



# UT2301

**Power MOSFET**

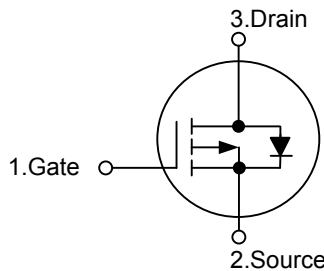
## -2.8A, -20V P-CHANNEL ENHANCEMENT MODE POWER MOSFET

■ DESCRIPTION

The UTC **UT2301** is P-channel enhancement mode power MOSFET, designed in serried ranks. With fast switching speed, low on-resistance, favorable stabilization.

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

■ SYMBOL



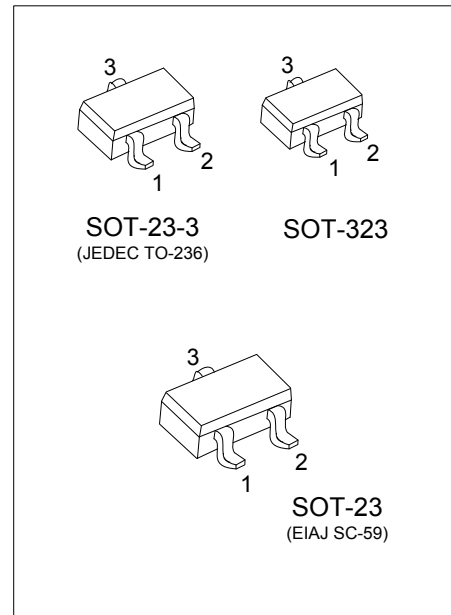
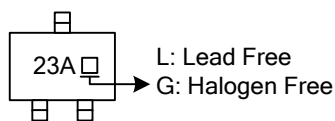
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2301L-AE2-R	UT2301G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT2301L-AE3-R	UT2301G-AE3-R	SOT-23	G	S	D	Tape Reel
UT2301L-AL3-R	UT2301G-AL3-R	SOT-323	G	S	D	Tape Reel

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

<p>UT2301G-AE2-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) AE2: SOT-23-3, AE3: SOT-23, AL3: SOT-323 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



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

PARAMETER	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	-20	V
Gate-Source Voltage	$V_{GSS}$	$\pm 8$	V
Continuous Drain Current	Continuous $I_D$	-2.8	A
Pulsed Drain Current	Pulsed (Note 2) $I_{DM}$	-8.4	A
Avalanche Energy	Single Pulsed (Note 3) $E_{AS}$	63	mJ
Total Power Dissipation	$P_D$	1.14	W
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.  $L=16\text{mH}$ ,  $I_{AS}=-2.8\text{A}$ ,  $V_{DD}=-20\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	110	$^\circ\text{C/W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

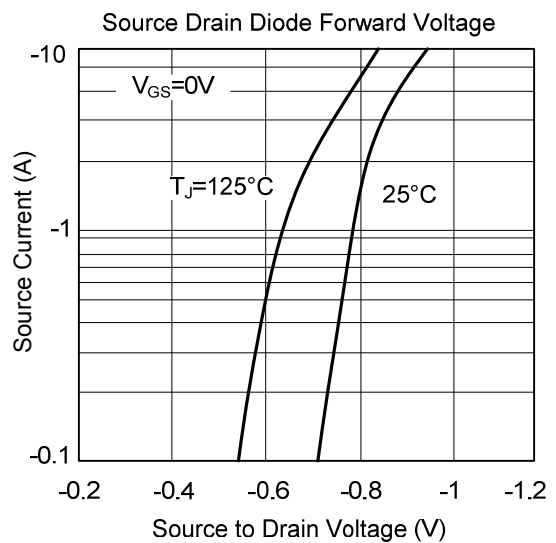
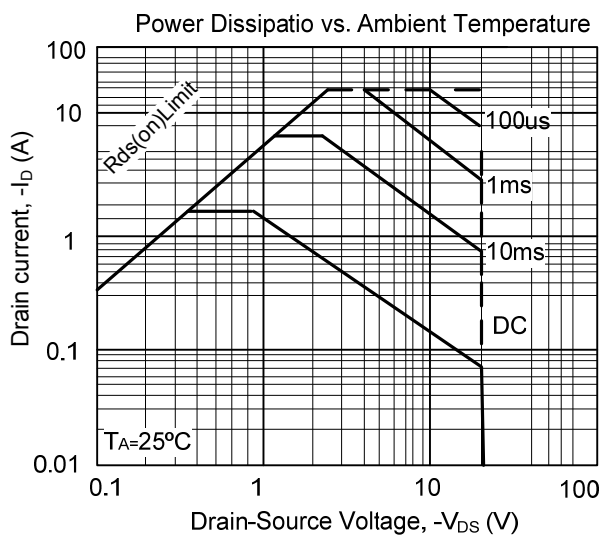
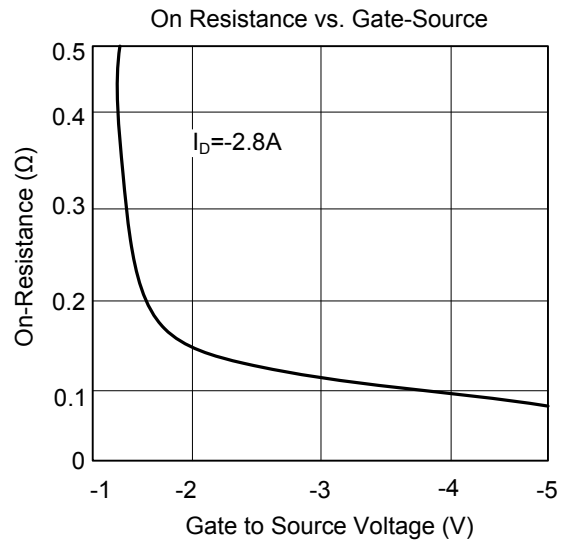
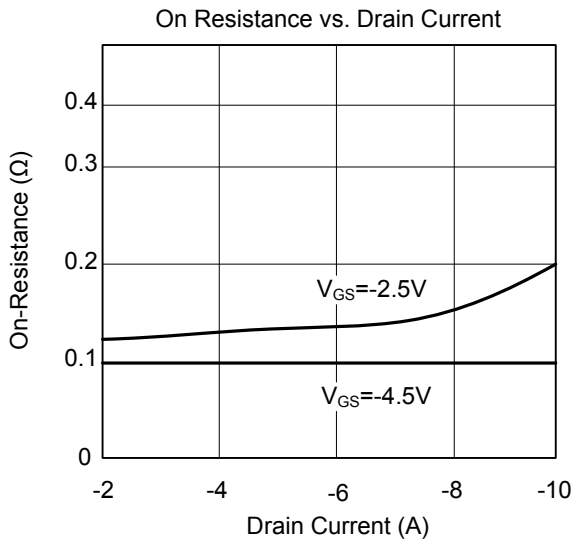
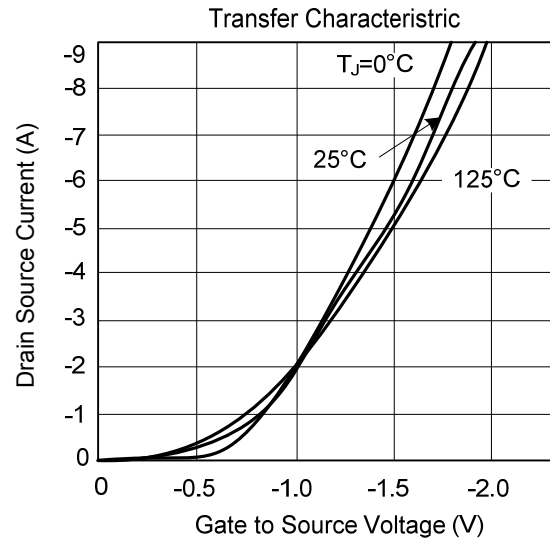
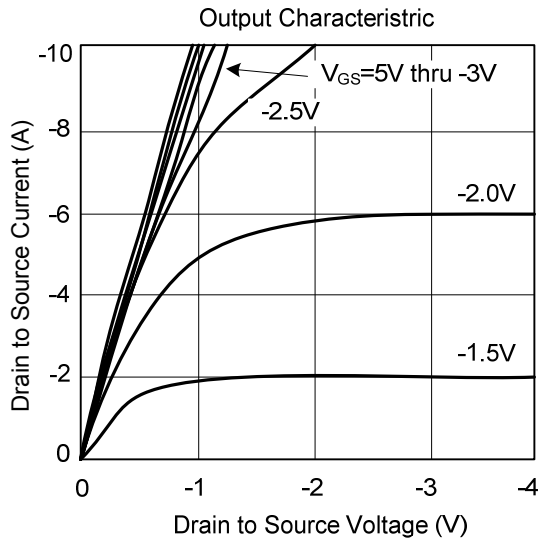
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

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	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8\text{V}$ , $V_{DS}=0\text{V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-0.45			V
Static Drain-Source On-State Resistance (Note 1)	$R_{DS(ON)}$	$V_{GS}=-4.5\text{V}$ , $I_D=-2.8\text{A}$			130	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}$ , $I_D=-2.0\text{A}$			190	$\text{m}\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=-10\text{V}$ , $f=1.0\text{MHz}$		630		pF
Output Capacitance	$C_{OSS}$			110		pF
Reverse Transfer Capacitance	$C_{RSS}$			90		pF
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=-16\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-2.8\text{A}$ , $I_D=-1\text{mA}$		30.5		nC
Gate-Source Charge	$Q_{GS}$			3.6		nC
Gate-Drain Charge	$Q_{GD}$			2.0		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=-10\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-2.8\text{A}$ , $R_G=6\Omega$		7.2		ns
Turn-ON Rise Time	$t_R$			3.8		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			32		ns
Turn-OFF Fall Time	$t_F$			13		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				-1.6	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				-8.4	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$V_{GS}=0\text{V}$ , $I_S=-1.6\text{A}$	-0.8	-1.2		V

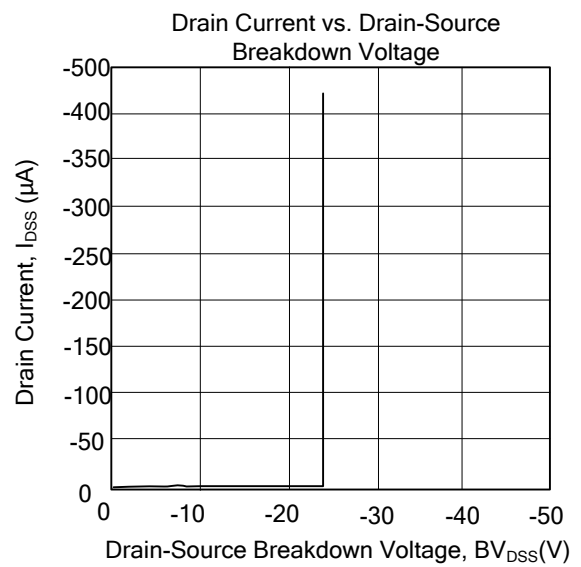
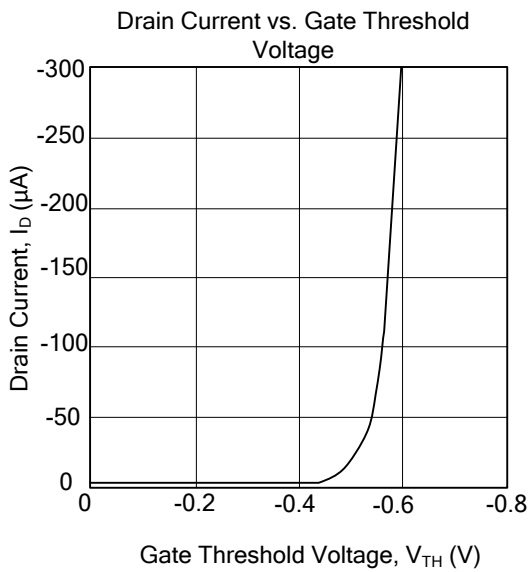
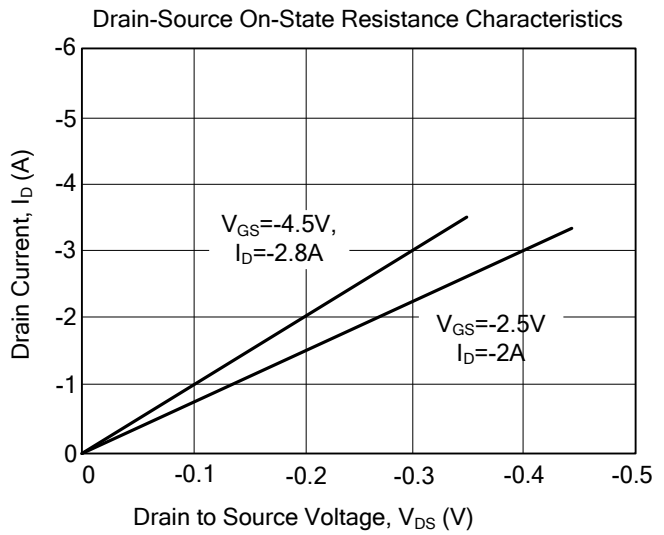
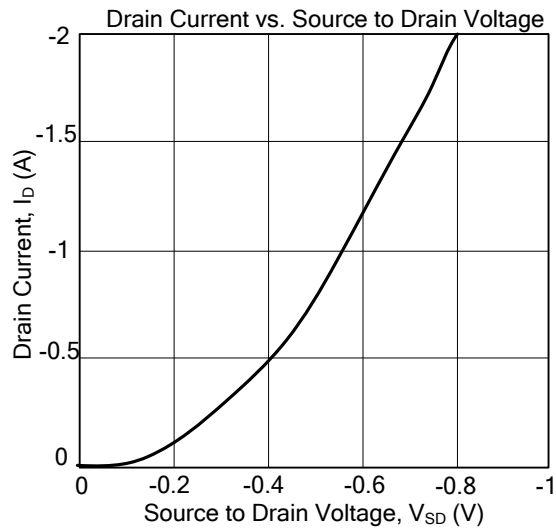
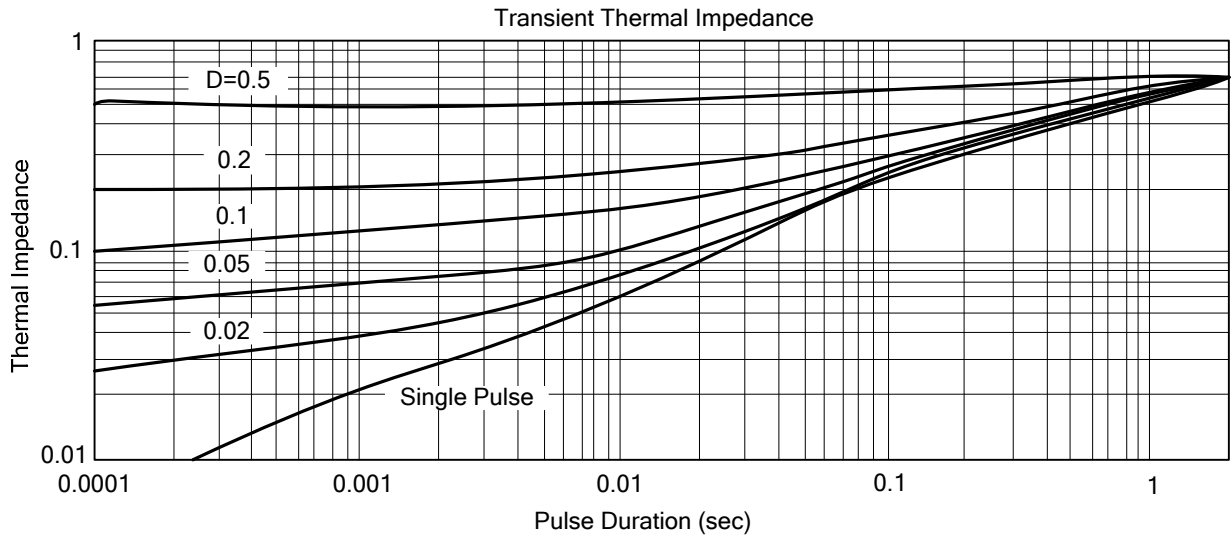
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

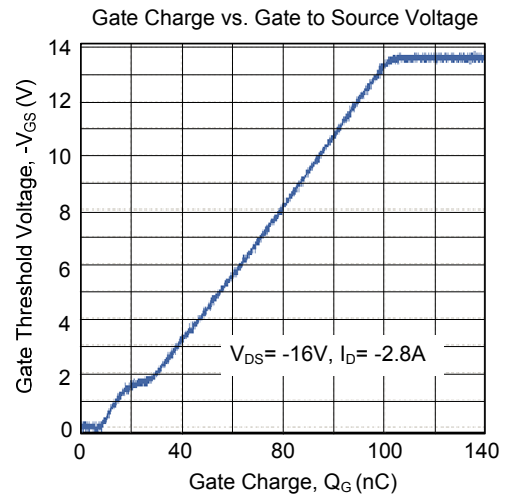
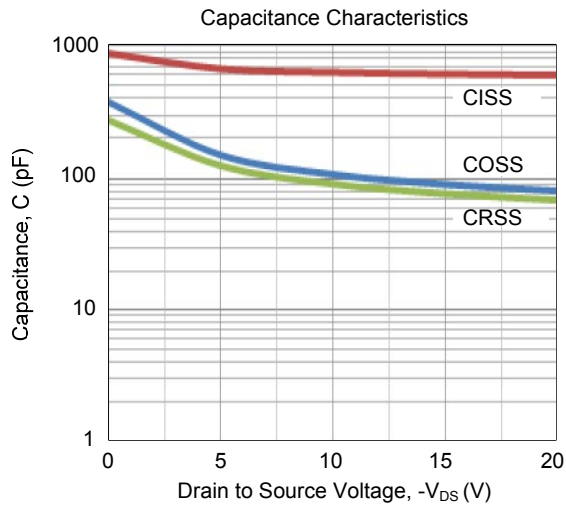
## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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