General Purpose ITVS, 4 I/Os, $C_{I/O-VSS}$<1.5pF AT2042

General Description

BCD ITVS (Integrated Transient Voltage Suppression) devices are designed and built using a BCD proprietary process based on BCD standard technology. These devices integrate the various diodes, transistors and resistors required to build these ITVS products. These diodes and transistors feature low parasitic resistance and the diodes also exhibit low capacitance. Using these devices, BCD is able to design voltage clamping products where low capacitance associated with low dynamic resistance is required.

The BCD AT2042 is a general purpose, high performance and low cost device suitable for protecting high speed data interfaces. The AT2042 is a unique design integrating low capacitance steering diodes and a clamping cell, specially created to protect sensitive components connected to data and transmission lines.

The AT2042 is available in SOT-23-6 package. This package allows simple and optimal placement in existing high-speed PCB layout.

Features

- Low Clamping Voltage:
- Typical 9V at 10A 100ns, TLP, I/O to VSS
- 11V at 10A 8μs/20μs, I/O to VSS
- IEC 61000-4-2: ±30kV (I/O to VSS, Air)
  ±30kV (I/O to VSS, Contact)
- IEC 61000-4-5: ±10A (I/O to VSS)
- Input Capacitance from I/O to VSS: 1.2pF
- TLP Dynamic Resistance, I/O to VSS: 0.25Ω
- Monolithic Silicon Technology

Application

- VGA
- USB 2.0 Power/Data Lines Protection
- IEEE 1394
- Laptop and Personal Computers
- Flat Panel Displays
- Video Graphics Cards
- SIM Ports

SOT-23-6

Figure 1. Package Type of AT2042

Pin Configuration

K6 Package
(SOT-23-6)

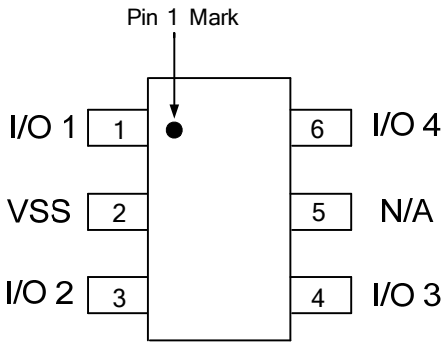


Figure 2. Pin Configuration of AT2042 (Top View)

Circuit Diagram

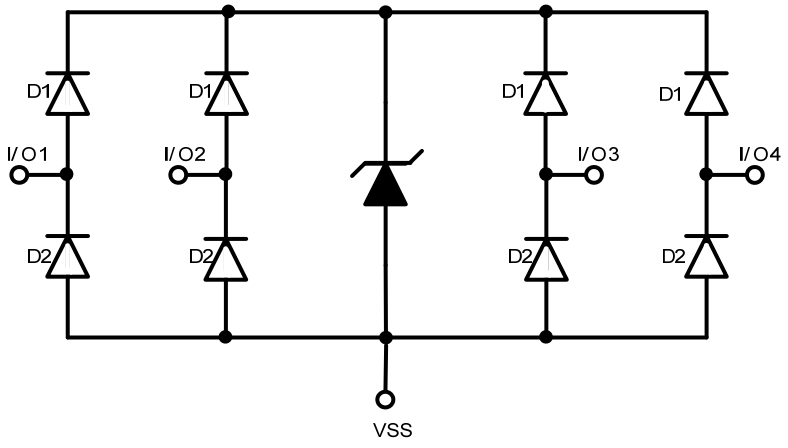
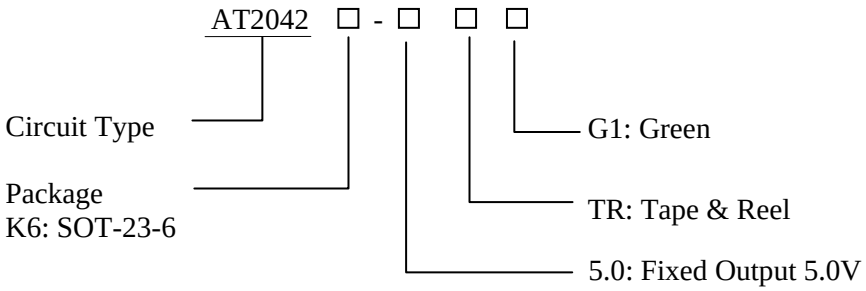


Figure 3. Circuit Diagram of AT2042

General Purpose ITVS, 4 I/Os, $C_{I/O-VSS}$<1.5pF AT2042

Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing Type
SOT-23-6	-55 to 85°C	AT2042K6-5.0TRG1	GJR	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and green.

Absolute Maximum Ratings (Note 1)

Parameter		Symbol	Value	Unit
Peak Pulse Current (tp 8μs/20μs) , I/O to VSS		$I_{PP(I/O-VSS)}$	±10	A
Operating Voltage (DC)			5.5	V
IEC61000-4-2 ESD (Air)	I/O to VSS, VCC Floating		±30	kV
IEC61000-4-2 ESD (Contact)	I/O to VSS, VCC Floating		±30	kV
IEC61000-4-5 (Lightning)	I/O to VSS		10	A
			120	W
Lead Temperature (Soldering, 10sec)		T_{LEAD}	260	ºC
Operating Temperature			-55 to 85	ºC
Storage Temperature			-55 to 150	ºC

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

General Purpose ITVS, 4 I/Os, $C_{I/O-VSS}$<1.5pF AT2042

Electrical Characteristics

T_A=25ºC, unless otherwise specified.

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Working Voltage, I/O to VSS				-0.7		5.5	V
Channel Leakage Current		I_R	V_{CC}=5V,V_{SS}=0V			1	μA
Reverse Breakdown Voltage, I/O to VSS		V_{BR}	I_{BV}=1mA	5.5			V
Holding Voltage		V_H		5.5			V
Clamping Voltage (Lightning) (IEC61000-4-5)	I/O to VSS		At 10A		11		V
Trigger Voltage	I/O to VSS	V_{TRIG}			9	9.5	V
ESD Clamping Voltage	I/O to VSS		At 10A, TLP, 100ns		9		V
Differential Clamping Resistance	I/O to VSS	R_{DIFF-F}			0.25		Ω
Channel Input Capacitance	I/O to VSS	$C_{I/O}$	$V_{I/O}$=2.5V, V_{SS}=0V, f=1MHz		1.2	1.5	pF

Typical Performance Characteristics

T_A=25°C, unless otherwise specified.

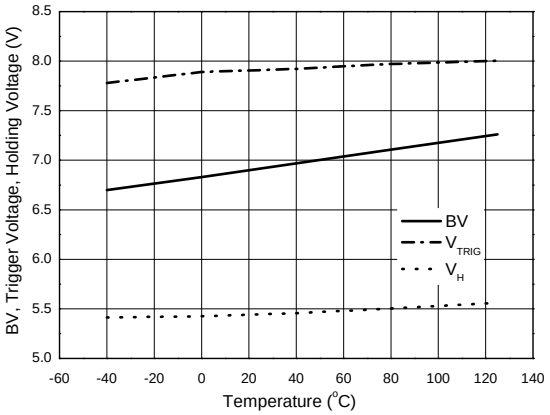


Figure 4. BV, Trigger Voltage, Holding Voltage vs. Temperature

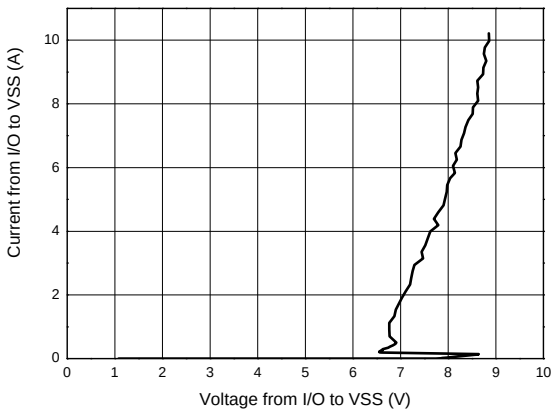


Figure 5. Current from I/O to VSS vs. Voltage from I/O to VSS

Typical Performance Characteristics (Continued)

T_A=25°C, unless otherwise specified.

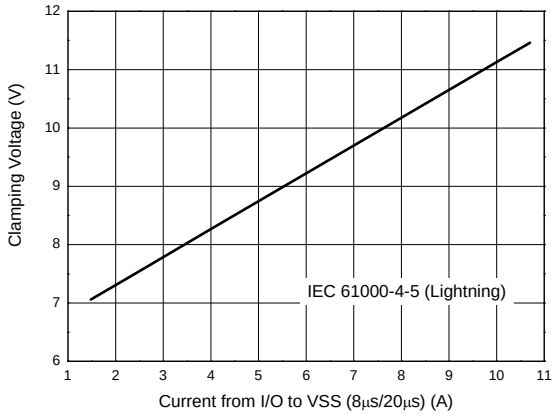


Figure 6. Clamping Voltage
vs. Current from I/O to VSS (8μs/20μs)

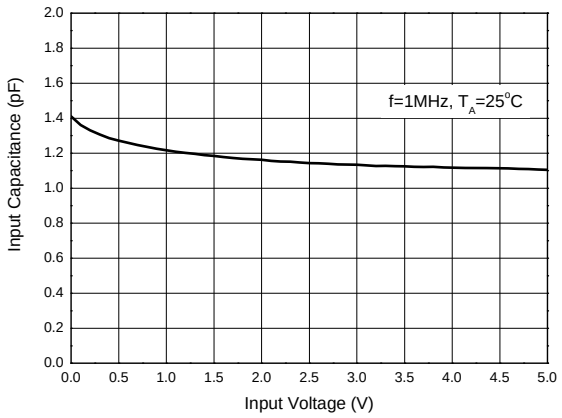


Figure 7. Input Capacitance vs. Input Voltage

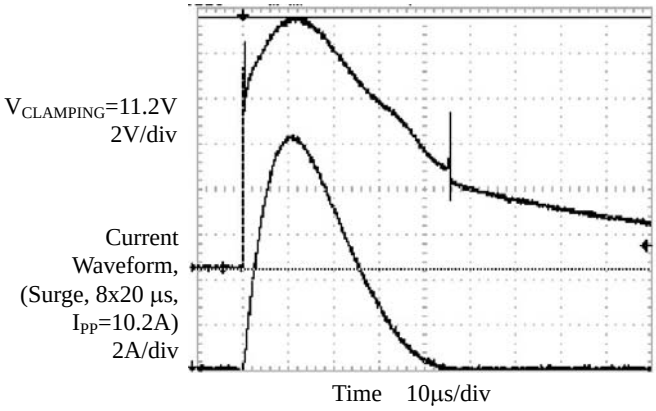


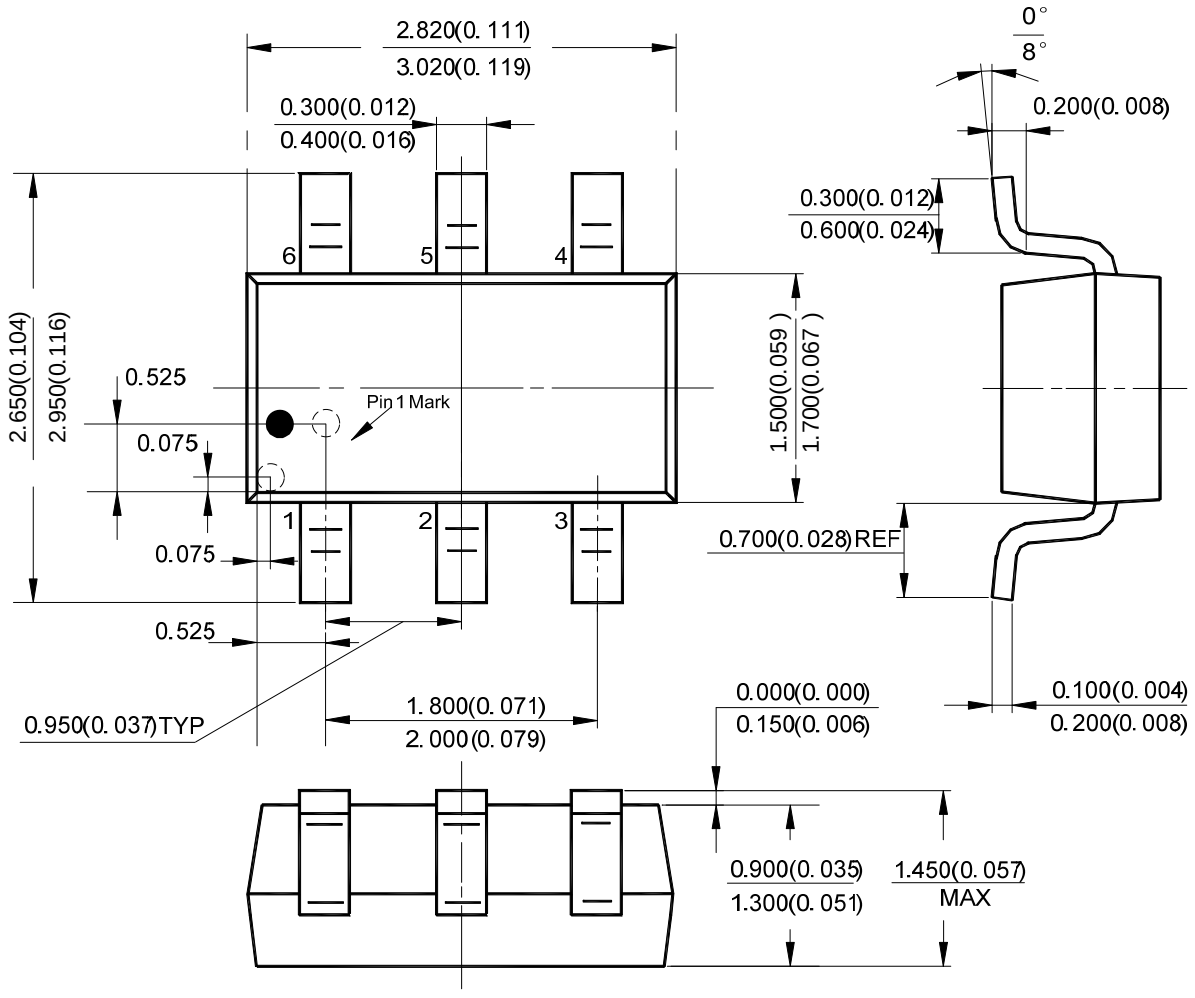
Figure 8. Waveform of I/O to VSS (Positive)

General Purpose ITVS, 4 I/Os, $C_{I/O-VSS}$<1.5pF AT2042

Mechanical Dimensions

SOT-23-6

Unit: mm(inch) MIN / mm(inch) MAX



Note: Pin 1 Dot Ø 0.15mm
Pin 1 Dot area 0.6mm*0.6mm

BCD Semiconductor Manufacturing Limited

http://www.bcdsemi.com

IMPORTANT NOTICE

BCD Semiconductor Manufacturing Limited reserves the right to make changes without further notice to any products or specifications herein. BCD Semiconductor Manufacturing Limited does not assume any responsibility for use of any its products for any particular purpose, nor does BCD Semiconductor Manufacturing Limited assume any liability arising out of the application or use of any its products or circuits. BCD Semiconductor Manufacturing Limited does not convey any license under its patent rights or other rights nor the rights of others.

MAIN SITE

- Headquarters
BCD Semiconductor Manufacturing Limited
No. 1600, Zi Xing Road, Shanghai ZiZhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

- Wafer Fab
Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.
800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

REGIONAL SALES OFFICE

Shenzhen Office
Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office
Unit A Room 1203, Skyworth Bldg., Gaoxin Ave.1.S., Nanshan District, Shenzhen, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

Taiwan Office
BCD Semiconductor (Taiwan) Company Limited
4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

USA Office
BCD Semiconductor Corp.
30920 Huntwood Ave. Hayward, CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788