



## UT2309A

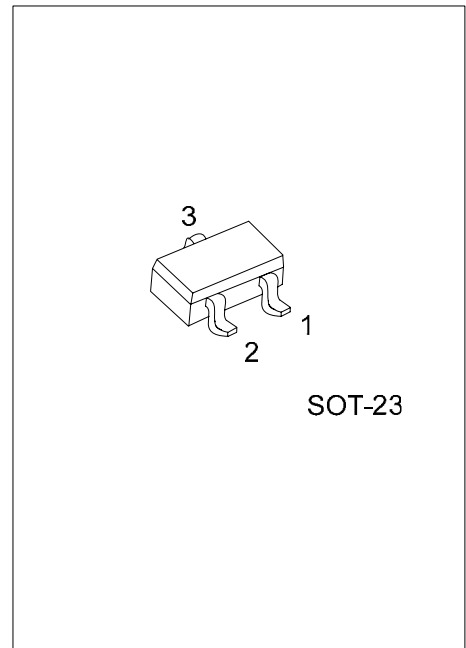
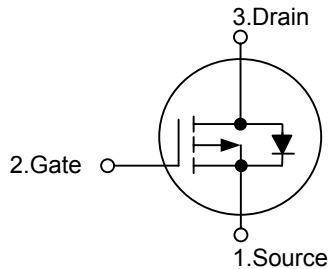
Power MOSFET

### P-CHANNEL ENHANCEMENT MODE

#### DESCRIPTION

The **UT2309A** is P-channel Power MOSFET, designed with high density cell with fast switching speed, ultra low on-resistance, 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



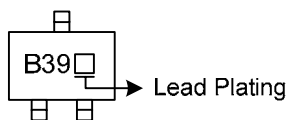
\*Pb-free plating product number: UT2309AL

#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
UT2309A-AE3-R	UT2309AL-AE3-R	SOT-23	S	G	D	Tape Reel

<p>UT2309AL-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) L: Lead Free Plating, Blank: Pb/Sn</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	
Storage Temperature	$T_{STG}$	-55 ~ +150	

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

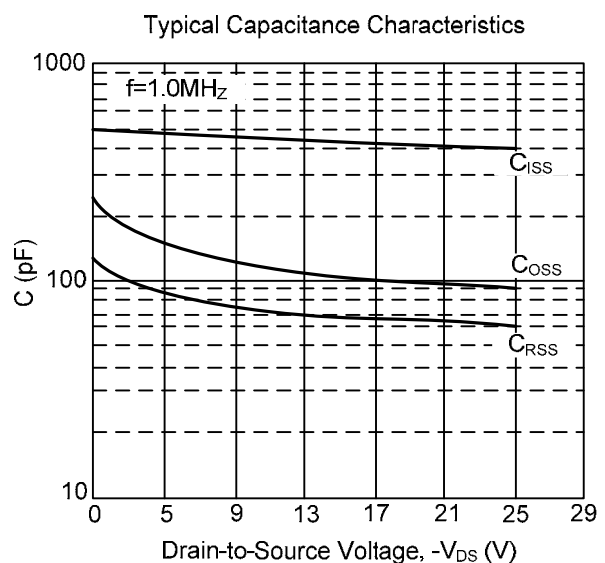
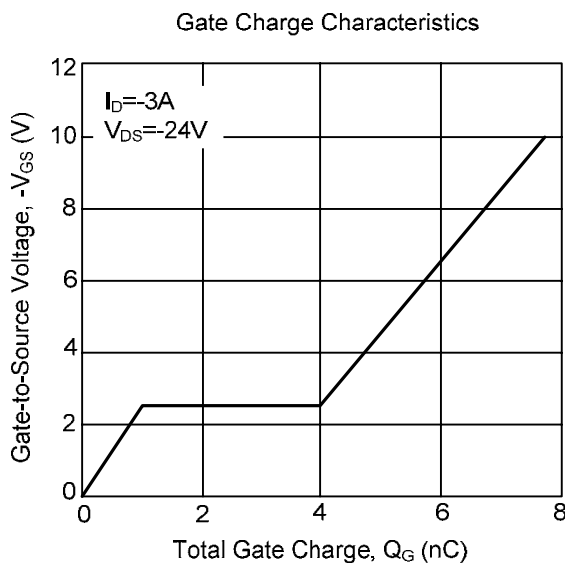
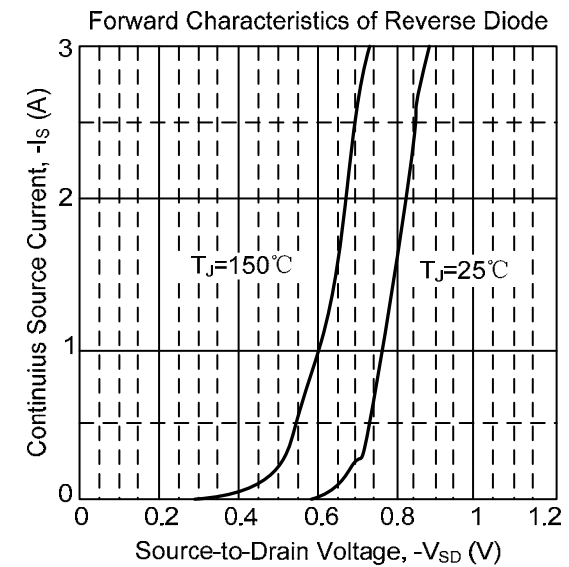
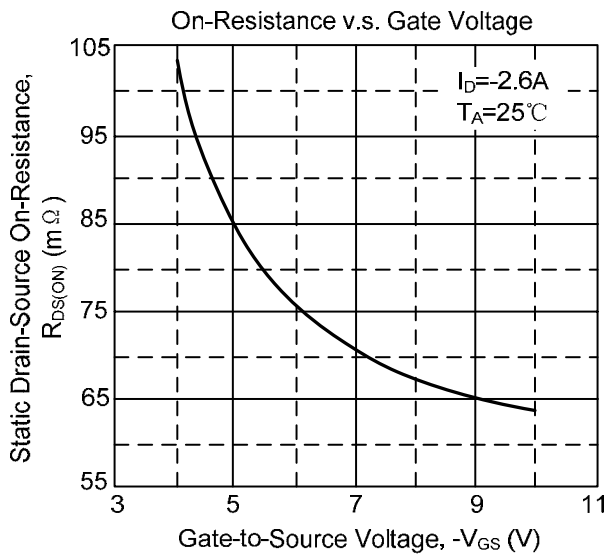
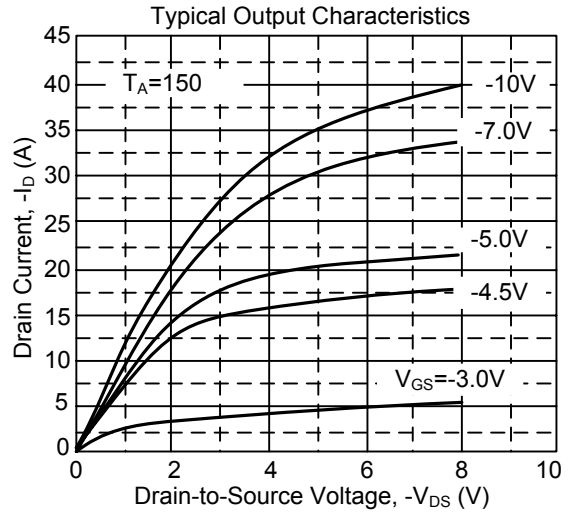
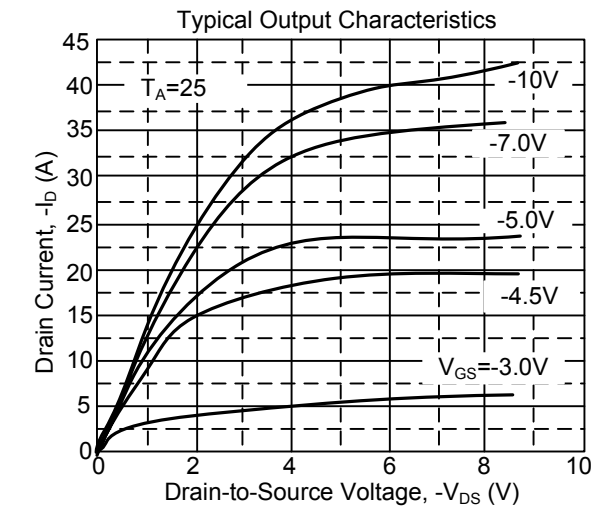
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient (Note 3)	$\theta_{JA}$			90	/W

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

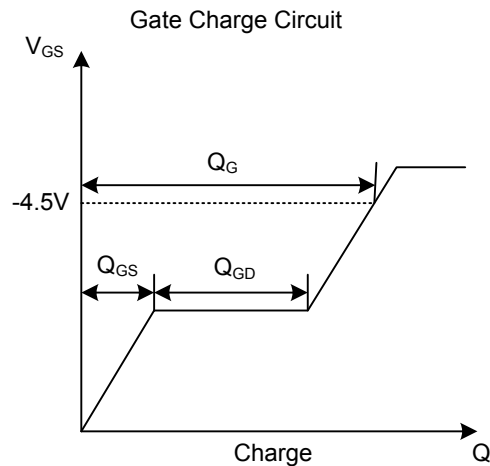
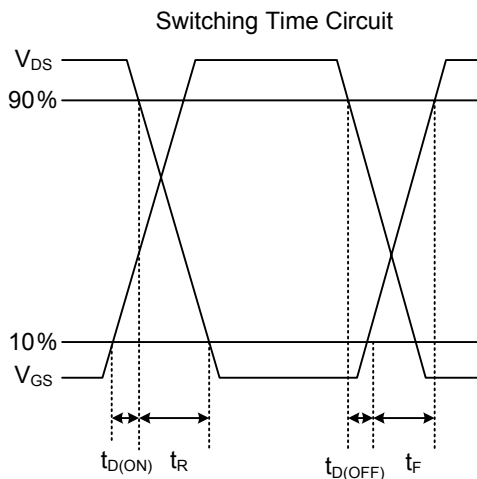
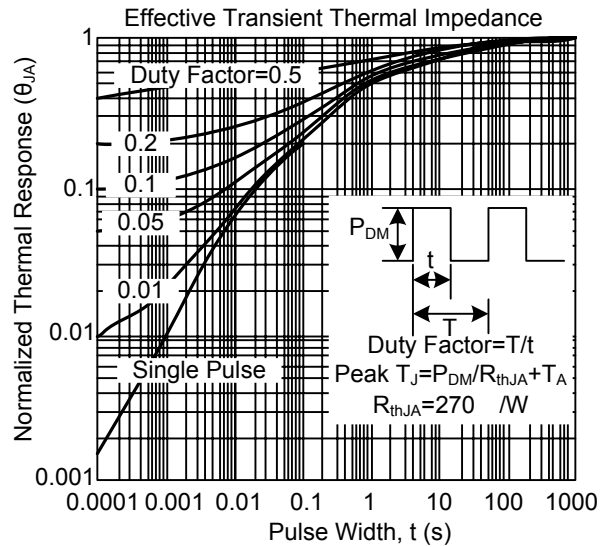
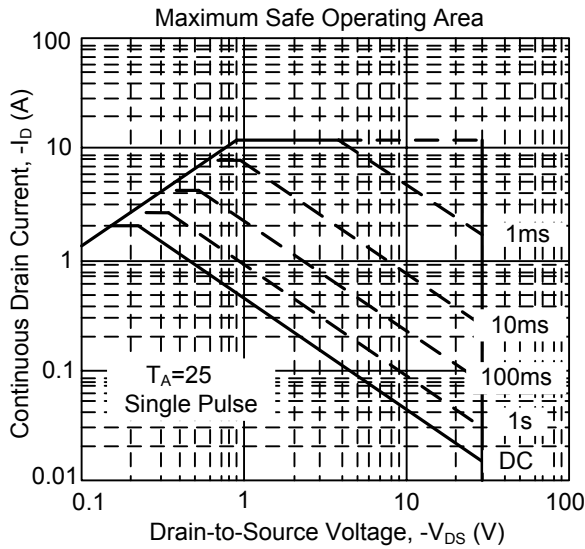
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{V}, I_D = -250\ \mu\text{A}$	-30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$			-0.5	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}$			5	nA
Breakdown Voltage Temperature Coefficient	$BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D = -1\text{mA}$		-0.02		V/
<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-Resistance (Note 2)	$R_{DS(ON)}$	$V_{GS} = -10\text{V}, I_D = -5\text{A}$			65	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -5\text{A}$			85	$\text{m}\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{V}, V_{DS} = -25\text{V}, f = 1.0\text{MHz}$		412	660	pF
Output Capacitance	$C_{OSS}$			91		
Reverse Transfer Capacitance	$C_{RSS}$			62		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS} = -15\text{V}, I_D = -1\text{A}, R_G = 3.3\Omega, V_{GS} = -10\text{V}, R_D = 15\Omega$		8		ns
Turn-ON Rise Time	$t_R$			5		
Turn-OFF Delay Time	$t_{D(OFF)}$			20		
Turn-OFF Fall Time	$t_F$			7		
Total Gate Charge (Note 2)	$Q_G$	$V_{DS} = -24\text{V}, V_{GS} = -4.5\text{V}, I_D = -3\text{A}$		5	8	nC
Gate-Source Charge	$Q_{GS}$			1		
Gate-Drain Charge	$Q_{GD}$			3		
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Forward On Voltage	$V_{SD}$	$I_S = -1\text{A}, V_{GS} = 0\text{V}$		-0.76	-1.2	V
Reverse Recovery Time	$t_{RR}$	$I_S = -3\text{A}, V_{GS} = 0\text{V},$		20		ns
Reverse Recovery Charge	$Q_{RR}$	$di/dt = -100\text{A}/\mu\text{s}$		15		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  $1\ \text{in}^2$  copper pad of FR4 board.

## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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