



## UT70P10H

Preliminary

POWER MOSFET

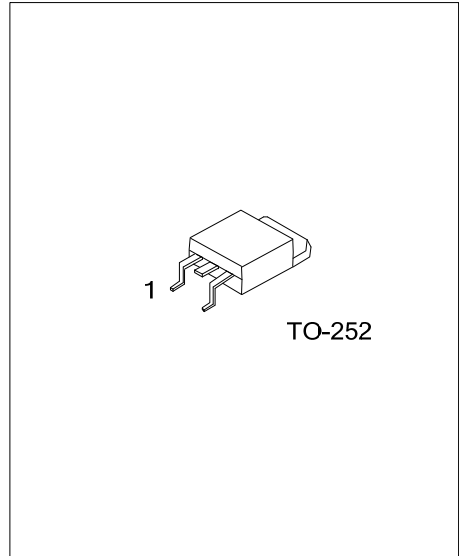
### -70A, -100V P-CHANNEL POWER MOSFET

#### DESCRIPTION

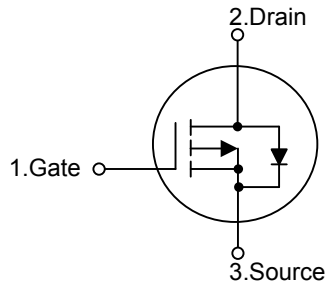
The **UT70P10H** uses advanced proprietary, planar stripe, DMOS technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable to be used in low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

#### FEATURES

- \*  $R_{DS(ON)} \leq 38 \text{ m}\Omega @ V_{GS}=-10\text{V}, I_D=-35\text{A}$
- \* High Switching Speed
- \* High Cell Density Trench Technology



#### SYMBOL



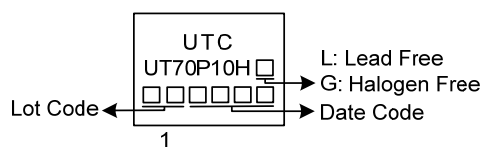
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT70P10HL-TN3-R	UT70P10HG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UT70P10HG-TN3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: 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	$V_{DSS}$	-100	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	-70	A
Pulsed Drain Current (Note 2)	$I_{DM}$	-140	A
Single Pulsed Avalanche Energy (Note 3)	$E_{AS}$	202	mJ
Peak Diode Recovery dv/dt	dv/dt	3.7	V/ns
Power Dissipation	$P_D$	60	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.

3.  $L = 0.1\text{mH}$ ,  $I_{AS} = -63.6\text{A}$ ,  $V_{DD} = -50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD} \leq -30\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	110	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	2.08 (Note)	$^\circ\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

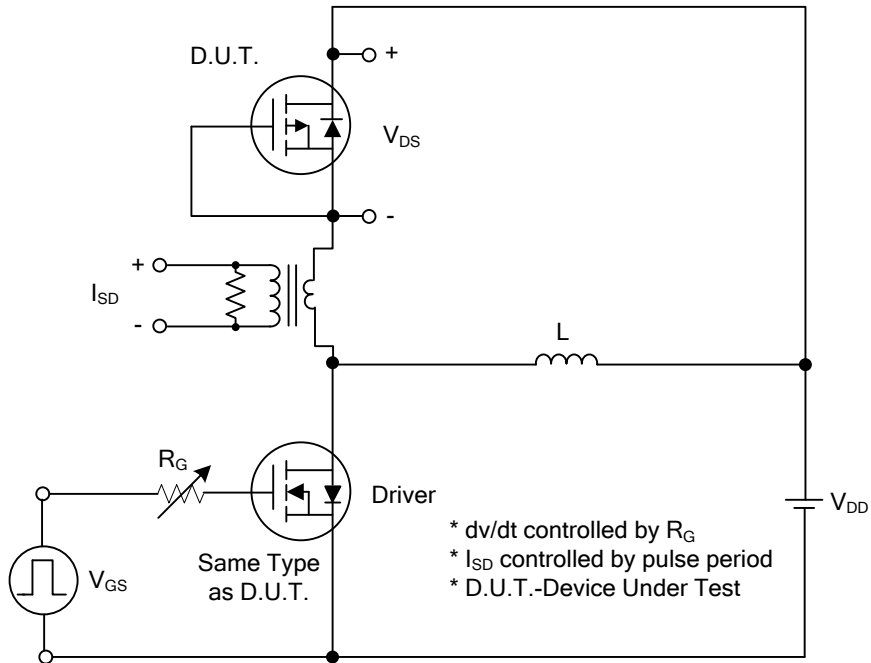
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0 V, I <sub>D</sub> =-250μA	-100			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V			-1	μA
		V <sub>DS</sub> =-100V, T <sub>C</sub> =125°C			-10	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-2.0		-4.0	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-35A			38	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1.0MHz		8550		pF
Output Capacitance	C <sub>OSS</sub>			375		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			275		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =-80V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-70A (Note 1, 2)		115		nC
Gate Source Charge	Q <sub>GS</sub>			27		nC
Gate Drain Charge	Q <sub>GD</sub>			29		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =-50V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-70A, R <sub>G</sub> =3Ω (Note 1, 2)		22		ns
Turn-ON Rise Time	t <sub>R</sub>			23		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			98		ns
Turn-OFF Fall-Time	t <sub>F</sub>			34		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				-70	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				-140	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-70A			-1.4	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> =-30A,		60		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>F</sub> /dt=100A/μs (Note 1)		135		nC

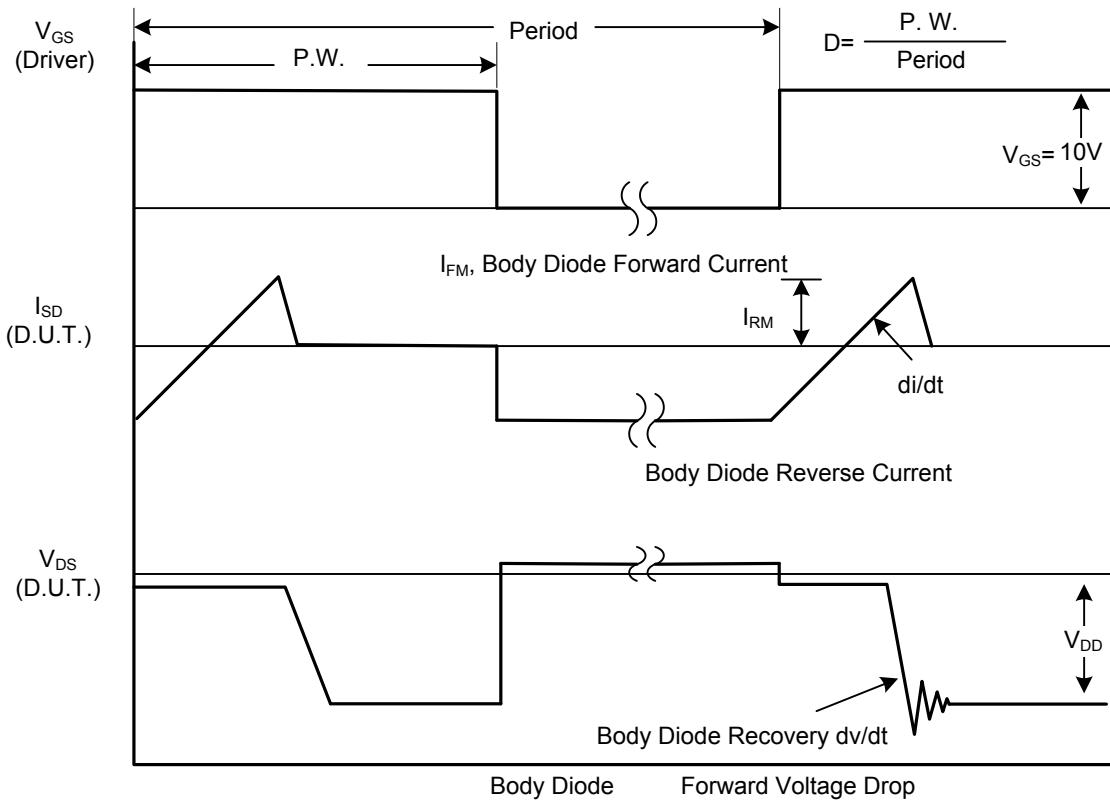
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

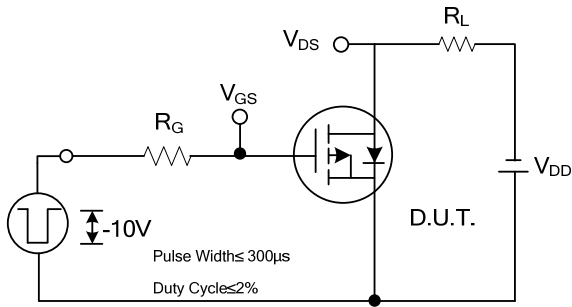


Peak Diode Recovery  $dv/dt$  Test Circuit

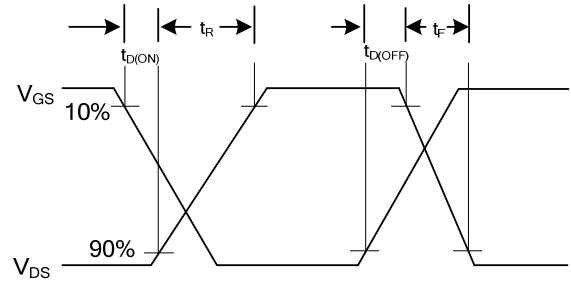


Peak Diode Recovery  $dv/dt$  Waveforms

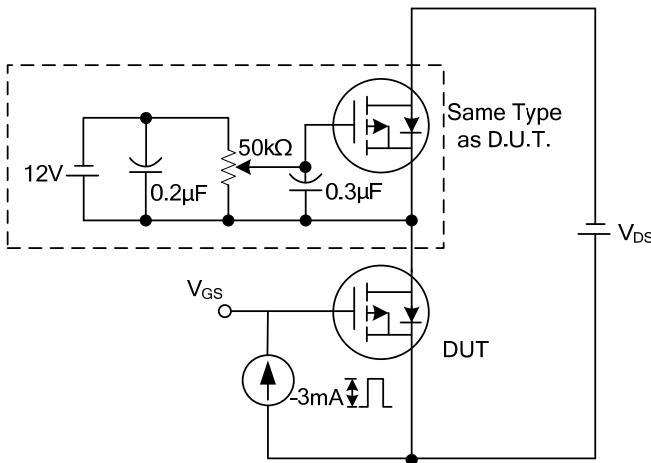
■ TEST CIRCUITS AND WAVEFORMS



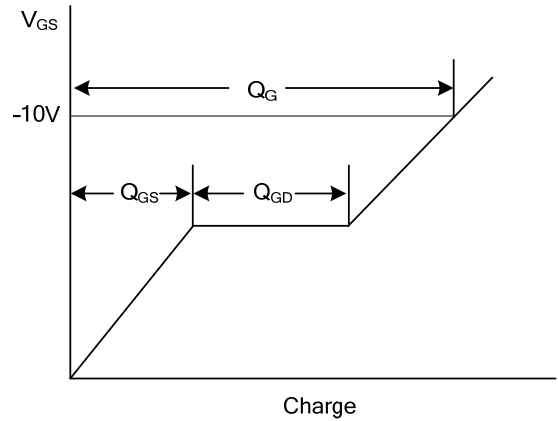
Switching Test Circuit



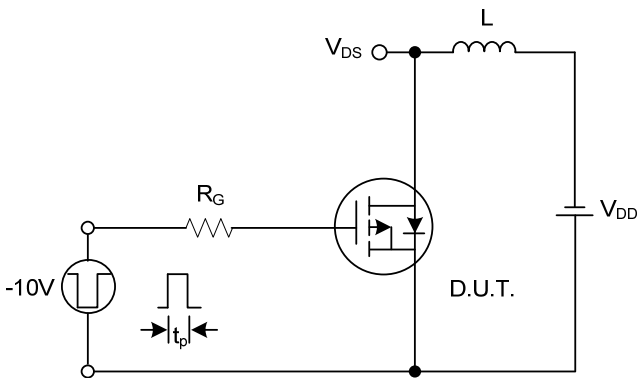
Switching Waveforms



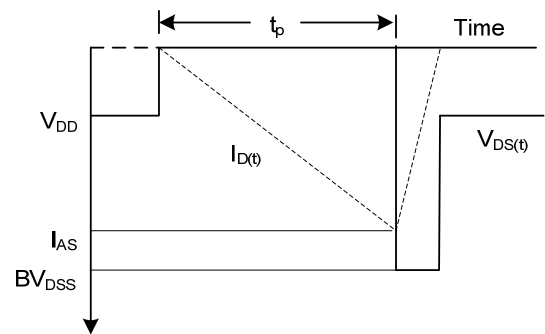
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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