

0.5Ω超低导通电阻、双通道单刀双掷（SPDT）模拟开关

UM5223 QFN10 1.8×1.4

描述

UM5223是一款低导通电阻、双通道单刀双掷（SPDT）模拟开关，采用 +1.65V 至 +4.5V 单电源供电。该器件的目标应用包括电池供电设备，此类设备可受益于其低导通电阻特性。

UM5223具有2路最大导通电阻为0.5Ω的单刀双掷开关，通道间平坦度为0.15Ω，匹配度为0.05Ω。该开关在 +2.7V 电压下具备先断后连功能（1ns），其 $t_{ON} < 60ns$ ， $t_{OFF} < 40ns$ 。

UM5223采用无铅 QFN10 封装。

应用

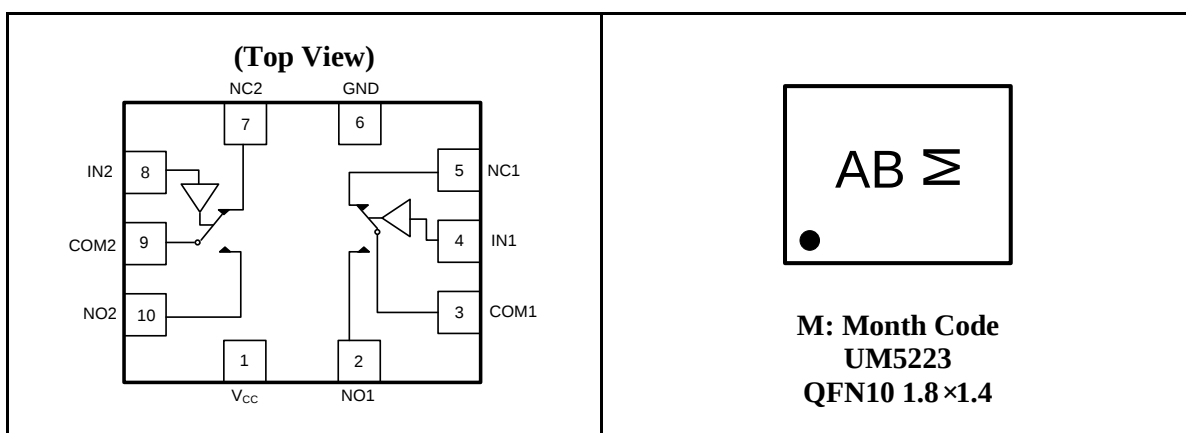
- 手机音频开关
- 扬声器和耳机切换
- 便携式设备
- 电池供电设备
- 调制解调器
- 医疗设备
- 计算机外设
- 铃声芯片/放大器切换

特性

- 在 $V_{CC}=3.3\pm0.3V$ 范围内，超低 $R_{ON}<0.5\Omega$
- R_{ON} 平坦度为 0.15Ω
- +1.65V 至 +4.5V 单电源供电
- 控制逻辑与 1.8V 逻辑兼容
- 0-V_{CC} 电平信号处理能力
- 断电保护：
当 $V_{CC}=0V$ 时，输入信号最高可达 4.5V
- 高隔离度：-78dB (100kHz)
- 低串扰：-92dB (100kHz)
- 低失真：0.12%
- 高持续电流能力：
每路开关可通过 $\pm 300mA$
- 采用无铅 QFN10 封装

引脚配置

顶部视图



Pin Description

Pin	Name	Function
1	V _{CC}	Positive Supply Voltage
2	NO1	Analog Switch 1-Normally Open Terminal
3	COM1	Analog Switch 1-Common Terminal
4	IN1	Analog Switch 1-Digital Control Input
5	NC1	Analog Switch 1-Normally Closed Terminal
6	GND	Ground Connection
7	NC2	Analog Switch 2-Normally Closed Terminal
8	IN2	Analog Switch 2-Digital Control Input
9	COM2	Analog Switch 2-Common Terminal
10	NO2	Analog Switch 2-Normally Open Terminal

Ordering Information

Part Number	Packaging Type	Marking Code	Shipping Qty
UM5223	QFN10 1.8×1.4	AB	3000pcs/7 Inch Tape & Reel

Function Table

IN ₋	NO ₋	NC ₋
0	OFF	ON
1	ON	OFF

Absolute Maximum Ratings

Symbol	Parameter	Limit	Unit
V _{CC}	Supply Voltage	-0.3 to +4.6	V
V _S	DC Switch Voltage (Note 1)	-0.3 to (V _{CC} +0.3)	
IN ₋	DC IN Voltage	-0.3 to +4.6	
I _O	Continuous Current (COM ₋ , NO ₋ , NC ₋)	±300	mA
I _P	Peak Current (Pulsed at 1ms, 10% Duty Cycle)	±500	
T _O	Operating Temperature Range	-40 to +85	°C
T _J	Junction Temperature	+150	
T _{STG}	Storage Temperature Range	-55 to +150	
T _L	Junction Lead Temperature (Soldering, 10 Seconds)	+260	
ESD	ESD Method 3015.7	>2000	V

Note 1: Signals on COM₋, NO₋, or NC₋ exceeding V_{CC} or GND are clamped by internal diodes.
Limit forward-diode current to maximum current rating.

DC Electrical Characteristics

Symbol	Parameter	Test Conditions	V _{CC} (V)	Temp	Limits (-40 °C to 85 °C)			Unit
					Min	Typ	Max	
I _{IN}	Input Leakage Current	V _{IN} =3.6V or GND	3.6	Room Full	-0.1 -1.0		0.1 1.0	μA
I _{OFF}	Power Off Leakage Current	V _{IN} =3.6V or GND	0	Room Full	-0.5 -2.0		0.5 2.0	μA
I _{COM(ON)}	COM ON Leakage Current	V _{IN} =V _{IL} or V _{IH} V _{NO} 0.3V or 3.3V with V _{NC} Floating or V _{NC} 0.3V or 3.3V with V _{NO} Floating V _{COM} =0.3V or 3.3V	3.6	Room Full	-0.01 -0.1		0.01 0.1	μA
I _{NO/NC(OFF)}	OFF State Leakage Current	V _{IN} =V _{IL} or V _{IH} V _{NO} or V _{NC} =0.3V V _{COM} =3.3V	3.6	Room Full	-0.3		0.3	μA
I _{CC}	Quiescent Supply Current	Select V _{IS} =V _{CC} or GND	1.65 to 3.6	Room Full	-1.0 -2.0		1.0 2.0	μA
V _{IH}	Input High Voltage		3.0	Full	1.4			V
			3.6		1.7			
V _{IL}	Input Low Voltage		3.0	Full			0.7	V
			3.6				0.8	
R _{ON}	On-Resistance (Note 2)	V _{IN} =V _{IL} or V _{IH} V _{IS} =V _{CC} to GND I _{COM} =100mA	3.0	Room Full		0.5 0.6		Ω
			3.6	Room Full		0.5 0.6		
ΔR _{ON}	On Resistance Match Between Channels (Note 2,3,4)	V _{IS} =1.5V I _{COM} =100mA; V _{IS} =1.8V I _{COM} =100mA	3.0	Room Full			0.05 0.05	Ω
			3.6	Room Full			0.05 0.05	
R _{FLAT}	On Resistance Flatness (Note 2,3,5)	V _{IS} =V _{CC} to GND I _{COM} =100mA	3.0	Room Full			0.15 0.15	Ω
			3.6	Room Full			0.15 0.15	

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.

Note 4: ΔR_{ON}=R_{ON (B0)}–R_{ON (B1)} measured at identical V_{CC}, temperature and voltage levels.

Note 5: Flatness is defined as the difference between the maximum and minimum value of On Resistance over the specified range of conditions.

AC Electrical Characteristics

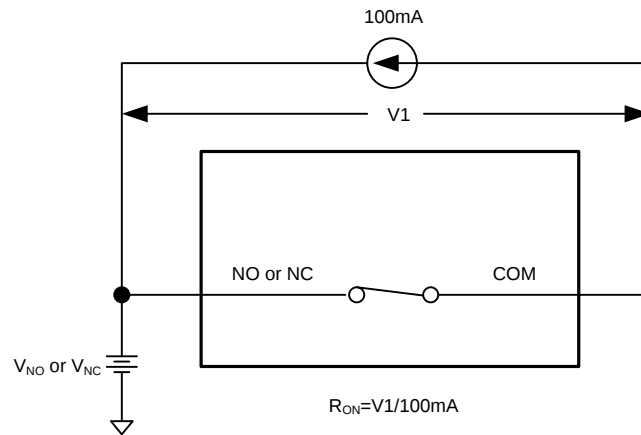
Symbol	Parameter	Test Conditions	V _{CC} (V)	Temp	Limits (-40 °C to 85 °C)			Unit
					Min	Typ	Max	
t _{ON}	Turn On Time	V _{IS} =1.5V R _L =50Ω, C _L =35pF	2.3 to 3.6	Room Full		50 60		ns
t _{OFF}	Turn Off Time	V _{IS} =1.5V R _L =50Ω, C _L =35pF	2.3 to 3.6	Room Full		30 40		ns
t _{BBM}	Break Before Make Time (Note 6)	V _{IS} =3.0V R _L =50Ω, C _L =35pF	3.0	Room Full	2	15		ns
Q _{INJ}	Charge Injection (Note 6)	C _L =1.0nF, V _{GEN} =0V, R _{GEN} =0Ω	1.65 to 3.6	Room		38		pC
V _{ISO}	Off Isolation (Note 7)	C _L =5.0pF, f=100kHz	1.65 to 3.6	Room		-78		dB
V _{CT}	Crosstalk	R _L =50Ω, C _L =5.0pF, f=100kHz	1.65 to 3.6	Room		-92		dB
BW	-3dB Bandwidth		1.65 to 3.6	Room		75		MHz
THD	Total Harmonic Distortion (Note 6)	f _{IS} =20Hz to 20kHz, R _L =R _{GEN} =600Ω C _L =50pF, V _{IS} =2.0V RMS	3.0	Room		0.12		%
Capacitance								
C _{IN}	IN Pin Input Capacitance (Note 8)	V _{CC} =3.6V				4.5		pF
C _{NO/NC}	NO/NC Port Off Capacitance (Note 8)	V _{CC} =3.6V				20		pF
C _{COM}	COM Port Capacitance when Switch is Enabled (Note 8)	V _{CC} =3.6V				55		pF

Note 6: Guaranteed by design.

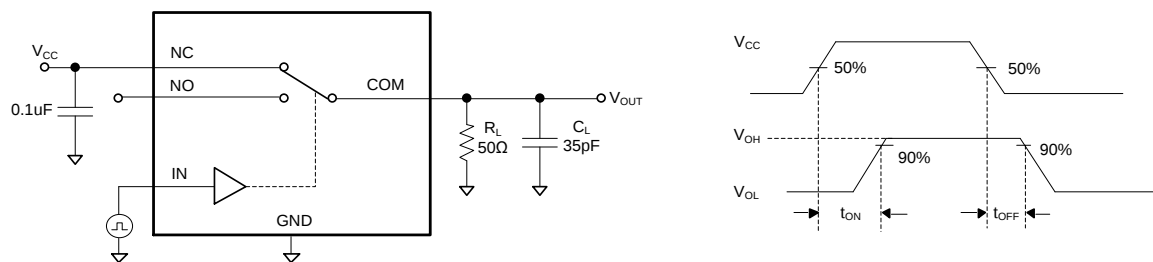
Note 7: Off Isolation=20 log₁₀ [V_{COM}/V_{NO/NC}].

Note 8: T_A=+25 °C, f=1MHz, Capacitance is characterized but not tested in production.

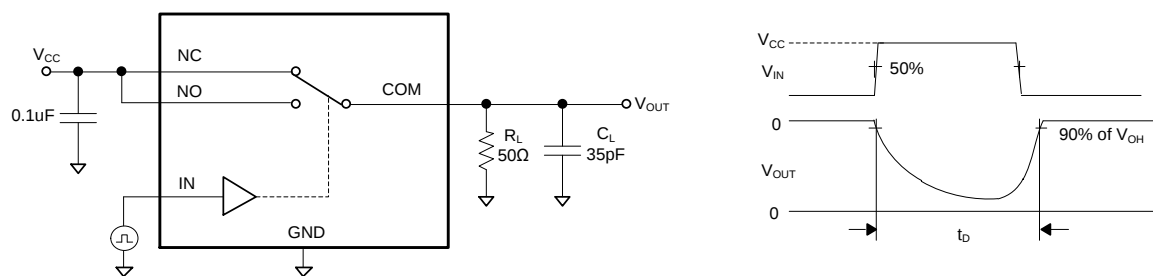
Test Circuits



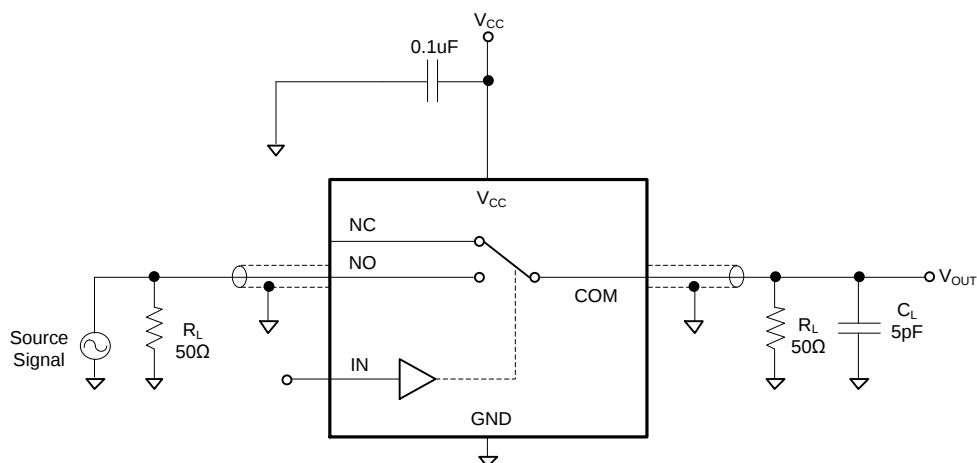
Test Circuit 1. On Resistance



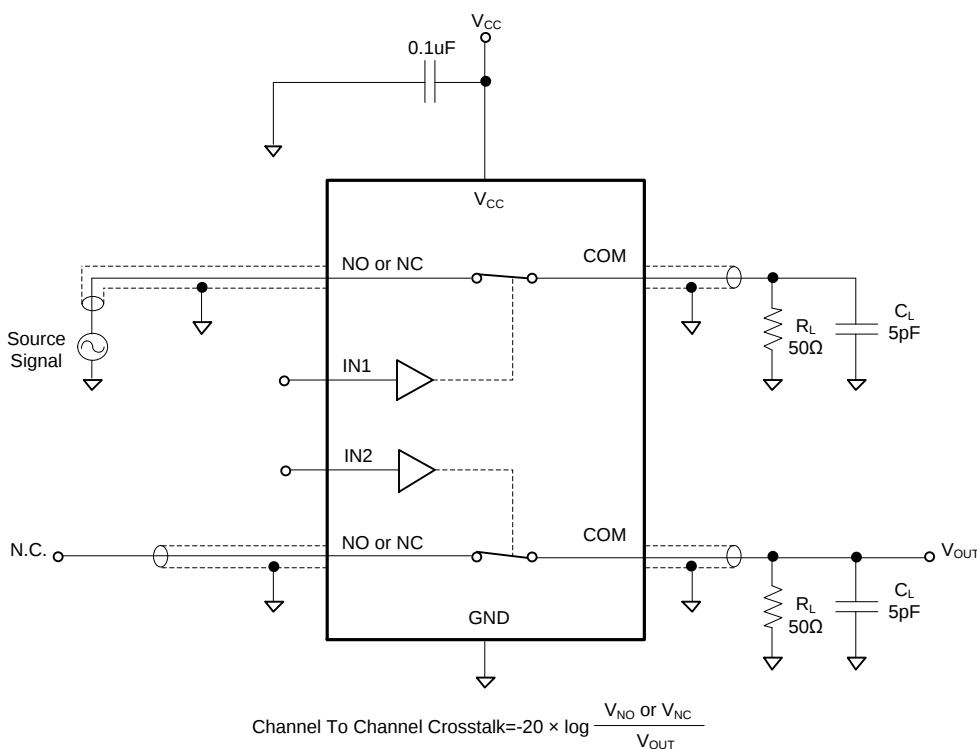
Test Circuit 2. Switching Times (t_{ON} , t_{OFF})



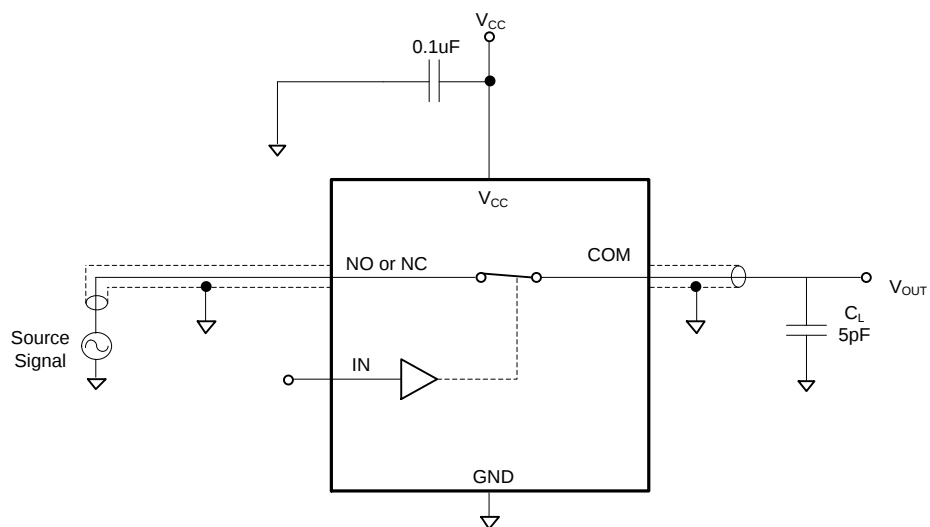
Test Circuit 3. Break-Before-Make Time (t_D)



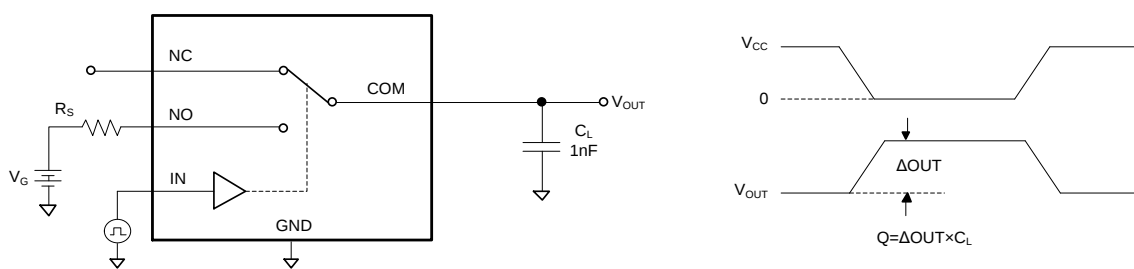
Test Circuit 4. Off Isolation



Test Circuit 5. Channel-to-Channel Crosstalk



Test Circuit 6. -3dB Bandwidth

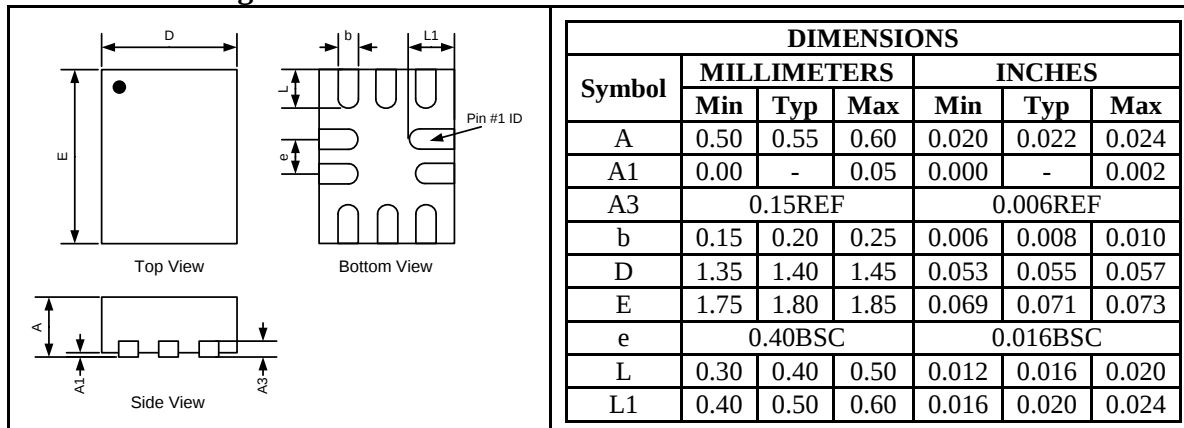


Test Circuit 7. Charge Injection (Q)

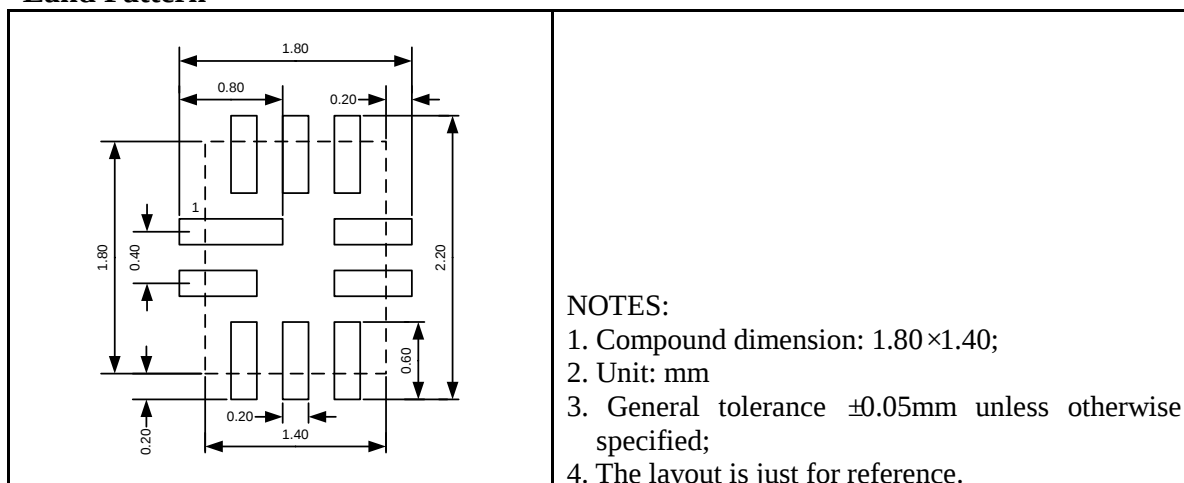
Package Information

QFN10 1.8×1.4

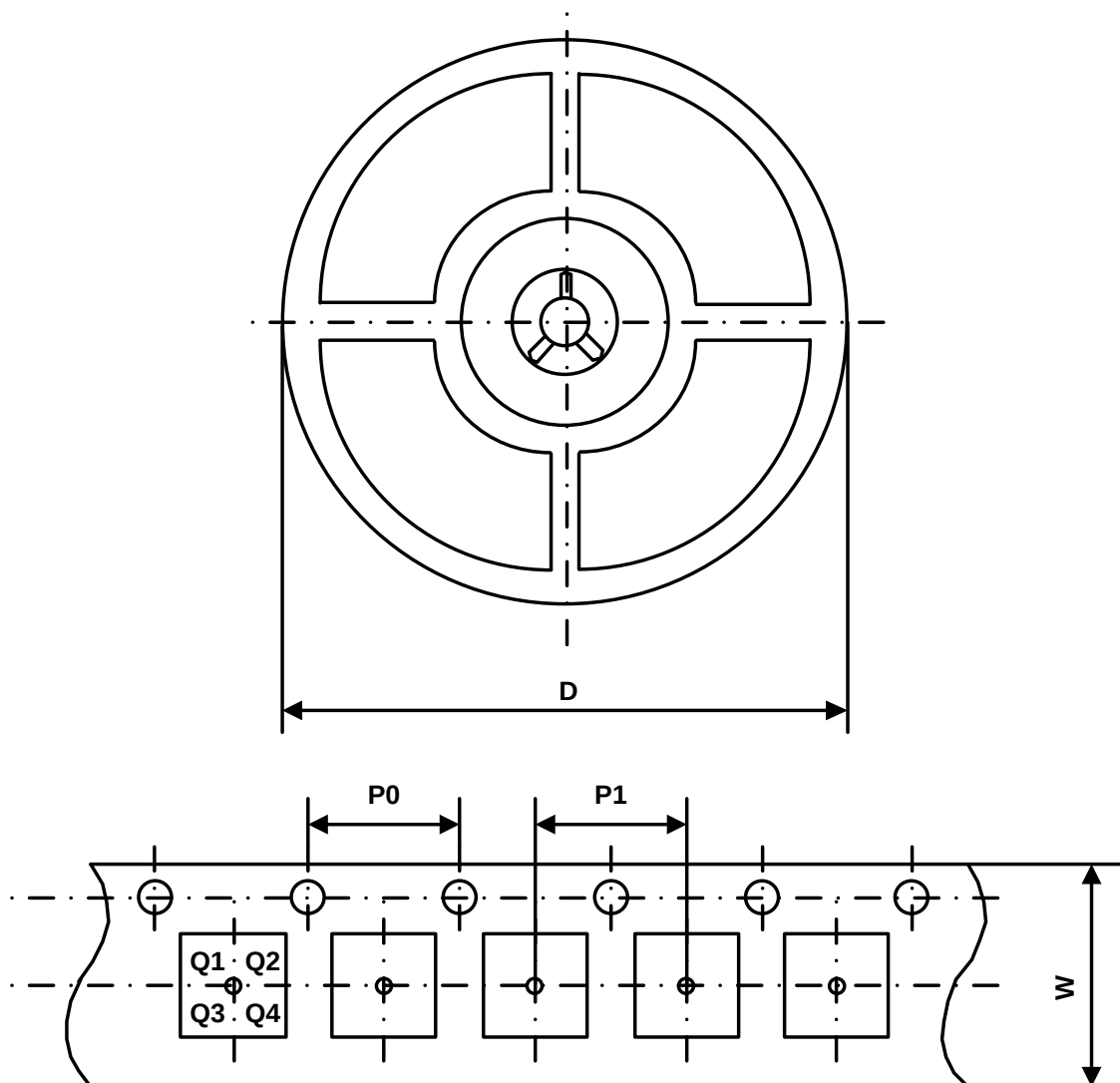
Outline Drawing



Land Pattern



Packing Information



Part Number	Package Type	Carrier Width (W)	Pitch (P0)	Pitch (P1)	Reel Size (D)	PIN 1 Quadrant
UM5223	QFN10 1.8×1.4	8 mm	4 mm	4 mm	180 mm	Q1

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.