

UNISONIC TECHNOLOGIES CO., LTD

15NM50 Preliminary Power MOSFET

15A, 500V N-CHANNEL SUPER-JUNCTION MOSFET

■ DESCRIPTION

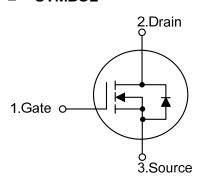
The UTC 15NM50 is an Super Junction MOSFET Structure. It uses UTC advanced planar stripe, DMOS technology to provide customers perfect switching performance, minimal on-state resistance.

The UTC 15NM50 is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

■ FEATURES

- * $R_{DS(ON)} < 0.35\Omega$ @ $V_{GS}=10V$, $I_D=7.5A$
- * By using Super Junction Structure
- * Fast Switching
- * With 100% Avalanche Tested

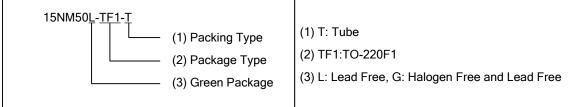
■ SYMBOL



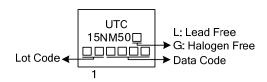
ORDERING INFORMATION

Ordering Number		Dookses	Pin Assignment			Dooling	
Lead Free	Halogen Free	Package	1	2	3	Packing	
15NM50L-TF1-T	15NM50G-TF1-T	TO-220F1	G	D	S	Tube	

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



MARKING



1 TO-220F1

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		$V_{ extsf{DSS}}$	500	V
Gate to Source Voltage		V_{GSS}	±30	V
Continuous Drain Current	T _C =25°C		15 (Note 2)	А
	T _C =100°C	I _D	7 (Note 2)	А
Pulsed Drain Current (Note 3)		I _{DM}	44 (Note 2)	А
Single Pulsed Avalanche Energy(Note 4)		E _{AS}	225	mJ
Peak Diode Recovery dv/dt (Note 5)		dv/dt	4.5	V/ns
Power Dissipation	T _C =25°C	Б	52	W
	Derate above 25°C	P _D	0.416	W/°C
Junction Temperature		T_J	+150	°C
Storage Temperature		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. Drain current limited by maximum junction temperature
- 3. Repetitive Rating: Pulse width limited by maximum junction temperature
- 4. L=2mH, I_{AS} =15A, V_{DD} = 50V, R_{G} =25 Ω , Starting T_{J} =25 $^{\circ}$ C
- 5. $I_{SD} \le 11A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25$ °C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT	
Junction to Ambient	θ_{JA}	62.5	°C/W	
Junction to Case	θ_{JC}	2.4	°C/W	

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

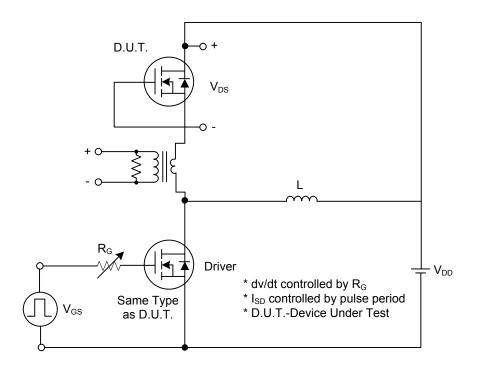
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PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_{J}$	I _D =250μA,Referenced to 25°C		0.5		V/°C
Drain Course Lookens Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	μΑ
Drain-Source Leakage Current		V _{DS} =500V, T _J =125°C			100	μΑ
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V ,V _{GS} =±30V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	2.0		4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =7.5A			0.35	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}			625		pF
Output Capacitance	Coss	V _{DS} =25V,V _{GS} =0V, f=1.0MHz		330		pF
Reverse Transfer Capacitance	C _{RSS}			15		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	t _{D(ON)}			55		ns
Turn-ON Rise Time	t_R	V_{DD} =30V, I_{D} =0.5A, R_{G} =25 Ω		95		ns
Turn-OFF Delay Time	t _{D(OFF)}	V _{GS} =10V (Note 1, 2)		295		ns
Turn-OFF Fall Time	t _F			125		ns
Total Gate Charge	Q_G	\\ _50\\ \\ _40\\ _42A		41		nC
Gate-Source Charge	Q_GS	V _{DS} =50V, V _{GS} =10V, I _D =1.3A,		6		nC
Gate-Drain Charge	Q_{GD}	I _G =100μA (Note 1, 2)		12		nC
SOURCE- DRAIN DIODE RATINGS AND C	HARACTERIS	STICS				
Maximum Body-Diode Continuous Current	I _S				11	Α
Maximum Body-Diode Pulsed Current	I _{SM}				44	Α
Drain-Source Diode Forward Voltage	V _{SD}	I _S =15A, V _{GS} =0V			1.4	V
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Note: 1. Pulse Test : Pulse width ≤ 300µs, Duty cycle ≤ 2%

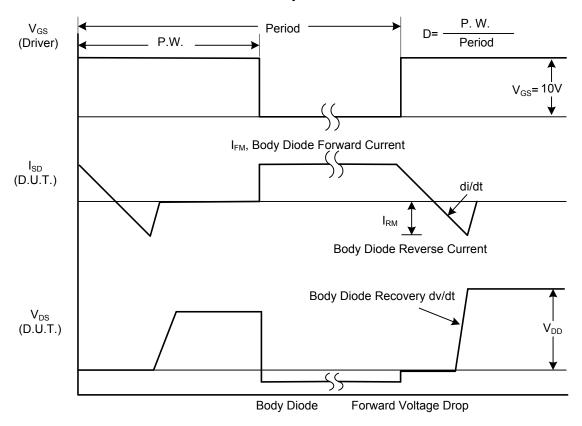
2. Essentially independent of operating temperature



TEST CIRCUITS AND WAVEFORMS

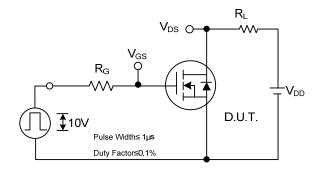


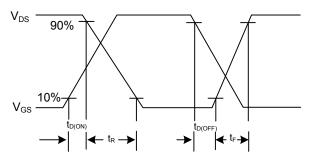
Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

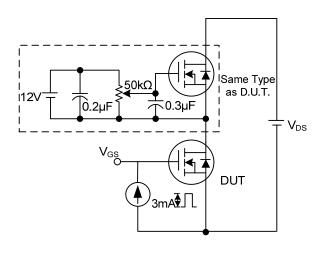
■ TEST CIRCUITS AND WAVEFORMS (Cont.)

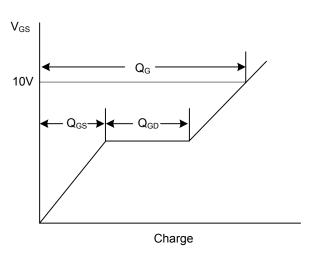




Switching Test Circuit

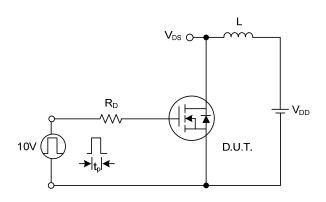
Switching Waveforms

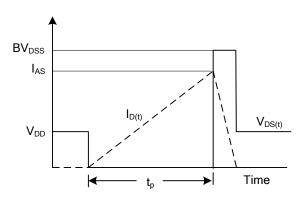




Gate Charge Test Circuit

Gate Charge Waveform





Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

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