



## UT2301Z

Power MOSFET

### 20V P-CHANNEL ENHANCEMENT MODE

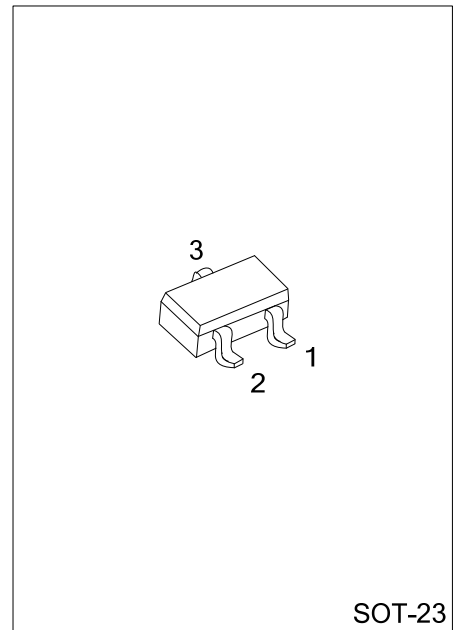
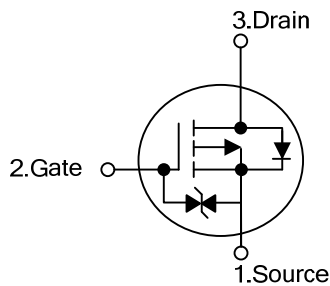
#### DESCRIPTION

The UTC **UT2301Z** is a -20V P-channel enhancement mode Power MOSFET with fast switching speed, low on-resistance and favorable stabilization. It can be used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

#### FEATURES

- \* Very High Density Cell Design for Low On-Resistance
- \* Very Good Thermal and Electrical Capabilities

#### SYMBOL

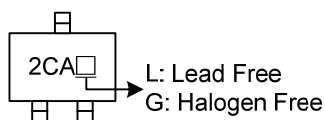


#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2301ZL-AE3-R	UT2301ZG-AE3-R	SOT-23	S	G	D	Tape Reel

<p>UT2301ZL-AE3-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</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 ( $T_a = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNITS
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current	$I_D$	-2.3	A
Pulsed Drain Current (Note 2, 3)	$I_{DM}$	-10	A
Total Power Dissipation	$P_D$	1.25	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Note: 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. Pulse width limited by  $T_{J(MAX)}$

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

■ THERMAL DATA (Note)

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	100	$^\circ\text{C/W}$

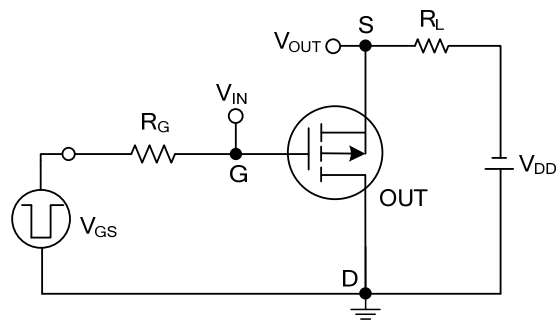
Note: Surface mounted on FR4 board  $t \leq 5\%$ sec.

■ ELECTRICAL CHARACTERISTICS ( $I_D = -2.3\text{A}$ ,  $T_a = 25^\circ\text{C}$ , unless otherwise specified)

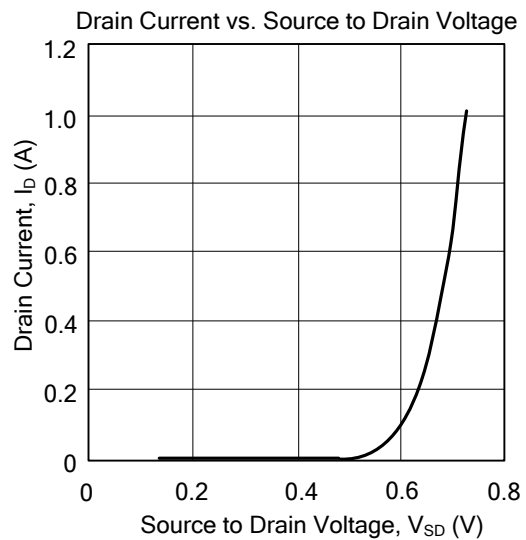
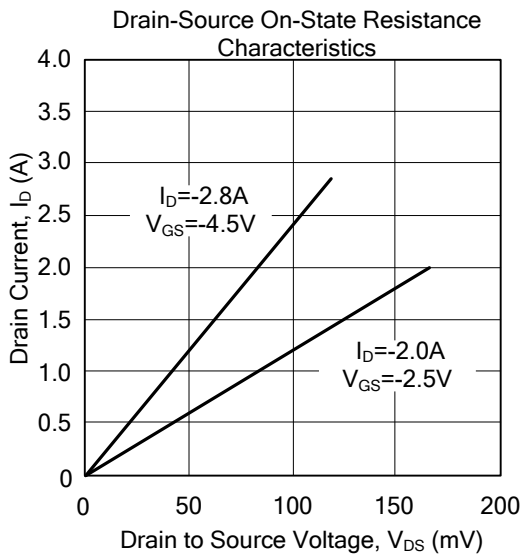
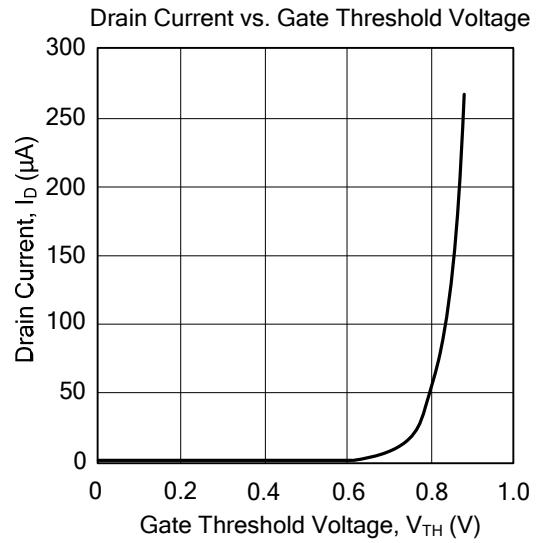
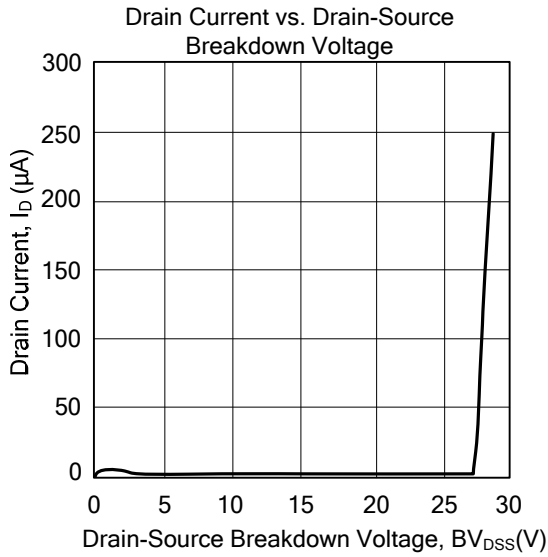
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}$ , $I_D=-250\mu\text{A}$	-20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-16\text{V}$ , $V_{GS}=0\text{V}$			-1.0	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8\text{V}$ , $V_{DS}=0\text{V}$			$\pm 5$	$\mu\text{A}$
<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	$R_{DS(ON)}$	$V_{GS}=-4.5\text{V}$ , $I_D=-2.8\text{A}$		95	130	m $\Omega$
		$V_{GS}=-2.5\text{V}$ , $I_D=-2.0\text{A}$		122	190	m $\Omega$
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=-5\text{V}$ , $V_{GS}=-10\text{V}$	-6			A
Forward Transconductance	$g_{FS}$	$V_{DS}=-5\text{V}$ , $I_D=-2.8\text{A}$		6.5		S
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=-6\text{V}$ , $f=1.0\text{MHz}$		447		pF
Output Capacitance	$C_{OSS}$			127		pF
Reverse Transfer Capacitance	$C_{RSS}$			80		pF
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge (Note)	$Q_G$	$V_{DS}=-6\text{V}$ , $V_{GS}=-4.5\text{V}$ , $I_D=-2.8\text{A}$		5.4	10	nC
Gate-Source Charge	$Q_{GS}$			0.8		nC
Gate-Drain Charge	$Q_{GD}$			1.1		nC
Turn-ON Delay Time (Note)	$t_{D(ON)}$	$V_{DD}=-6\text{V}$ , $V_{GEN}=-4.5\text{V}$ , $I_D=-1\text{A}$ , $R_G=6\Omega$ , $R_L=6\Omega$		5	25	ns
Turn-ON Rise Time	$t_R$			19	60	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			95	110	ns
Turn-OFF Fall Time	$t_F$			65	80	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Diode Forward Voltage (Note)	$V_{SD}$	$I_S=-1.6\text{A}$ , $V_{GS}=0\text{V}$		-0.8	-1.2	V
Maximum Diode Forward Current	$I_S$				-1.6	A

Note: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

### ■ SWITCHING TEST CIRCUIT



### TYPICAL CHARACTERISTICS



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