



## UT35N06

Preliminary

POWER MOSFET

### 35A, 60V N-CHANNEL POWER MOSFET

#### DESCRIPTION

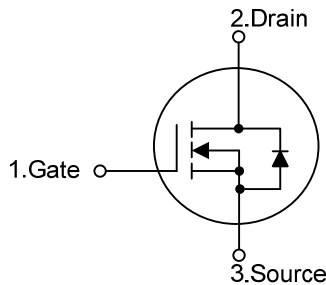
The UTC **UT35N06** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect  $R_{DS(ON)}$  and high switching speed.

The UTC **UT60N06** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

#### FEATURES

- \*  $R_{DS(ON)} \leq 15m\Omega @ V_{GS}=10V, I_D=15A$
- \*  $R_{DS(ON)} \leq 23m\Omega @ V_{GS}=4.5V, I_D=15A$
- \* High Switching Speed

#### SYMBOL



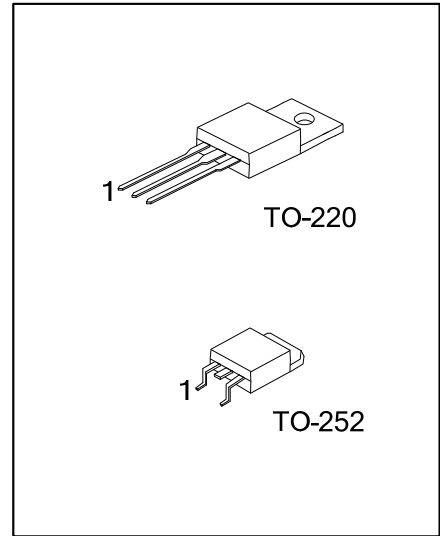
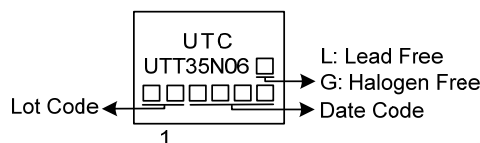
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT35N06L-TA3-T	UT35N06G-TA3-T	TO-220	G	D	S	Tube
UT35N06L-TN3-R	UT35N06G-TN3-R	TO-252	G	D	S	Tape Reel

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

	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	35	A
	Pulsed (Note 2)	$I_{DM}$	70	A
Power Dissipation	TO-220	$P_D$	100	W
	TO-252		46	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.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	$\theta_{JA}$	62.5	$^{\circ}\text{C}/\text{W}$
	TO-252		100	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	$\theta_{JC}$	1.24	$^{\circ}\text{C}/\text{W}$
	TO-252		2.7	$^{\circ}\text{C}/\text{W}$

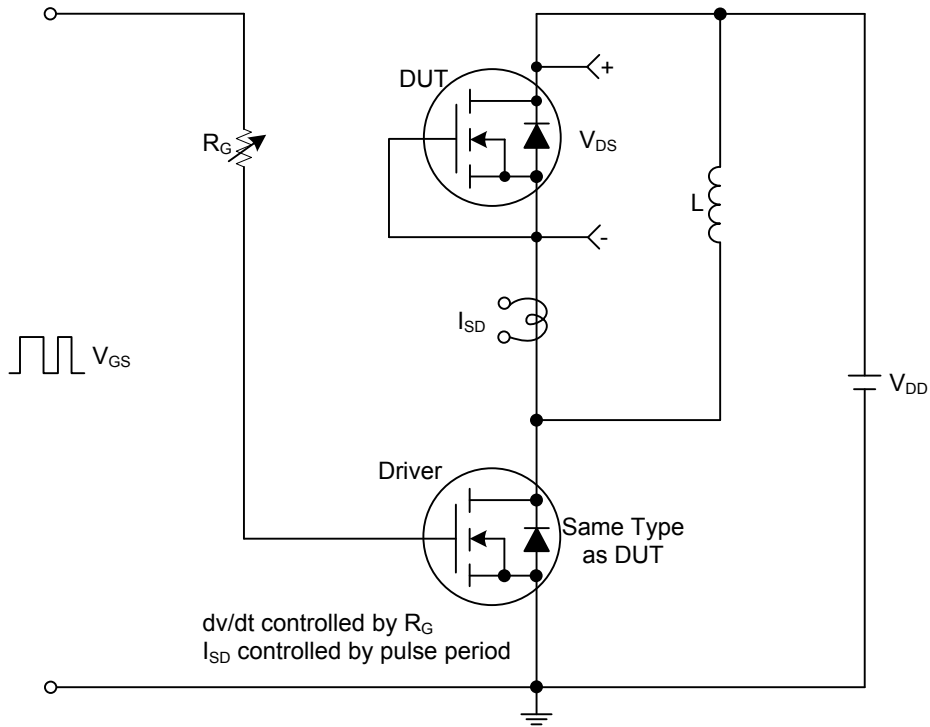
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	60			V
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=+20\text{V}, V_{DS}=0\text{V}$			+100	nA
	Reverse		$V_{GS}=-20\text{V}, V_{DS}=0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=15\text{A}$			15	m $\Omega$
			$V_{GS}=4.5\text{V}, I_D=15\text{A}$			23	m $\Omega$
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		$C_{ISS}$	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		1620		pF
Output Capacitance		$C_{OSS}$			180		pF
Reverse Transfer Capacitance		$C_{RSS}$			120		pF
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge (Note 1)		$Q_G$	$V_{DS}=30\text{V}, V_{GS}=10\text{V}, I_D=35\text{A}, I_G=1\text{mA}$ (Note 1, 2)		36		nC
Gate to Source Charge		$Q_{GS}$			4.5		nC
Gate to Drain Charge		$Q_{GD}$			7		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	$V_{DD}=30\text{V}, V_{GS}=10\text{V}, I_D=1\text{A}, R_G=3\Omega$ (Note 1, 2)		7		ns
Rise Time		$t_R$			15		ns
Turn-off Delay Time		$t_{D(OFF)}$			63		ns
Fall-Time		$t_F$			42		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current		$I_S$				35	A
Maximum Body-Diode Pulsed Current		$I_{SM}$				70	A
Drain-Source Diode Forward Voltage (Note 1)		$V_{SD}$	$I_S=17.5\text{A}, V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time (Note 1)		$t_{rr}$	$I_S=17.5\text{A}, V_{GS}=0\text{V}$		30		nS
Reverse Recovery Charge		$Q_{rr}$	$di/dt=100\text{A}/\mu\text{s}$		16		nC

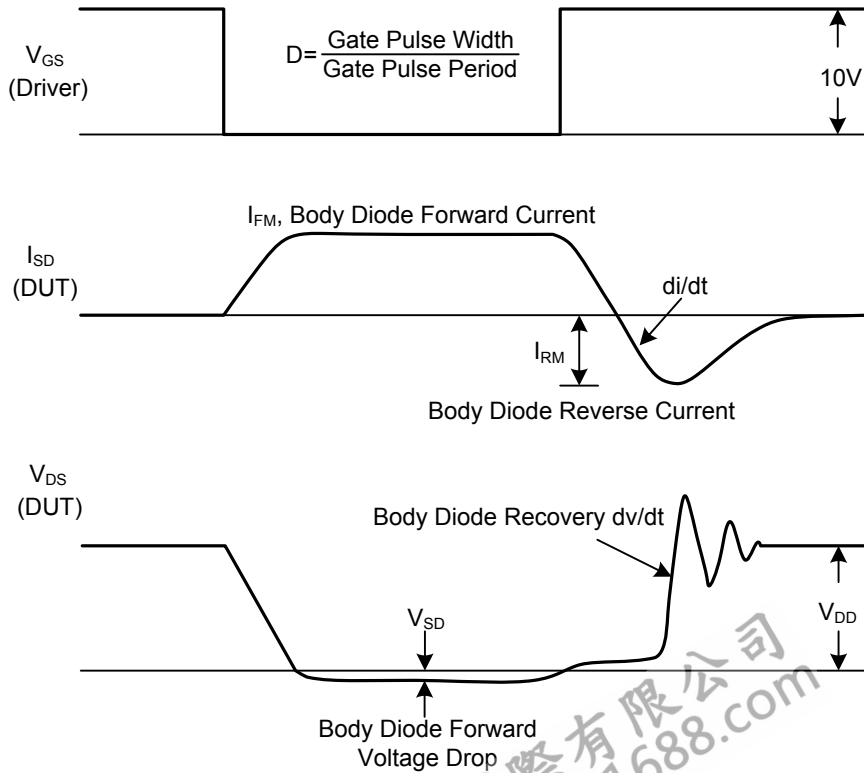
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



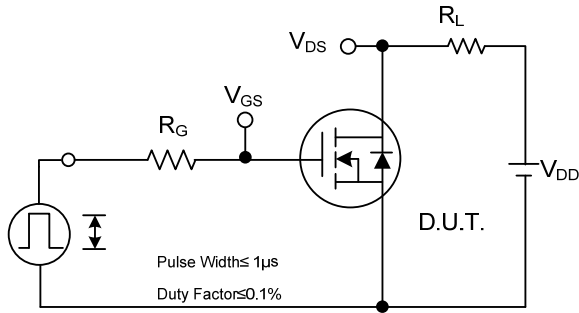
Peak Diode Recovery dv/dt Test Circuit



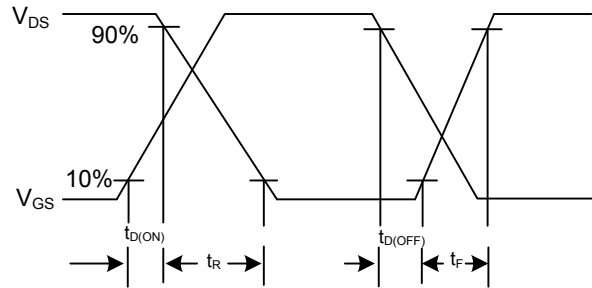
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

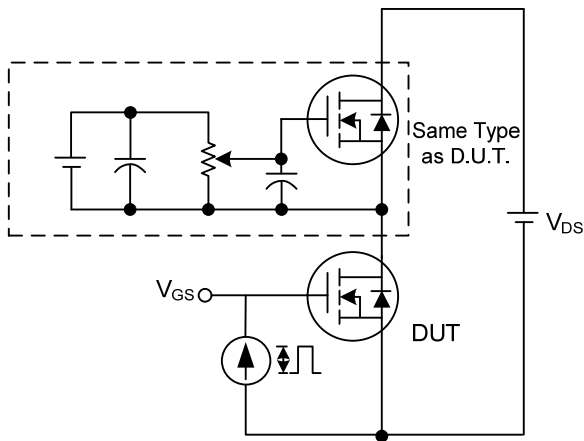
TEST CIRCUITS AND WAVEFORMS



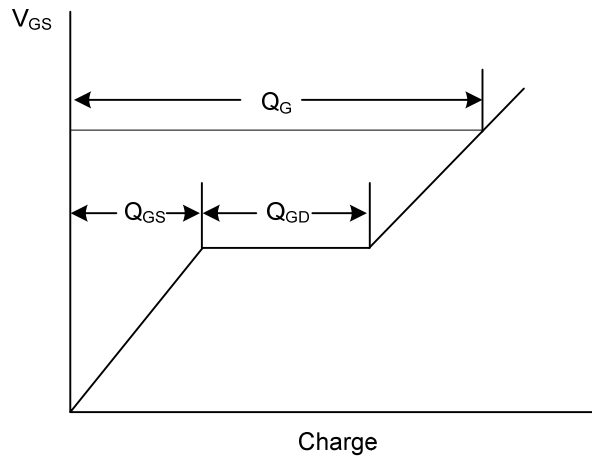
Switching Test Circuit



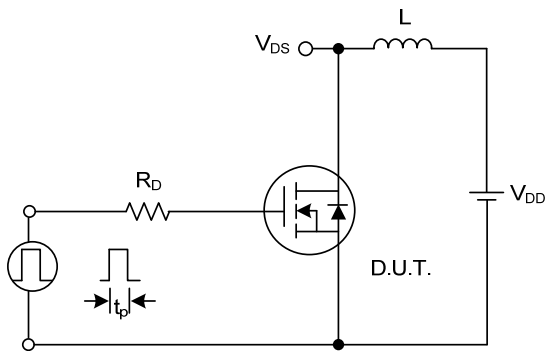
Switching Waveforms



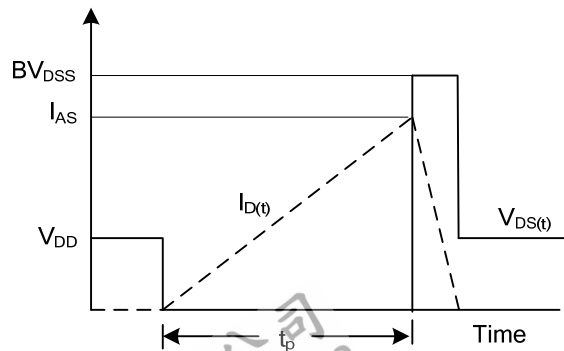
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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