

## UT2309

Power MOSFET

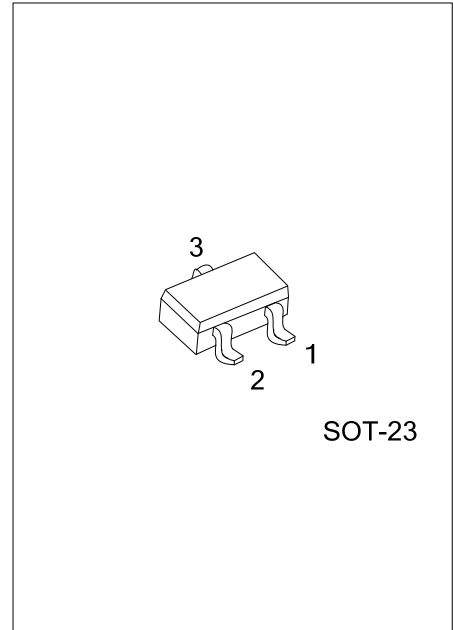
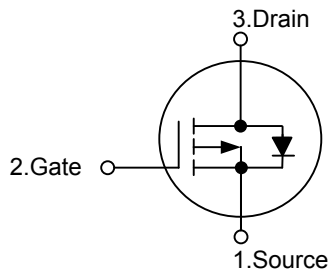
### P-CHANNEL ENHANCEMENT MODE

#### DESCRIPTION

The **UT2309** is P-channel power MOSFET, designed with high density cell with fast switching speed, ultra low on-resistance and excellent thermal and electrical capabilities.

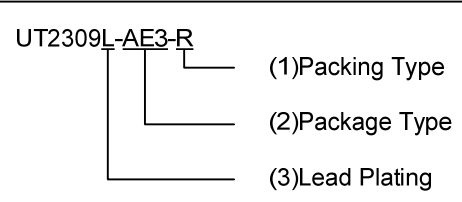
Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

#### SYMBOL

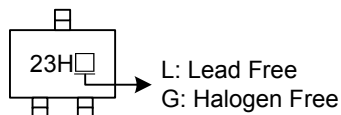


#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2309L-AE3-R	UT2309G-AE3-R	SOT-23	S	G	D	Tape Reel

<p>UT2309L-AE3-R</p>  <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Plating</p>	<p>(1) R: Tape Reel</p> <p>(2) AE3: SOT-23</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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#### MARKING



## ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	-30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 3)	$I_D$	-3.7	A
Pulsed Drain Current (Note 1, 2)	$I_{DM}$	-12	A
Total Power Dissipation	$P_D$	1.38	W
Junction Temperature	$T_J$	+150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^{\circ}C$

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

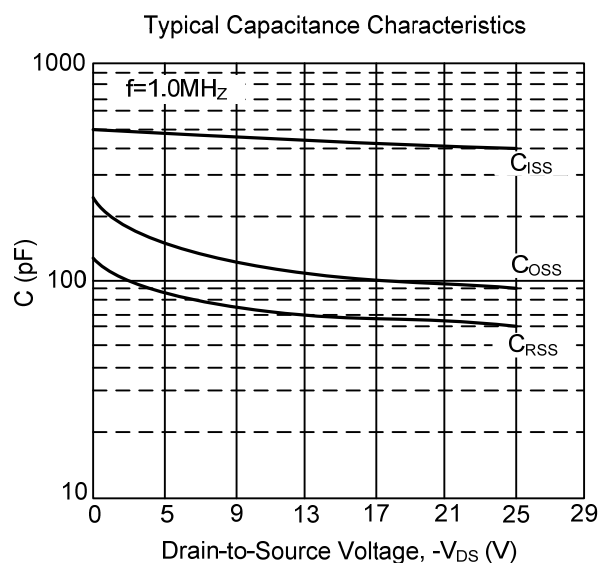
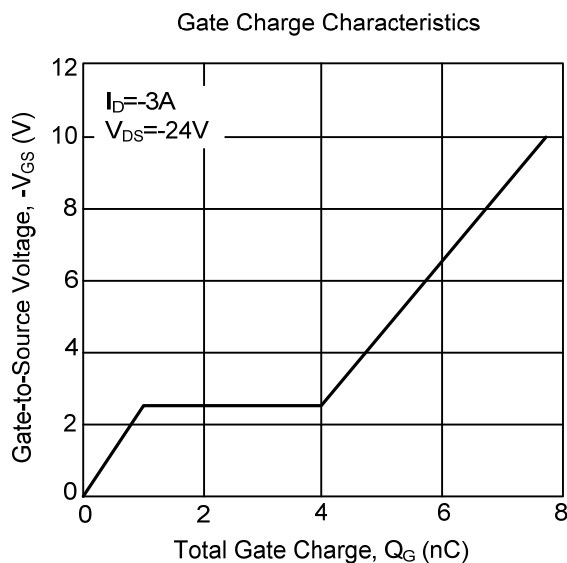
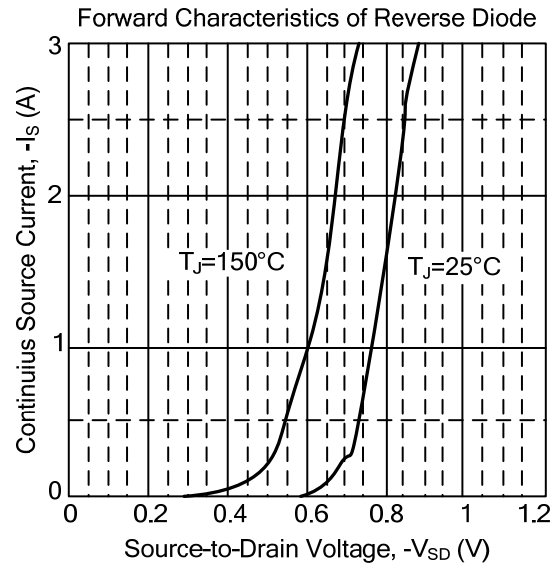
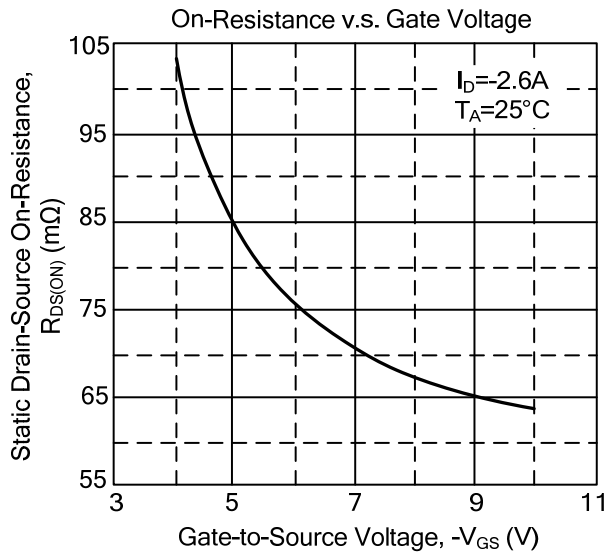
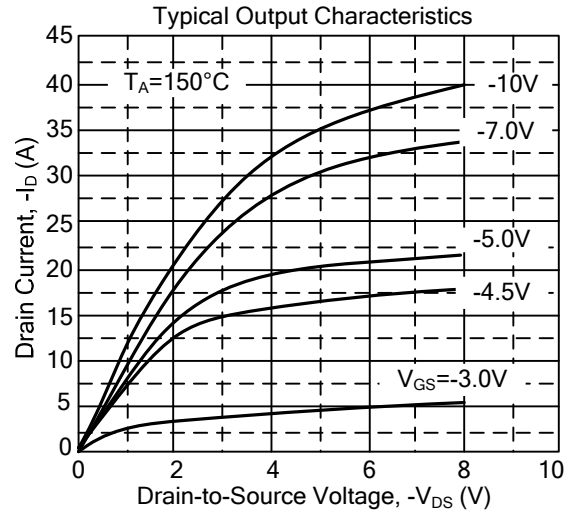
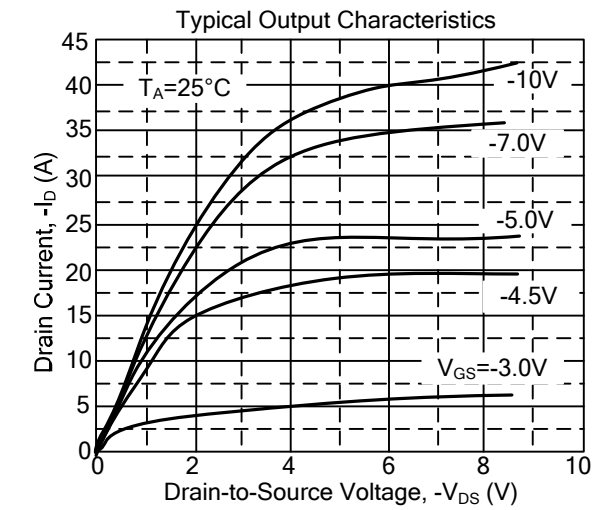
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 3)	$\theta_{JA}$	90	$^{\circ}C/W$

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

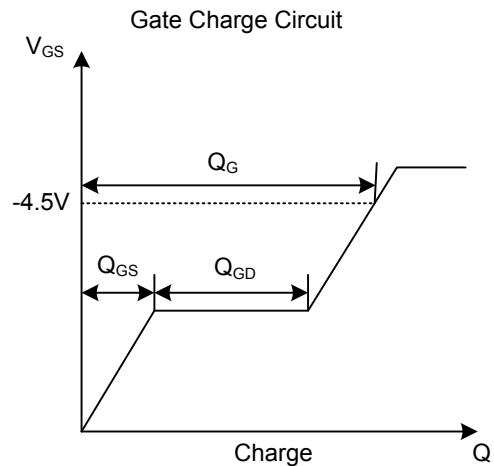
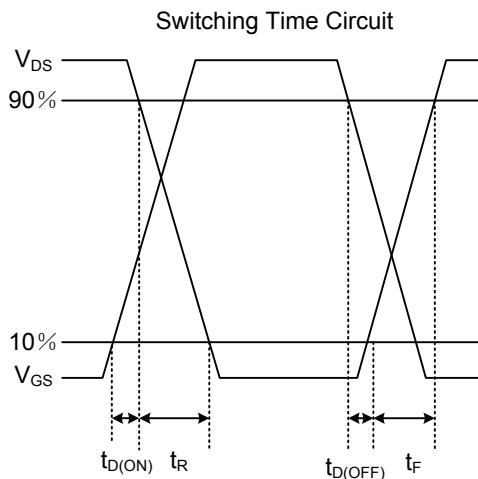
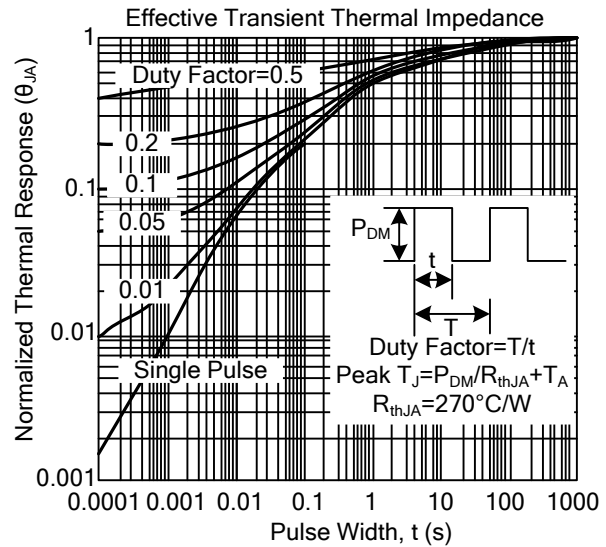
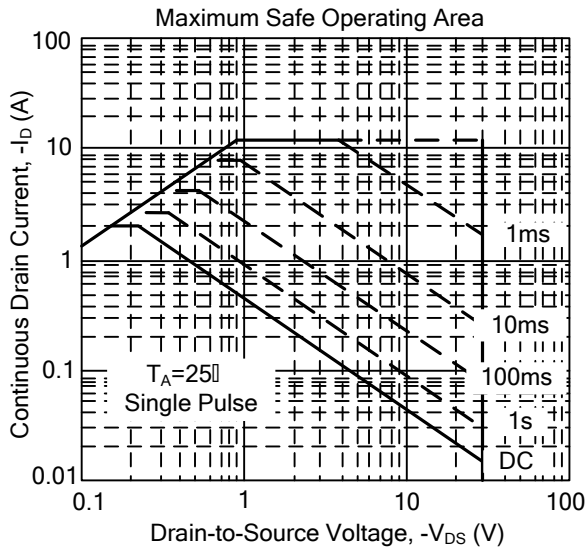
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$			-0.5	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			5	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^{\circ}C, I_D=-1mA$		-0.02		$V/^{\circ}C$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1		-3	V
Static Drain-Source On-Resistance (Note 2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-3A$			75	$m\Omega$
		$V_{GS}=-4.5V, I_D=-2.6A$			120	$m\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-25V, f=1.0MHz$		412	660	pF
Output Capacitance	$C_{OSS}$			91		pF
Reverse Transfer Capacitance	$C_{RSS}$			62		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS}=-15V, I_D=-1A, R_G=3.3\Omega, V_{GS}=-10V, R_D=15\Omega$		8		ns
Turn-ON Rise Time	$t_R$			5		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			20		ns
Turn-OFF Fall Time	$t_F$			7		ns
Total Gate Charge (Note 2)	$Q_G$	$V_{DS}=-24V, V_{GS}=-4.5V, I_D=-3A$		5	8	nC
Gate-Source Charge	$Q_{GS}$			1		nC
Gate-Drain Charge	$Q_{GD}$			3		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Forward On Voltage	$V_{SD}$	$I_S=-1A, V_{GS}=0V$		-0.76	-1.2	V
Reverse Recovery Time	$t_{RR}$	$I_S=-3A, V_{GS}=0V,$		20		ns
Reverse Recovery Charge	$Q_{RR}$	$di/dt=-100A/\mu s$		15		nC

Notes: 1. Pulse width limited by  $T_{J(MAX)}$   
2. Pulse width  $\leq 300\mu s$ , 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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