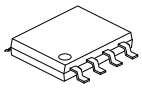
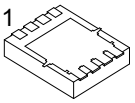
6.3A, 60V N-CHANNEL FAST SWITCHING MOSFET



SOP-8



PDFN5×6

■ DESCRIPTION

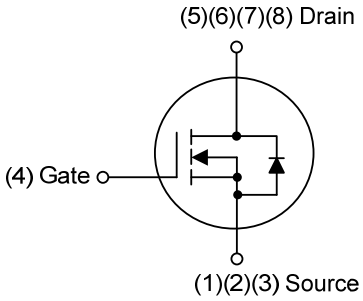
The UTC **UTM6006** is an N-Channel MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge.

The UTC **UTM6006** is suitable for application in networking AC-DC power system and LCD/LED back light, etc.

■ FEATURES

* $R_{DS(ON)}$ ≤ 18 mΩ @ V_{GS}=10V, I_D=6.0A
  $R_{DS(ON)}$ ≤ 20 mΩ @ V_{GS}=4.5V, I_D=4.0A
* Low gate charge
* Excellent CdV/dt effect decline
* High switching speed

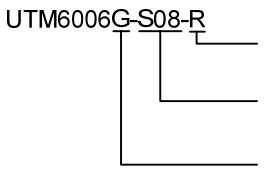
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTM6006L-S08-R	UTM6006G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTM6006L-P5060-R	UTM6006G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

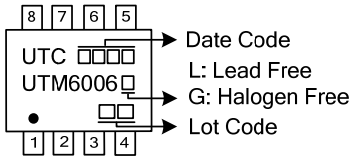
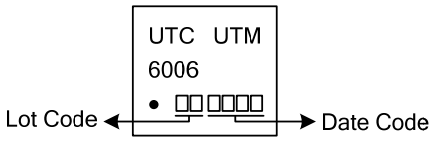


(1) R: Tape Reel

(2) S08: SOP-8, P5060: PDFN5×6

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOP-8	PDFN5×6
	

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous	T_A=25°C	I_D	6.3	A
	V_{GS} @ 10V (Note 1)	T_A=70°C		5.0	A
	Pulsed (Note 2)		I_{DM}	32	A
Avalanche Current			I_{AS}	28	A
Single Pulse Avalanche Energy (Note 3)			E_{AS}	67	mJ
Power Dissipation (T_A=25°C) (Note 4)		SOP-8	P_D	1.5	W
		PDFN5×6		1.92	
Junction Temperature			T_J	-55 ~ +150	°C
Storage Temperature Range			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 DATA (Note 1)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-8	θ_{JA}	85	°C/W
	PDFN5×6		65	
Junction to Case	SOP-8	θ_{JC}	24	°C/W
	PDFN5×6		12	

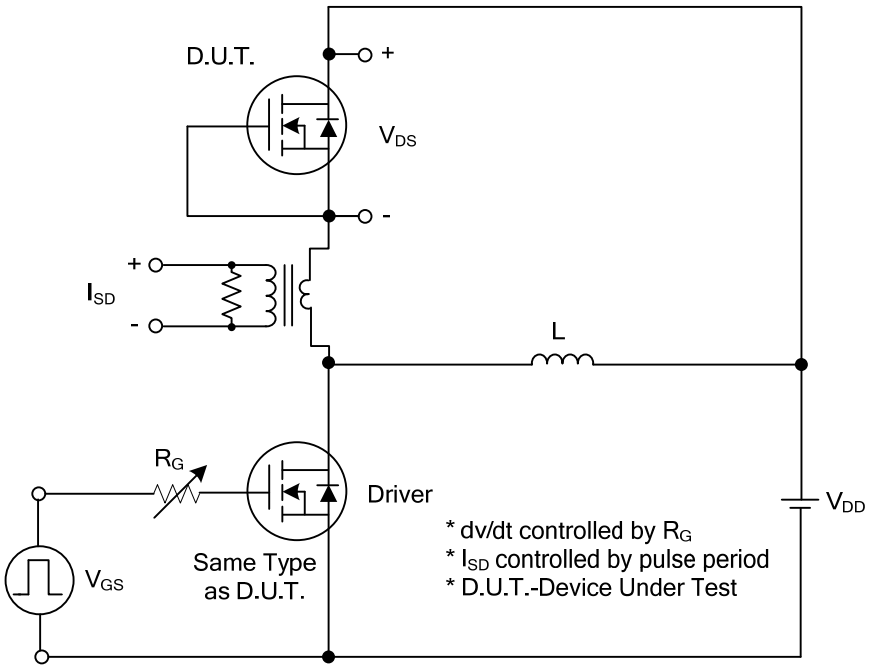
Notes: 1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
3. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=30A.
4. The power dissipation is limited by 150°C junction temperature.

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

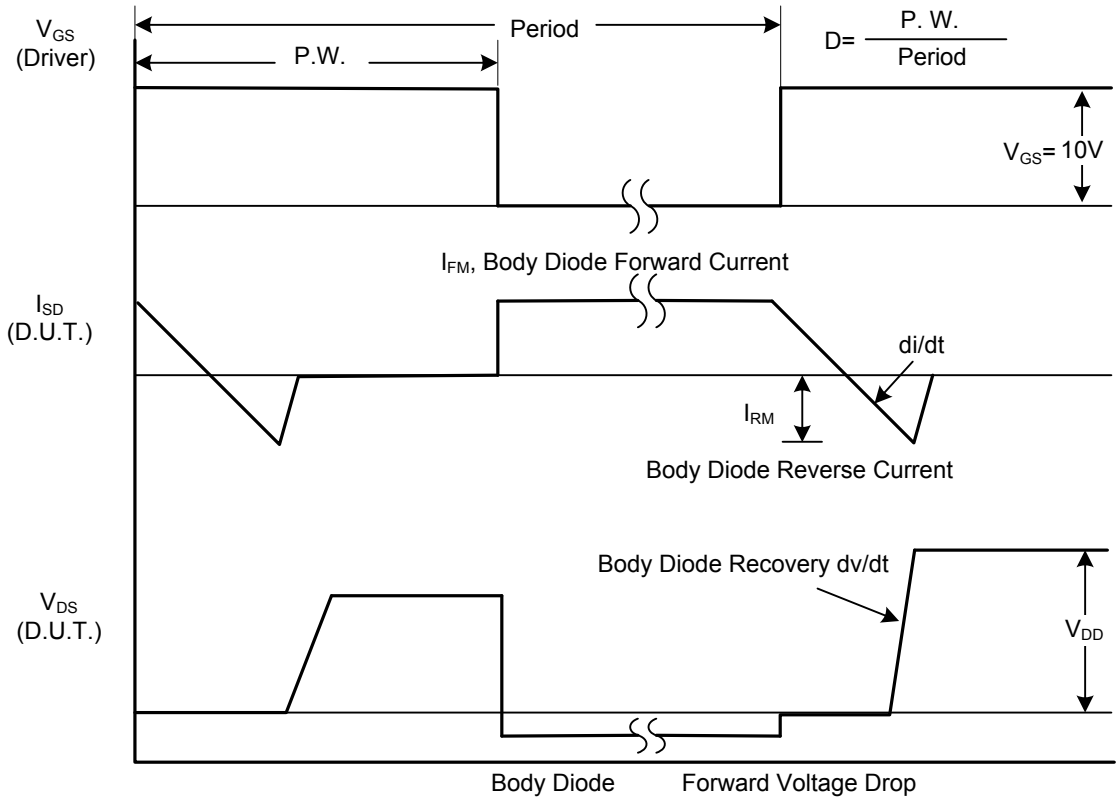
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
BV_{DSS} Temperature Coefficient		$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C , I_D=1mA		0.057		V/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=48V, V_{GS}=0V, T_J=25°C			1	μA
			V_{DS}=48V, V_{GS}=0V, T_J=55°C			5	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	1.2		2.5	V
$V_{GS(TH)}$ Temperature Coefficient		$\triangle V_{GS(TH)}$			-5.68		mV/°C
Static Drain-Source On-State Resistance (Note 2)		$R_{DS(ON)}$	V_{GS}=10V, I_D=6.0A		14	18	mΩ
			V_{GS}=4.5V, I_D=4.0A		16	20	mΩ
Forward Transconductance		g_{FS}	V_{DS}=5V, I_D=6A		40		S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1070	1200	pF
Output Capacitance		C_{OSS}			200	220	pF
Reverse Transfer Capacitance		C_{RSS}			190	210	pF
SWITCHING PARAMETERS (Note 2)							
Total Gate Charge (4.5V)		Q_G	V_{GS}=10V, V_{DS}=48V, I_D=1A		290	310	nC
Gate to Source Charge		Q_{GS}			10.7	15	nC
Gate to Drain Charge		Q_{GD}			30	45	nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{GS}=10V, V_{DD}=30V, R_G=3.3Ω, I_D=2A		55	70	ns
Rise Time		t_R			100	120	ns
Turn-OFF Delay Time		$t_{D(OFF)}$			580	620	ns
Fall-Time		t_F			190	210	ns
GUARANTEED AVALANCHE CHARACTERISTICS							
Single Pulse Avalanche Energy (Note 5)		E_{AS}	V_{DD}=25V, L=0.1mH, I_{AS}=15A	19			mJ
DIODE CHARACTERISTICS							
Continuous Source Current (Note 1, 6)		I_S	V_G=V_D=0V , Force Current			6.3	A
Pulsed Source Current (Note 2, 6)		I_{SM}				32	A
Diode Forward Voltage (Note 2)		V_{SD}	V_{GS}=0V , I_S=6.3A , T_J=25°C			1	V
Reverse Recovery Time		t_{rr}	I_F=6A, dI/dt=100A/μs, T_J=25°C		15		nS
Reverse Recovery Charge		Q_{rr}			10.4		nC

Notes: 1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width≤300μs, duty cycle≤2%.
3. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=30A.
4. The power dissipation is limited by 150°C junction temperature.
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

■ TEST CIRCUITS AND WAVEFORMS

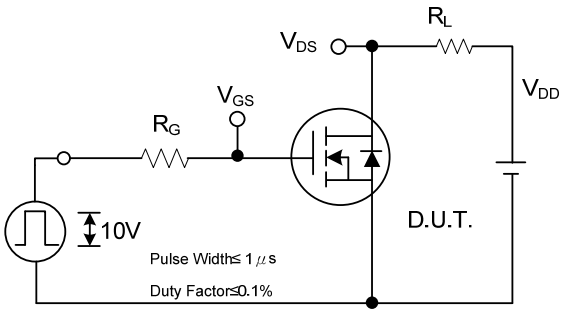


Peak Diode Recovery dv/dt Test Circuit

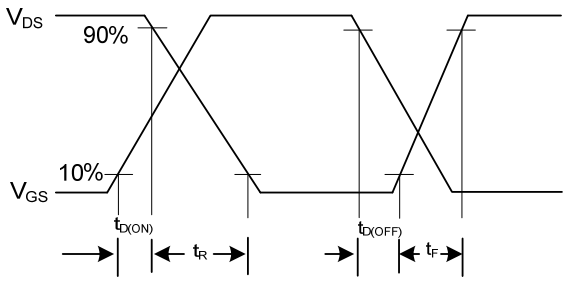


Peak Diode Recovery dv/dt Waveforms

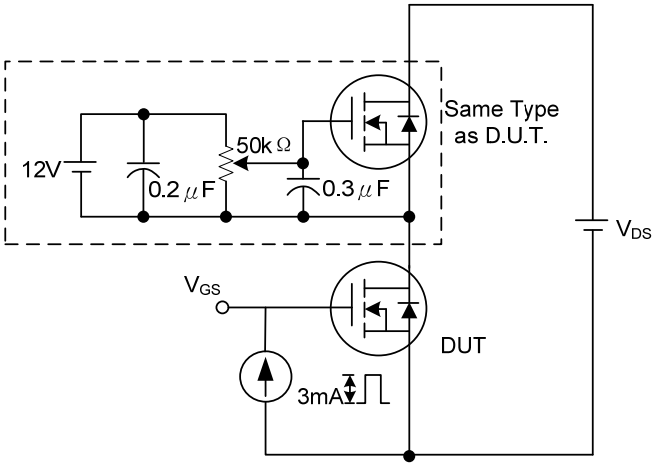
■ TEST CIRCUITS AND WAVEFORMS



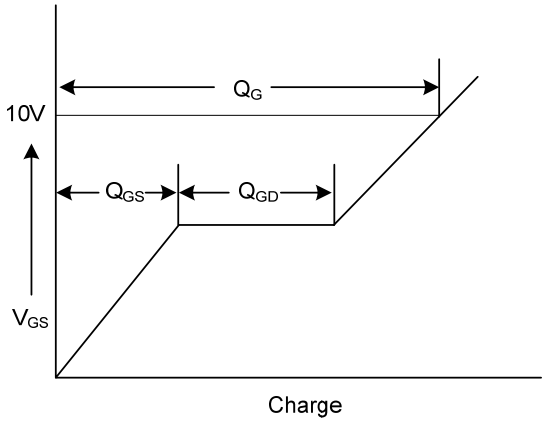
Switching Test Circuit



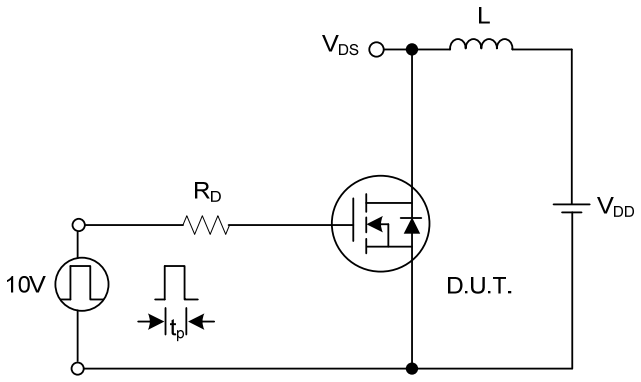
Switching Waveforms



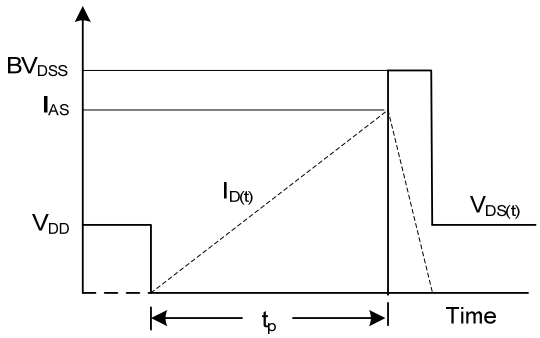
Gate Charge Test Circuit



Gate Charge Waveform



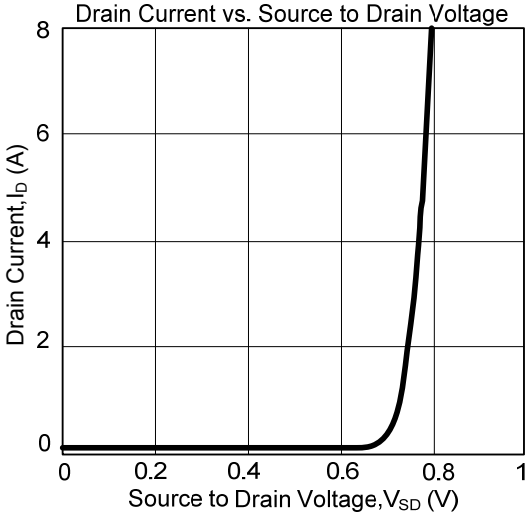
Unclamped Inductive Switching Test Circuit



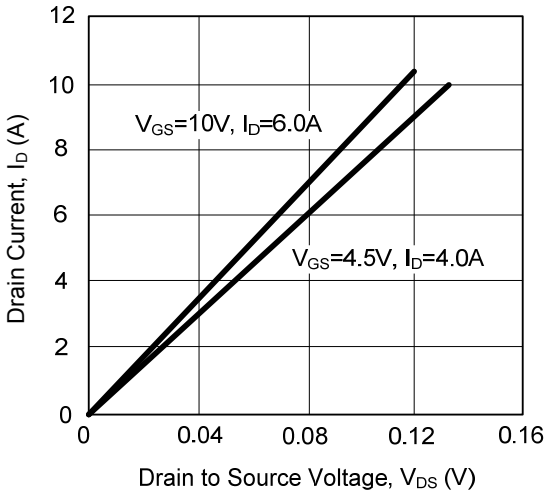
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

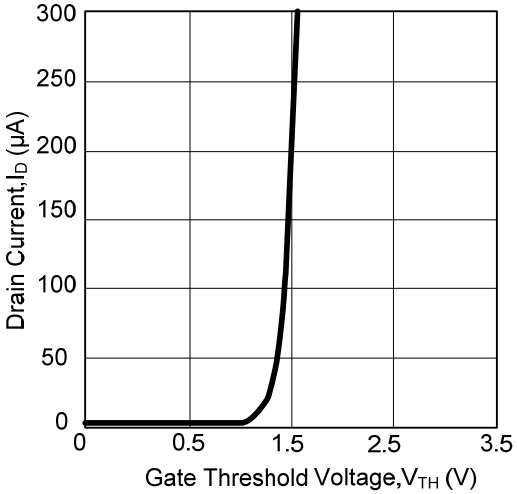
Drain Current vs. Source to Drain Voltage



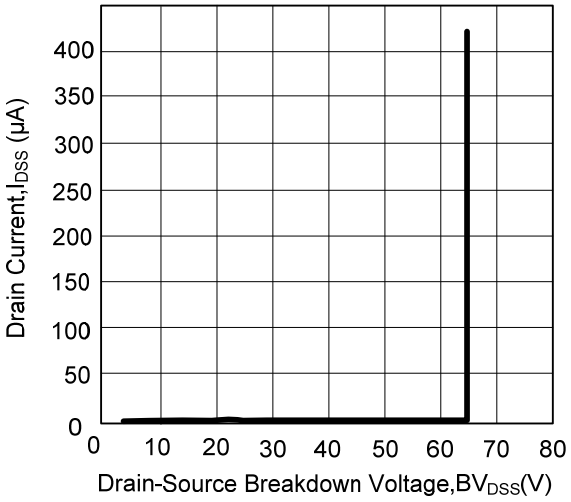
Drain-Source On-State Resistance Characteristics



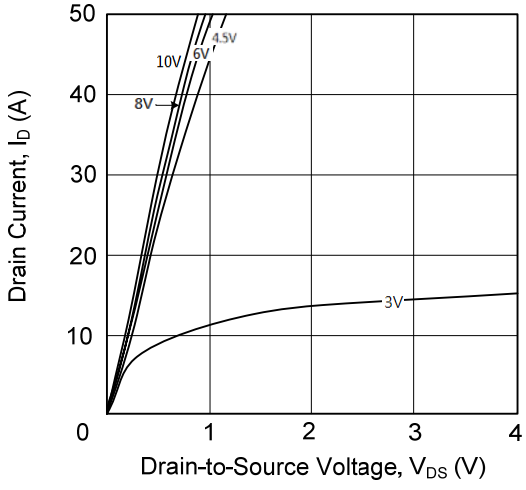
Drain Current vs. Gate Threshold Voltage



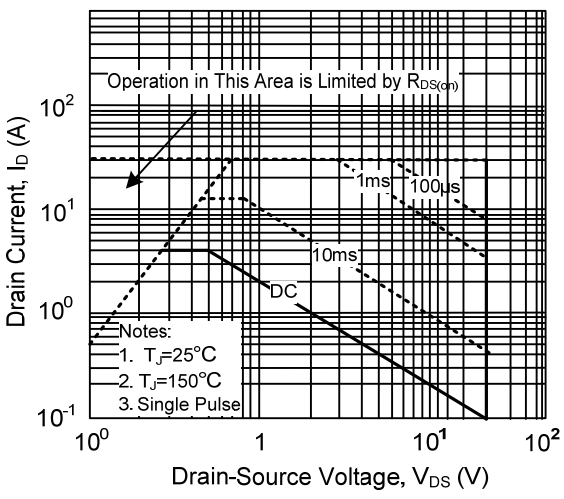
Drain Current vs. Drain-Source Breakdown Voltage



On-State Characteristics

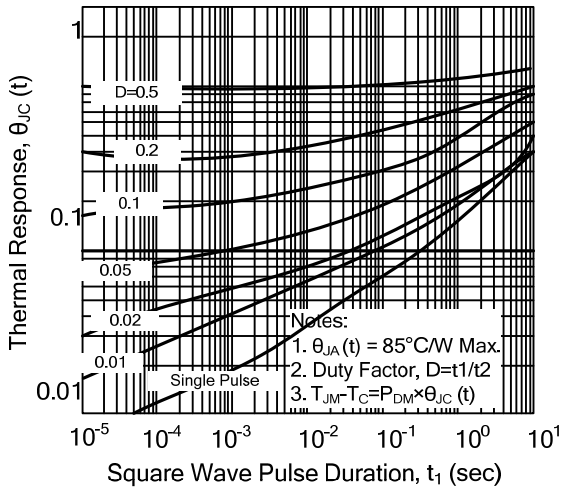


Safe Operating Area



■ TYPICAL CHARACTERISTICS (Cont.)

Transient Thermal Response Curve



Transient Characteristics