



4NM100-Q

Preliminary

Power MOSFET

4.0A, 1000V N-CHANNEL SUPER-JUNCTION MOSFET

DESCRIPTION

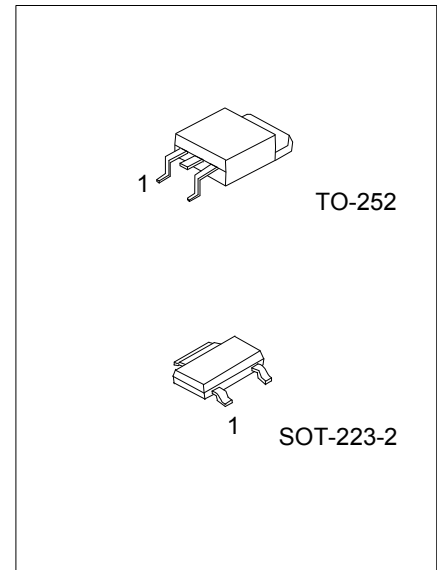
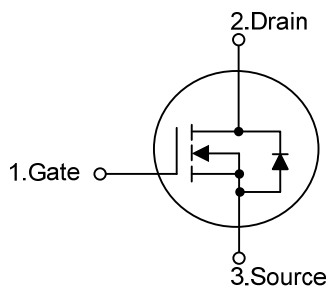
The UTC **4NM100-Q** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

FEATURES

* $R_{DS(ON)} \leq 3.5 \Omega$ @ $V_{GS}=10V$, $I_D=2.0A$

* High Switching Speed

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
4NM100L-AA2-R	4NM100G-AA2-R	SOT-223-2	G	D	S	Tape Reel
4NM100L-TN3-R	4NM100G-TN3-R	TO-252	G	D	S	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

4NM100G-AA2-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AA2: SOT-223-2, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-223-2	TO-252
4NM100 Lot Code 1 2 3 L: Lead Free G: Halogen Free Date Code	UTC 4NM100 Lot Code 1 L: Lead Free G: Halogen Free Date Code

■ **ABSOLUTE MAXIMUM RATINGS** (unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	1000	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current	Continuous	I_D	4	A
	Pulsed	I_{DM}	8	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	2.4	V/ns
Power Dissipation	SOT-223-2	P_D	4.5	W
	TO-252		24	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $I_{SD} \leq 4.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223-2	θ_{JA}	150	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	SOT-223-2	θ_{JC}	27.7 (Note)	$^{\circ}\text{C}/\text{W}$
	TO-252		5.2 (Note)	$^{\circ}\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

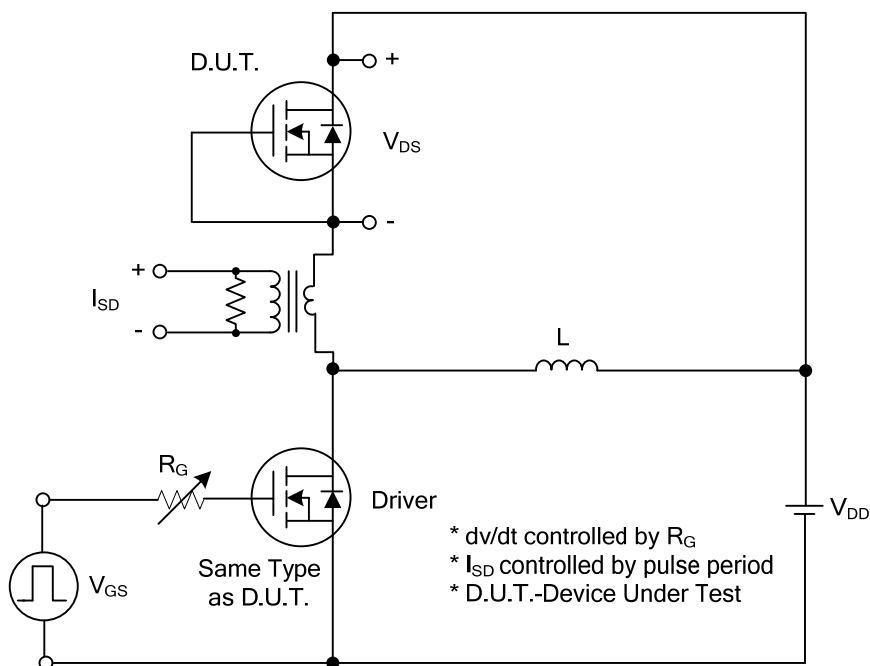
■ ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu A$, $V_{GS}=0V$	1000			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=1000V$, $V_{GS}=0V$			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+30V$, $V_{DS}=0V$			+100	nA
	Reverse		$V_{GS}=-30V$, $V_{DS}=0V$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	2.5		4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=2.0A$			3.5	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	$V_{GS}=0V$, $V_{DS}=50V$, $f=1.0MHz$		290		pF
Output Capacitance		C_{OSS}			23		pF
Reverse Transfer Capacitance		C_{RSS}			2.3		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	$V_{DS}=800V$, $V_{GS}=10V$, $I_D=4.0A$ (Note 1, 2)		17		nC
Gate to Source Charge		Q_{GS}			6.6		nC
Gate to Drain Charge		Q_{GD}			4		nC
Turn-ON Delay Time		$t_{D(ON)}$	$V_{DD}=100V$, $V_{GS}=10V$, $I_D=4.0A$, $R_G=25\Omega$ (Note 1, 2)		6.4		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			38		ns
Fall-Time		t_F			32		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				4	A
Maximum Body-Diode Pulsed Current		I_{SM}				8	A
Drain-Source Diode Forward Voltage		V_{SD}	$I_S=4.0A$, $V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	$I_S=4.0A$, $V_{GS}=0V$,		520		ns
Reverse Recovery Charge		Q_{rr}	$dl_F/dt=100A/\mu s$ (Note 1)		3.5		μC

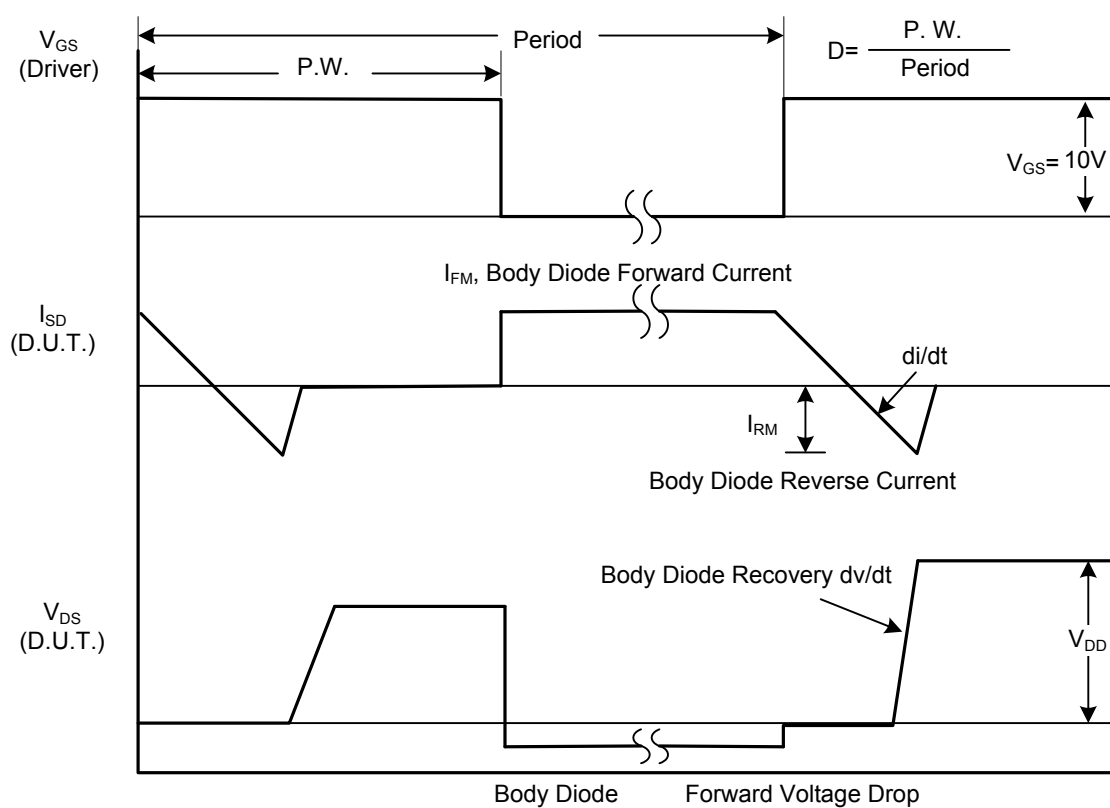
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

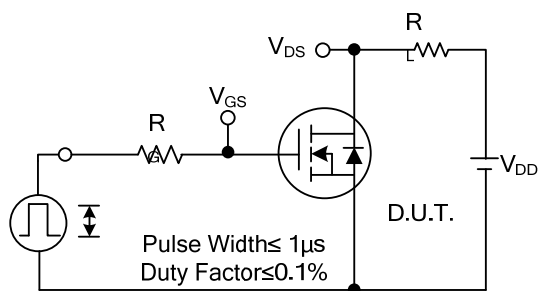


Peak Diode Recovery dv/dt Test Circuit

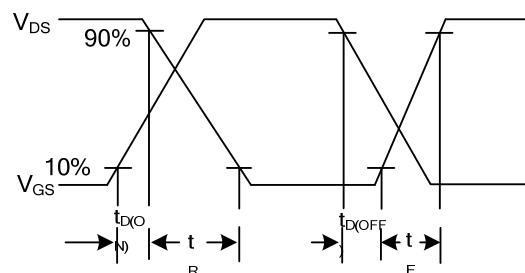


Peak Diode Recovery dv/dt Waveforms

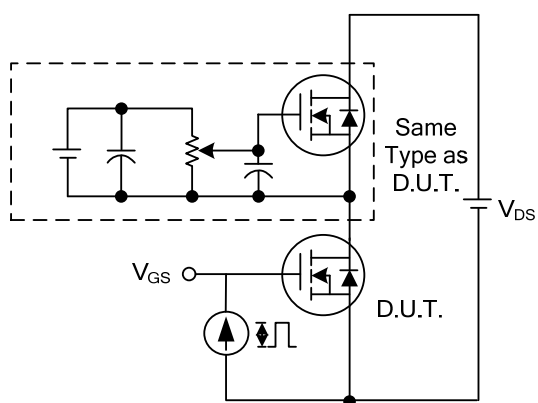
■ TEST CIRCUITS AND WAVEFORMS



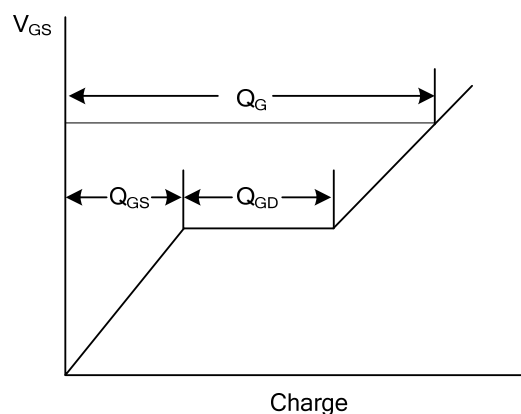
Switching Test Circuit



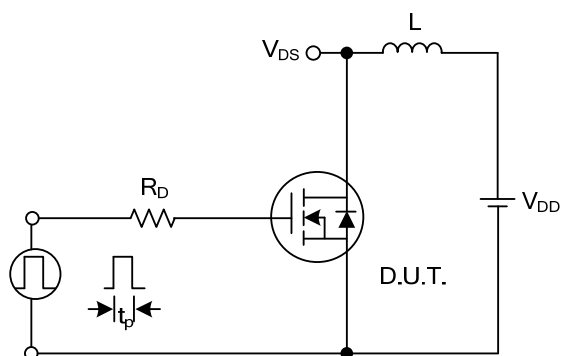
Switching Waveforms



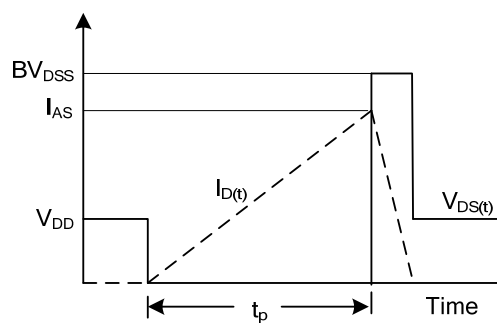
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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