



13NM100SZ

Preliminary

Power MOSFET

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

DESCRIPTION

The UTC **13NM100SZ** 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 **13NM100SZ** is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

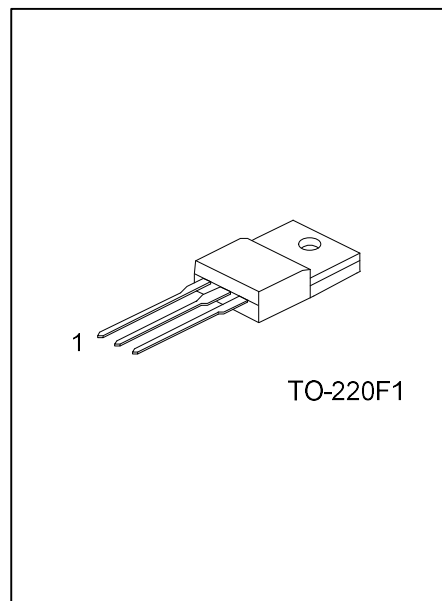
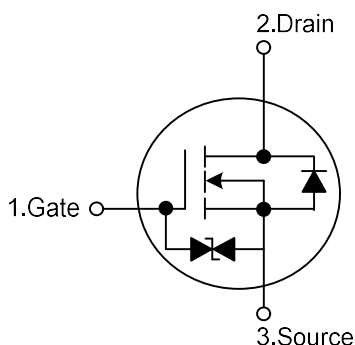
FEATURES

* $R_{DS(ON)} \leq 0.68 \Omega$ @ $V_{GS} = 10V$, $I_D = 3.25A$

* High switching speed

* High breakdown voltage

SYMBOL



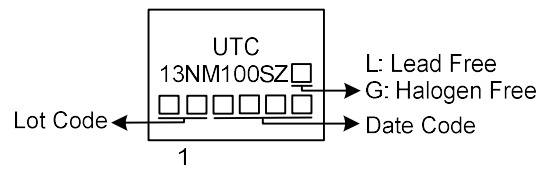
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13NM100SZL-TF1-T	13NM100SZG-TF1-T	TO-220F1	G	D	S	Tube

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

13NM100SZG-TF1-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) TF1: TO-220F1
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	1000	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	Continuous	I _D	13	A
	Pulsed (Note 2)	I _{DM}	26	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	75	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.5	V/ns
Power Dissipation		P _D	30	W
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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. L = 100mH, I_{AS} = 1.23A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C.

4. I_{SD} ≤ 13A, di/dt ≤ 200A/μs, V_{DD} ≤ 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}	4.16	°C/W

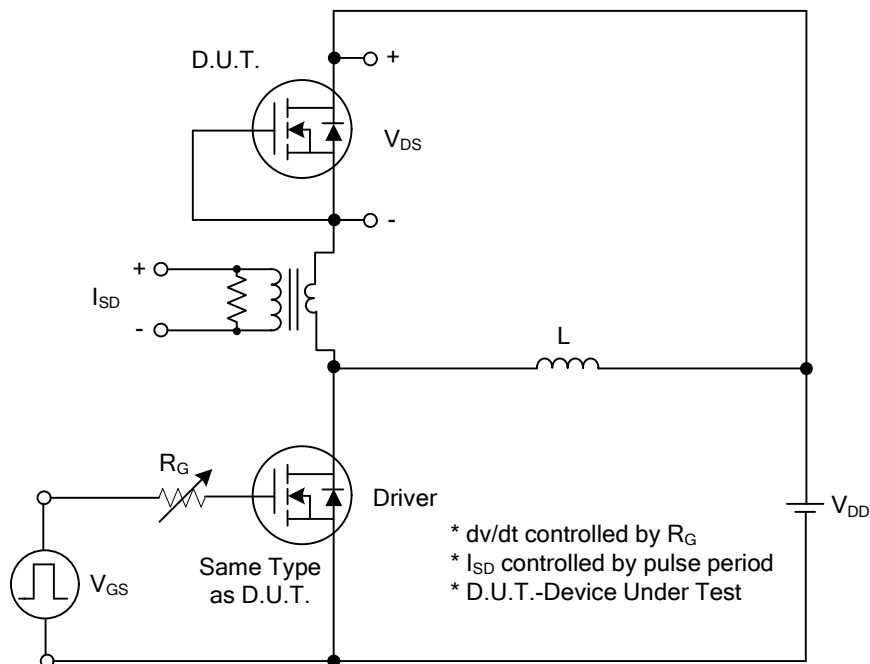
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D = 250μA	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} =20V, V _{DS} =0V			10	μA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-10	μA
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 =3.25A			0.68	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =50V, f=1.0 MHz		840		pF
Output Capacitance		C _{OSS}			113		pF
Reverse Transfer Capacitance		C _{RSS}			6		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =760V, V _{GS} =10V, I _D =13A, (Note 1,2)		27		nC
Gate-source Charge		Q _{GS}			9		nC
Gate-Drain Charge		Q _{GD}			3		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =13A, R _G =25Ω (Note 1,2)		15		ns
Rise Time		t _R			21		ns
Turn-off Delay Time		t _{D(OFF)}			68		ns
Fall-Time		t _F			30		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				13	A
Maximum Body-Diode Pulsed Current		I _{SM}				26	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =13A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =13A, V _{GS} =0V		454		ns
Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs (Note1)		7.6		μC

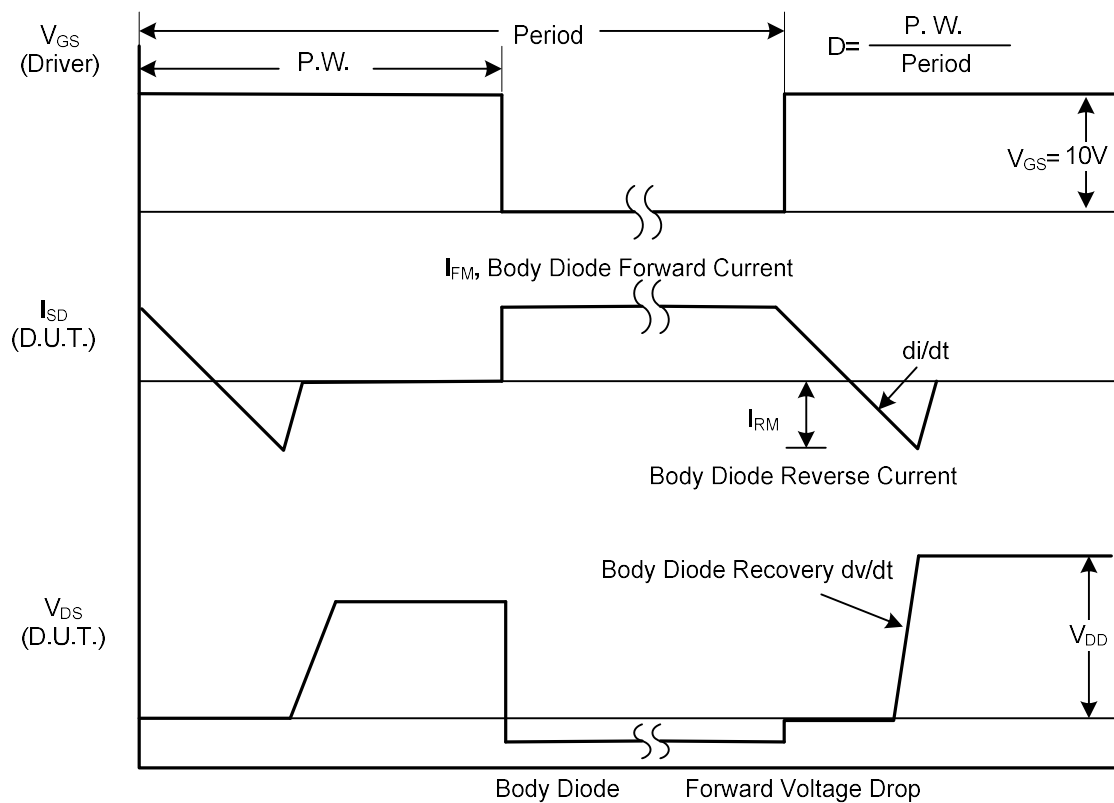
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

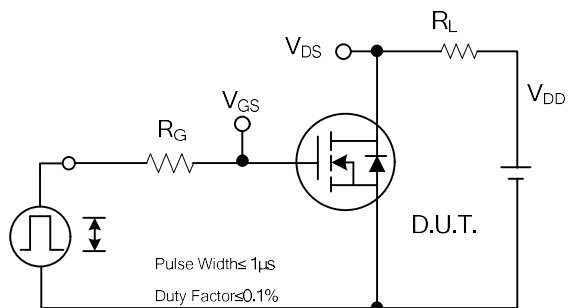


Peak Diode Recovery dv/dt Test Circuit

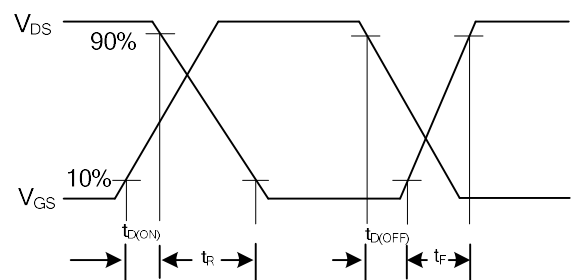


Peak Diode Recovery dv/dt Waveforms

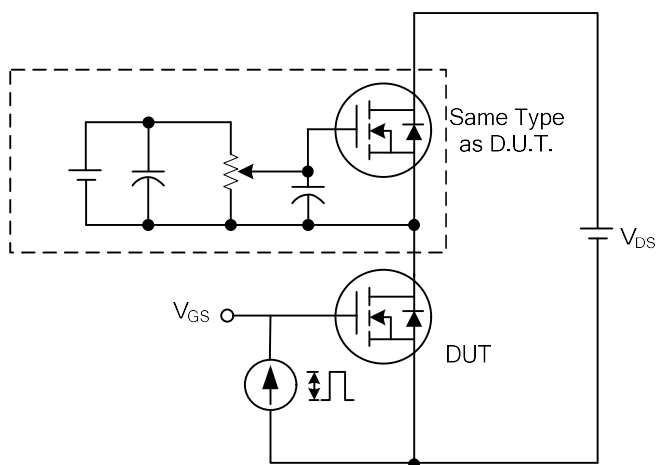
■ TEST CIRCUITS AND WAVEFORMS



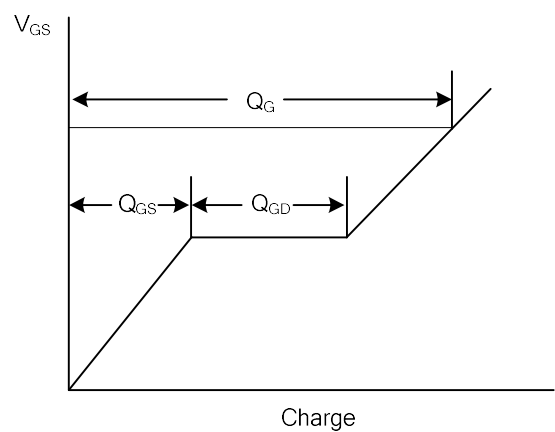
Switching Test Circuit



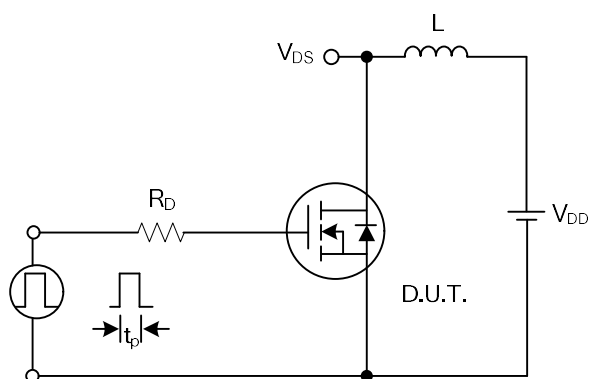
Switching Waveforms



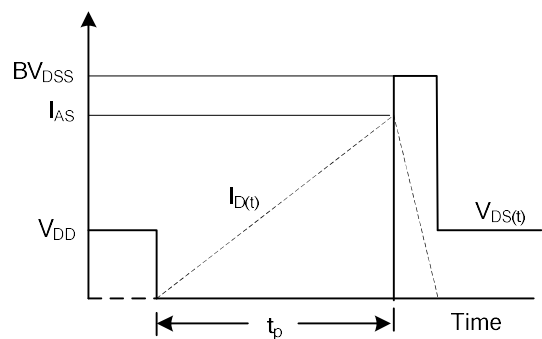
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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