



UT150N06M

Preliminary

Power MOSFET

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

DESCRIPTION

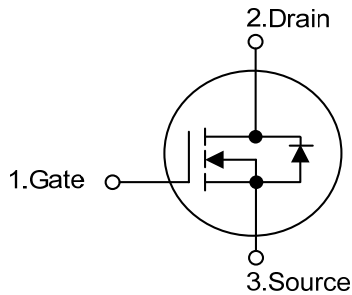
The UTC **UT150N06M** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(ON)}$ characteristic by high cell density trench technology.

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

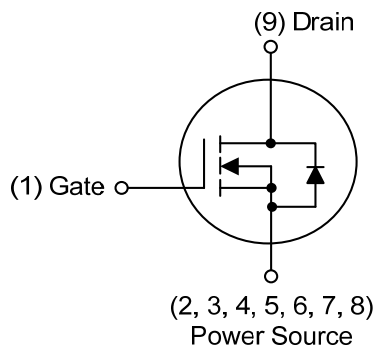
FEATURES

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

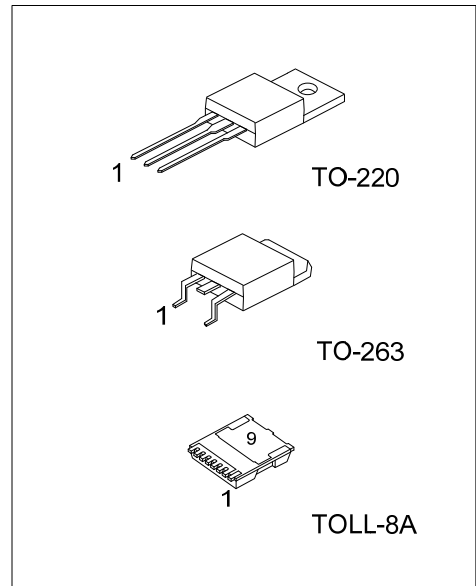
SYMBOL



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

<p>UT150N06MG-TA3-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TQ2: TO-263, T8A: TOLL-8A</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

TO-220 / TO-263	TOLL-8A
<p>UTC</p> <p>UT150N06M</p> <p>L: Lead Free</p> <p>G: Halogen Free</p> <p>Date Code</p> <p>Lot Code</p> <p>1</p>	<p>UTC</p> <p>150N06M</p> <p>L: Lead Free</p> <p>G: Halogen Free</p> <p>Date Code</p> <p>Lot Code</p> <p>1</p>

■ ABSOLUTE MAXIMUM RATING ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current ($T_C=25^\circ\text{C}$)	Continuous	I_D	150	A
	Pulsed (Note 2)	I_{DM}	30	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	$^\circ\text{C}$
Storage Temperature Range		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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L=0.1\text{mH}$, $I_{AS}=85\text{A}$, $V_{DD}=30\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

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

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

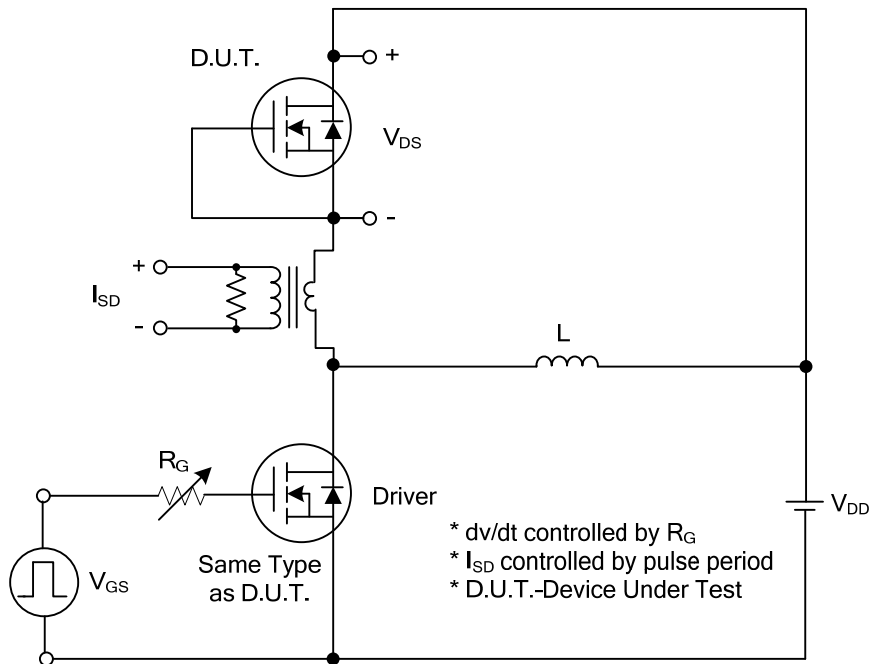
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

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
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	

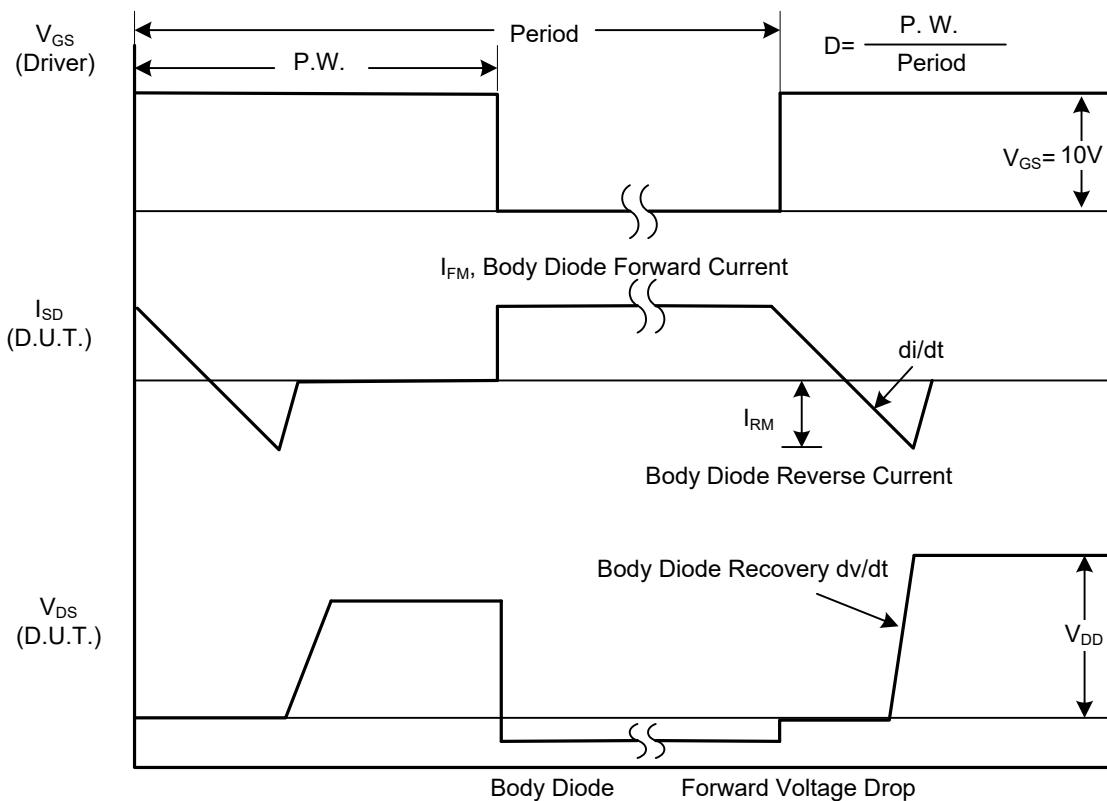
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

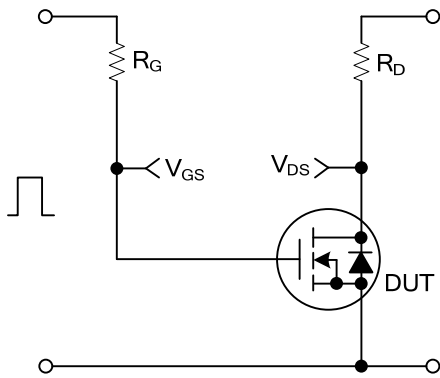


Peak Diode Recovery dv/dt Test Circuit

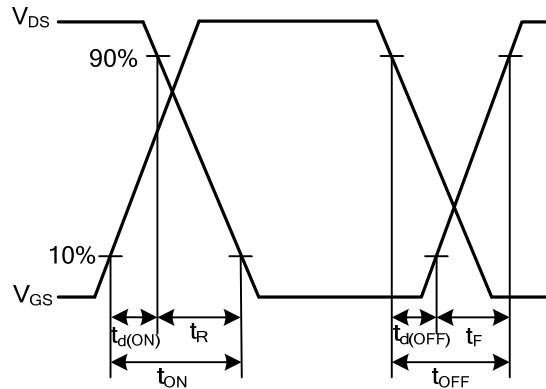


Peak Diode Recovery dv/dt Waveforms

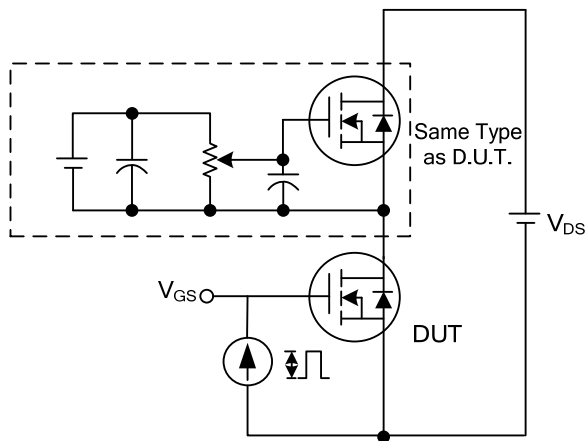
■ TEST CIRCUITS AND WAVEFORMS



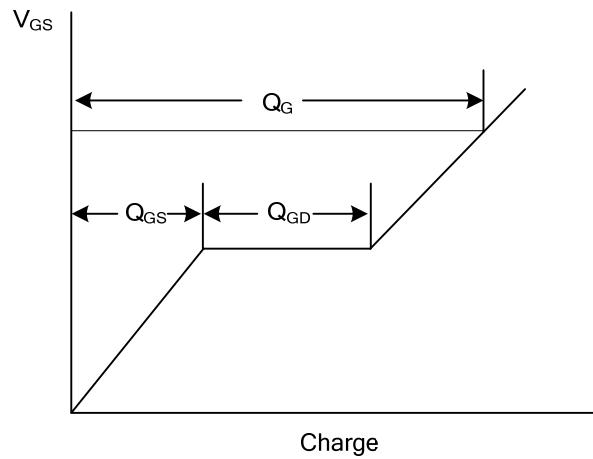
Switching Test Circuit



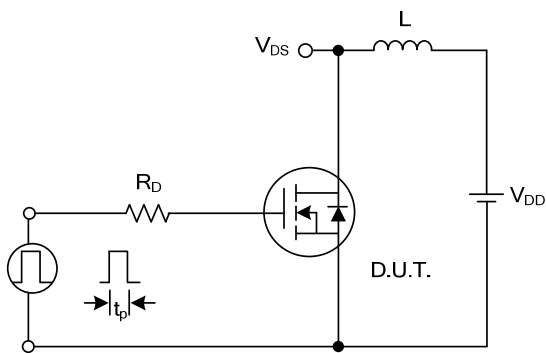
Switching Waveforms



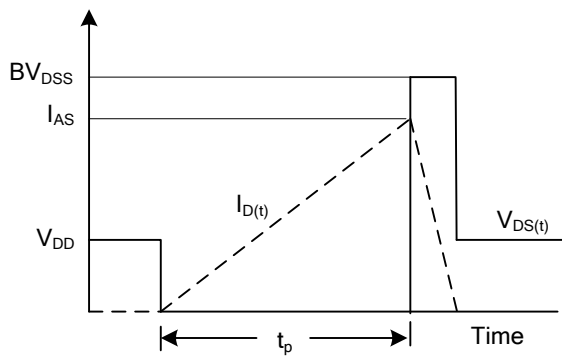
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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