

高速USB2.0 (480 Mbps) 双刀双掷 (DPDT) 开关**UM7222MA MSOP10
UM7222 QFN10 1.8×1.4****描述**

UM7222MA/UM7222是一款低功耗双端口高速数据开关，针对USB2.0信号交换进行了优化。UM7222MA/UM7222开关采用双刀双掷 (DPDT) 配置，可处理双向信号流，实现带宽 (-3dB) 550MHz，在250MHz时端口间串扰和隔离度为-50dB。

UM7222MA/UM7222采用+2.7V至+5.5V单电源供电，电流消耗小于1uA。

UM7222MA/UM7222具有宽带宽和位到位低偏移的特点，因此能够以良好的信号完整性传递高速差分信号，在输出端几乎不衰减高速信号。其通道间串扰抑制能力强，可将接口噪声降至最低。其带宽足以通过高速USB2.0差分信号 (480Mbps)，并控制逻辑阈值确保与1.8V逻辑兼容。

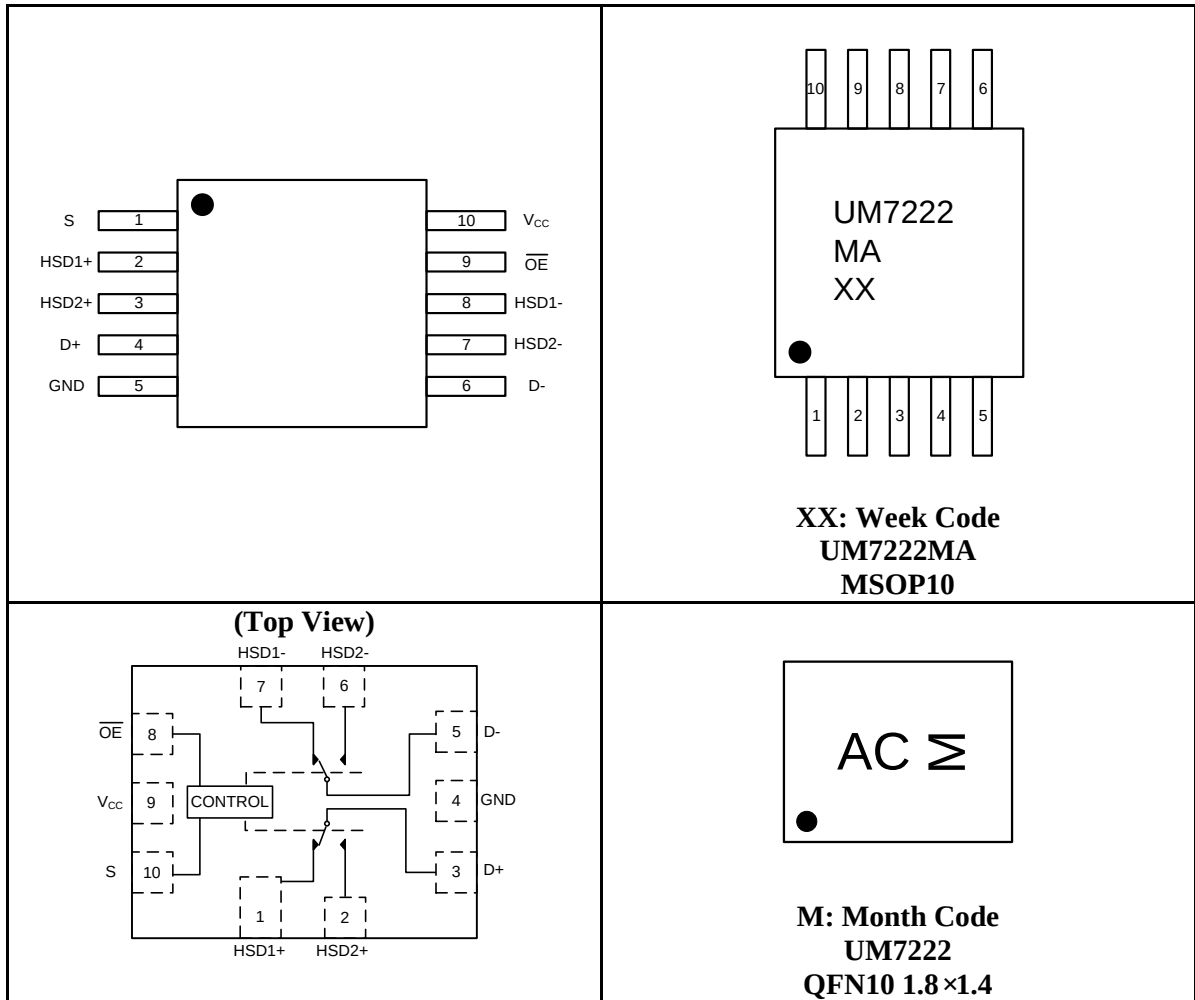
UM7222MA采用无铅MSOP10封装，而UM7222则采用无铅QFN10封装 (1.4mm×1.8mm×0.55mm)。它们是便携式高速混合信号开关应用的理想之选。

应用**特性**

- 差分信号数据路由
- USB2.0 信号路由
- 手机、个人数字助理 (PDA)、数码相机和笔记本电脑
- LCD 显示器、电视和机顶盒
- 在 $V_{CC}=3.0V$ 时， R_{on} 通常为 6.5Ω (典型值)
- 低位间时序偏差：通常为 50ps
- D+ 和 D- 上的过压容限 (OVT) 高达 5.5V
- 断电保护：当 $V_{CC}=0V$ 时，D+ 和 D- 可承受高达 5.5V 的电压
- 低串扰：-50dB (250MHz)
- 低电流消耗：1 μ A
- 接近 0 传播延迟：250ps
- 通道导通电容：6.5pF (典型值)
- V_{CC} 工作电压范围：+2.7V 至+5.5V
- 带宽 (或数据频率)：550MHz
- 无铅 MSOP10 和 QFN10 封装
- 静电放电 (ESD) 额定值： $\pm 4kV$ (I/O 至 GND)

Pin Configurations

Top View



Pin Description

Pin		Name	Function
UM7222MA	UM7222		
2	1	HSD1+	Data Ports
3	2	HSD2+	Data Ports
4	3	D+	Data Ports
5	4	GND	Ground Connection
6	5	D-	Data Ports
7	6	HSD2-	Data Ports
8	7	HSD1-	Data Ports
9	8	$\overline{OE}$	Output Enable
10	9	V_{CC}	Positive Supply Voltage
1	10	S	Select Input

Ordering Information

Part Number	Packaging Type	Marking Code	Shipping Qty
UM7222MA	MSOP10	UM7222MA	4000pcs/13 Inch Tape & Reel
UM7222	QFN10 1.8×1.4	AC	3000pcs/7 Inch Tape & Reel

Function Table

$\overline{\text{OE}}$	S	HSD1+, HSD1-	HSD2+, HSD2-
1	X	OFF	OFF
0	0	ON	OFF
0	1	OFF	ON

Absolute Maximum Ratings

Symbol	Parameter	Limit	Unit
V_{CC}	Supply Voltage	-0.5 to +6.5	V
V_{IS}	Analog Switch Input Voltage	-0.5 to +6.5	
V_{IN}	Digital Select Input Voltage	-0.5 to +6.5	
I_D	Continuous DC Current	50	mA
P_D	Power Dissipation	0.5	W
T_O	Operating Temperature Range	-40 to +85	°C
T_{STG}	Storage Temperature Range	-65 to +150	

DC Electrical Characteristics

Symbol	Parameter	Test Conditions	V _{CC} (V)	Temp	Limits (-40 °C to 85 °C)			Unit
					Min	Typ (Note1)	Max	
I _{IN}	Input Leakage Current	0 ≤ V _{IS} ≤ V _{CC}	3.6	Full	-1.0		1.0	μA
I _{OFF}	Power Off Leakage Current	0 ≤ V _{IS} ≤ V _{CC}	0	Full	-1.0		1.0	μA
I _{CCT}	Increase in I _{CC} per Control Voltage	V _{IN} =2.6V	3.6	Full			10	μA
I _{OZ}	OFF State Leakage Current	0 ≤ V _{IS} ≤ V _{CC}	3.6	Full	-1.0		1.0	μA
I _{CC}	Quiescent Supply Current	V _{IS} =V _{CC} or GND	3.6	Full			1.0	μA
V _{IH}	Input High Voltage		3.0 to 3.6	Full	1.3			V
V _{IL}	Input Low Voltage		3.0 to 3.6	Full			0.5	V
V _{IK}	Clamp Diode Voltage	I _{IS} =-18mA	3.0	Full			-1.2	V
R _{ON}	On-Resistance (Note 2)	V _{IS} =0 to 0.4V I _D =8mA	3.0	Full		6.5	9	Ω
ΔR _{ON}	On Resistance Match Between Channels (Note 2, 3)	V _{IS} =0 to 0.4V I _D =8mA	3.0	Full		0.35		Ω
R _{FLAT}	On Resistance Flatness (Note 2, 3)	V _{IS} =0 to 1.0V I _D =8mA	3.0	Full		4.5		Ω

Note 1: Typically values are at V_{CC}=3.3V and T_A=+25 °C.

Note 2: Guaranteed by design. Resistance measurements do not include test circuit or package resistance.

Note 3: Parameter is characterized but not tested in production.

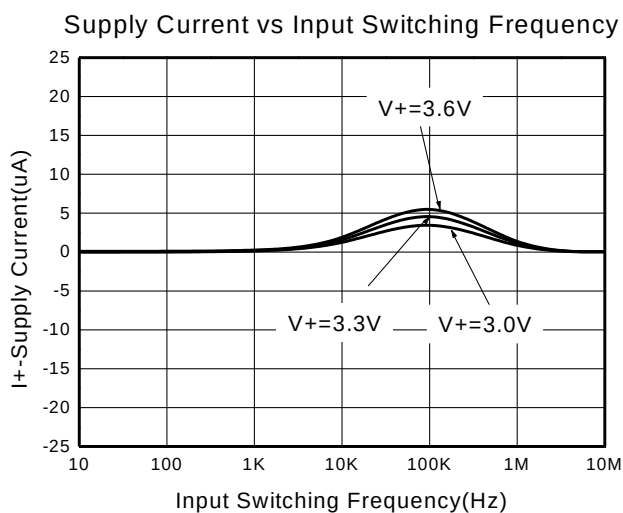
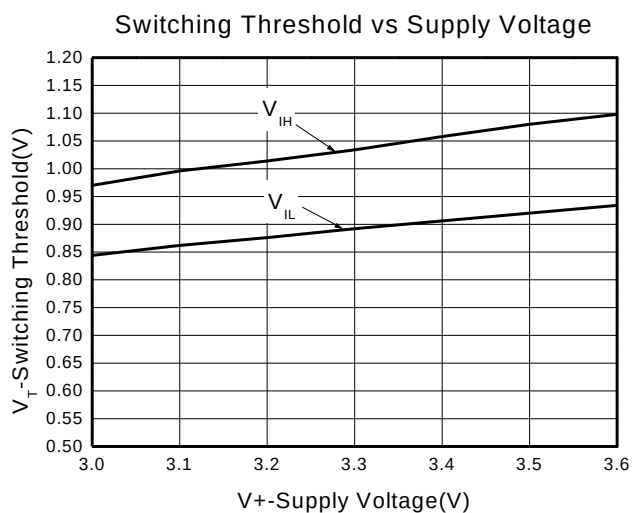
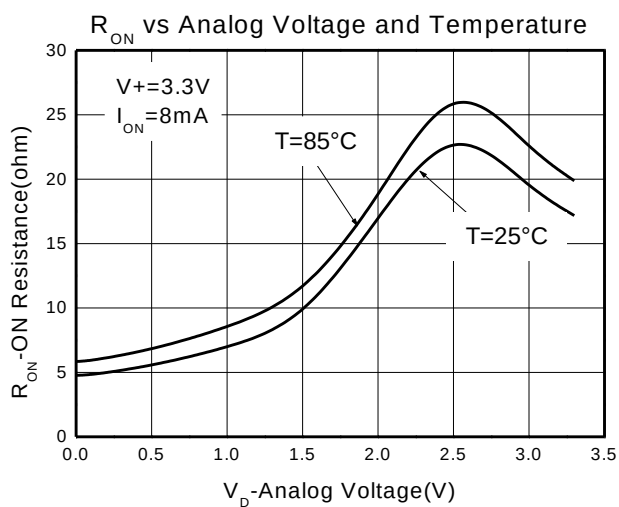
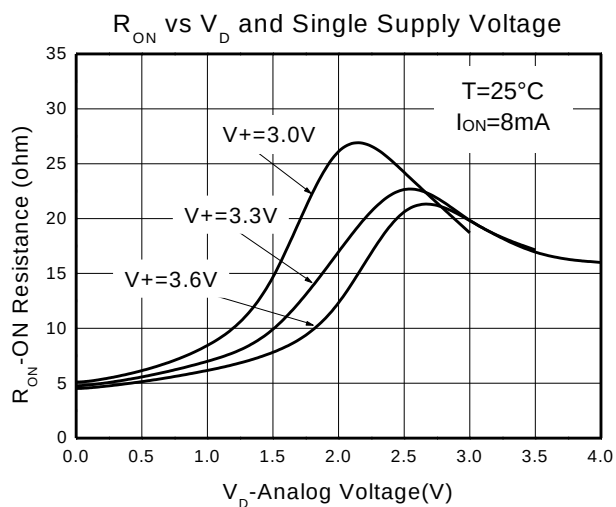
AC Electrical Characteristics

Symbol	Parameter	Test Conditions	V _{CC} (V)	Temp	Limits (-40 °C to 85 °C)			Unit
					Min	Typ (Note1)	Max	
t _{ON}	Turn On Time	V _{IS} =0.8V	3.0 to 3.6	Full		13	30	ns
t _{OFF}	Turn Off Time	V _{IS} =0.8V	3.0 to 3.6	Full		12	25	ns
t _{BBM}	Break Before Make Time (Note 4)	V _{IS} =0.8V	3.0 to 3.6	Full	2	4.7	6.5	ns
t _{PD}	Propagation Delay	C _L =10pF	3.0 to 3.6	Full		0.25		ns
t _{SK(O)}	Channel to Channel Skew	C _L =10pF	3.0 to 3.6			0.05		ns
O _{IRR}	Off Isolation	R _L =50Ω, f=250MHz	3.0 to 3.6	Full		-25		dB
X _{TALK}	Crosstalk	R _L =50Ω, f=250MHz	3.0 to 3.6	Full		-48		dB
BW	-3dB Bandwidth	R _L =50Ω	3.0 to 3.6	Full		550		MHz
Capacitance								
C _{IN}	Control Pin Input Capacitance (Note 5)	V _{CC} =0V				2.5		pF
C _{OFF}	HSD+ HSD- Off Capacitance (Note 5)	V _{CC} =V _{IS} =3.3V, OE=3.3V				4.5		pF
C _{ON}	HSD+ HSD- ON Capacitance (Note 5)	V _{CC} =3.3V, OE=0V				7.0		pF

Note 4: Guaranteed by design.

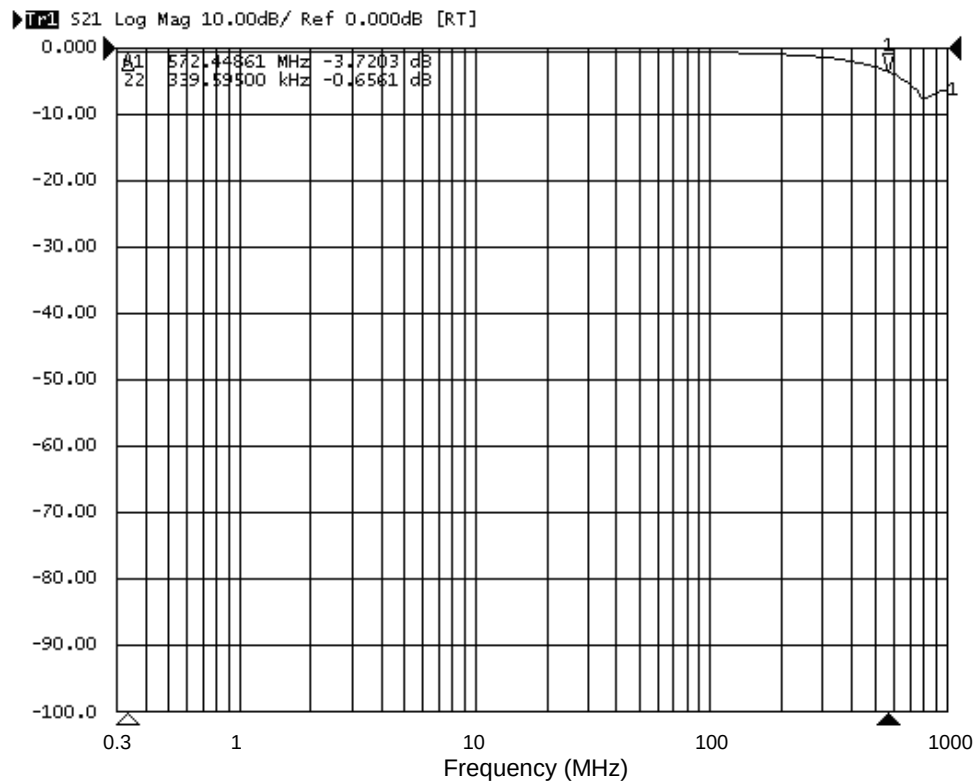
Note 5: T_A=+25 °C, f=1MHz, Capacitance is characterized but not tested in production.

Typical Performance Characteristics

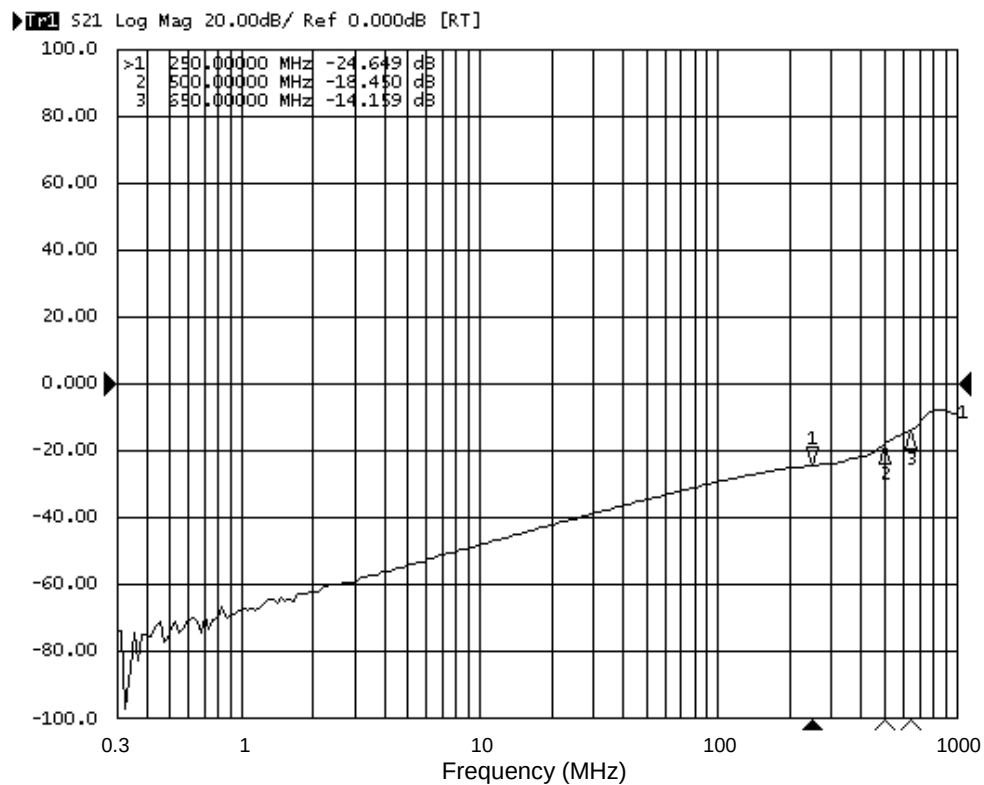


Typical Performance Characteristics (Continued)

Bandwidth

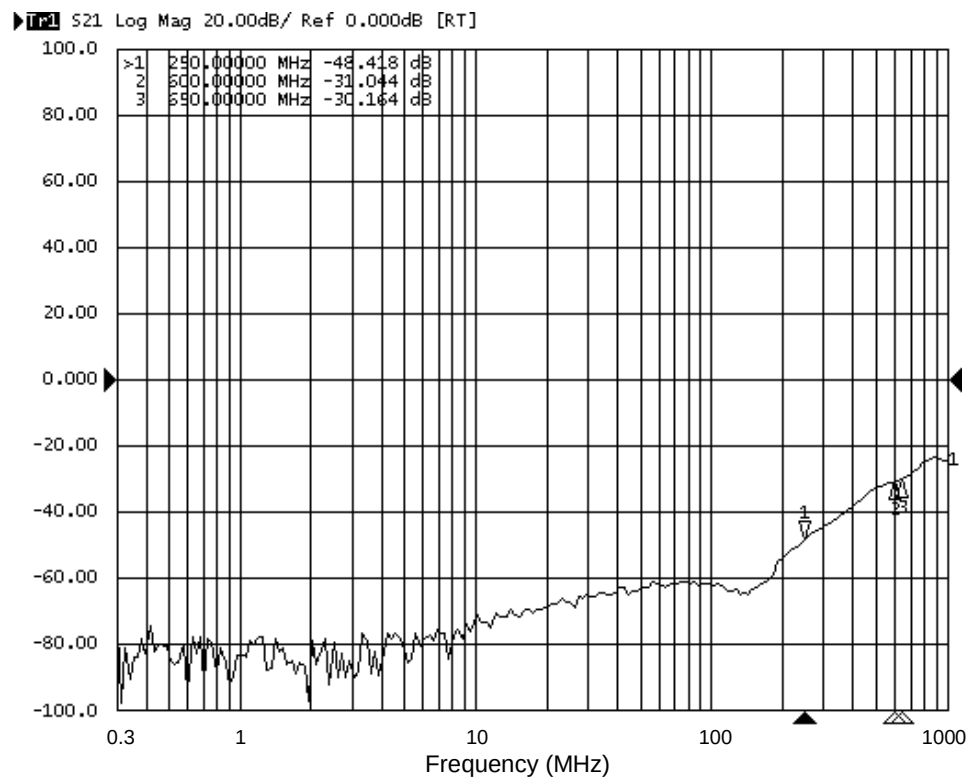


Off Isolation

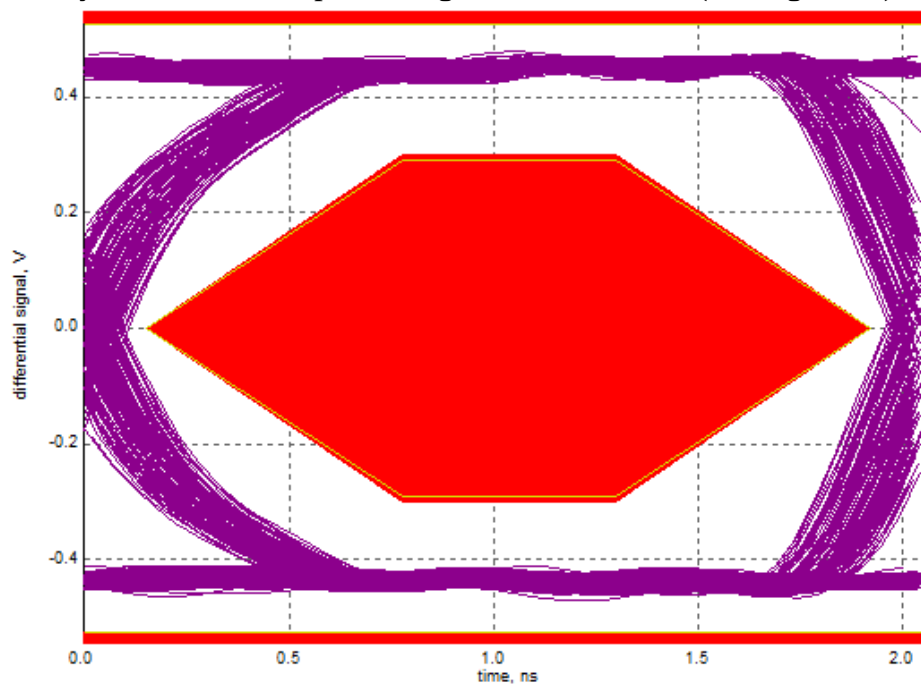


Typical Performance Characteristics (Continued)

Crosstalk

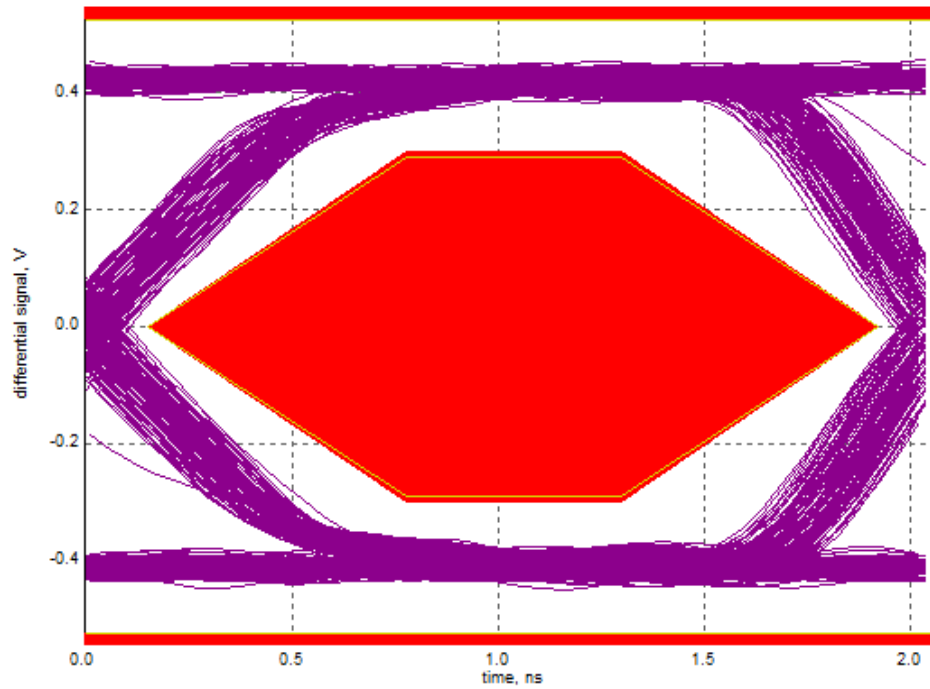


Eye Pattern: 480Mbps USB Signal with No Switch (Through Path)

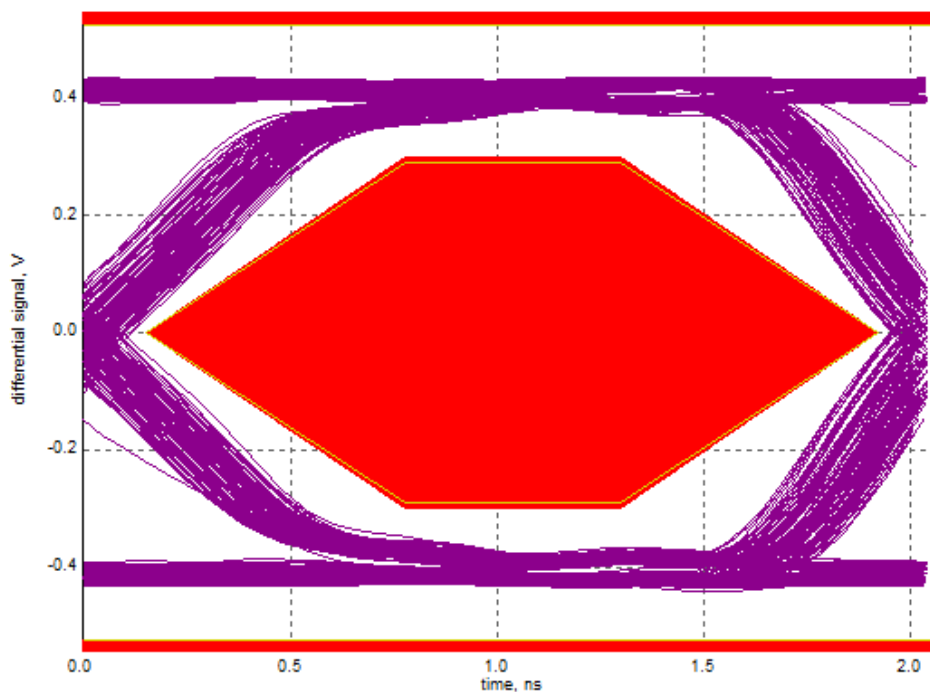


Typical Performance Characteristics (Continued)

Eye Pattern: 480Mbps USB Signal with Switch HSD1+ and HSD1- Path



Eye Pattern: 480Mbps USB Signal with Switch HSD2+ and HSD2- Path



Applications Information

Power-Off Protection

For a VBUS short circuit, the switch is expected to withstand such a condition for at least 24 hours. The UM7222 has specially designed circuitry which prevents unintended signal bleed through as well as guaranteed system reliability during a power-down, over-voltage condition. The protection has been added to the common pins (D+, D-).

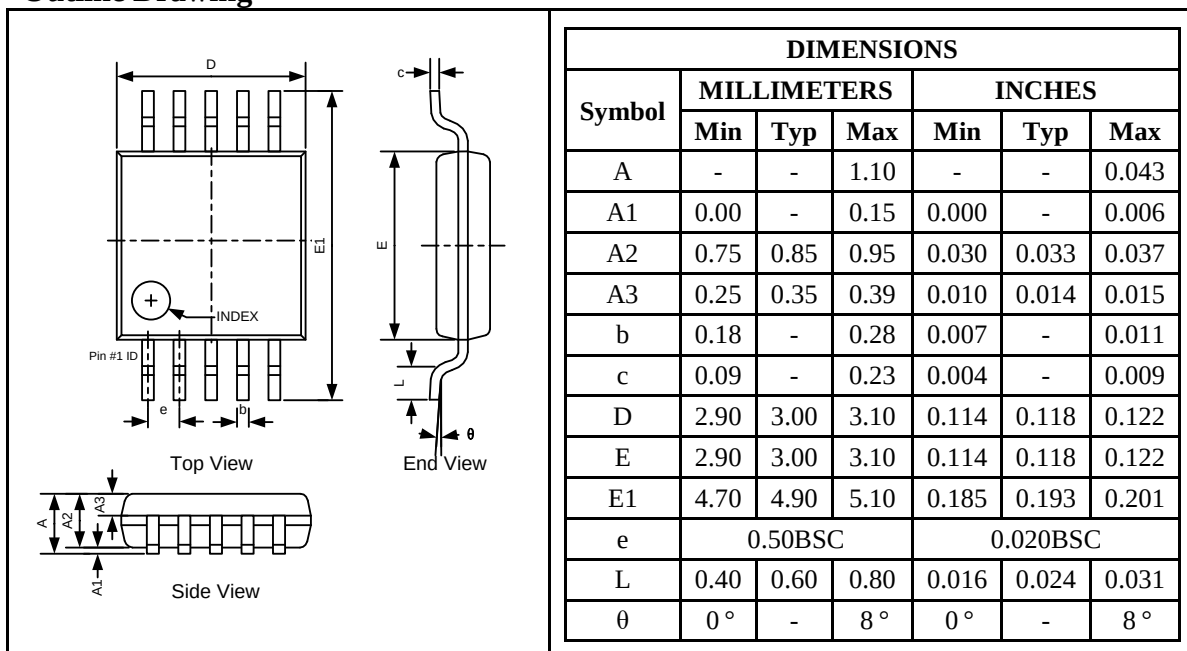
Power-On Protection

The USB 2.0 specification also notes that the USB device should be capable of withstanding a VBUS short during transmission of data. This modification works by limiting current flow back into the V+ rail during the over-voltage event so current remains within the safe operating range. In this application, the switch passes the full 5.25V input signal through to the selected output while maintaining specified off isolation on the un-selected pins.

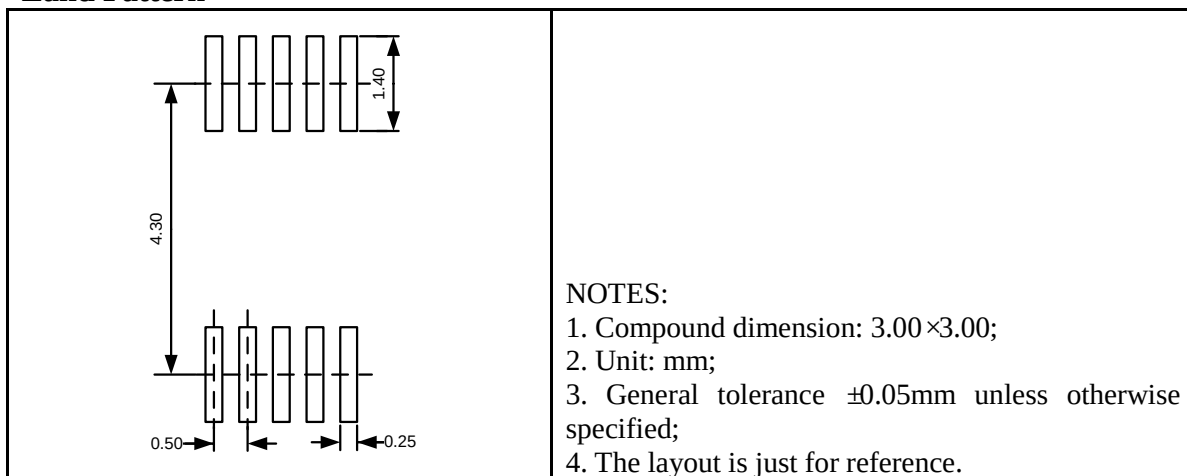
Package Information

UM7222MA MSOP10

Outline Drawing



Land Pattern

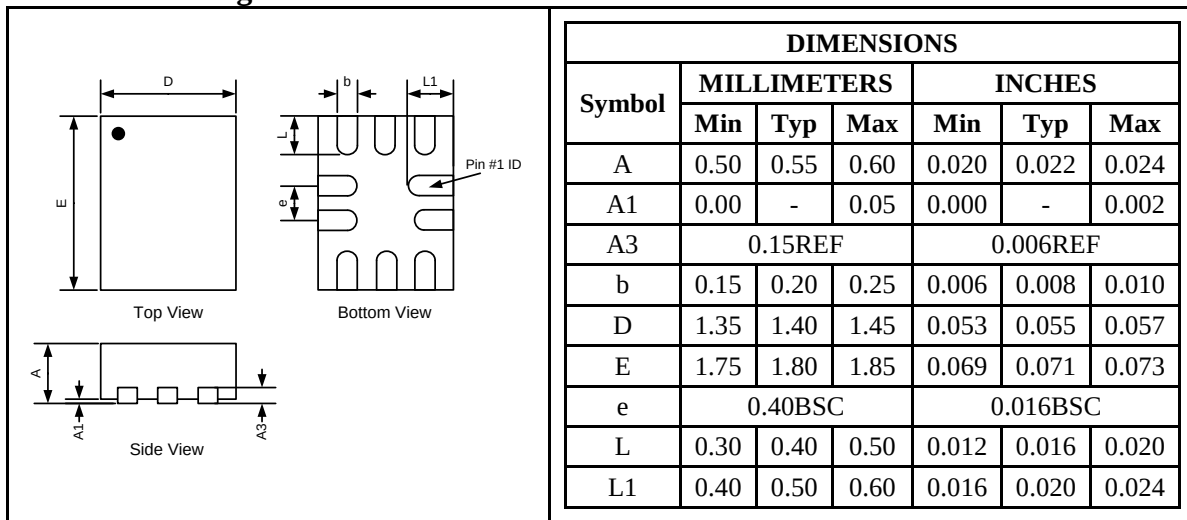


Tape and Reel Orientation

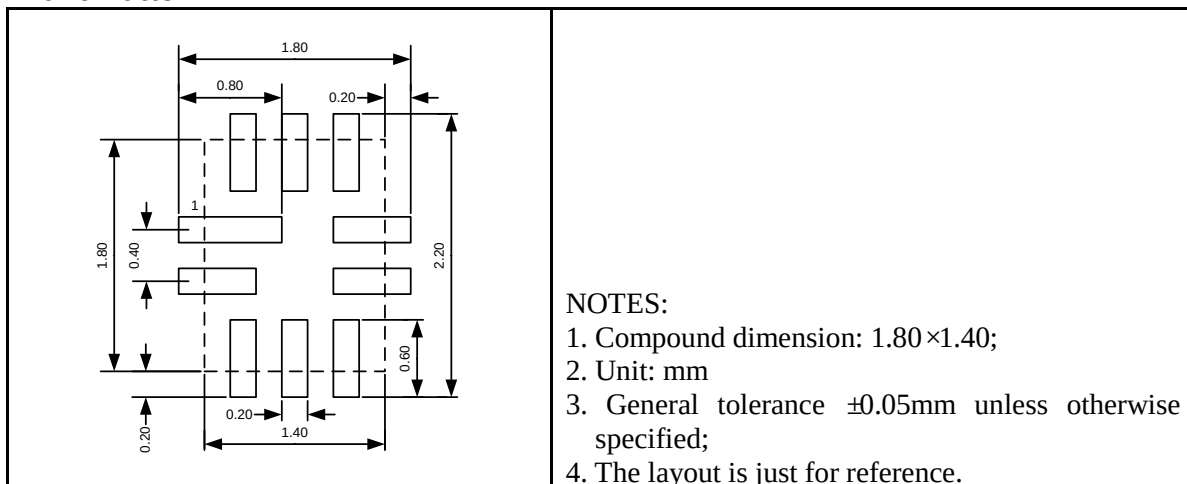


UM7222 QFN10 1.8×1.4

Outline Drawing



Land Pattern



Tape and Reel Orientation



GREEN COMPLIANCE

Union Semiconductor is committed to environmental excellence in all aspects of its operations including meeting or exceeding regulatory requirements with respect to the use of hazardous substances. Numerous successful programs have been implemented to reduce the use of hazardous substances and/or emissions.

All Union components are compliant with the RoHS directive, which helps to support customers in their compliance with environmental directives. For more green compliance information, please visit:

http://www.union-ic.com/index.aspx?cat_code=RoHSDeclaration

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.