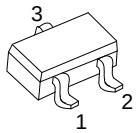
UT2312H

Power MOSFET

5A, 20V N-CHANNEL ENHANCEMENT MODE MOSFET



SOT-23-3
(JEDEC TO-236)

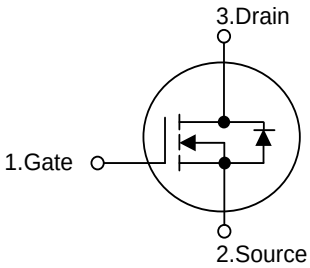
■ DESCRIPTION

The **UT2312H** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

* $R_{DS(ON)}$ ≤ 55 mΩ @ V_{GS} =4.5V, I_D =5.0 A
* $R_{DS(ON)}$ ≤ 85 mΩ @ V_{GS} =2.5 V, I_D =4.0 A
* Advanced trench process technology
* Excellent thermal and electrical capabilities
* High density cell design for ultra low on-resistance

■ SYMBOL



■ ORDERING INFORMATION

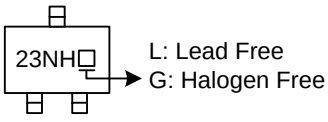
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2312HL-AE2-R	UT2312HG-AE2-R	SOT-23-3	G	S	D	Tape Reel

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

UT2312HG-AE2-R

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

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±8	V
Drain Current	Continuous	I_D	5	A
	Pulsed (Note2)	I_{DM}	15	A
Power Dissipation		P_D	0.5	W
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. Repetitive Rating : Pulse width limited by maximum junction temperature.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	250	°C/W

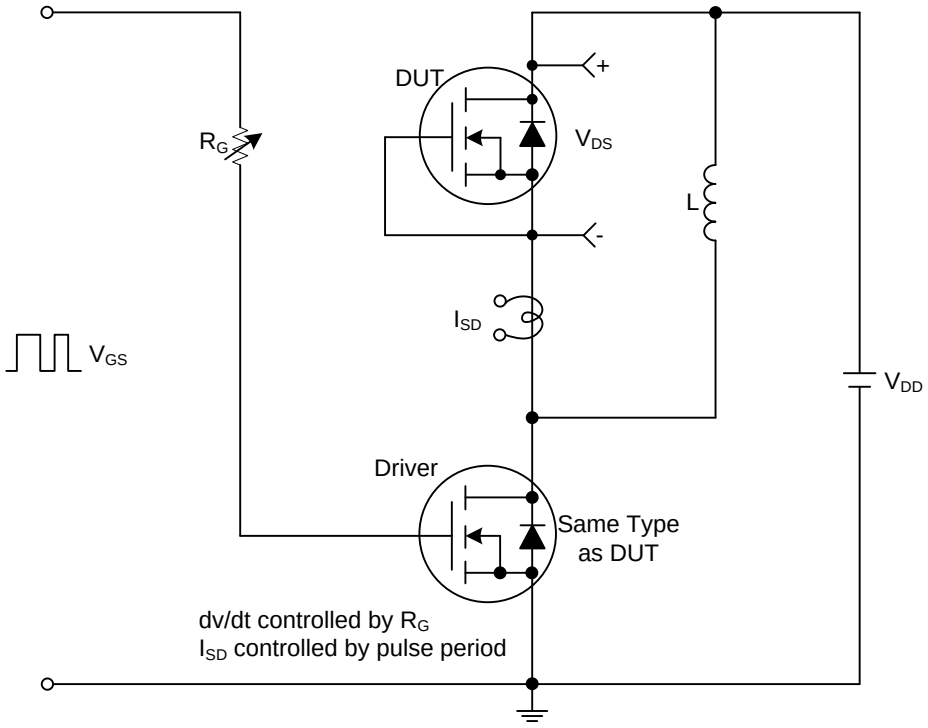
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

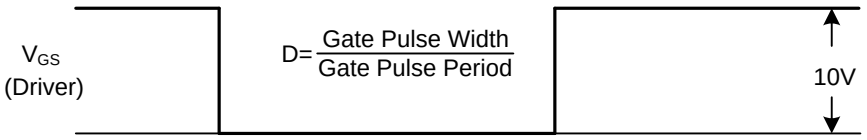
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

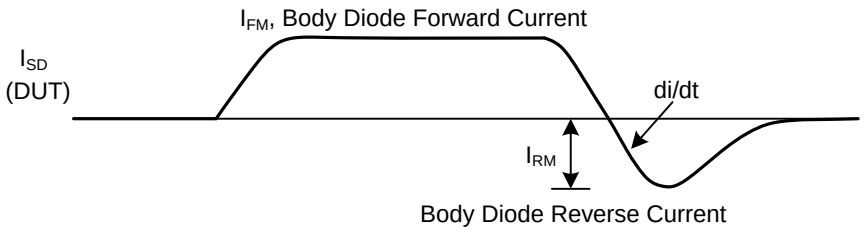
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate–Body Leakage, Forward	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.5		1.2	V
Static Drain–Source On–Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=5.0A			55	mΩ
		V_{GS}=2.5V, I_D=4.0A			85	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=10V, V_{GS}=0V, f=1.0MHz		200		pF
Output Capacitance	C_{OSS}			44		pF
Reverse Transfer Capacitance	C_{RSS}			36		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=10V, V_{GS}=4.5V, I_D=5A I_G=1mA (Note 1, 2)		3.2		nC
Gate Source Charge	Q_{GS}			0.5		nC
Gate Drain Charge	Q_{GD}			0.3		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=10V, V_{GS}=10V, I_D =5A, R_G =3Ω (Note 1, 2)		2.4		ns
Turn-ON Rise Time	t_R			13.8		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			14.2		ns
Turn-OFF Fall-Time	t_F			7.9		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				15	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V			1.2	V

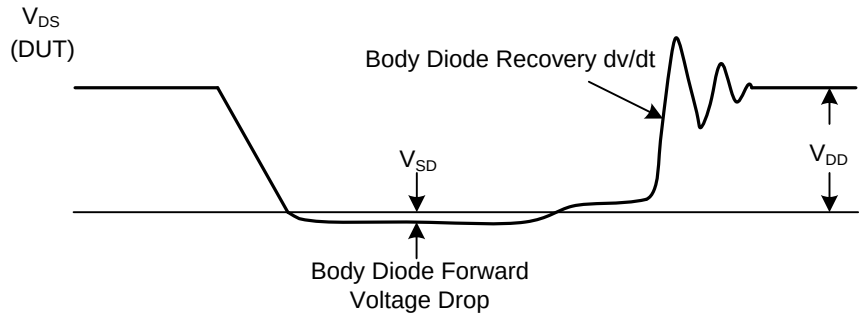
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle≤2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



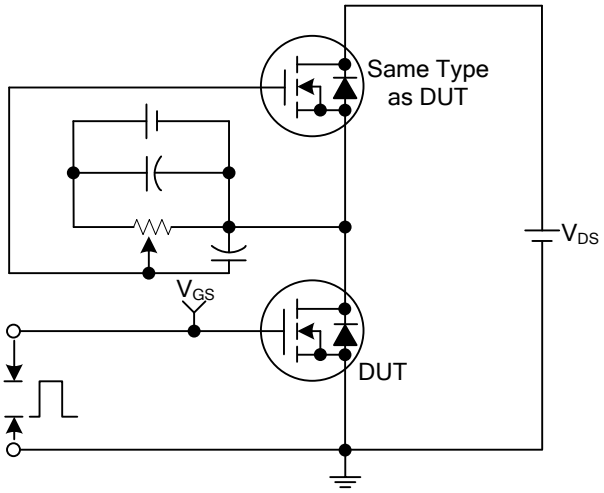




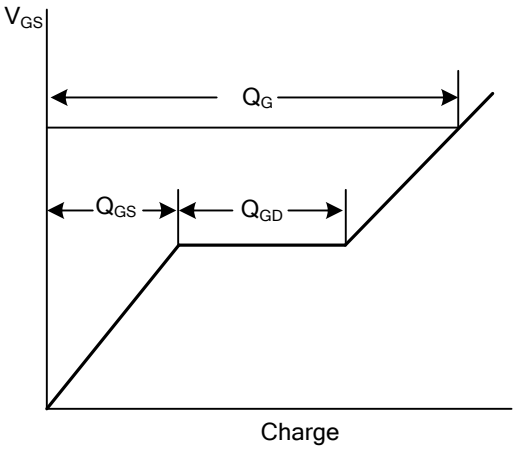


Peak Diode Recovery dv/dt Test Circuit and Waveforms

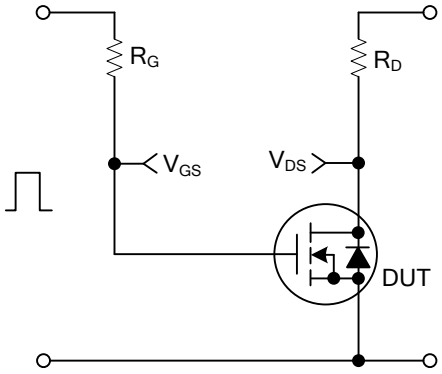
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



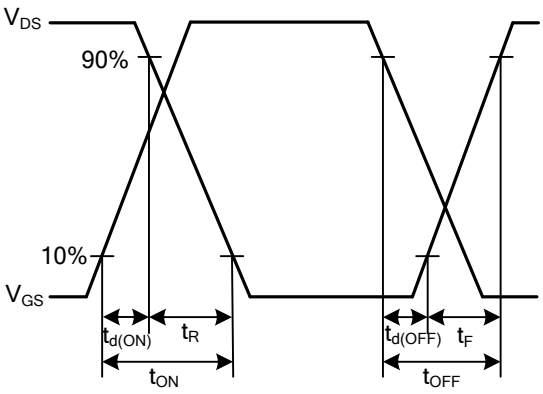
Gate Charge Test Circuit



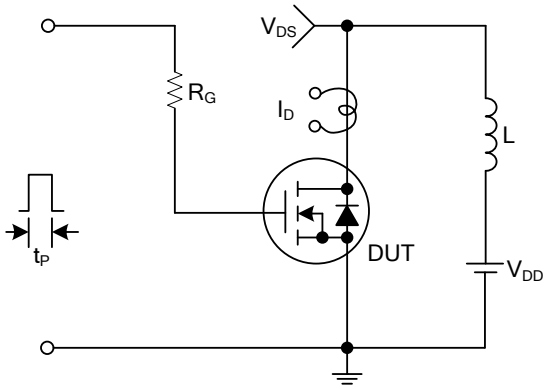
Gate Charge Waveforms



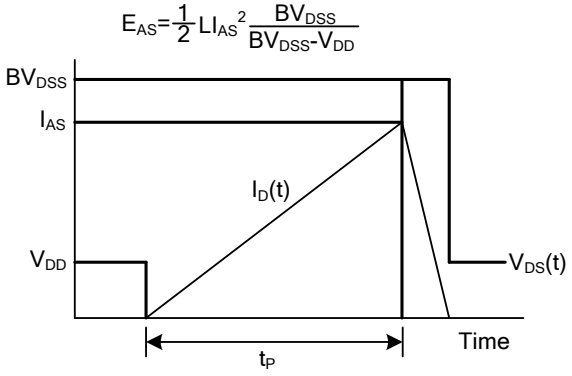
Resistive Switching Test Circuit



Resistive Switching Waveforms



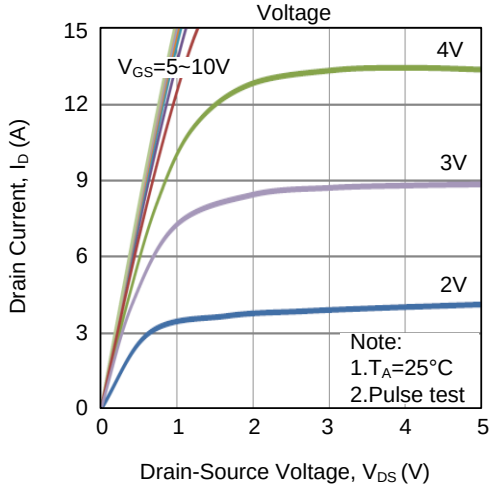
Unclamped Inductive Switching Test Circuit



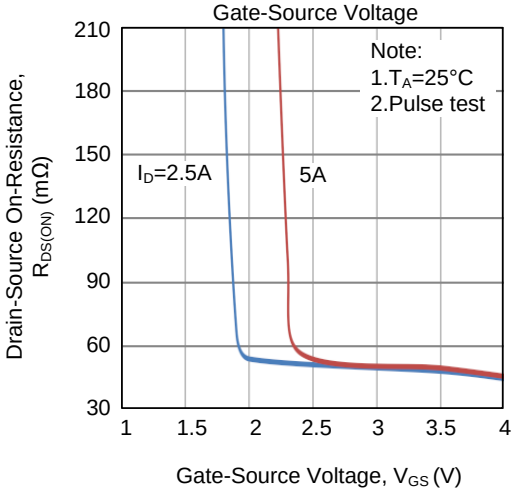
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

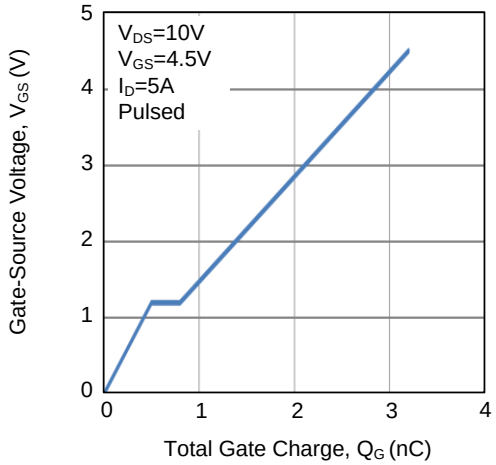
Drain Current vs. Drain-Source Voltage



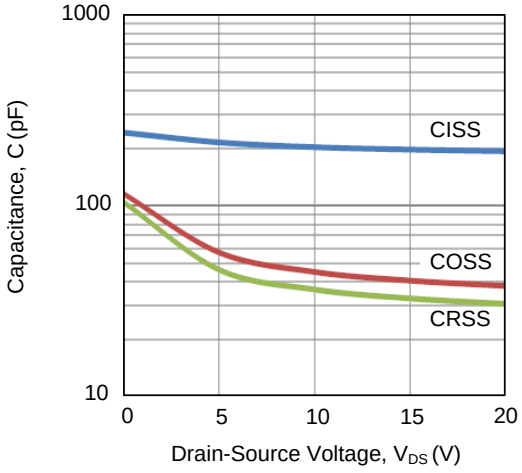
Drain-Source On-Resistance vs. Gate-Source Voltage



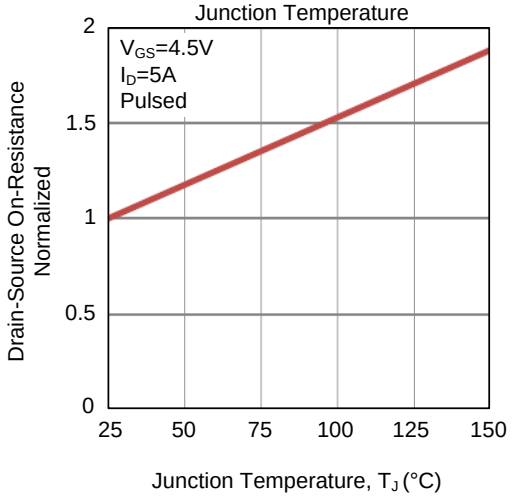
Gate Charge Characteristics



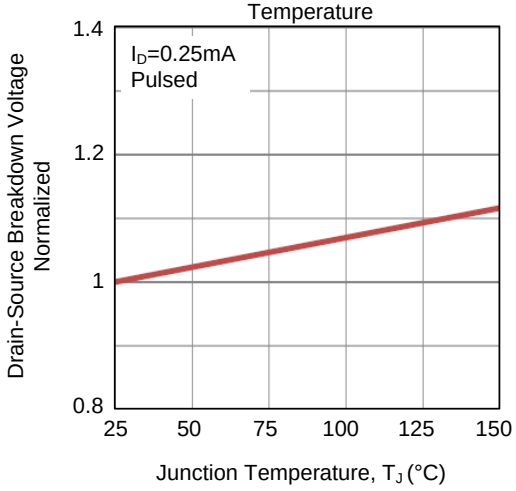
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

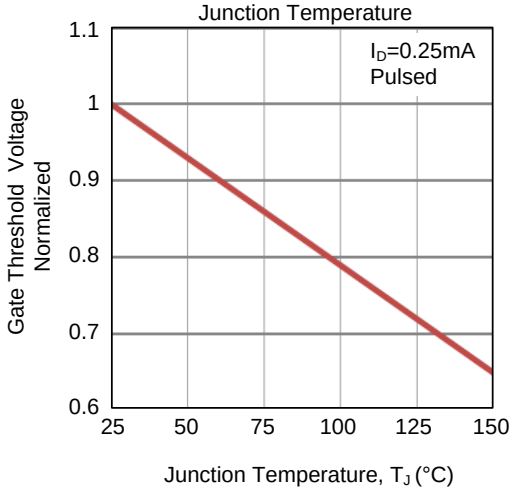


Breakdown Voltage vs. Junction Temperature

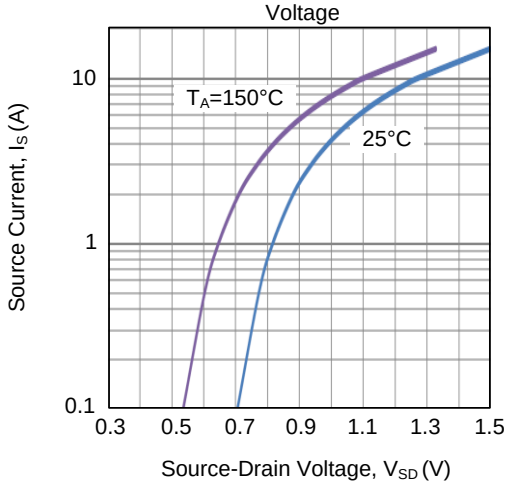


■ TYPICAL CHARACTERISTICS (Cont.)

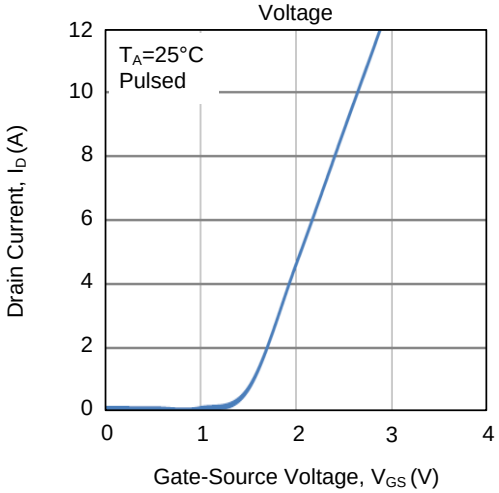
Gate Threshold Voltage vs. Junction Temperature



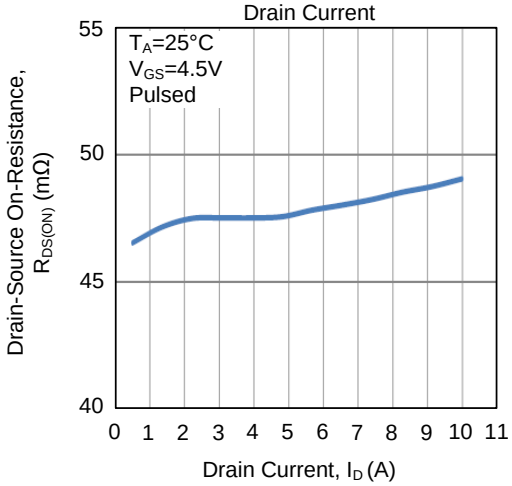
Source Current vs. Source-Drain Voltage



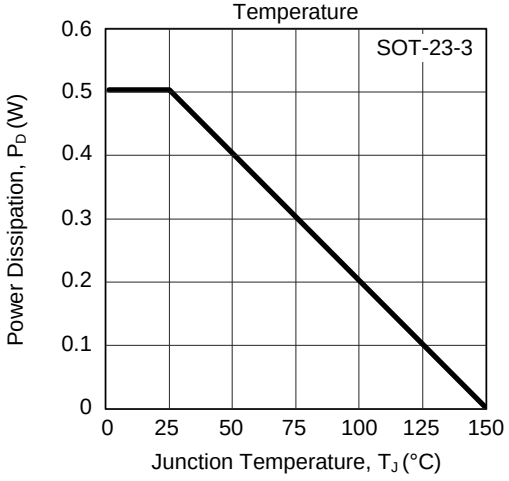
Drain Current vs. Gate-Source Voltage



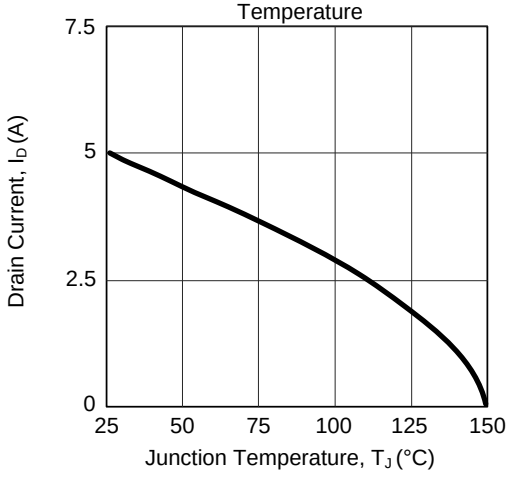
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)