



## UTT150N06

Preliminary

Power MOSFET

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

#### DESCRIPTION

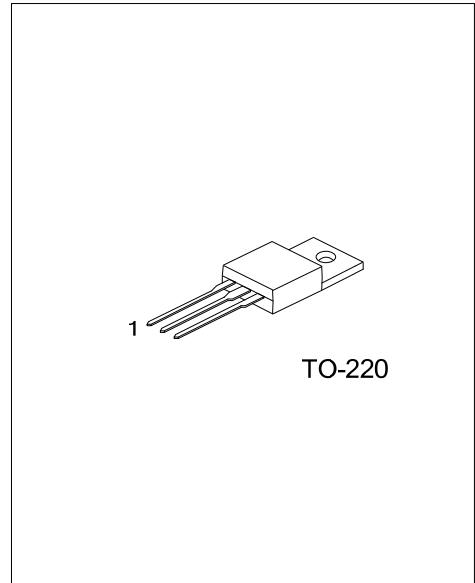
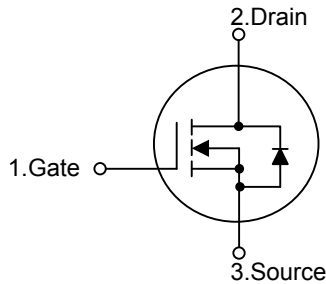
The UTC **UTT150N06** is an N-channel Power Trench MOSFET, using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UTT150N06** is generally applied in synchronous Rectification or DC to DC converter.

#### FEATURES

- \* 150A, 60V,  $R_{DS(ON)}=3.2m\Omega @ V_{GS}=10V, I_D = 75A$
- \* Low Gate Charge (Typical 102nC)
- \* High Switching Speed
- \* High Power and Current Handling Capability
- \* RoHS Compliant

#### SYMBOL



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT150N06L-TA3-T	UTT150N06G-TA3-T	TO-220	G	D	S	Tube

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

UTT150N06L-TA3-T 	(1) Packing Type (2) Package Type (3) Lead Free	(1) T: Tube (2) TA3: TO-220 (3) G: Halogen Free, L: Lead Free
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■ ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Peak Diode Recovery $dv/dt$ (Note 3)		$dv/dt$	7.0	V/ns
Drain Current	Continuous ( $T_C=25^\circ\text{C}$ , Silicon Limited)	$I_D$	150	A
	Pulsed (Note 1)	$I_{DM}$	600	A
Single Pulsed Avalanche Energy (Note 2)		$E_{AS}$	872	mJ
Power Dissipation	$T_C=25^\circ\text{C}$	$P_D$	231	W
	Derate above $25^\circ\text{C}$		1.54	
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55~+150	$^\circ\text{C}$

Note: 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.

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^\circ\text{C/W}$
Junction to Case	$\theta_{JC}$	0.94	$^\circ\text{C/W}$

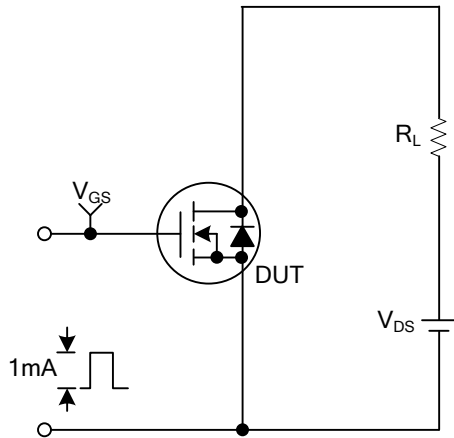
■ ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$ , $T_C=25^\circ\text{C}$	60			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=250\mu\text{A}$		0.04		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
			$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$ , $T_C=150^\circ\text{C}$			500	
Gate- Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=+20\text{V}$ , $V_{DS}=0\text{V}$			+100	nA
	Reverse		$V_{GS}=-20\text{V}$ , $V_{DS}=0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2.5	3.5	4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=75\text{A}$		3.2	4.0	m $\Omega$
Forward Transconductance		$g_{FS}$	$V_{DS}=10\text{V}$ , $I_D=75\text{A}$ (Note 4)		169		S
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		6190	8235	pF
Output Capacitance		$C_{OSS}$			900	1195	
Reverse Transfer Capacitance		$C_{RSS}$			385	580	
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge		$Q_{G(tot)}$	$V_{GS}=10\text{V}$ , $V_{DS}=48\text{V}$ , $I_D=75\text{A}$ (Note 4, 5)		102	133	nC
Gate to Source Charge		$Q_{GS}$			32		
Gate to Drain Charge		$Q_{GD}$			32		
Turn-ON Delay Time		$t_{D(ON)}$	$V_{DD}=30\text{V}$ , $I_D=75\text{A}$ , $R_{GEN}=4.7\Omega$ , $V_{GS}=10\text{V}$		30	70	ns
Rise Time		$t_R$			40	90	
Turn-OFF Delay Time		$t_{D(OFF)}$			55	120	
Fall-Time		$t_F$			24	58	
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current		$I_S$				150	A
Maximum Body-Diode Pulsed Current		$I_{SM}$				600	A
Drain-Source Diode Forward Voltage		$V_{SD}$	$I_{SD}=150\text{A}$ , $V_{GS}=0\text{V}$			1.3	V
Body Diode Reverse Recovery Time		$t_{RR}$	$I_{SD}=150\text{A}$ , $V_{GS}=0\text{V}$ , $di_F/dt=100\text{A}/\mu\text{s}$ (Note 4)		41		ns
Body Diode Reverse Recovery Charge		$Q_{RR}$			47		

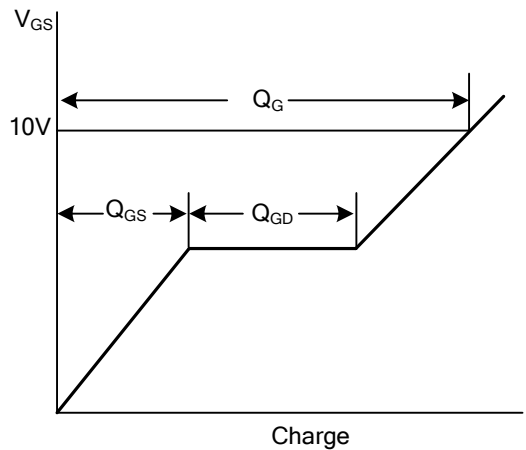
- Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature  
2.  $L = 0.31\text{mH}$ ,  $I_{AS} = 75\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$   
3.  $I_{SD} \leq 75\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$   
4. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$   
5. Essentially independent of operating temperature Typical Characteristics

■ TEST CIRCUITS AND WAVEFORMS

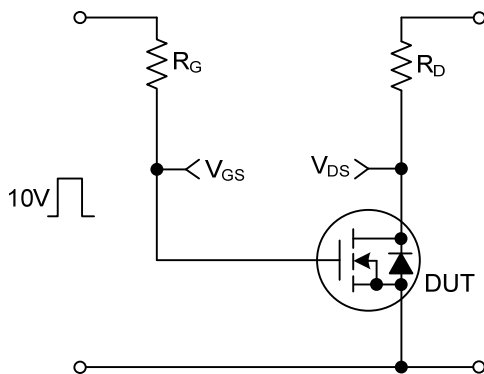
Gate Charge Test Circuit



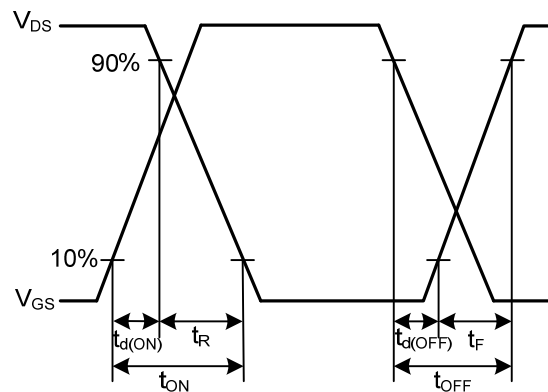
Gate Charge Waveforms



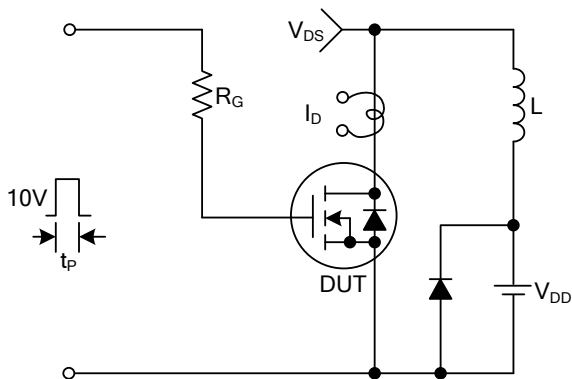
Resistive Switching Test Circuit



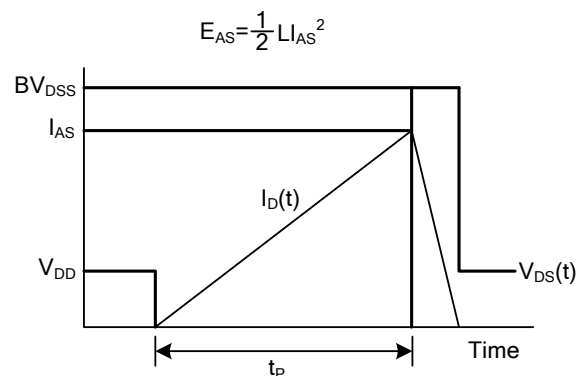
Resistive Switching Waveforms



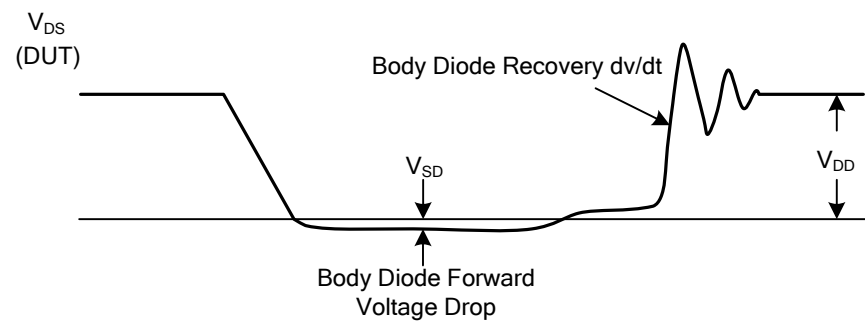
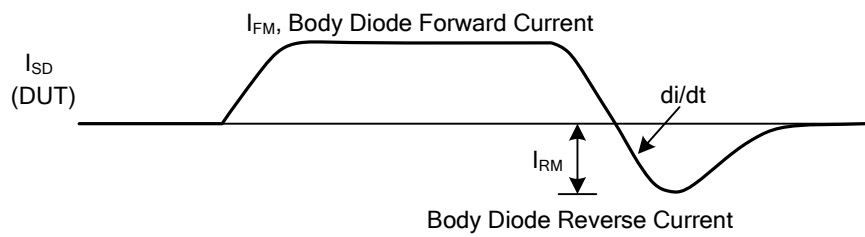
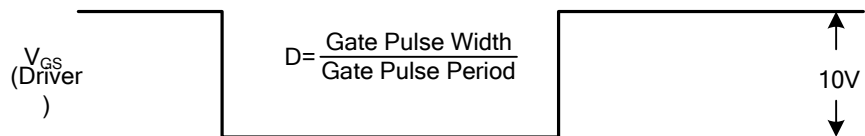
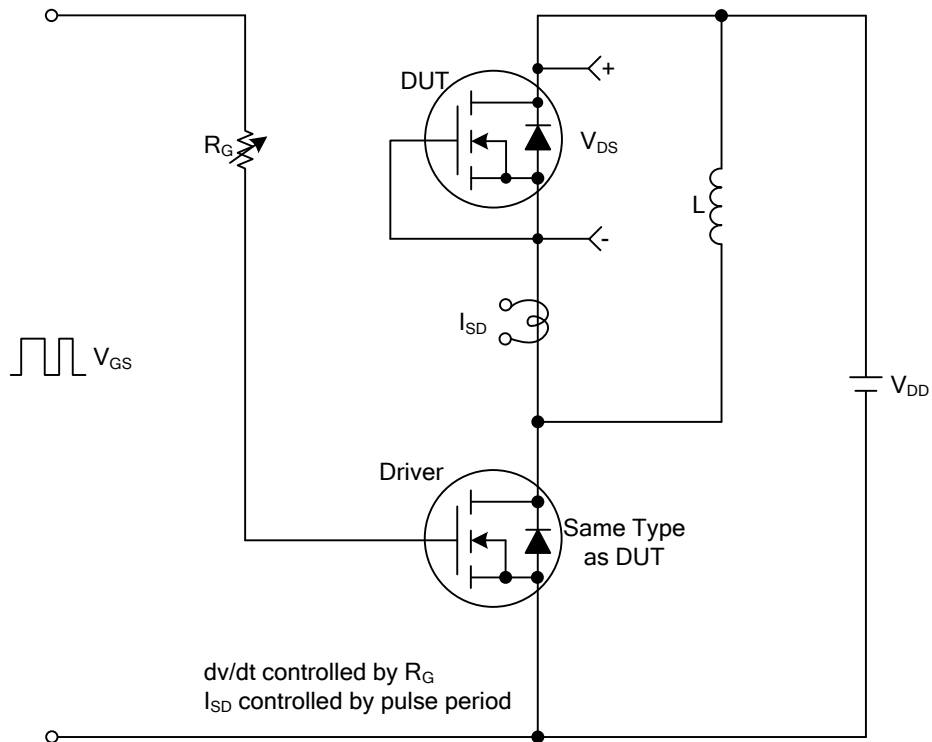
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



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