



UT05N10H

Preliminary

Power MOSFET

0.5A, 100V N-CHANNEL POWER MOSFET

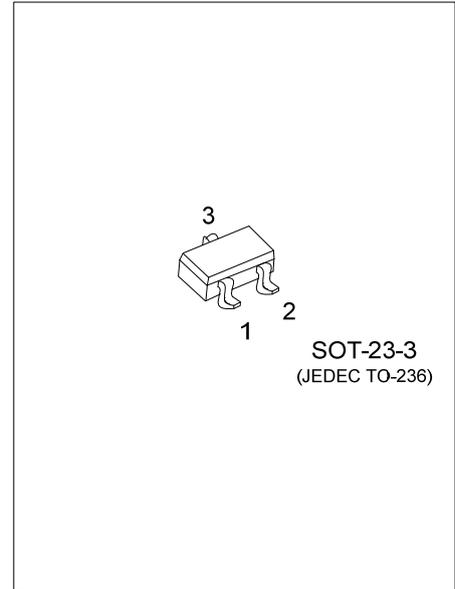
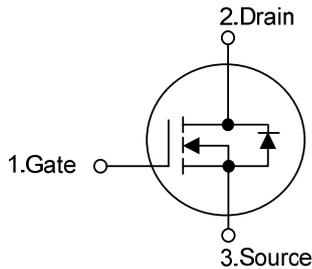
DESCRIPTION

The UTC **UT05N10H** is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

FEATURES

- * $R_{DS(ON)} \leq 0.65 \Omega @ V_{GS}=10V, I_D=0.5A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



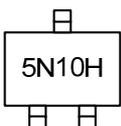
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT05N10HL-AE2-R	UT05N10HG-AE2-R	SOT-23-3	G	S	D	Tape Reel

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

<p>UT05N10HG-AE2-R</p>	<p>(1) R: Tape Reel</p> <p>(2) AE2: SOT-23-3</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT	
Drain-Source Voltage	V_{DSS}	100	V	
Gate-Source Voltage	V_{GSS}	± 20	V	
Drain Current	Continuous	I_D	0.5	A
	Pulsed (Note 2)	I_{DM}	1.0	A
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.2	V/ns	
Power Dissipation	P_D	0.3	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. $I_{SD} \leq 0.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	416	$^\circ\text{C}/\text{W}$

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

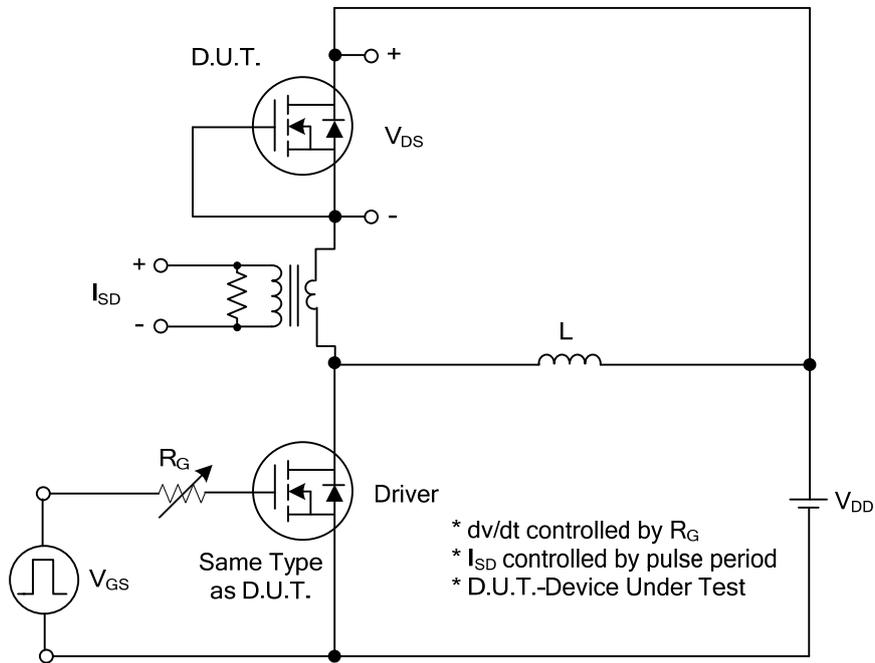
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current		I_{GSS}			100	nA
					$V_{GS}=20\text{V}$, $V_{DS}=0\text{V}$	-100
		$V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$				
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=0.5\text{A}$			0.65	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		69		pF
Output Capacitance	C_{OSS}			14.5		pF
Reverse Transfer Capacitance	C_{RSS}			8.5		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=80\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.5\text{A}$, (Note 1, 2)		10.2		nC
Gate to Source Charge	Q_{GS}			4.2		nC
Gate to Drain Charge	Q_{GD}			1.6		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.5\text{A}$, $R_G=3.3\Omega$ (Note 1, 2)		2.8		ns
Rise Time	t_R			16.3		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			8		ns
Fall-Time	t_F			18.6		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Body-Diode Continuous Current	I_S				0.5	A
Maximum Body-Diode Pulsed Current (Note 1)	I_{SM}				1.0	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=0.5\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=0.5\text{A}$, $V_{GS}=0\text{V}$		20		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$dI_F/dt=100\text{A}/\mu\text{s}$		10		nC

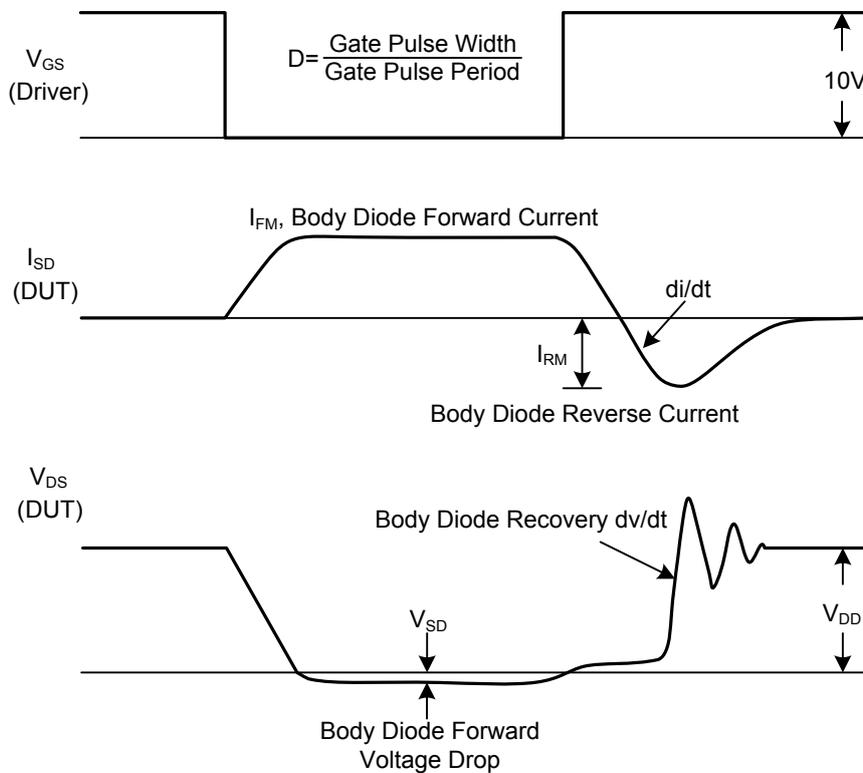
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

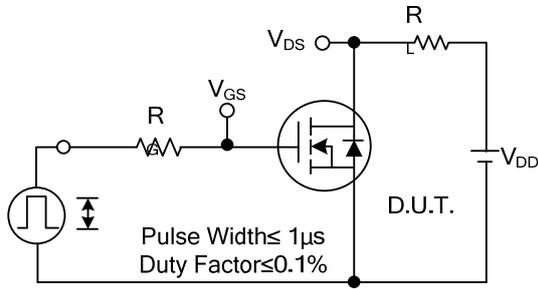


Peak Diode Recovery dv/dt Test Circuit

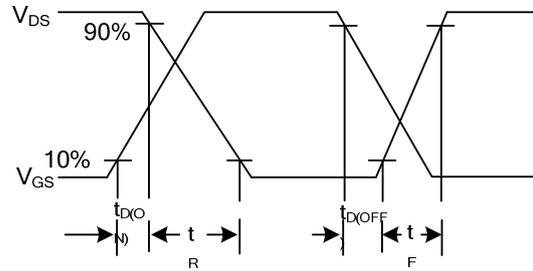


Peak Diode Recovery dv/dt Waveforms

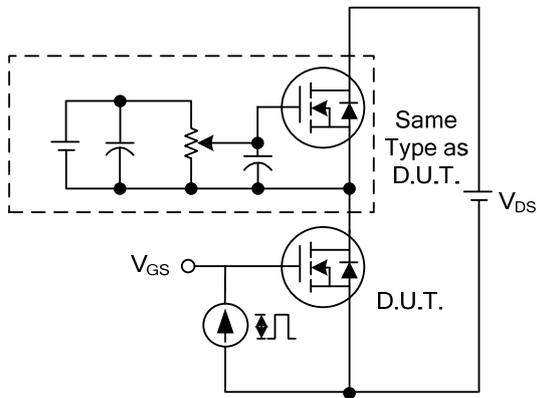
■ TEST CIRCUITS AND WAVEFORMS



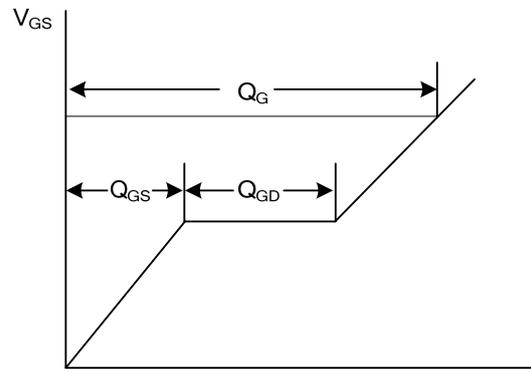
Switching Test Circuit



Switching Waveforms

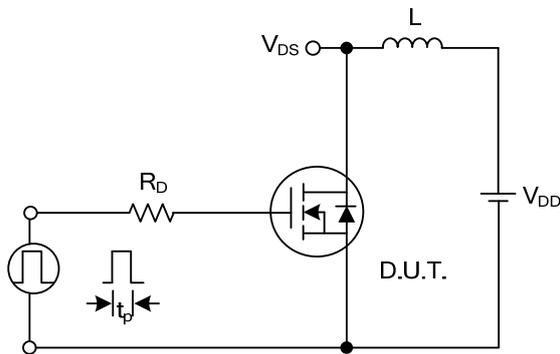


Gate Charge Test Circuit

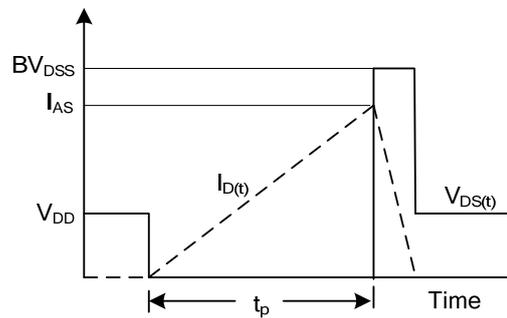


Charge

Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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