}$
NJ030P065Q	650V	75A	30mΩ

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

Maximum Ratings

T_C=25℃, unless otherwise specified

Parameter	Symbol	Test conditions	Value	Unit
Drain - Source Voltage	V_{DSmax}	V_{GS} = 0V, I_D = 100μA	650	V
Gate - Source Voltage (dynamic)	V_{GSmax}	AC (f>1 Hz)	-10/+25	V
Gate - Source Voltage (static)	V_{GSop}	static	-5/+20	V

Maximum Ratings

T_C=25℃, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous Drain Current: V_{GS} = 20V T_C = 25°C T_C = 100°C	I_D	75 54	A
Pulsed Drain Current: T_C = 25°C	$I_{D(pulse)}$	170	A
Short Circuit Capability : V_{DD} = 400V V_{GS} = 20V	t_{sc}	TBD	μS
Short Circuit Capability : V_{DD} = 400V V_{GS} = 20V	I_{DS}	TBD	A
Total power dissipation : T_C = 25°C	P_D	300	W
Operating Junction Temperature :	T_j	-55 to 175	°C
Storage Temperature :	T_{stg}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Condition	Typ	Max	Unit
Thermal Resistance (per device)	$R_{th(j-c)}$	junction-case	0.35	0.5	°C/W

Typical Characteristics

T_C =25℃, unless otherwise specified

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	650			V	V_{GS} = 0V I_D = 100μA
Gate Threshold Voltage	$V_{GS(th)}$	2.0	2.6 2.1 2.0	4.0	V	V_{DS} = V_{GS} I_D = 10mA T_J = 150°C T_J = 175°C
Zero Gate Voltage Drain Current	I_{DSS}	0	5	100	μA	V_{DS} = 650V V_{GS} = 0V
Gate-Source Leakage Current	I_{GSS}	0 -200	10 -10	200 0	nA	V_{GS} = 20V V_{DS} = 0V V_{GS} = -5V V_{DS} = 0V
Drain-Source On-State Resistance	$R_{DS(on)}$		30 42 45	40	mΩ	V_{GS} = 20V I_D = 40 A T_J = 150°C T_J = 175°C
Trans-conductance	g_{fs}		18 TBD TBD		S	V_{GS} = 20V I_D = 40 A T_J = 150°C T_J = 175°C
Input capacitance	C_{iss}		2000		pF	V_{DS} = 400V V_{GS} = 0V f = 1MHz
Output capacitance	C_{iss}		270			
Reverse transfer capacitance	C_{rss}		23			
Coss Stored Energy	E_{oss}		TBD		μJ	
Total gate charge	Q_g		TBD		nC	V_{DS} = 400V V_{GS} = -5V / 20V I_D = 40 A
Gate-source charge	Q_{gs}		TBD			
Gate-drain charge	Qgd		TBD			
Internal gate input resistance	$R_{g(int)}$		3		Ω	f = 1MHz I_D = 0A
Turn-On Switching Energy	E_{ON}		TBD		μJ	V_{DS}= 400V V_{GS} = -5V/20V I_D = 40A $R_{G(ext)}$ =1.5 Ω L = 450μH
Turn-Off Switching Energy	E_{OFF}		TBD			
Turn-On Delay Time	$t_{d(on)}$		TBD		ns	V_{DS} = 800V V_{GS} = -5V/20V

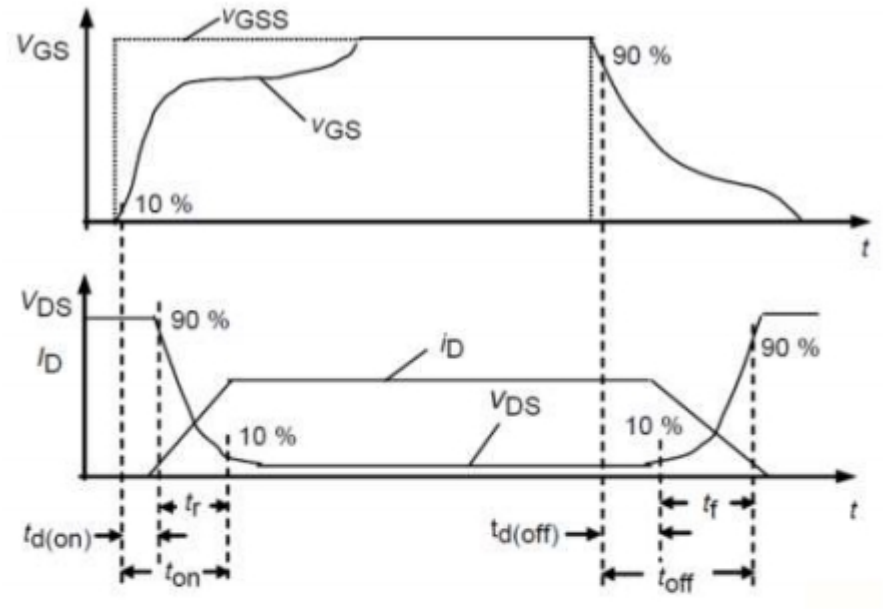
Rise Time	t_r		TBD			I_D = 40A $R_{G(ext)}$ =1.5 Ω L = 450μH
Turn-Off Delay Time	$t_{d(off)}$		TBD			
Fall Time	t_f		TBD			
Avalanche Capability	E_{AS}		TBD		mJ	V_{DD} = 100V V_{GS} = 20V L=1mH
	I_{Av}		TBD		A	

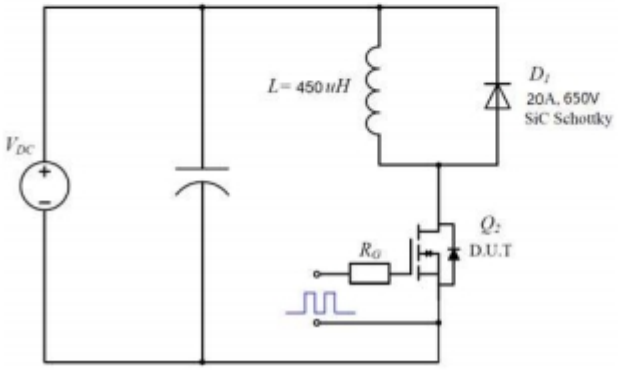
Reverse Diode Characteristics

T_C =25℃, unless otherwise specified

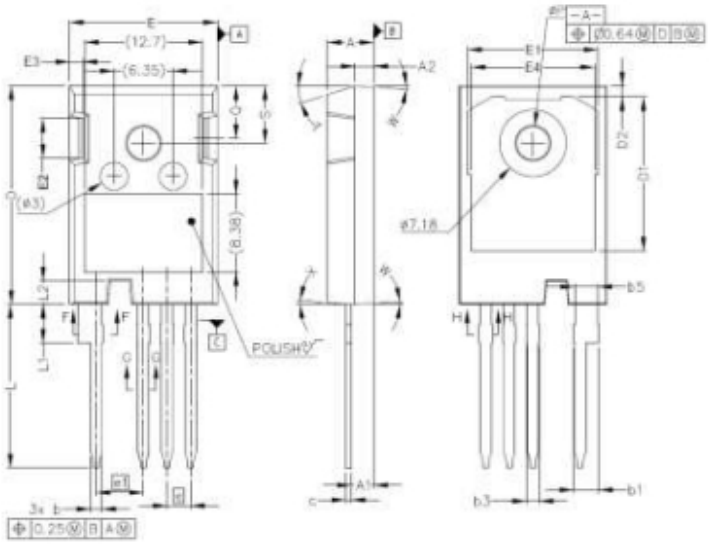
Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Diode Forward Voltage	V_{SD}		4.0 3.5 3.3		V	V_{GS} = -5V I_{SD} = 10A T_J = 150°C T_J = 175°C
Continuous Diode Forward Current	I_S		50		A	V_{GS} = -5V
Reverse Recovery time	t_{rr}		TBD		ns	V_{GS} = -5V I_{SD} = 20A V_R = 400V dif/dt = 2600 A/μs
Reverse Recovery Charge	Q_{rr}		TBD		nC	
Peak Reverse Recovery Current	I_{rrm}		TBD		A	

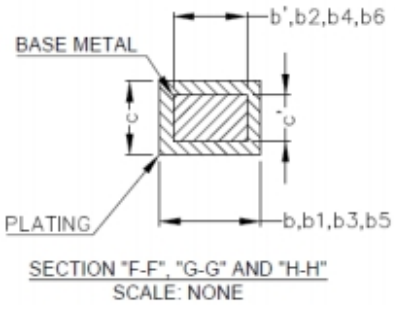
Switching Times Definition and Test Circuit





Package Outline:TO-247-4





SECTION "F-F", "G-G" AND "H-H"
SCALE: NONE

SYMBOL	MILLIMETERS	
	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	2.39	2.94
b2	2.39	2.84
b3	1.07	1.60
b4	1.07	1.50
b5	2.39	2.69
b6	2.39	2.64
c'	0.55	0.65
c	0.55	0.68
D	23.30	23.60
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	2.54 BSC	
e1	5.08 BSC	
N	4	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
øP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF.	
W	3.5 ° REF.	
X	4° REF.	