



## UT2309

Power MOSFET

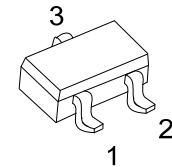
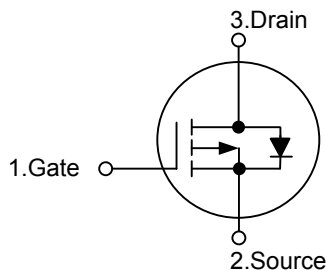
### P-CHANNEL ENHANCEMENT MODE

#### 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



SOT-23  
(EIAJ SC-59)

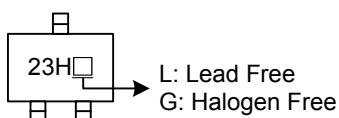
#### ORDERING INFORMATION

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

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

<p>UT2309G-AE3-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>		<p>(1) R: Tape Reel (2) AE3: SOT-23 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
--	--	---

#### 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	°C
Storage Temperature	$T_{STG}$	-55 ~ +150	°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	°C/W

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

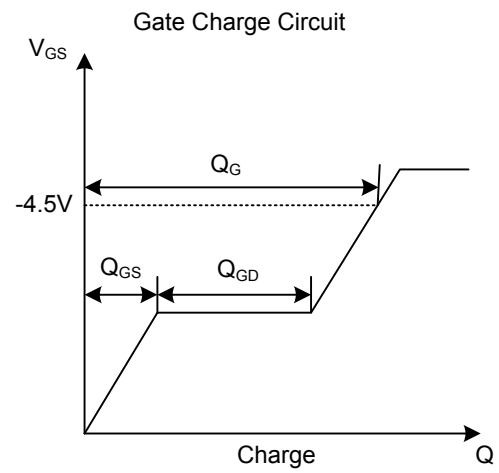
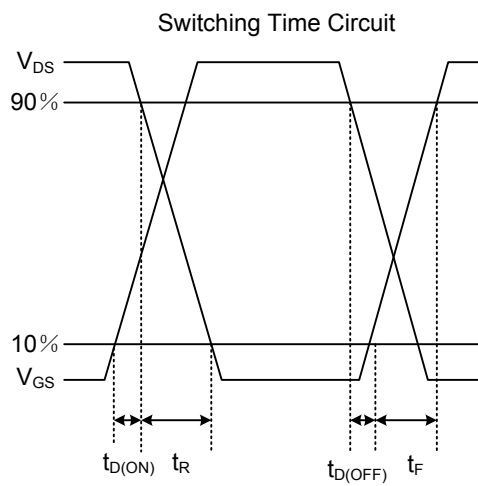
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$	-30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-30\text{V}, V_{GS}=0\text{V}$			-0.5	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$			100	nA
ON CHARACTERISTICS						
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-Resistance (Note 2)	$R_{DS(ON)}$	$V_{GS}=-10\text{V}, I_D=-3\text{A}$			75	m $\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-2.6\text{A}$			120	m $\Omega$
DYNAMIC CHARACTERISTICS						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}, V_{DS}=-25\text{V},$ $f=1.0\text{MHz}$		626		pF
Output Capacitance	$C_{OSS}$			95		pF
Reverse Transfer Capacitance	$C_{RSS}$			81		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 2)	$Q_G$	$V_{DS}=-24\text{V}, V_{GS}=-4.5\text{V}, I_D=-3\text{A}$		8.4		nC
Gate-Source Charge	$Q_{GS}$			2.5		nC
Gate-Drain Charge	$Q_{GD}$			3.6		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS}=-15\text{V}, V_{GS}=-10\text{V}, I_D=-3\text{A},$ $R_G=3.3\Omega$		6		ns
Turn-ON Rise Time	$t_R$			15		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			19		ns
Turn-OFF Fall Time	$t_F$			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Forward On Voltage	$V_{SD}$	$I_S=-1\text{A}, V_{GS}=0\text{V}$			-1.2	V

Notes: 1. Repetitive rating, pulse width limited by junction temperature.

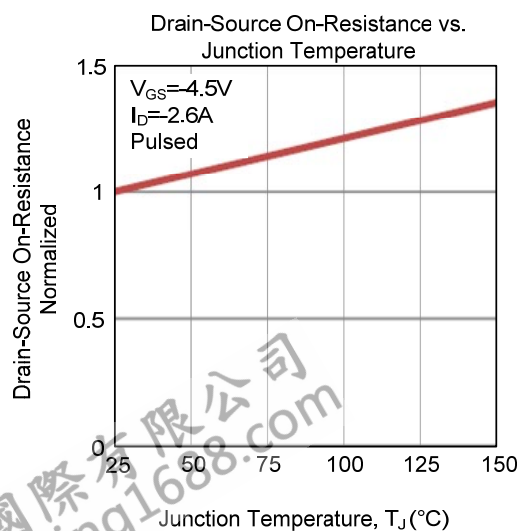
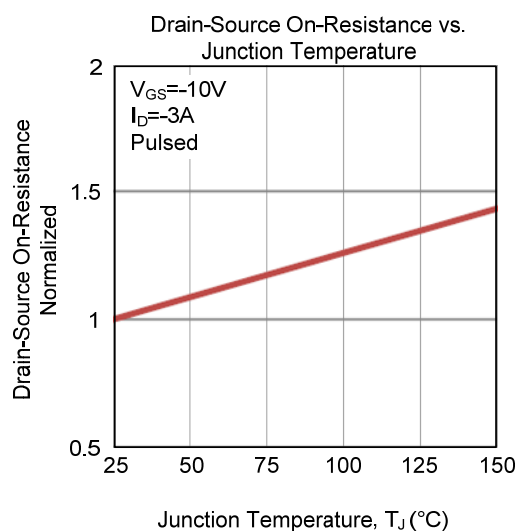
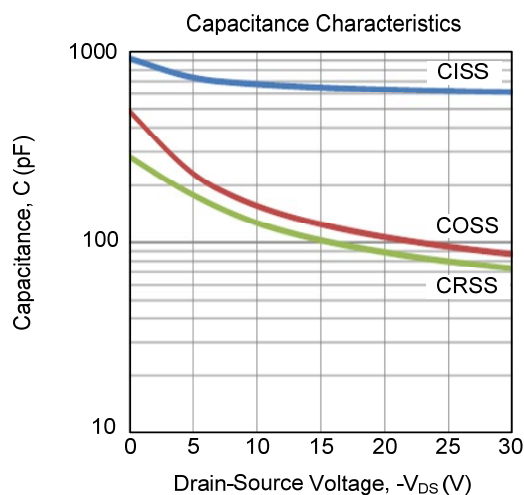
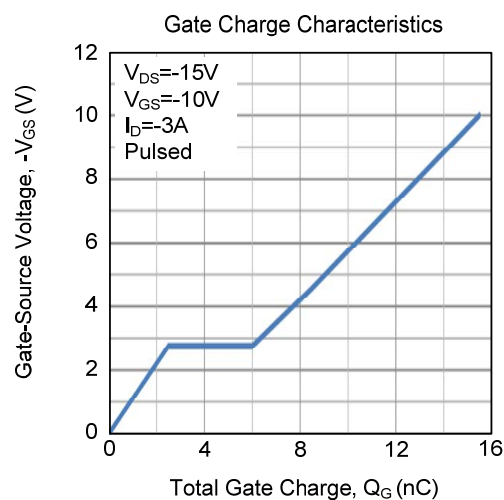
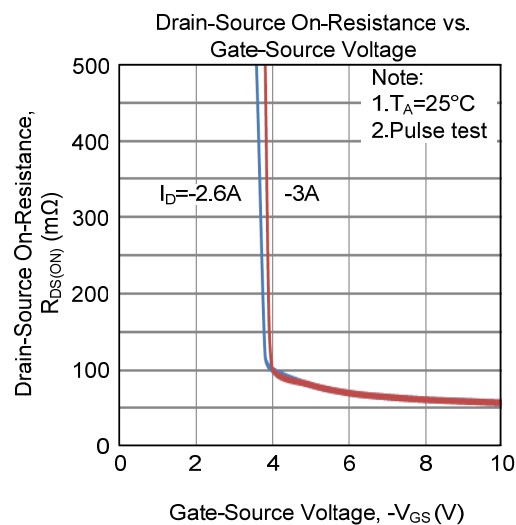
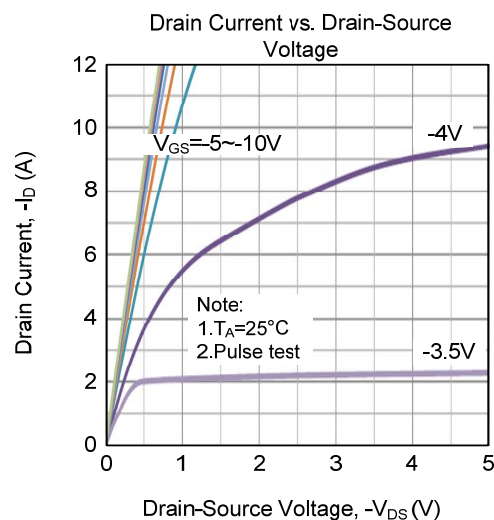
2. Pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board.

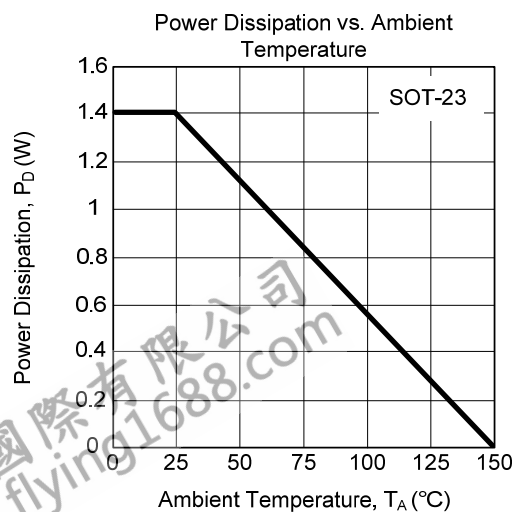
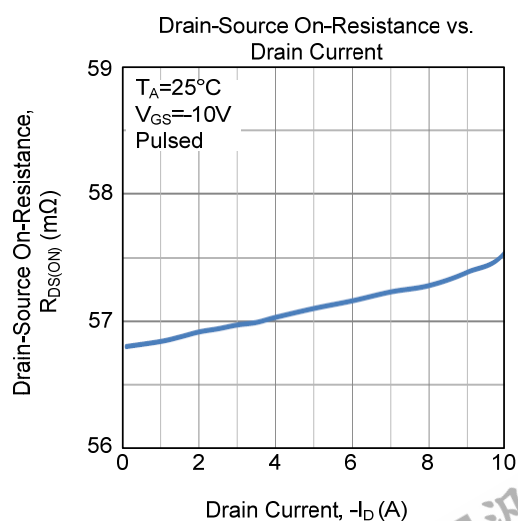
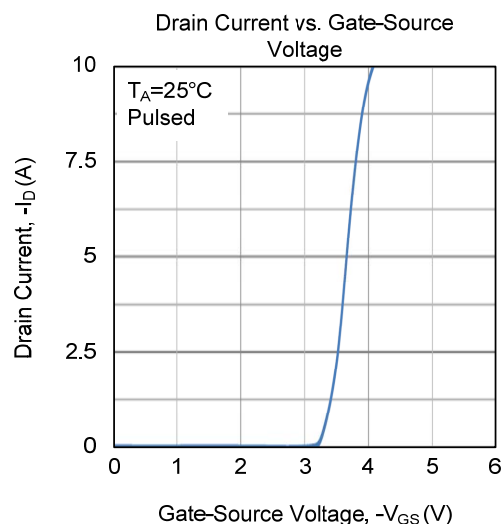
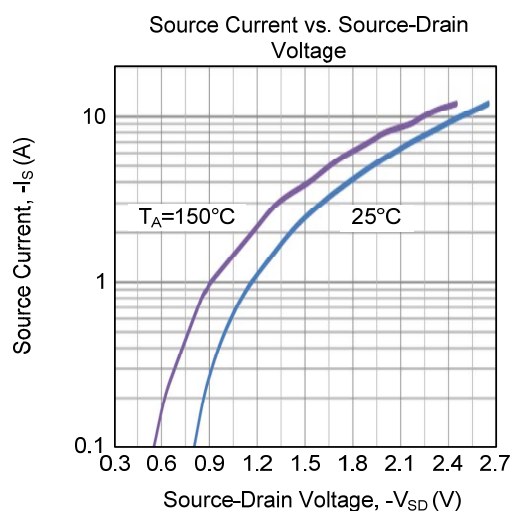
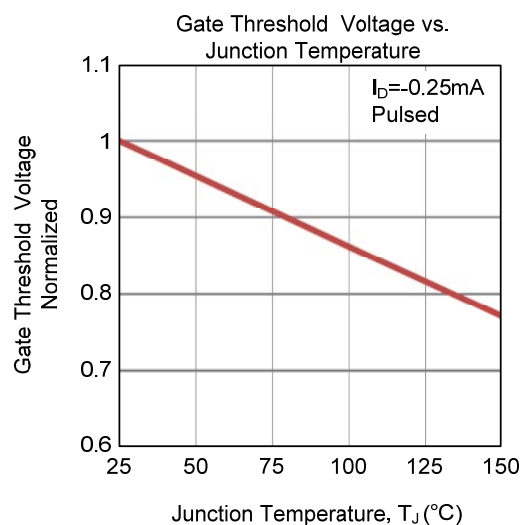
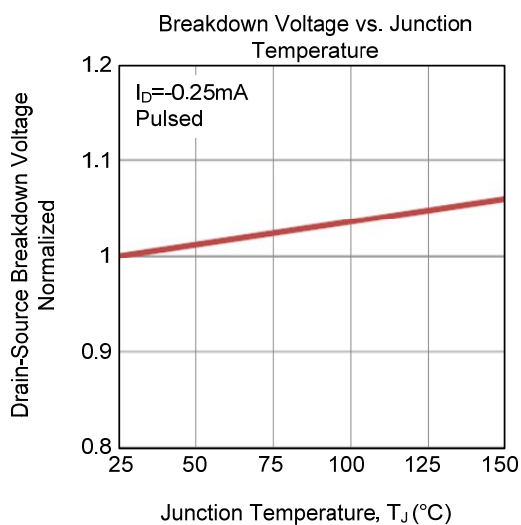
# ■ TEST CIRCUITS AND WAVEFORMS



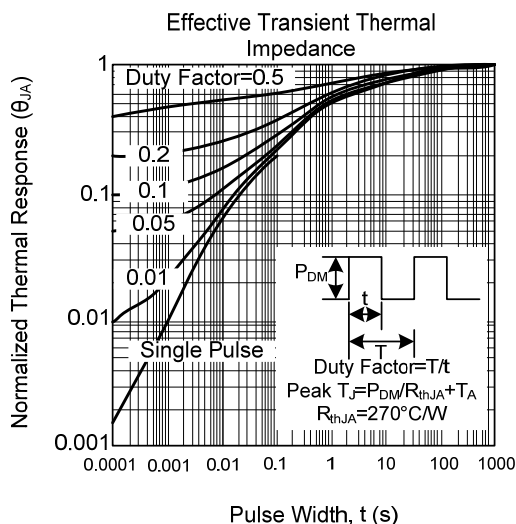
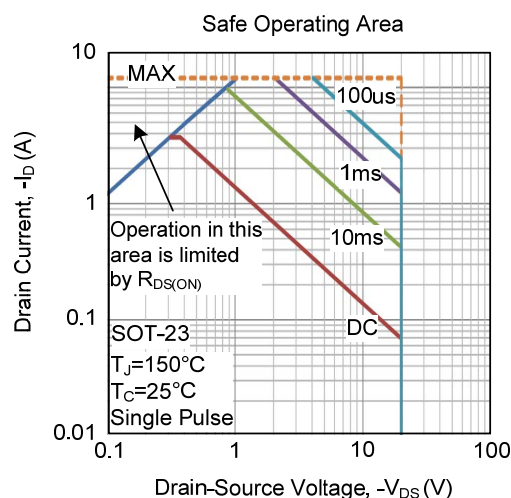
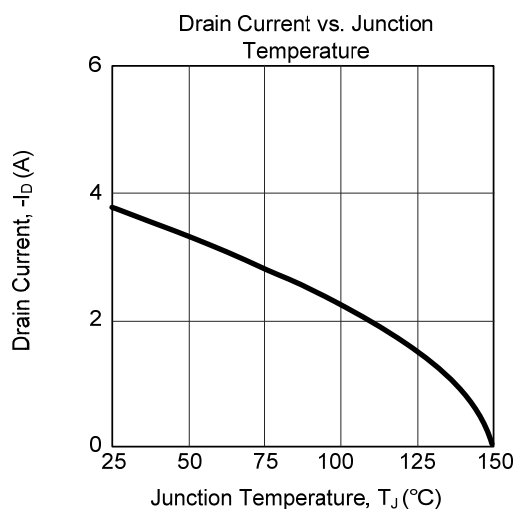
# TYPICAL CHARACTERISTICS



# ■ TYPICAL CHARACTERISTICS (Cont.)



# TYPICAL CHARACTERISTICS (Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.