

UNISONIC TECHNOLOGIES CO., LTD

4NM100 Preliminary Power MOSFET

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

■ DESCRIPTION

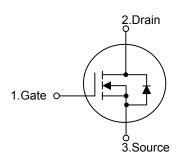
The UTC **4NM100** is an Super Junction MOSFET Structure. It uses UTC advanced planar stripe, DMOS technology to provide customers perfect switching performance, minimal on-state resistance.

The UTC **4NM100** is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

■ FEATURES

- * $R_{DS(ON)} \le 2.6 \Omega @ V_{GS} = 10V, I_D = 2.0A$
- * High switching speed
- * High breakdown voltage

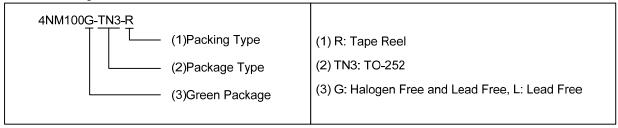
■ SYMBOL



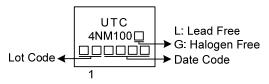
ORDERING INFORMATION

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

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



MARKING



1 TO-252

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■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		$V_{ extsf{DSS}}$	1000	V	
Drain-Gate Voltage		V_{DGR}	1000	V	
Gate-Source Voltage		V_{GSS}	±30	V	
Drain Current	Continuous	I _D	4	Α	
	Pulsed	I _{DM}	8	Α	
Peak Diode Recovery dv/dt (Note 3)		dv/dt	2.4	V/ns	
Power Dissipation		P_D	25	W	
Junction Temperature		TJ	-55 ~ + 150	°C	
Storage Temperature Range		T _{STG}	-55 ~ + 150	°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. $I_{SD} \le 4.0A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT	
Junction to Ambient	θ_{JA}	110	°C/W	
Junction to Case	$\theta_{ m JC}$	5 (Note)	°C/W	

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

■ **ELECTRICAL CHARACTERISTICS** (T_J=25°C, unless otherwise specified)

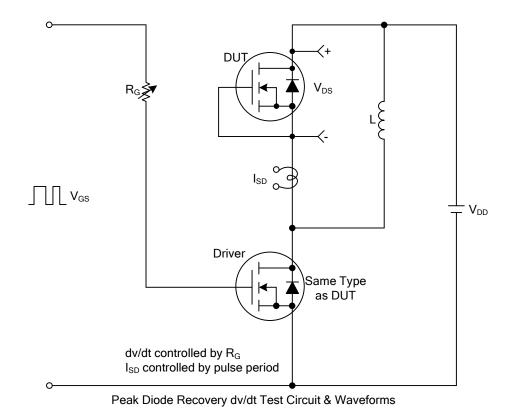
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =0.25mA, V _{GS} =0V, T _J =25°C				V	
Drain-Source Leakage Current		I _{DSS}	V _{DS} =1000V, V _{GS} =0V, T _J =25°C			10	μΑ	
			V _{DS} =1000V, V _{GS} =0V, T _C =125°C			100	μΑ	
Gate-Source Leakage Current	Forward	<u> </u>	V_{GS} =+30V, V_{DS} =0V			+100	nA	
	Reverse	I_{GSS}	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			2.6	Ω	
DYNAMIC PARAMETERS								
Input Capacitance		C _{ISS}			350		pF	
Output Capacitance		Coss	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		110		pF	
Reverse Transfer Capacitance		C_{RSS}			6		pF	
SWITCHING PARAMETERS								
Total Gate Charge		Q_G	\\ 000\\ \\ 10\\ \ 100\\		19		nC	
Gate to Source Charge		Q_GS	V _{DS} =800V, V _{GS} =10V, I _D =4.0A, (Note 1,2)		7		nC	
Gate to Drain Charge		Q_GD	(Note 1,2)		5		nC	
Turn-ON Delay Time		$t_{D(ON)}$			6.4		ns	
Rise Time		t_R	V _{DD} =100V, V _{GS} =10V, I _D =4.0A,		17		ns	
Turn-OFF Delay Time		$t_{D(OFF)}$	R _G =25Ω (Note 1,2)		43		ns	
Fall-Time		t_{F}			36		ns	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Maximum Body-Diode Continuous Current		I _S	T _C =25°C			4	Α	
Maximum Body-Diode Pulsed Current		I _{SM}	T _C =25°C			8	Α	
Drain-Source Diode Forward Voltage		V_{SD}	I _F =4.0A, V _{GS} =0V			1.4	V	
Reverse Recovery Time		t _{rr}	I _S =4.0A,V _{GS} =0V,		468		ns	
Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs (Note 1)		3.7		μC	

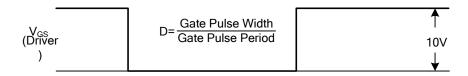
Notes: 1. Pulse Test: Pulse width $\leq 300 \mu s$, Duty cycle $\leq 2\%$.

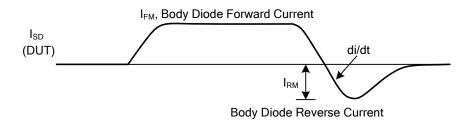
2. Essentially independent of operating temperature.

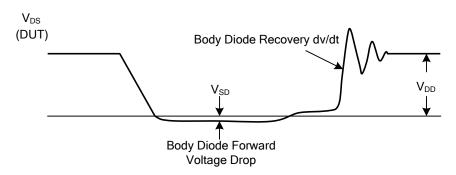


■ TEST CIRCUITS AND WAVEFORMS

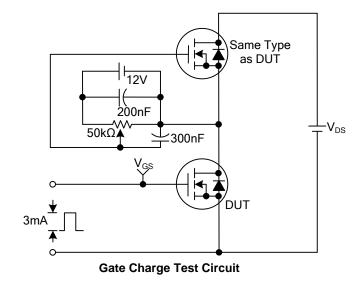


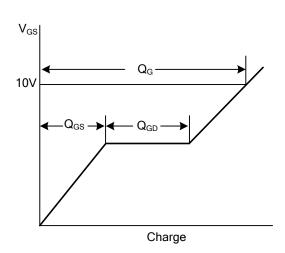




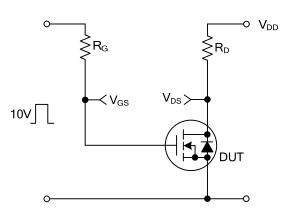


■ TEST CIRCUITS AND WAVEFORMS(Cont.)

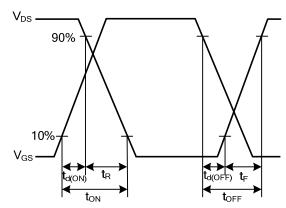




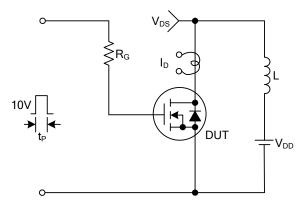
Gate Charge Waveforms



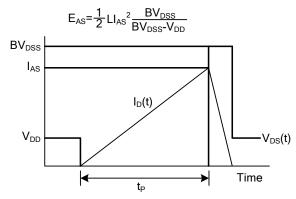
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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