

**UT50P06H**

Preliminary

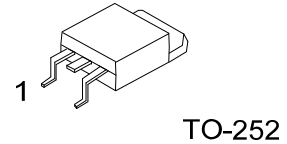
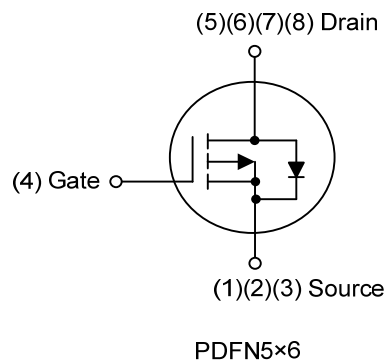
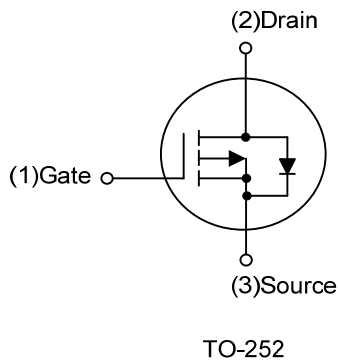
POWER MOSFET**-50A, -60V P-CHANNEL
TRENCH GATE POWER
MOSFET****■ DESCRIPTION**

The **UT50P06H** is a P-channel power MOSFET using UTC's advanced technology.

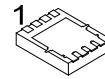
The advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, audio amplifier, DC motor control, and variable switching power applications

■ FEATURES

- * $R_{DS(ON)} \leq 14 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -25\text{A}$
- * 100% Avalanche Tested
- * High current capability
- * Low $R_{DS(ON)}$ and gate charge (Q_g)
- * Fast power switching performance
- * High Cell Density Trench Technology

■ SYMBOL

TO-252



PDFN5x6

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT50P06HL-TN3-R	UT50P06HG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT50P06HL-P5060-R	UT50P06HG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT50P06HG-TN3-R 		(1) R: Tape Reel (2) TN3: TO-252, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-252	PDFN5×6

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current		I_D	-50	A
Pulsed Drain Current (Note 2)		I_{DM}	-100	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	172	mJ
Peak Diode Recovery dv/dt		dv/dt	2.1	V/ns
Power Dissipation	TO-252	P_D	58	W
	PDFN5x6		55	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. $L = 0.1\text{mH}$, $I_{AS} = -58.7\text{A}$, $V_{DD} = -50\text{V}$, $R_G = 25\Omega$, 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	TO-252	θ_{JA}	110	$^{\circ}\text{C}/\text{W}$
	PDFN5x6		65	$^{\circ}\text{C}/\text{W}$
Junction to Case (Note)	TO-252	θ_{JC}	2.15	$^{\circ}\text{C}/\text{W}$
	PDFN5x6		2.27	$^{\circ}\text{C}/\text{W}$

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

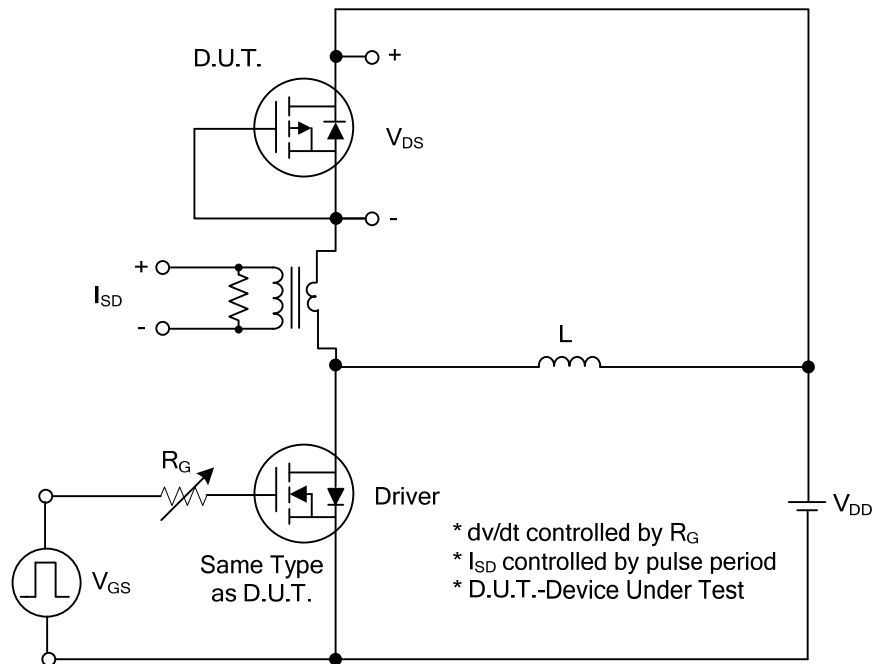
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0 V, I _D =-250μA	-60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V			-1	μA
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-2.0		-4.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-25A			14	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =-25V, V _{GS} =0V, f=1.0MHz		4250		pF
Output Capacitance	C _{OSS}			392		pF
Reverse Transfer Capacitance	C _{RSS}			327		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =-48V, V _{GS} =-10V, I _D =-50A (Note 1, 2)		41		nC
Gate Source Charge	Q _{GS}			6.3		nC
Gate Drain Charge	Q _{GD}			15.3		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =-30V, V _{GS} =-10V, I _D =-50A, R _G =3Ω (Note 1, 2)		15		ns
Turn-ON Rise Time	t _R			18		ns
Turn-OFF Delay Time	t _{D(OFF)}			78		ns
Turn-OFF Fall-Time	t _F			37		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				-50	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				-100	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-50A			-1.4	V
Body Diode Reverse Recovery Time	t _{rr}	V _{GS} = 0V, I _S =-30A,		84		ns
Body Diode Reverse Recovery Charge	Q _{rr}	dl _F /dt=100A/μs (Note 1)		149		μC

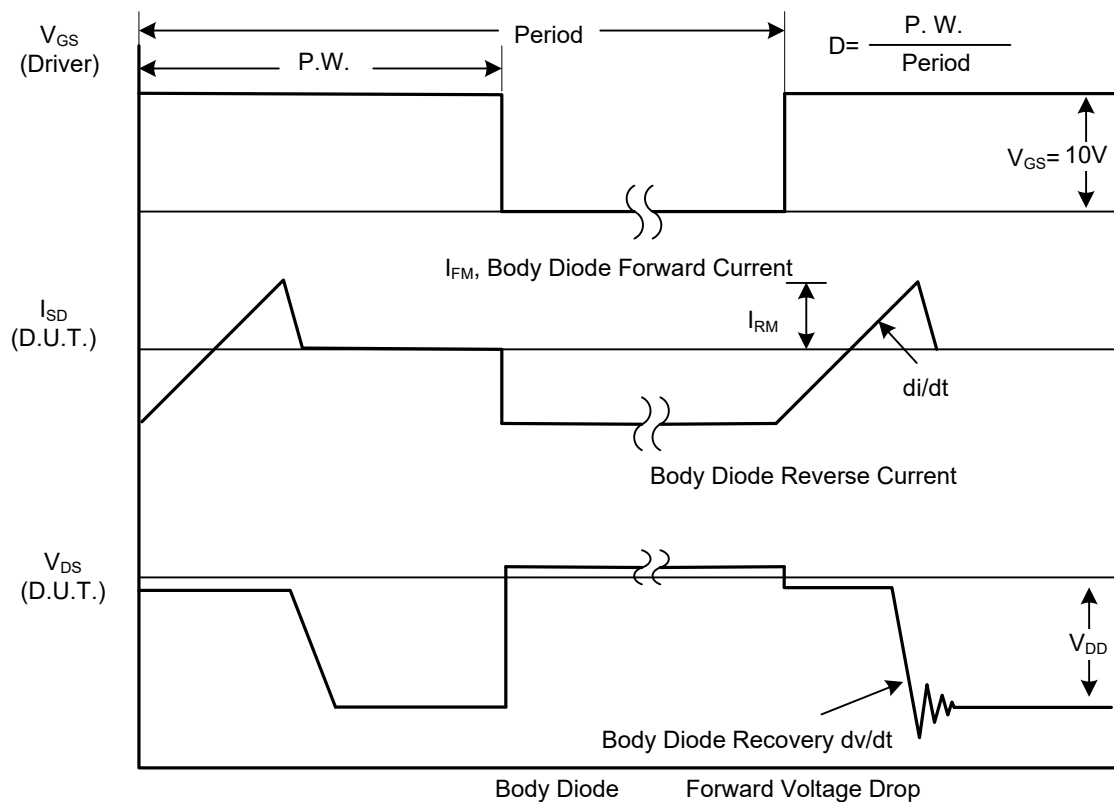
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

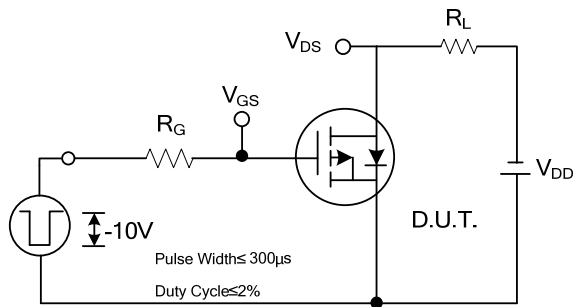


Peak Diode Recovery dv/dt Test Circuit

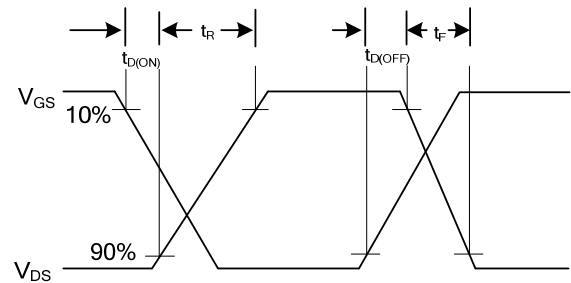


Peak Diode Recovery dv/dt Waveforms

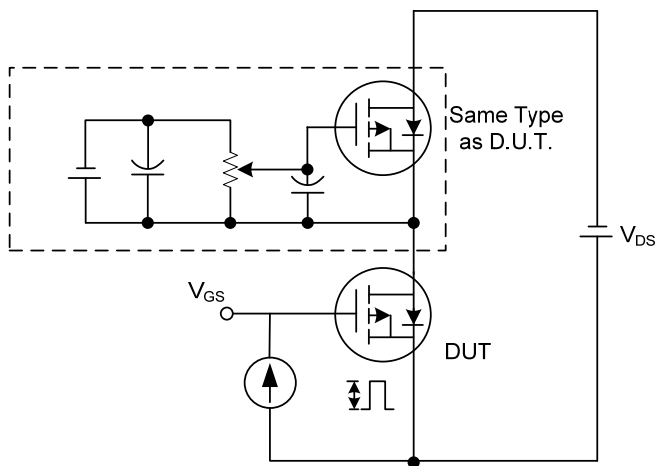
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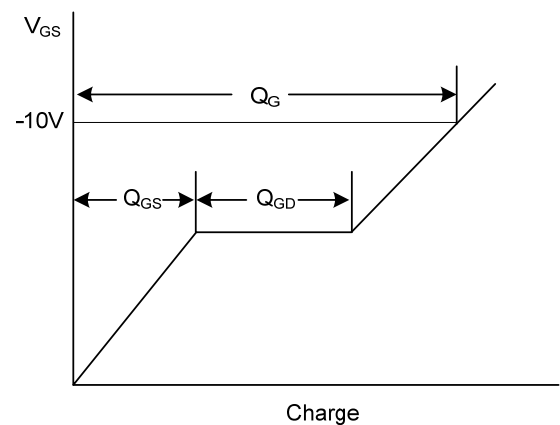
Switching Test Circuit



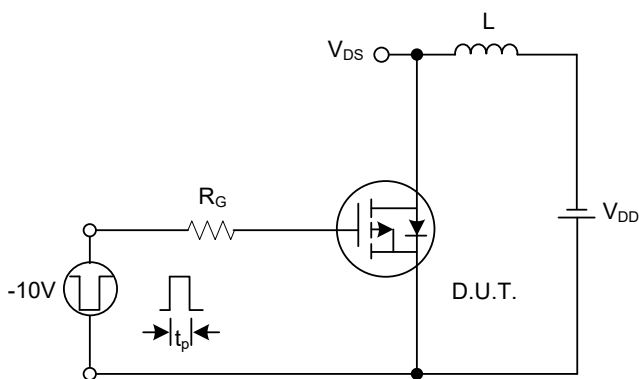
Switching Waveforms



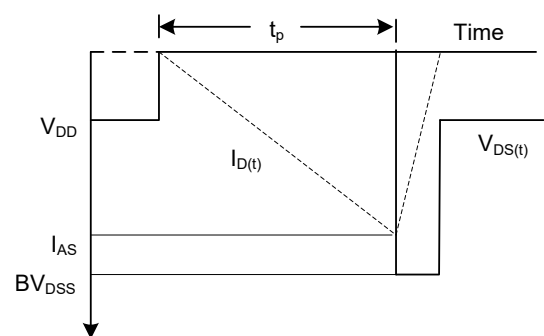
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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