



## 12N25V

Power MOSFET

### 12A, 250V N-CHANNEL POWER MOSFET

#### DESCRIPTION

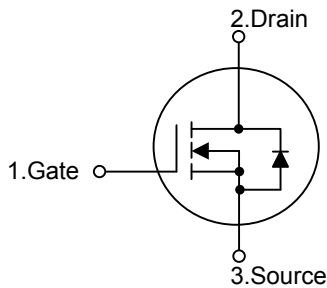
The UTC **12N25V** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **12N25V** is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

#### FEATURES

- \*  $I_D=12A$
- \*  $V_{DS} = 250V$
- \*  $R_{DS(ON)} < 0.5\Omega @ V_{GS}=10V, I_D=12A$
- \* High switching speed
- \* 100% avalanche tested

#### SYMBOL

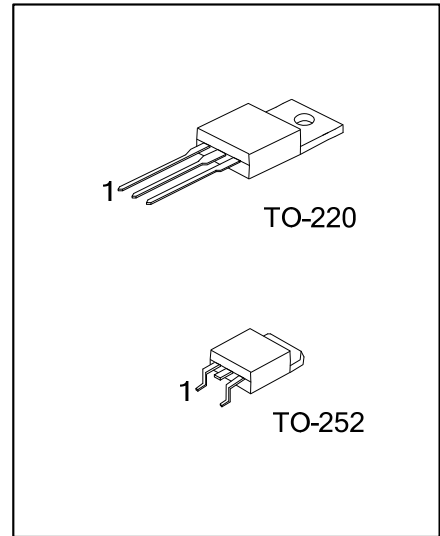


#### ORDERING INFORMATION

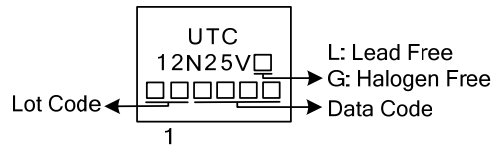
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
12N25VL-TA3-T	12N25VG-TA3-T	TO-220	G	D	S	Tube
12N25VL-TN3-R	12N25VG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>12N25VL-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	250	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	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
Peak Diode Recovery dv/dt		dv/dt	7.5	V/ns
Power Dissipation	TO-220	$P_D$	73	W
	TO-252		83	W
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-55 ~ +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.

■ THERMAL DATA

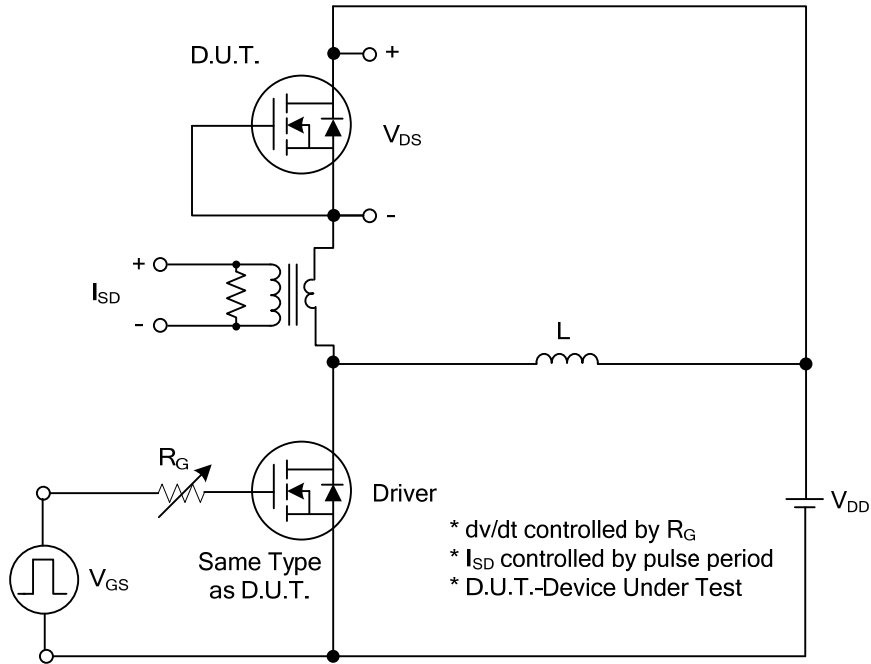
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	$\theta_{JA}$	62.5	$^\circ\text{C/W}$
	TO-252		100	$^\circ\text{C/W}$
Junction to Case	TO-220	$\theta_{JC}$	1.7	$^\circ\text{C/W}$
	TO-252		1.5	$^\circ\text{C/W}$

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

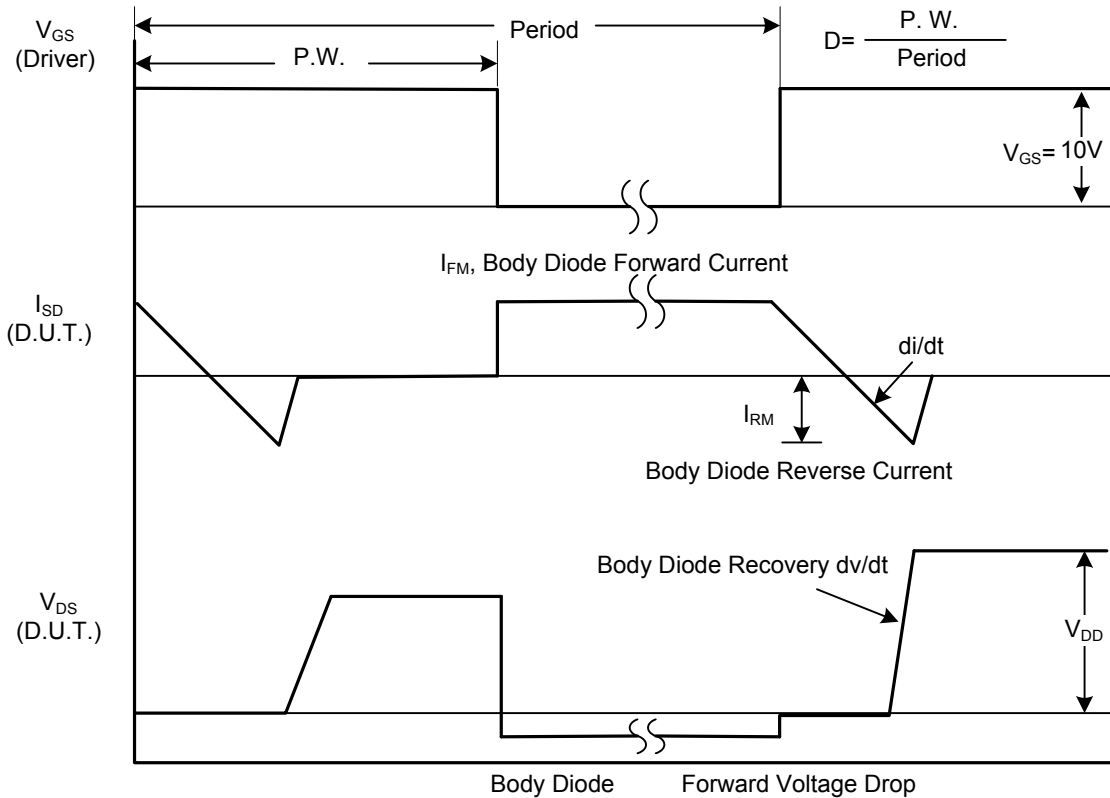
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	250			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=250\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate- Source Leakage Current	Forward	$I_{GSS}$			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		2.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=12\text{A}$		0.34	0.5	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		3000		pF
Output Capacitance	$C_{OSS}$			900		pF
Reverse Transfer Capacitance	$C_{RSS}$			400	6	pF
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=200\text{V}, I_D=12\text{A}, R_G=25\Omega$ (Note 1, 2)		14		ns
Rise Time	$t_R$			80		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			90		ns
Fall-Time	$t_F$			80		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				12	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				48	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=12\text{A}, V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time	$t_{rr}$	$I_S=12\text{A}, V_{GS}=0\text{V}, di_F/dt=100\text{A}/\mu\text{s}$		210		ns
Reverse Recovery Charge	$Q_{rr}$			1.5		$\mu\text{C}$

Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .  
 2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

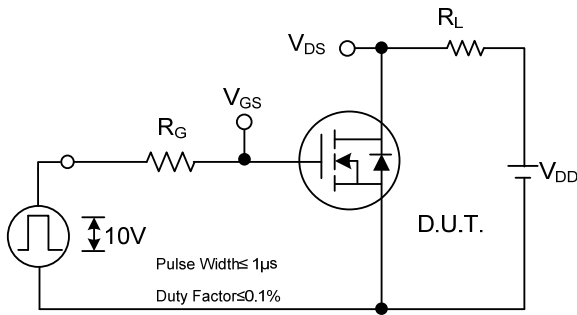


Peak Diode Recovery dv/dt Test Circuit

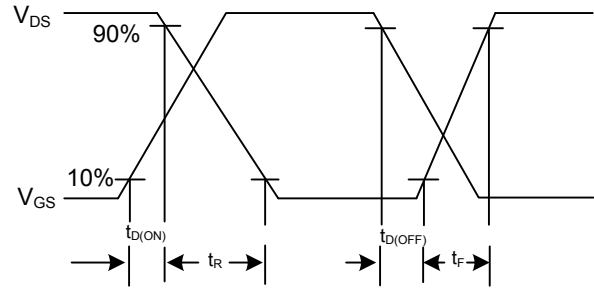


Peak Diode Recovery dv/dt Waveforms

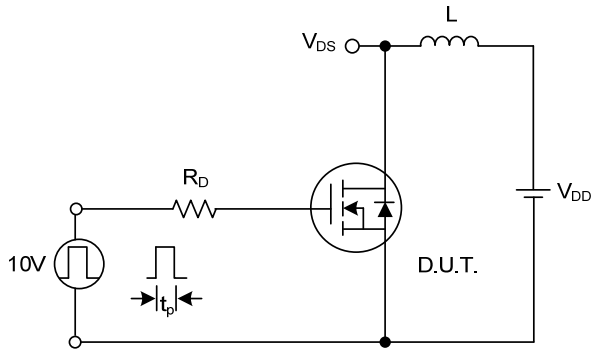
### ■ TEST CIRCUITS AND WAVEFORMS (Cont.)



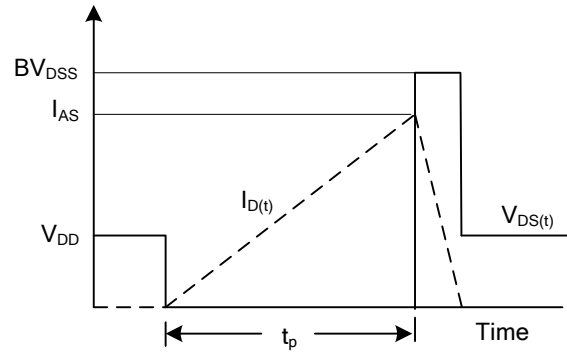
**Switching Test Circuit**



**Switching Waveforms**

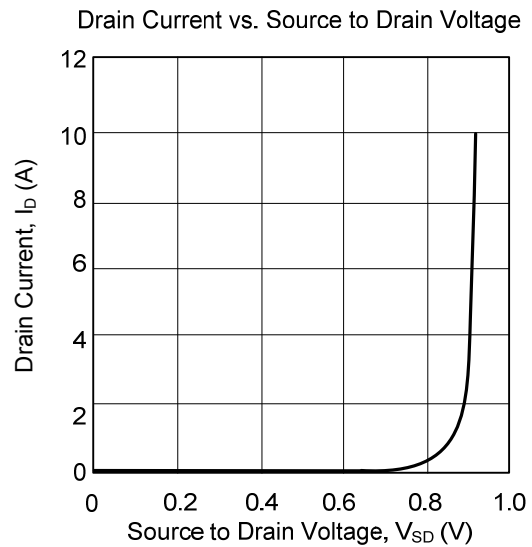
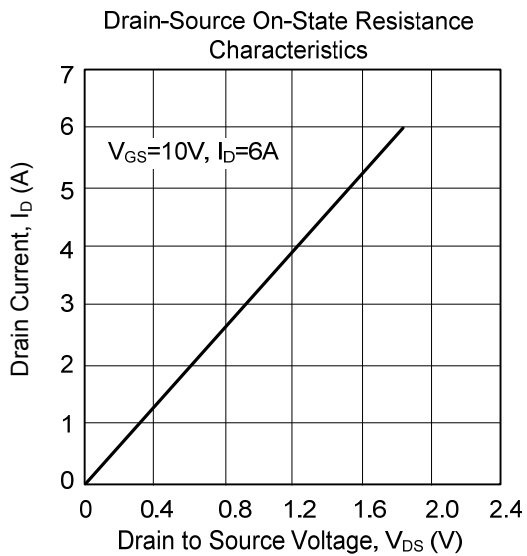
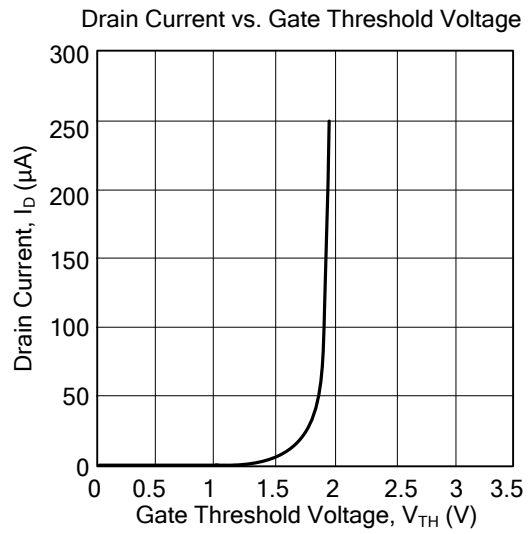
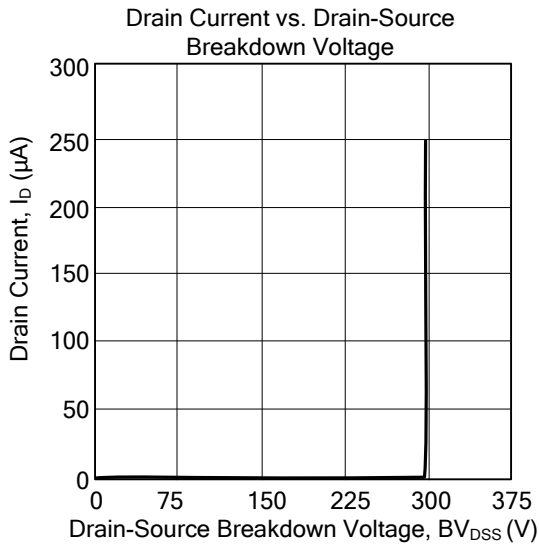


**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

■ TYPICAL CHARACTERISTICS



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