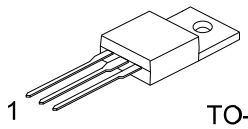
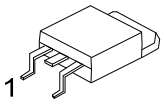
UT150N06M **Preliminary** ***Power MOSFET***

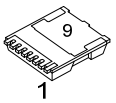
150A, 60V N-CHANNEL ENHANCEMENT MODE TRENCH POWER MOSFET



TO-220



TO-263



TOLL-8A

■ DESCRIPTION

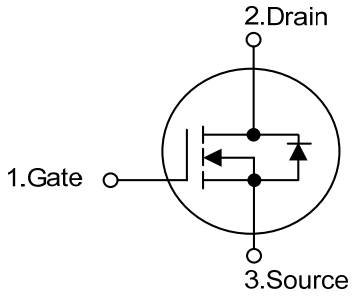
The UTC **UT150N06M** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(ON)}$ characteristic by high cell density trench technology.

The UTC **UT150N06M** is suitable for high efficiency synchronous rectification in SMPS, UPS, hard switched and high frequency circuits.

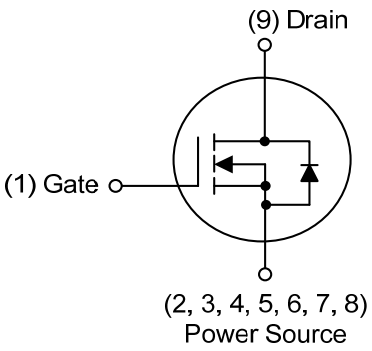
■ FEATURES

* $R_{DS(ON)} \leq 3.5\ m\Omega$ @ V_{GS}=10V, I_D=75A
  $R_{DS(ON)} \leq 5.0\ m\Omega$ @ V_{GS}=4.5V, I_D=50A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



TO-220 / TO-263

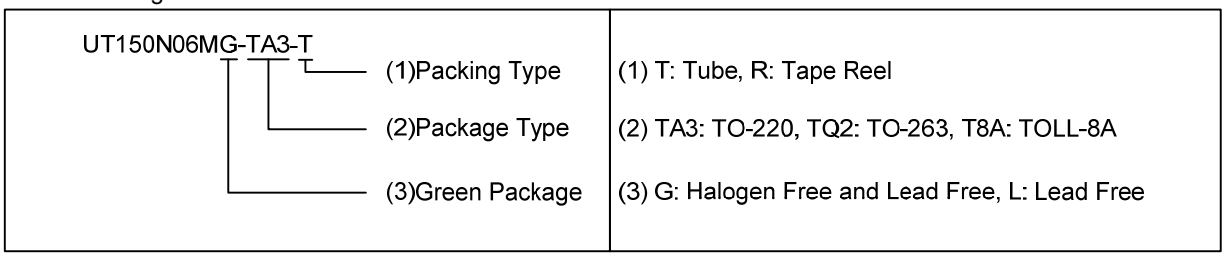


TOLL-8A

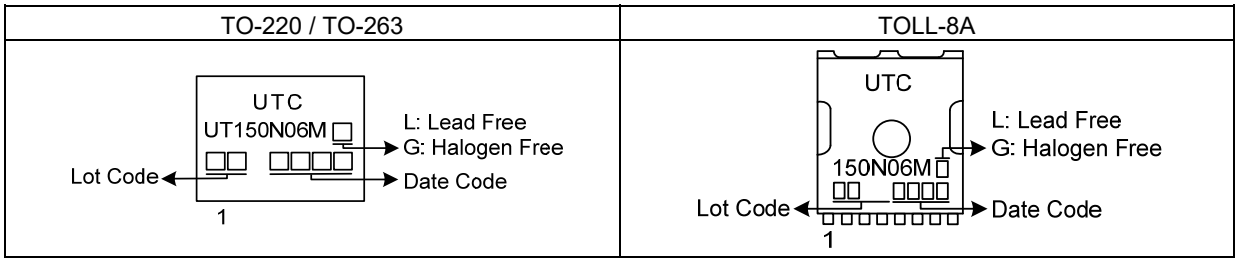
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment									Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	9	
UT150N06ML-TA3-T	UT150N06MG-TA3-T	TO-220	G	D	S	-	-	-	-	-	-	Tube
UT150N06ML-TQ2-T	UT150N06MG-TQ2-T	TO-263	G	D	S	-	-	-	-	-	-	Tube
UT150N06ML-TQ2-R	UT150N06MG-TQ2-R	TO-263	G	D	S	-	-	-	-	-	-	Tape Reel
UT150N06ML-T8A-R	UT150N06MG-T8A-R	TOLL-8A	G	S	S	S	S	S	S	S	S	Tape Reel

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



■ MARKING



■ ABSOLUTE MAXIMUM RATING (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current (T_C=25°C)	Continuous	I_D	150	A
			30	A
	Pulsed (Note 2)	I_{DM}	300	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	361	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.6	V/ns
Power Dissipation	TO-220/TO-263	P_D	250	W
	TOLL-8A		400	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°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.
3. L=0.1mH, I_{AS}=85A, V_{DD}=30V, R_G=25Ω, Starting T_J=25°C
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62.5	°C/W
	TOLL-8A		40	°C/W
Junction to Case (Note)	TO-220/TO-263	θ_{JC}	0.5	°C/W
	TOLL-8A		0.3125 (Note)	°C/W

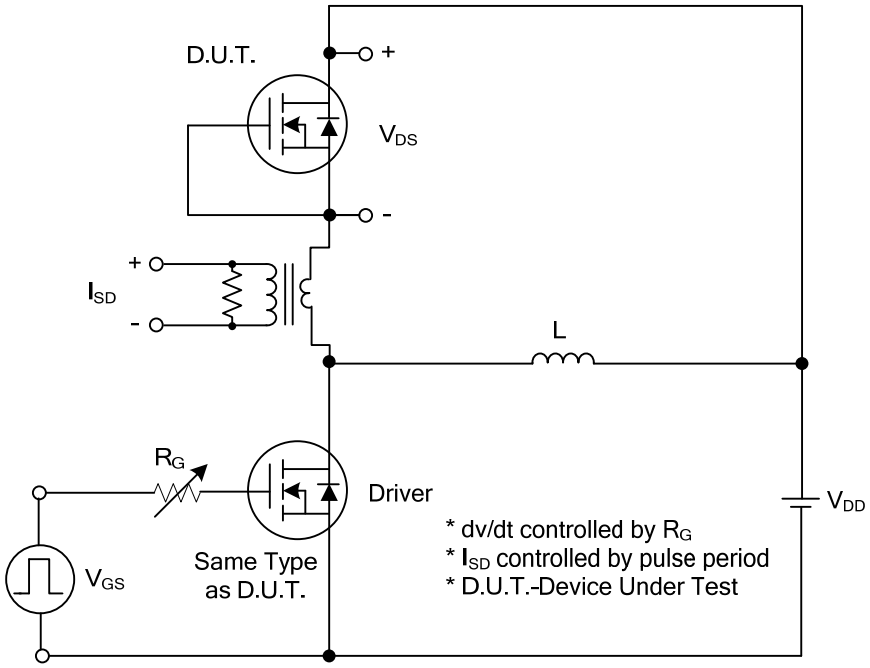
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

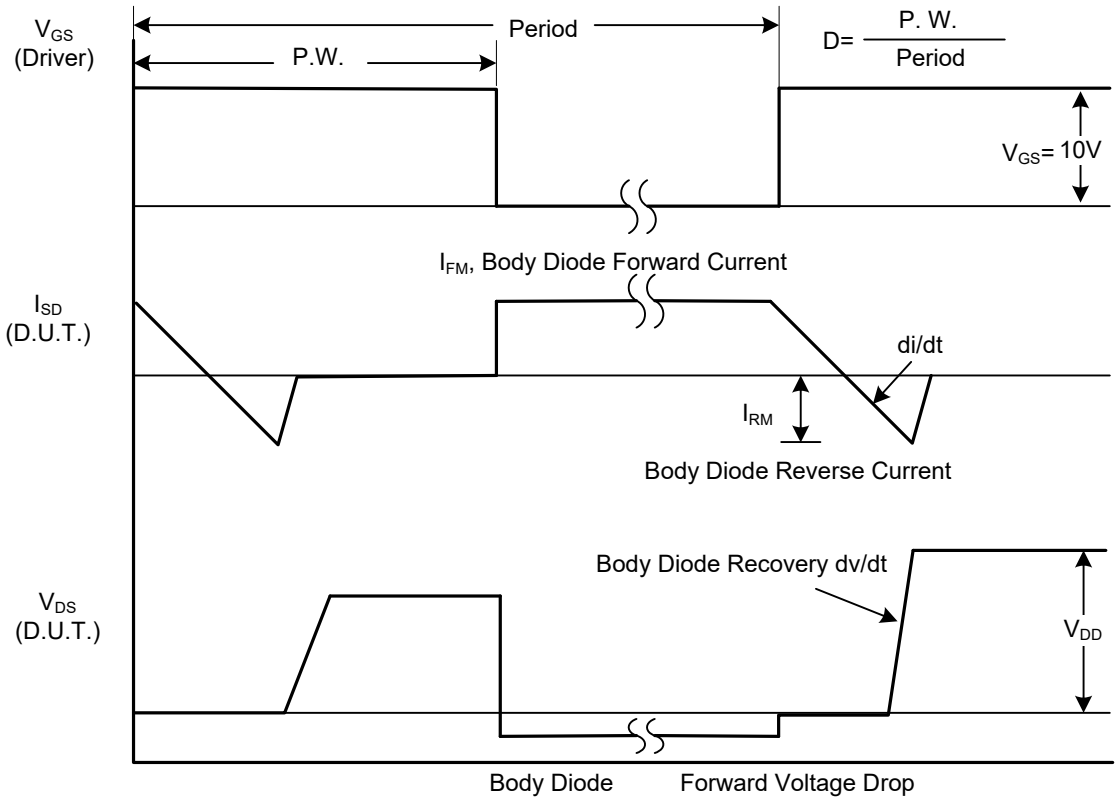
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=75A			3.5	mΩ
			V_{GS}=4.5V, I_D=50A			5.0	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		14.6		nF
Output Capacitance		C_{OSS}			1450		pF
Reverse Transfer Capacitance		C_{RSS}			1180		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=48V, V_{GS}=4.5V, I_D=150A (Note 1, 2)		165		nC
Gate-Source Charge		Q_{GS}			40		nC
Gate-Drain Charge		Q_{GD}			80		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=30V, V_{GS}=10V, I_D=150A, R_G=3Ω (Note 1, 2)		26		ns
Turn-On Rise Time		t_R			28		ns
Turn-Off Delay Time		$t_{D(OFF)}$			192		ns
Turn-Off Fall Time		t_F			122		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I_S				150	A
Maximum Body-Diode Pulsed Current		I_{SM}				300	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=20A , V_{GS}=0V			1.3	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=30A, V_{GS}=0V, dI_F/dt=100A/μs		64		ns
Body Diode Reverse Recovery Charge		Q_{rr}			90		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

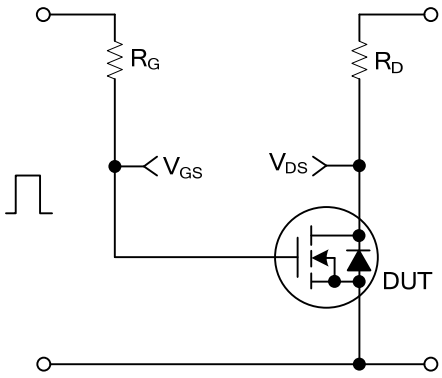


Peak Diode Recovery dv/dt Test Circuit

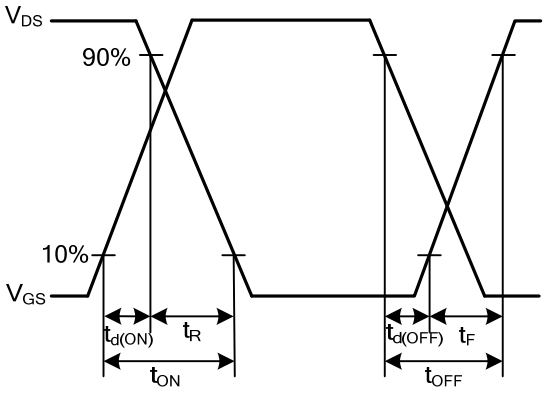


Peak Diode Recovery dv/dt Waveforms

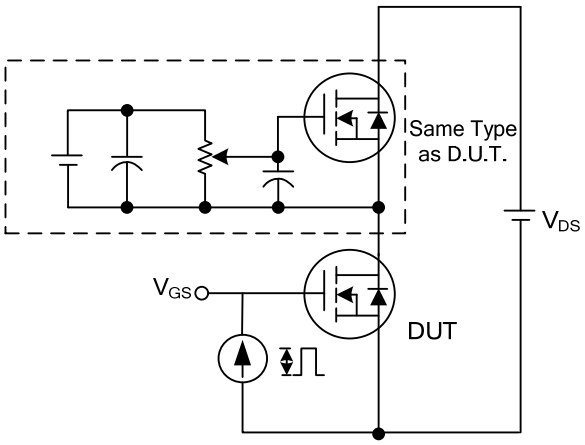
■ TEST CIRCUITS AND WAVEFORMS



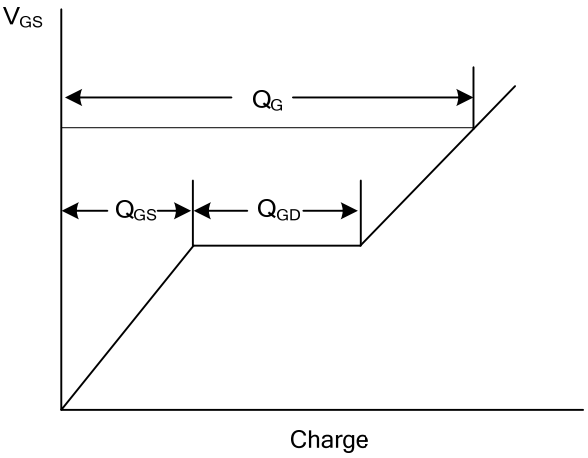
itching Test Circuit



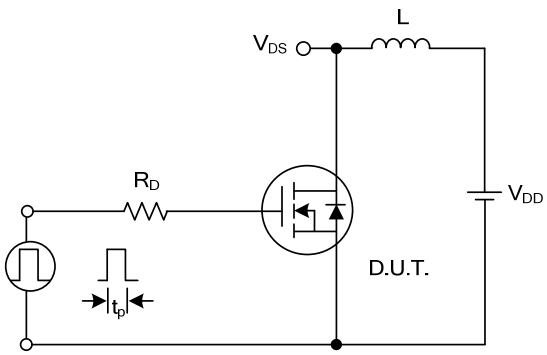
Switching Waveforms



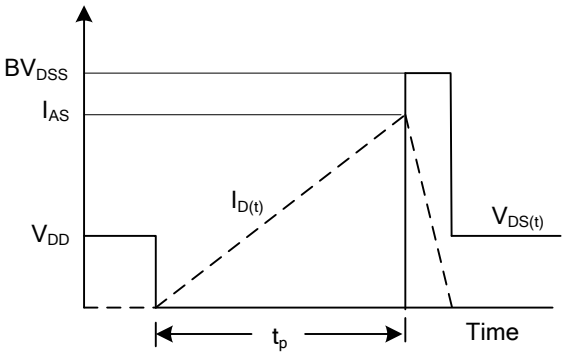
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms