用于彩色LCD接口的多通道ESD/EMI防护

UM4601 *DFN8 2.0×2.0*
UM4611 *DFN8 1.7×1.3*
UM8601 *DFN16 4.0×1.6*
UM8611 *DFN16 3.3×1.3*

描述

UM4601/UM4611/UM8601/UM8611是一款集成TVS二极管的（L-C）低通滤波器阵列。该器件专为抑制便携式电子设备中的不需要的电磁干扰 (EMI) 信号并提供静电放电 (ESD) 保护而设计。该器件采用固态硅雪崩技术，具有优异的钳位性能和直流电气特性。经过优化，可用于保护手机和其他便携式电子产品中的彩色LCD和摄像头线路。

UM4601/UM4611/UM8601/UM8611 由多个相同的电路组成，包括用于 ESD 保护的 TVS 二极管和用于 EMI 滤波的 L-C 网络。典型的电感值为 17nH，电容值为 15pF，可在 800MHz 至 2.7GHz 范围内实现 24dB 最小衰减。TVS 二极管可有效抑制超过 ±15kV（空气间隙放电）和 ±8kV（接触放电）的 ESD 电压，符合 IEC 61000-4-2 标准的第 4 级要求。

UM4601 采用符合 RoHS 标准的 DFN8 2.0×2.0 封装，UM4611 采用符合 RoHS 规范的 DFN8 1.7×1.3 封装，UM8601 采用符合 RoHS 规范的 DFN16 4.0×1.6 封装，UM8611 采用符合 RoHS 规范的 DFN16 3.3×1.3 封装。引脚采用无铅工艺处理。小型封装使其非常适合用于手机、数码相机和 PDA 等便携式电子产品。

应用

- 彩色LCD保护
- 手机CCD摄像头线路
- 翻盖式手机

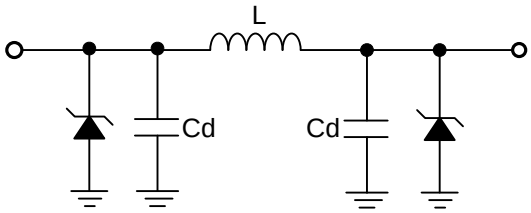
特性

- 集成 TVS 的双向 EMI 滤波器，提供静电放电（ESD）保护
- ESD 保护符合 IEC 61000-4-2 第 4 级要求：
  ±15kV (空气间隙放电)
  ±8kV (接触放电)
- 滤波器性能：从 800MHz 到 2.7GHz 的最小衰减为 24dB
- TVS 工作电压：5V
- 电感：17nH (典型值)
- 电容：15pF (典型值，在 V_R=2.5V 时)
- 多线路的保护和滤波
  UM4601/4611：4 路
  UM8601/8611：8 路
- 固态硅雪崩技术

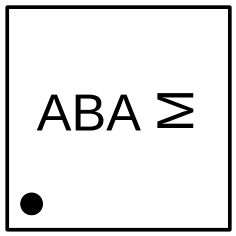
订购信息

芯片型号	工作电压	封装类型	通道数	丝印编码	发货数量
UM4601	5.0V	DFN8 2.0×2.0	4	ABA	3000pcs/7Inch Tape & Reel
UM4611	5.0V	DFN8 1.7×1.3	4	AN	
UM8601	5.0V	DFN16 4.0×1.6	8	8601	
UM8611	5.0V	DFN16 3.3×1.3	8	8611	

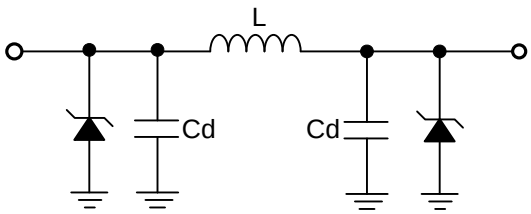
Pin Configurations **Top View**



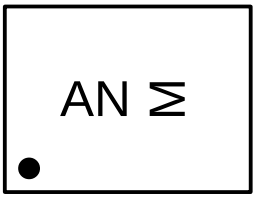
Device Schematic (4X)



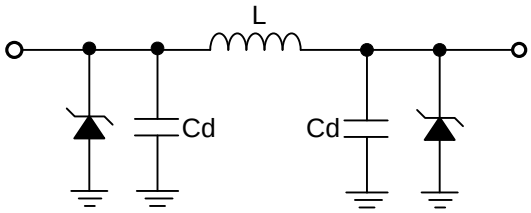
M: Month Code
UM4601
DFN8 2.0×2.0



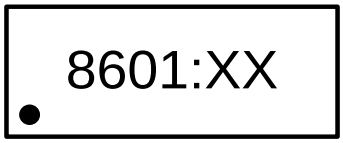
Device Schematic (4X)



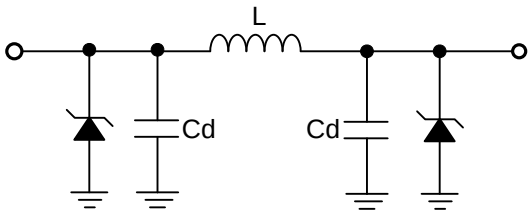
M: Month Code
UM4611
DFN8 1.7×1.3



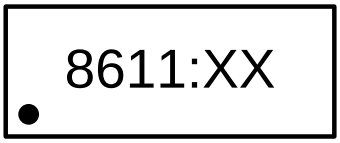
Device Schematic (8X)



XX: Week Code
UM8601
DFN16 4.0×1.6



Device Schematic (8X)



XX: Week Code
UM8611
DFN16 3.3×1.3

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	±20 ±15	kV
Junction Temperature	T_J	125	℃
Operating Temperature Range	T_{OP}	-40 to 85	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃

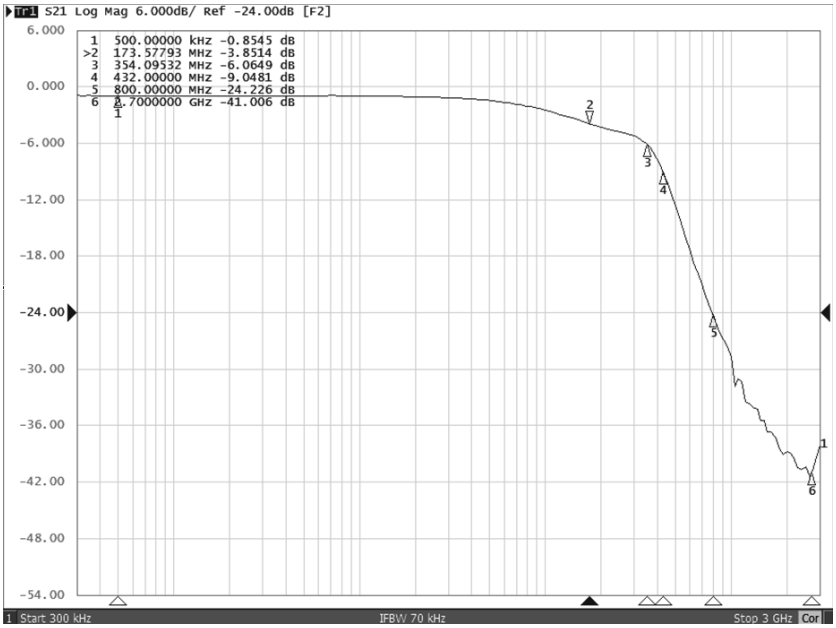
Electrical Characteristics

(T_J=25 ℃, unless otherwise noted)

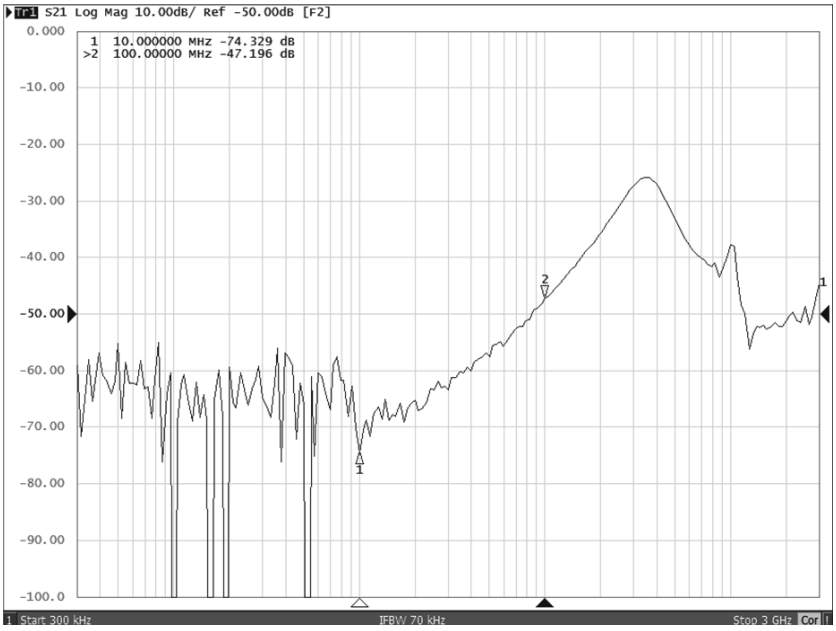
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
TVS Reverse Stand-Off Voltage	V_{RWM}				5	V
TVS Reverse Breakdown Voltage	V_{BR}	I_T=1mA	6	8	10	V
TVS Reverse Leakage Current	I_R	V_{RWM}=3.3V			0.1	μA
DC Resistance	R_{cc}			10		Ω
Roll-Off Frequency at -6dB Attenuation	f_R	Z_{source}=Z_{load}=50Ω		350		MHZ
Filter Cut-Off Frequency	fc	Z_{source}=Z_{load}=50Ω		150		MHZ
Inductance	L			17		nH
Capacitance	C_d	V_R=2.5V, f=1MHZ		15		pF
Total Capacitance	C_{total}	Input to GND, Each Line V_R=2.5V, f=1MHZ	24	30	36	pF

Typical Operating Characteristics

Typical Insertion Loss



Analog Crosstalk



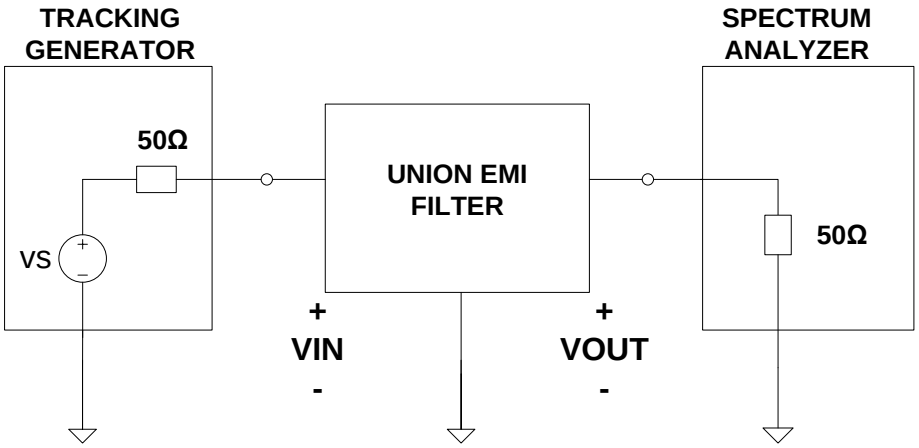
Applications Information

Insertion Loss

Insertion Loss (IL) is used to describe the transmission coefficient between two points in a circuit often described in terms of dB. When examining S parameters, S21 is often described as insertion loss. Insertion Loss and S21 will be used interchangeably from here on out. The insertion loss of a circuit with VOUT and VIN would be expressed as

$IL=S_{21}(dB)=20\log(V_{OUT}/V_{IN})$

The setup for measuring insertion loss in a 50Ω system is shown in the figure below. It will be analyzed in a 50Ω environment, so the source impedance and load impedance is 50Ω. The transfer functions then can be analyzed in terms of insertion loss (S21).



Test Conditions: Source Impedance=50Ω
Load Impedance=50Ω
Input Power=0dBm

Cut Off Frequency

Cut off Frequency is the frequency at which the signal strength is 3.0dB less than it is Pass Band 3.0dB of attenuation equates to half the original signal power. The Pass Band is the range of frequencies that are allowed to "pass" through a filter with minimal attenuation. For our purposes it starts from DC and ends at the cut off frequency.

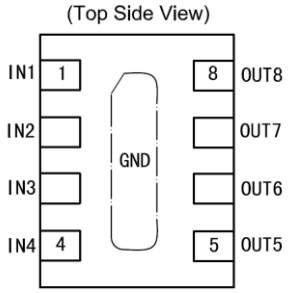
Device Connection

The UM4601/UM4611/UM8601/UM8611 is comprised of identical circuits consisting of a low pass filter for EMI suppression and dual TVS diodes for ESD protection. The device is in an 8-pin DFN and 16-pin DFN package. Electrical connection is made to all the pins located at the bottom of the device. A center tab serves as the ground connection. The device has a flow through design for easy layout. All path lengths should be kept as short as possible to minimize the effects of parasitic inductance in the board traces.

Ground Connection Recommendation

Parasitic inductance (L) present in the board layout will affect the filtering performance of the device. As frequency (f) increases, the effect of the inductance becomes more dominant. This effect is given by Equation 1.

Pin Identification & Configuration



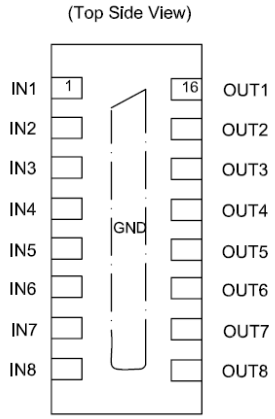
UM4601/UM4611

Pin	Identification
1-4	Input Lines
5-8	Output Lines
Center Tab	Ground

Equation 1: The Impedance of an Inductor at Frequency XLF

$XLF(L,f) = 2\times\pi\times f\times L$
Where:
L= Inductance (H)
f = Frequency (Hz)

Pin Identification & Configuration



UM8601/UM8611

Pin	Identification
1-8	Input Lines
9-16	Output Lines
Center Tab	Ground

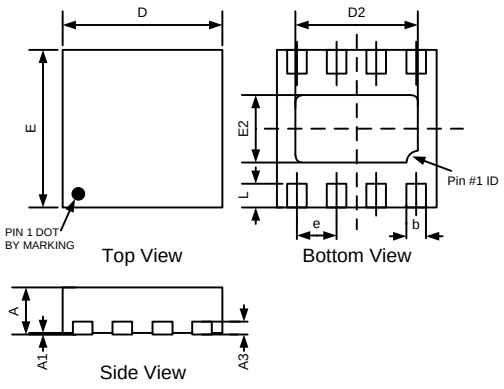
Equation 1: The Impedance of an Inductor at Frequency XLF

$XLF(L, f) = 2\times\pi\times f\times L$
Where:
L= Parasitic Inductance in the PCB (H)
f = Frequency (Hz)

Package Information

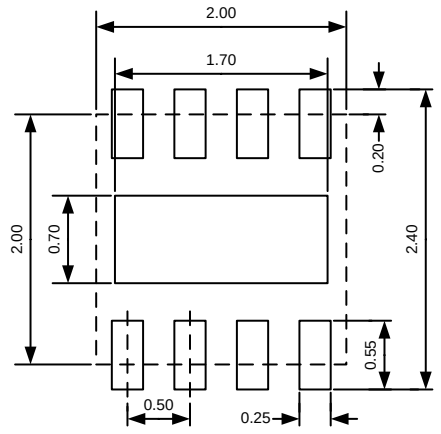
DFN8 2.0×2.0

Outline Drawing



Symbol	DIMENSIONS					
	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.55	-	0.80	0.022	-	0.031
A1	0.00	-	0.05	0.000	-	0.002
A3	0.20REF			0.008REF		
b	0.18	-	0.30	0.007	-	0.012
D	1.924	2.00	2.076	0.076	0.079	0.082
D2	1.35	-	1.80	0.053	-	0.071
E	1.924	2.00	2.076	0.076	0.079	0.082
E2	0.75	-	1.00	0.030	-	0.039
e	0.50TYP			0.020TYP		
L	0.20	0.30	0.40	0.008	0.012	0.016

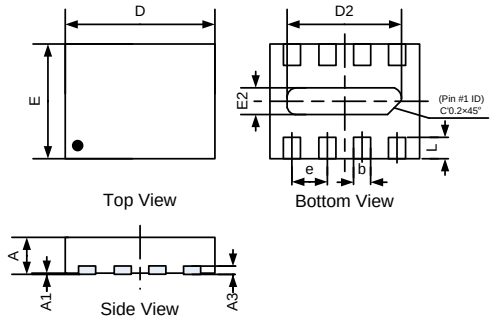
Land Pattern



NOTES:
1. Unit: mm;
2. General tolerance ±0.05mm unless otherwise specified;
3. The layout is just for reference.

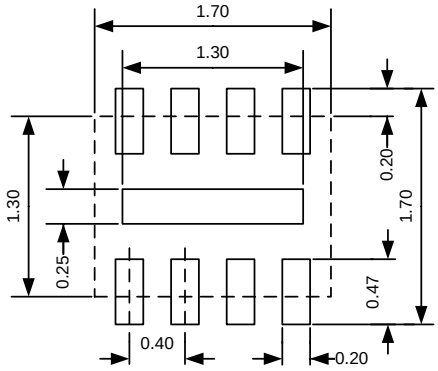
DFN8 1.7×1.3

Outline Drawing



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.45	0.55	0.60	0.018	0.022	0.024
A1	0.00	-	0.05	0.000	-	0.002
A3	0.15REF			0.006REF		
b	0.15	0.20	0.25	0.006	0.008	0.010
D	1.624	1.70	1.776	0.064	0.067	0.070
D2	0.85	-	1.40	0.033	-	0.055
E	1.25	1.30	1.426	0.049	0.051	0.056
E2	0.20	-	0.50	0.008	-	0.020
e	0.40TYP			0.016TYP		
L	0.17	-	0.37	0.007	-	0.015

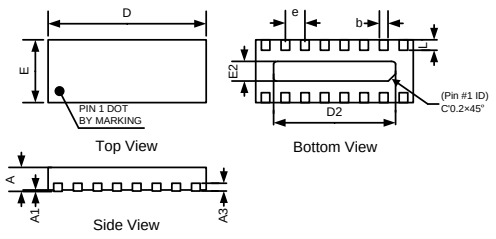
Land Pattern



NOTES:
1. Unit: mm;
2. General tolerance ±0.05mm unless otherwise specified;
3. The layout is just for reference.

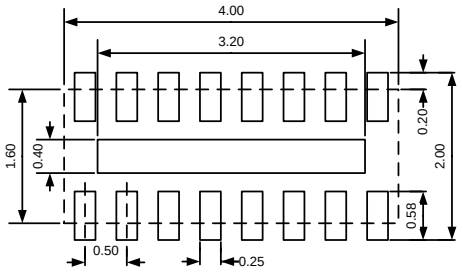
DFN16 4.0×1.6

Outline Drawing



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.50	-	0.80	0.020	-	0.031
A1	0.00	-	0.05	0.000	-	0.002
A3	0.203REF			0.008REF		
b	0.15	-	0.30	0.006	-	0.012
D	3.924	4.00	4.076	0.154	0.157	0.160
D2	2.95	-	3.30	0.116	-	0.130
E	1.524	1.60	1.676	0.060	0.063	0.066
E2	0.30	-	0.60	0.012	-	0.024
e	0.50TYP			0.020TYP		
L	0.15	-	0.38	0.006	-	0.015

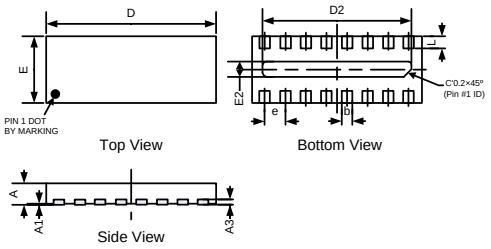
Land Pattern



NOTES:
1. Unit: mm;
2. General tolerance ±0.05mm unless otherwise specified;
3. The layout is just for reference.

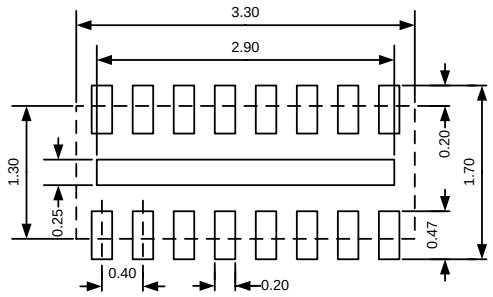
DFN16 3.3×1.3

Outline Drawing



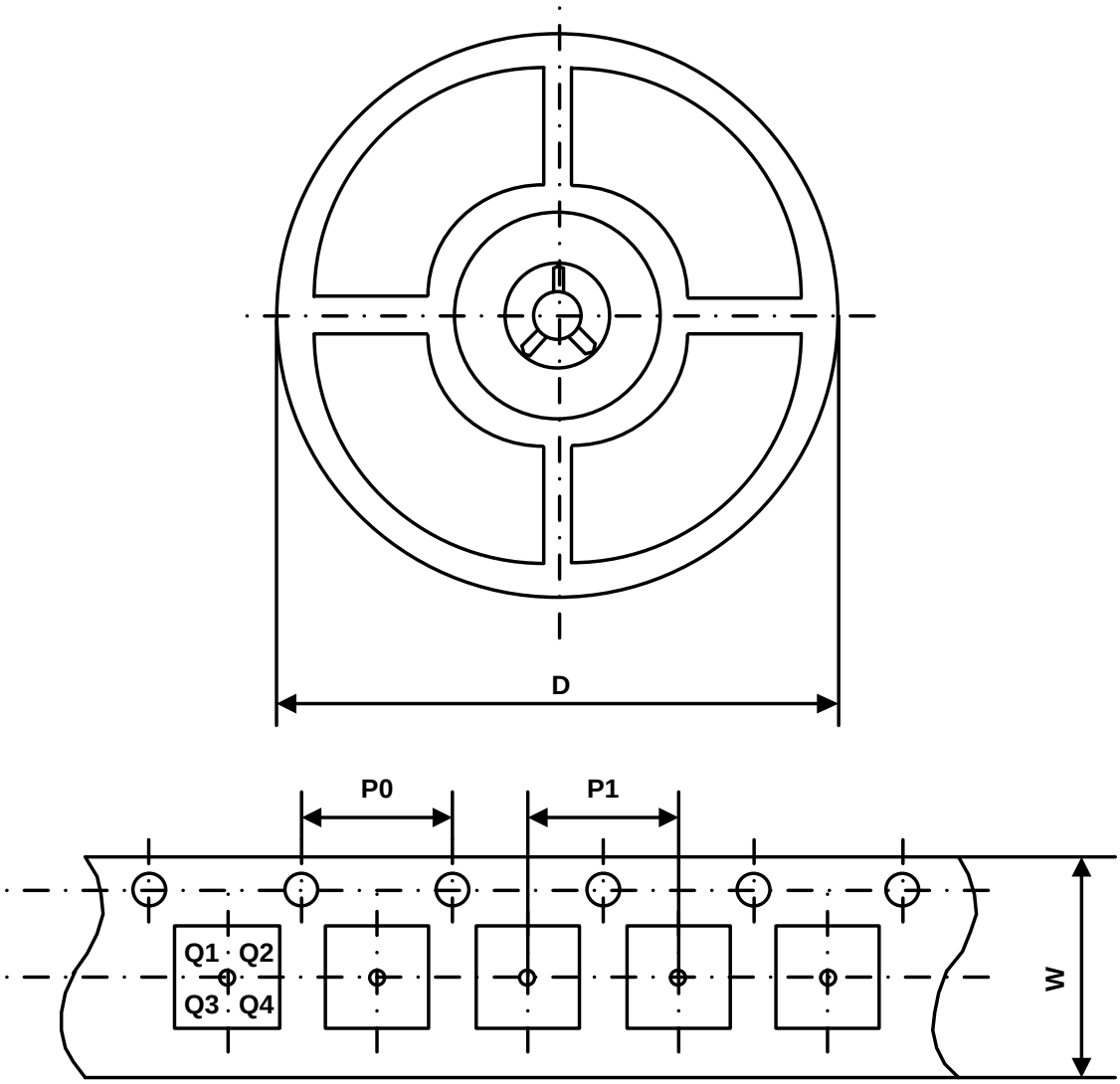
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.47	0.55	0.60	0.019	0.022	0.024
A1	0.00	-	0.05	0.000	-	0.002
A3	0.15REF			0.006REF		
b	0.15	0.20	0.25	0.006	0.008	0.010
D	3.224	3.30	3.376	0.127	0.130	0.133
D2	2.45	-	3.00	0.096	-	0.118
E	1.25	1.30	1.426	0.049	0.051	0.056
E2	0.20	-	0.50	0.008	-	0.020
e	0.40TYP			0.016TYP		
L	0.17	-	0.37	0.007	-	0.015

Land Pattern



NOTES:
1. Unit: mm;
2. General tolerance ±0.05mm unless otherwise specified;
3. The layout is just for reference.

Packing Information



Part Number	Package Type	Carrier Width (W)	Pitch (P0)	Pitch (P1)	Reel Size (D)	PIN 1 Quadrant
UM4601	DFN8 2.0×2.0	8 mm	4 mm	4 mm	180 mm	Q1
UM4611	DFN8 1.7×1.3	8 mm	4 mm	4 mm	180 mm	Q1
UM8601	DFN16 4.0×1.6	12 mm	4 mm	4 mm	180 mm	Q1
UM8611	DFN16 3.3×1.3	8 mm	4 mm	4 mm	180 mm	Q1

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