



UT25P06H

Preliminary

Power MOSFET

-25A, -60V P-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **UT25P06H** 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

- * $R_{DS(ON)} \leq 48 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -25\text{A}$
- * 100% Avalanche Tested
- * High Switching Speed
- * High Cell Density Trench Technology

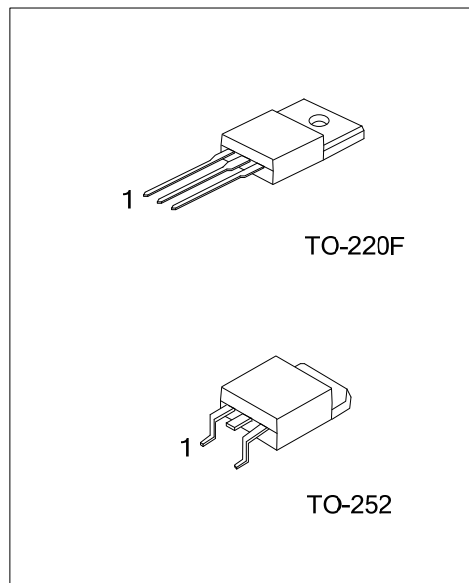
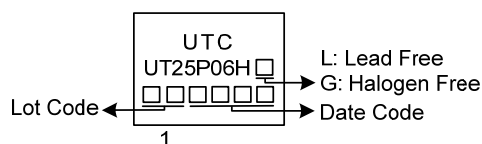
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT25P06HL-TF3-T	UT25P06HG-TF3-T	TO-220F	G	D	S	Tube
UT25P06HL-TN3-R	UT25P06HG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UT25P06HG-TF3-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) TF3: TO-220F, TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ 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}	± 25	V
Continuous Drain Current	Continuous	I_D	-25	A
Pulsed Drain Current	Pulsed (Note 2)	I_{DM}	-50	A
Avalanche energy	Single Pulsed (Note 3)	E_{AS}	40	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	7.6	V/ns
Power Dissipation	TO-220F	P_D	39	W
	TO-252		44	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. $L=0.1\text{mH}$, $I_{AS}=-28.2\text{A}$, $V_{DD}=-50\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}\text{C}$.

4. $I_{SD} \leq -25\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J = 25^{\circ}\text{C}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220F	θ_{JC}	3.19	$^{\circ}\text{C}/\text{W}$
	TO-252		2.85	$^{\circ}\text{C}/\text{W}$

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

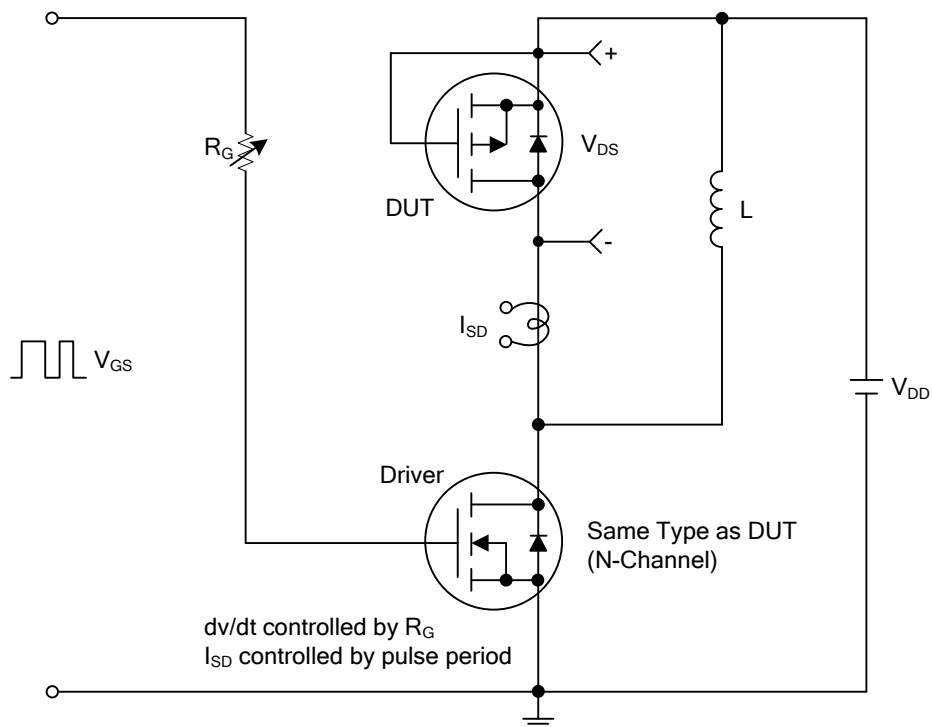
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	-60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =-60V, V _{GS} =0V, T _J =25°C			-1	μA
			V _{DS} =-48V, V _{GS} =0V, T _J =150°C			-10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{DS} =0V ,V _{GS} =+25V			+100	nA
	Reverse		V _{DS} =0V ,V _{GS} =-25V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} = V _{GS} , I _D =250μA	-2.0		-4.0	V
Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =-10V, I _D =-25A			48	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz		1450		pF
Output Capacitance		C _{OSS}			120		pF
Reverse Transfer Capacitance		C _{RSS}			99		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =-48V, V _{GS} =-10V, I _D =-25A		24		nC
Gate to Source Charge		Q _{GS}			5		nC
Gate to Drain Charge		Q _{GD}			7		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DD} =-50V, V _{GS} =-10V, I _D =-25A, R _G =3Ω		8		ns
Rise Time		t _R			18		ns
Turn-off Delay Time		t _{D(OFF)}			28		ns
Fall-Time		t _F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Pulsed Current		I _S				-25	A
Drain-Source Diode Forward Voltage (Note 1)		I _{SM}				-50	A
Maximum Body-Diode Continuous Current		V _{SD}	I _S =-1.0A, V _{GS} =0V			-1.0	V
Body Diode Reverse Recovery Time		t _{RR}	I _F =-25A, di/dt=100A/μs		33		ns
Body Diode Reverse Recovery Charge		Q _{RR}			20		ns

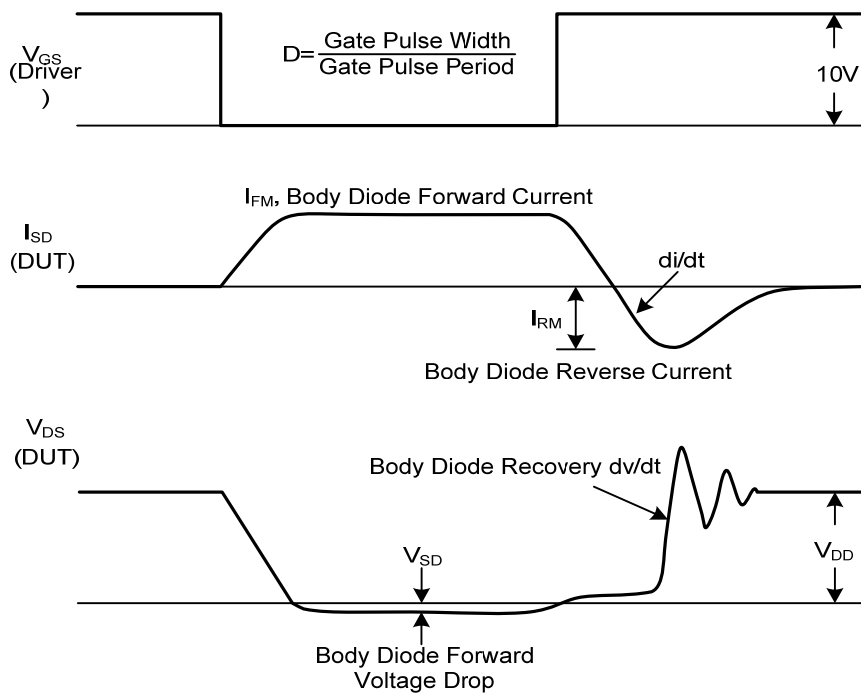
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

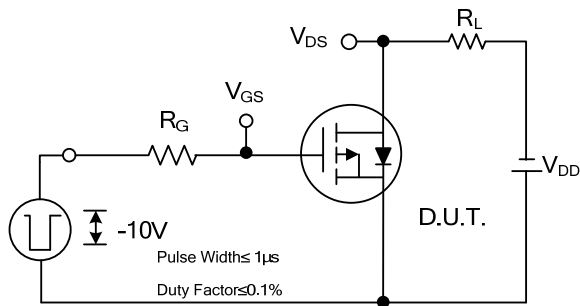


Peak Diode Recovery dv/dt Test Circuit

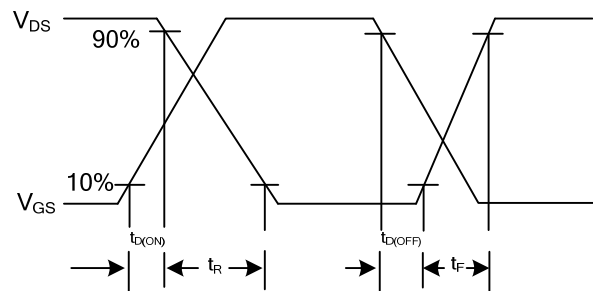


Peak Diode Recovery dv/dt Waveforms

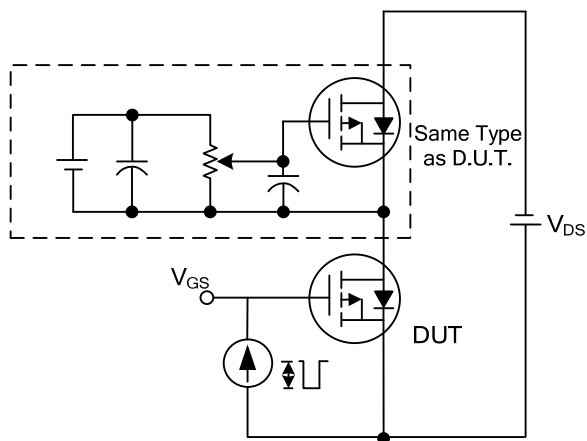
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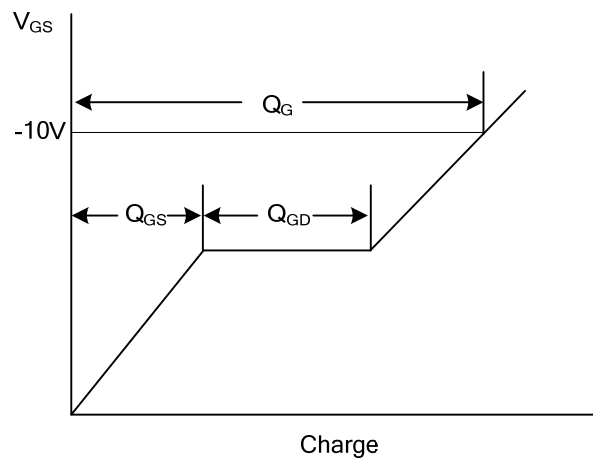
Switching Test Circuit



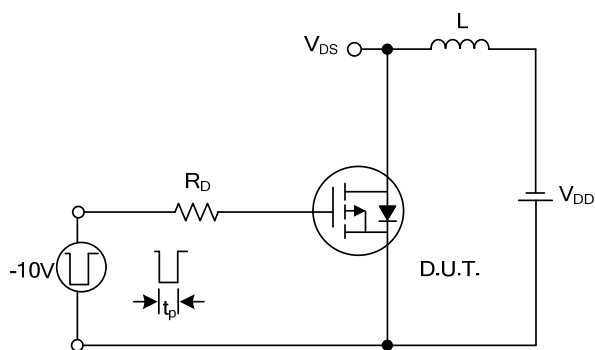
Switching Waveforms



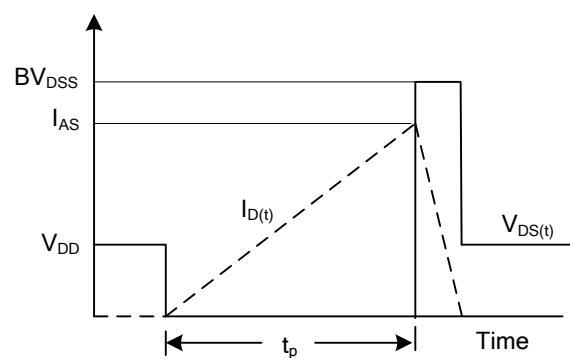
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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