

**33N25**

Preliminary

Power MOSFET

**33A, 250V N-CHANNEL
POWER MOSFET**

■ DESCRIPTION

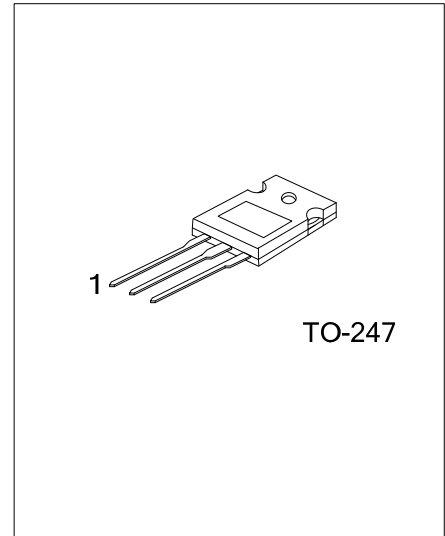
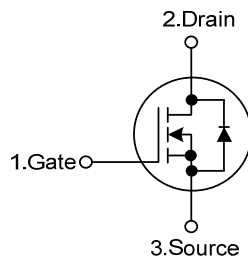
The UTC **33N25** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

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

33N25L-T47-T		(1) Packing Type	(1) T: Tube
		(2) Package Type	(2) T47: TO-247
		(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 _{DSS}	250	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	Continuous (V _{GS} =10V) T _C =25°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/°C
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. 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	$^{\circ}\text{C/W}$
Junction to Case		θ_{JC}	0.53	$^{\circ}\text{C/W}$

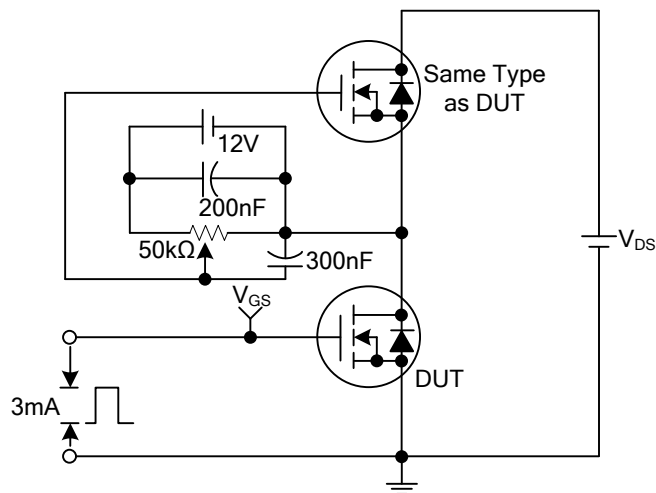
■ ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	250			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =250V, 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		4	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =33A		32	80	mΩ
			V _{GS} =6V, I _D =15A		40	72	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		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} =10V, V _{DD} =50V, I _D =33A, I _G =1.0mA		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} =50V, I _D =33A, V _{GS} =10V, R _{GS} =16Ω		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} =33A			1.4	V

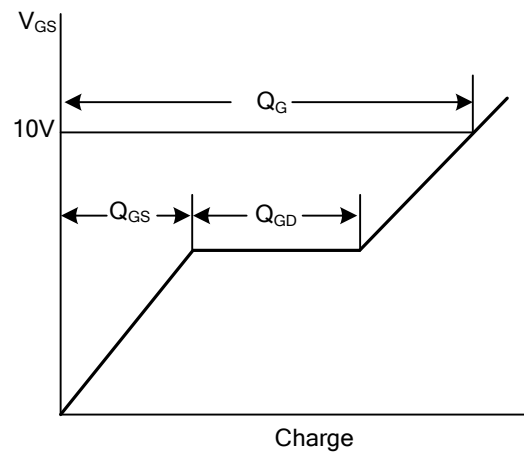
Notes: 1. Pulse width limited by safe operating area

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

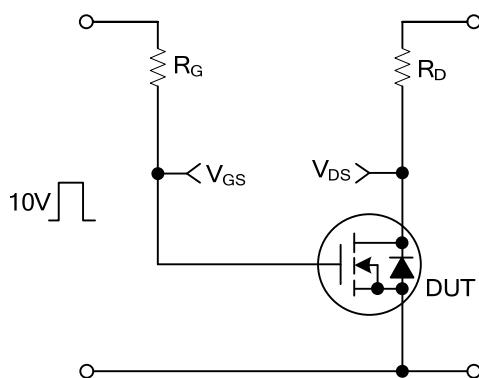
■ TEST CIRCUITS AND WAVEFORMS



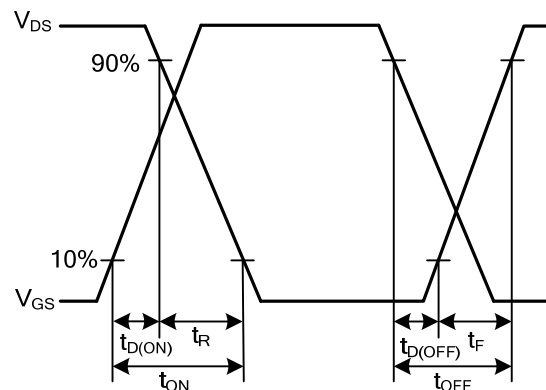
Gate Charge Test Circuit



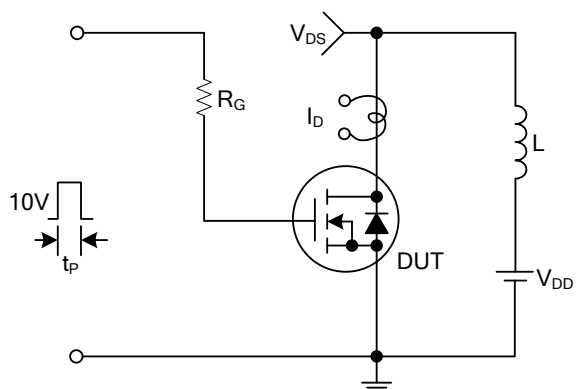
Gate Charge Waveforms



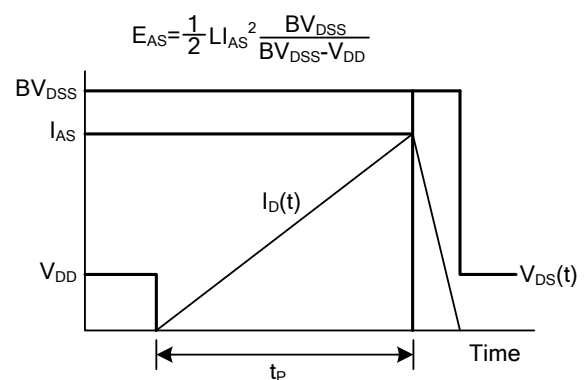
Resistive Switching Test Circuit



Resistive Switching Waveforms

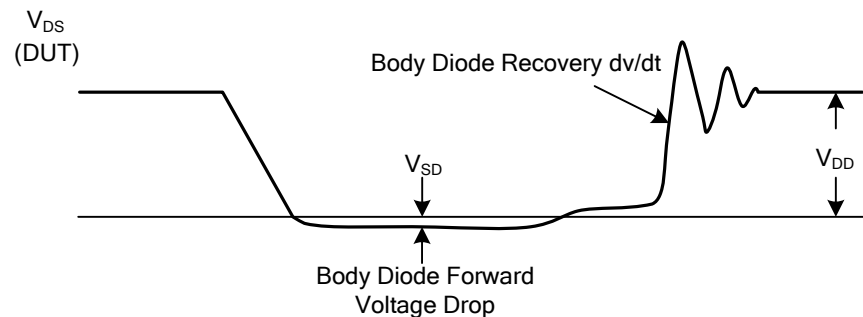
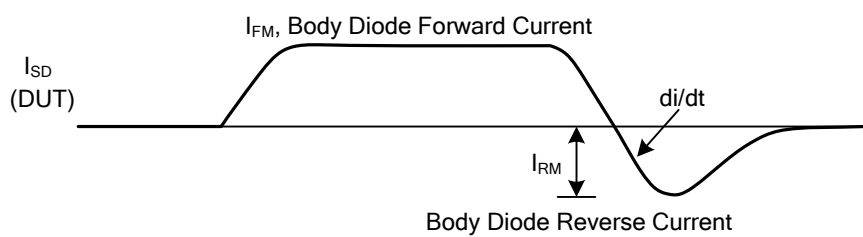
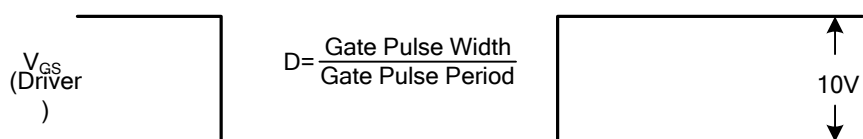
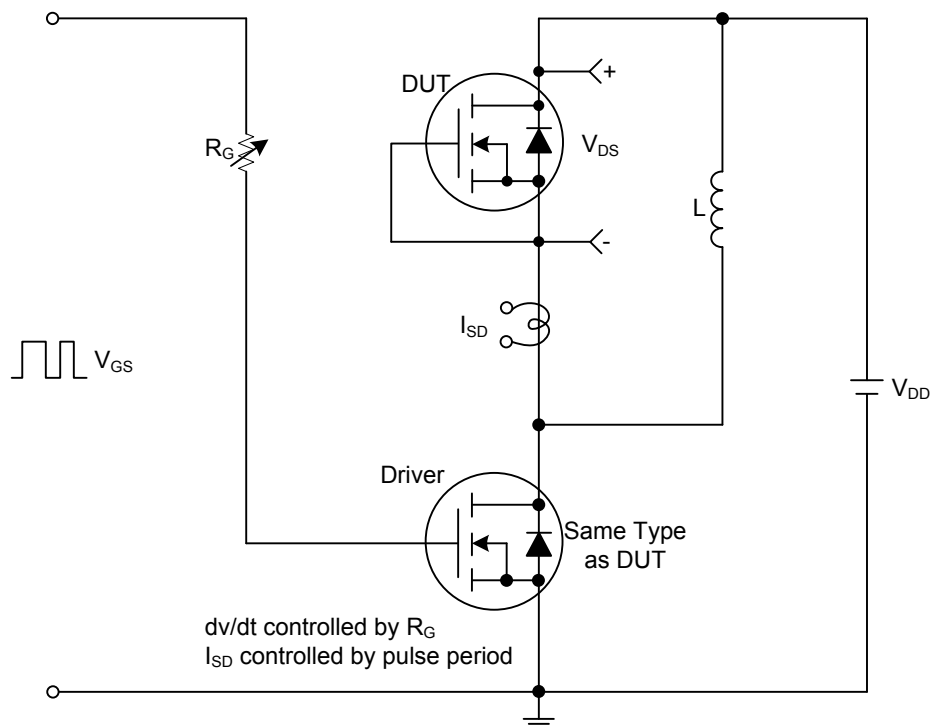


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit and Waveforms

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