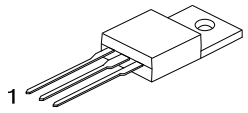
150 Amps, 60 Volts
N-CHANNEL POWER MOSFET



TO-220

■ DESCRIPTION

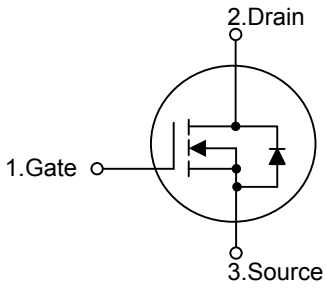
The UTC **UTT150N06** is an N-channel Power Trench MOSFET, using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

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

■ FEATURES

* 150A, 60V, $R_{DS(ON)}$=3.2mΩ @ 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

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°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°C, Silicion 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°C	P_D	231	W
		Derate above 25°C		1.54	
Junction Temperature			T_J	+150	°C
Storage Temperature			T_{STG}	-55~+150	°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	°C/W
Junction to Case	θ_{JC}	0.94	°C/W

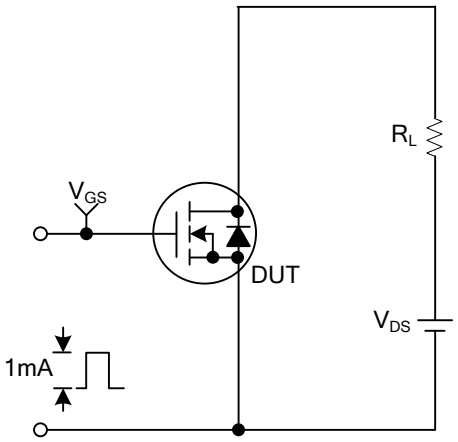
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

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		$\triangle BV_{DSS}/\triangle T_J$	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 (Note 4)		41		ns
Body Diode Reverse Recovery Charge		Q_{RR}			47		μC

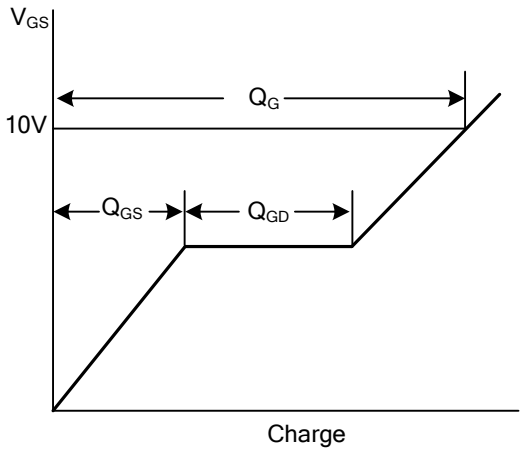
Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 0.31mH, I_{AS} = 75A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 75A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature Typical Characteristics

■ TEST CIRCUITS AND WAVEFORMS

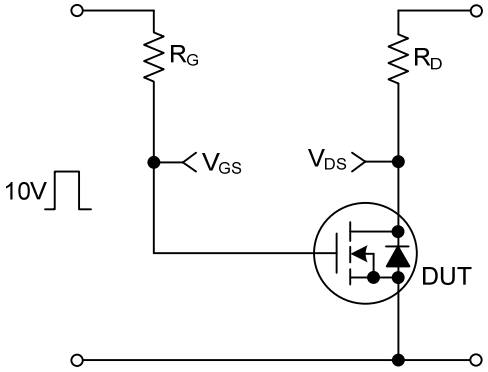
Gate Charge Test Circuit



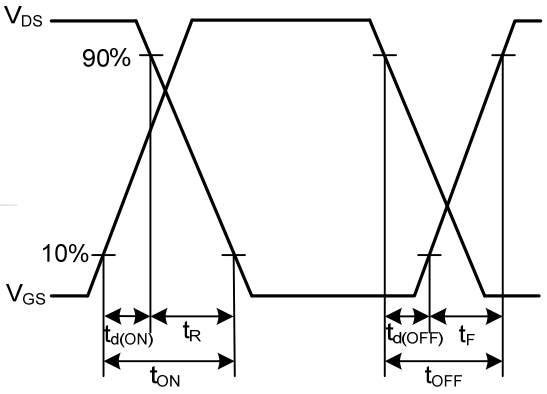
Gate Charge Waveforms



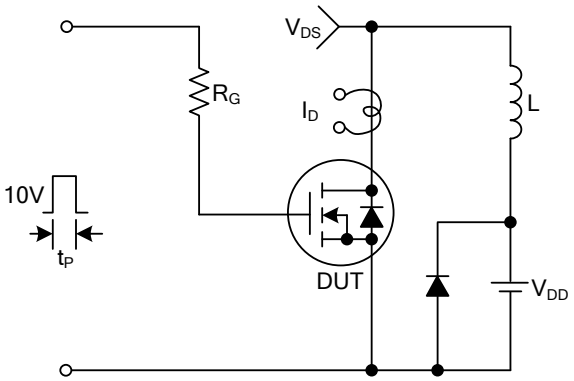
Resistive Switching Test Circuit



Resistive Switching Waveforms

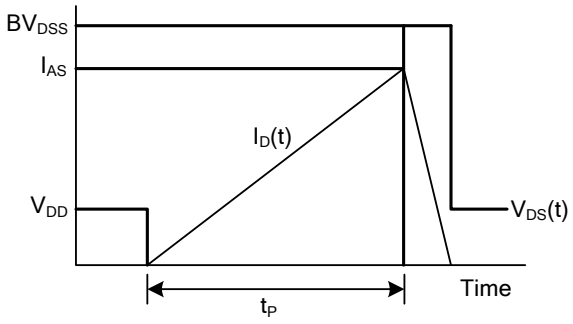


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

$E_{AS}=\frac{1}{2}LI_{AS}^2$



Peak Diode Recovery dv/dt Test Circuit & Waveforms