



# UT2304

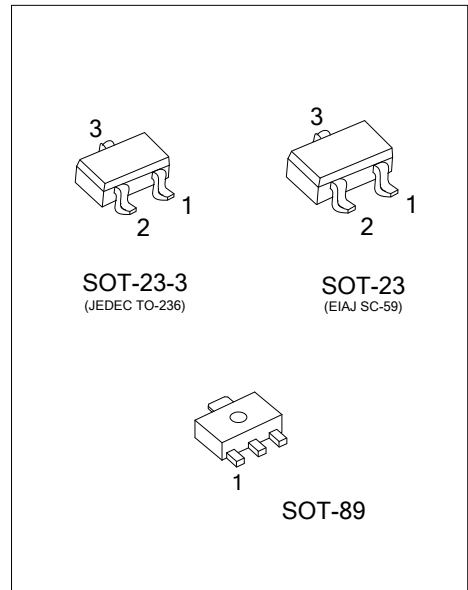
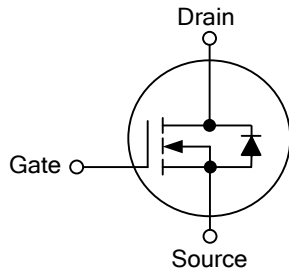
**Power MOSFET**

## N-CHANNEL ENHANCEMENT MODE

■ DESCRIPTION

The **UT2304** is an N-Channel Power MOSFET that can achieve the lowest possible on-resistance, extremely and cost- effectiveness device by using advanced trench technology.

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
UT2304G-AE2-R	SOT-23-3	S	G	D	Tape Reel
UT2304G-AE3-R	SOT-23	S	G	D	Tape Reel
UT2304G-AB3-R	SOT-89	S	D	G	Tape Reel

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

	<p>(1) R: Tape Reel</p> <p>(2) AE2: SOT-23-3, AE3: SOT-23, AB3: SOT-89</p> <p>(3) G: Halogen Free and Lead Free</p>
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■ MARKING

SOT-23 / SOT-23-3	SOT-89

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

PARAMETER	SYMBOL	RATING	UNITS
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note 3)	$I_D$	2.5	A
Pulsed Drain Current (Note 1, 2)	$I_{DM}$	10	A
Power Dissipation	$P_D$	1.4	W
Junction Temperature	$T_J$	+150	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^{\circ}\text{C}$

Note: 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.

■ THERMAL DATA

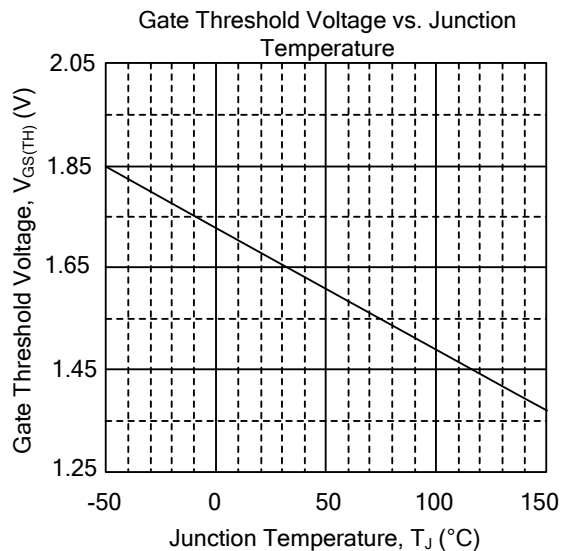
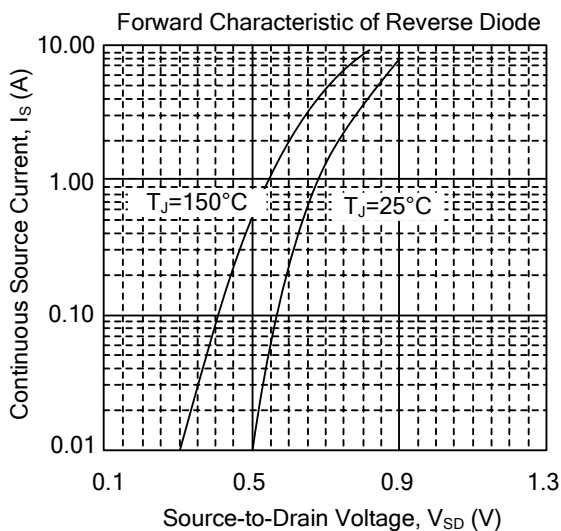
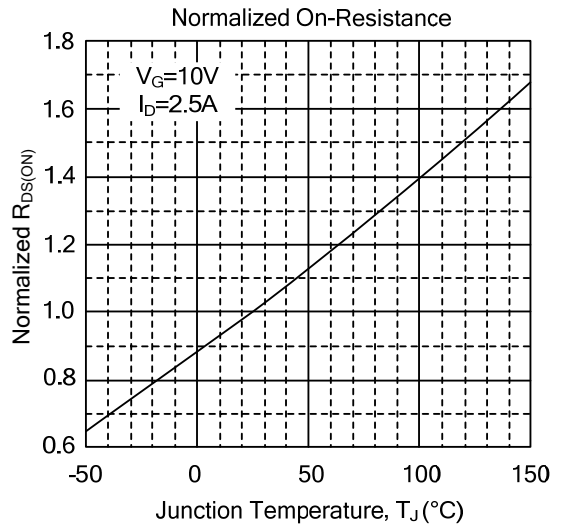
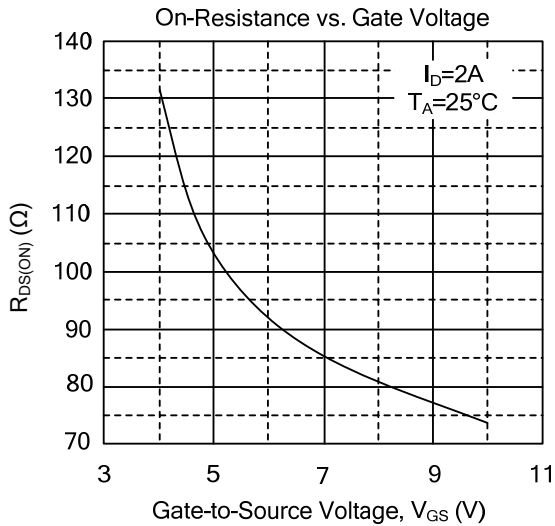
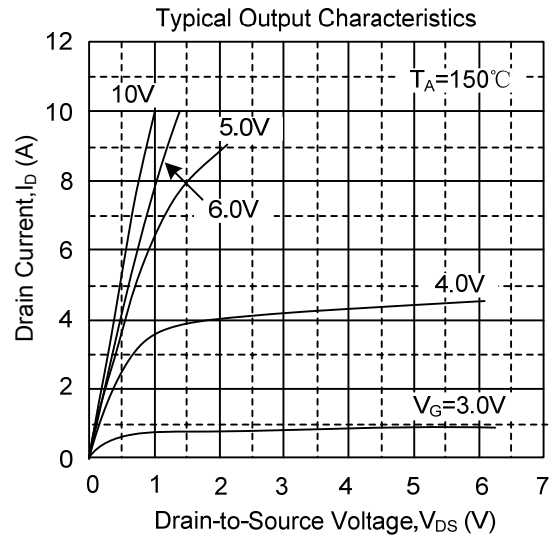
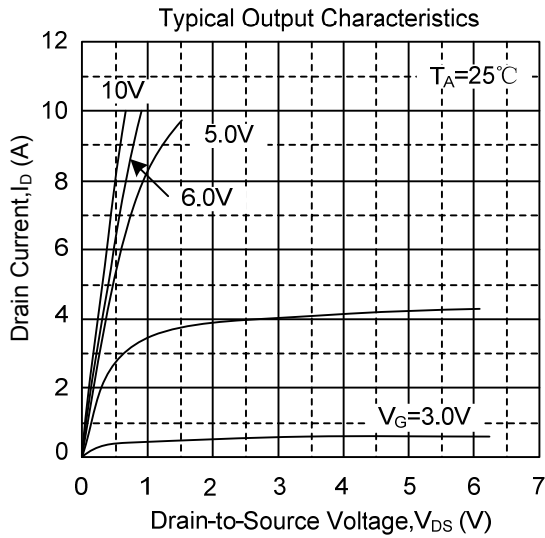
PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient (Note 3)	$\theta_{JA}$	90	$^{\circ}\text{C}/\text{W}$

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

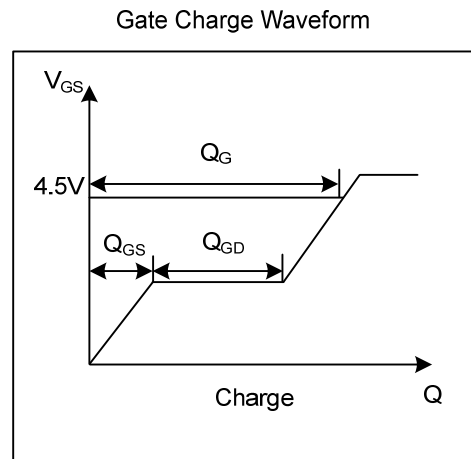
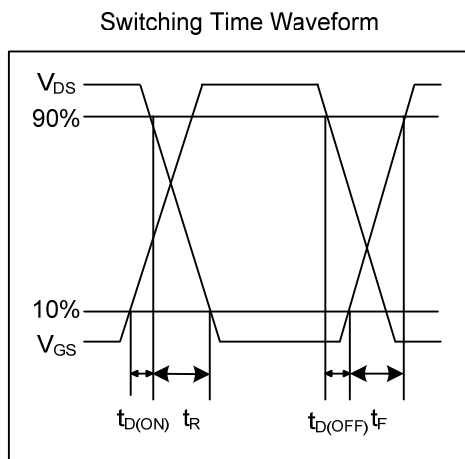
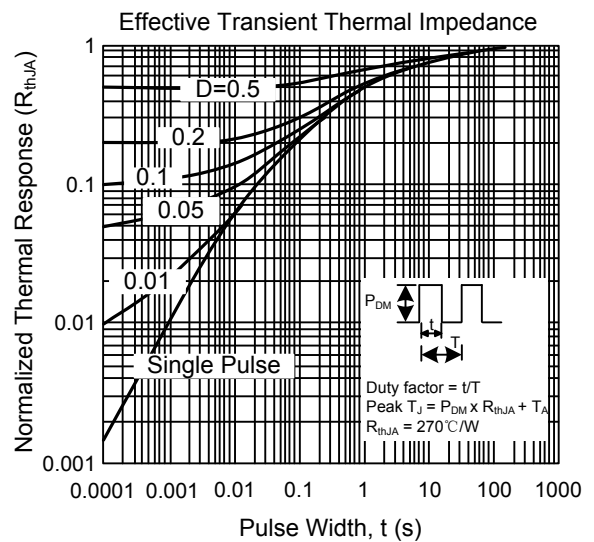
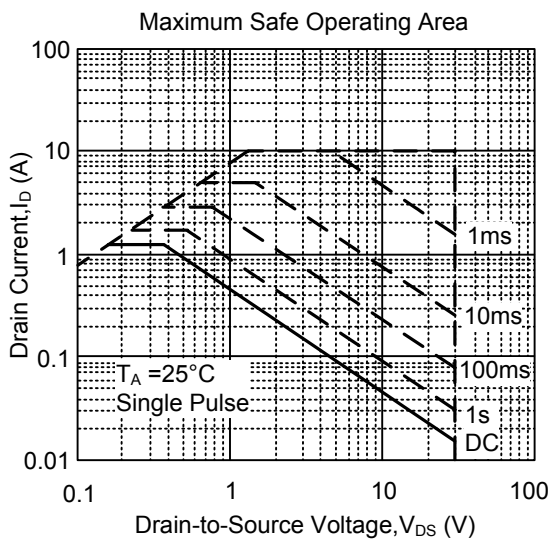
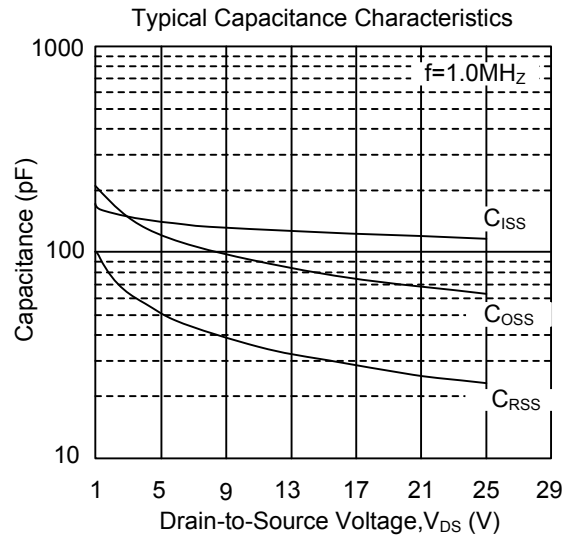
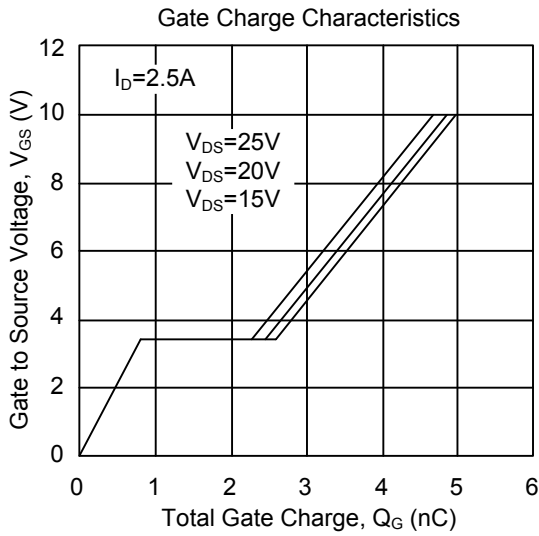
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$			$\pm 100$	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^{\circ}\text{C}, I_D=1\text{mA}$		0.1		$\text{V}/^{\circ}\text{C}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1		3	V
Static Drain-Source On-State Resistance (Note 2)	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=2.5\text{A}$			117	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=2\text{A}$			190	$\text{m}\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		120	190	pF
Output Capacitance	$C_{OSS}$			62		pF
Reverse Transfer Capacitance	$C_{RSS}$			24		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS}=15\text{V}, V_{GS}=10\text{V}, I_D=1\text{A}, R_G=3.3\Omega, R_D=15\Omega$		5		ns
Turn-ON Rise Time	$t_R$			9		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			11		ns
Turn-OFF Fall Time	$t_F$			2		ns
Total Gate Charge (Note 2)	$Q_G$	$V_{DS}=24\text{V}, V_{GS}=4.5\text{V}, I_D=2.5\text{A}$		3	5	nC
Gate-Source Charge	$Q_{GS}$			0.8		nC
Gate-Drain Charge	$Q_{GD}$			1.8		nC
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Forward On Voltage (Note 2)	$V_{SD}$	$V_{GS}=0\text{V}, I_S=1.2\text{A}$			1.2	V
Reverse Recovery Time (Note 2)	$t_{RR}$	$I_S=2\text{A}, V_{GS}=0\text{V}$		24		ns
Reverse Recovery Charge	$Q_{RR}$	$di/dt=100\text{A}/\mu\text{s}$		23		nC

- Notes: 1. Pulse width limited by  $T_{J(MAX)}$   
 2. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS(Cont.)



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