

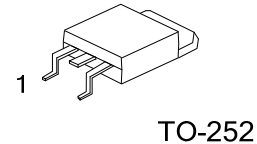


12A, 300V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **12N30** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **12N30** is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

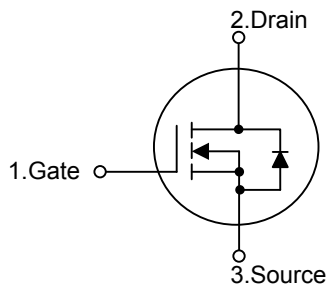


FEATURES

* $R_{DS(ON)}=0.34\Omega$ @ $V_{GS}=10V$

* High switching speed

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
12N30L-TN3-R	12N30G-TN3-R	TO-252	G	D	S	Tape Reel

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

12N30L-TN3-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) TN3: TO-252
	(3)Lead Free	(3) G: Halogen Free, L: Lead Free

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	300	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous ($T_C=25^\circ\text{C}$)	I_D	12	A
	Pulsed (Note 2)	I_{DM}	48	A
Single Pulsed Avalanche Energy		E_{AS}	474	mJ
Power Dissipation		P_D	83	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55~+150	$^\circ\text{C}$

Note: 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. Starting $T_J=25^\circ\text{C}$, $I_{AS}=12\text{A}$, $V_{DD}=50\text{V}$, $L=6.58\text{mH}$.

■ **THERMAL DATA**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	θ_{JC}	1.5	$^\circ\text{C/W}$

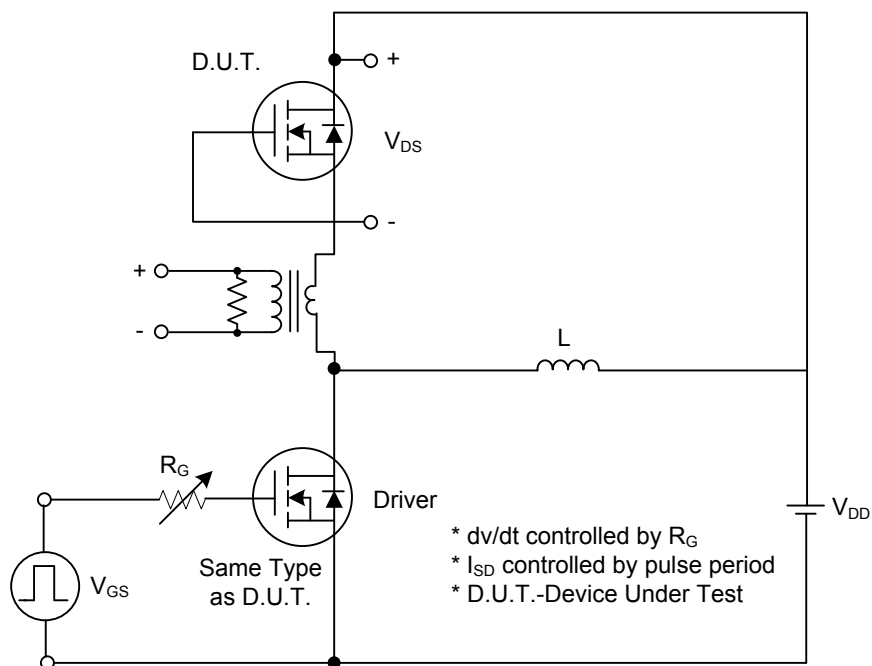
■ **ELECTRICAL CHARACTERISTICS** ($T_C=25^\circ\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS} I	D=250μA, V _{GS} =0V 300				V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =300V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =12A		0.34	0.47	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz			3000	pF
Output Capacitance		C _{OSS}				900	pF
Reverse Transfer Capacitance		C _{RSS}				400	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DD} =150V, V _{GS} =10V, I _D =12A (Note 1, 2)	24			nC
Gate-Source Charge		Q _{GS}			5		nC
Gate-Drain Charge		Q _{GD}			5.6		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =30V, I _D =12A, R _G =25Ω (Note 1, 2)	30		50	ns
Rise Time		t _R			105	150	ns
Turn-OFF Delay Time		t _{D(OFF)}			480	750	ns
Fall-Time		t _F			140	200	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	I _S =12A, V _{GS} =0V			1.4	V
Maximum Body-Diode Continuous Current		I _S				12	A
Maximum Body-Diode Pulsed Current		I _{SM}				48	A

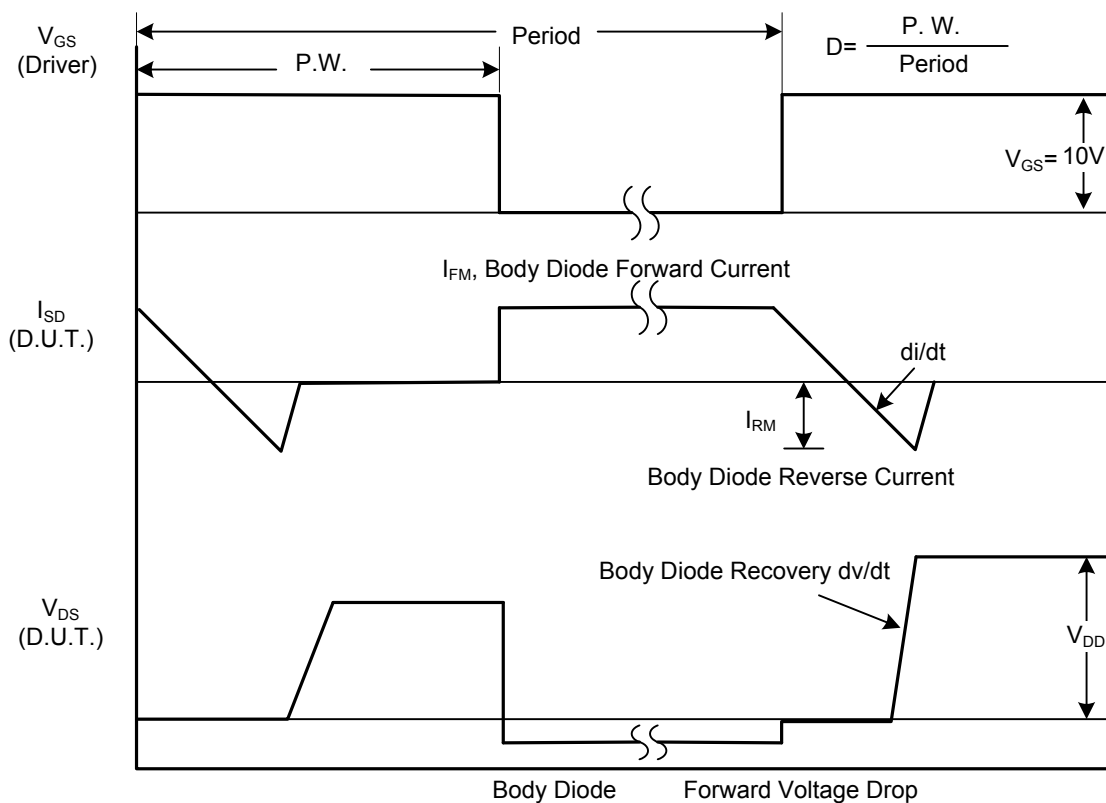
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

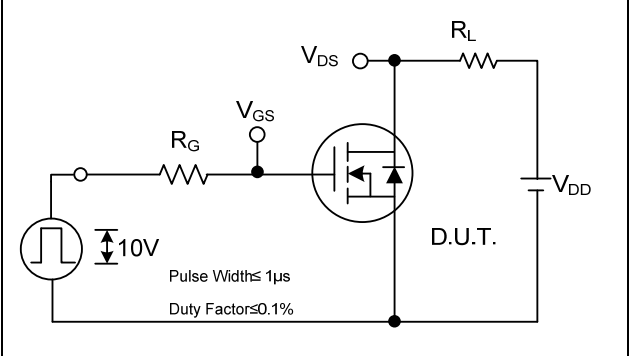
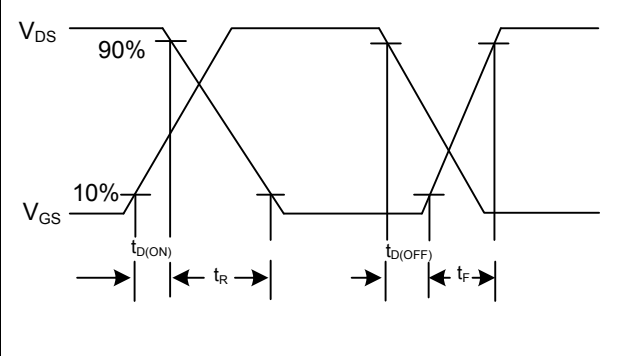
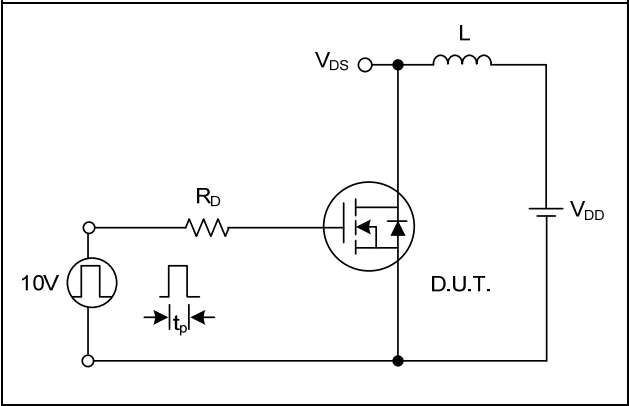
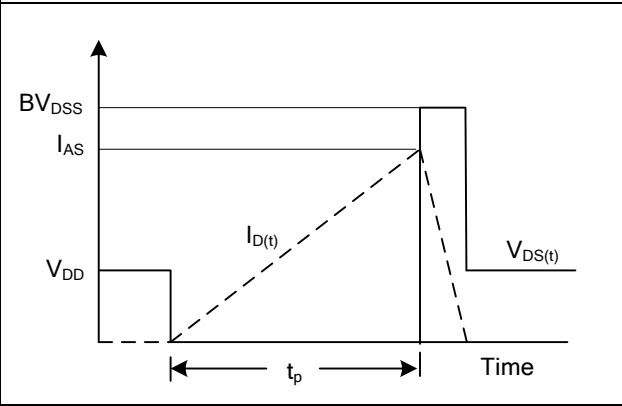


Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

 Diagram of a switching test circuit. A 10V pulse source is connected to the gate of a MOSFET (D.U.T.) through a gate resistor R_G. The drain is connected to a load resistor R_L and a supply voltage V_{DD}. The gate voltage is labeled V_{GS} and the drain voltage is labeled V_{DS}. The pulse source parameters are: Pulse Width $\leq 1\mu s$ and Duty Factor $\leq 0.1\%$.	 Diagram showing the switching waveforms for V_{DS} and V_{GS}. The V_{GS} waveform is a square wave with a pulse width $t_{D(ON)}$ and a fall time t_F. The V_{DS} waveform shows the drain voltage during switching, with a rise time t_R and a fall time t_F. The V_{DS} waveform is a square wave with a pulse width $t_{D(OFF)}$ and a fall time t_F. The V_{GS} waveform is a square wave with a pulse width $t_{D(ON)}$ and a fall time t_F.
Switching Test Circuit	Switching Waveforms
 Diagram of an unclamped inductive switching test circuit. A 10V pulse source is connected to the gate of a MOSFET (D.U.T.) through a gate resistor R_D. The drain is connected to an inductor L and a supply voltage V_{DD}. The gate voltage is labeled V_{GS} and the drain voltage is labeled V_{DS}. The pulse source parameters are: Pulse Width $\leq 1\mu s$ and Duty Factor $\leq 0.1\%$.	 Diagram showing the unclamped inductive switching waveforms. The $V_{DS}(t)$ waveform shows the drain voltage during switching, with a rise time t_p and a fall time t_F. The $I_D(t)$ waveform shows the drain current during switching, with a peak current I_{AS} and a fall time t_F. The V_{GS} waveform is a square wave with a pulse width $t_{D(ON)}$ and a fall time t_F.
Unclamped Inductive Switching Test Circuit	Unclamped Inductive Switching Waveforms

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