



150 Amps, 60 Volts N-CHANNEL POWER MOSFET

DESCRIPTION

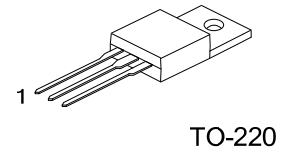
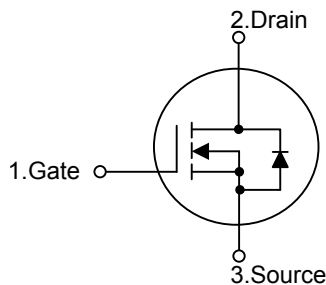
The UTC **UTT150N06** is an N-channel Power Trench MOSFET, using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

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	(1) T: Tube
		(2) Package Type	(2) TA3: TO-220
		(3) Lead Free	(3) G: Halogen Free, L: Lead Free

■ **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}	± 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°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	θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	θ_{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
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V, T _C =25°C	60			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =250μA		0.04		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
			V _{DS} =60V, V _{GS} =0V , T _C =150°C			500	
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.5	3.5	4.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =75A		3.2	4.0	mΩ
Forward Transconductance		g _{FS}	V _{DS} =10V, I _D =75A (Note 4)		169		S
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		6190	8235	pF
Output Capacitance		C _{OSS}			900	1195	pF
Reverse Transfer Capacitance		C _{RSS}			385	580	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _{G(tot)}	V _{GS} =10V, V _{DS} =48V, I _D =75A (Note 4, 5)		102	133	nC
Gate to Source Charge		Q _{GS}			32		nC
Gate to Drain Charge		Q _{GD}			32		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =30V, I _D =75A, R _{GEN} =4.7Ω, V _{GS} =10V		30	70	ns
Rise Time		t _R			40	90	ns
Turn-OFF Delay Time		t _{D(OFF)}			55	120	ns
Fall-Time		t _F			24	58	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
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} =150A, V _{GS} =0V			1.3	V
Body Diode Reverse Recovery Time		t _{RR}	I _{SD} =150A, V _{GS} =0V, dI _F /dt=100A/μs		41		ns
Body Diode Reverse Recovery Charge		Q _{RR}	(Note 4)		47		μC

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 $T_J = 25^\circ\text{C}$

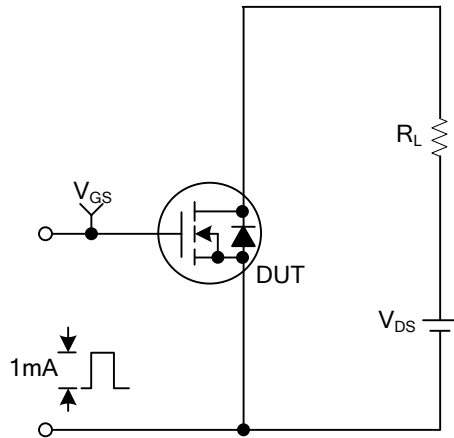
3. $I_{SD} \leq 75\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

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

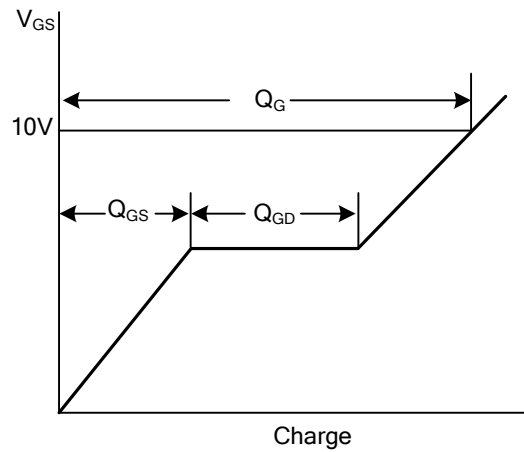
5. Essentially independent of operating temperature Typical Characteristics

■ TEST CIRCUITS AND WAVEFORMS

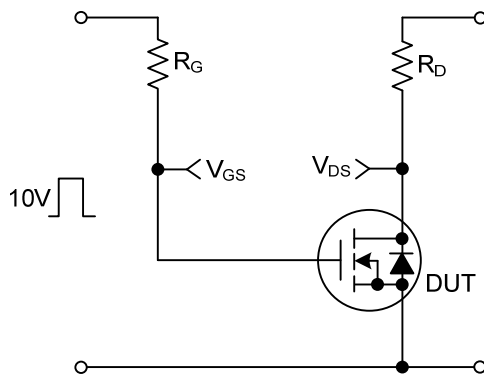
Gate Charge Test Circuit



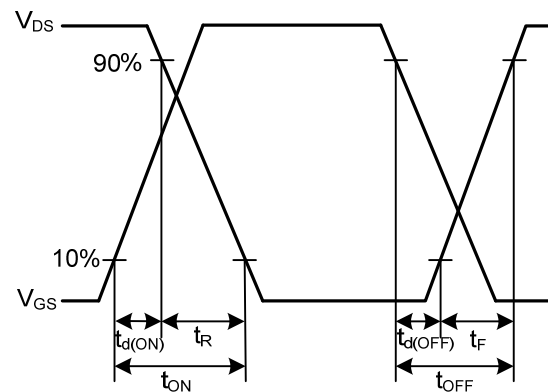
Gate Charge Waveforms



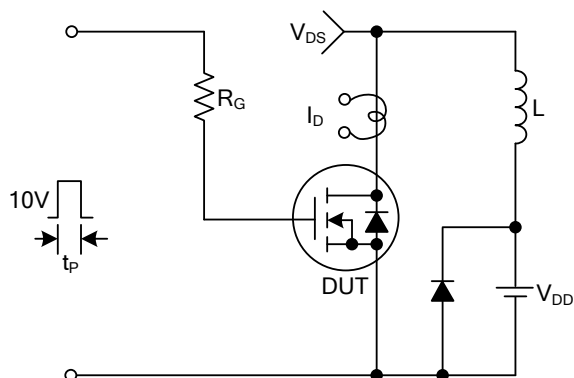
Resistive Switching Test Circuit



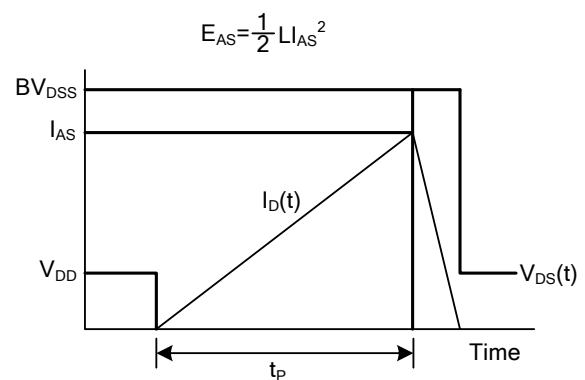
Resistive Switching Waveforms



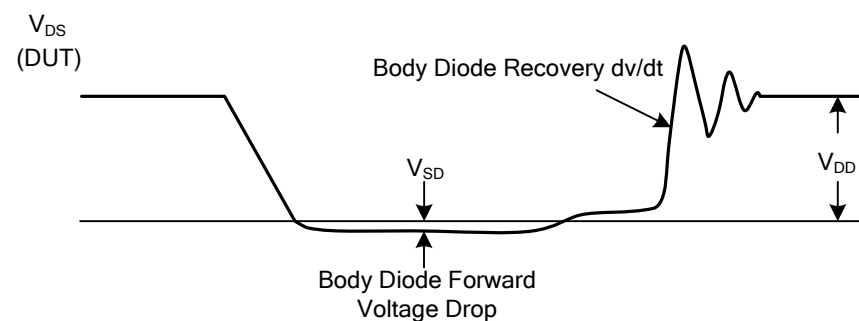
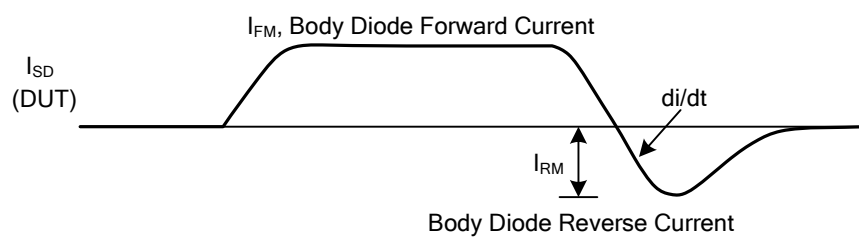
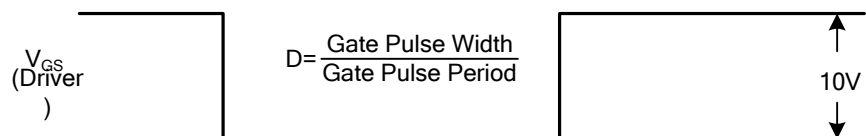
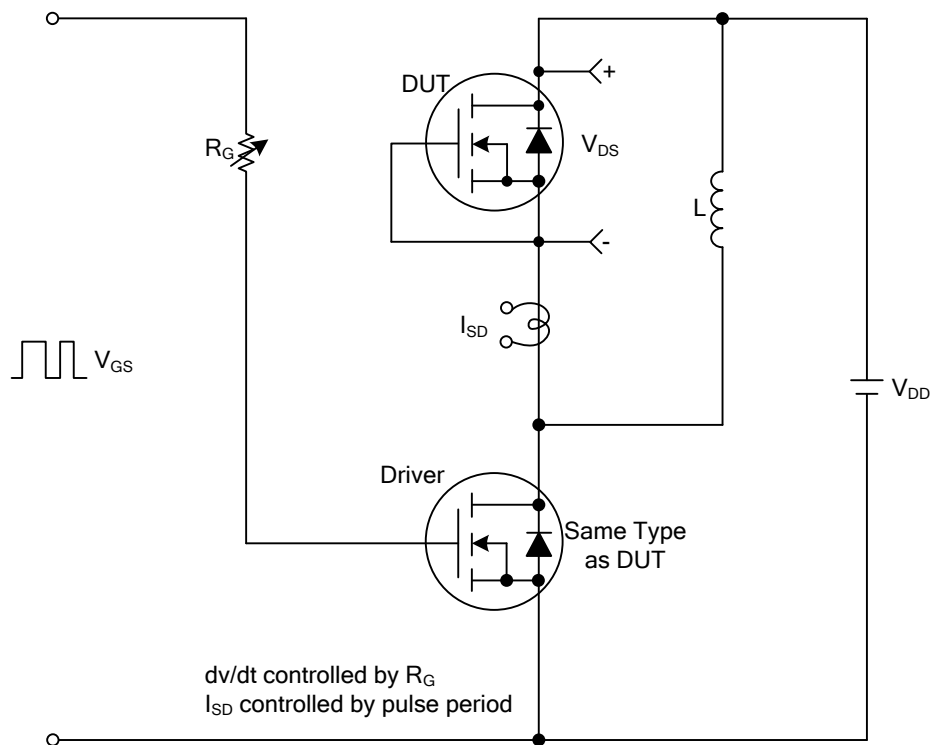
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



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