20V N-Channel Power MOSFET

UM2302S *SOT23-3*
UM2302P *SOT323*

General Description

The UM2302 is a low threshold N-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

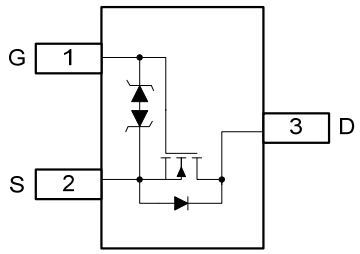
- Battery Packs
- Battery-Powered Portable Equipments
- Cellular and Cordless Telephones

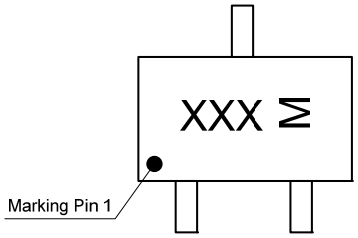
Features

- Drain-Source Voltage (Max): 20V
- Low On-Resistance:
  90mΩ@V_{GS}=4.5V
  150mΩ@V_{GS}=2.5V
- Continuous Drain Current (Max):
  2A@25°C (SOT23-3)
  1.6A@25°C (SOT323)

Pin Configurations

Top View





M: Month Code
XXX: UM2302S 10B
UM2302P VLC

Ordering Information

Part Number	Packaging Type	Marking Code	Shipping Qty
UM2302S	SOT23-3	10B	3000pcs/7 Inch Tape & Reel
UM2302P	SOT323	VLC	

Absolute Maximum Ratings

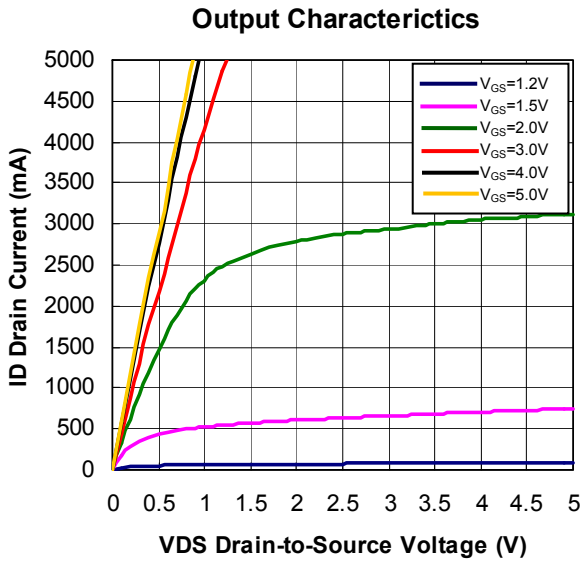
Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source Voltage		20	V
V_{GS}	Gate-Source Voltage		±8	V
I_D	Continuous Drain Current (5s)	SOT23-3	2	A
		SOT323	1.6	
I_{DP}	Drain Current Pulsed (Pulse Width≤10μs, Duty Cycle≤1%)		5	A
P_D	Power Dissipation	SOT23-3	0.86	W
		SOT323	0.5	
T_J	Junction Temperature		-55~150	°C
Tstg	Storage Temperature		-55~150	°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (≤5s)	SOT23-3	145	°C/W
		SOT323	250	
ESD	ESD Method 3015.8		2000	V

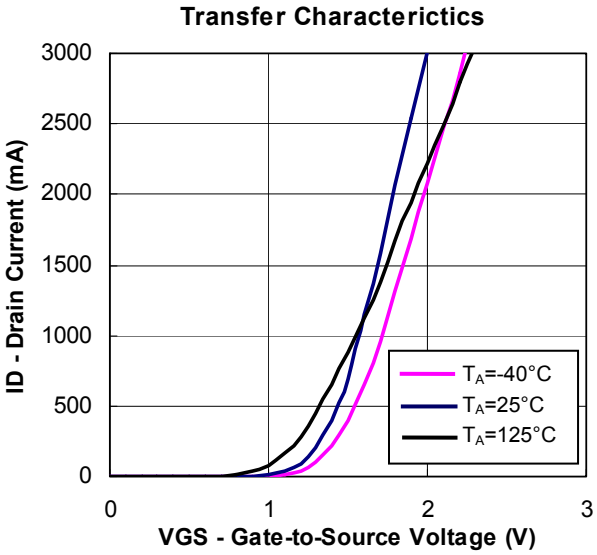
Electrical Characteristics (T_J=25°C, unless otherwise noted)

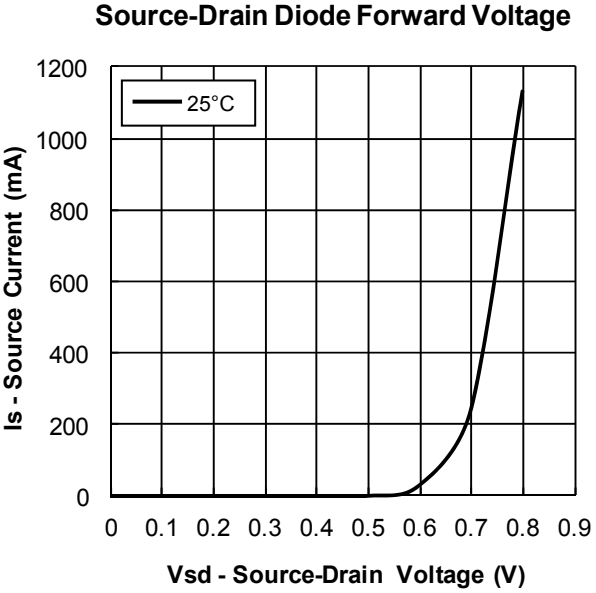
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-to-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V			0.1	μA
I_{GSS}	Gate-to-Source Leakage Current	V_{GS}=±8V, V_{DS}=0V			±10	μA
On Characteristics						
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance (Note 1)	V_{GS}=4.5V, I_D=1.0A		90	150	mΩ
		V_{GS}=2.5V, I_D=1.0A		150	200	
$V_{GS(TH)}$	Gate-Source Threshold Voltage	V_{DS}= V_{GS} , I_D=250μA	0.40		0.90	V
g_{fs}	Forward Transconductance (Note 1)	V_{DS}=5V, I_D=2A		4.5		S
Dynamic Characteristics (Note 2)						
Ciss	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1.0MHz		150		pF
Coss	Output Capacitance			50		
Crss	Reverse Transfer Capacitance			40		
Switching Characteristics (Note 2)						
td(on)	Turn-on Delay Time	V_{DD}=10V, R_L=2.78Ω, I_D=3.6A, V_{GEN}=4.5V, R_G=1Ω		8	15	ns
tr	Rise Time			10	25	
td(off)	Turn-off Delay Time			30	45	
tf	Fall Time			25	40	
Drain-Source Diode Characteristics and Maximum Ratings						
V_{SD}	Forward Diode Voltage	I_S=0.95A, V_{GS}=0V		0.7	1.2	V

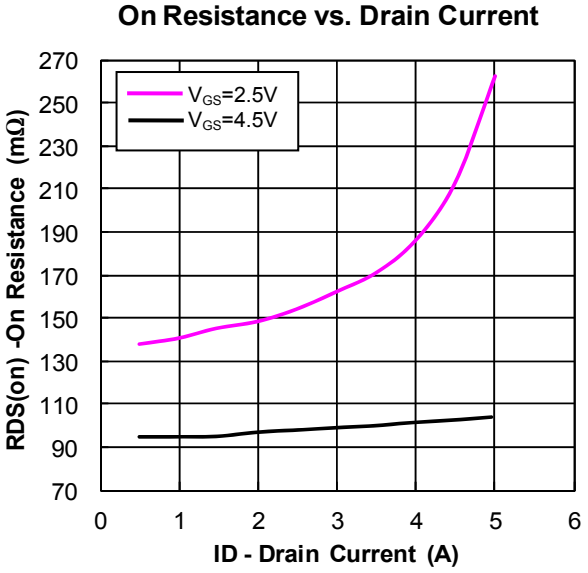
Note 1: Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%.
Note 2: Guaranteed by design, not subject to production testing.

Typical Characteristics (T_J=25°C, unless otherwise noted)



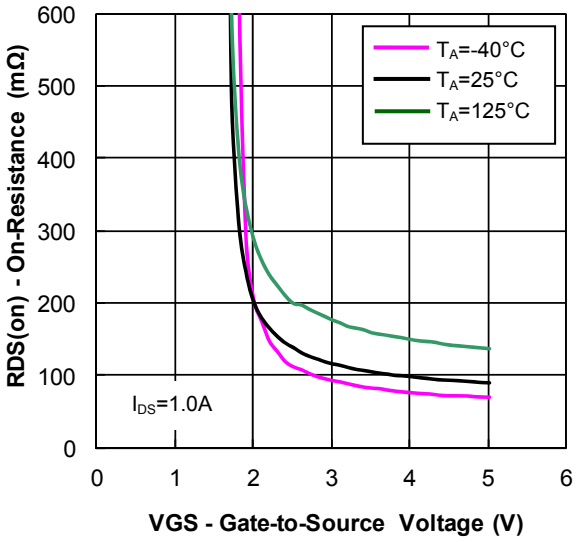




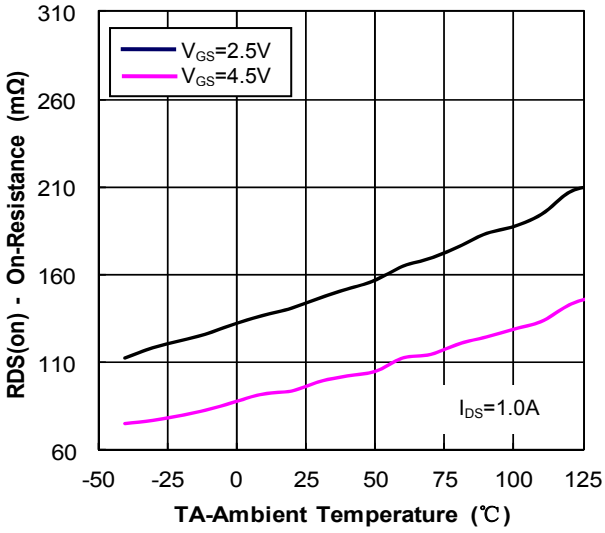


Typical Characteristics (T_J=25°C, unless otherwise noted)

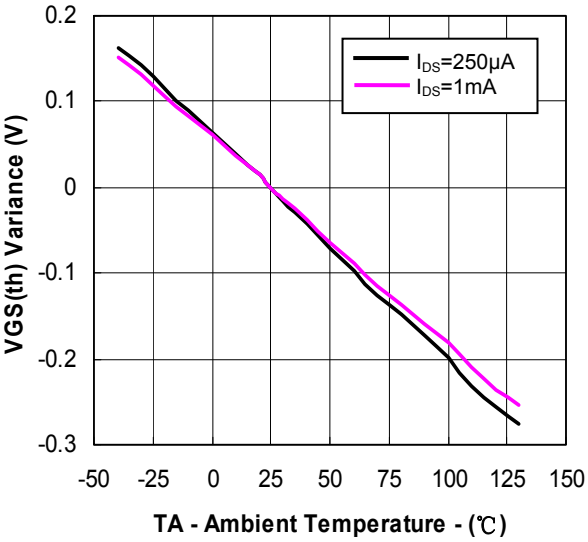
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Ambient Temperature



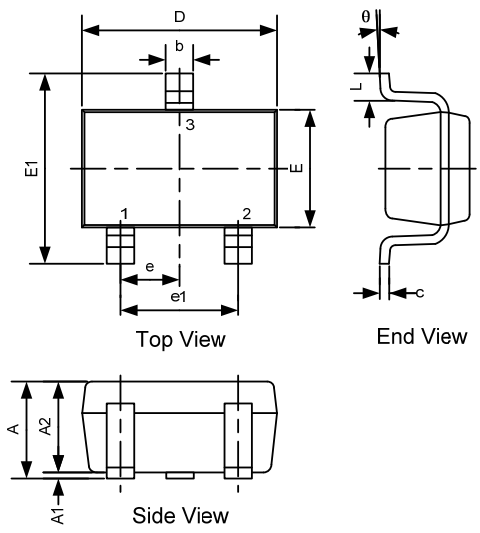
Threshold Voltage vs. Ambient Temperature



Package Information

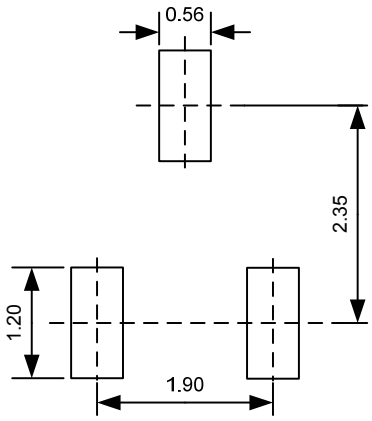
UM2302S SOT23-3

Outline Drawing



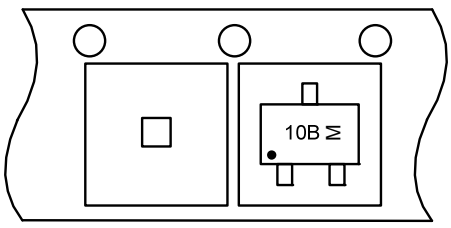
Symbol	DIMENSIONS					
	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	1.013	1.15	1.40	0.040	0.045	0.055
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	1.00	1.10	1.30	0.039	0.043	0.051
b	0.30	-	0.50	0.012	-	0.020
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.82	-	3.10	0.111	-	0.122
E	1.50	1.60	1.70	0.059	0.063	0.067
E1	2.60	2.80	3.00	0.102	0.110	0.118
e	0.95REF			0.037REF		
e1	1.90REF			0.075REF		
L	0.30	-	0.60	0.012	-	0.024
θ	0°	-	8°	0°	-	8°

Land Pattern



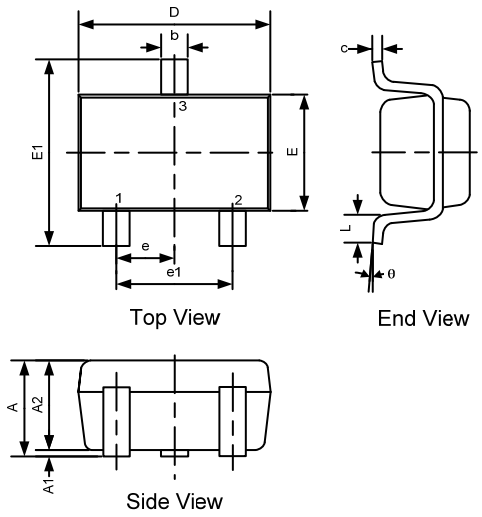
NOTES:
1. Compound dimension: 2.92×1.60；
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



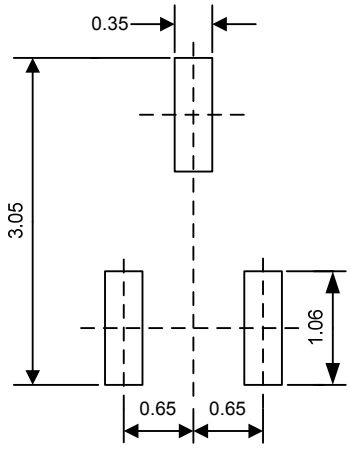
UM2302P SOT323

Outline Drawing



Symbol	DIMENSIONS					
	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.90	-	1.10	0.035	-	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.90	-	1.00	0.035	-	0.039
b	0.20	0.30	0.40	0.008	0.012	0.016
c	0.08	-	0.18	0.003	-	0.007
D	1.80	2.15	2.20	0.071	0.085	0.087
E	1.15	1.30	1.35	0.045	0.051	0.053
E1	2.00	-	2.45	0.079	-	0.096
e	0.65BSC			0.026BSC		
e1	1.20	1.30	1.40	0.047	0.051	0.055
L	0.25	-	0.46	0.010	-	0.018
θ	0°	-	8°	0°	-	8°

Land Pattern



NOTES:
1. Compound dimension: 2.15×1.30.
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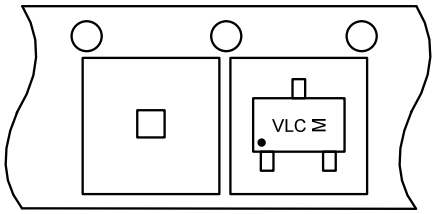
Tape and Reel Orientation



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