

SC70-6L Five Lines TVS Array for ESD Protection
Description

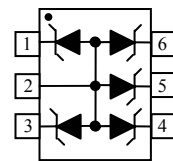
TVS diodes are designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's. They offer superior electrical characteristics such as lower clamping voltage and no device degradation when compared to MLVs.

The UMD5V-706 is a TVS array designed to protect I/O or data lines from the damaging effects of ESD. Their integrated design provides very effective and reliable protection for five separate lines using only one package. The SC70-6L is a very small package which allows space saving on high density printed circuit board and also gives the designer the flexibility to provide Uni-Directional or Bi-Directional protection.

Features

- * Solid-state silicon avalanche technology
- * SC70-6L package
- * Uni-Directional or Bi-Directional protection
- * Protects up to five data lines
- * 100 Watts peak pulse power ($t_p = 8/20\mu s$)
- * Working voltage: 5V
- * Low clamping factor V_{cl}/V_{br}
- * Low leakage current
- * Full RoHS compliance
- * Complies with the following standards:
 - IEC 61000-4-2 (ESD) Air-15kv, Contact-8kv
 - IEC 61000-4-4 (EFT) (5/50ns)
 - IEC 61000-4-5 (Surge) (8/20 μs)

Small Surface Mount Device TVS

SC70-6L Pin Configuration


<u>Pin</u>	<u>Description</u>
1	Cathode
2	Anode
3	Cathode
4	Cathode
5	Cathode
6	Cathode

Mechanical Characteristics

- * Molded SC70-6L package
- * Weight 7 milligrams (Approximate)
- * Available in Lead-Free Pure-Tin Plating
- * Solder Reflow Temp: Pure-Tin (Sn), 260-270°C
- * Consult Factory for Leaded Device Availability
- * Flammability Rating UL 94V-0
- * 8mm Tape and Reel per EIA Standard 481
- * Device Marking: Marking Code,
Pin one defined by DOT

Applications

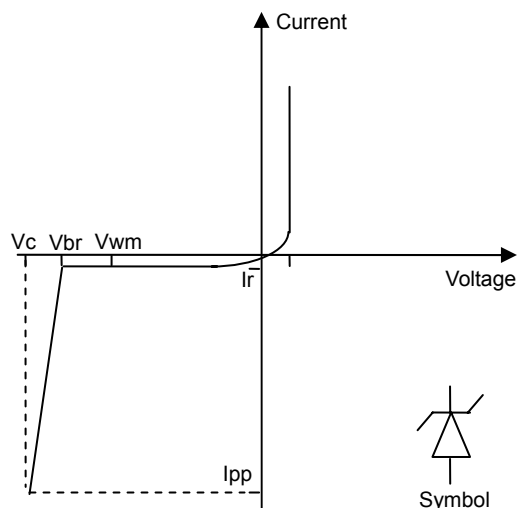
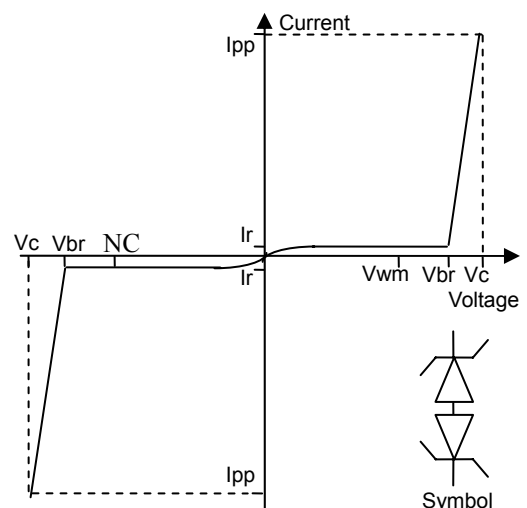
- * Cellular Handset
- * PDA
- * Notebook
- * Digital Camera
- * Wifi Phone
- * Microprocessor Based Equipment

SC70-6L Five Lines TVS Array for ESD Protection
Absolute Maximum Ratings @ 25°C unless otherwise specified

Parameter	Symbol	Value	Units
Peak Pulse Power; pulse waveform = 8/20μs	P _{pp}	100	W
Peak Pulse Current; pulse waveform = 8/20μs	I _{pp}	10	A
ESD per IEC 61000-4-2 (Air)	V _{pp}	±15	kV
ESD per IEC 61000-4-2 (Contact)		±8	
Operating Temperature	T _j	-55 to 150	°C
Storage Temperature	T _{stg}	-55 to 150	°C

Electrical Characteristics @ 25°C unless otherwise specified

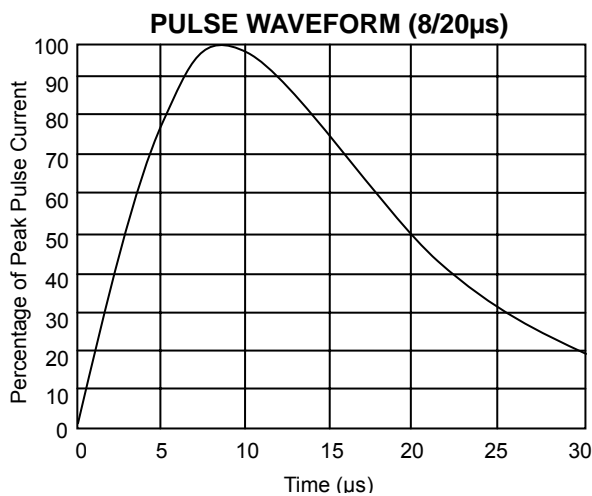
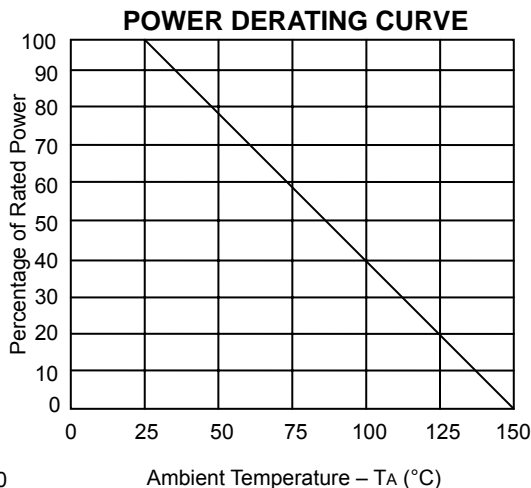
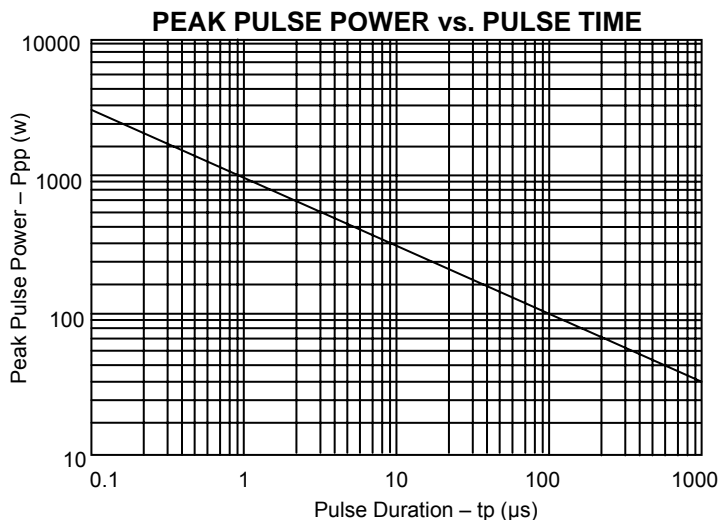
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Stand-off Voltage	V _{wm}				5.0	V
Breakdown Voltage	V _{br}	I _t =1mA	6.0			V
Leakage Current	I _r	V _{wm} =5V, T=25°C			5	μA
Clamping Voltage	V _c	I _{pp} =1A T _p =8/20μs			8.8	V
Clamping Voltage	V _c	I _{pp} =10A T _p =8/20μs			10.0	V
Peak Pulse Current	I _{pp}	T _p =8/20μs			10	A
Junction Capacitance	C _j	V _r =0V, f=1MHz		40		pF

Uni-Directional Protection

Bi-Directional Protection


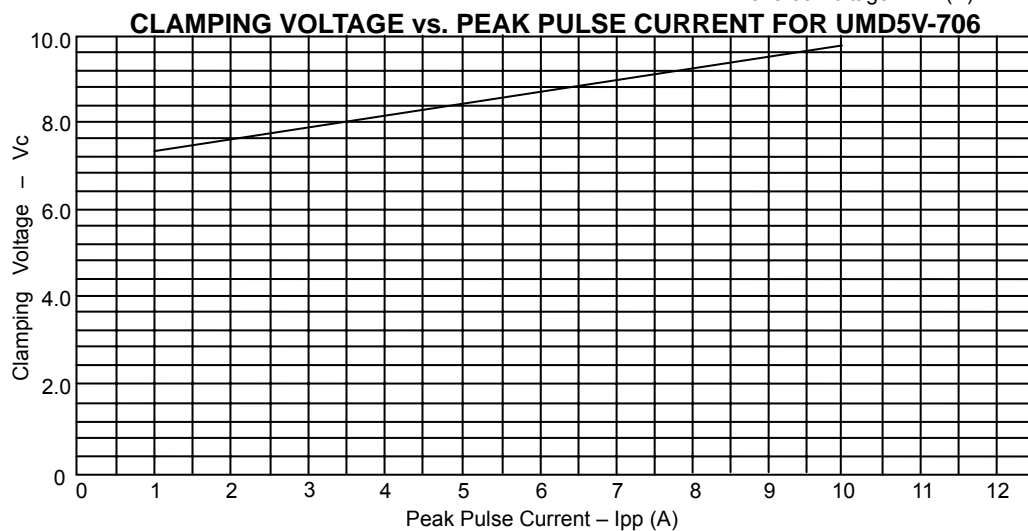
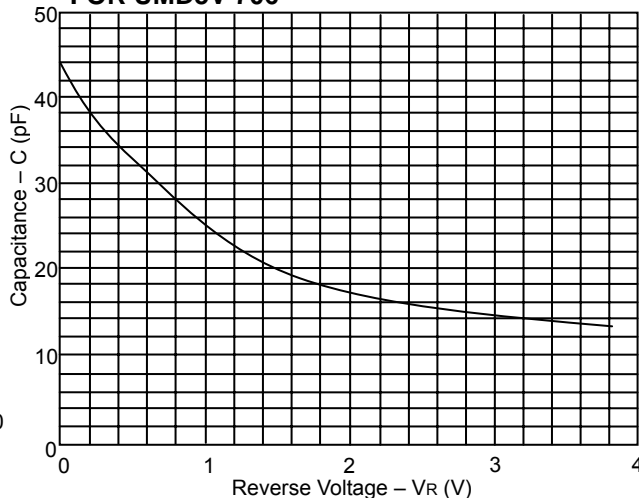


SC70-6L Five Lines TVS Array for ESD Protection

Electrical Characteristics Graphs



CAPACITANCE vs. REVERSE VOLTAGE FOR UMD5V-706



SC70-6L Five Lines TVS Array for ESD Protection

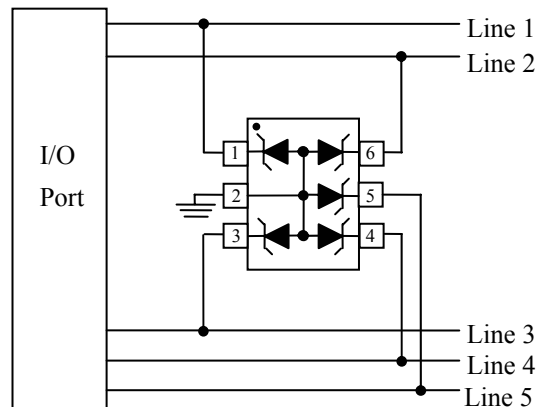
Applications Information

The UMD5V-706 is designed for use in applications where board space is at a premium. Each device requires less than 4.8mm² of PCB area and will protect up to five Uni-Directional lines.

The UMD5V-706 provides up to 5 lines of protection in a common-mode Uni-Directional configuration.

Circuit connectivity is as follows:

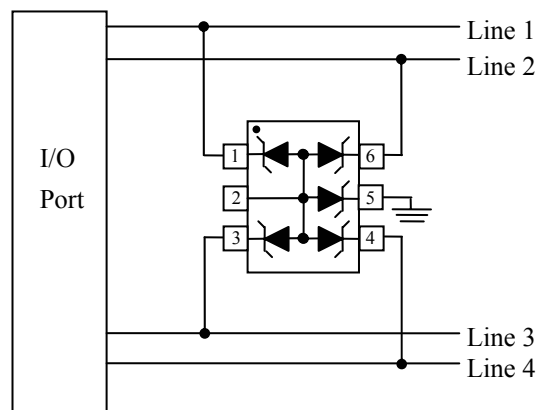
- Line 1 is connected to Pin 1
- Line 2 is connected to Pin 6
- Line 3 is connected to Pin 3
- Line 4 is connected to Pin 4
- Line 5 is connected to Pin 5
- Pin 2 is connected to ground



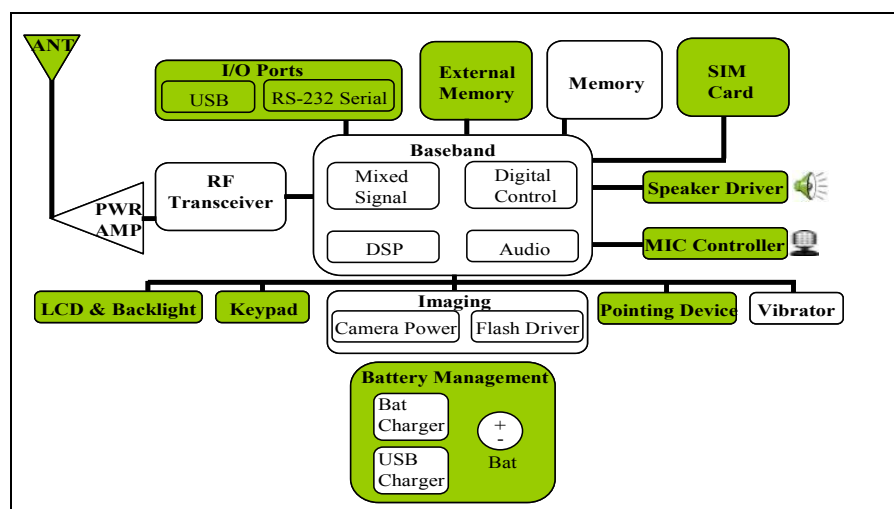
The UMD5V-706 provides up to 4 lines of protection in a common-mode Bi-Directional configuration.

Circuit connectivity is as follows:

- Line 1 is connected to Pin 1
- Line 2 is connected to Pin 6
- Line 3 is connected to Pin 3
- Line 4 is connected to Pin 4
- Pin 2 is not connected
- Pin 5 is connected to ground



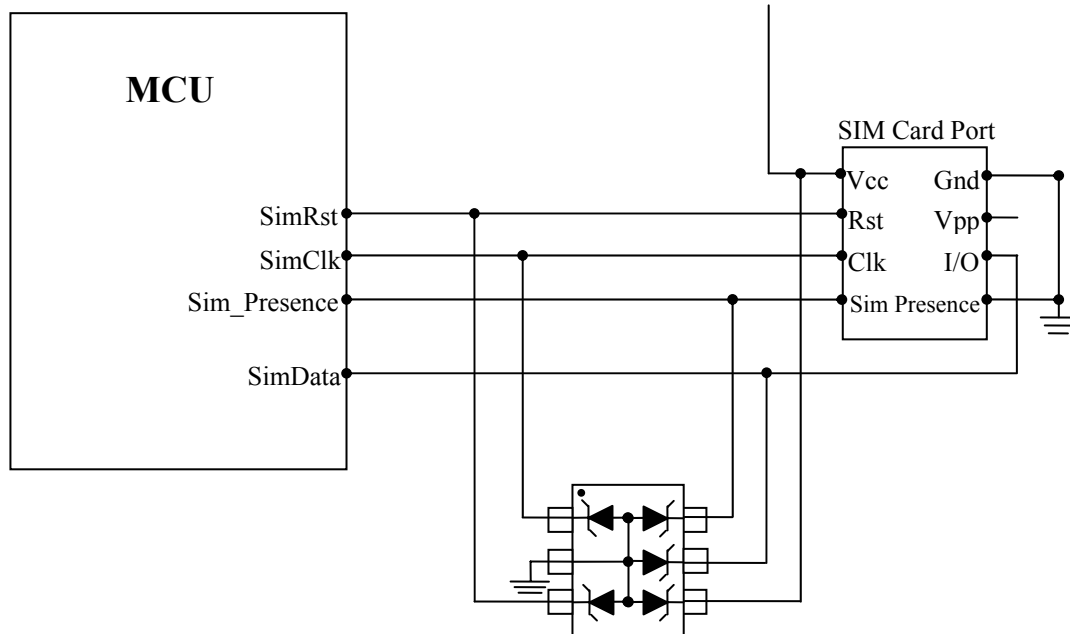
Mobile Handset Block Diagram



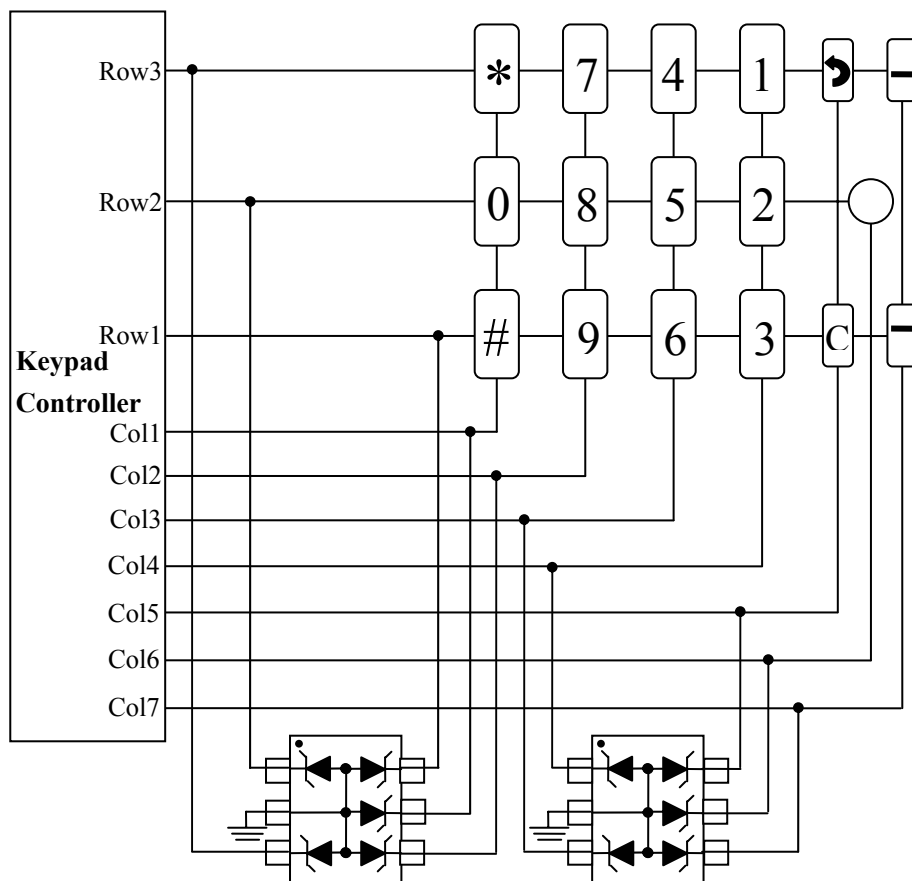
Areas that require ESD protection are highlighted.

SC70-6L Five Lines TVS Array for ESD Protection

UMD5V-706 on Sim Card Port Application

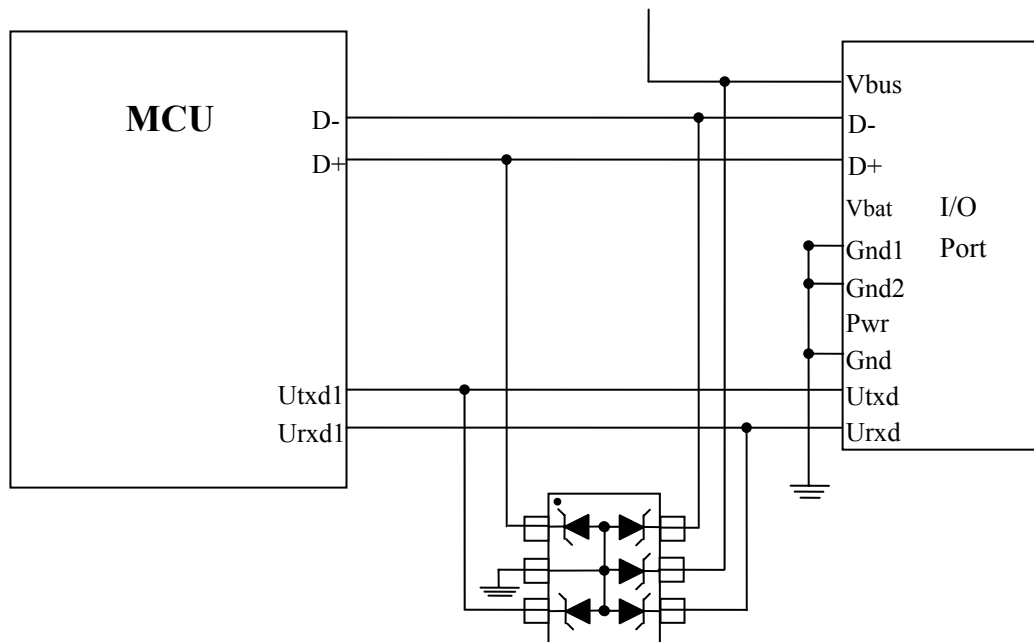


UMD5V-706 on Keypad Application

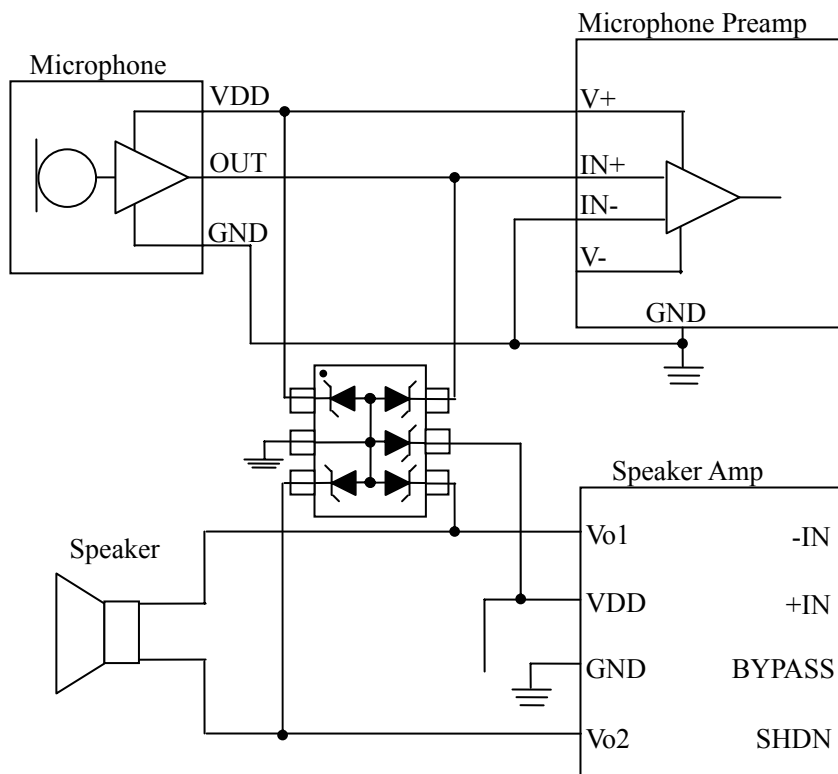


SC70-6L Five Lines TVS Array for ESD Protection

UMD5V-706 on I/O Port Application

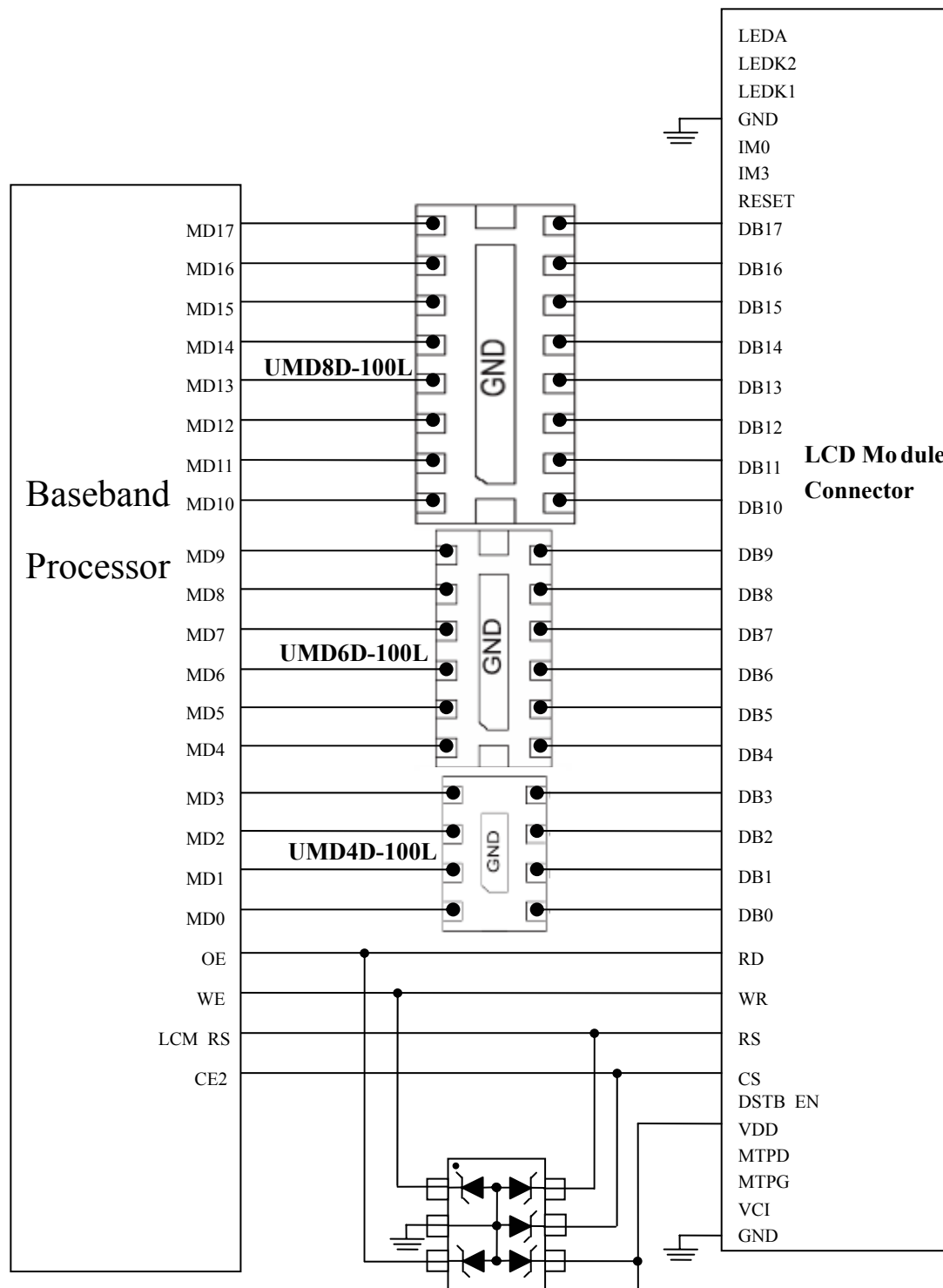


UMD5V-706 on Speaker and Microphone Application



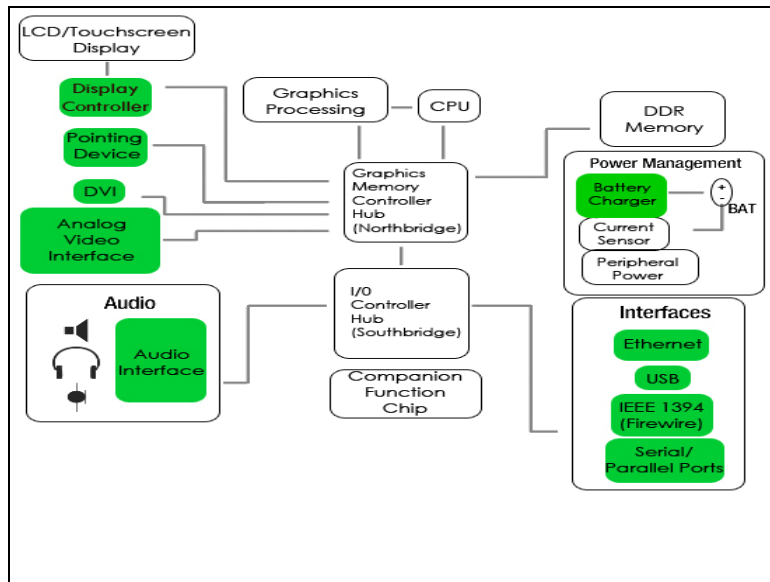
SC70-6L Five Lines TVS Array for ESD Protection

UMD5V-706 on LCM Application



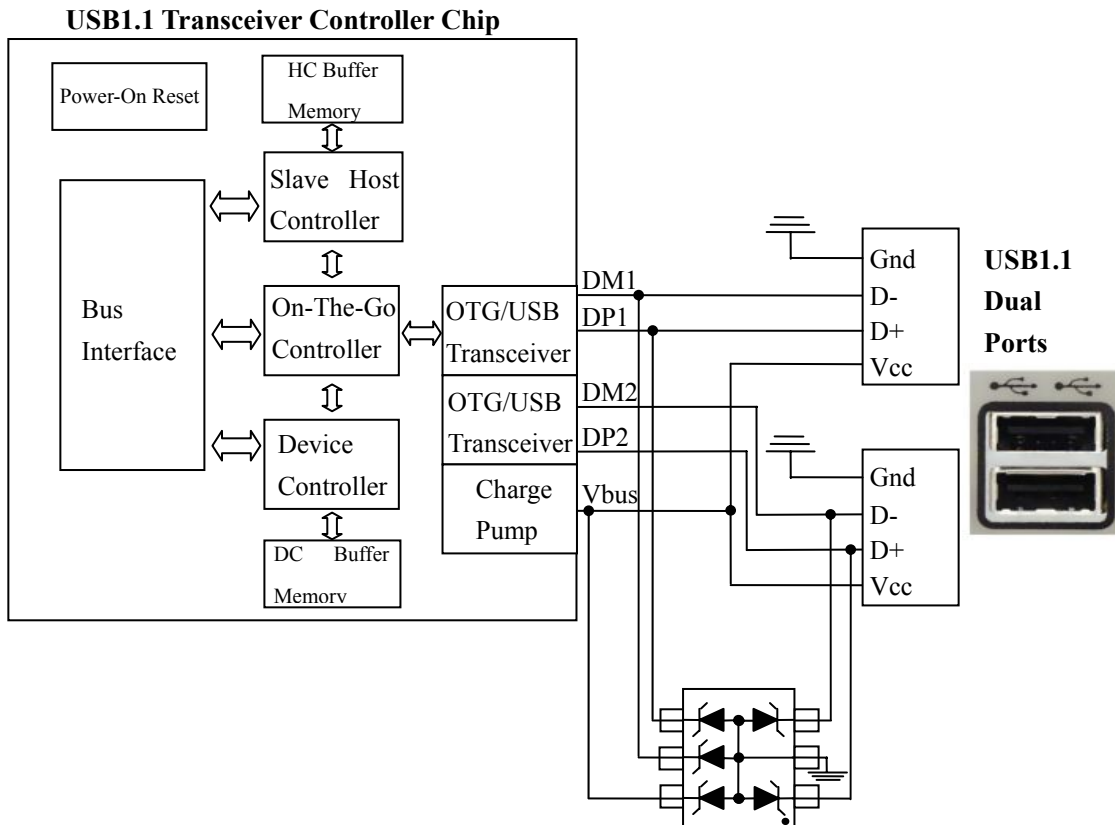
SC70-6L Five Lines TVS Array for ESD Protection

Laptop Block Diagram



Areas that require ESD protection are highlighted.

UMD5V-706 on Dual USB1.1 Ports Protection



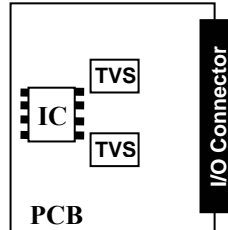
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Circuit Board Layout Recommendations

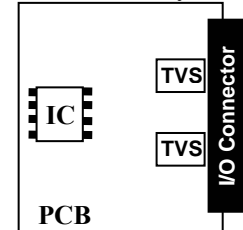
Good circuit board layout is critical for creating an effective surge suppression circuit. The following PCB guidelines are recommended to enhance the performance of a TVS device:

- Place the TVS near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the TVS and the protected line.
- The ESD transient return path to ground should be kept as short as possible.
- Place a TVS and decoupling capacitor between power and ground of components that may be vulnerable to electrostatic discharges to the ground plane.
- Minimize all conductive loops including power and ground loops.
- Use multilayer boards when possible.
- Minimize interconnecting line lengths.
- Never run critical signals near board edges.
- Fill unused portions of the PCB with ground plane.

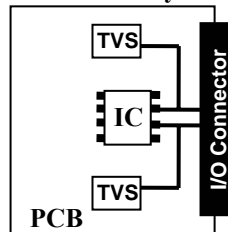
Poor PCB Layout



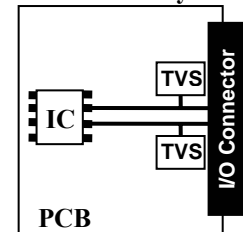
Good PCB Layout



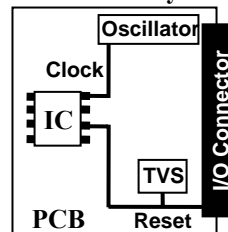
Poor PCB Layout



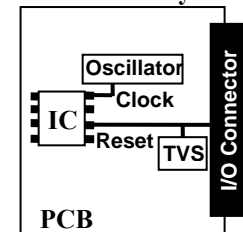
Good PCB Layout



Poor PCB Layout



Good PCB Layout

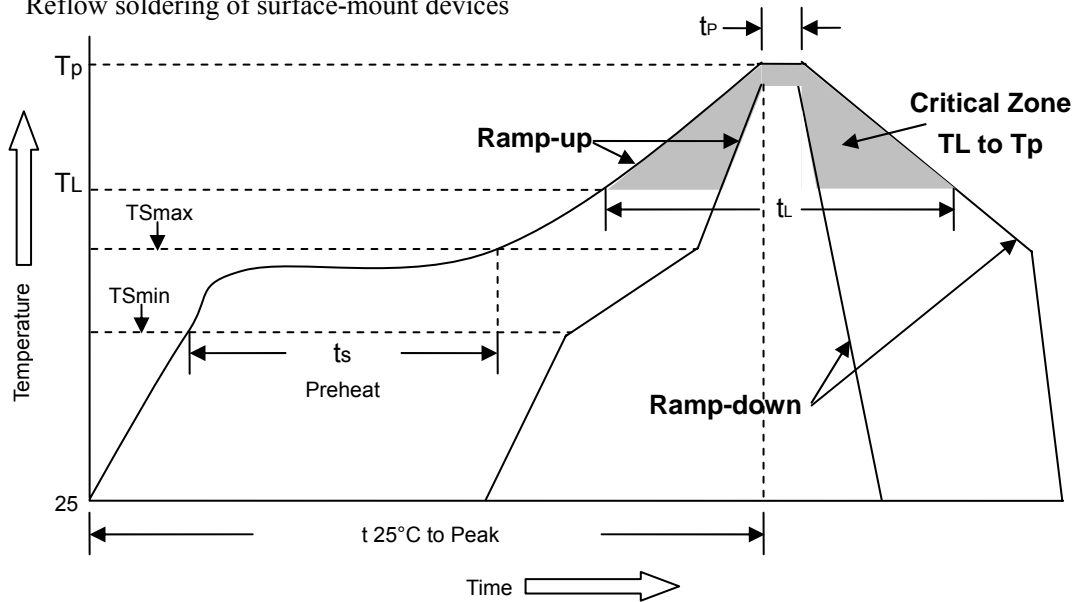


Matte Tin Lead Finish

Matte tin has become the industry standard lead-free replacement for SnPb lead finishes. A matte tin finish is composed of 100% tin solder with large grains. Since the solder volume on the leads is small compared to the solder paste volume that is placed on the land pattern of the PCB, the reflow profile will be determined by the requirements of the solder paste. Therefore, these devices are compatible with both lead-free and SnPb assembly techniques. Unlike other lead-free compositions, matte tin does not have any added alloys that can cause degradation to solder joint.

SC70-6L Five Lines TVS Array for ESD Protection
Soldering Method for UMD's Products

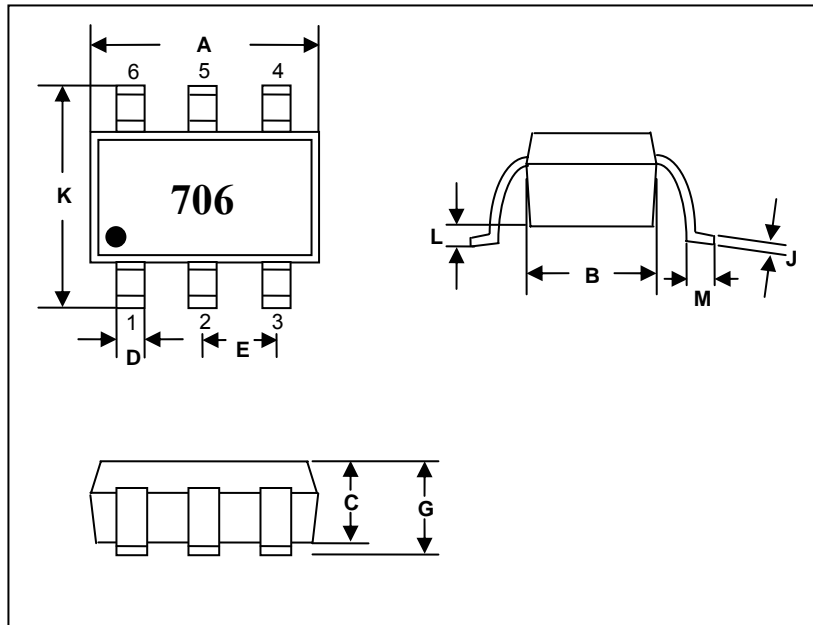
1. Storage environment: Temperature = 10°C~35°C Humidity = 65%±15%
2. Reflow soldering of surface-mount devices



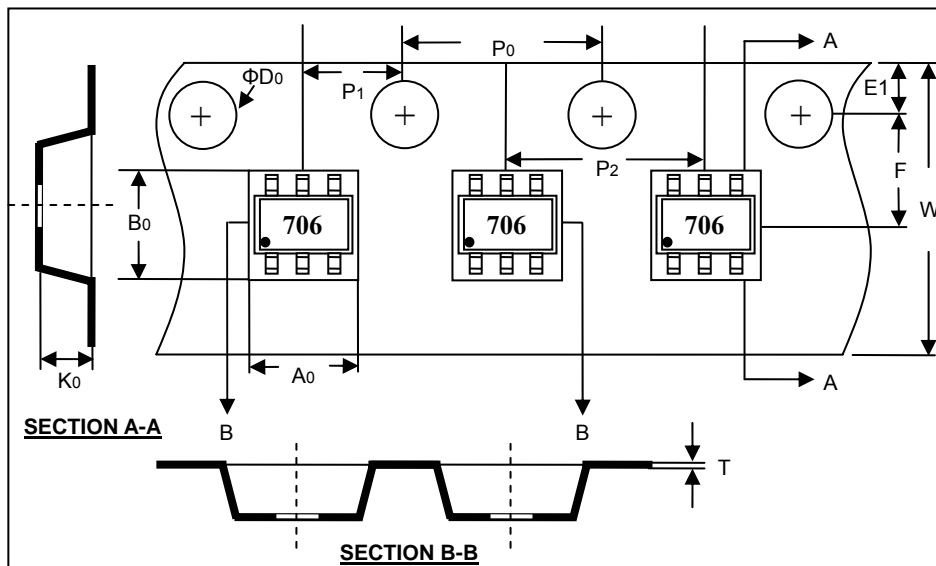
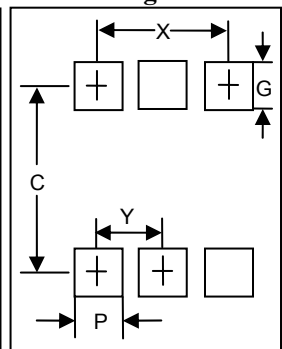
Profile Feature	Pb-Free Assembly
Average ramp-up rate (TL to TP)	<3°C/sec
Preheat	
- Temperature Min (TSmin)	150°C
- Temperature Max (TSmax)	200°C
- Time (min to max) (ts)	60~180sec
TSmax to TL	
- Ramp-up Rate	<3°C/sec
Time maintained above:	
- Temperature (TL)	220°C
- Time (tL)	50~145sec
Peak Temperature (Tp)	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (tp)	20~40sec
Ramp-down Rate	<6°C/sec
Time 25°C to peak Temperature	<8 minutes

Flow (wave) soldering (solder dipping)

Products	Dipping time
Pb devices	5sec±1sec
Pb-Free devices	5sec±1sec

SC70-6L Five Lines TVS Array for ESD Protection
SC70-6L Dimension Drawing


Dim	Dimensions			
	Inches		mm	
	Min	Max	Min	Max
A	0.075	0.085	1.90	2.15
B	0.045	0.053	1.15	1.35
C	0.031	0.039	0.80	1.00
D	0.006	0.012	0.15	0.30
E	0.026 BSC		0.65 BSC	
G	0.031	0.043	0.80	1.10
J	0.003	0.010	0.08	0.25
K	0.075	0.085	1.90	2.15
L	0	0.004	0	0.10
M	0.010	0.018	0.26	0.46

SC70-6L Carrier Dimension

Mounting Pattern


Typical		
Dim	MM	Inches
C	1.72	0.068
G	0.60	0.024
P	0.50	0.020
X	1.30	0.051
Y	0.65	0.026

Dimensions in mm.

Reel Dia.	Tape Width	A0	B0	K0	ΦD0	E1
178mm (7")	8mm	2.25±0.10	2.55±0.10	1.20±0.10	1.50±0.10	1.75±0.10
F	W	P0	P1	P2	T	
3.50±0.05	8.00±0.30	4.00±0.10	2.00±0.05	4.00±0.10	0.25±0.02	



SC70-6L Five Lines TVS Array for ESD Protection

Marking Code

Part Number	Device Marking
UMD5V-706	706

Ordering Information

Part Number	Lead Finish	Qty Per Reel	Reel Size
UMD5V-706	Pb-Free	3,000	7 inch

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