



UF150N06M

Power MOSFET

150A, 60V N-CHANNEL POWER MOSFET

DESCRIPTION

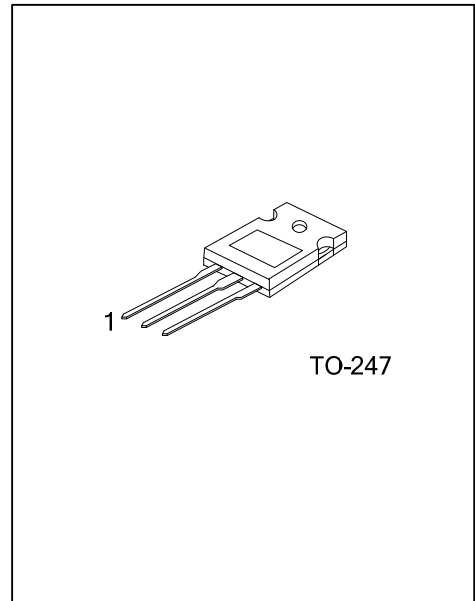
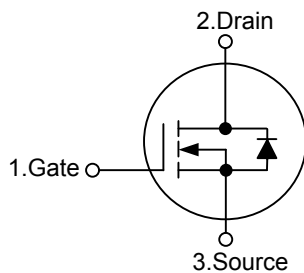
The UTC **UF150N06M** is a N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with ideal for low voltage inverter applications.

The UTC **UF150N06M** is suitable for high efficiency synchronous rectification in SMPS, UPS, hard switched and high frequency circuits.

FEATURES

- * $R_{DS(ON)} < \text{m}\Omega @ V_{GS}=10V, I_D=75A$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability

SYMBOL



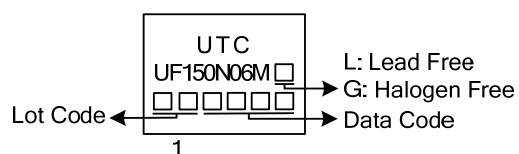
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF150N06ML-T47-T	UF150N06MG-T47-T	TO-247	G	D	S	Tube

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

UF150N06MG-T47-T (1)Packing Type (2)Package Type (3)Green Package		(1) T: Tube (2) T47: TO-247 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	150	A
	Pulsed	I_{DM}	450	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	680	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.5	V/ns
Power Dissipation		P_D	231	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		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. $L = 0.1\text{mH}$, $I_{AS} = 116.7\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, 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		θ_{JA}	40	$^{\circ}\text{C}/\text{W}$
Junction to Case		θ_{JC}	0.35	$^{\circ}\text{C}/\text{W}$

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250 μA	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{DS} =0V, V _{GS} =+20V			+100	nA
	Reverse		V _{DS} =0V, V _{GS} =-20V			-100	nA
ON CHARACTERISTICS(Note1)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =75A			6.0	mΩ
			V _{GS} =4.5V, I _D =75A			9.0	mΩ
DYNAMIC PARAMETERS (Note 2)							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		7200		pF
Output Capacitance		C _{OSS}			2100		pF
Reverse Transfer Capacitance		C _{RSS}			540		pF
SWITCHING PARAMETERS(Note 2)							
Total Gate Charge		Q _G	V _{DS} =48V, V _{GS} =10V, I _D =60A, I _G =1mA (Note 1, 2)		174		nC
Gate Source Charge		Q _{GS}			34		nC
Gate Drain Charge		Q _{GD}			54		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =60A, R _G = 25Ω (Note 1, 2)		54		ns
Turn-ON Rise Time		t _R			130		ns
Turn-OFF Delay Time		t _{D(OFF)}			504		ns
Turn-OFF Fall-Time		t _F			212		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Current		I _S				150	A
Maximum Body-Diode Pulsed Current		I _{SM}				450	A
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _S =150A			1.5	V
Body Diode Reverse Recovery Time		t _{rr}	V _{GS} =0V, I _S =30A		92		ns
Body Diode Reverse Recovery Charge		Q _{rr}	di _F /dt=100A/μs (Note 1)		300		nC

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

D.U.T.

V_{DS}

I_{SD}

L

V_{DD}

R_G

Driver

V_{GS}

Same Type as D.U.T.

- * dv/dt controlled by R_G
- * I_{SD} controlled by pulse period
- * D.U.T.-Device Under Test

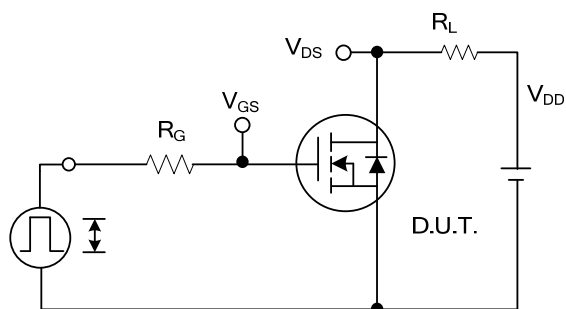
The diagram illustrates the timing relationships for a MOSFET's body diode during switching. It consists of three vertically aligned waveforms:

- Top Trace (V_{GS} (Driver)):** A square wave representing the gate voltage. The pulse width is labeled **P.W.**, the total time for one pulse is the **Period**, and the duty cycle is given by $D = \frac{P.W.}{Period}$. The peak voltage is $V_{GS} = 10V$.
- Middle Trace (I_{SD} (D.U.T.)):** Shows the source-drain current. During the **Body Diode Forward Current** phase, the current is I_{FM} . During the **Body Diode Reverse Current** phase, the current is I_{RM} . The reverse current phase shows a **di/dt** (rate of change of current) during turn-off.
- Bottom Trace (V_{DS} (D.U.T.)):** Shows the drain-source voltage. It includes the **Body Diode Recovery dv/dt** phase, where the voltage rises from zero during the reverse current phase. The peak reverse voltage is V_{DD} .

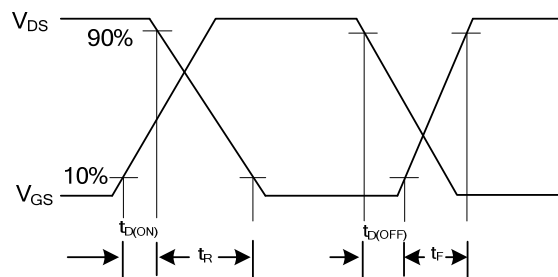
Labels at the bottom indicate the **Body Diode** and **Forward Voltage Drop** regions.

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QW-R209-279.A

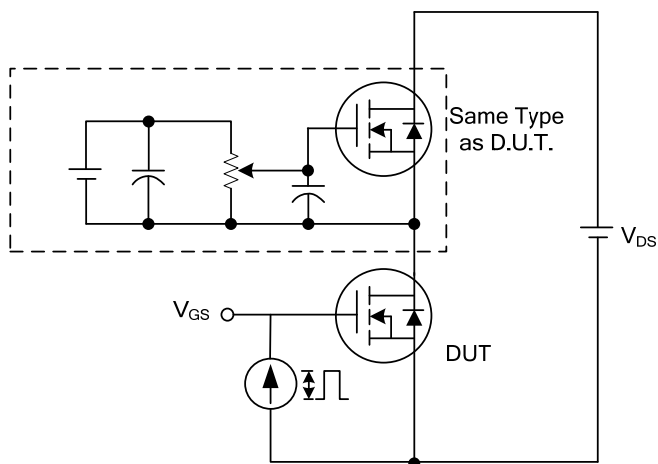
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



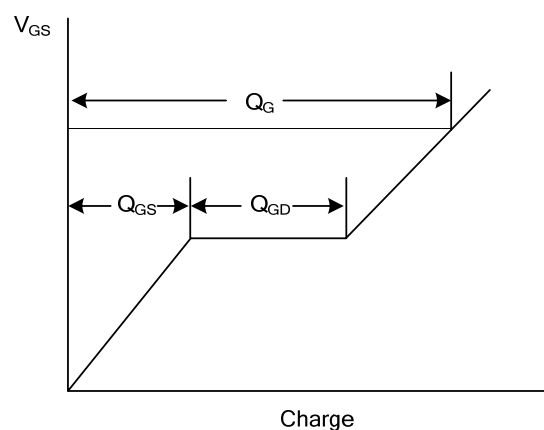
Switching Test Circuit



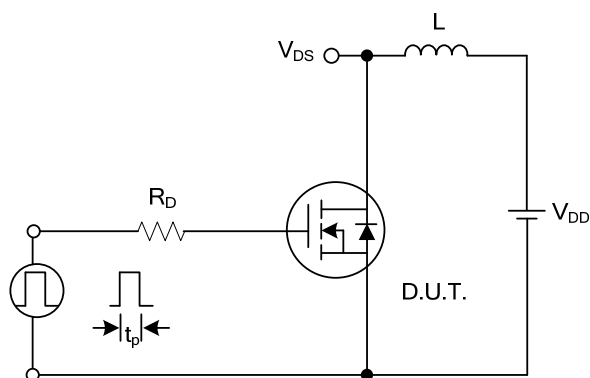
Switching Waveforms



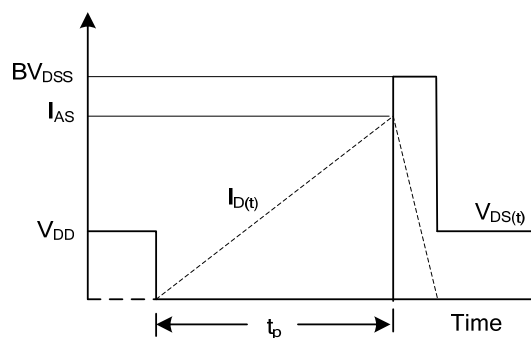
Gate Charge Test Circuit



Gate Charge Waveform

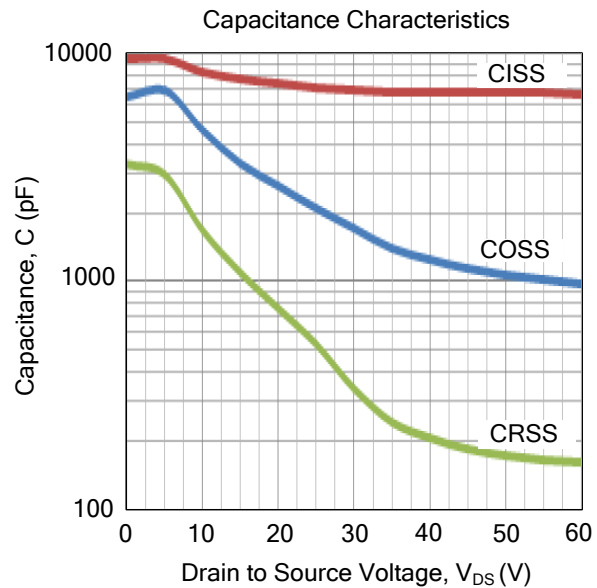
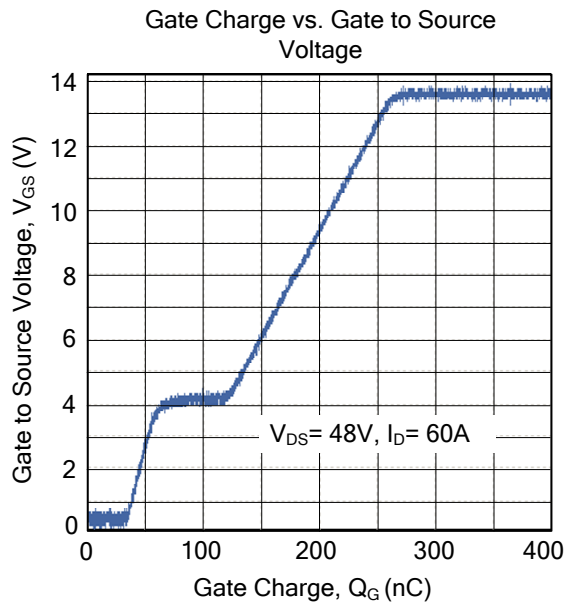


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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