



## UT10P06

**Power MOSFET**

### -10A, -60V P-CHANNEL POWER MOSFET

#### DESCRIPTION

The UTC **UT10P06** is a P-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance and low gate charge, etc.

The UTC **UT10P06** is suitable for load switch and battery protection applications.

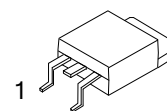
#### FEATURES

\*  $R_{DS(ON)} \leq 130 \text{ m}\Omega$  @  $V_{GS} = -10\text{V}$ ,  $I_D = -2.5\text{A}$

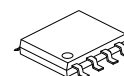
$R_{DS(ON)} \leq 160 \text{ m}\Omega$  @  $V_{GS} = -4.5\text{V}$ ,  $I_D = -2.5\text{A}$

\* Improved dv/dt capability

\* Fast switching

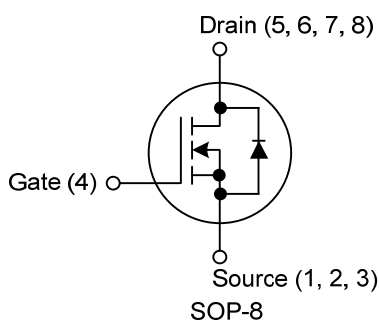
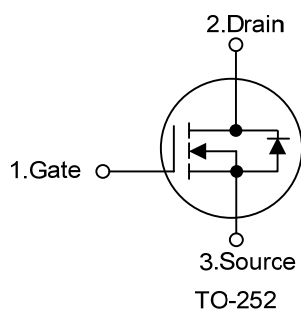


TO-252



SOP-8

#### SYMBOL



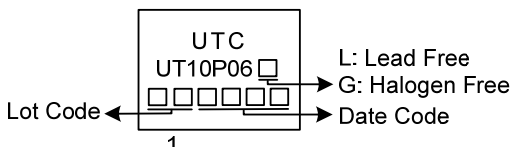
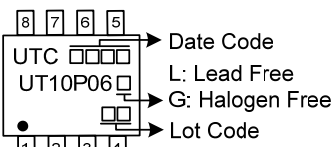
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT10P06L-TN3-R	UT10P06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT10P06L-S08-R	UT10P06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT10P06G-TN3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>		<p>(1) R: Tape Reel (2) TN3: TO-252, S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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## ■ MARKING

TO-252	SOP-8
 <p>UTC UT10P06 □ □ □ □ □ □ 1</p> <p>Lot Code ←</p> <p>→ L: Lead Free → G: Halogen Free → Date Code</p>	 <p>8 7 6 5 UTC □ □ □ □ UT10P06 □ ● □ □ 1 2 3 4</p> <p>→ Date Code → L: Lead Free → G: Halogen Free → Lot 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		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current		$I_D$	-10	A
Pulsed Drain Current (Note 2)		$I_{DM}$	-20	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	5	mJ
Power Dissipation	TO-252	$P_D$	30	W
	SOP-8		1.2	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.  $L = -0.1\text{mH}$ ,  $I_{AS} = -10\text{A}$ ,  $V_{DD} = -50\text{V}$ ,  $R_G = -25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252	$\theta_{JA}$	50	$^\circ\text{C/W}$
	SOP-8		125	$^\circ\text{C/W}$
Junction to Case	TO-252	$\theta_{JC}$	4.16	$^\circ\text{C/W}$
	SOP-8		104	$^\circ\text{C/W}$

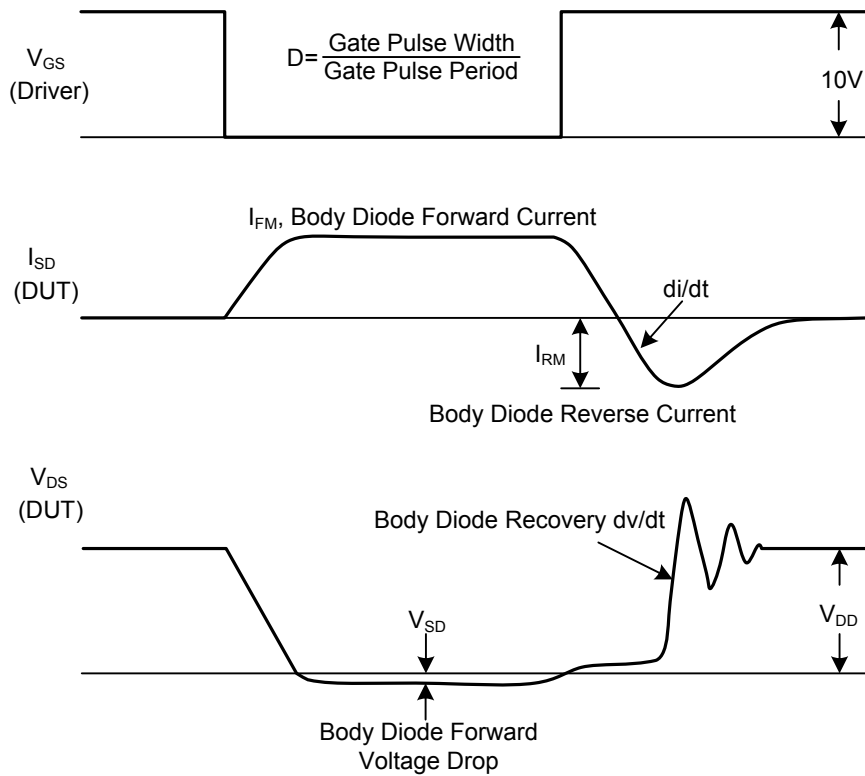
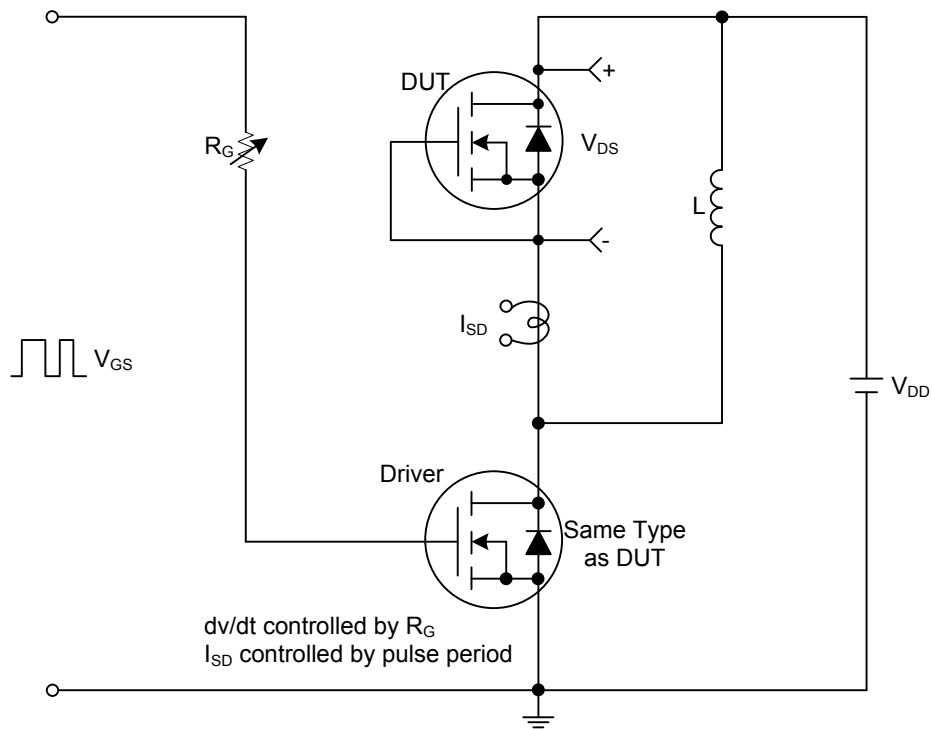
Note: Device mounted on FR-4 substrate  $P_C$  board, 2oz copper, with 1inch square copper plate.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-60			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V			-1	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-2.5A			130	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.5A			160	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, f=1.0MHz		677.9		pF
Output Capacitance	C <sub>OSS</sub>			57.1		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			47.9		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, I <sub>D</sub> =-10A R <sub>G</sub> =25Ω (Note 1, 2)		20		nC
Gate to Source Charge	Q <sub>GS</sub>			3.6		nC
Gate to Drain Charge	Q <sub>GD</sub>			4.2		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A, R <sub>G</sub> =3Ω (Note 1, 2)		4		ns
Turn-ON Rise Time	t <sub>R</sub>			16.26		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			25.2		ns
Turn-OFF Fall-Time	t <sub>F</sub>			18.11		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-10	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-10A,V <sub>GS</sub> =0V			-1.4	V

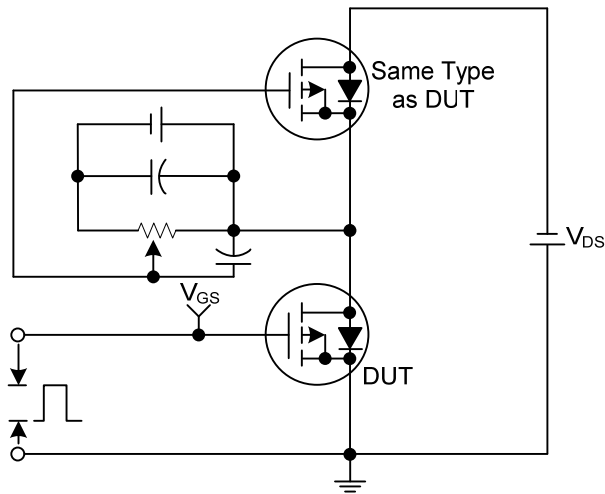
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .  
 2. Essentially independent of operating temperature.

## ■ TEST CIRCUITS AND WAVEFORMS

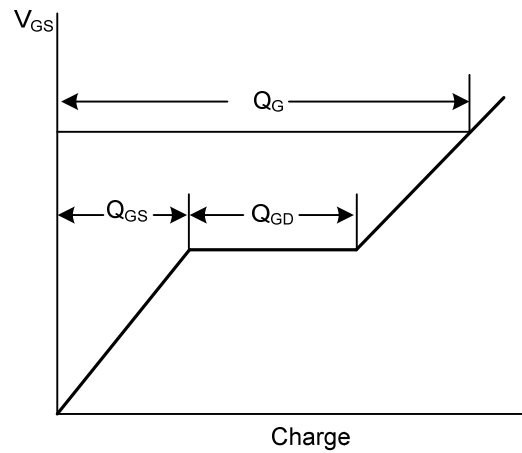


Peak Diode Recovery dv/dt Test Circuit and Waveforms

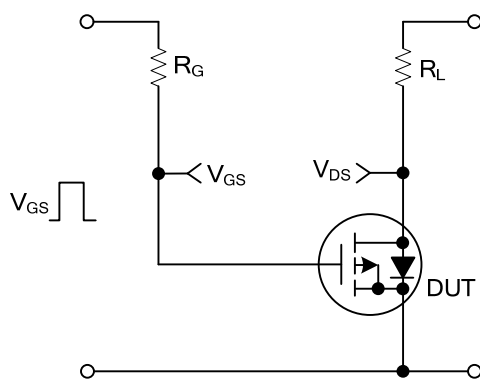
## ■ TEST CIRCUITS AND WAVEFORMS



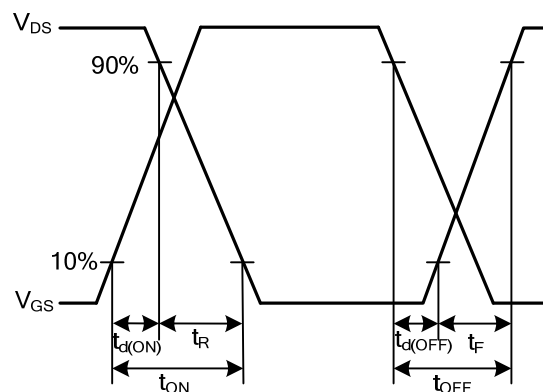
Gate Charge Test Circuit



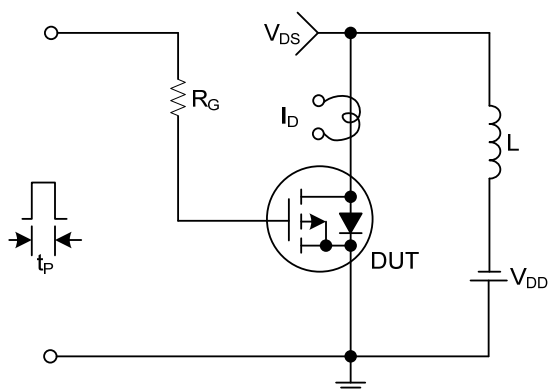
Gate Charge Waveforms



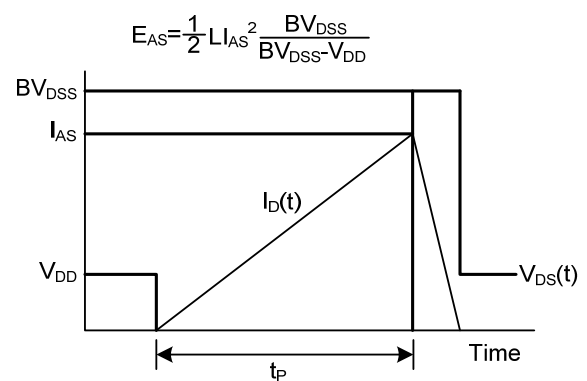
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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