



## UTT70N06

Power MOSFET

### 70 Amps, 60 Volts N-CHANNEL POWER MOSFET

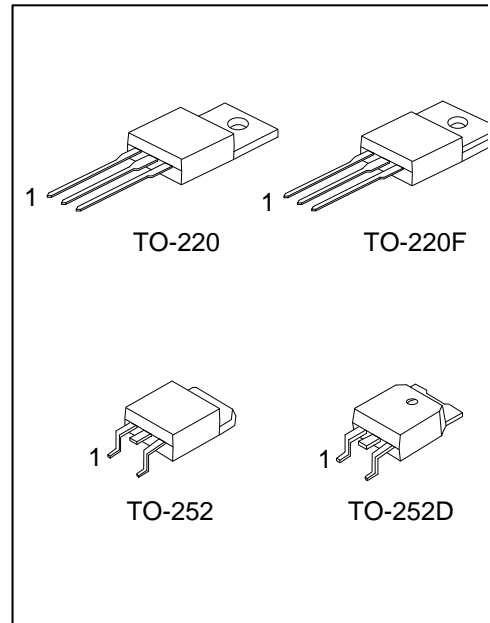
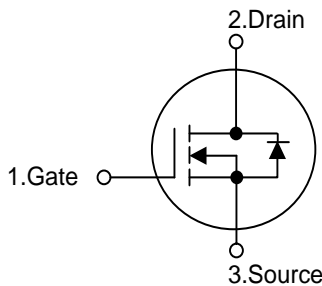
#### DESCRIPTION

The UTC **UTT70N06** is N-channel enhancement mode power field effect transistors with stable off-state characteristics, fast switching speed, low thermal resistance, usually used at telecom and computer application.

#### FEATURES

- \*  $R_{DS(ON)} \leq 15 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=35\text{A}$
- \* Fast switching capability
- \* Avalanche energy specified
- \* Improved dv/dt capability

#### SYMBOL



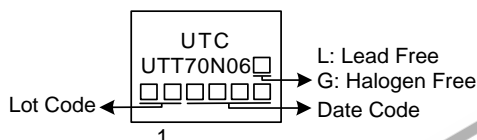
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT70N06L-TA3-T	UTT70N06G-TA3-T	TO-220	G	D	S	Tube
UTT70N06L-TF3-T	UTT70N06G-TF3-T	TO-220F	G	D	S	Tube
UTT70N06L-TN3-R	UTT70N06G-TN3-R	TO-252	G	D	S	Tape Reel
UTT70N06L-TND-R	UTT70N06G-TND-R	TO-252D	G	D	S	Tape Reel

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

<p>UTT70N06G-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TN3: TO-252, TND: TO-252D (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	$I_D$	70	A
	$T_C = 100^\circ\text{C}$		56	A
Drain Current Pulsed (Note 2)		$I_{DM}$	280	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	80	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	10	V/ns
Power Dissipation	TO-220	$P_D$	104	W
	TO-220F		36	W
	TO-252/TO-252D		50	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. Repeativity rating: pulse width limited by junction temperature.

3.  $L=0.1\text{mH}$ ,  $I_{AS}=40\text{A}$ ,  $V_{DD}=25\text{V}$ ,  $R_G=20\Omega$ , Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD}\leq 48\text{A}$ ,  $di/dt\leq 300\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

### ■ THERMAL DATA

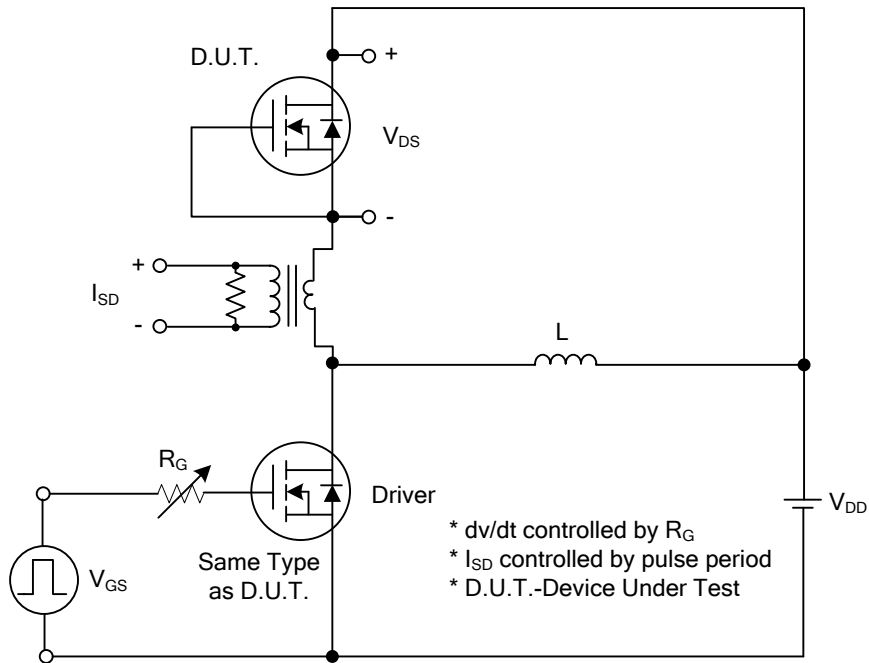
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
	TO-252/TO-252D		100	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	$\theta_{JC}$	1.2	$^\circ\text{C}/\text{W}$
	TO-220F		3.47	$^\circ\text{C}/\text{W}$
	TO-252/TO-252D		2.5	$^\circ\text{C}/\text{W}$

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

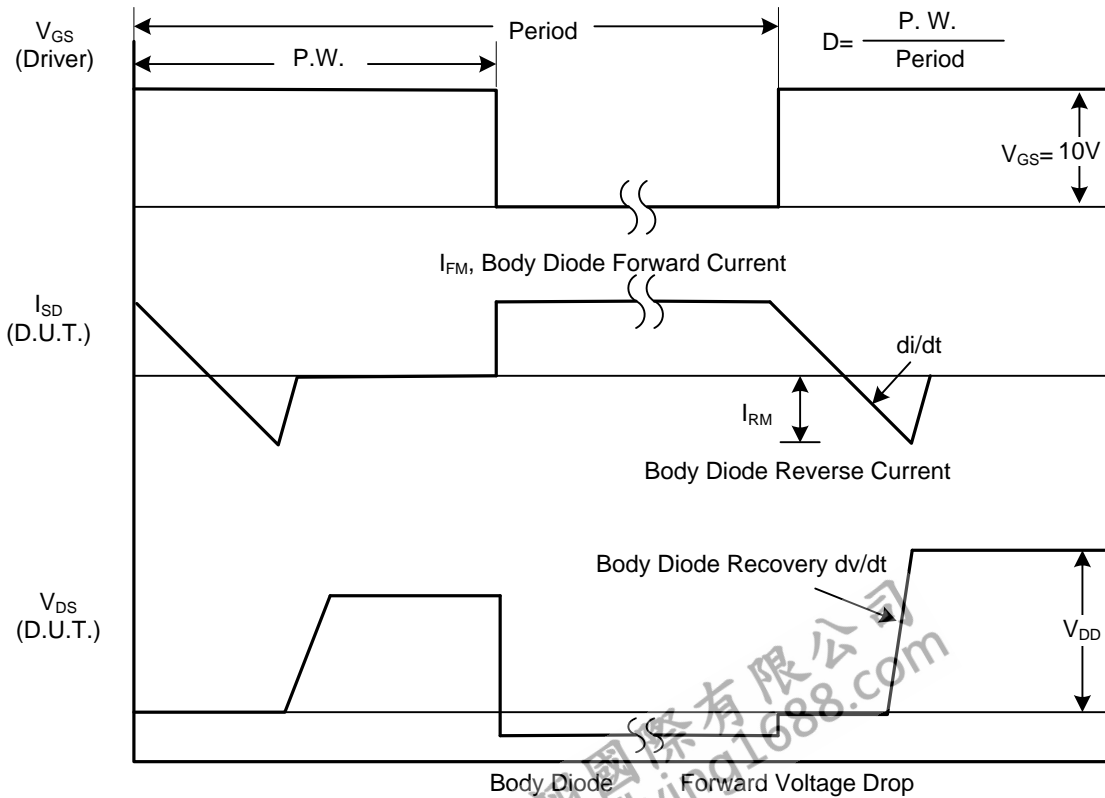
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$
Gate-Source Leakage Current	Forward	$I_{GSS}$			100	nA
	Reverse				-100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D = 1\text{mA}$ , Referenced to $25^\circ\text{C}$		0.08		$V/^\circ\text{C}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=35A$			15	$m\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$		3500		pF
Output Capacitance	$C_{OSS}$			310		pF
Reverse Transfer Capacitance	$C_{RSS}$			55		pF
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge	$Q_G$	$V_{DS}=50V, V_{GS}=10V, I_D=48A, I_G=100\mu A$ (Note 1, 2)		275		nC
Gate-Source Charge	$Q_{GS}$			18		nC
Gate-Drain Charge (Miller Charge)	$Q_{GD}$			41		nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=30V, V_{GS}=10V, I_D=0.5A$ (Note 1, 2)		125		ns
Turn-On Rise Time	$t_R$			160		ns
Turn-Off Delay Time	$t_{D(OFF)}$			720		ns
Turn-Off Fall Time	$t_F$			200		ns
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				70	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				280	
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=70A$			1.4	V
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=70A$ $di_f/dt=100A/\mu s$		90		ns
Reverse Recovery Charge	$Q_{rr}$			300		$\mu C$

Notes: 1. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .  
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



1A Peak Diode Recovery dv/dt Test Circuit



1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

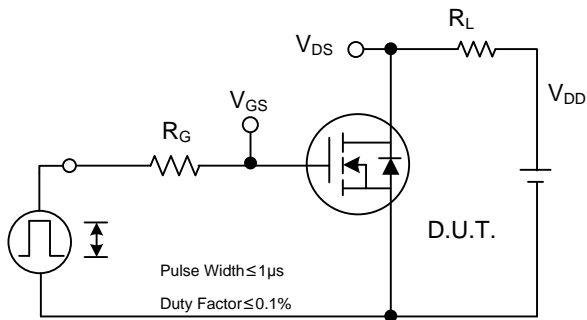


Fig. 2A Switching Test Circuit

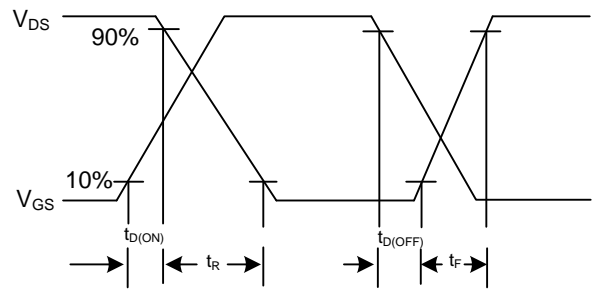


Fig. 2B Switching Waveforms

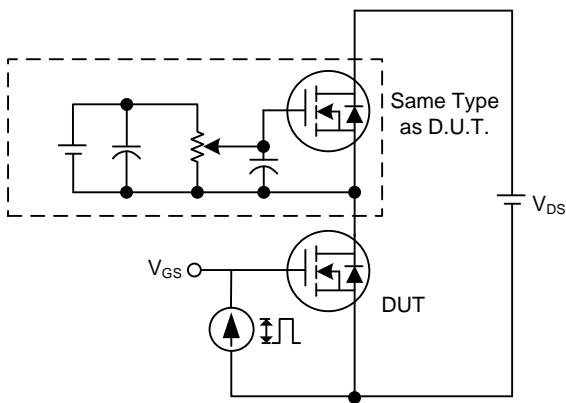


Fig. 3A Gate Charge Test Circuit

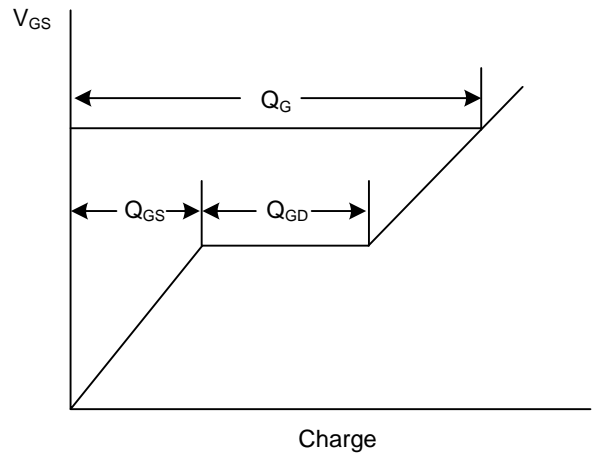


Fig. 3B Gate Charge Waveform

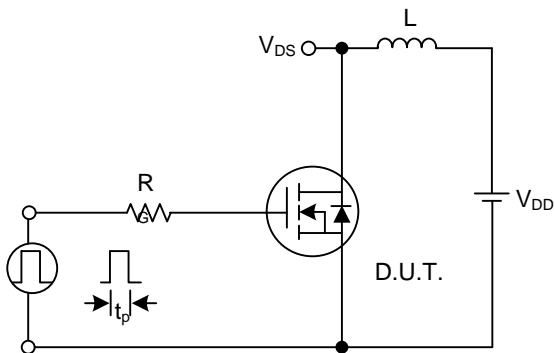


Fig. 4A Unclamped Inductive Switching Test Circuit

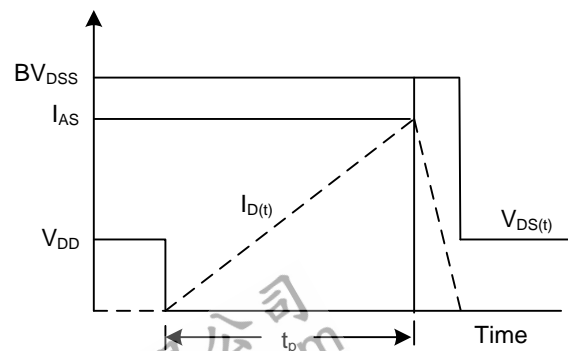


Fig. 4B Unclamped Inductive Switching Waveforms

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