Product Specification

QNM7611AJ

30V Complementary MOSFET

FEATURES

- N-Channel: 30V, 10A

  $R_{DS(ON)}$ Typ= 14mΩ @ V_{GS} = 10V

  $R_{DS(ON)}$ Typ= 22mΩ @ V_{GS} = 4.5V
- P-Channel: -30V, -7A

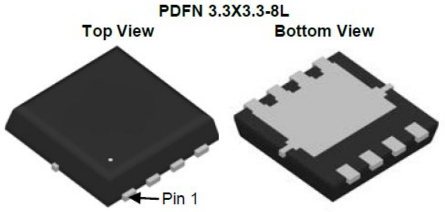
  $R_{DS(ON)}$ Typ= 34mΩ @ V_{GS} = -10V

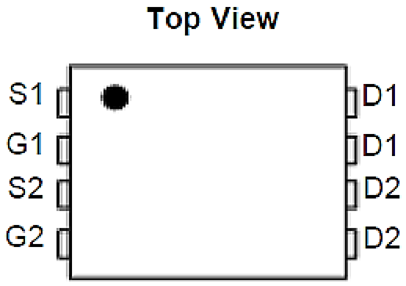
  $R_{DS(ON)}$ Typ= 46mΩ @ V_{GS} = -4.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

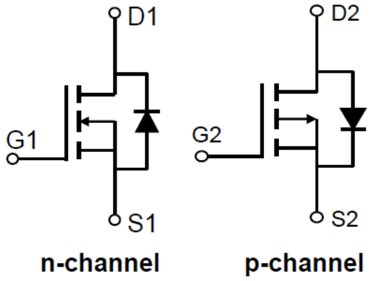
Applications

- Battery Protection
- Load Switch
- Power Management

Pin Description







NO.	Symbol	Description
1	S1	SOURCE
2	G1	GATE
3	S2	SOURCE
4	G2	GATE
5	D1	DRAIN
6	D1	DRAIN
7	D2	DRAIN
8	D2	DRAIN

Absolute Maximum Ratings

(@ T_C = 25℃ unless otherwise specified)

Symbol	Parameter		N-Channel Value	P-Channel Value	Units
V_{DS}	Drain-to-Source Voltage		30	-30	V
V_{GS}	Gate-to-Source Voltage		±20	±20	V
I_D	Continuous Drain Current	T_C=25°C	10	-7	A
		T_C=100°C	5	-5	
I_{DM}	Pulsed Drain Current (1)		48	-40	A
E_{AS}	Single Pulsed Avalanche Energy (2)		12	20	mJ
P_D	Power Dissipation	T_C = 25°C	6	6.9	W
$R_{θJC}$	Thermal Resistance, Junction to Case		21	18	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150		°C

N-Channel 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	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	-	-	1.0	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	1.0	1.7	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance$^{(3)}$	V_{GS} = 10V, I_D = 3A	-	14	27	mΩ
		V_{GS} = 4.5V, I_D = 2A	-	22	44	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	-	511	-	pF
C_{oss}	Output Capacitance		-	66	-	pF
C_{rss}	Reverse Transfer Capacitance		-	52	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 15V, I_D = 3A	-	10	-	nC
Q_{gs}	Gate Source Charge		-	2	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V I_D= 3A, R_{GEN} = 3 Ω	-	4	-	ns
t_r	Turn-On Rise Time		-	6	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	12	-	ns
t_f	Turn-Off Fall Time		-	3	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	10	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	48	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 5A	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F = 3A, di/dt = 100A/us	-	8	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	2	-	nC

P-Channel Electrical Characteristics

(T_J = 25°C 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	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -30V, V_{GS} = 0V	-	-	-1.0	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250uA	-1.0	-1.7	-2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = -10V, I_D = -5A	-	34	48	mΩ
		V_{GS} = -4.5V, I_D = -3A	-	46	67	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz	-	516	-	pF
C_{oss}	Output Capacitance		-	71	-	pF
C_{rss}	Reverse Transfer Capacitance		-	60	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -10V V_{DS} = -15V, I_D = -3A	-	16	-	nC
Q_{gs}	Gate Source Charge		-	3	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	3	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -10V, V_{DD} = -15V I_D= -3A, R_{GEN} = 3 Ω	-	4	-	ns
t_r	Turn-On Rise Time		-	2	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	38	-	ns
t_f	Turn-Off Fall Time		-	22	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-7	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-40	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -5A	-	-	-1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F = -3A, di/dt = 100A/us	-	10	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	3	-	nC

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

2. E_{AS} condition: Starting T_J=25℃, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=7A

E_{AS} condition: Starting T_J=25℃, V_{DD}=-20V, V_G=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-9A

3. Pulse Test: Pulse Width⩽300us, Duty Cycle⩽0.5%.

Test Circuit N-MOS

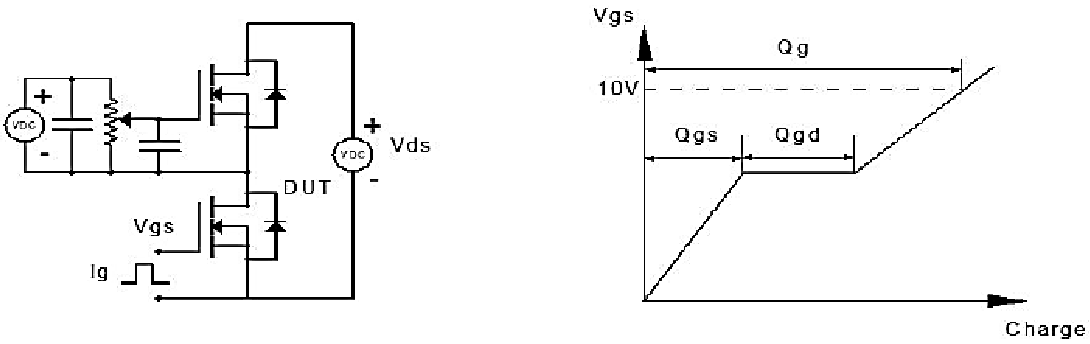


Figure 1: Gate Charge Test Circuit & Waveform

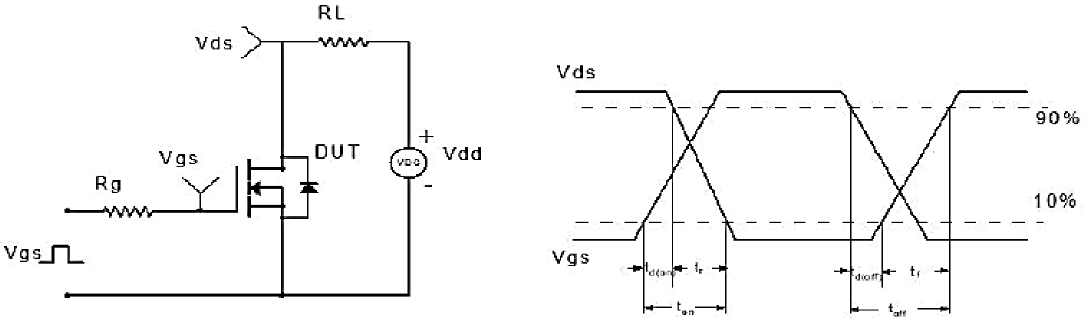


Figure 2: Resistive Switching Test Circuit & Waveform

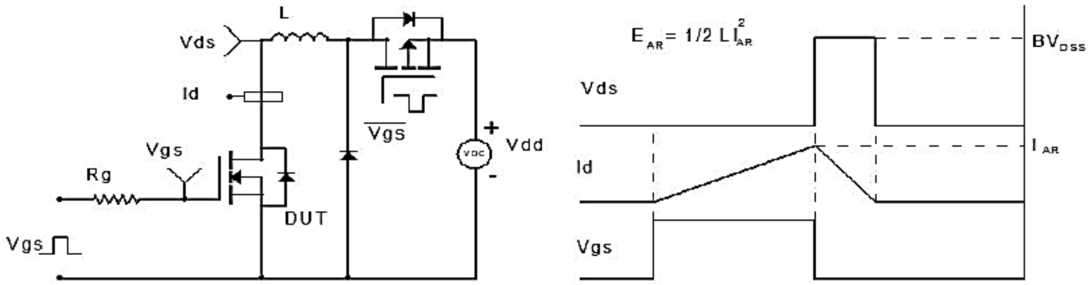


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

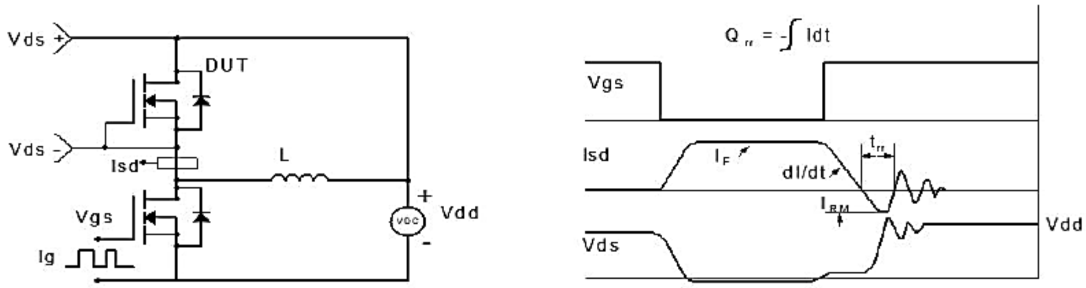


Figure 4: Diode Recovery Test Circuit & Waveform

Test Circuit P-MOS

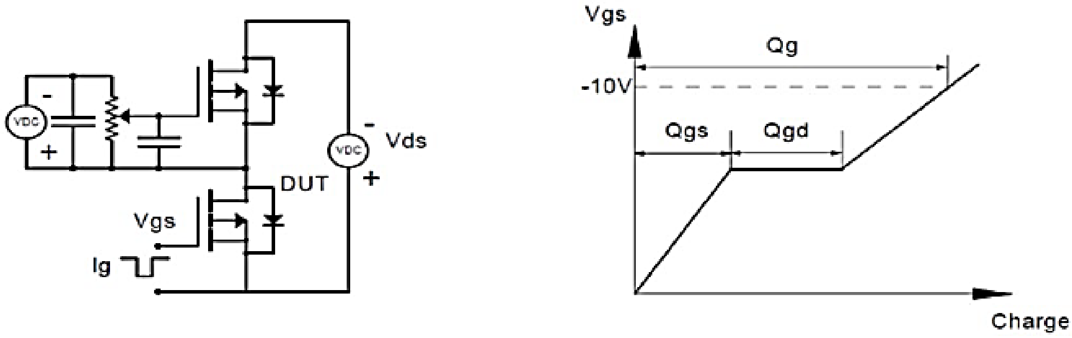


Figure 1: Gate Charge Test Circuit & Waveform

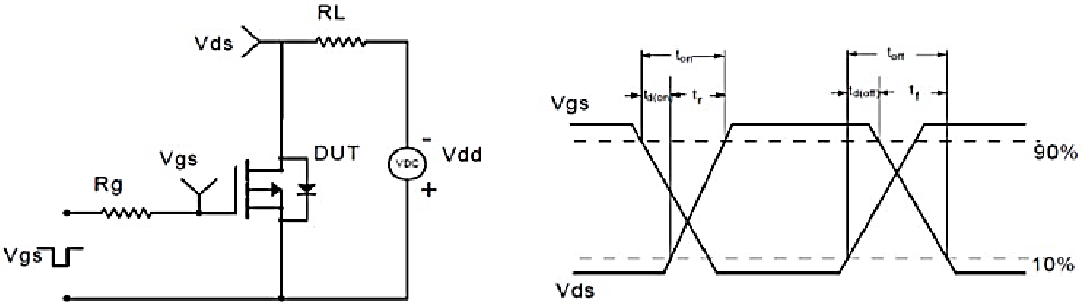


Figure 2: Resistive Switching Test Circuit & Waveform

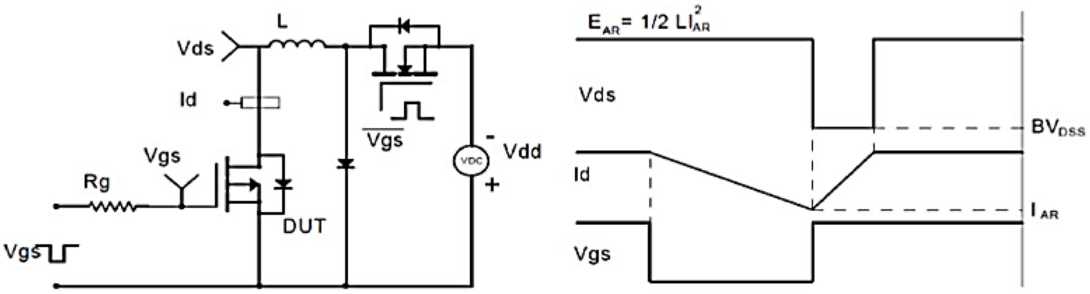


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

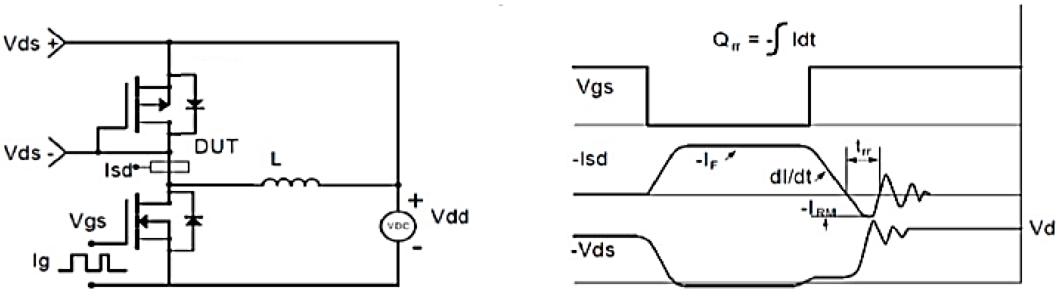
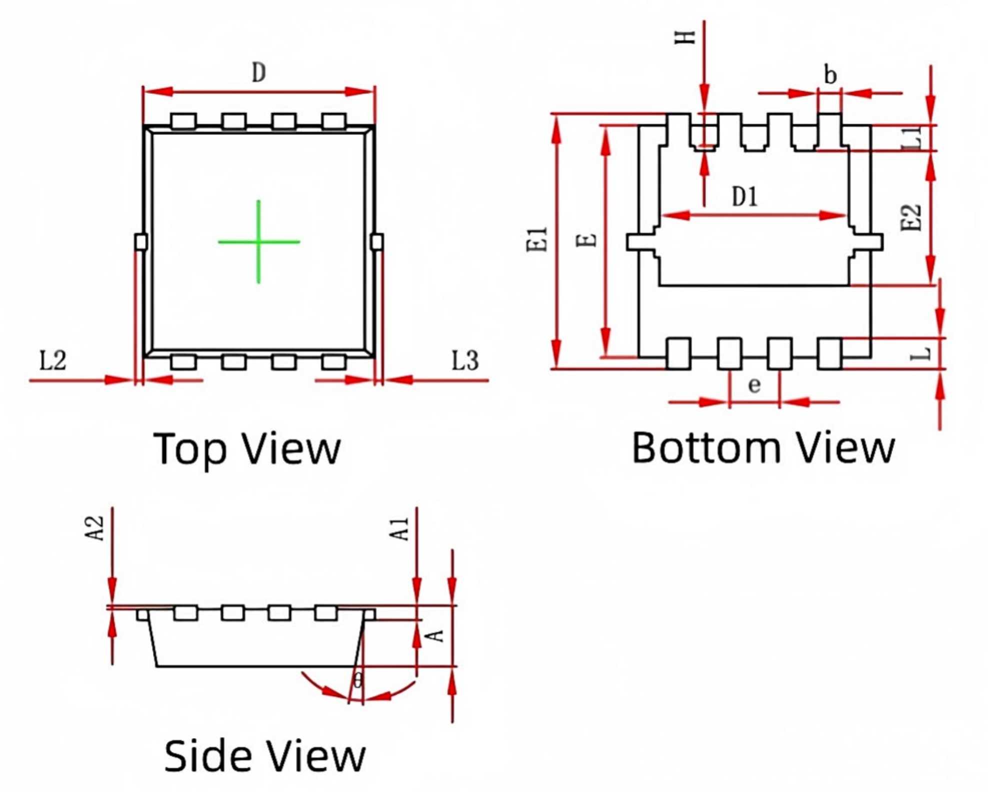
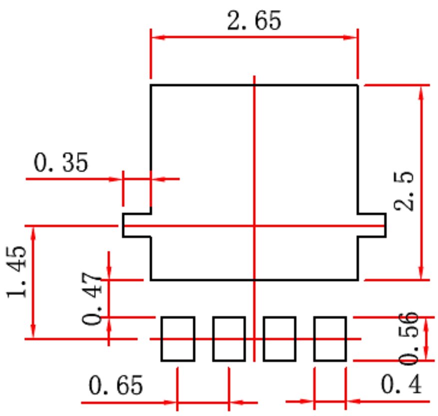


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN 3.3x3.3-8)



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: ±0.05mm.

3.The pad layout is for reference purposes only.

Ordering information

Order Code	Package	V_{DS}(V)	I_D(A)	$R_{DS(ON)}$(mΩ)	
QNM7611AJ	PDFN 3.3x3.3-8	30	10	V_{GS}=10V	14
				V_{GS}=4.5V	22
		-30	-7	V_{GS}=-10V	34
				V_{GS}=-4.5V	46