



General Description

The QN4101M6N is the highest performance trench N-Channel MOSFET with extreme high cell density, which provides excellent RDSON and gate charge for most of the synchronous applications.

The QN4101M6N meet the RoHS and Green Product requirement ,with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Green Device Available

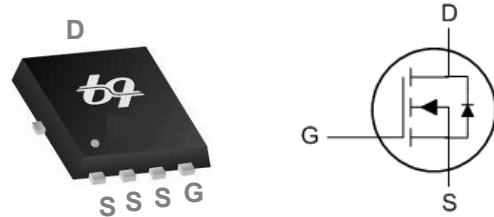
Product Summary

BVDSS	RDSON (VGS=10V)	ID (Tc=25°C)
40V	2.5mΩ	100A

Applications

- Synchronous rectifier for Consumer/Computing /Industry Power Supply
- Motor
- Load Switch

PRPAK 5X6 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	100	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	63	A
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	22	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 10V ¹	17	A
I _{DM}	Pulsed Drain Current ²	200	A
EAS	Single Pulse Avalanche Energy ³	617.5	mJ
I _{AS}	Avalanche Current	49.7	A
P _D @T _C =25°C	Total Power Dissipation ⁴	43	W
P _D @T _A =25°C	Total Power Dissipation ⁴	2	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance (> 10S)Junction-Ambient ¹	15	20	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ¹	47	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	2.9	3.8	°C/W

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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.024	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =20A	---	---	2.5	mΩ
		V _{GS} =4.5V, I _D =20A	---	---	3.3	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	---	1.6	---	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.0	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =40V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =40V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A	---	29	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	0.9	---	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =20V, V _{GS} =4.5V, I _D =15A	---	61.0	---	nC
Q _g	Total Gate Charge (4.5V)		---	28.4	---	
Q _{gs}	Gate-Source Charge		---	8.8	---	
Q _{gd}	Gate-Drain Charge		---	8.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =20V, V _{GS} =10V, R _G =3.3Ω I _D =15A	---	12.8	---	ns
T _r	Rise Time		---	38.8	---	
T _{d(off)}	Turn-Off Delay Time		---	46.7	---	
T _f	Fall Time		---	8.7	---	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	---	3730	---	pF
C _{oss}	Output Capacitance		---	693	---	
C _{rss}	Reverse Transfer Capacitance		---	46	---	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy ⁵	V _{DD} =25V, L=0.5mH, I _{AS} =36A	324	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	---	100	---	A
I _{SM}	Pulsed Source Current ^{2,6}		---	200	---	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	0.7	1.2	V
t _{rr}	Reverse Recovery Time	IF=15A, di/dt=100A/μs, T _J =25°C	---	41	---	nS
Q _{rr}	Reverse Recovery Charge		---	40	---	nC

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.5mH
- The power dissipation is limited by 150°C junction temperature
- The Min. value is 100% EAS tested guarantee.
- The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

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Typical Characteristics

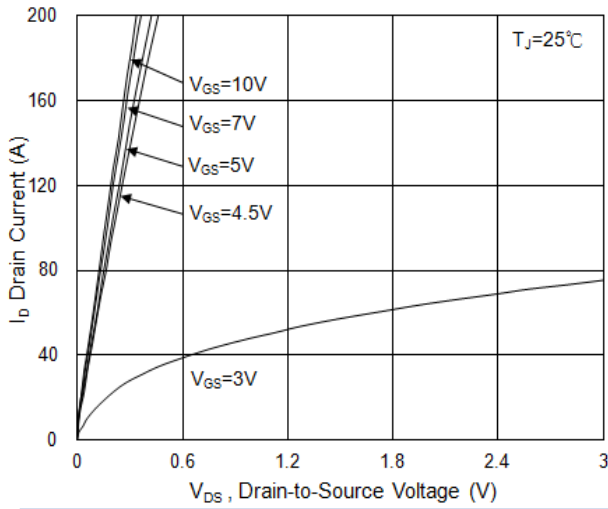


Fig.1 Typical Output Characteristics

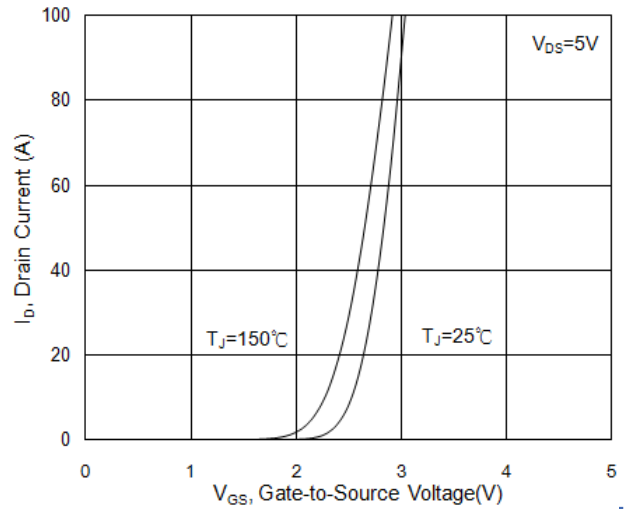


Fig.2 Transfer Characteristics

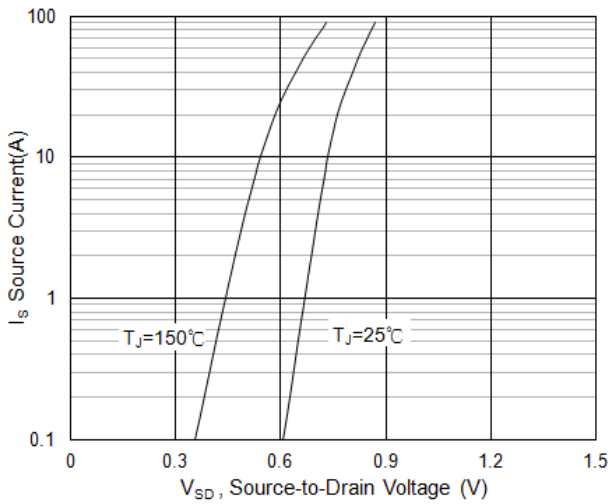


Fig.3 Forward Characteristics of Reverse

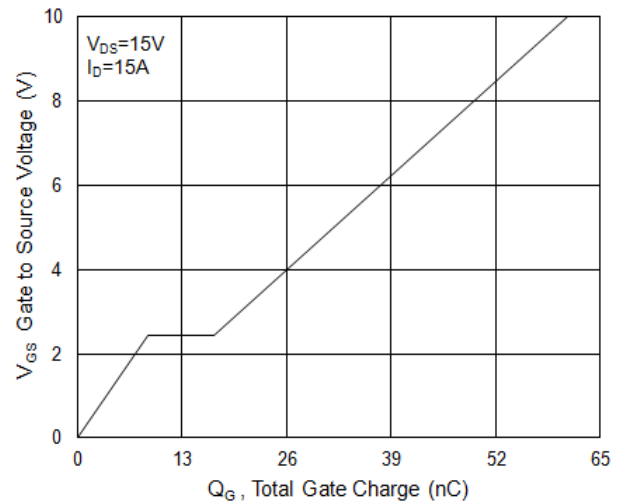


Fig.4 Gate-Charge Characteristics

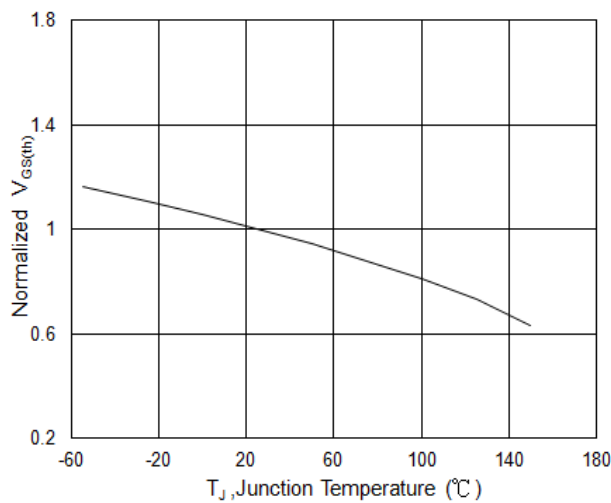


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

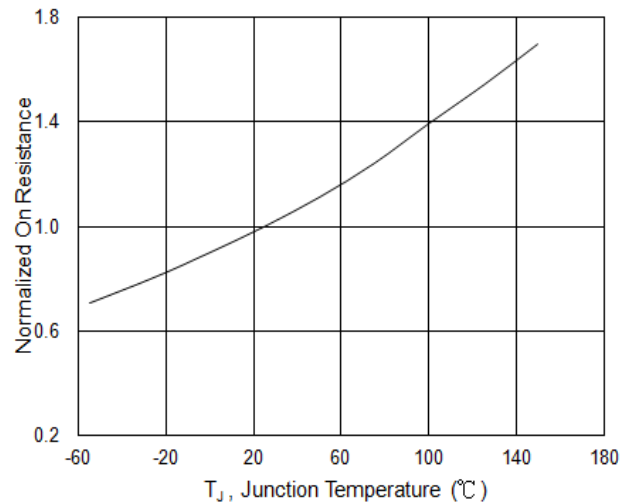


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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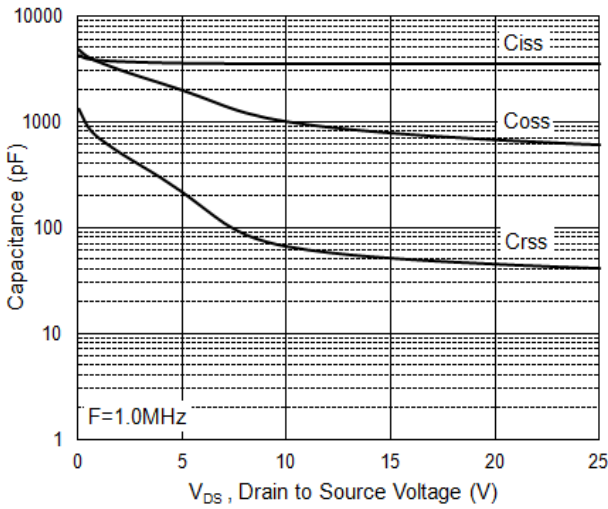


Fig.7 Capacitance

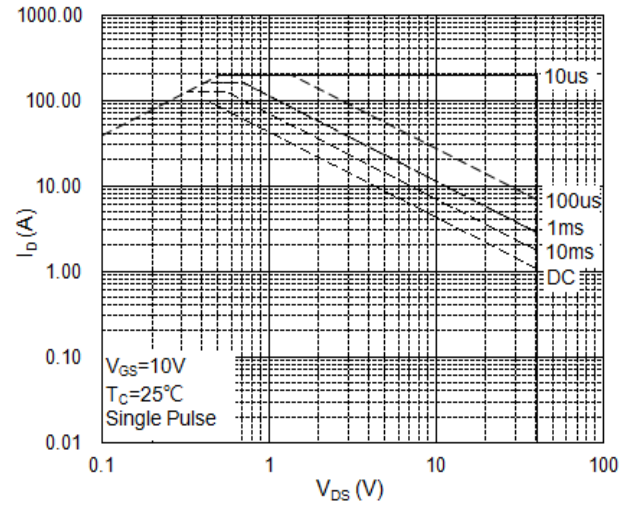


Fig.8 Safe Operating Area

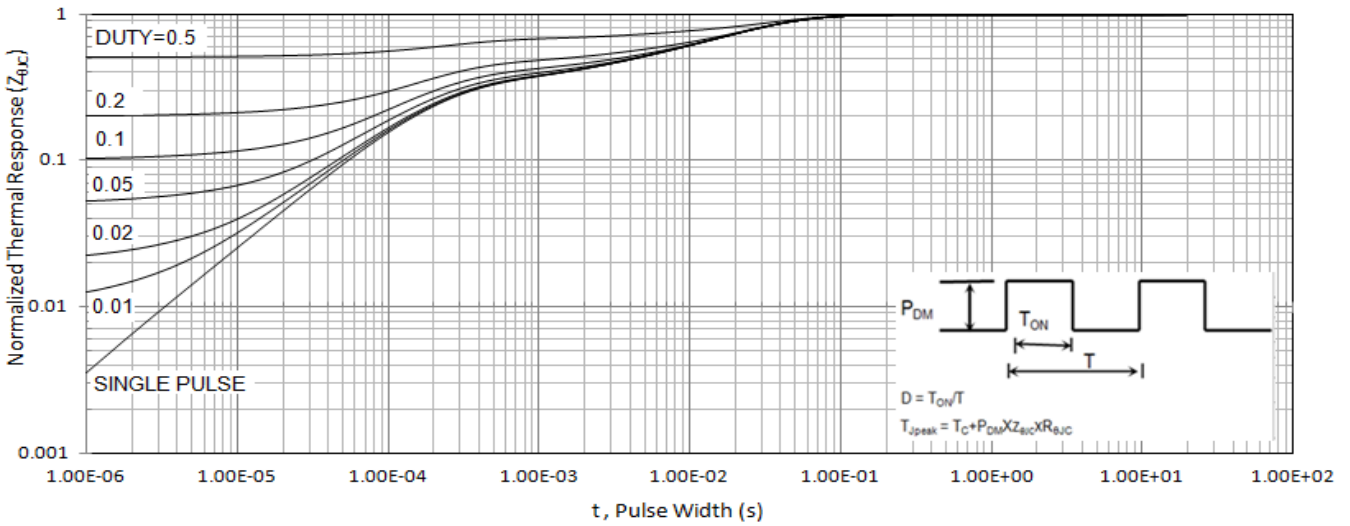
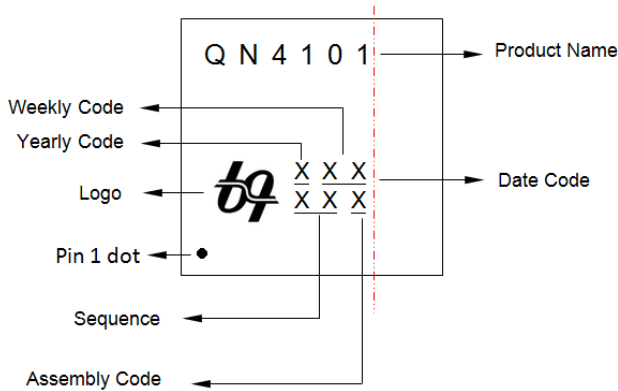
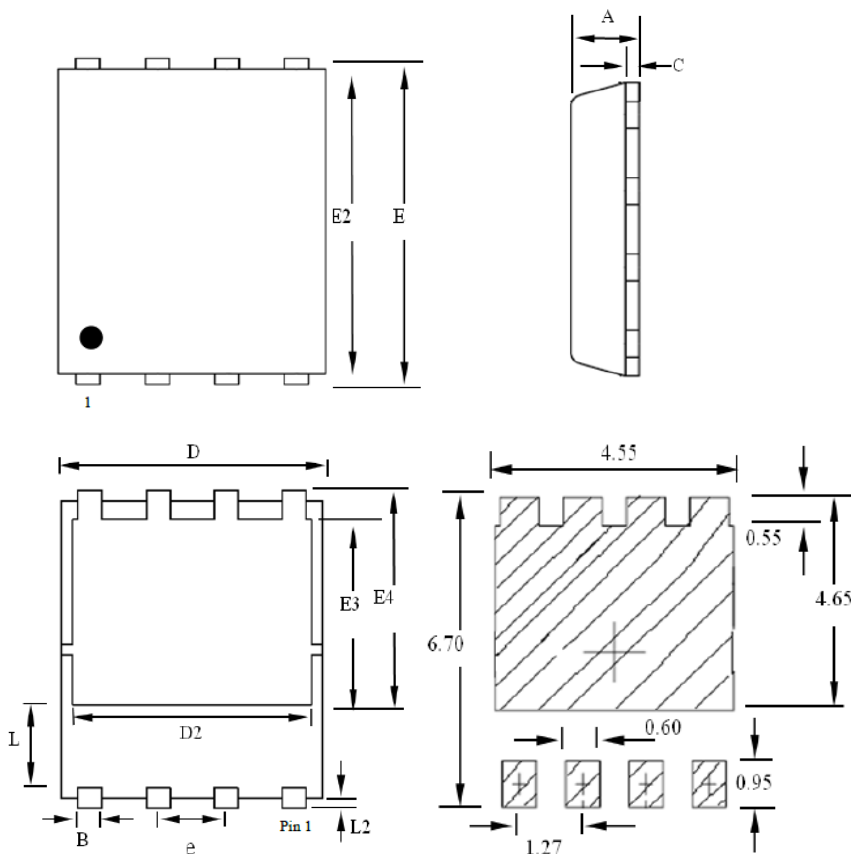


Fig.9 Transient Thermal Impedance

Top Marking



PRPAK5X6 Package Outline Drawing



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	0.90	1.00	1.20
B	0.33	--	0.51
C	0.20	--	0.34
D	4.50	--	5.10
D2	3.60	--	4.22
E	5.90	--	6.13
E2	5.50	--	5.84
E3	3.18	--	4.30
E4	3.69	--	4.39
L	1.10	--	1.39
L2	0.02	--	0.33
e	--	1.27	--

LAND PATTERN RECOMMENDATION (Unit : mm)

Note:

1. ALL DIMENSIONS LISTED ON THE DRAWING MEETING JEDEC STANDARD.
2. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
3. RECOMMENDED LAND PATTERN DESIGN IS ONLY FOR REFERENCE

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