



# UT6302

## Power MOSFET

### P-CHANNEL ENHANCEMENT MOSFET

#### DESCRIPTION

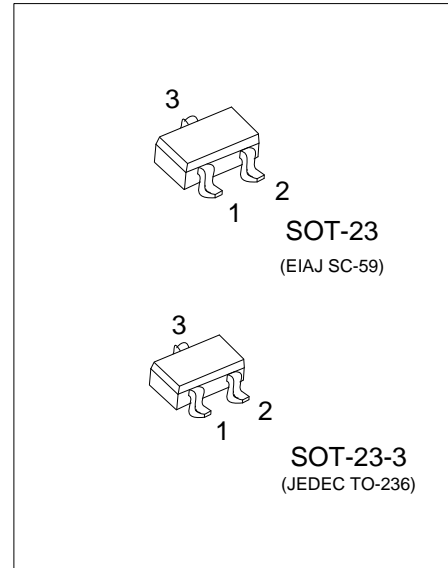
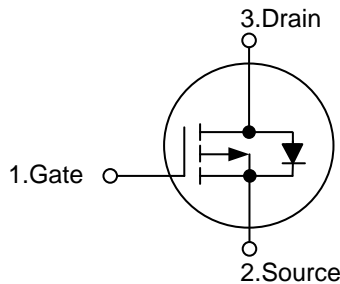
The UTC **UT6302** is a power MOSFET offering the customers efficient and reliable performance.

The UTC **UT6302** is ideal for thin application environments, such as portable electronics and PCMCIA cards.

#### FEATURES

- \* Extremely-Low On-Resistance
- \* Fast Switching Speed

#### SYMBOL



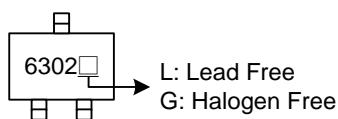
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT6302L-AE2-R	UT6302G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT6302L-AE3-R	UT6302G-AE3-R	SOT-23	G	S	D	Tape Reel

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

<p>UT6302G-AE2-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AE2: SOT-23-3, AE3: SOT-23</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	-20	V
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current ( $V_{GS} = -4.5\text{V}$ , $T_A = 25^\circ\text{C}$ )	$I_D$	-0.78	A
Pulsed Drain Current (Note 2)	$I_{DM}$	-4.9	A
Peak Diode Recovery $dv/dt$ (Note 3)	$dv/dt$	-5.0	V/nS
Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_D$	540	mW
Linear Derating Factor above $25^\circ\text{C}$		4.3	mW / $^\circ\text{C}$
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.  $I_{SD} \leq -0.61\text{A}$ ,  $di/dt \leq 76\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J = 150^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	230	$^\circ\text{C}/\text{W}$

Note: Surface Mounted on FR-4 Board,  $t \leq 5\text{sec}$ .

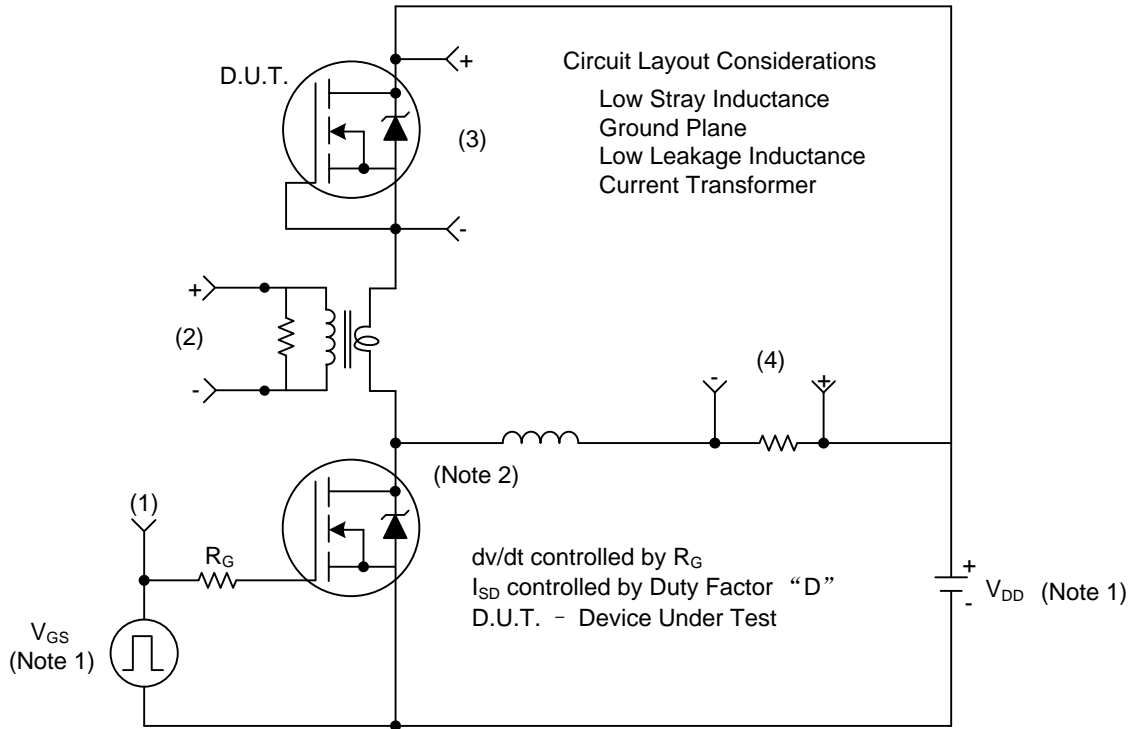
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{V}$ , $I_D = -250\ \mu\text{A}$	-20			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = -16\text{V}$ , $V_{GS} = 0\text{V}$			-1.0	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 12\text{V}$ , $V_{DS} = 0\text{V}$			$\pm 100$	nA
Drain-Source Breakdown Voltage	$\Delta BV_{DSS}/\Delta I_D$	$I_D = -1\text{mA}$ , Reference to $25^\circ\text{C}$		-4.9		mV/ $^\circ\text{C}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}$ , $I_D = -250\ \mu\text{A}$	-0.70		-1.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5\text{V}$ , $I_D = -0.61\text{A}$ (Note 2)			0.60	$\Omega$
		$V_{GS} = -2.7\text{V}$ , $I_D = -0.31\text{A}$ (Note 2)			0.90	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS} = -15\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1.0\text{MHz}$		85		pF
Output Capacitance	$C_{OSS}$			25		pF
Reverse Transfer Capacitance	$C_{RSS}$			18		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS} = -4.5\text{V}$ , $V_{DS} = -16\text{V}$ $I_D = -0.61\text{A}$ (Note 1, 2)		4		nC
Gate Source Charge	$Q_{GS}$			0.5		nC
Gate Drain Charge	$Q_{GD}$			1		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD} = -10\text{V}$ , $I_D = -0.61\text{A}$ , $R_G = 6.2\ \Omega$ , $R_D = 16\ \Omega$ (Note 1, 2)		1.5		nS
Turn-ON Rise Time	$t_R$			15		nS
Turn-OFF Delay Time	$t_{D(OFF)}$			8		nS
Turn-OFF Fall-Time	$t_F$			22		nS
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				-0.54	A
Maximum Pulsed Drain-Source Diode Forward Current (Note 1)	$I_{SM}$				-4.9	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S = -0.61\text{A}$ , $V_{GS} = 0\text{V}$			-1.2	V

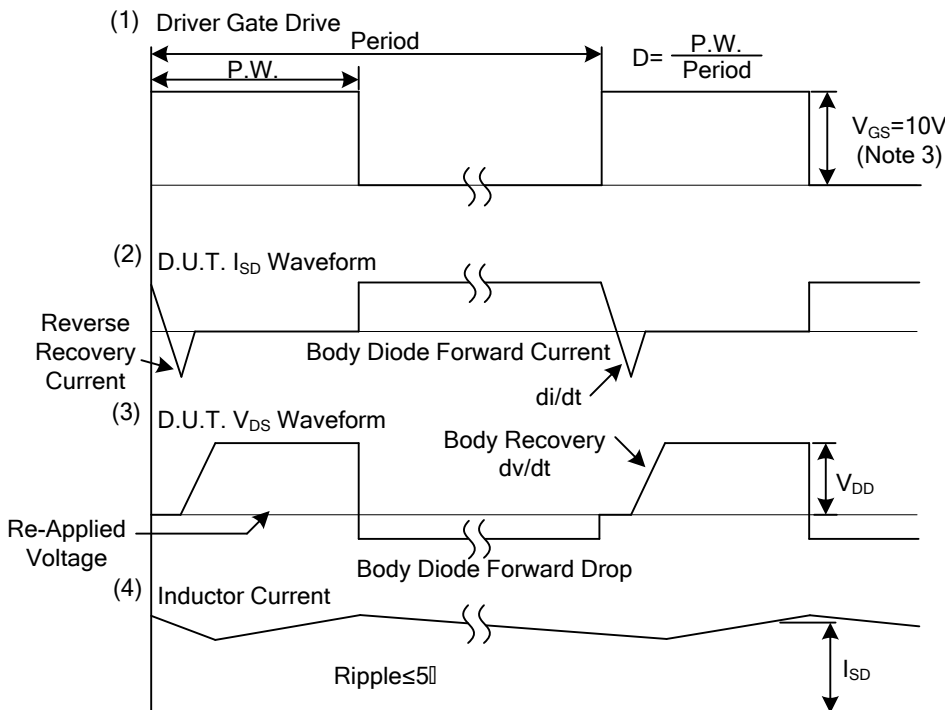
Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

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

■ TEST CIRCUITS AND WAVEFORMS



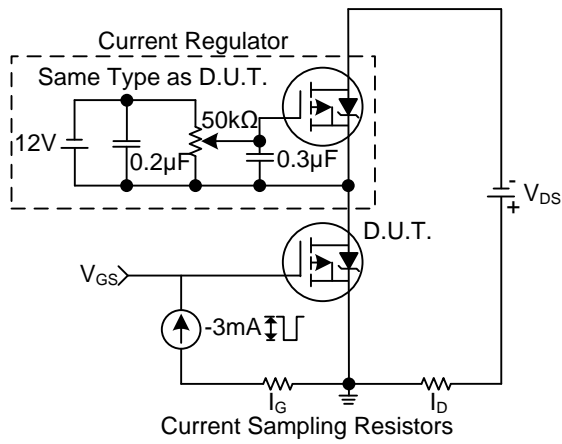
Peak Diode Recovery dv/dt Test Circuit



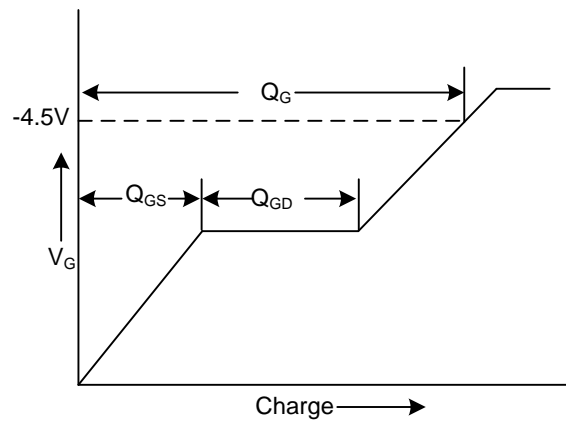
Peak Diode Recovery dv/dt Waveforms

- Notes: 1. Reverse Polarity for P-Channel.
- 2. Use P-Channel Driver for P-Channel Measurements.
- 3.  $V_{GS}=5.0V$  for Logic Level and 3V Drive Devices.

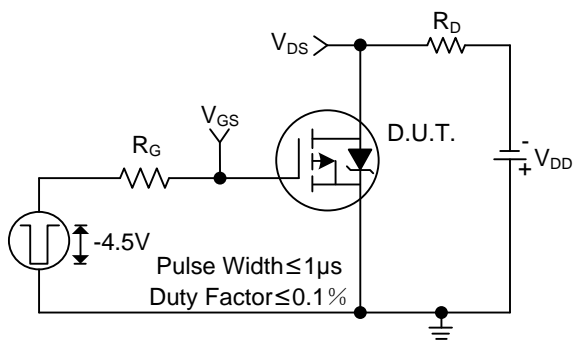
## ■ TEST CIRCUITS AND WAVEFORMS



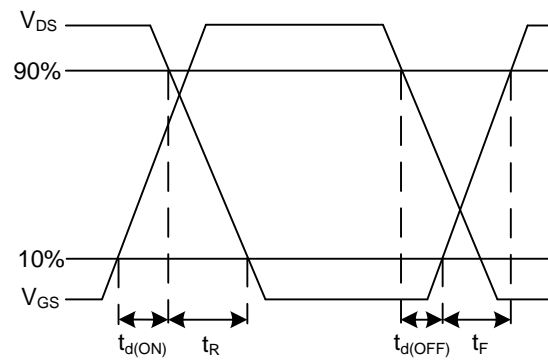
**Gate Charge Test Circuit**



**Gate Charge Waveforms**



**Switching Time Test Circuit**



**Switching Time Waveforms**

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