20V P-Channel Power MOSFET

UM2301S SOT23-3
UM2301P SOT323

General Description

The UM2301 is a low threshold P-channel MOSFET, have extremely low on-resistance. This benefit provides the designer with an extremely efficient device for use in battery and load management applications. The device uses a space-saving, small-outline SOT23-3 or SOT323 package.

Applications

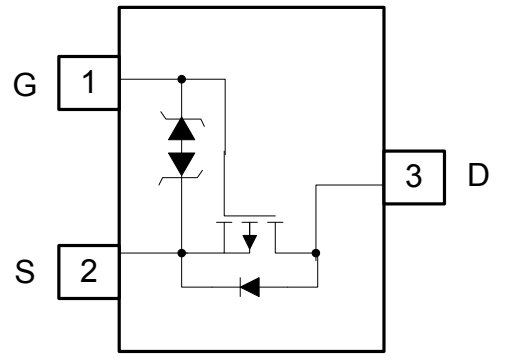
- Battery Packs
- Battery-powered Portable Equipment
- Cellular and Cordless Telephones

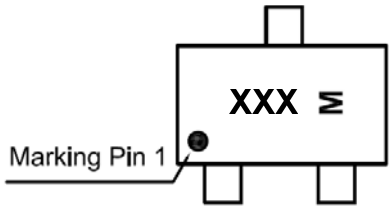
Features

- Drain-Source Voltage(max)：-20V
- Low On-Resistance：
  200mΩ@V_{GS}=-4.5V
  250mΩ@V_{GS}=-2.5V
- Continuous Drain Current(max)：
  -1.5A@25℃(SOT23-3)
  -1.1A@25℃(SOT323)

Pin Configurations

Top View





M: Month Code
XXX: UM2301S 10A
UM2301P VLD

Ordering Information

Part Number	Packaging Type	Marking Code	Shipping Qty
UM2301S	SOT23-3	10A	3000pcs/7 Inch Tape & Reel
UM2301P	SOT323	VLD	

Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source voltage		-20	V
V_{GS}	Gate-Source voltage		±8	V
I_D	Continuous Drain Current (5s)	SOT23-3	-1.5	A
		SOT323	-1.1	
I_{DP}	Drain Current Pulsed		-5	A

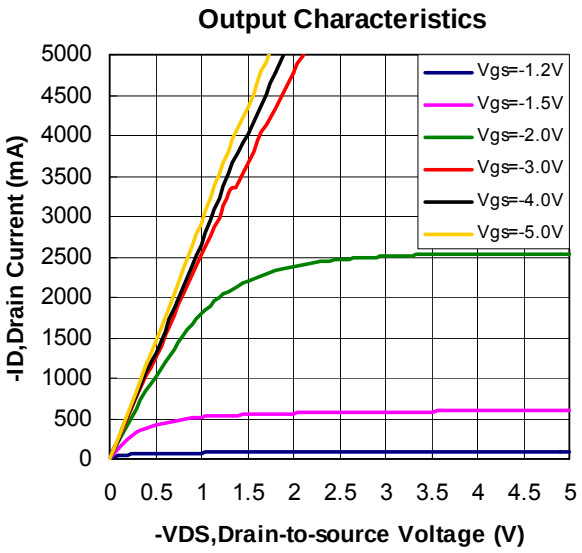
	(Pulse Width ≤ 10μs, Duty Cycle ≤ 1%)			
P_D	Power Dissipation	SOT23-3	0.86	W
		SOT323	0.5	
T_J	Junction Temperature		-55~150	℃
Tstg	Storage Temperature		-55~150	℃
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (≤5s)	SOT23-3	145	℃/W
		SOT323	250	
ESD	ESD Method 3015.8		2000	V

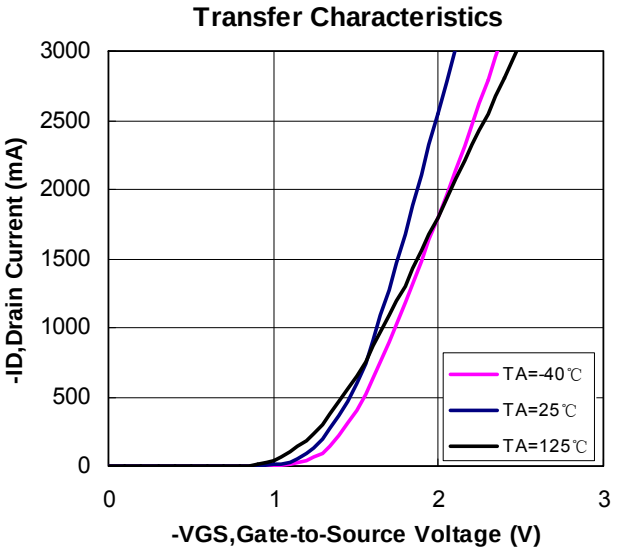
Electrical Characteristics (T_J=25℃, Unless otherwise noted)

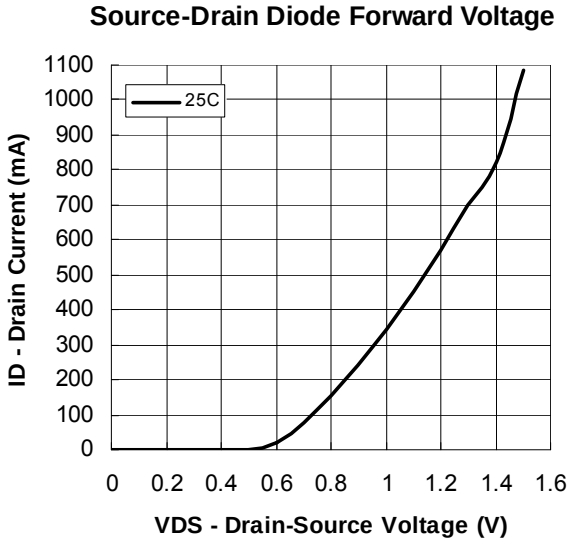
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V			-0.1	μA
I_{GSS}	Gate-to-Source Leakage Current	V_{GS}=±8V, V_{DS}=0V			±10	μA
On Characteristics						
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance [a]	V_{GS}=-4.5V, I_D=-1.0A		200	350	mΩ
		V_{GS}=-2.5V, I_D=-1.0A		250	400	
$V_{GS(TH)}$	Gate-Source Threshold Voltage	V_{DS}= V_{GS} , I_D=-250μA	-0.4	-0.6	-1	V
g_{fs}	Forward Transconductance [a]	V_{DS}=-5V, I_D=-2.0A		4.5		S
Dynamic Characteristics [b]						
Ciss	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, f=1.0MHz		405		pF
Coss	Output Capacitance			150		
Crss	Reverse Transfer Capacitance			55		
Switching Characteristics [b]						
td(on)	Turn-on Delay Time	V_{DD}=-10V, R_L=10Ω, I_D=-1A, V_{GEN}=-4.5V, R_G=1Ω		11	20	ns
tr	Rise Time			35	60	
td(off)	Turn-off Delay Time			80	150	
tf	Fall Time			50	90	
Drain-Source Diode Characteristics and Maximum Ratings						
V_{SD}	Forward Diode Voltage	I_S=-0.7A		-0.8	-1.2	V

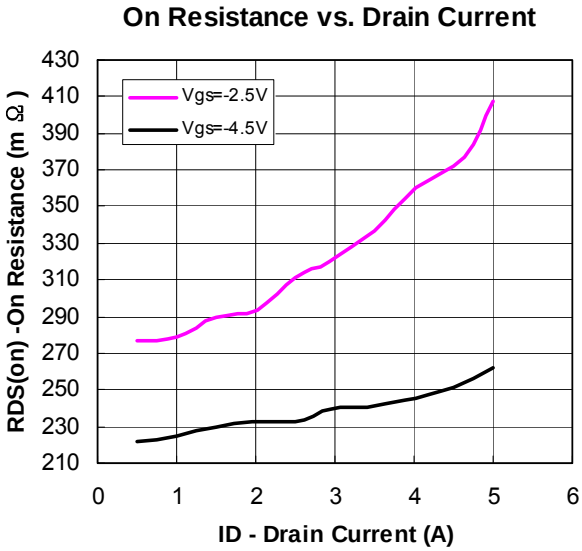
a: Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%.
b: Guaranteed by design, not subject to production testing.

Typical Characteristics (T_J=25℃, Unless otherwise noted)



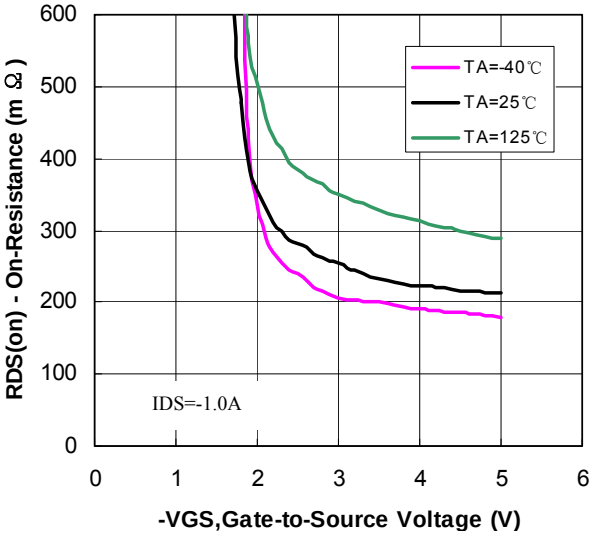




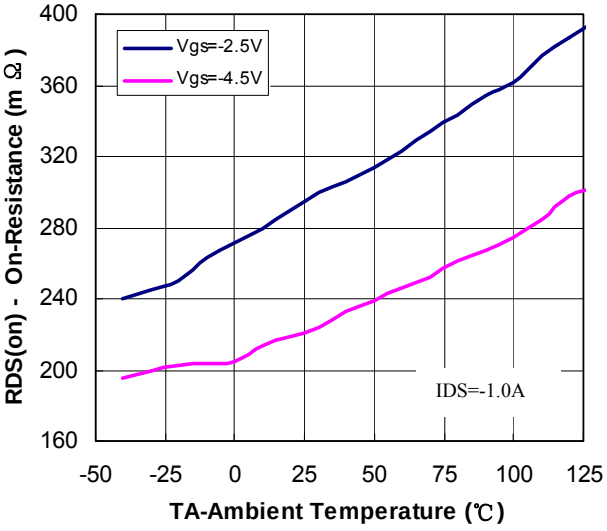


Typical Characteristics (T_J=25℃, Unless otherwise noted)

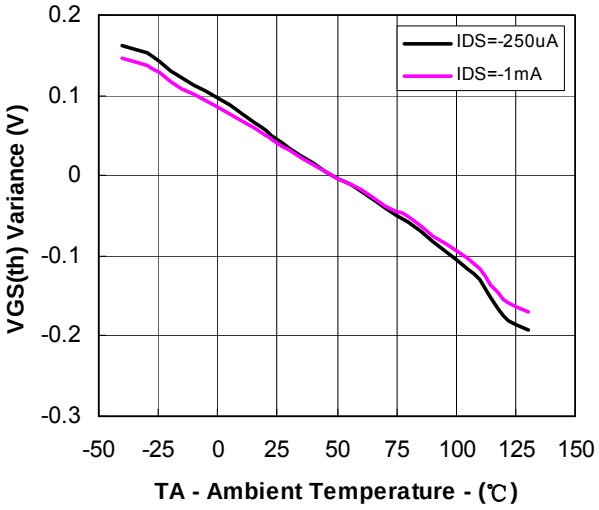
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Ambient Temperature



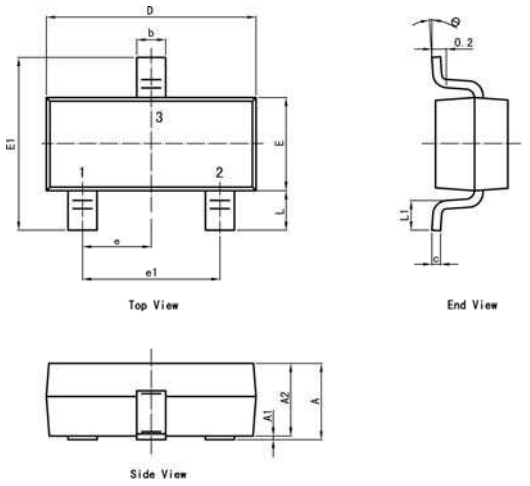
Threshold Voltage vs. Ambient Temperature



Package Information

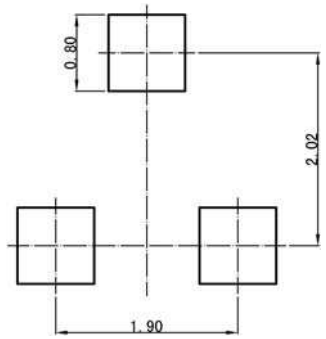
UM2301S SOT23-3

Outline Drawing



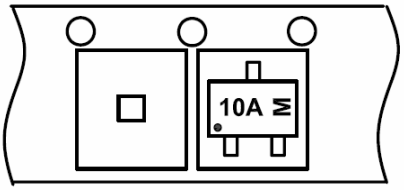
Symbol	DIMENSIONS			
	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950REF		0.037REF	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Land Pattern



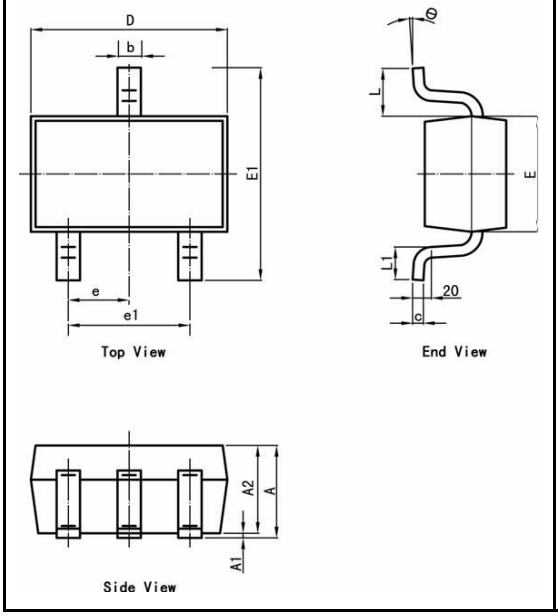
NOTES:
1. Compound dimension: 2.92×1.60;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



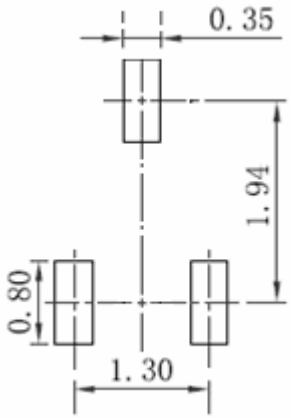
UM2301P SOT323

Outline Drawing



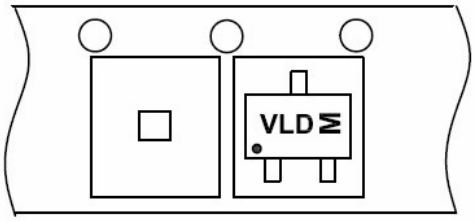
Symbol	DIMENSIONS			
	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.877	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.220	0.003	0.009
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	2.000	2.450	0.079	0.096
e	0.650REF		0.026REF	
e1	1.200	1.400	0.047	0.055
L	0.488REF		0.020REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Land Pattern



NOTES:
1. Compound dimension: 2.10×1.25;
2. Unit: mm;
3.General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



IMPORTANT NOTICE

The information in this document has been carefully reviewed and is believed to be accurate. Nonetheless, this document is subject to change without notice. Union assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the contained information, or to notify a person or organization of any update. Union reserves the right to make changes, at any time, in order to improve reliability, function or design and to attempt to supply the best product possible.

Union Semiconductor, Inc
Add: 2F, No. 3, Lane 647 Songtao Road, Shanghai 201203
Tel: 021-51093966
Fax: 021-51026018
Website: www.union-ic.com