



# APPROVAL SHEET

## Customer Information

Customer :			
Part Name :			
Part No. :			
Model No. :			
	<b>COMPANY</b>	<b>PURCHASE</b>	<b>R&amp;D</b>


## Vendor Information

Name:	SFI ELECTRONICS TECHNOLOGY CORP. INC.
Part Name	Chip TVS
Part No.	08CH LF Series
Lot No.	

## SFI ELECTRONICS TECHNOLOGY INC.

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Quality Control	Document Control	Business Issue	
 DIN EN ISO 9001 Certificate: 01 100 008833	REV : A	Prepared	Check



### PART NO. 08CH LF Series

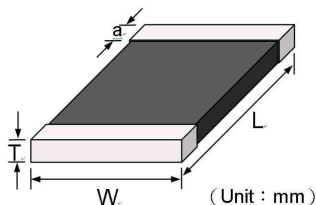
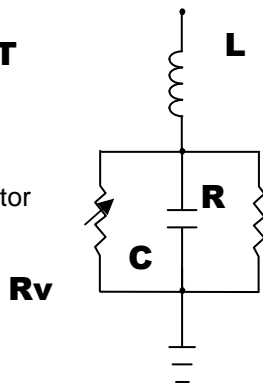
#### 1.1 Performance Characteristics

Part Number	Working Voltage		Breakdown Voltage <sup>(*1)</sup>	Clampin g Voltage	Peak Current	Energy	Capacitance	Thickness <sub>Max</sub>
	AC	DC						
08CH470KB-E01	30	38	47( 42.3~51.7 )	90	500	2.5	1050	1.8
08CH560KB-E01	35	45	56(50.4~61.6)	106	500	2.5	1250	1.8
08CH121KB-E01	75	102	120( 108~132 )	198	500	6.0	300	1.8
08CH241KB-E01	150	200	240(216~264)	390	500	14.5	380	2.0
08CH271KB-E01	175	225	270( 243~297 )	450	500	16.0	340	2.0
08CH391KB-E01	250	330	390( 351~429 )	647	500	20.0	125	2.3
08CH431KB-E01	275	369	430( 387~473 )	705	450	21.0	120	2.3
08CH471KB-E01	300	385	470(423~ 517 )	775	400	21.6	115	2.3

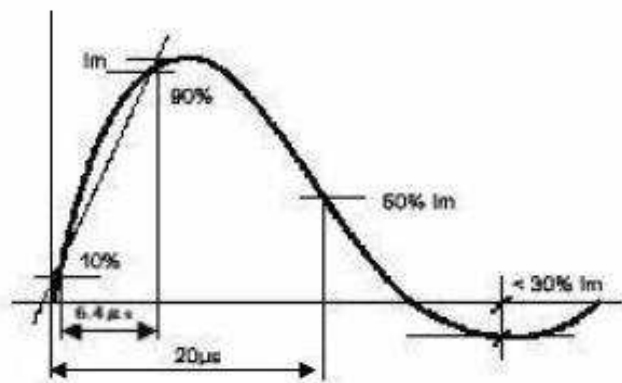
- \* 1 The varistor voltage was measured at 1 mA current
- \* 2 The Clamping voltage was measured at standard 10A current
- \* 3 The Peak Current was tested at 8/20 us waveform
- \* 4 The capacitance value and Energy only for customer reference · it's not formal specification

#### EQUIVALENT CIRCUIT

- ☆L Body Inductance
- ☆C Device Capacitance
- ☆R<sub>v</sub> Voltage Variable Resistor
- ☆R Insulation Resistor



Wave shape "Short circuit" (Current I<sub>sc</sub>)



8/20 μs waveform current ( A )

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# SFI Electronics Technology

## SMD Transient Voltage Suppressors

Type	Length	Width	Electrode
08CH(mm)	8.1±0.30	5.0±0.30	0.8+0.5/-0.1

SEVERITY LEVEL	T1	T2
1	8 μs	20 μs
2	10 μs	1000 μs

### 1.2 Reference Data

	Symbol		Value	Unit
Response time	$T_{rise}$	<	1	ns
Leakage current at $V_{1mA} \times 80\%$	$I_{VV}$	<	50	uA
Leakage current at $V_{1mA} \times 80\%$ (After Reliability Test)	$I_{VVA}$	<	200	uA
Operation ambient temperature			-55 ~ +85	°C
Storage temperature			-55 ~ +125	°C
Reflow solder profile temperature(Recommend)			250	°C

### 1.3 Other Data

	Symbol		Value	Unit
Body			ZnO	
End termination			Ag/Ni/Sn	
Packaging			Reel	
Complies with Standard			IEC61000-4-2	
Complies with RoHs Standard			Yes	
Marking			None	
Lead content		<	1000	ppm

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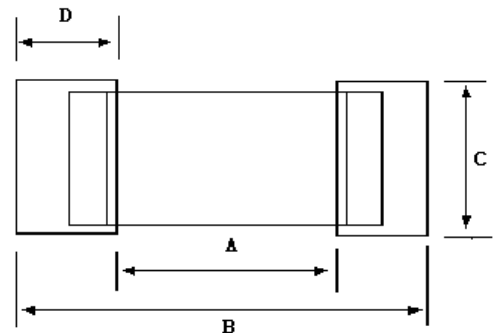
### 3. Environmental Reliability Test

Characteristic	Test method and description		
High Temperature Storage	The specimen shall be subjected to $150 \pm 2^{\circ}\text{C}$ for $1000 \pm 12$ hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. The change of varistor voltage shall be within 10 % .		
Temperature Cycle	The temperature cycle of specified temperature shall be repeated five times and then stored at room temperature and humidity for one or two hours. The change of varistor voltage shall be within 10 % and mechanical damage shall be examined.	Step	Temperature
		1	$-40 \pm 3^{\circ}\text{C}$
		2	Room Temperature
		3	$125 \pm 2^{\circ}\text{C}$
		4	Room Temperature
High Temperature Load	After being continuously applied the maximum allowable voltage at $85 \pm 2^{\circ}\text{C}$ for $1000 \pm 2$ hours, the specimen shall be stored at room temperature and humidity for one or two hours, the change of varistor voltage shall be within 10% .		
Damp Heat Load/ Humidity Load	The specimen should be subjected to $40 \pm 2^{\circ}\text{C}$ , 90 to 95 % RH environment, and the maximum allowable voltage applied for 1000 hours, then stored at room temperature and humidity for one or two hours. The change of varistor voltage shall be within 10% .		
Low Temperature Storage	The specimen should be subjected to $-40 \pm 2^{\circ}\text{C}$ , without load for 500 hours and then stored at room temperature for one or two hours. The change of varistor voltage shall be within 10 %		

### 4. Soldering Recommendations

#### 4.1 Recommended solder pad layout

( Unit : mm )		
A	B	C
6.5	9.5	6.8



#### 4.2 The SIR test of the solder paste shall be done ( Based on JIS-Z-3284 )

#### 4.3 Steel plate and foot distance printing

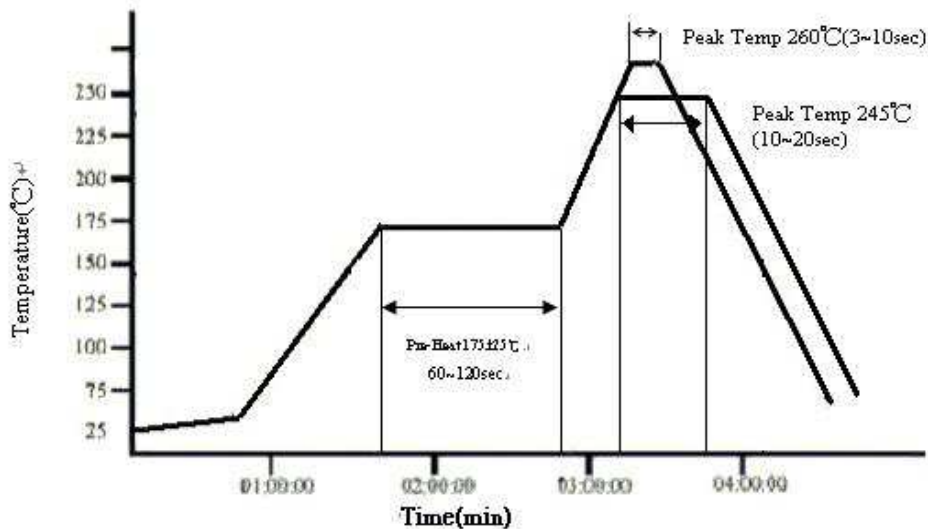
Foot distance printing (mm)	Steel Plate thickness (mm)
> 0.65mm	0.18mm
0.65mm~0.5mm	0.15mm
0.50mm~0.40mm	0.12mm
<=0.40 mm	0.10mm

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### 4.4 IR Soldering

Rapid heating, partial heating or rapid cooling will easily cause defect of the component. So preheating and gradual cooling process is suggested. IR soldering has the highest yields due to controlled heating rates and solder liquidus times. Make sure that the element is not subjected to a thermal gradient steeper than 4 degrees per second. 2 degrees per second is the ideal gradient. During the soldering process, pre-heating to within 100 degrees of the solders peak temperature is essential to minimize thermal shock.



#### ☆ IR reflow Pb Free Process suggestion profile

- (1) The solder recommend is Sn96.5/Ag 3.5 of 120 to 150  $\mu$  m
- (2) Ramp-up rate (217°C to Peak) + 3°C/second max
- (3) Temp. maintain at 175 +/-25°C 180 seconds max
- (4) Temp. maintain above 217 °C 60-150 seconds
- (5) Peak temperature range 245°C +20°C/ -10 °C time within 5 °C of actually peak temperature (tp) 10~20 seconds
- (6) Ramp down rate +6 °C/second max.

※Perform adequate test in advance as the reflow temperature profile will vary according to the conditions of the manufacturing process, and the specification of the reflow furnace.

4.5 Resistance to soldering heat-High Temperature Resistance:260°C, 10sec-3times.

### 4.6 Hand Soldering

In hand soldering of the Varistors. Large temperature gradient between preheated the Varistors and the tip of soldering iron may cause electrical failures and mechanical damages such as crackings or

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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.

### 4.6.1 Recommended Soldering Condition 1

- (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 Varistors shall be preheated so that Temperature Gradient between the devices and the tip of soldering iron is 150°C or below.
- (3) Soldering Iron  
Rated Power of 20w max with 3mm soldering tip in diameter.  
Temperature of soldering iron tip 380°C max,3-5sec ( The required amount of solder shall be melted in advance on the soldering tip.)
- (4) Cooling  
After soldering. The Varistors shall be cooled gradually at room ambient temperature.

### 4.6.2 Recommended Soldering Condition 2 ( Without preheating )

- (1) Solder iron tip shall not directly touch to ceramic dielectrics.
- (2) Solder iron tip shall be fully preheated before soldering while soldering iron tip to the external electrode of Varistors.

### 4.7 Post Soldering Cleaning

- 4.7.1 Residues of corrosive soldering fluxes on the PC board after cleaning may greatly have influences on the electrical characteristic and the reliability (such as humidity resistance)of the Varistors which have been mounted on the board. It shall be confirmed that the characteristic and the reliability of the devices are not affected by the applied cleaning conditions.
- 4.7.2. When an ultrasonic cleaning is applied to the mounted Varistors on PC Boards. Following conditions are recommended for preventing failures or damages of the devices due to the large vibration energy and the resonance caused by the ultrasonic waves.
  - (1) Frequency 29MHz max
  - (2) Radiated Power 20w/lithr max
  - (3) Period 5minuets max

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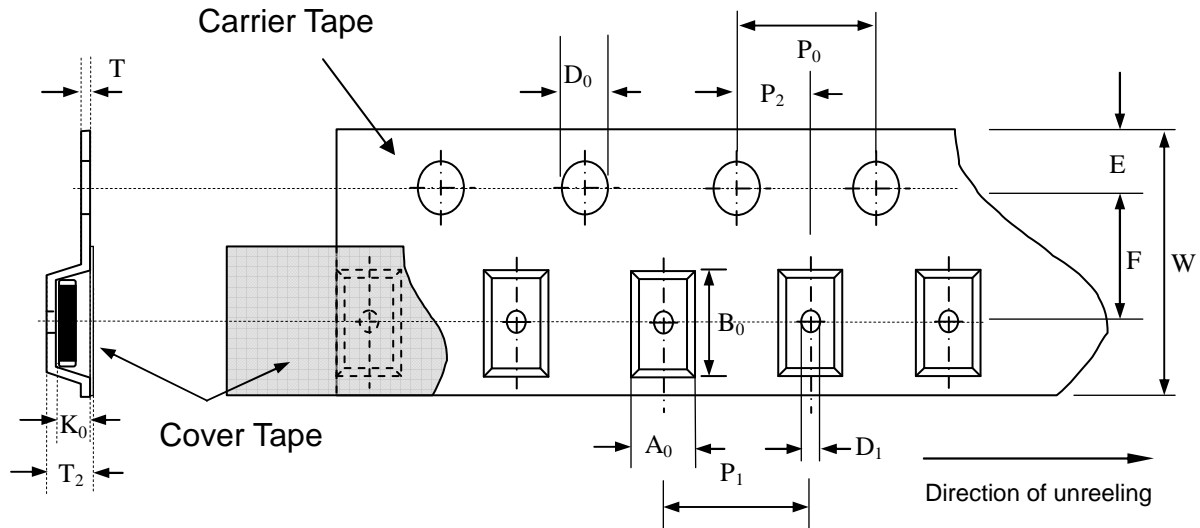


### 5. Packaging Specification

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.

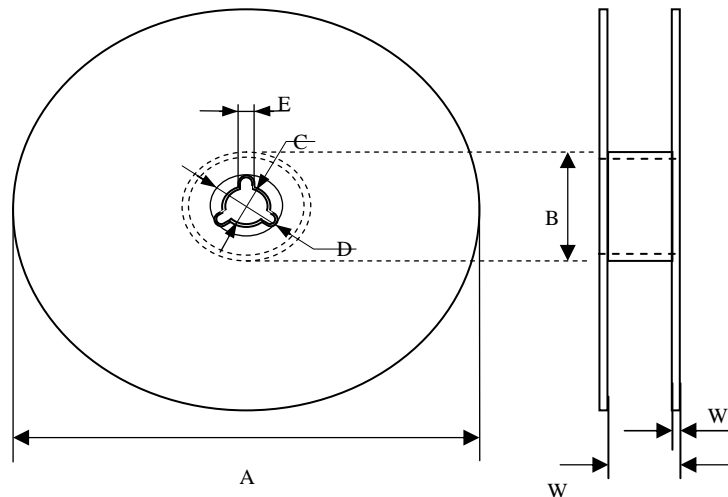
5.2 The adhesion of the heat-sealed cover tape shall be  $40 + 20 / - 15$ grams.

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.



Symbol	$A_0$ $\pm 0.10$	$B_0$ $\pm 0.10$	$K_0$ $\pm 0.1$ 0	T $\pm 0.05$	$T_2$ $\pm 0.05$	$D_0$ $+0.10$ $-0.00$	$D_1$ $\pm 0.05$	$P_1$ $\pm 0.10$	$P_2$ $\pm 0.05$	$P_0$ $\pm 0.05$	W $\pm 0.20$	E $\pm 0.10$	F $\pm 0.05$
Mm	5.5	8.5	2.0	1.0	0.1	0.1	1.5	8.0	2.0	4.0	16.0	1.75	7.5

### 6. Reel Dimension 1000pcs/reel



Symbol	A	B	C	D	E	W	W <sub>1</sub>
Unit(mm)	178±1	60±0.2	13±0.1	21±0.1	2.0±0.5	12±0.15	1.4±0.1

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