



33N25

Preliminary

Power MOSFET

33A, 250V N-CHANNEL POWER MOSFET

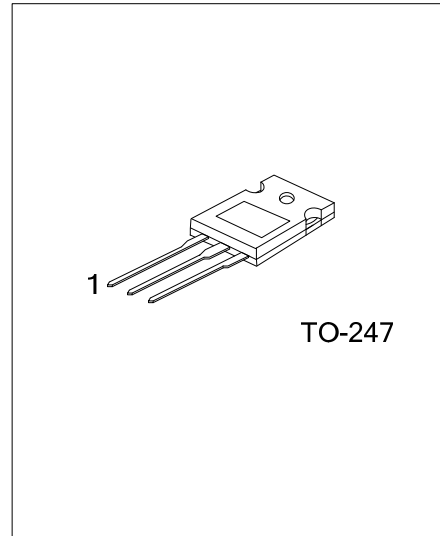
DESCRIPTION

The UTC **33N25** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

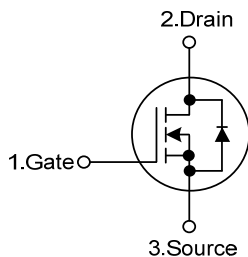
The UTC **33N25** is suitable for high voltage synchronous rectifier and DC/DC converters, etc.

FEATURES

- * $R_{DS(ON)} < 80\text{ m}\Omega$ @ $V_{GS}=10\text{V}, I_D=33\text{A}$
- * $R_{DS(ON)} < 80\text{ m}\Omega$ @ $V_{GS}=6.0\text{V}, I_D=15\text{A}$
- * Low Gate Charge (Typical 18.5nC)
- * High Switching Speed



SYMBOL



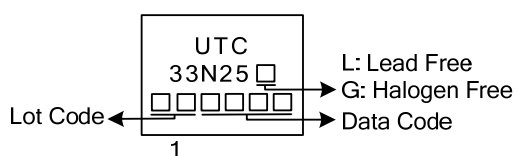
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
33N25L-T47-T	33N25G-T47-T	TO-247	G	D	S	Tube

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

<p>33N25L-T47-T</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package 	<ul style="list-style-type: none"> (1) T: Tube (2) T47: TO-247 (3) L: Lead Free, G: Halogen Free and 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}	250	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous ($V_{GS}=10\text{V}$) $T_C=25^\circ\text{C}$	I_D	33	A
	Pulsed	I_{DM}	132	A
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	918	mJ
Power Dissipation		P_D	235	W
Derate above 25°C			1.89	mW/ $^\circ\text{C}$
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		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.
 3. Starting $T_J = 25^\circ\text{C}$, $L = 1.35\text{mH}$, $I_{AS} = 33\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$.

■ THERMAL DATA

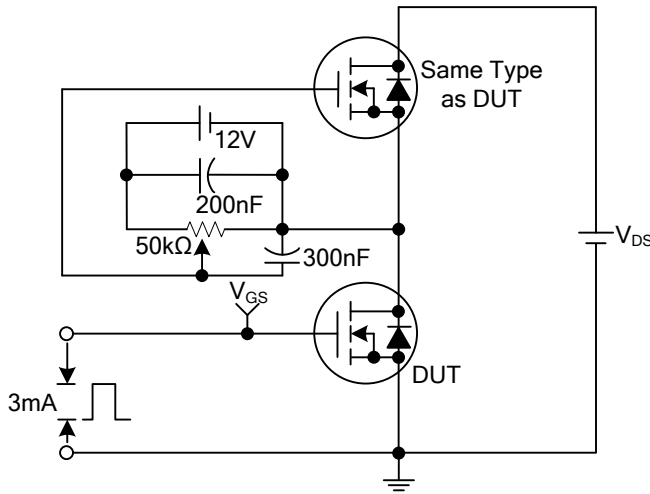
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.53	$^\circ\text{C}/\text{W}$

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

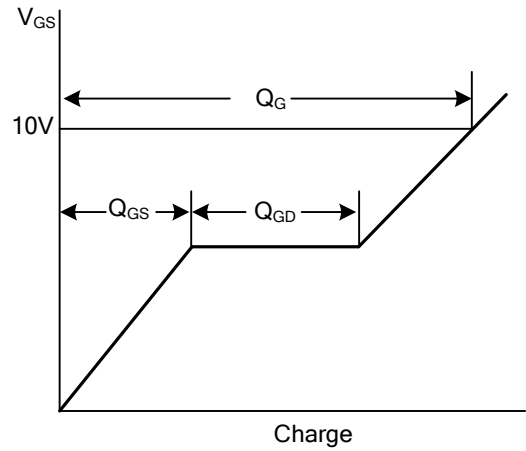
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	250			V	
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=250\text{V}$, $V_{GS}=0\text{V}$			1	μA	
Gate- Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$			+100	nA	
	Reverse		$V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$			-100	nA	
ON CHARACTERISTICS								
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V	
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=33\text{A}$			80	m Ω	
			$V_{GS}=6.0\text{V}$, $I_D=15\text{A}$			80	m Ω	
DYNAMIC PARAMETERS								
Input Capacitance		C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		1250		pF	
Output Capacitance		C_{OSS}				190		pF
Reverse Transfer Capacitance		C_{RSS}				45		pF
SWITCHING PARAMETERS								
Total Gate Charge at 10V		Q_G	$V_{GS}=10\text{V}$, $V_{DD}=50\text{V}$, $I_D=33\text{A}$, $I_G=1.0\text{mA}$		18.5	28	nC	
Gate to Source Charge		Q_{GS}				6.5		nC
Gate to Drain Charge		Q_{GD}				4.6		nC
Turn-ON Time		t_{ON}	$V_{DD}=50\text{V}$, $I_D=33\text{A}$, $V_{GS}=10\text{V}$, $R_{GS}=16\Omega$		35	80	ns	
Turn-ON Delay Time		$t_{D(ON)}$				230		ns
Rise Time		t_R				75		ns
Turn-OFF Delay Time		$t_{D(OFF)}$				120		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Drain-Source Diode Forward Voltage		V_{SD}	$I_{SD}=33\text{A}$			1.4	V	

- Notes: 1. Pulse width limited by safe operating area.
 2. Pulsed: Pulse duration=300 μs , Duty cycle $\leq 2\%$.

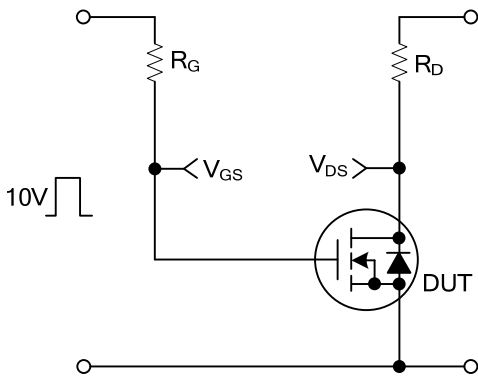
■ TEST CIRCUITS AND WAVEFORMS



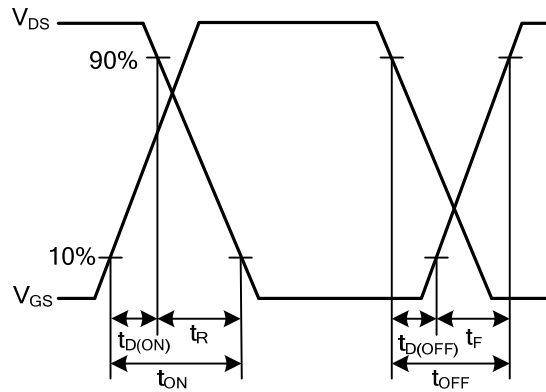
Gate Charge Test Circuit



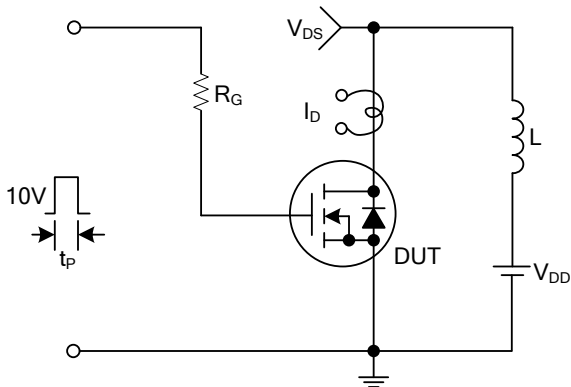
Gate Charge Waveforms



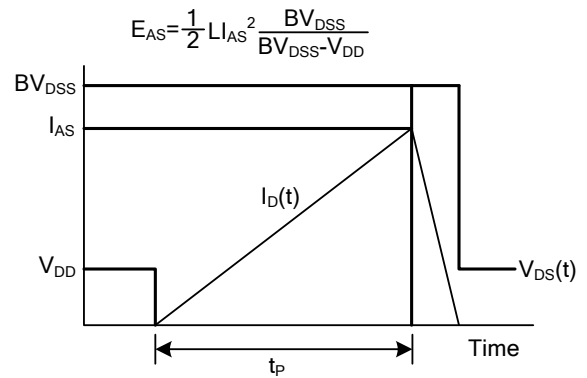
Resistive Switching Test Circuit



Resistive Switching Waveforms

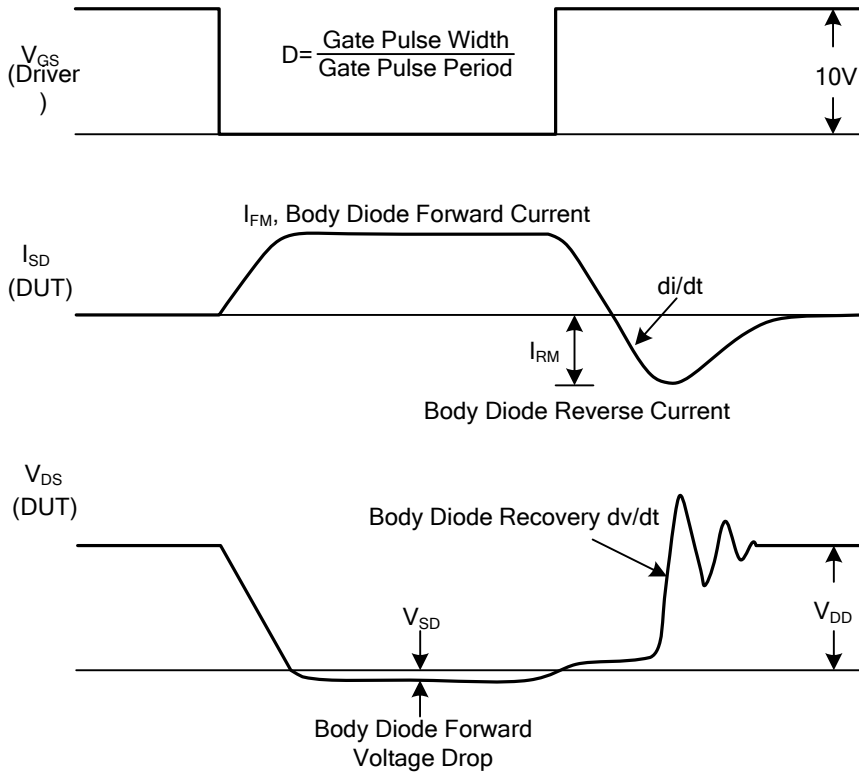
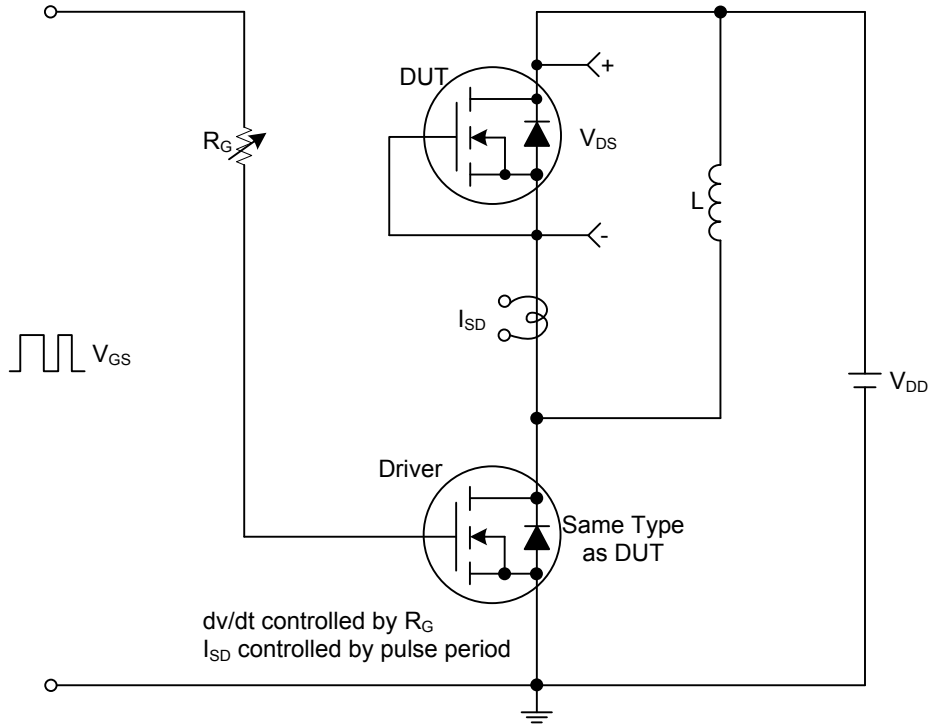


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit and Waveforms

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