# *用于信号线的8 通道 ESD/EMI 保护芯片*

## UM8511 *DFN16 3.3×1.3*

## 描述

UM8511是一款集成了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，具有卓越的箝位性能和直流电气特性。经过优化，该器件可用于保护手机和其他便携式电子产品中的信号线。

该器件由 8 路相同电路组成，包括用于 ESD 保护的 TVS 二极管，以及用于 EMI 滤波的 C-L-C 网络电路组成。采用典型的 17nH 电感值和 12pF 电容值组合，可在 800MHz 至 2.7GHz 范围内实现 19dB 的最小衰减。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。

UM8511 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。该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

- 信号线保护
- 手机 CCD 摄像机线路
- 翻盖手机

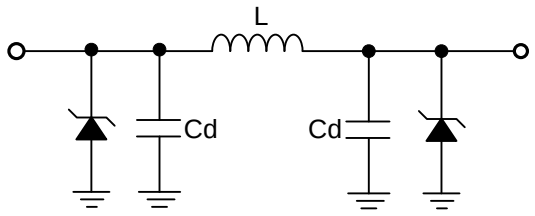
## 特性

- 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）
- 滤波性能：从800MHz到2.7GHz的最小衰减为19 dB
- TVS 工作电压：5V
- 电感：17nH (典型值)
- 电容：12pF (典型值，在 $V_R$=2.5V 时)
- 多路保护和滤波
  UM8511: 8 路

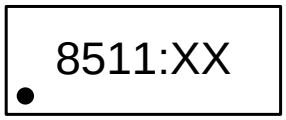
## 订购信息

| 芯片型号 | 工作电压 | 封装类型 | 通道数 | 丝印编码 | 发货数量 |
|---|---|---|---|---|---|
| UM8511 | 5.0V | DFN16 3.3×1.3 | 8 | 8511 | 3000pcs /7Inch Tape & Reel |

**Pin Configurations** **Top View**




**Device Schematic (8X)**




**XX: Week Code**
**UM8511**
**DFN16 3.3×1.3**

## Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction Temperature | $T_J$ | 125 | ℃ |
| Operating Temperature Range | $T_{OP}$ | -40 to 85 | ℃ |
| Storage Temperature Range | $T_{STG}$ | -55 to 150 | ℃ |

## Electrical Characteristics

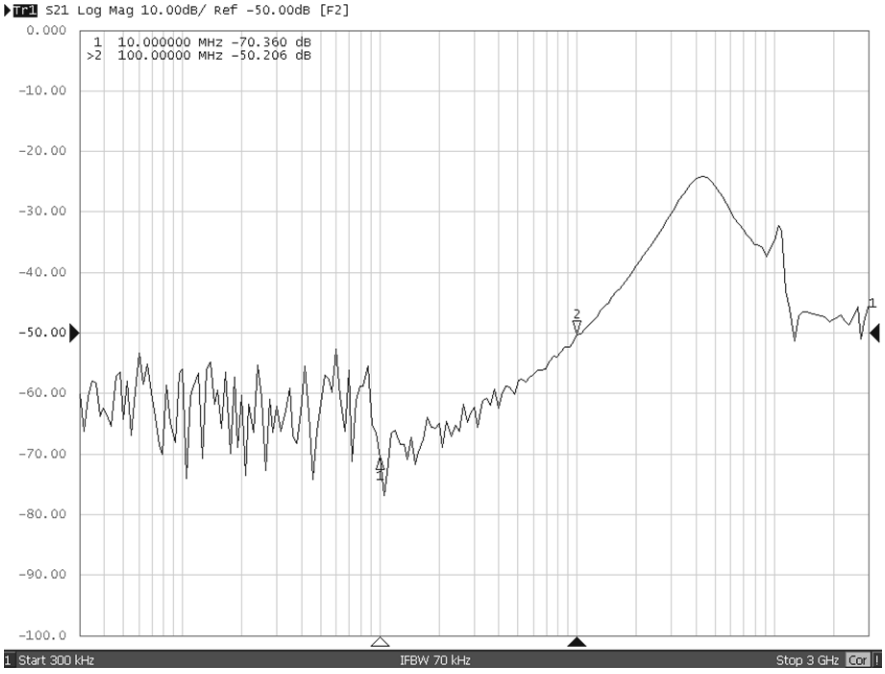
($T_J$ =25 ℃, unless otherwise noted)

| 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 |
| Filter Cut-Off Frequency | $f_c$ | $Z_{source}$=$Z_{load}$=50Ω | | 250 | | MHZ |
| Inductance | L | | | 17 | | nH |
| Capacitance | $C_d$ | $V_R$=2.5V, f=1MHz | | 12 | | pF |
| Total Capacitance | $C_{total}$ | Input to GND, Each Line $V_R$=2.5V, f=1MHz | 19 | 24 | 29 | pF |
| Stop Band Attenuation | | 800MHz to 2.7GHz | | 19 | | dB |

## 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 Figure 1. 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).

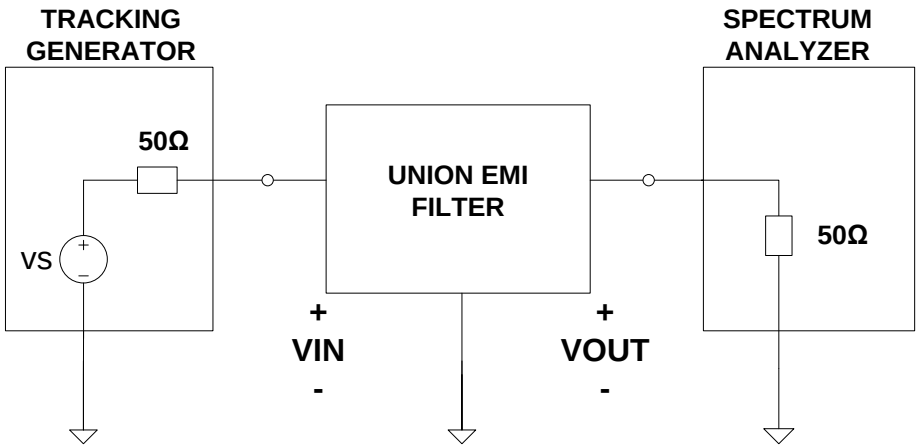



**Figure 1. Test Conditions: Source Impedance=50Ω**
**Load Impedance=50Ω**
**Input Power=0dBm**

### Cut Off Frequency

Cut off frequency is the frequency at which the signal strength is 3.0dB less than that of its 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.

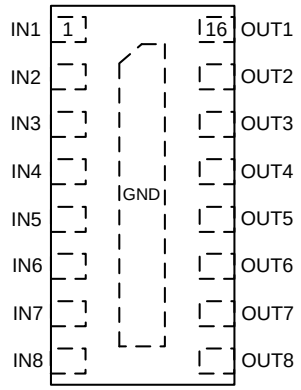
### Device Connection

The UM8511 is comprised of identical circuits each consisting of a low pass filter for EMI suppression and dual TVS diodes for ESD protection. The device is in a 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.

Figure 2. Pin Identification & Configuration
(UM8511 Top View)




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

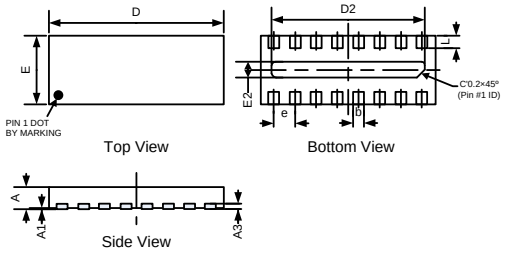
**Equation 1: The Impedance of an Inductor at Frequency XLF**

$XLF(L, f) = 2 \times л \times f \times L$
Where:
L= parasitic inductance in the PCB (H)
f = frequency (Hz)

## Package Information

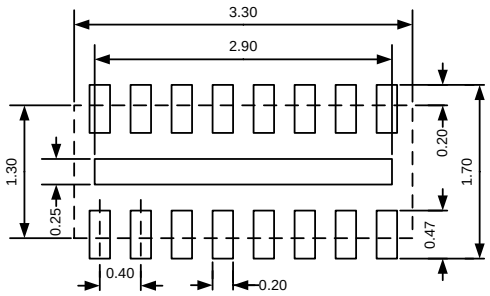
### UM8511: DFN16 3.3×1.3

### Outline Drawing



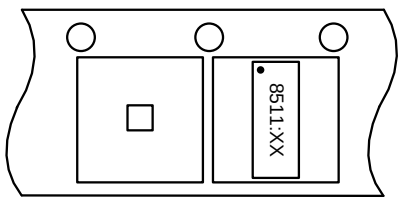

| DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | MILLIMETERS | | | INCHES | | |
| | Min | Typ | Max | Min | Typ | Max |
| A | 0.47 | 0.55 | 0.60 | 0.019 | 0.022 | 0.024 |
| A1 | 0.00 | - | 0.05 | 0.000 | - | 0.002 |
| A3 | 0.15REF | | | 0.006REF | | |
| b | 0.15 | 0.20 | 0.25 | 0.006 | 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. Compound dimension: 3.30×1.30;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

### 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.