

**UT200N06M**

Preliminary

Power MOSFET

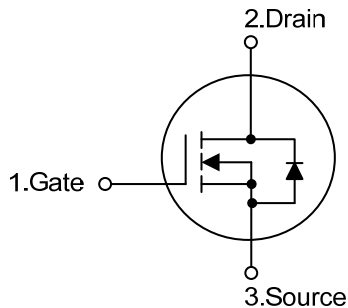
**200A, 60V N-CHANNEL
ENHANCEMENT MODE
TRENCH POWER MOSFET****DESCRIPTION**

The UTC **UT200N06M** 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 **UT200N06M** is suitable for high efficiency synchronous rectification in SMPS, UPS, hard switched and high frequency circuits.

FEATURES

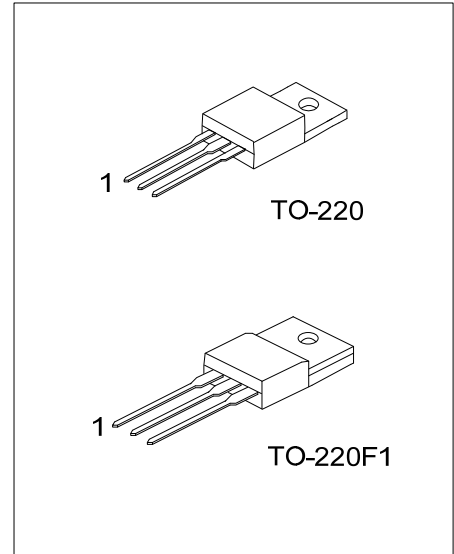
- * $R_{DS(ON)} \leq 4.3 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=100\text{A}$
- * $R_{DS(ON)} \leq 8.8 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=20\text{A}$
- * Low capacitance
- * Low gate charge
- * Fast switching capability
- * Avalanche energy specified

SYMBOL**ORDERING INFORMATION**

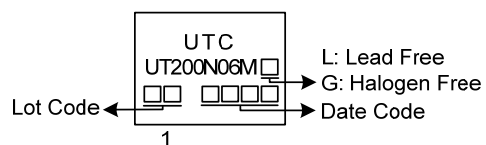
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT200N06ML-TA3-T	UT200N06MG-TA3-T	TO-220	G	D	S	Tube
UT200N06ML-TF1-T	UT200N06MG-TF1-T	TO-220F1	G	D	S	Tube

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

UT200N06MG-TA3-T		(1)Packing Type	(1) T: Tube
		(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1
		(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current ($T_C=25^{\circ}\text{C}$)	Continuous	I_D	200	A
	Pulsed (Note 2)	I_{DM}	400	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	304	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.4	V/ns
Power Dissipation	TO-220	P_D	250	W
	TO-220F1		50	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. $L=0.1\text{mH}$, $I_{AS}=78\text{A}$, $V_{DD}=30\text{V}$, $R_G=25\Omega$, 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	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-220F1			$^{\circ}\text{C/W}$
Junction to Case (Note)	TO-220	θ_{JC}	0.5	$^{\circ}\text{C/W}$
	TO-220F1		2.5	$^{\circ}\text{C/W}$

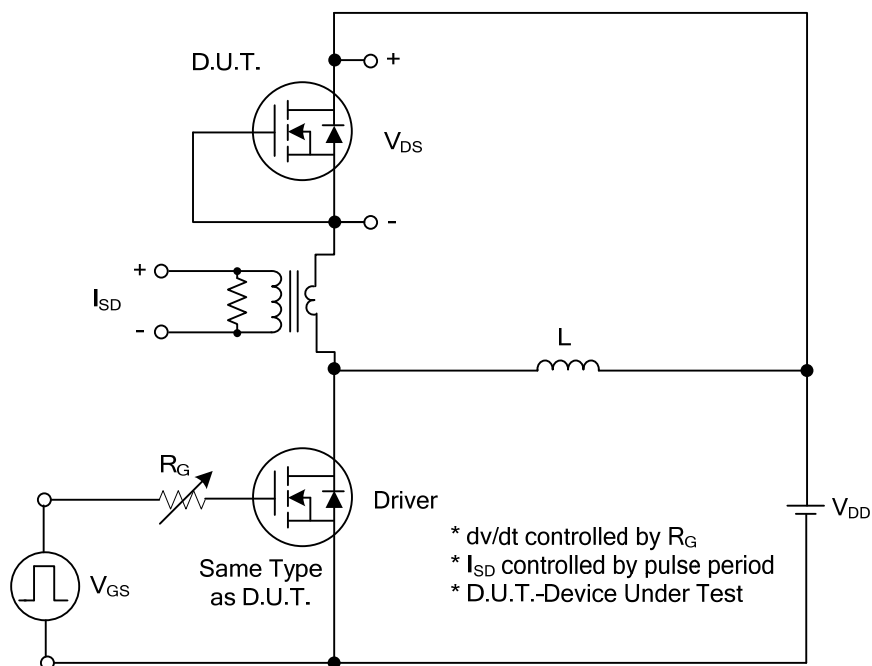
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

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 =100A			4.3	mΩ
			V _{GS} =4.5V, I _D =20A			8.8	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		18.28		nF
Output Capacitance		C _{OSS}			1365		pF
Reverse Transfer Capacitance		C _{RSS}			1130		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =48V, V _{GS} =4.5V, I _D =200A (Note 1, 2)		180		nC
Gate-Source Charge		Q _{GS}			50		nC
Gate-Drain Charge		Q _{GD}			120		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =200A, R _G =3.3Ω (Note 1, 2)		44		ns
Turn-On Rise Time		t _{TR}			32		ns
Turn-Off Delay Time		t _{D(OFF)}			170		ns
Turn-Off Fall Time		t _F			78		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				200	A
Maximum Body-Diode Pulsed Current		I _{SM}				400	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =200A , V _{GS} =0V			1.3	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		59		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		80		nC

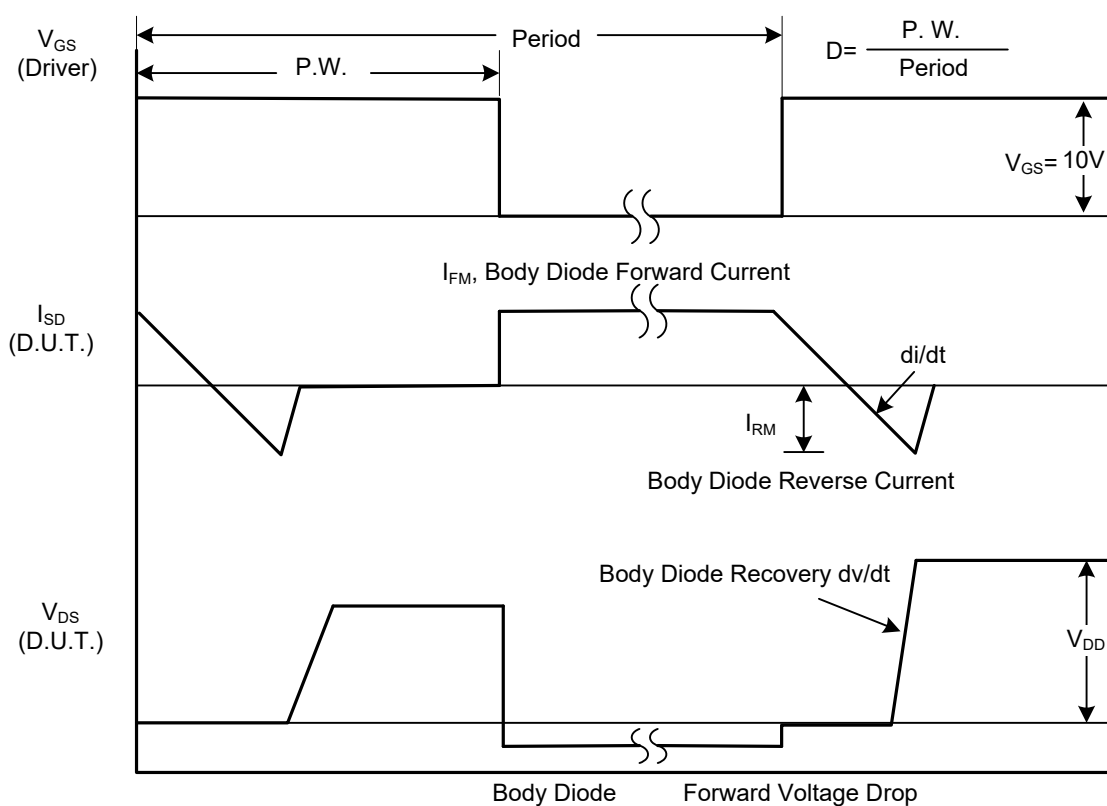
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

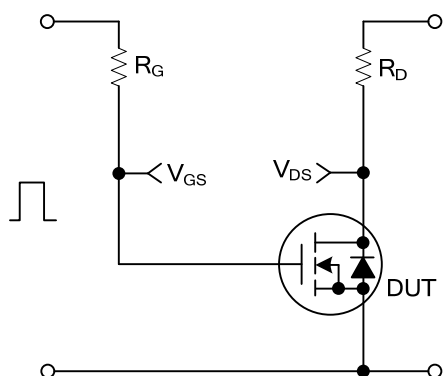


Peak Diode Recovery dv/dt Test Circuit

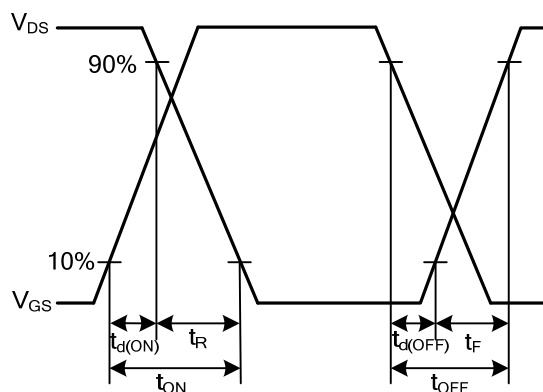


Peak Diode Recovery dv/dt Waveforms

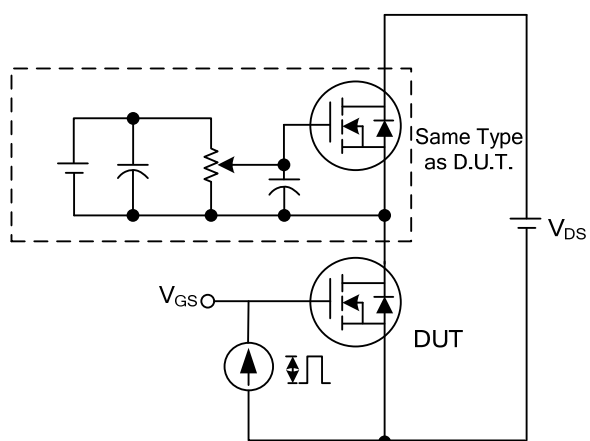
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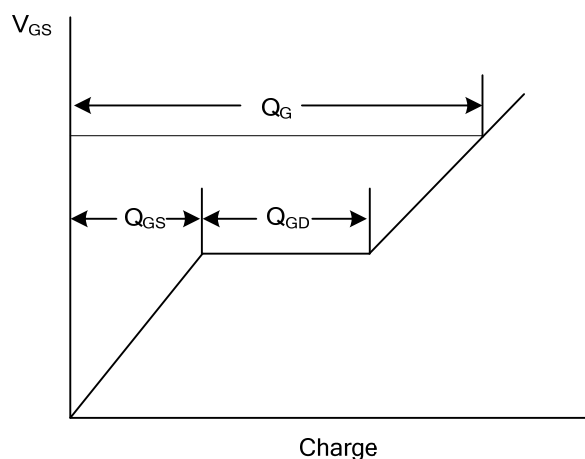
Switching Test Circuit



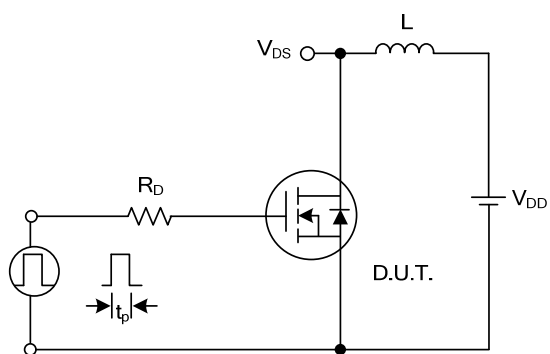
Switching Waveforms



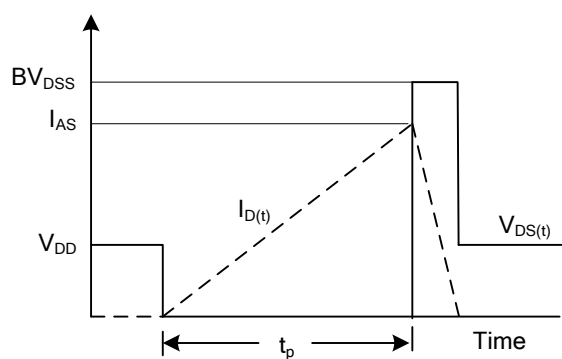
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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