



13A, 1000V N-CHANNEL SUPER-JUNCTION MOSFET

DESCRIPTION

The UTC **13NM100** 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 **13NM100** is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

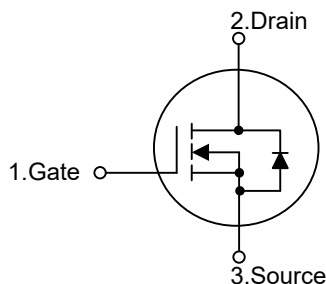
FEATURES

* $R_{DS(ON)} \leq 0.6 \Omega$ @ $V_{GS}=10V$, $I_D=6.5A$

* High switching speed

* High breakdown voltage

SYMBOL

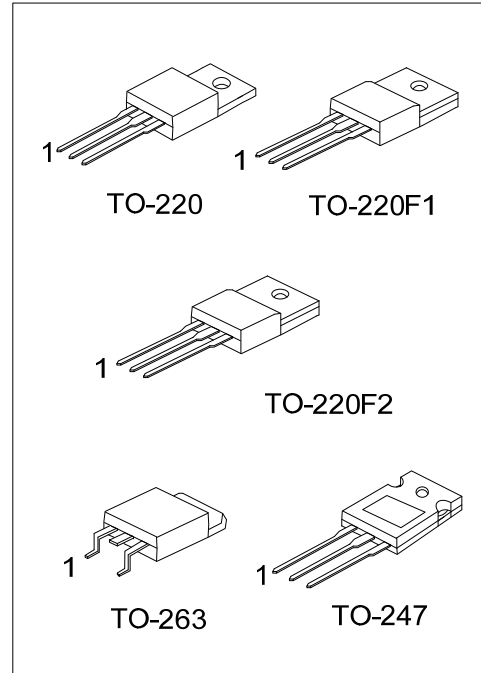


ORDERING INFORMATION

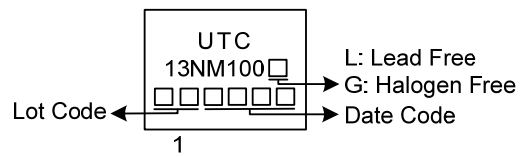
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13NM100L-TA3-T	13NM100G-TA3-T	TO-220	G	D	S	Tube
13NM100L-TF1-T	13NM100G-TF1-T	TO-220F1	G	D	S	Tube
13NM100L-TF2-T	13NM100G-TF2-T	TO-220F2	G	D	S	Tube
13NM100L-TQ2-T	13NM100G-TQ2-T	TO-263	G	D	S	Tube
13NM100L-TQ2-R	13NM100G-TQ2-R	TO-263	G	D	S	Tape Reel
13NM100L-T47-T	13NM100G-T47-T	TO-247	G	D	S	Tube

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

13NM100G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2 T47: TO-247, TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	1000	V
Drain-Gate Voltage		V_{DGR}	1000	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_{D}	13	A
	Pulsed	I_{DM}	26	A
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	338	mJ
Power Dissipation	TO-220/TO-263	P_{D}	120	W
	TO-220F1/TO-220F2		32	W
	TO-247		145	W
Junction Temperature		T_{J}	$-55 \sim +150$	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

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. $L = 100\text{mH}$, $I_{\text{AS}} = 2.6\text{A}$, $V_{\text{DD}} = 120\text{V}$, $R_{\text{G}} = 25\ \Omega$ Starting $T_{\text{J}} = 25^{\circ}\text{C}$.

4. $I_{\text{SD}} \leq 13\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{\text{DD}} \leq BV_{\text{DSS}}$, Starting $T_{\text{J}} = 25^{\circ}\text{C}$.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F1	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-220F2/TO-263			
	TO-247		40	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220/TO-263	θ_{JC}	1.04	$^{\circ}\text{C}/\text{W}$
	TO-220F1/TO-220F2		3.9	$^{\circ}\text{C}/\text{W}$
	TO-247		0.86	$^{\circ}\text{C}/\text{W}$

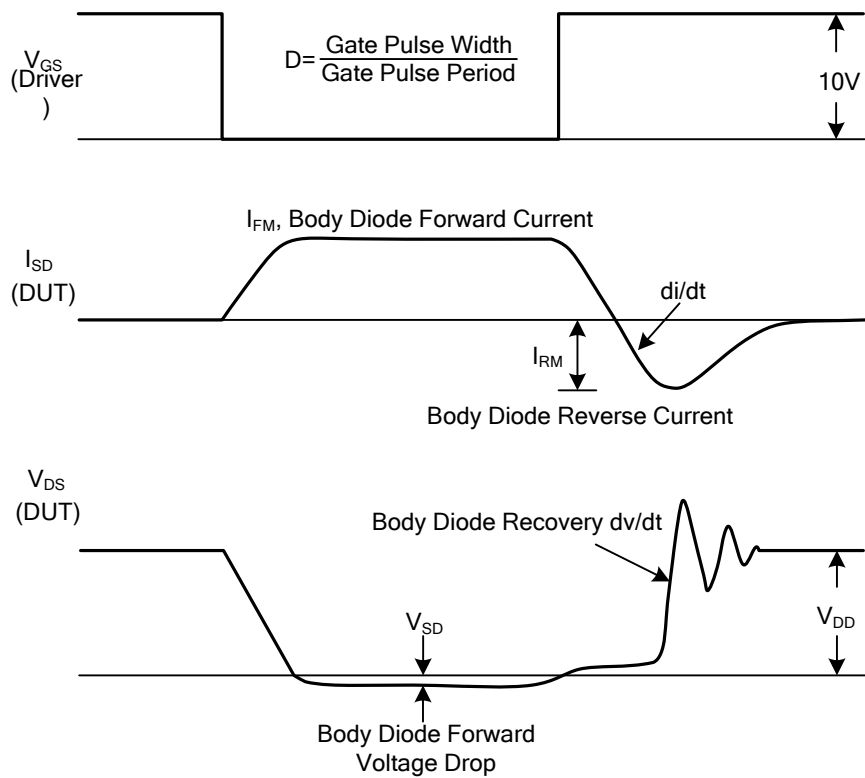
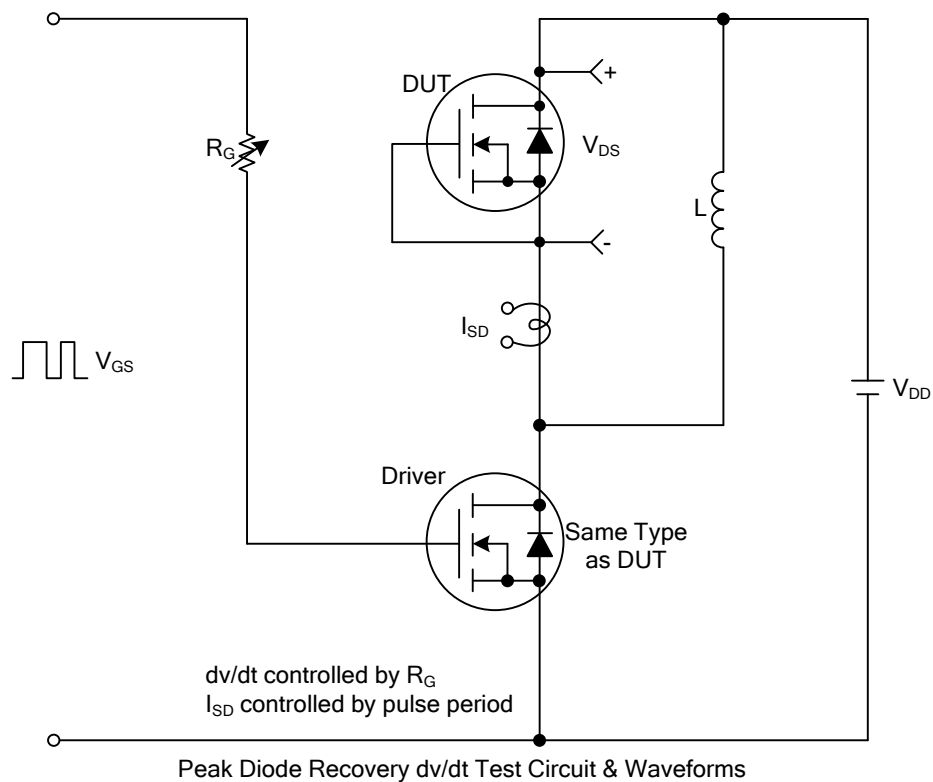
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

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	1000			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =1000V, V _{GS} =0V, T _J =25°C			10	μA
			V _{DS} =1000V, V _{GS} =0V, T _C =125°C			100	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 =250μA	2.5		4.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =6.5A			0.6	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =50V, f=1.0MHz		1300		pF
Output Capacitance		C _{OSS}			72		pF
Reverse Transfer Capacitance		C _{RSS}			3.5		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =800V, V _{GS} =10V, I _D =13A, (Note 1,2)		58		nC
Gate to Source Charge		Q _{GS}			14		nC
Gate to Drain Charge		Q _{GD}			23		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =13A, R _G =25Ω (Note 1,2)		14		ns
Rise Time		t _R			23		ns
Turn-OFF Delay Time		t _{D(OFF)}			160		ns
Fall-Time		t _F			76		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S	T _C =25°C			13	A
Maximum Body-Diode Pulsed Current		I _{SM}	T _C =25°C			26	A
Drain-Source Diode Forward Voltage		V _{SD}	I _F =13A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =13A, V _{GS} =0V,		640		ns
Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs (Note 1)		11.5		μC

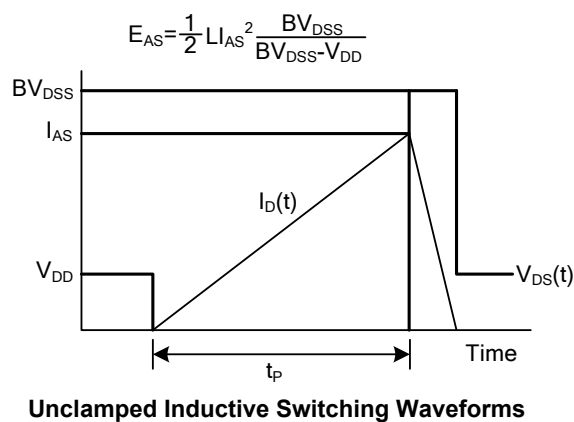
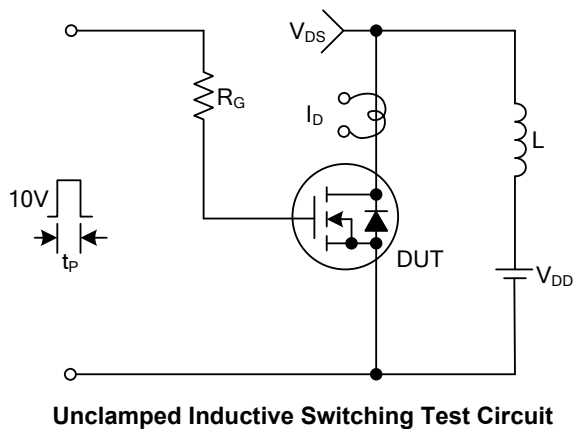
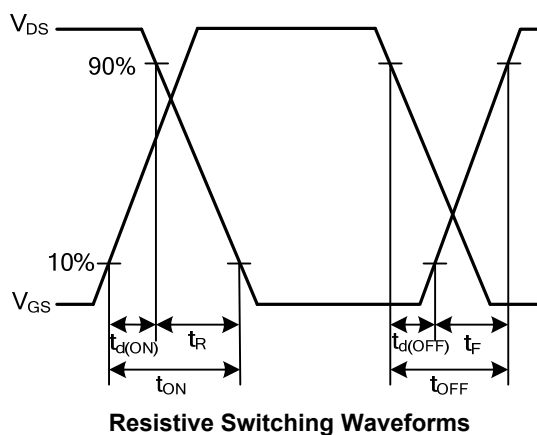
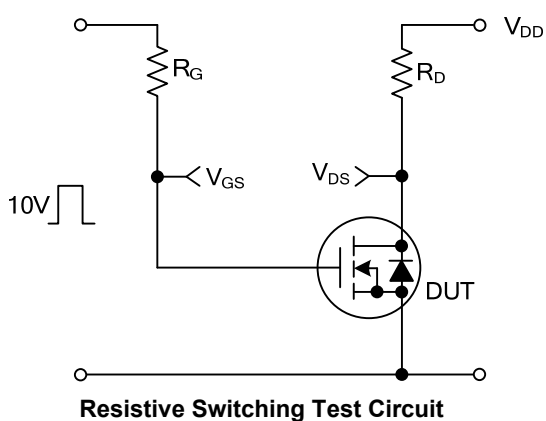
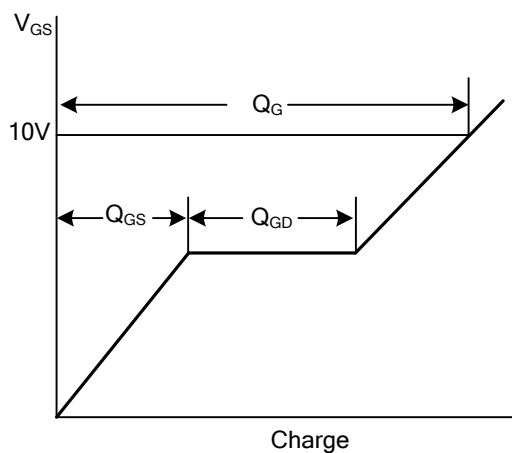
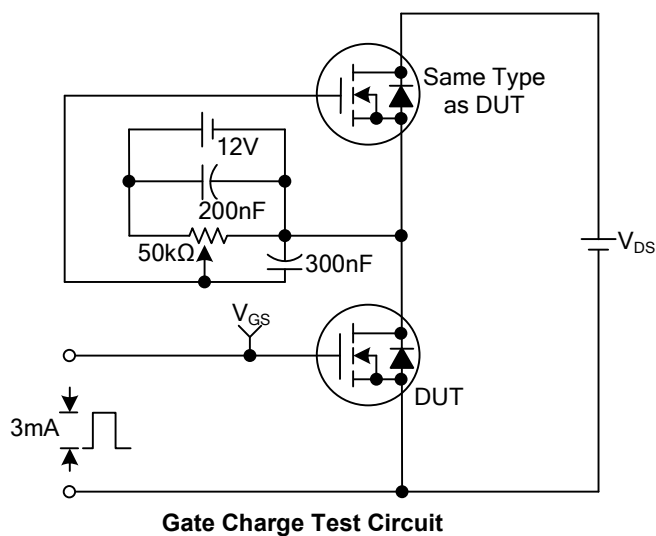
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



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