



QNHCHIP

QNM30N20AJ

Product Specification

QNM30N20AJ

30V N-Channel MOSFET



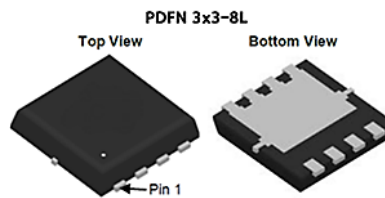
FEATURES

- 30V, 18A
 $R_{DS(ON)}$ Typ= 8.7m Ω @ $V_{GS} = 10V$
 $R_{DS(ON)}$ Typ= 12.7m Ω @ $V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

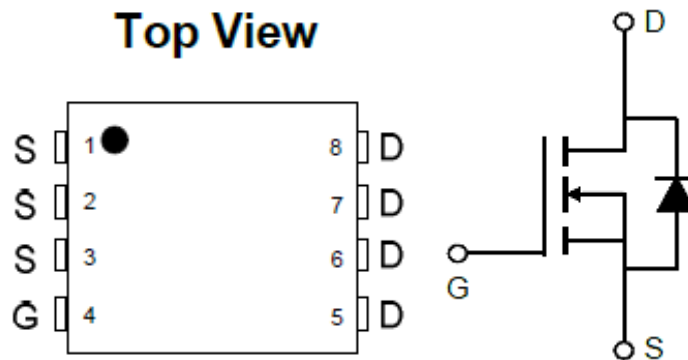
Applications

- Load Switch
- PWM Application
- Power Management

Pin Description



Top View



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

(@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units	
V_{DS}	Drain-to-Source Voltage	30	V	
V_{GS}	Gate-to-Source Voltage	± 20	V	
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	18	A
		$T_C = 100^\circ\text{C}$	11	
I_{DM}	Pulsed Drain Current ⁽¹⁾	72	A	
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	20	mJ	
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	18	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽³⁾	50	$^\circ\text{C}/\text{W}$	
$R_{\theta JC}$	Thermal Resistance, Junction to Case	7		
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$	



Electrical Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu A, V_{GS} = 0V$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance ⁽⁴⁾	$V_{GS}=10V, I_D=0A$	-	8.7	12.2	m Ω
		$V_{GS}=4.5V, I_D=5A$	-	12.7	20.5	m Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{GS} = 0V, V_{DS} = 15V, f=1MHz$	-	835	-	pF
C_{oss}	Output Capacitance		-	100	-	pF
C_{rss}	Reverse Transfer Capacitance		-	81	-	pF
Q_g	Total Gate Charge	$V_{GS}=0\sim 10V, V_{DS} = 15V, I_D = 15A$	-	16	-	nC
Q_{gs}	Gate Source Charge		-	3.6	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	3.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	$V_{GS} = 10V, V_{DD} = 15V, I_D = 15A, R_{GEN} = 3\Omega$	-	6	-	ns
t_r	Turn-On Rise Time		-	15	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	17	-	ns
t_f	Turn-Off Fall Time		-	5	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	18	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	72	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 18A$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F = 13A, di/dt = 100A/us$	-	9.4	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	3.3	-	nC

($T_J = 25^\circ C$ unless otherwise specified)

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J=25^\circ C, V_{DD}=15V, V_G=10V, R_G=25\Omega, L=0.5mH, I_{AS}=9A$
3. $R_{\theta JA}$ is measured with the device mounted on a 1 inch² pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Performance Characteristics

Figure 1: Output Characteristics

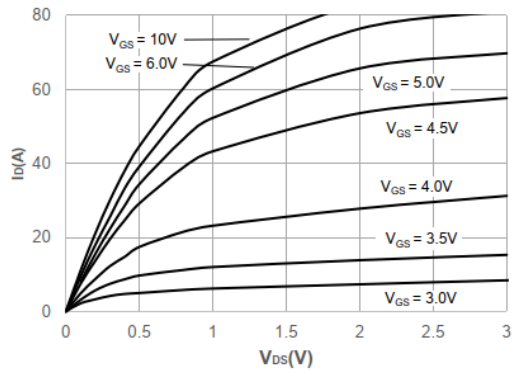


Figure 2: Typical Transfer Characteristics

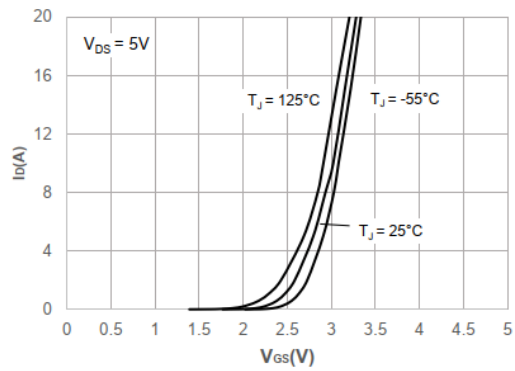


Figure 3: On-resistance vs. Drain Current

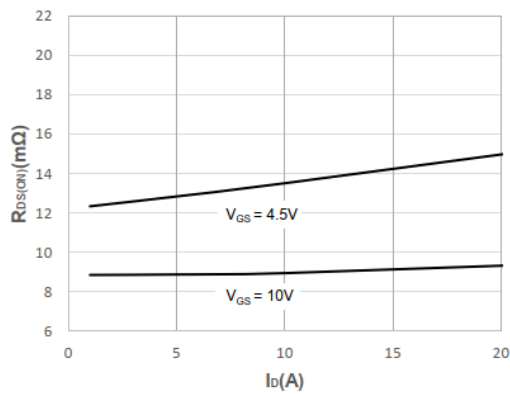


Figure 4: Body Diode Characteristics

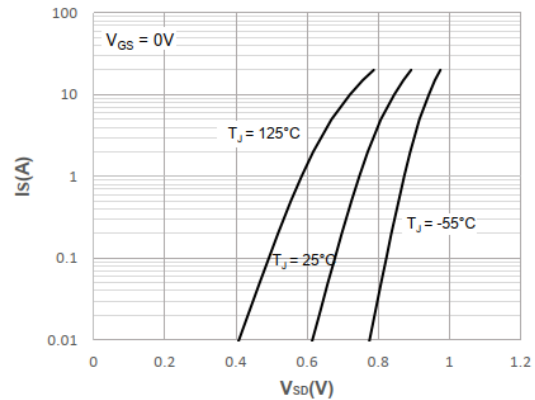


Figure 5: Gate Charge Characteristics

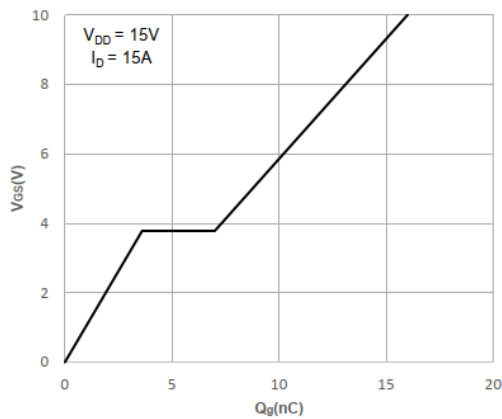


Figure 6: Capacitance Characteristics

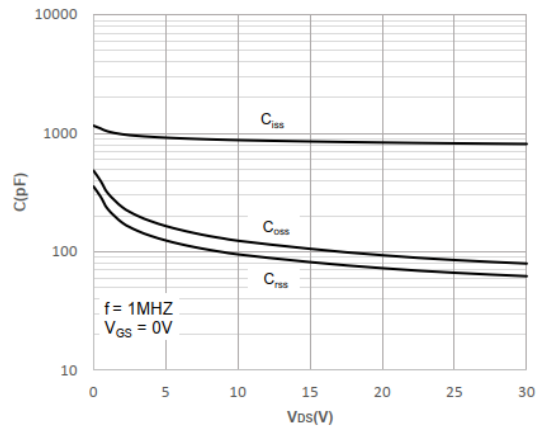




Figure 7: Normalized Breakdown voltage vs. Junction Temperature

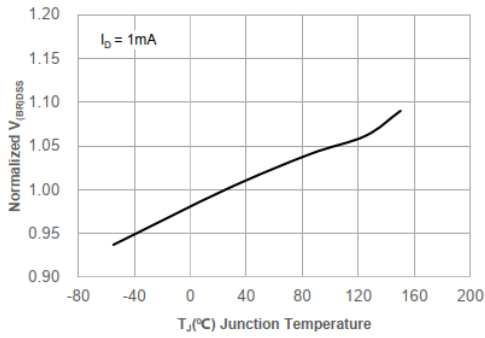


Figure 8: Normalized on Resistance vs. Junction Temperature

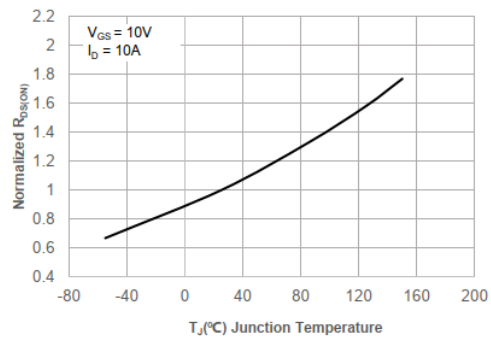


Figure 9: Maximum Safe Operating Area

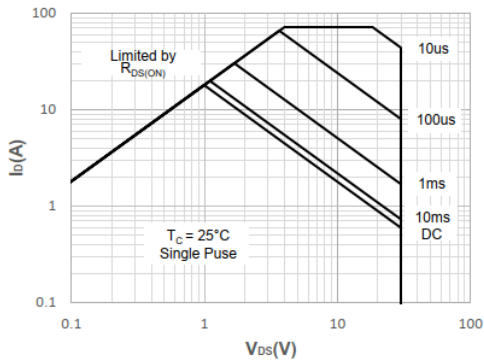


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

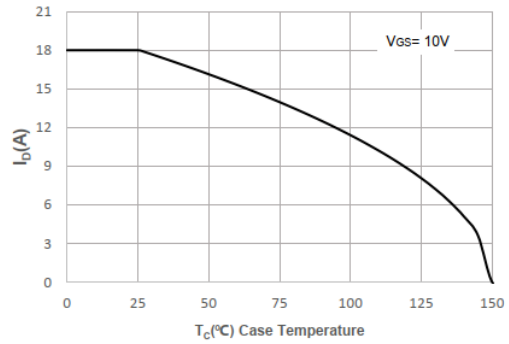


Figure 11: Normalized Maximum Transient Thermal Impedance

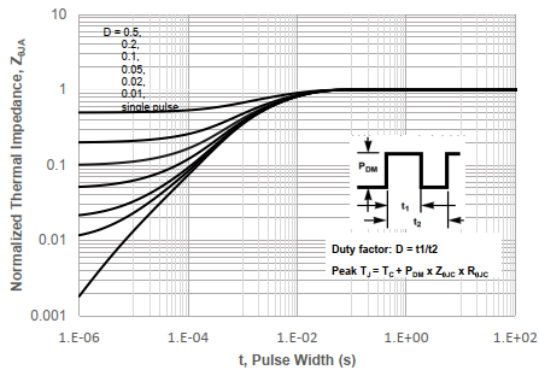
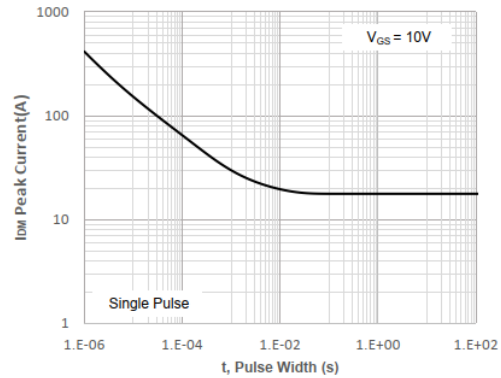


Figure 12: Peak Current Capacity





Test Circuit

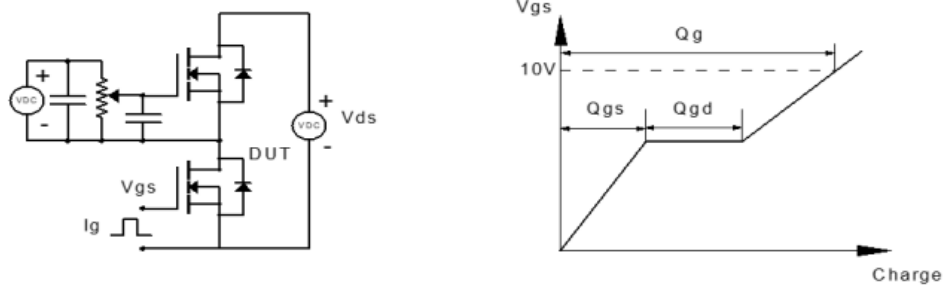


Figure 1: Gate Charge Test Circuit & Waveform

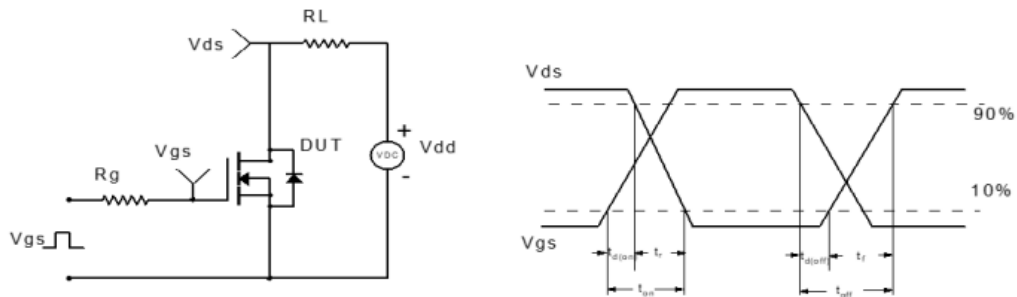


Figure 2: Resistive Switching Test Circuit & Waveform

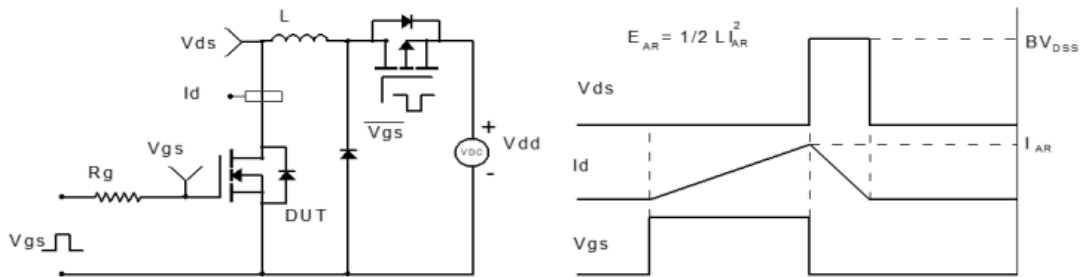


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

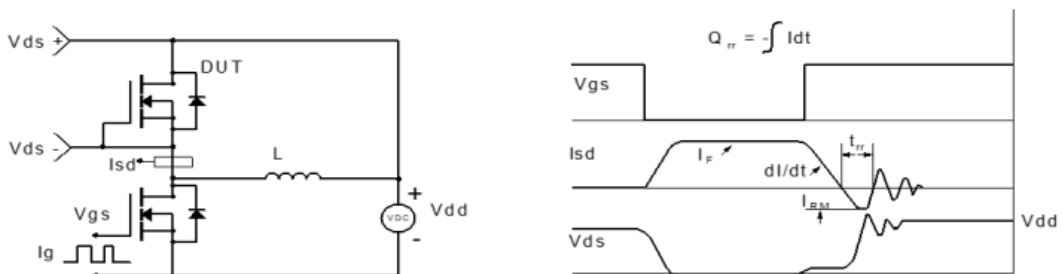
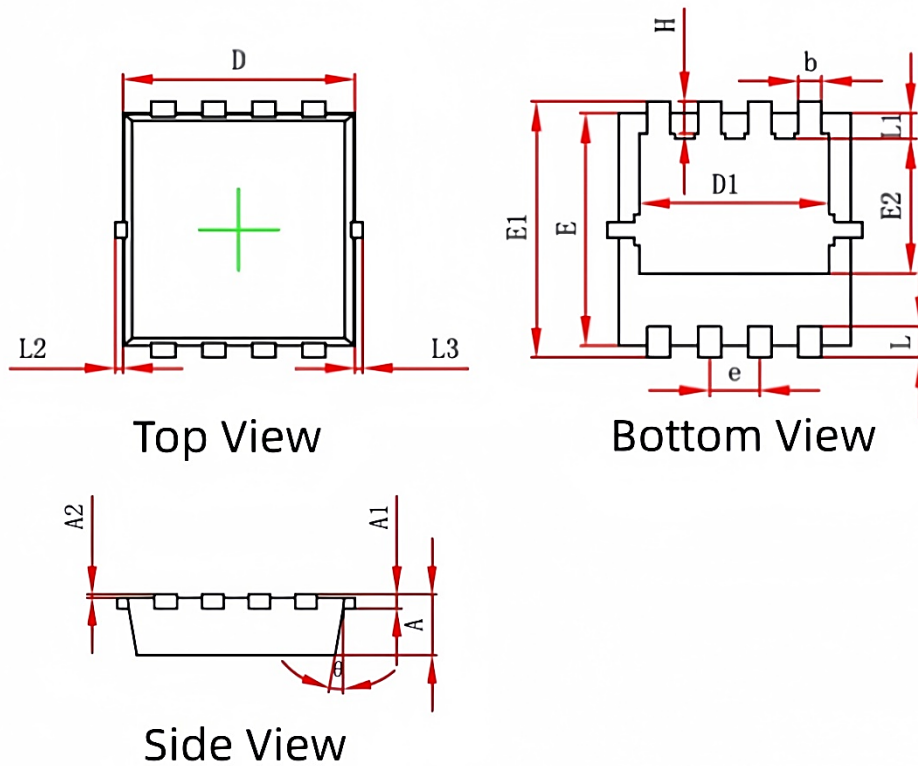


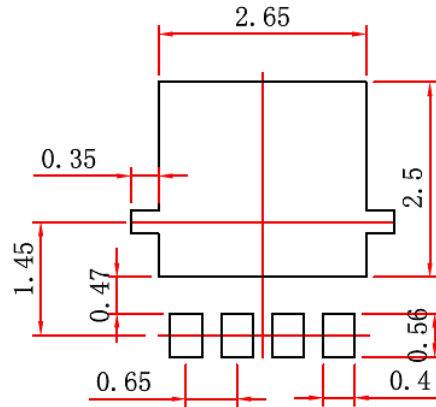
Figure 4: Diode Recovery Test Circuit & Waveform



Package Mechanical Data(PDFN 3x3-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

Ordering information

Order Code	Package	$V_{DS}(V)$	$I_D(A)$	$R_{DS(ON)}(m\Omega)$	
				$V_{GS}=10V$	$V_{GS}=4.5V$
QNM30N20AJ	PDFN 3x3-8	30	18	$V_{GS}=10V$	8.7
				$V_{GS}=4.5V$	12.7