Product Specification

QNN5N50NA

500V N-Channel MOSFET

FEATURES

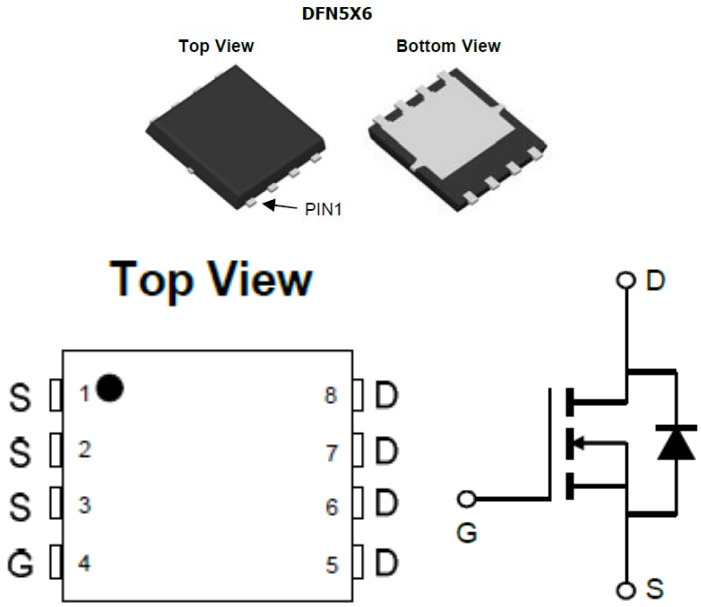
- 500V, 5A

  $R_{DS(ON)}$ = 1.5 Ω @ V_{GS} = 10V

Applications

- LED power supplies
- Cell Phone Charger
- Standby Power

Pin Description



NO.	Symbol	Description
1	S	SOURCE
2	S	SOURCE
3	S	SOURCE
4	G	GATE
5	D	DRAIN
6	D	DRAIN
7	D	DRAIN
8	D	DRAIN

Absolute Maximum Ratings

(@ T_C = 25℃ unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		500	V
V_{GS}	Gate-to-Source Voltage		±30	V
I_D	Continuous Drain Current	T_C = 25℃	5	A
		T_C = 100℃	3	
I_{DM}	Pulsed Drain Current (1)		10	A
E_{AS}	Single Pulsed Avalanche Energy (2)		214	mJ
P_D	Power Dissipation	T_C = 25℃	33	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)		60	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		3.7	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	℃

Electrical Characteristics

(T_J = 25℃ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D=250uA, V_{GS}=0V	500	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=500V, V_{GS}=0V	-	-	1.0	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V, V_{GS}=±30V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	3.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS}=10V, I_D=2A	1.3	-	1.5	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	570	-	pF
C_{oss}	Output Capacitance		-	59	-	pF
C_{rss}	Reverse Transfer Capacitance		-	4.4	-	pF
Q_g	Total Gate Charge	V_{GS}=0~10V, V_{DS}=250V,I_D=13A	-	33	-	nC
Q_{gs}	Gate Source Charge		-	9.7	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	11	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DD}=253.5V, I_D=13A, R_{GEN}=24Ω	-	26	-	ns
t_r	Turn-On Rise Time		-	40	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	92	-	ns
t_f	Turn-Off Fall Time		-	42	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	10	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=13A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F=13A, di/dt=100A/us	-	386	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4.2	-	uC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition: Starting T_J=25℃, V_{DD}=50V, V_G=10V, R_G=25Ω, L=10mH, I_{AS}=9A

3. $R_{\theta JA}$ is measured with the device mounted on a minimum recommended pad of 2oz copper FR4 PCB

4. Pulse Test: Pulse Width≤300us, Duty Cycle≤0.5%.

Test Circuit

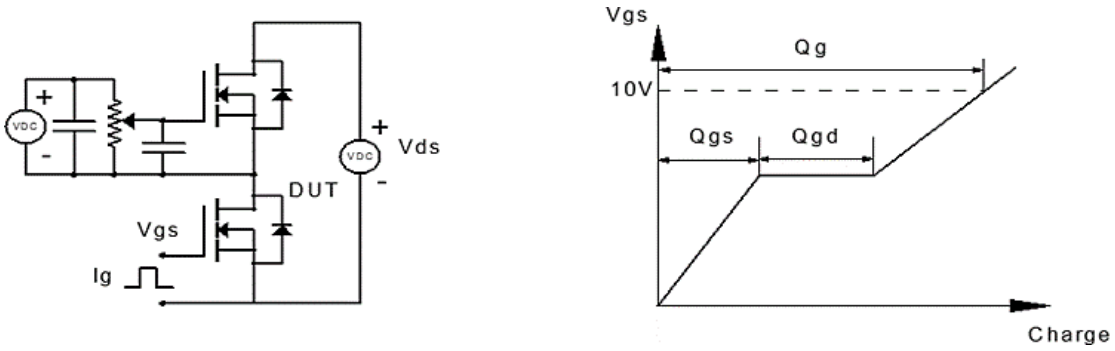


Figure 1: Gate Charge Test Circuit & Waveform

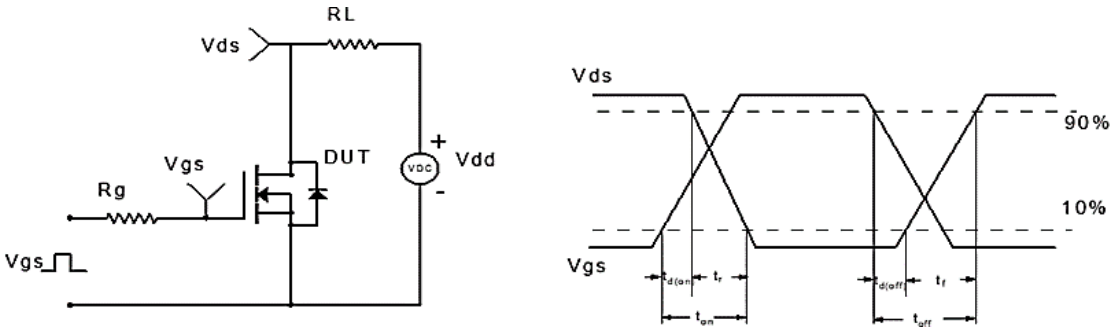


Figure 2: Resistive Switching Test Circuit & Waveform

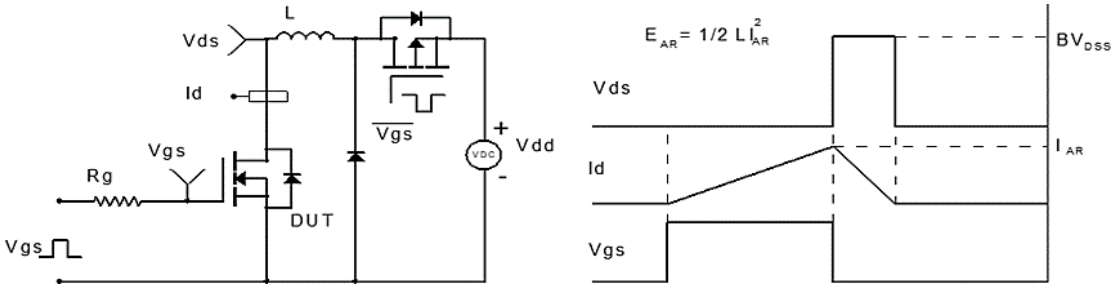


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

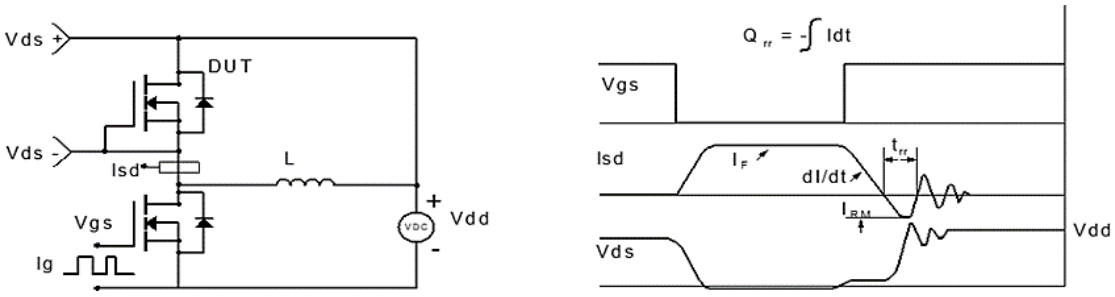
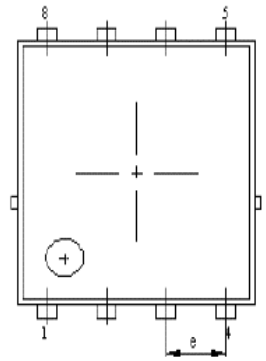
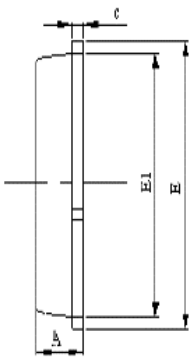


Figure 4: Diode Recovery Test Circuit & Waveform

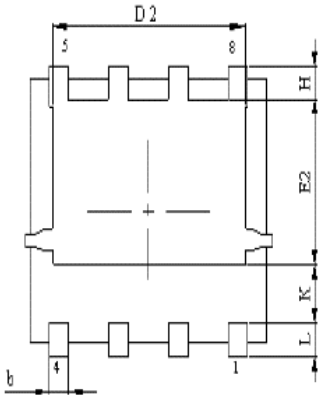
Package Mechanical Data(PDFN 5x6-8L)



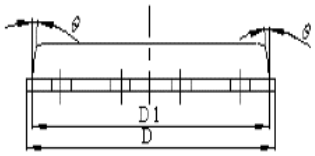
Top View



Side View

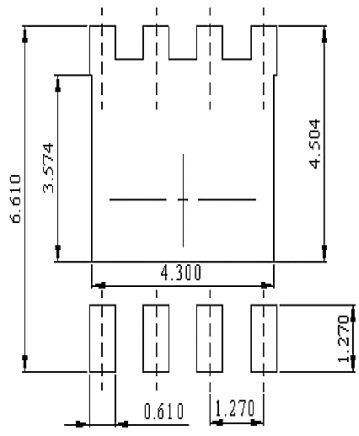


Bottom View



Front View

Symbol	Dimensions In Millimeters		
	Min.	NOM.	Max.
A	0.9	1	1.15
b	0.31	0.41	0.51
C	0.24	0.32	0.4
D	5	5.2	5.4
D1	4.95	5.05	5.15
D2	4	4.1	4.2
E	6.05	6.15	6.25
E1	5.5	5.6	5.7
E2	3.42	3.53	3.63
e		1.27 BSC	
H	0.6	0.7	0.8
L	0.5	0.7	0.8
K		1.23 BEF	
O			10



DIMENSIONS:MILLIMETERS

Ordering information

Order Code	Package	V_{DS}(V)	I_D(A)	$R_{DS(ON)}$(Ω)	
QNN5N50NA	PDFN 5x6-8	500	5	V_{GS}=10V	1.5