



## UT2315-H

Preliminary

Power MOSFET

### -3.3A, -20V P-CHANNEL ENHANCEMENT MODE POWER MOSFET

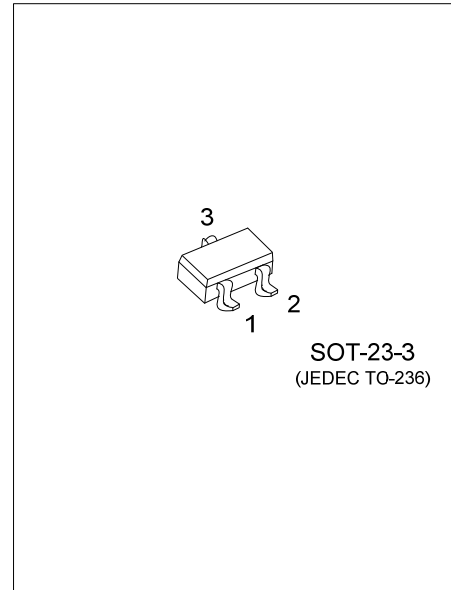
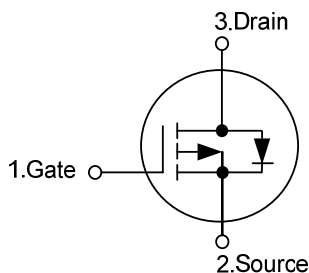
#### DESCRIPTION

The UTC **UT2315-H** is P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

#### FEATURES

- \* Extremely low on-resistance due to high density cell
- \* Perfect thermal performance and electrical capability with advanced technology of trench process

#### SYMBOL



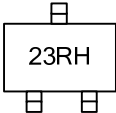
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2315L-AE2-R	UT2315G-AE2-R	SOT-23-3	G	S	D	Tape Reel

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

<p>UT2315G-AE2-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) AE2: SOT-23-3 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
--	---

#### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	-20	V
Gate-Source Voltage	$V_{GSS}$	$\pm 10$	V
Continuous Drain Current	$I_D$	-3.3	A
Pulsed Drain Current	$I_{DM}$	-13.2	A
Peak Diode Recovery $dv/dt$ (Note 4)	$dv/dt$	2.5	V/ns
Power Dissipation ( $T_C=25^\circ\text{C}$ ) (Note 3)	$P_D$	1.56	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. Surface mounted on 1 in  $\times$  2 copper pad of FR4 board.
4.  $I_{SD} \leq 3.3\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (PCB mounted)	$\theta_{JA}$	80	$^\circ\text{C}/\text{W}$

Note: Surface Mounted on FR4 board  $t \leq 5$  sec.

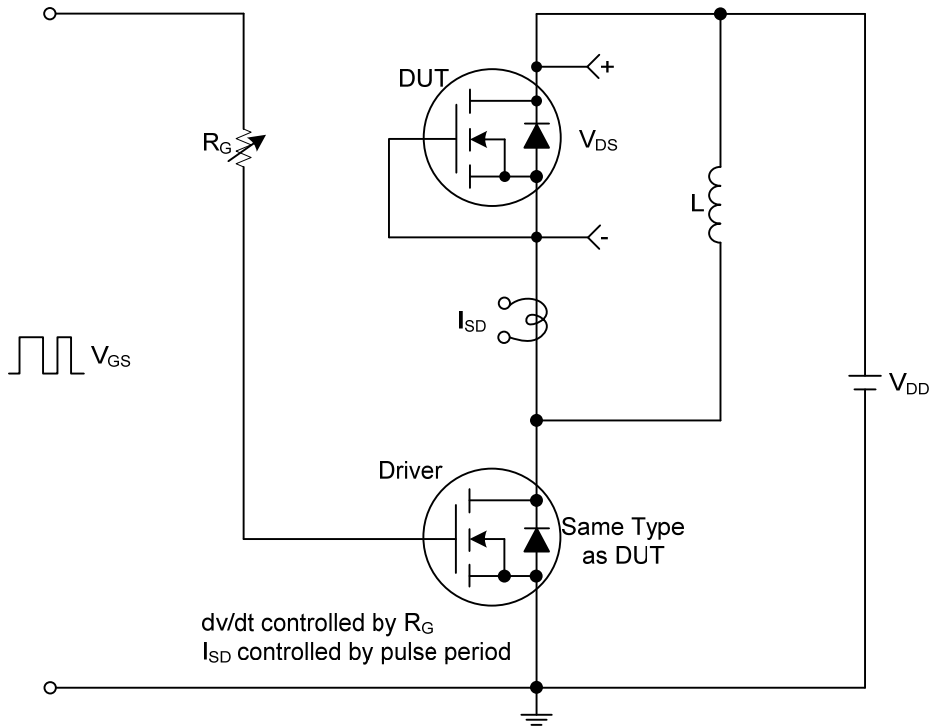
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ\text{C}$			-1	$\mu A$
		$V_{DS}=-16V, V_{GS}=0V, T_J=125^\circ\text{C}$			-10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 100$	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=-1mA$		-0.01		$V/^\circ\text{C}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.3	-0.6	-1.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-3.0A$		77	85	$m\Omega$
		$V_{GS}=-2.5V, I_D=-2.0A$		103	120	$m\Omega$
		$V_{GS}=-1.8V, I_D=-1.0A$		138	170	$m\Omega$
<b>DYNAMIC PARAMETERS<sup>b</sup></b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=-15V, V_{GS}=0V, f=1.0MHz$		350		pF
Output Capacitance	$C_{OSS}$			65		pF
Reverse Transfer Capacitance	$C_{RSS}$			50		pF
<b>SWITCHING PARAMETERS<sup>b</sup></b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-3.0A$		4.8		nC
Gate Source Charge	$Q_{GS}$			0.5		nC
Gate Drain Charge	$Q_{GD}$			1.9		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=-10V, V_{GS}=-4.5V, I_D=-1.0A$ $R_G=25\Omega$		3.5		ns
Turn-ON Rise Time	$t_R$			12.6		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			32.6		ns
Turn-OFF Fall-Time	$t_F$			8.4		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$	$V_G=V_D=0V$ , Force Current			-3.3	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				-13.2	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=-1.0A, V_{GS}=0V, T_J=25^\circ\text{C}$			-1.0	V
Reverse Recovery Time (Note 1)	$t_{rr}$	$I_S=-1.0A, V_{GS}=0V, di_F/dt=100A/\mu s$		3140		ns
Reverse Recovery Charge	$Q_{rr}$				20	

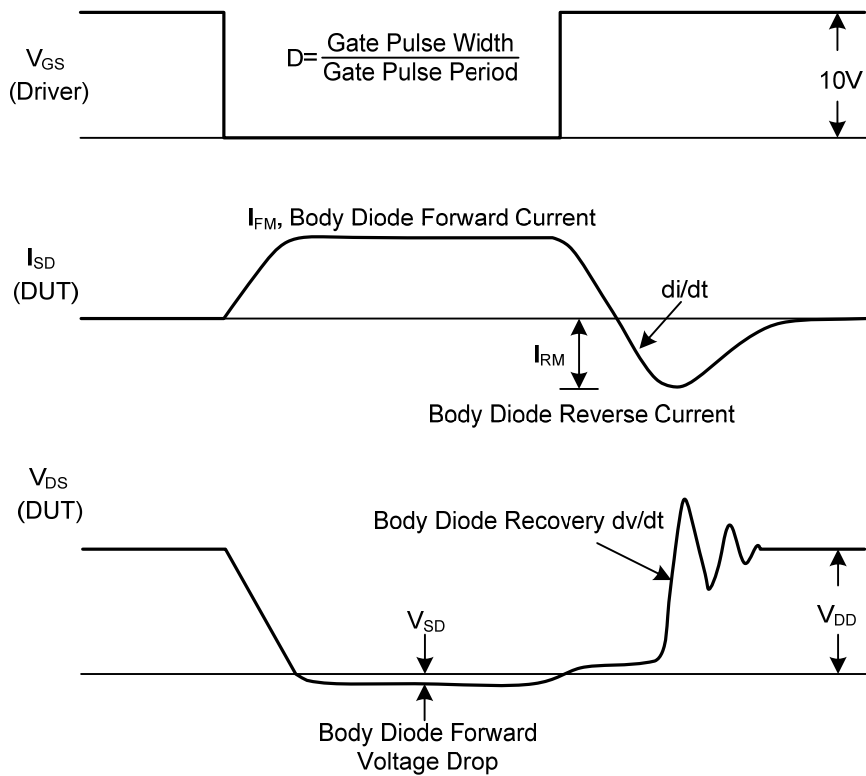
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



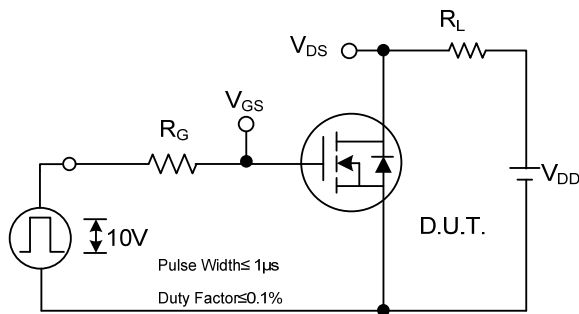
Peak Diode Recovery dv/dt Test Circuit



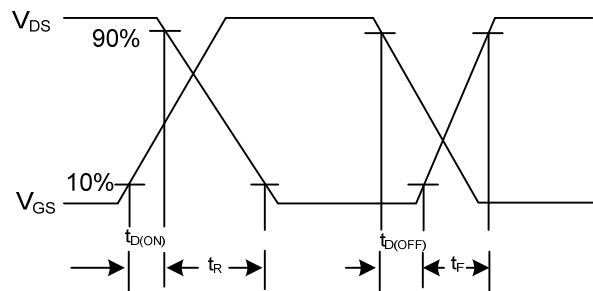
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

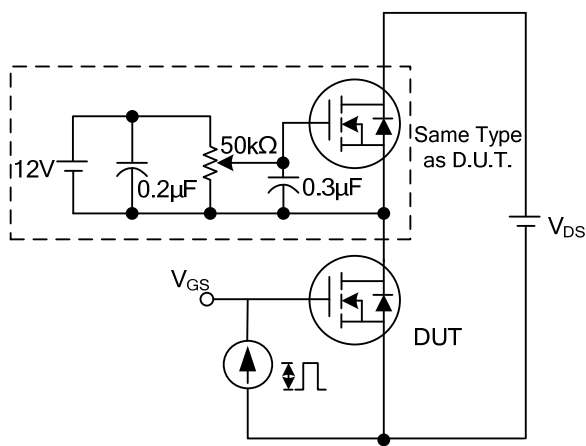
■ TEST CIRCUITS AND WAVEFORMS



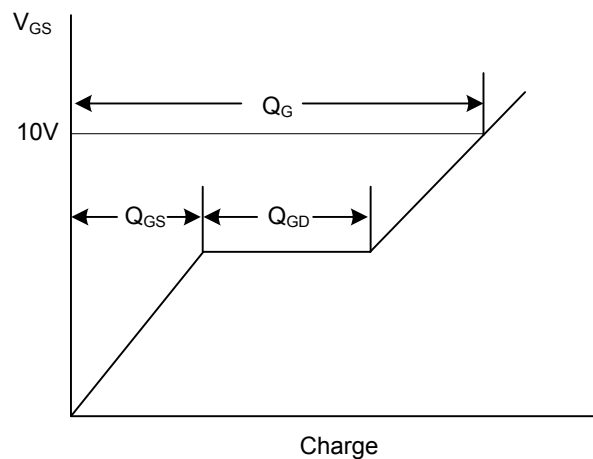
Switching Test Circuit



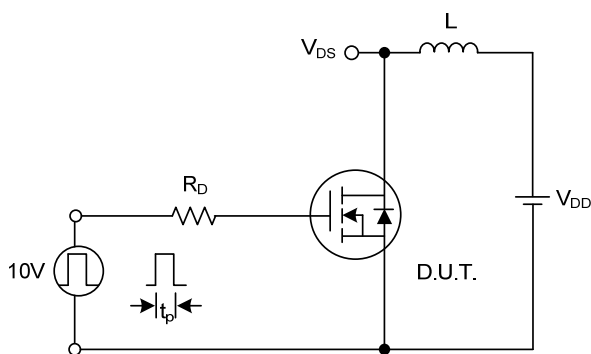
Switching Waveforms



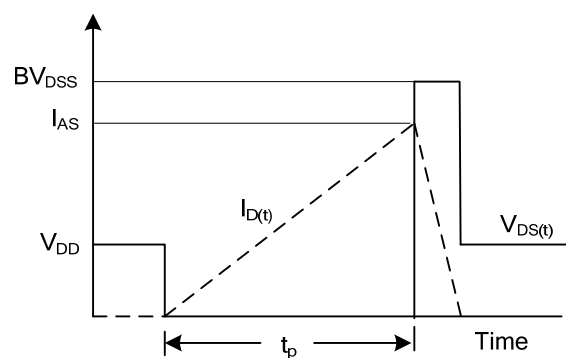
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.