Approval Sheet

Customer Information

Customer	
Part Name	
Part No.	
Model No.	

COMPANY	PURCHASE	R&D

Vendor Information

Name	SFI Electronics Technology Inc.
Part Name	TVS Automotive Device
Part No.	SFI0402TA050-0R3W-11
Lot No.	

SFI Electronics Technology Inc.

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	SFI Electronics Technology INC. 2017.1.19 Issue Date Document Control Center		

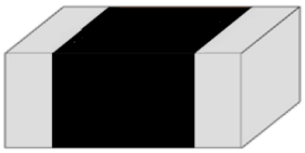
1. Part Number Identification

SFI 0402 TA 050 – 0R3 W - 11

- Company Logo
- Size
  Case : 0402 (SGD0402)
- TA
  TVS Automotive Device
- Reverse Working Voltage
  050=5*10^0=5V
- Parasitic Capacitance
  0R3=0.3pF
- Inner Code
- 11
  Bidirectional

1.1 Features

(1) Transient protection for high-speed data lines
ISO 10605 (ESD) ±20KV (air)
±20KV (contact)
IEC61000-4-4 (EFT) 20A (5/50ns)
Cable discharge event (CDE)
AEC-Q101 qualified



(2) Package optimized for high-speed lines
(3) Ultra-small package (1.0mm×0.6mm×0.5mm)
(4) Protects one data, controller or power line
(5) Ultra-low capacitance : 0.3pF (typical)
(6) Low leakage current : 1nA @V_{RWM} (typical)
(7) Low clamping voltage
(8) Each I/O pin can withstand over 1000 ESD strikes for ±8KV contact discharge

1.2 Description

SFI0402TA050-0R3W-11 is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for data, control or power lines. With typical capacitance of 0.3pF only, SFI0402TA050-0R3W-11 is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with ISO 10605(ESD) (±20KV air, ±20KV contact discharge), IEC61000-4-4 (electrical fast transient -EFT) (20A, 5/50ns), very fast charged device model (CDM) ESD, cable discharge event (CDE) and AEC-Q101, etc.

SFI0402TA050-0R3W-11 uses ultra-small 0402 (SGD0402) package. Each SFI0402TA050-0R3W-11 device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

1.3 Applications

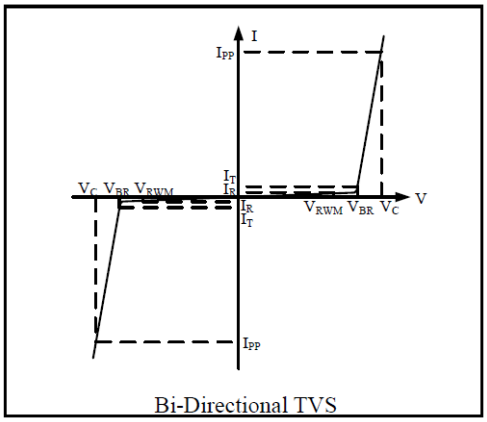
(1) USB2.0 and USB3.0
(2) HDMI1.3 and HDMI1.4
(3) Cellular phones
(4) DVI
(5) Notebook
(6) PCI express

1.4 Absolute Maximum Ratings (Ta=25℃)

ITEM	Symbol	Rating	Unit
Peak pulse power (t_p=8/20μs)	P_{PK}	54	W
Peak pulse current (t_p=8/20μs)	I_{PP}	3	A
ESD per ISO 10605 (air)	V_{ESD}	±20	KV
ESD per ISO 10605 (contact)	V_{ESD}	±20	KV
Operating temperature range	T_{OPT}	-55~125	℃
Storage temperature range	T_{STG}	-55~150	℃

1.5 Electrical Characteristics (Ta=25℃)

Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal Frequency



Bi-Directional TVS

ITEM	Symbol	SFI0402TA050-0R3W-11	Unit
Working peak reverse voltage	V_{RWM}	5	V
Maximum reverse leakage (@V_{RWM}, 25℃) (between I/O_1 and I/O_2)	I_R	Typ. 0.001 (Max. 0.1)	μA
Breakdown voltage (@I_T=1mA) (between I/O_1 and I/O_2)	V_{BR}	Typ. 9.0 (Min. 7.0 Max. 11.0)	V
Clamping voltage (@I_{PP}=16A, t_p=100ns, TLP)	V_{CL}	30	V
Clamping voltage (@V_{ESD}=8KV)	V_{CL}	30	V
Maximum clamping voltage (@I_{PP}=1A, t_p=8/20μs) (between I/O_1 and I/O_2)	V_C	Max. 12	V
Maximum clamping voltage (@I_{PP}=3A, t_p=8/20μs) (between I/O_1 and I/O_2)	V_C	Max. 18	V
Parasitic capacitance (@V_R=0V, f=1MHz) (between I/O_1 and I/O_2)	C_{ESD}	Typ. 0.3	pF

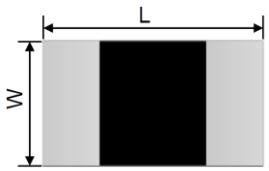
2 . Mechanical Characteristics

(1) Case : 0402 (SGD0402 package)

(2) Flammability rating : UL 94V-0

(3) Packaging : tape and reel

(4) Polarity : bidirectional



Top View（Bottom View）

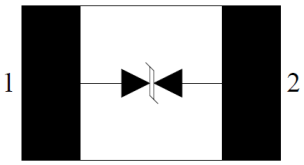
Side View

(unit : mm)

Model	0402 (SGD0402)
Length(L)	1.00 ± 0.05
Width(W)	0.60 ± 0.05
Thickness(T)	0.50 ± 0.05
Termination(a)	0.20 ± 0.05

2.1 Circuit Diagram

2.2 Pin Configuration

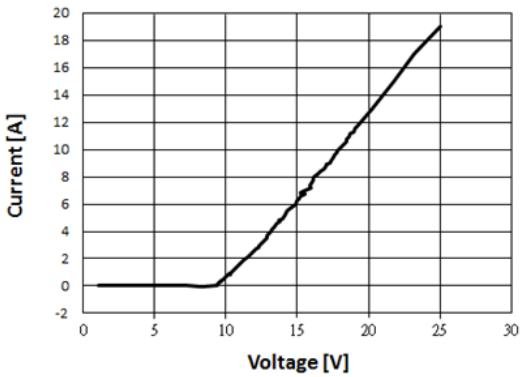


0402 (SGD0402)

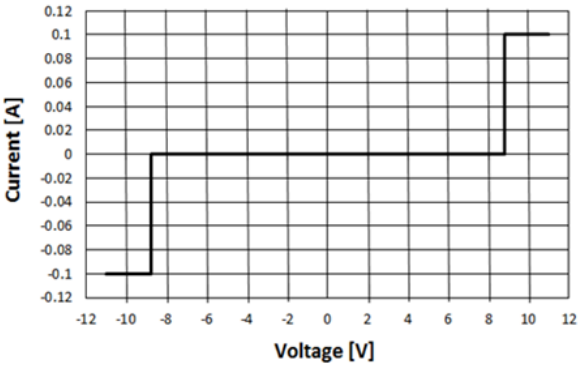
(TOP View)

3. Rating and Characteristic Curves

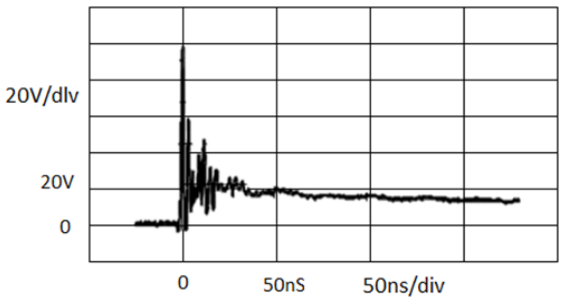
TLP Measurement



Voltage Sweeping of I/O_1 to I/O_2



ESD Clamping of I/O_1 to I/O_2
(+8kV Contact per IEC 61000-4-2)



ESD Clamping of I/O_1 to I/O_2
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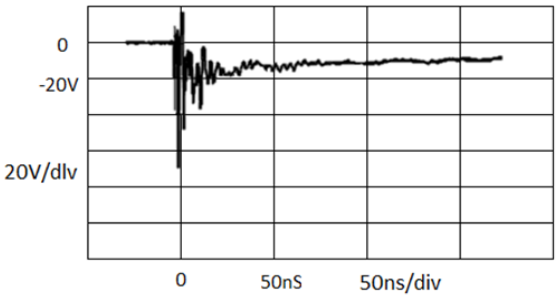
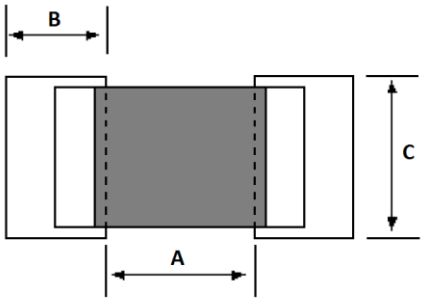


4. Soldering Recommendations

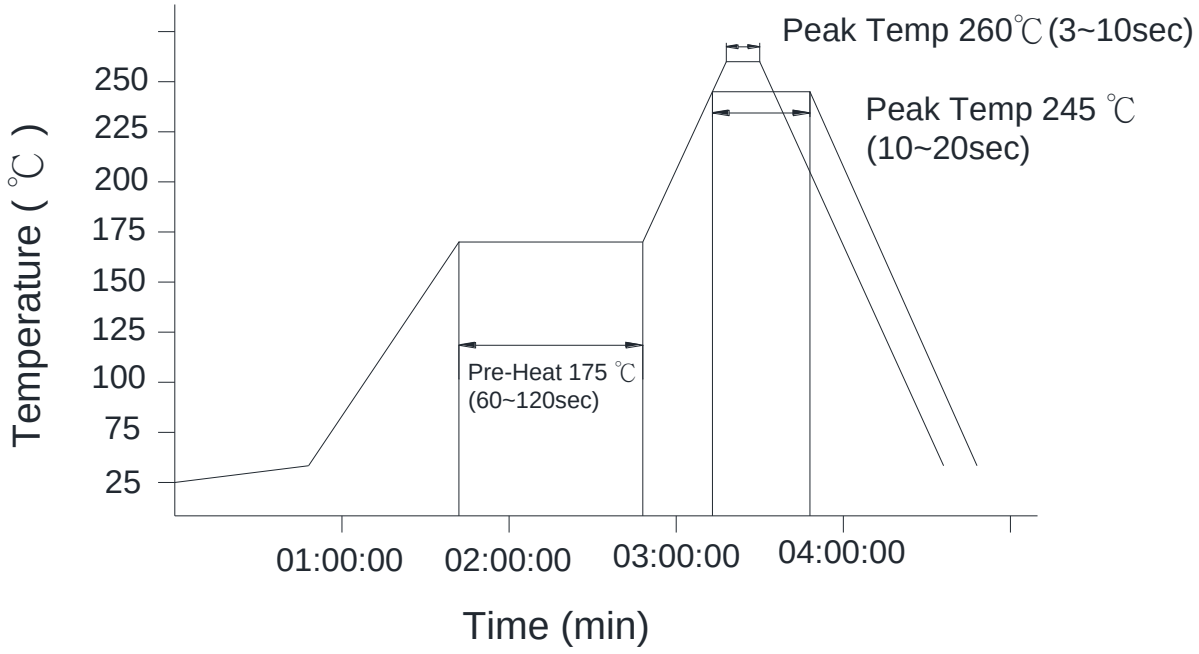
4.1 Recommended solder pad layout

(Unit : mm)

	A	B	C
0402	0.4~0.6	0.5~0.7	0.6~0.7



4.2 The IR reflow and temperature of soldering for Pb free process



☆ **IR reflow Pb free process suggestion profile**

(1) The solder recommend is Sn96.5/Ag3.5 of 80 to 130μm
(2) Ramp-up rate (217℃ to peak) +3℃/second max.
(3) Temp. maintain at 175±25℃ 180 seconds max.
(4) Temp. maintain above 217℃ 60~150 seconds
(5) Peak temperature range 245 +20/-10℃ within 5℃ of actually peak temperature (t_p) 10~20 seconds
(6) Ramp down rate -6℃/second max.
(7) Steel plate thickness 0.08~0.12mm

4.3 Hand soldering

In hand soldering of the STA devices, large temperature gradient between preheated the STA devices and the tip of soldering iron may cause electrical failures and mechanical damages such as cracking or breakings of the devices. The soldering shall be carefully controlled and carried out, so that the temperature gradient is kept minimum with following recommended conditions for hand soldering.

4.3.1 Recommended soldering condition 1 (with preheating)

(1) Solder
0.12~0.18mm thread solder (Sn96.5:Ag3.5) with soldering flux in the core rosin-based and non-activated flux is recommended.

(2) Preheating
The STA devices shall be preheated so that temperature gradient between the devices and the tip of soldering iron is 150℃ or below.

(3) Soldering iron
Rated power of 20W max. with 3mm soldering tip in diameter
Temperature of soldering iron tip **300℃ max. 3-5sec** (The required amount of solder shall be melted in advance on the soldering tip.)

(4) Cooling
After soldering, the STA devices shall be cooled gradually at room ambient temperature.

4.3.2 Recommended soldering condition 2 (without preheating)

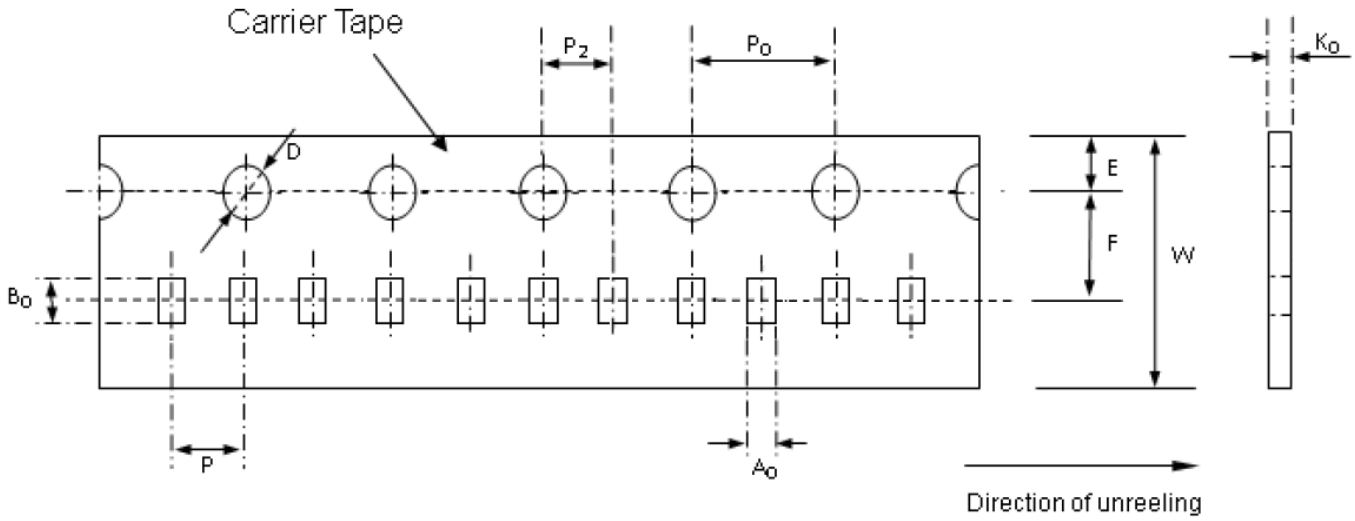
(1) Temperature of soldering iron tip **300℃max. 3-5sec**
(2) Solder iron tip shall not directly touch to STA devices.
(3) Solder iron tip shall be fully preheated before soldering while soldering iron tip to the external electrode of STA devices.

5. Packaging Specification

5.1 Carrier tape and transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.

5.2 The adhesion of the heat-sealed cover tape shall be 40 +20/-15 grams.

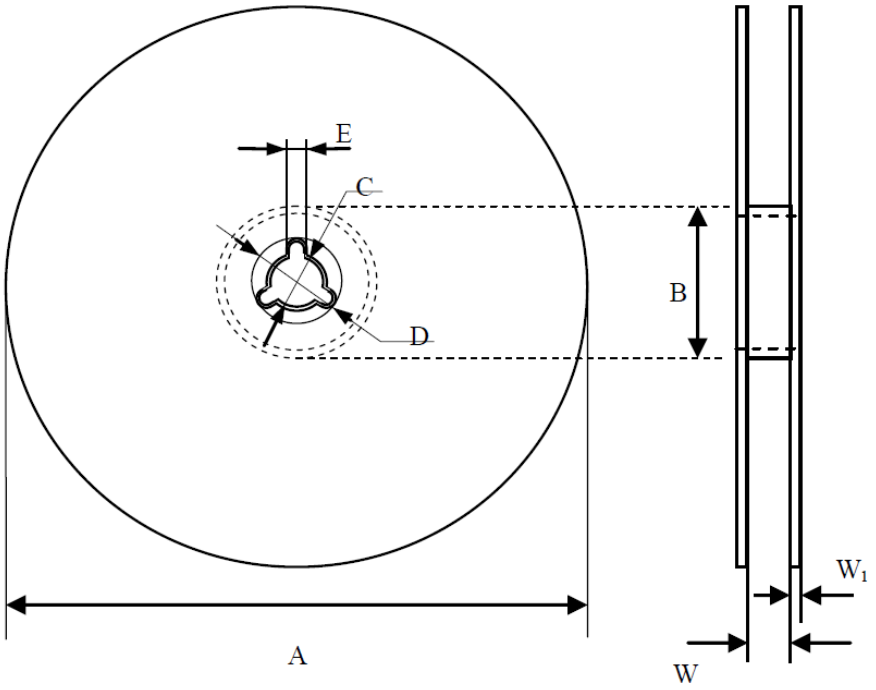
5.3 Both the head and the end portion of the taping shall be empty for reel package and SMT auto-pickup machine. And a normal paper tape shall be connected in the head of taping for the operator to handle.



(Unit : mm)

Symbol	A_0 ±0.05	B_0 ±0.05	K_0 ±0.05	D +0.10 -0.05	P ±0.10	P_2 ±0.10	P_0 ±0.10	W ±0.10	E ±0.10	F ±0.05
0402	0.70	1.12	0.60	1.50	2.00	2.00	4.00	8.00	1.75	3.50

6. Reel Dimension



(Unit : mm)

Symbol	A	B	C	D	E	W	W_1
0402	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.5	1.5±0.1

7. Ordering Information

Part Number	Working Voltage	Quantity	Reel Size
SFI0402TA050-0R3W-11	5V	10000	7 inch

单击下面可查看定价，库存，交付和生命周期等信息

>>SFI(台湾立昌)