



# UTT24P10-H

*Power MOSFET*

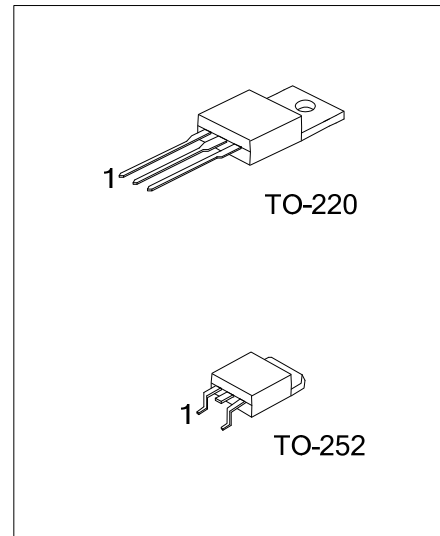
## -24A, -100V P-CHANNEL POWER MOSFET

### DESCRIPTION

The UTC **UTT24P10-H** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance. It can also withstand high energy in the avalanche.

### FEATURES

- \*  $R_{DS(ON)} < 95\text{ m}\Omega$  @  $V_{GS} = -10V, I_D = -6.0A$
- \*  $R_{DS(ON)} < 110\text{ m}\Omega$  @  $V_{GS} = -4.5V, I_D = -3.0A$
- \* High Switching Speed
- \* Fast switching
- \* 100% EAS Guaranteed
- \* Improved dv/dt capability



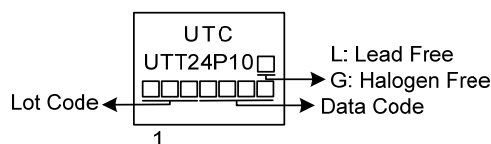
### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT24P10L-TA3-T	UTT24P10G-TA3-T	TO-220	G	D	S	Tube
UTT24P10L-TN3-R	UTT24P10G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UTT24P10G-TA3-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, 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			$V_{GSS}$	$\pm 25$	V
Continuous Drain Current	Continuous	$T_C=25^\circ\text{C}$	$I_D$	-24	A
		$T_C=100^\circ\text{C}$		-15.1	A
Pulsed Drain Current	Pulsed (Note 2)		$I_{DM}$	-96	A
Power Dissipation			$P_D$	125	W
Junction Temperature			$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range			$T_{STG}$	-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	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	1.0	$^\circ\text{C}/\text{W}$

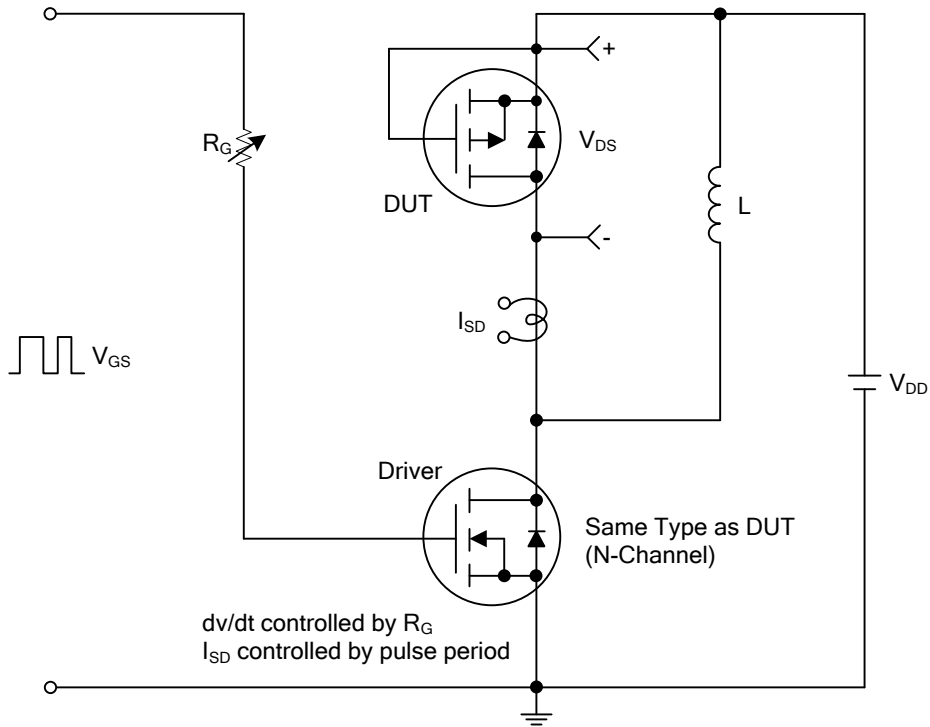
### ■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	-100			V	
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-100\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$			-1	$\mu\text{A}$	
		$V_{DS}=-80\text{V}, V_{GS}=0\text{V}, T_J=125^\circ\text{C}$			-10	$\mu\text{A}$	
Gate-Source Leakage Current	Forward	$I_{GSS}$	$V_{DS}=0\text{V}, V_{GS}=+25\text{V}$			+100	nA
	Reverse			$V_{DS}=0\text{V}, V_{GS}=-25\text{V}$			-100
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1.2	-1.6	-2.2	V	
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}, I_D=-6.0\text{A}$		75	95	m $\Omega$	
		$V_{GS}=-4.5\text{V}, I_D=-3.0\text{A}$		80	110	m $\Omega$	
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}, V_{DS}=-30\text{V}, f=1.0\text{MHz}$		2250	3900	pF	
Output Capacitance	$C_{OSS}$			130	250	pF	
Reverse Transfer Capacitance	$C_{RSS}$			90	180	pF	
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=-50\text{V}, V_{GS}=-10\text{V}, I_D=-6\text{A}$		40.4	70	nC	
Gate to Source Charge	$Q_{GS}$			7.7	15	nC	
Gate to Drain Charge	$Q_{GD}$			6.6	13	nC	
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=-30\text{V}, V_{GS}=-10\text{V}, I_D=-1\text{A}, R_G=6\Omega$		27	54	ns	
Rise Time	$t_R$			12	24	ns	
Turn-off Delay Time	$t_{D(OFF)}$			150	300	ns	
Fall-Time	$t_F$			45	90	ns	
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Pulsed Current	$I_S$	$V_G=V_D=0\text{V}$ , Force Current			-24	A	
Drain-Source Diode Forward Voltage (Note 1)	$I_{SM}$				-48	A	
Maximum Body-Diode Continuous Current	$V_{SD}$	$I_S=-1.0\text{A}, V_{GS}=0\text{V}$			-1.2	V	

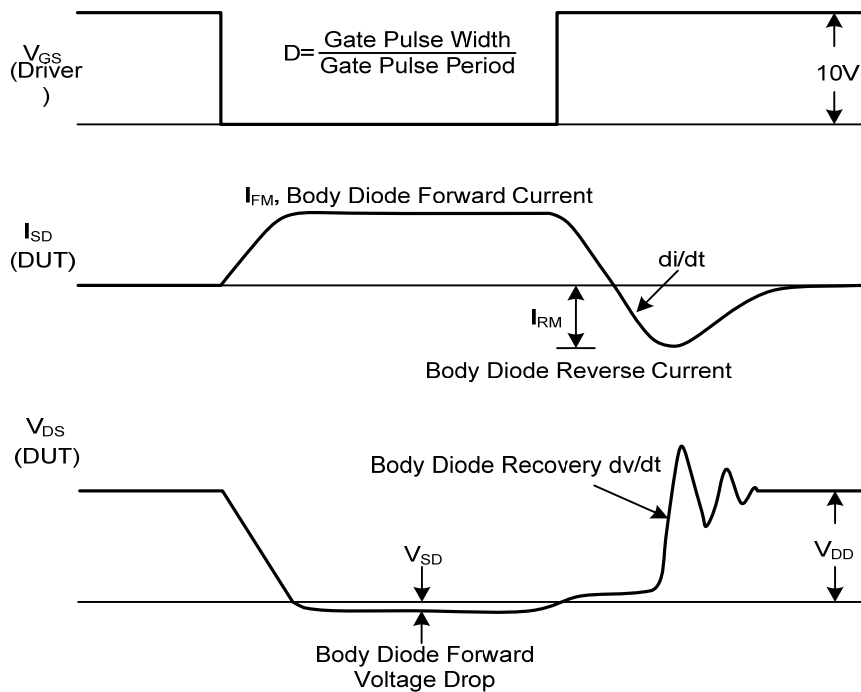
Note: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

## TEST CIRCUITS AND WAVEFORMS

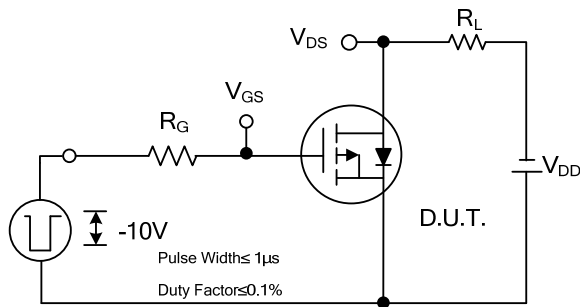


**Peak Diode Recovery dv/dt Test Circuit**

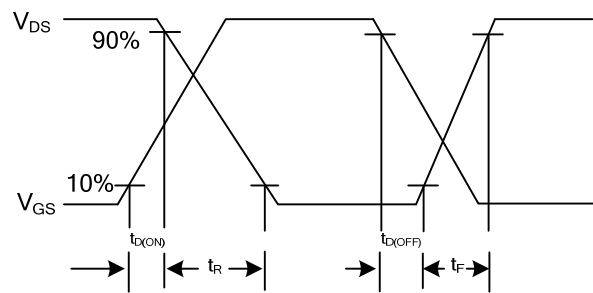


**Peak Diode Recovery dv/dt Waveforms**

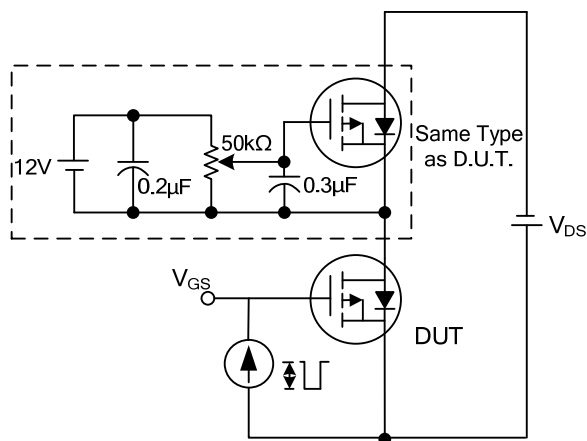
## TEST CIRCUITS AND WAVEFORMS



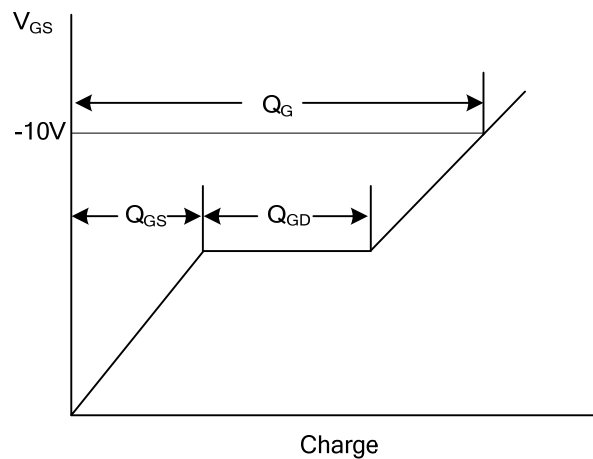
**Switching Test Circuit**



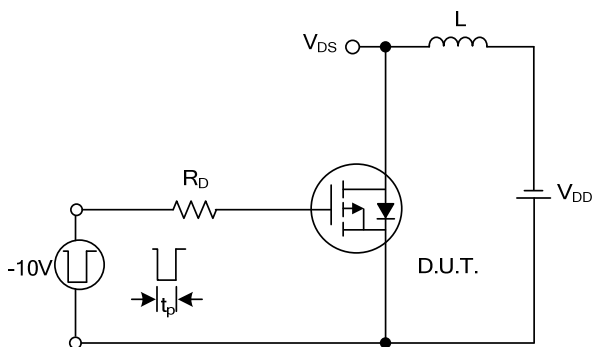
**Switching Waveforms**



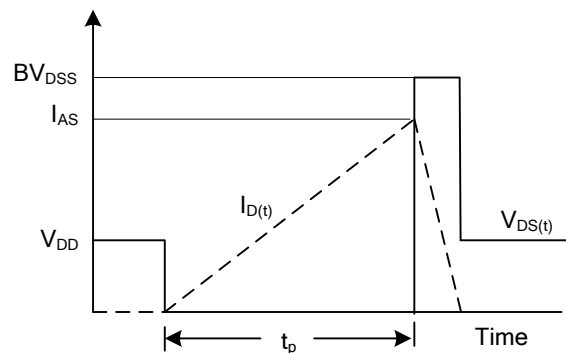
**Gate Charge Test Circuit**



**Gate Charge Waveform**

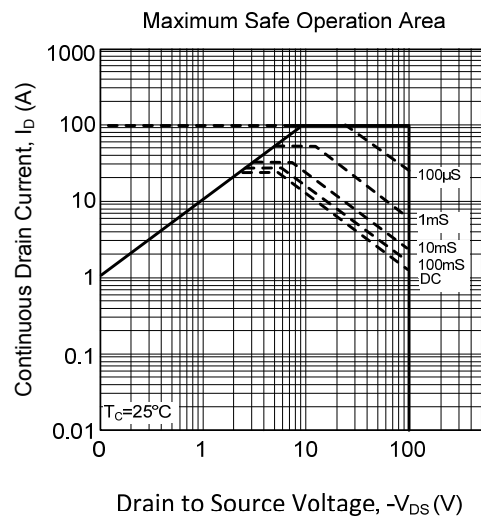
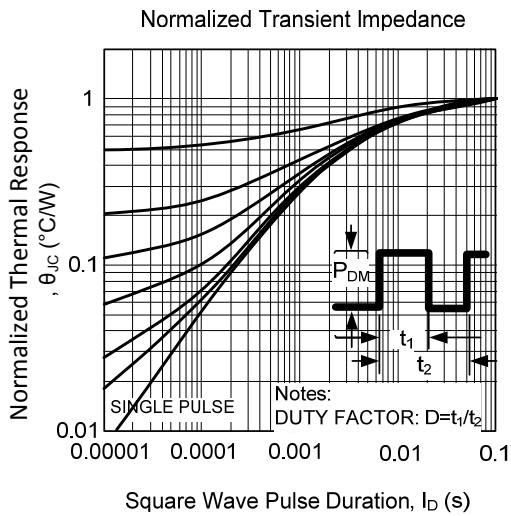
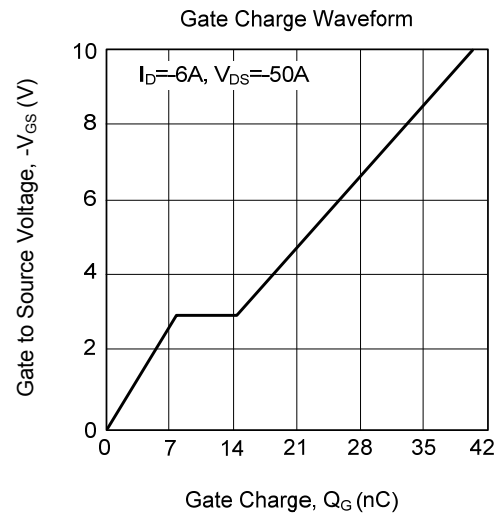
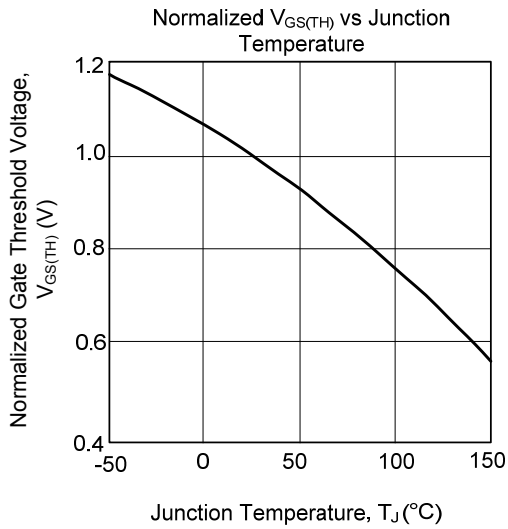
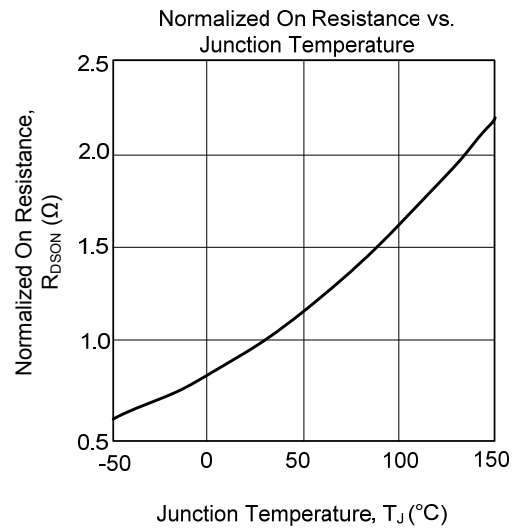
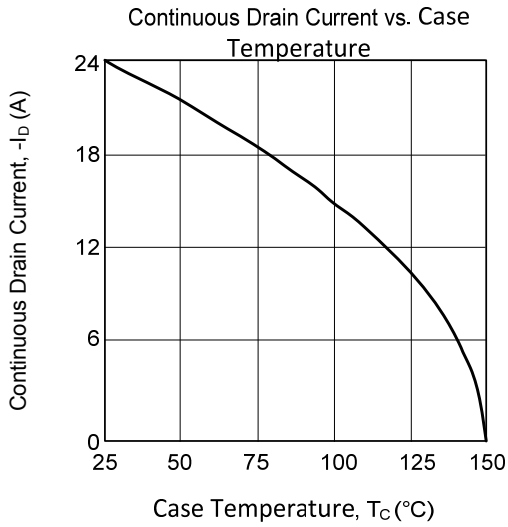


**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

## TYPICAL CHARACTERISTICS



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