



33N25

Preliminary

Power MOSFET

33A, 250V N-CHANNEL POWER MOSFET

DESCRIPTION

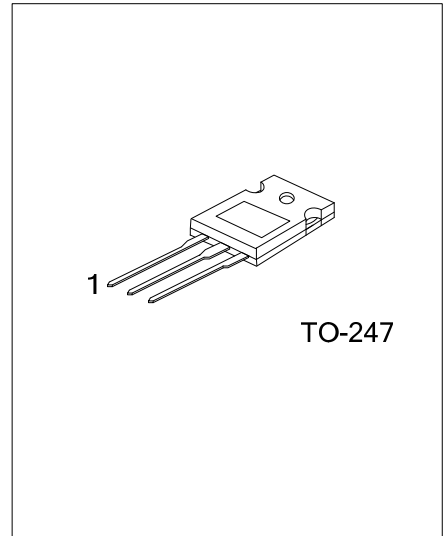
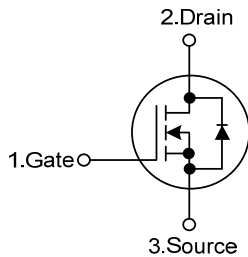
The UTC **33N25** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

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

FEATURES

- * $R_{DS(ON)} < 80m\Omega$ @ $V_{GS}=10V, I_D=33A$
- * 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> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) T47: TO-247</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ 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. 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	$^\circ\text{C}/\text{W}$

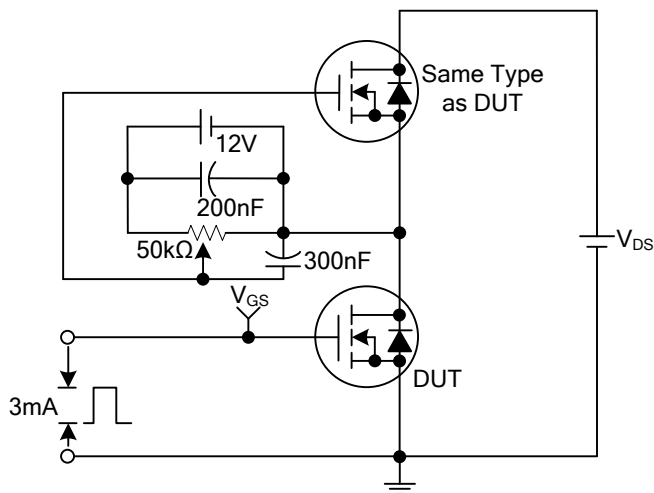
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

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} $V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$ $V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$			+100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2		4	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=33\text{A}$		32	80	m Ω
		$V_{GS}=6\text{V}$, $I_D=15\text{A}$		40	72	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

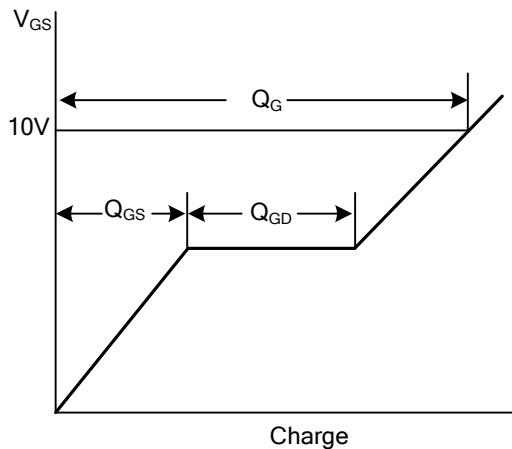
Notes: 1. Pulse width limited by safe operating area

2. Pulsed: Pulse duration=300 μs , Duty cycle $\leq 2\%$

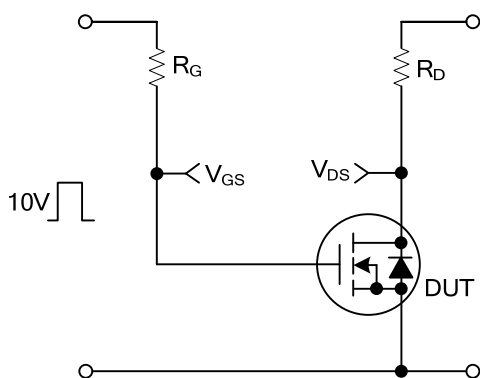
■ TEST CIRCUITS AND WAVEFORMS



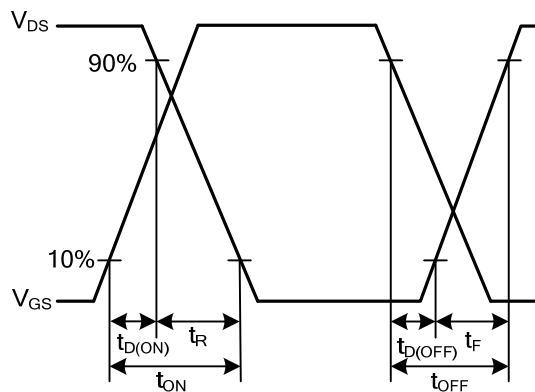
Gate Charge Test Circuit



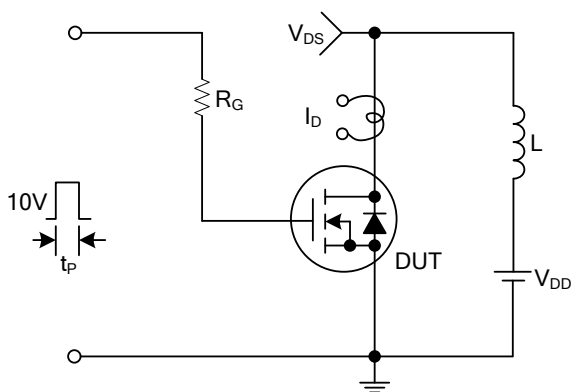
Gate Charge Waveforms



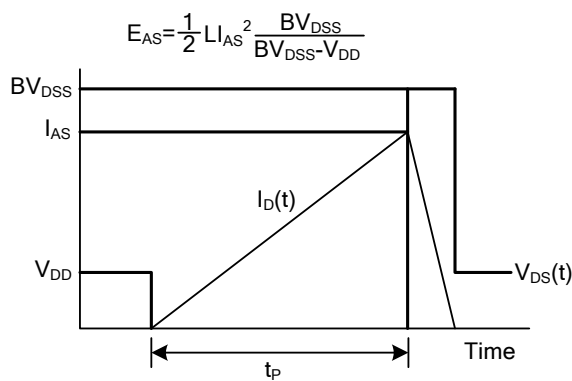
Resistive Switching Test Circuit



Resistive Switching Waveforms

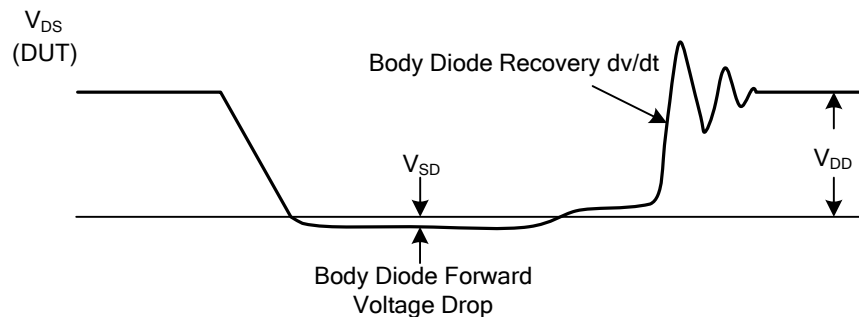
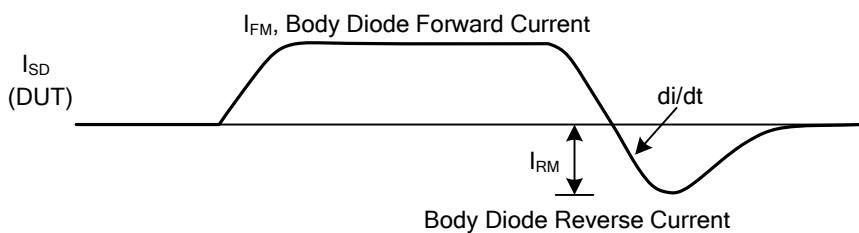
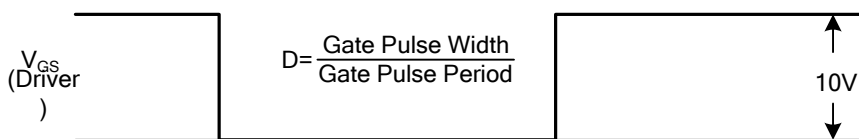
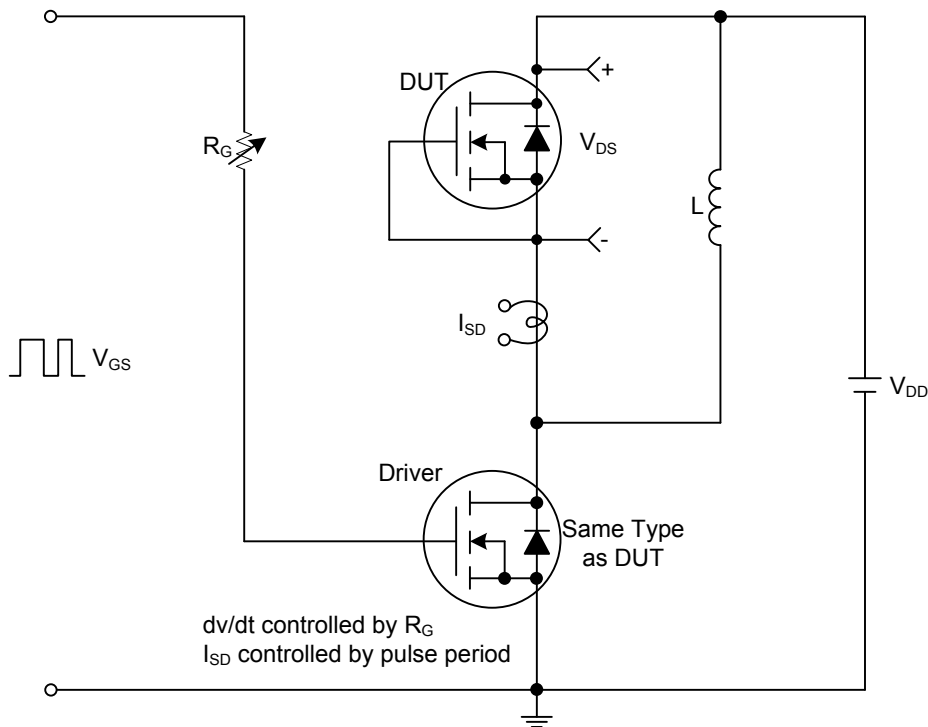


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit and Waveforms

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