UMW ESD0504F

Ultra Low Capacitance ESD Protection Array

1.Description

ESD0504F is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to protection for high-speed data interfaces. With typical capacitance of 0.20pF (I/O to I/O) only,ESD0504F is designed to protect parasitic- sensitive systems against over-voltage and over current transient events. ESD0504F uses small SOT-363 package. Each ESD0504F device can protect four high-speed data lines one Vcc line. The combined features of ultra-low capacitance, small size and high ESD robustness make ESD0504F ideal for high-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications. The low clamping voltage of the ESD0504F guarantees a minimum stress on the protected IC.

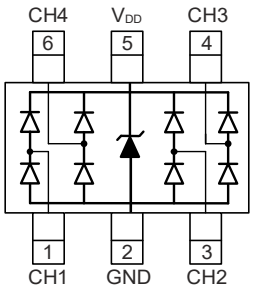
2.Features

- Transient protection for high-speed data lines
  IEC 61000-4-2(ESD) ±25KV(Air)
  ±20KV(Contact)
  IEC 61000-4-4(EFT)40A(5/50ns)
  Cable Discharge Event(CDE)
- Package optimized for high-speed lines
- Small package(2.1mm*2.3mm*1.0mm)
- Protects four data lines and one Vcc line
- Low capacitance: 0.20pF (I/O to I/O)
- Low leakage current
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8KV contact discharge

3.Applications

- Serial ATA
- MDDI Ports
- USB 2.0/3.0 Power and Data Line Protection
- Display Ports
- High Definition Multi-Media Interface (HDMI)
- Digital Visual Interface (DVI)

4.Pinning information



SOT-363

5.Absolute Maximum Rating

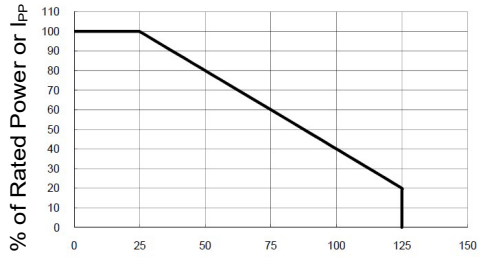
Parameter	Symbol	Value	Units
Peak Pulse Power (8/20μs)	P_{PP}	60	W
ESD per IEC 61000-4-2 (Air)	V_{ESD}	±25	kV
ESD per IEC 61000-4-2 (Contact)		±20	kV
Junction Temperature	T_{OPT}	-55 to 125	°C
Storage Temperature	T_{STG}	-55 to 150	°C

6.Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Reverse Working Voltage	V_{RWM}	Any I/O pin to GND			5	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA, Any I/O pin to GND	6		9	V
Reverse Leakage Current	I_R	V_{RWM}=5V, Any I/O pin to GND			1	μA
Clamping Voltage	V_C	I_{PP}=1A, t_p=8/20μs, Any I/O pin to GND			10	V
		I_{PP}=4A, t_p=8/20μs, Any I/O pin to GND			15	V
		I_{PP}=8A, t_p=8/20μs, V_{CC} pin to GND			15	V
Parasitic Capacitance	C_{ESD}	V_R=0V, f=1MHz, Between I/O and I/O		0.2	0.3	pF
		V_R=0V, f=1MHz, Between I/O and GND		0.45	0.5	pF
		V_R=0V, f=1MHz, Between V_{CC} and GND		0.8		pF

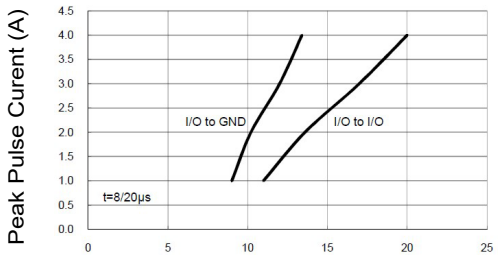
Notes: I/O Pins are pin 1,3,4,6. Pin 5 is Vcc. Pin 2 is GND.

7.Typical characteristic



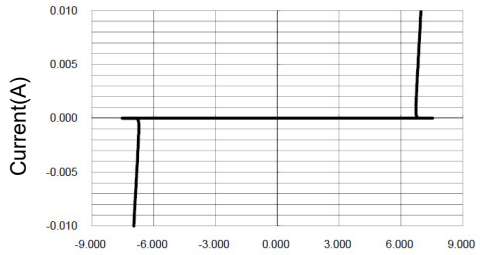
Ambient Temperature (°C)

Figure 1: Power Derating Curve



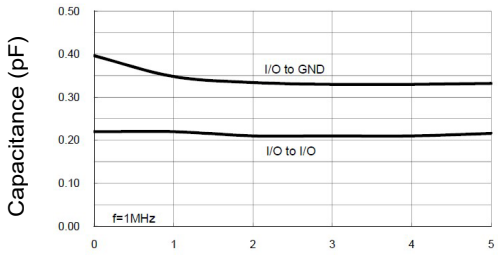
Clamping Voltage (V)

Figure 2: Clamping Voltage vs Peak Pulse Current



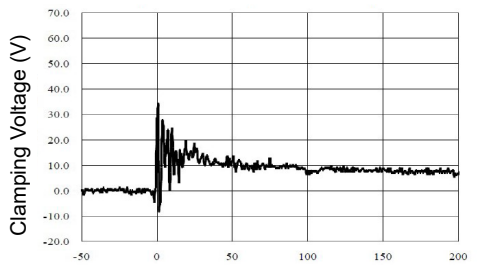
Voltage (V)

Figure 3: Voltage Sweeping of I/O to I/O



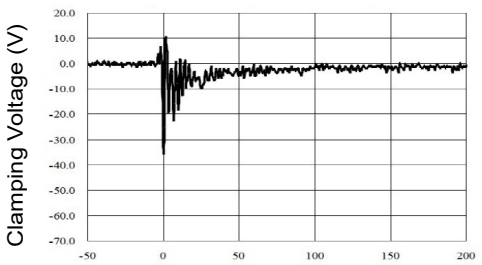
Voltage (V)

Figure 4: Voltage vs Capacitance



Time(ns)

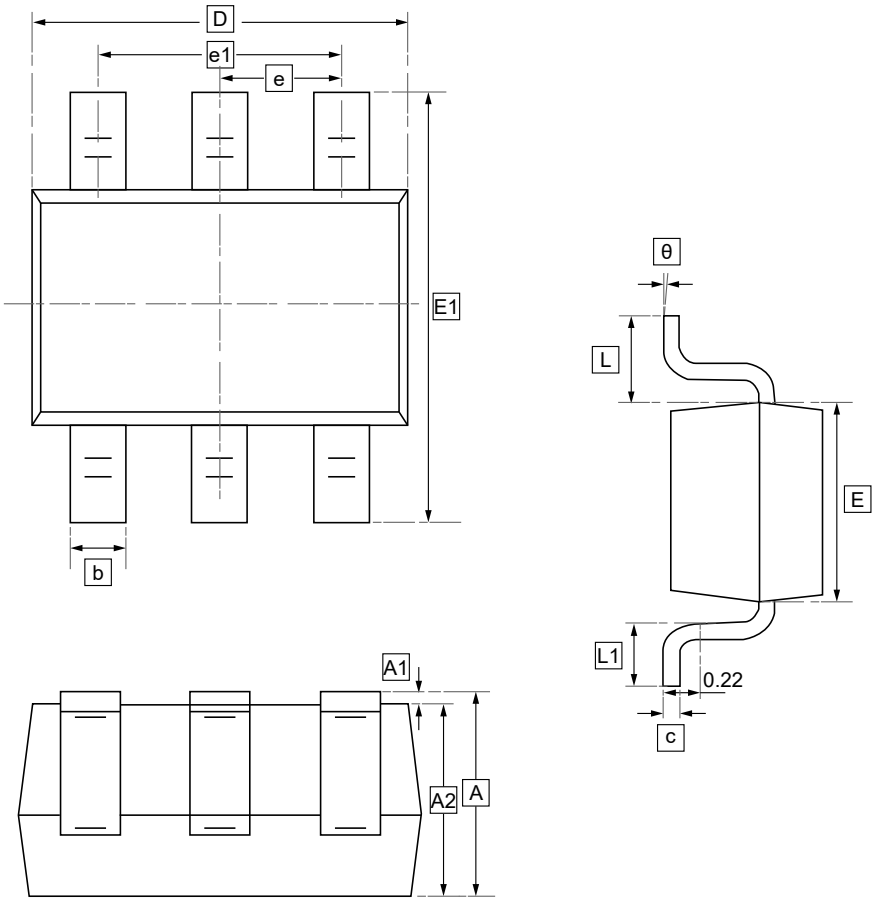
Figure 5: ESD Clamping of I/O to GND
(+8kV Contact per IEC 61000-4-2)



Time(ns)

Figure 6: ESD Clamping of I/O to GND
(+8kV Contact per IEC 61000-4-2)

8.SOT-363 Package Outline Dimensions

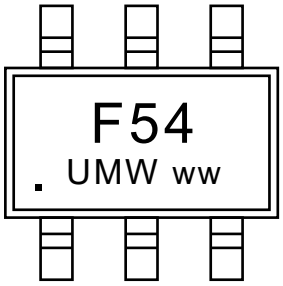


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	e1	L	L1
Min	0.900	0.000	0.900	0.150	0.080	2.000	1.150	2.150	0.65	1.200	0.525	0.260
Max	1.100	0.100	1.000	0.350	0.150	2.200	1.350	2.450	TYP	1.400	REF	0.460

Symbol	θ
Min	0°
Max	8°

9.Ordering information



ww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW ESD0504F	SOT-363	3000	Tape and reel

10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.