



UTM6016

Power MOSFET

8.0A, 60V N-CHANNEL FAST SWITCHING MOSFET

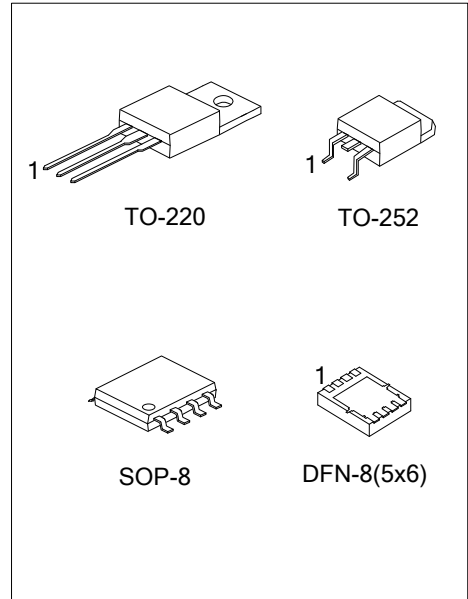
■ **DESCRIPTION**

The UTC **UTM6016** 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.

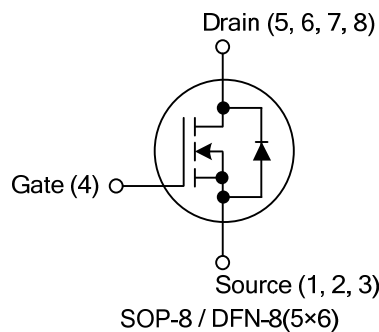
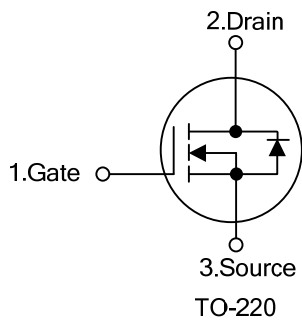
The UTC **UTM6016** is suitable for application in networking DC-DC power system and LCD/LED back light, etc.

■ **FEATURES**

- * $R_{DS(ON)} < 12\text{ m}\Omega$ @ $V_{GS} = 10\text{V}$, $I_D = 8\text{A}$
- $R_{DS(ON)} < 15\text{ m}\Omega$ @ $V_{GS} = 4.5\text{V}$, $I_D = 6\text{A}$
- * Low gate charge
- * Excellent CdV/dt effect decline
- * High switching speed



■ **SYMBOL**



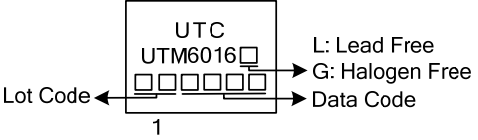
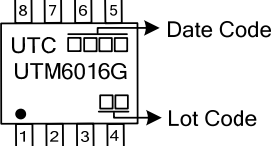
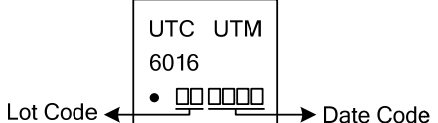
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTM6016L-TA3-T	UTM6016G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTM6016L-TN3-R	UTM6016G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
-	UTM6016G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
-	UTM6016G-K08-5060-R	DFN-8(5x6)	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTM6016L-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, TN3: TO-252, S08: SOP-8, K08-5060: DFN-8(5x6)</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING

Package	Marking
TO-220 / TO-252	 <p>UTC UTM6016 1</p> <p>Lot Code ← → Data Code</p> <p>L: Lead Free G: Halogen Free</p>
SOP-8	 <p>8 7 6 5 → Date Code</p> <p>UTC UTM6016G</p> <p>← Lot Code</p> <p>1 2 3 4</p>
DFN-8(5×6)	 <p>UTC UTM 6016</p> <p>Lot Code ← → Date Code</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	8.0	A
	Pulsed (Note 2)	I_{DM}	32	A
Avalanche Current (Note 2)		I_{AR}	23	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	26	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.6	V/ns
Power Dissipation (Note 4)	TO-220	P_D	28	W
	TO-252		40	W
	SOP-8		5.2	W
	DFN-8(5x6)		10.4	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. $L=0.1\text{mH}$, $I_{AS}=23\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD}\leq 8.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

5. The power dissipation is limited by 150°C junction temperature.

■ THERMAL CHARACTERISTICS (Note 1)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-252		110	
	SOP-8/DFN-8(5x6)		50	
Junction to Case	TO-220	θ_{JC}	4.38	$^\circ\text{C}/\text{W}$
	TO-252		3.13	
	SOP-8		24	
	DFN-8(5x6)		12	

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

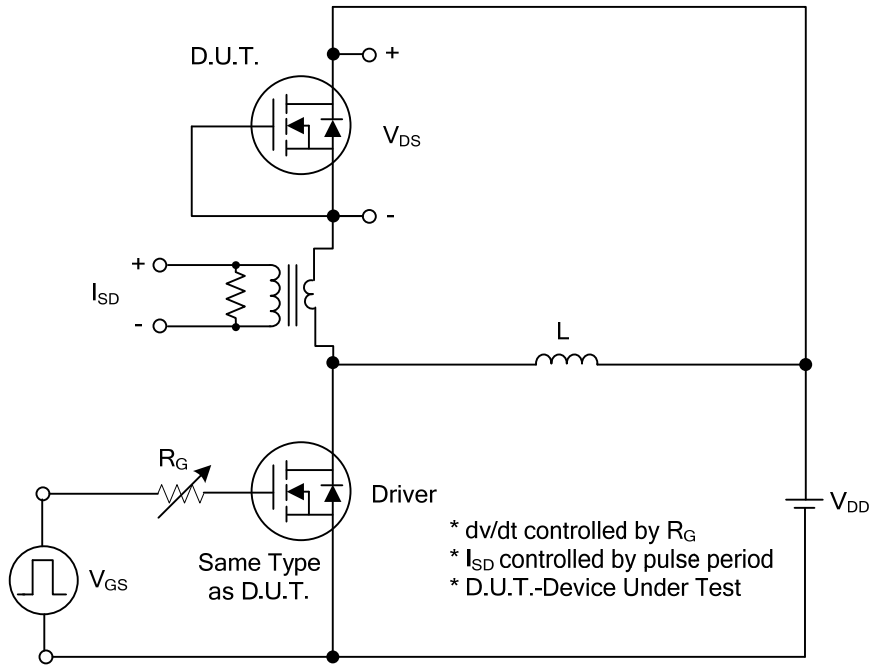
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =48V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	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	1.2		2.5	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =8A			12	mΩ
		V _{GS} =4.5V, I _D =6A			15	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =8A		45		S
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		2880		pF
Output Capacitance	C _{OSS}			208		pF
Reverse Transfer Capacitance	C _{RSS}			167		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =50V, I _D =1.3A, V _{GS} =10V I _G =100μA		160		nC
Gate to Source Charge	Q _{GS}			9.0		nC
Gate to Drain Charge	Q _{GD}			21		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _G =25Ω, V _{GS} =0V		90		ns
Rise Time	t _R			106		ns
Turn-OFF Delay Time	t _{D(OFF)}			938		ns
Fall-Time	t _F			285		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				8	A
Maximum Body-Diode Pulsed Current	I _{SM}				32	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =8.0A, V _{GS} =0V			1.2	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =8.0A, V _{GS} =0V,		210		nS
Body Diode Reverse Recovery Charge	Q _{rr}	dI _F /dt=100A/μs		430		nC

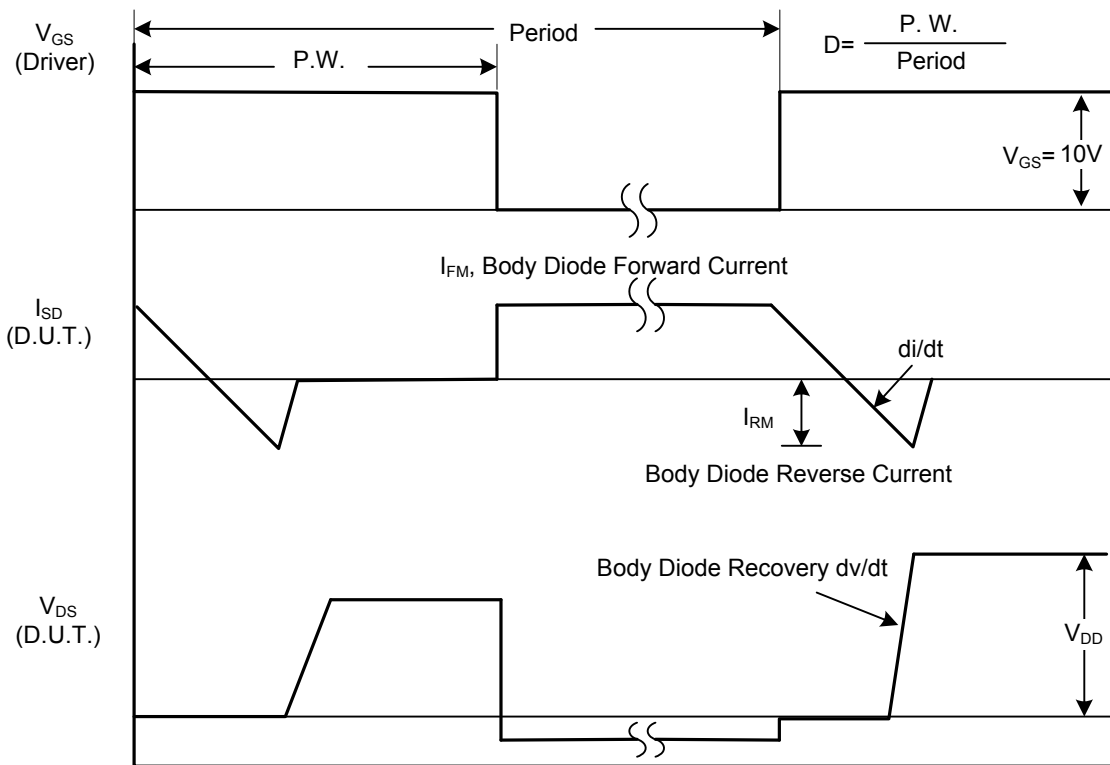
Notes: 1. The data tested by pulsed, pulse width≤300μs, duty cycles≤2%.

2. The power dissipation is limited by 150°C junction temperature.

■ TEST CIRCUITS AND WAVEFORMS

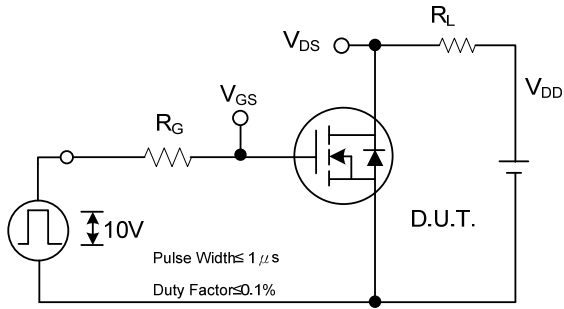


Peak Diode Recovery dv/dt Test Circuit

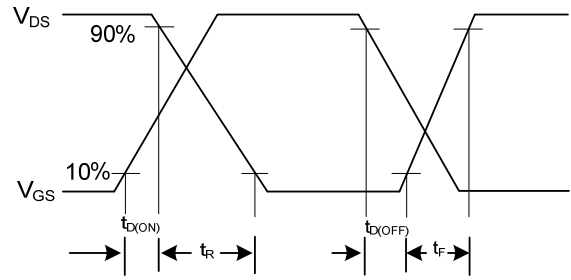


Peak Diode Recovery dv/dt Waveforms

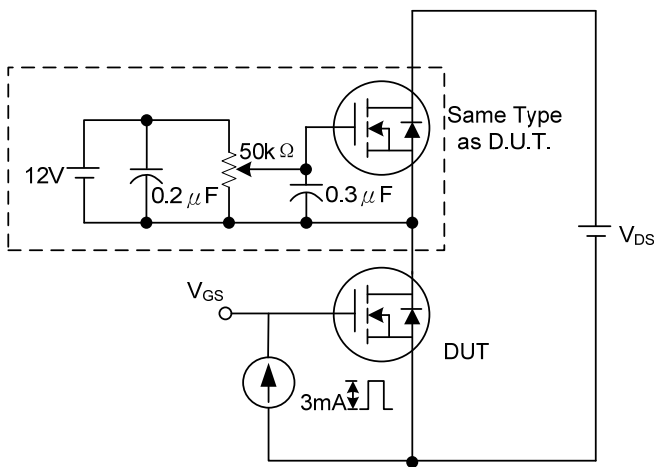
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



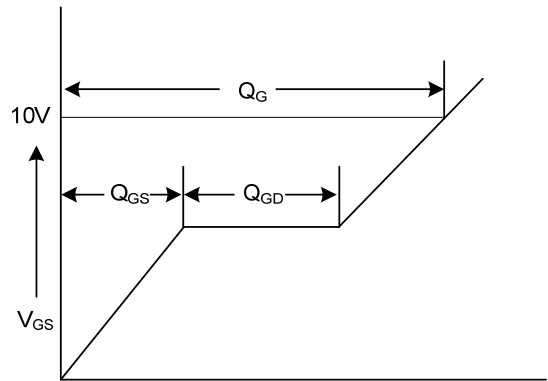
Switching Test Circuit



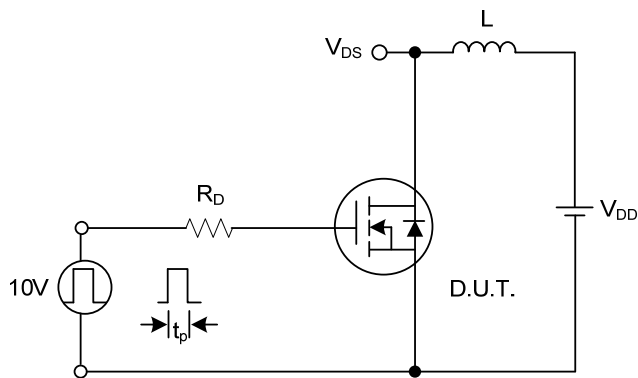
Switching Waveforms



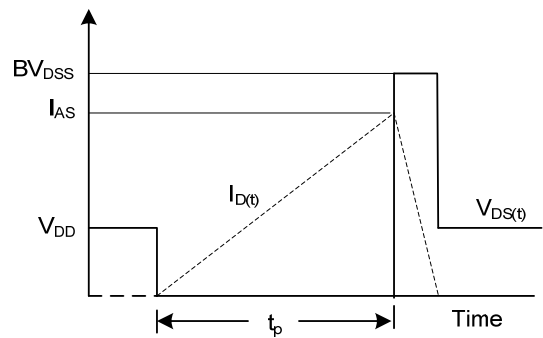
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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