

UT1333

Power MOSFET

-550mA, -20V P-CHANNEL POWER MOSFET

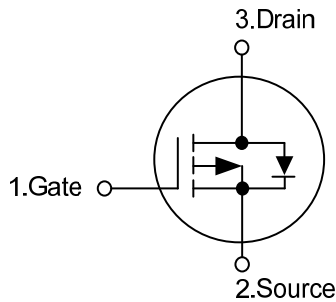
DESCRIPTION

The **UT1333** uses advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable to be used in low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

FEATURES

- * $R_{DS(ON)} \leq 600 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -550\text{mA}$
- $R_{DS(ON)} \leq 800 \text{ m}\Omega$ @ $V_{GS} = -4.5\text{V}$, $I_D = -500\text{mA}$
- $R_{DS(ON)} \leq 1000 \text{ m}\Omega$ @ $V_{GS} = -2.5\text{V}$, $I_D = -300\text{mA}$
- * Low capacitance
- * Low gate charge
- * Fast switching capability
- * Avalanche energy specified

SYMBOL



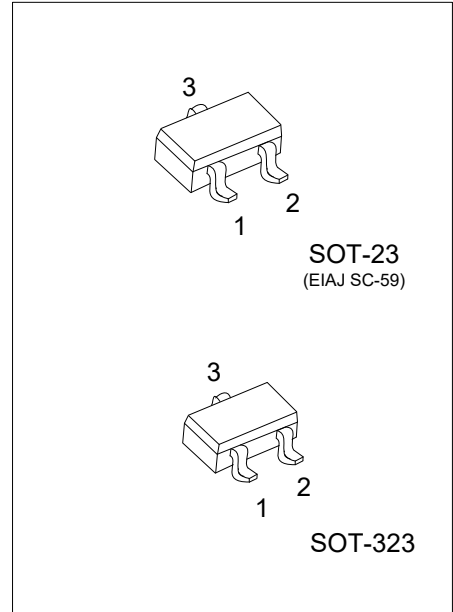
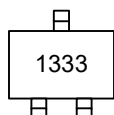
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT1333L-AE3-R	UT1333G-AE3-R	SOT-23	G	S	D	Tape Reel
UT1333L-AL3-R	UT1333G-AL3-R	SOT-323	G	S	D	Tape Reel

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

UT1333G-AE3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE3: SOT-23, AL3: SOT-323 (3) G: Halogen Free and Lead Free, L: 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_{DS}	-20	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	Continuous	I_D	-550	mA
Pulsed Drain Current	Pulsed (Note 2)	I_{DM}	-2200	mA
Power Dissipation ($T_A=25^{\circ}\text{C}$)	SOT-23	P_D	0.4	W
	SOT-323		0.35	W
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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-23	θ_{JA}	312	$^{\circ}\text{C/W}$
	SOT-323		360	$^{\circ}\text{C/W}$

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

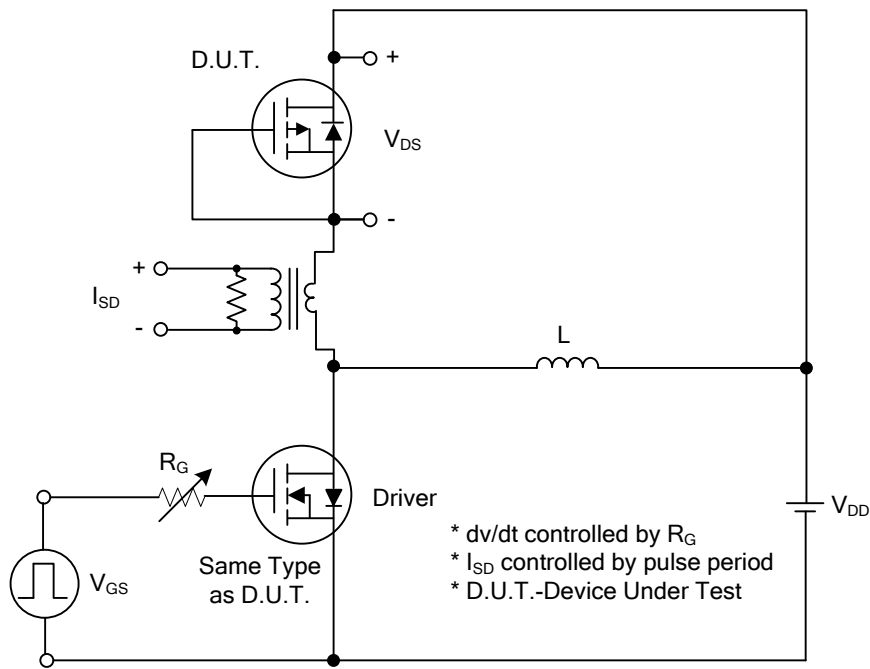
■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0 V, I _D =-250μA	-20			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =-20V, V _{GS} =0V			-1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{DS} =0V, V _{GS} =+12V			100	nA
	Reverse		V _{DS} =0V, V _{GS} =-12V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-0.4		-1.2	V
Static Drain-Source On-Resistance		R _{DS(ON)}	V _{GS} =-10V, I _D =-550mA			600	mΩ
			V _{GS} =-4.5V, I _D =-500mA			800	mΩ
			V _{GS} =-2.5V, I _D =-300mA			1000	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =-15V, V _{GS} =0V, f=1.0MHz		110		pF
Output Capacitance		C _{OSS}			20		pF
Reverse Transfer Capacitance		C _{RSS}			14		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =-16V, V _{GS} =-4.5V, I _D =-0.55A I _G =-1mA (Note 1, 2)		4.8		nC
Gate Source Charge		Q _{GS}			1.4		nC
Gate Drain Charge		Q _{GD}			0.7		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =-10V, V _{GS} =-4.5V, I _D =-0.55A, R _G =25Ω (Note 1, 2)		14		ns
Turn-ON Rise Time		t _R			24		ns
Turn-OFF Delay Time		t _{D(OFF)}			48		ns
Turn-OFF Fall-Time		t _F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				-550	mA
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				-2200	mA
Diode Forward Voltage (Note 1)		V _{SD}	I _S =-300mA, V _{GS} =0V			-1.2	V

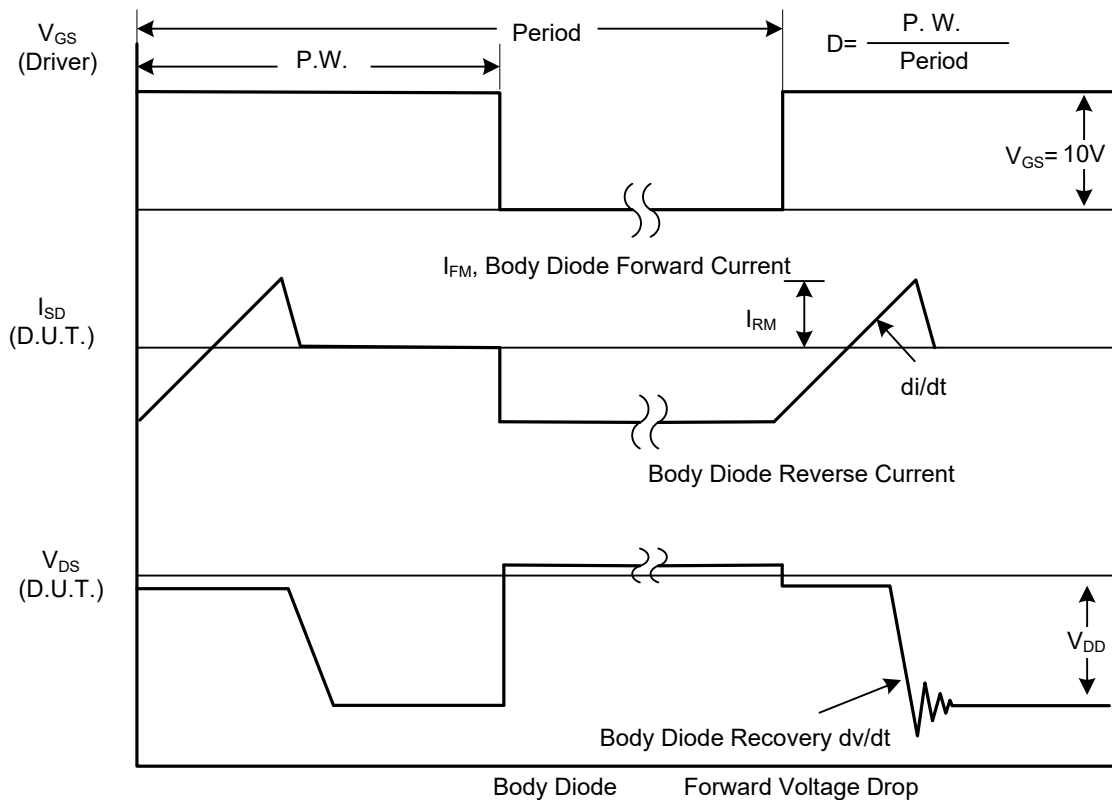
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

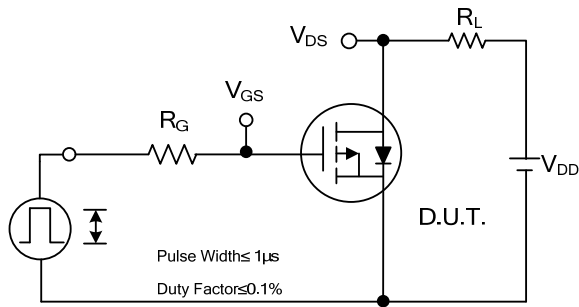


Peak Diode Recovery dv/dt Test Circuit

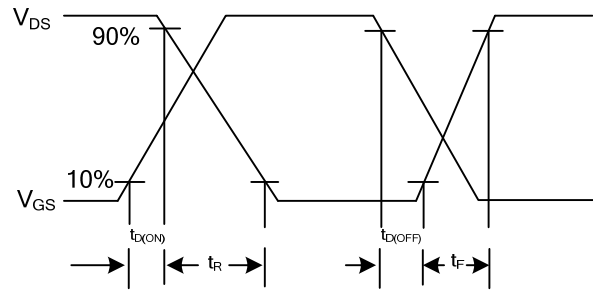


Peak Diode Recovery dv/dt Waveforms

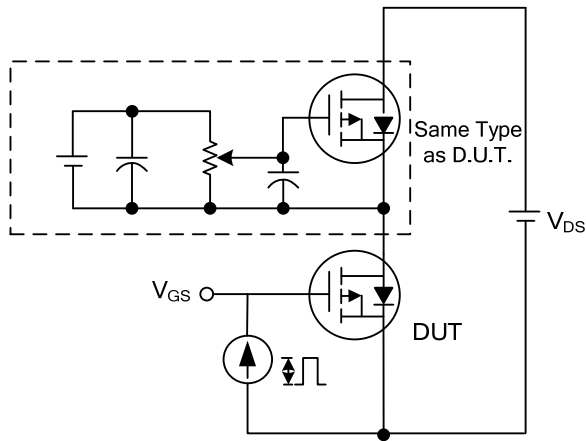
■ TEST CIRCUITS AND WAVEFORMS



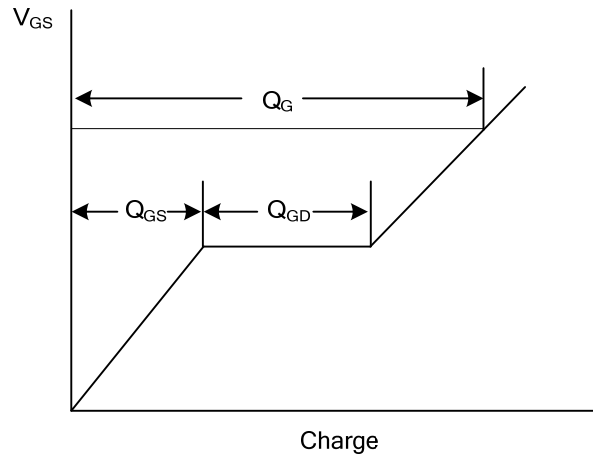
Switching Test Circuit



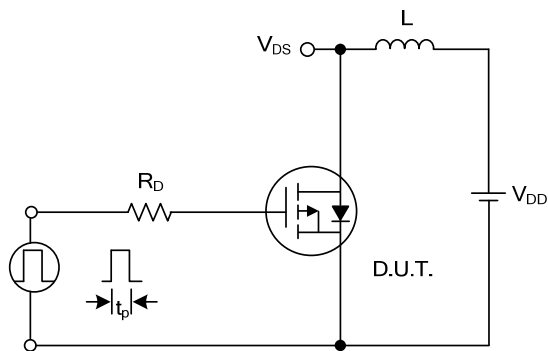
Switching Waveforms



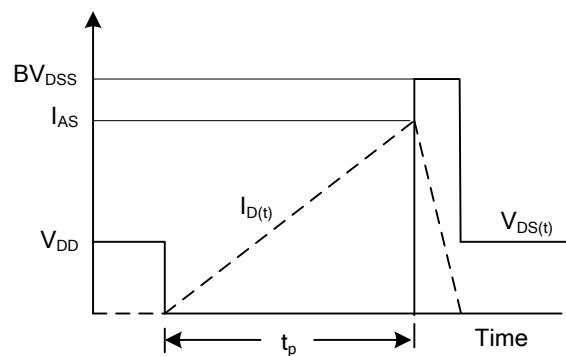
Gate Charge Test Circuit



Gate Charge Waveform

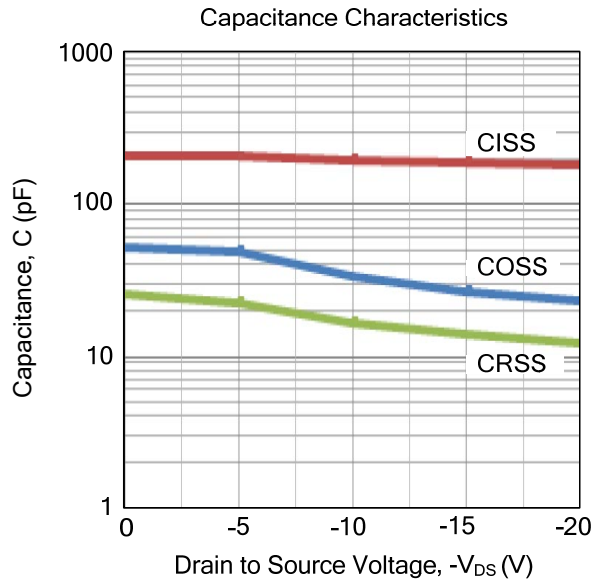
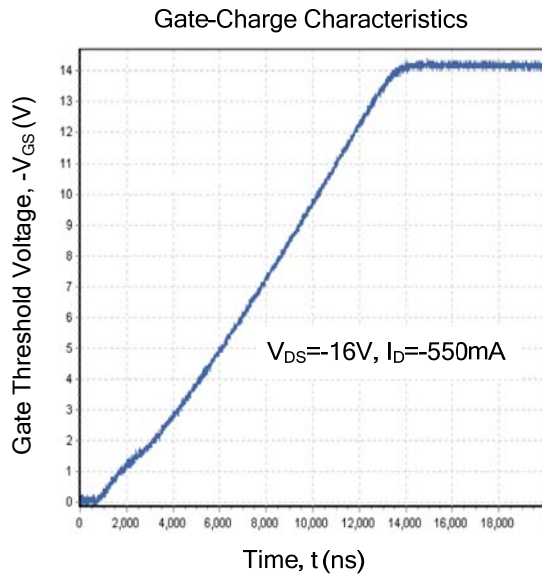


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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