

OVER VOLTAGE PROTECTION SOLUTION



SFI Electronics Technology Inc.



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Company Profile

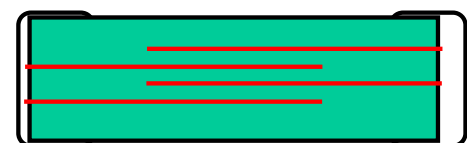
SFI is a professional manufacturer in full range over voltage products in mono-chip, multilayer chip, and advanced varistor. We have the largest production capability and production line of the over voltage protection components to supply customer the circuit protection in the world market.

Advanced Techniques Applied

In order to meet the market trend and fast market change, we build our R&D team to control reliability and stability of the products. We have been utilizing the advanced material and manufacturing techniques on producing the electronic elements and parts. In Taiwan, we are the first company to launch the Zinc Oxide based Ceramic Semiconductor devices with full range and with the highly advanced multilayer formation technologies to apply the high density circuit assemblies. We obtained many kinds of patents for excellent product designs. SFI's Varistors with high reliability can protect the electronics systems from over voltages by limited surge voltages and absorbing energy. They are used to safeguard the components to ensure more electromagnetic compatibility and to suppress transients caused by electrostatic discharge. In other words, they have the added advantage of greater surge current and energy handling capabilities as well as EMI / RFI attenuation. SFI's Varistors have established themselves as a secure and low-cost means of protection in general-purpose use.

Structure

Multilayer Surface Mount Varistors are made from semi-conducting ceramics by the highly advanced multilayer formation technologies, which could offer strong protection, excellent transient energy absorption and internal heat dissipation. The devices are leadless chip form. Eliminating lead inductance and guaranteeing a faster speed response time of less than 0.5ns, which make them fast enough to ensure reliable protection against ESD pulse and other specific transient events. These transient suppression devices are significantly smaller footprints and lower profiles than traditional zener diodes or radial MOVs,



Section of the chip



Type	Fig	Product	SFI P/N.	(mm)Max			Page	
				L	W	T		
Multilayer SMD Varistor		High Surge	1206ML-A	3.20 ± 0.20	1.60 ± 0.15	1.20 Max	8	
			1210ML-A	3.20 ± 0.20	2.50 ± 0.20	1.50 Max.	8	
			1812ML-A	4.50 ± 0.20	3.20 ± 0.20	2.00 Max.	8	
			2220ML-A	5.70 ± 0.20	5.00 ± 0.20	3.00 Max	8	
		Standard Surge	0402ML-C	1.00 ± 0.10	0.50 ± 0.10	0.50 ± 0.10	6-7	
			0603ML-C	1.60 ± 0.15	0.80 ± 0.15	0.90 Max	6-7	
			0805ML-C	2.00 ± 0.20	1.25 ± 0.15	1.00 Max	6-7	
			1206ML-C	3.20 ± 0.20	1.60 ± 0.15	1.20 Max	6-7	
			1210ML-C	3.20 ± 0.20	2.50 ± 0.20	1.50 Max.	6-7	
			1812ML-C	4.50 ± 0.20	3.20 ± 0.20	2.00 Max.	6-7	
		ESD	0201	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	9-10	
			0402	1.00 ± 0.10	0.50 ± 0.10	0.50 ± 0.10	9-10	
	0603		1.60 ± 0.15	0.80 ± 0.15	0.90 Max	9-10		
	0805		2.00 ± 0.20	1.25 ± 0.15	1.00 Max	9-10		
	SMD Varistor		High Voltage	08CH	8.10 ± 0.30	5.00 ± 0.30	2.50 Max	12
			Array	0405	1.37 ± 0.15	1.00 ± 0.15	0.66 Max.	17
0508				2.00 ± 0.20	1.25 ± 0.20	0.80 Max	13-14	
0612				3.20 ± 0.20	1.60 ± 0.15	0.95 Max	13-14	
		Low Cap.	0402	1.00 ± 0.10	0.50 ± 0.10	0.50 ± 0.10	11	
			0603	1.60 ± 0.15	0.80 ± 0.15	0.90 Max	11	
Dip Varistor			MOV	Φ 5、Φ 7、Φ 10、Φ 14、Φ 20、Φ 25、Φ 32、Φ 34、 Φ 40、Φ 53			15	



Type	Fig	Product	SFI P/N.	(mm)Max			Page
				L	W	T	
Gas Discharge Tube		Radial (3 Terminal)	3RM	6	8		19
			3R	8	10		19
		Radial (2 Terminal)	2RM	5.5	6		19
			2R	8	6		19
			2N	8	6/8		19
			2T	8	8/10		19
		SMD (3 Terminal)	3SM	5	7.2		19
			3SSM	5	7.2		19
		SMD (2 Terminal)	2SM	4	4.2		19
			2S	6	4.2		19
	SMD	4532	4.5	3.2		19	
EMI Filter		ESD+EMI	SEE0508	2.00 ± 0.2	1.25 ± 0.2	0.8 max	16-18
		EMI(Data)	SE0603	1.6 ± 0.2	0.8 ± 0.2	0.6 ± 0.2	16-18
			SE0805	2.0 ± 0.2	1.25 ± 0.2	0.6~1.2	16-18
			SE1206	3.2 ± 0.2	1.6 ± 0.2	1.5 Max	16-18
		EMI(Data Array)	SE0306	1.6 ± 0.1	0.8 ± 0.1	0.5 ± 0.1	16-18
			SE0508	2.0 ± 0.2	1.6 ± 0.2	0.5 ± 0.1	16-18
		EMI(Power)	SE0603	1.6 ± 0.2	0.8 ± 0.2	0.6 ± 0.2	16-18
			SE0805	2.0 ± 0.2	1.2 ± 0.2	0.6~1.2	16-18
			SE1206	3.2 ± 0.2	1.6 ± 0.2	1.5 Max	16-18
			SE1812	4.5 ± 0.3	3.2 ± 0.3	1.5 Max	16-18



•Introduction(簡介)

MLC/A Series

are metal oxide ceramic semiconductor resistor, which is based on zinc oxide (ZnO) as the main material, adding a variety of other trace elements, compound semiconductor nonlinear elements made of ceramic technology. It has a two-way symmetry, can be used to protect from the positive and negative directions transient surge voltages. Since the element is small, in response speed, large flow capacity, good temperature characteristics, which is widely used to inhibit engineering integrated circuits transient surge voltages, and automotive circuit protection.

MLC/A

MLV C/A系列是一種金屬氧化物陶瓷半導體電阻器，它是以(ZnO)為主體材料，添加多種其他微量元素，用陶瓷工藝製成的化合物半導體非線性元件。它具有雙向對稱性，可以用來保護來自正反方向的瞬態浪湧電壓。由於元件體積小，回應速度快，通流容量大，溫度特性好，因而被廣泛用於抑制積體電路中瞬態浪湧電壓，以及汽車電路保護等工程方面。

•Part No. Definition(編號定義)

Logo	Size (尺寸)	Series (系列)	Breakdown Voltage (崩潰電壓)	Series 系列
SFI	0402	ML	080	C
Logo	0402=1005(mm)		080=8x10 ⁰ =8(V)	C=Normal
	0603=1608(mm)		120=12x10 ⁰ =12(V)	A=Enhance
	0805=2012(mm)		101=10x10 ¹ =100(V)	
	1206=3212(mm)			
	1210=3225(mm)			
	1812=4532(mm)			
	2220=5250(mm)			



•Feature(功能)

- * Function (功能) : Surge protection(浪湧保護)
- * Size (尺寸) : 0402~2220
- * Fast Response <0.5nSec 快速反應時間
- * Wide range Working Voltage 寬工作電壓
- * Meet Lead Free 符合無鉛
- * Meet RoHS 符合RoHS需求
- * Bi-directional 雙向保護

•Application(應用)

- * Normal Low Freq. Single I/O (一般信號端口)
- * Integrated Circuit (晶片)
- * Consumer Device (消費性產品)
- * Industry Device(工控產品)

•Specification(規格)

Part NO.	Working Voltage (Max)		Breakdown Voltage	Peak Current (Max)	Clamping Voltage (Max)		Energy Absorption (Max)	Typical Capacitance (Reference)
	AC (V _{RMS})	DC (V)			(A)	(V)		
產品編號	工作電壓		擊穿電壓	瞬態電流	抑制電壓		能量吸收	電容值
Unit Condition	AC (V _{RMS})	DC (V)	1mA (V)	8/20 μs (A)	(A)	(V)	10/1000 μs (J)	1KHz (pF)
SFI0402ML080C-LF	4	5.5	8(7.5~10.5)	20	1	20	0.05	200
SFI0402ML080HC-LF	4	5.5	8(7.2~10.8)	20	1	16	0.05	480
SFI0402ML120C-LF	6	9	12(10.2~13.8)	20	1	24	0.05	135
SFI0402ML180C-LF	11	14	18(15.3~20.7)	20	1	35	0.05	50
SFI0402ML240C-LF	14	18	24(21.6~26.4)	20	1	40	0.05	45



Varistor Part Number Definition

Varistor ML-C/A Series

ML-C/A Series

Part NO.	Working Voltage (Max)		Breakdown Voltage	Peak Current (Max)	Clamping Voltage (Max)		Energy Absorption (Max)	Typical Capacitance (Reference)
	AC (V _{RMS})	DC (V)			(A)	(V)		
產品編號	工作電壓		擊穿電壓	瞬態電流	抑制電壓		能量吸收	電容值
Unit Condition	AC (V _{RMS})	DC (V)	1mA (V)	8/20 μs (A)	(A)	(V)	10/1000 μs (J)	1KHz (pF)
SFI0603ML080C-LF	4	5.5	8(7.5~10.5)	30	1	20	0.1	360
SFI0603ML120C-LF	6	9	12(10.2~13.8)	30	1	24	0.1	300
SFI0603ML180C-LF	11	14	18(15.3~20.7)	30	1	30	0.1	210
SFI0603ML240C-LF	14	18	24(21.6~26.4)	30	1	40	0.1	160
SFI0603ML270C-LF	17	22	27(24.3~29.7)	30	1	54	0.1	145
SFI0603ML390C-LF	25	30	39(35.1~42.9)	30	1	65	0.1	110
SFI0805ML080C-LF	4	5.5	8(7.5~10.5)	80	1	20	0.1	1400
SFI0805ML120C-LF	6	9	12(10.2~13.8)	80	1	24	0.1	650
SFI0805ML180C-LF	11	14	18(15.3~20.7)	100	1	30	0.1	350
SFI0805ML240C-LF	14	18	24(21.6~26.4)	100	1	39	0.1	300
SFI0805ML270C-LF	17	22	27(24.3~29.7)	100	1	44	0.2	250
SFI0805ML330C-LF	20	26	33(29.7~36.3)	100	1	54	0.3	220
SFI0805ML390C-LF	25	30	39(35.1~42.9)	100	1	65	0.3	200
SFI0805ML470C-LF	30	38	47(42.3~51.7)	100	1	77	0.3	150
SFI1206ML080C-LF	4	5.5	8(7.5~10.5)	100	1	20	0.2	3100
SFI1206ML180C-LF	11	14	18(15.3~20.7)	100	1	30	0.3	800
SFI1206ML240C-LF	14	18	24(21.6~26.4)	100	1	38	0.3	620
SFI1206ML270C-LF	17	22	27(24.3~29.7)	100	1	44	0.4	700
SFI1206ML330C-LF	20	26	33(29.7~36.3)	100	1	54	0.5	480
SFI1206ML390C-LF	25	30	39(35.1~42.9)	100	1	65	0.6	400
SFI1206ML470C-LF	30	38	47(42.3~51.7)	100	1	77	0.7	260
SFI1206ML560C-LF	35	45	56(50.4~61.6)	100	1	90	0.8	230
SFI1206ML680C-LF	40	56	68(61.2~74.8)	100	1	110	1.0	200
SFI1206ML820C-LF	50	65	82(73.8~90.2)	100	1	135	0.5	175
SFI1206ML101C-LF	60	85	100(90~110)	100	1	165	0.6	150
SFI1210ML240C-LF	14	18	24(21.6~26.4)	250	2.5	38	0.8	1150
SFI1210ML330C-LF	20	26	33(29.7~36.3)	250	2.5	54	1.2	610
SFI1210ML390C-LF	25	30	39(35.1~42.9)	250	2.5	65	1.4	920
SFI1210ML560C-LF	35	45	56(50.4~61.6)	250	2.5	90	2.0	400
SFI1210ML680C-LF	40	56	68(61.2~74.8)	250	2.5	110	2.3	300
SFI1210ML101C-LF	60	85	100(90~110)	200	2.5	165	1.4	210
SFI1812ML240C-LF	14	18	24(21.6~26.4)	500	5	38	1.7	2000
SFI1812ML560C-LF	35	45	56(50.4~61.6)	500	5	90	4.2	1000
SFI2220ML680C-LF	40	56	68(61.2~74.8)	1000	10	110	8.8	4000





• MLA Series (系列規格)

Part No.	Working Voltage (Max)		Breakdown Voltage	Peak Current (Max)	Clamping Voltage (Max)		Energy Absorption (Max)	Typical Capacitance (Reference)
	AC (V _{RMS})	DC (V)			(A)	(V)		
產品編號	工作電壓		擊穿電壓	瞬態電流	抑制電壓		能量吸收	電容值
Unit Condition	AC (V _{RMS})	DC (V)	1mA (V)	8/20 μs (A)	(A)	(V)	10/1000 μs (J)	1KHz (pF)
SFI1206ML180A-LF SFI1206ML240A-LF SFI1206ML330A-LF SFI1206ML390A-LF SFI1206ML470A-LF	11 14 20 25 30	14 18 26 30 38	18(15.3~20.7) 24(21.6~27.0) 33(29.7~36.3) 39(35.1~42.9) 47(42.3~51.7)	200 200 200 200 200	1 1 1 1 1	30 39 54 65 77	0.5 0.5 0.7 1.0 1.1	1200 780 700 510 440
SFI1210ML180A-LF SFI1210ML240A-LF SFI1210ML270A-LF SFI1210ML330A-LF SFI1210ML390A-LF SFI1210ML470A-LF	11 14 17 20 25 30	14 18 22 26 30 38	18(15.3~20.7) 24(21.6~27.0) 27(24.3~29.8) 33(29.7~36.3) 39(35.1~42.9) 47(42.3~51.7)	400 400 400 400 400 400	2.5 2.5 2.5 2.5 2.5 2.5	30 39 44 54 65 77	1.2 1.4 1.7 1.9 1.7 2.0	2000 1600 1500 880 800 530
SFI1812ML240A-LF SFI1812ML390A-LF SFI1812ML470A-LF SFI1812ML560A-LF	14 25 30 35	18 30 38 45	24(21.6~27.0) 39(35.1~42.9) 47(42.3~51.7) 56(50.4~61.6)	800 800 800 800	5 5 5 5	38 65 77 90	2.3 3.7 4.2 4.2	3500 2350 1600 1200
SFI2220ML240A-LF SFI2220ML270A-LF SFI2220ML390A-LF SFI2220ML470A-LF SFI2220ML560A-LF	14 17 25 30 35	18 22 30 38 45	24(21.6~27.0) 27(24.3~29.8) 39(35.1~42.9) 47(42.3~51.7) 56(50.4~61.6)	1200 1200 1200 1200 1200	10 10 10 10 10	39 44 65 77 90	5.8 7.2 9.6 12.0 12.0	8500 8300 6000 4000 3500



• Introduction(簡介)

MLE Series

is special designed for ESD transients protection. It meets IEC61000-4-2 ESD test Standard level 4 , There are several capacitance values to choose It also can used can be uaed as MLCC for EMI function when non- working status

MLE系列

特別是用於ESD瞬變設計的保護 它符合IEC 61000-4-2 ESD測試標準4 級，有多個電容值可供選擇，當在非工作狀態可以當成是MLCC作為電磁干擾功能使用。



• Part No. Definition(編號定義)

Logo	Size (尺寸)	Working Voltage (工作電壓)	Series (系列)	Capacitance (電容值)	Tolerance (誤差)	Lead Free (無鉛)
SFI	0402	050	E	330	NP	LF
	0201=0.6x0.3(mm)	050 = 5×10 ⁰ = 5(V)	MLE	330 = 33×10 ⁰ = 33(pF)	NP= ±30%	
	0402=1.0x0.5(mm)	120 = 12×10 ⁰ = 12(V)		2R5 = 2.5×10 ⁰ = 2.5(pF)	PP= +80-20 %	
	0603=1.6x0.8(mm)	240 = 24×10 ⁰ = 24(V)				
	0805=2.0x1.2(mm)					

• Feature(功能)

- * Cap. Control 電容值管控
- * Fast Response < 0.5nSec 快速反應速度
- * Low Working Voltage 低工作電壓
- * Low Leakage Current < 1 uA 低漏電流
- * Low Capacitance 0.05pF 低電容值
- * Low Clamping Voltage 低抑制電壓
- * Bi-directional 雙向保護

• Application(應用)

- * Normal Single I/O 一般數據端口
- * Audio / Video I/O 影音端口
- * USB 2.0/ USB3.0 數據端口
- * HDMI/ DP/DVI 高速影音端口
- * Vdd/ Reset 電源端口/復位端口

• Specification(規格)

0402 Size

Part No	Working Voltage	Clamping Voltage (max)	Leakage Current	Capacitance Volume	ESD Contact	ESD Air
產品編號	工作電壓	抑制電壓	漏電流	電容值	接觸放電能力	空氣放電能力
(Unit)	V _{DC} (Max)	V	uA(Max)	pF	KV	KV
SFI0402-050E101NP-LF	5	52	1	100	≥ 8	≥ 15
SFI0402-050E560NP-LF	5	52	1	56	≥ 8	≥ 15
SFI0402-050E330NP-LF	5	52	1	33	≥ 8	≥ 15
SFI0402-050E220NP-LF	5	52	1	22	≥ 8	≥ 15
SFI0402-050E100NP-LF	5	72	1	10	≥ 8	≥ 15
SFI0402-050E050PP-LF	5	72	1	4~9	≥ 8	≥ 15
SFI0402-120E101NP-LF	12	55	1	100	≥ 8	≥ 15
SFI0402-120E560NP-LF	12	55	1	56	≥ 8	≥ 15
SFI0402-120E330NP-LF	12	55	1	33	≥ 8	≥ 15
SFI0402-120E220NP-LF	12	55	1	22	≥ 8	≥ 15
SFI0402-120E100NP-LF	12	72	1	10	≥ 8	≥ 15
SFI0402-120E050PP-LF	12	72	1	4~9	≥ 8	≥ 15
SFI0402-240E2R5PP-LF	24	200	1	2~4.5	≥ 8	≥ 15
SFI0402240E3R0PP-LF	24	200	1	1.6~5.4	≥ 8	≥ 15
SFI0402-240E0R8PP-LF	24	200	1	0.8~1.5	≥ 8	≥ 15

Continue next page 接下頁



•Specification(規格)

0603 Size

Part No	Working Voltage	Clamping Voltage (Max)	Leakage Current	Capacitance Volume	ESD Contact	ESD Air
產品編號	工作電壓	抑制電壓	漏電流	電容值	接觸放電能力	空氣放電能力
(Unit)	V _{DC} (Max)	V	uA(Max)	pF	KV	KV
SFI0603-050E101NP-LF	5	36	1	100	≥ 8	≥ 15
SFI0603-050E560NP-LF	5	36	1	56	≥ 8	≥ 15
SFI0603-050E330NP-LF	5	34	1	33	≥ 8	≥ 15
SFI0603-050E220NP-LF	5	34	1	22	≥ 8	≥ 15
SFI0603-050E100NP-LF	5	65	1	10	≥ 8	≥ 15
SFI0603-050E050PP-LF	5	55	1	4~9	≥ 8	≥ 15
SFI0603-120E101NP-LF	12	55	1	100	≥ 8	≥ 15
SFI0603-120E560NP-LF	12	55	1	56	≥ 8	≥ 15
SFI0603-120E330NP-LF	12	55	1	33	≥ 8	≥ 15
SFI0603-120E220NP-LF	12	55	1	22	≥ 8	≥ 15
SFI0603-120E100NP-LF	12	60	1	10	≥ 8	≥ 15
SFI0603-120E050PP-LF	12	85	1	4~9	≥ 8	≥ 15
SFI0603-240E2R5PP-LF	24	240	1	2~4.5	≥ 8	≥ 15
SFI0603-240E3R0PP-LF	24	240	1	1.6~5.4	≥ 8	≥ 15
SFI0603-240E0R8PP-LF	24	200	1	0.8~1.5	≥ 8	≥ 15

0201 Size

Part No	Working Voltage	Clamping Voltage (Max)	Leakage Current	Capacitance Volume	ESD Contact	ESD Air
產品編號	工作電壓	抑制電壓	漏電流	電容值	接觸放電能力	空氣放電能力
(Unit)	V _{DC} (Max)	V	uA(Max)	pF	KV	KV
SFI0201-050E330NP-LF	5	48	1	33	≥ 8	≥ 15
SFI0201-050E100NP-LF	5	72	1	10	≥ 8	≥ 15
SFI0201-050E050PP-LF	5	72	1	0.5	≥ 8	≥ 15
SFI0201-120E2R5PP-LF	12	130	1	2.5	≥ 8	≥ 15
SFI0603-120E0R8PP-LF	12	200	1	0.8	≥ 8	≥ 15
SFI0603-120E0R4PP-LF	12	200	1	0.4	≥ 8	≥ 15

0805 Size

Part No	Working Voltage	Clamping Voltage (Max)	Leakage Current	Capacitance Volume	ESD Contact	ESD Air
產品編號	工作電壓	抑制電壓	漏電流	電容值	接觸放電能力	空氣放電能力
(Unit)	V _{DC} (Max)	V	uA(Max)	pF	KV	KV
SFI0805-120E560NP-LF	12	60	1	56	≥ 8	≥ 15



•Introduction(簡介)

EH Series

is special designed for ESD transients protection. It meets IEC61000-4-2 ESD test Standard level 4 . the capacitance value is under 1 pF that can apply for ultra high speed data line .

EH系列

特別是用於ESD瞬變設計的保護 它符合IEC 61000-4-2 ESD測試標準4 級，其電容值皆小於1pF，可以應用較高速的訊號線上。



•Part No. Definition(編號定義)

Logo	Size (尺寸)	Function (功能)	Working Voltage (工作電壓)	Capacitance (電容值)	Inner Code (內部碼)
SFI	0402	EH	240	0R20	P
	0402=1.0x0.5(mm)	ESD for High Speed	060 = $6 \times 10^0 = 6(V)$	0R20 = $0.2 \times 10^0 = 0.2(pF)$	
	0603=1.6x0.8(mm)		120 = $12 \times 10^0 = 12(V)$		
			240 = $24 \times 10^0 = 24(V)$		

•Feature(功能)

- * ESD function(ESD 功能)
- * 0402~0603
- * Capacitance value <1pF(電容值小於1pF)
- * Meet IEC61000-4-2 Level 4 ESD standard
- * Meet RoHS Requirement

•Application(應用)

- * USB3.0 /HDMI /DP
- * Antenna (天線)
- * Differential Signal (差分訊號線)

•Specification(規格)

Part No.	Working Voltage	Typical ESD Trigger Voltage	Typical ESD Clamping Voltage after 30ns	Leakage Current at V_{DC} (At initial state)	Leakage Current at V_{DC} (After ESD Test)	Cap. Value At 1MHz
Unit	$V_{DC}(max)$	V_T	$V_{clamp}(max)_2$	$I_{LDC}(\mu A)$	$I_{LDCA}(\mu A)$	pF
0402 Size						
SFI0402EH060-0R20P	6	300	30	0.050	10	0.2~0.3
SFI0402EH120-0R20P	12	300	30	0.050	10	0.2~0.3
SFI0402EH240-0R20P	24	300	30	0.050	10	0.2~0.3
0603 size						
SFI0603EH060-0R20P	6	300	30	0.050	10	0.2~0.4
SFI0603EH120-0R20P	12	300	30	0.050	10	0.2~0.4
SFI0603EH240-0R20P	24	300	30	0.050	10	0.2~0.4

Ultra Low Capacitance Series



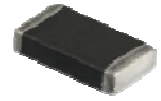
•Introduction(簡介)

CH Series

is special designed for surge transients protection. It meet IEC61000-4-5 surge test standard , It provides the SMD package for high working voltage like AC power application .

CH系列

特別是用於Surge(浪湧)突波保護設計的方案，它符合IEC 61000-4-5 標準，且提供SMD 封裝方式可以用於較高電壓的AC電源應用。



•Part No. Definition(編號定義)

Logo	Size (尺寸)	Series (系列)	Breakdown Voltage (崩潰電壓)	Inner Code (內部碼)	Lead Free (無鉛)
SFI	08 08=3.2x2.0(mm)	CH CH	560 560 = 56×10 ⁰ = 56V 271 = 27×10 ¹ = 270V	KB	LF

•Feature(功能)

- * Surge protection (浪湧功能)
- * Size 3220
- * Breakdown voltage 56V~470V(崩壓範圍)
- * Meet RoHS Requirement

•Application(應用)

- * AC Power
- * Industry Control 工控應用

•Specification(規格)

Part NO.	Working Voltage		Breakdown Voltage	Clamping Voltage		Peak Current	Energy	Capacitance (Reference)	Thickness
	交流	直流		A	V				
料號	交流	直流	崩潰電壓	抑制電壓	峰值電流	能量	電容值	厚度	
Symbol	AC	DC	V (1mA)	A	V	A	J	PF(1KHz)	mm
08CH560KB-LF	35	45	56(50.4~61.6)	5	106	500	> 2.50	1250	1.5 max
08CH680KB-LF	40	56	68(61.2~74.8)	5	124	500	> 3.20	1050	1.5 max
08CH121KB-LF	75	102	120(108~132)	10	198	500	> 6.00	600	1.5 max
08CH151KB-LF	95	127	150(135~165)	10	248	500	> 7.50	470	1.5 max
08CH241KB-LF	150	200	240(216~264)	10	390	500	> 14.5	380	1.7 max
08CH271KB-LF	175	225	270(243~297)	10	450	500	> 16.0	340	1.7 max
08CH391KB-LF	250	330	390(351~429)	10	647	500	> 20.0	125	2.2 max
08CH431KB-LF	275	369	430(387~473)	10	705	450	> 21.0	120	2.2 max
08CH471KB-LF	300	385	470(423~ 517)	10	775	400	> 21.6	115	2.2 max



Varistor Part Number Definition

Array Series

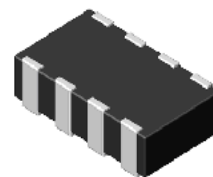
•Introduction(簡介)

Array Series

is special designed for ESD transients protection. It meets IEC61000-4-2 ESD test standard , It provide the multi-channel for signal data line ESD protection .

Array系列

特別是用於ESD(靜電)突波保護設計的方案，它符合IEC 61000-4-2標準，且提供多通道包裝方式可以應用於多條數據線同時ESD保護應用。



•Part No. Definition(編號定義)

Logo	Size (尺寸)	Working Voltage (工作電壓)	Series (系列)	Capacitance (電容值)	Tolerance (誤差)	Type (結構)	ports (通道)	Lead Free (無鉛)
SFI	0508 0508=1.2x2.0(mm)	050 050=5V	S	100 $100 = 10 \times 10^0$	NP NP=± 30%	A A M	4 4 ports 8 ports	LF

•Feature(功能)

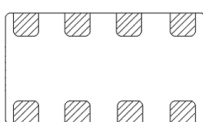
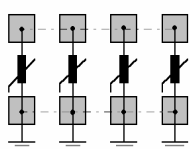
- * ESD protection (靜電保護功能)
- * Size 0405,0508,0612
- * Meet IEC61000-4-2 Level 4 ESD standard
- * Meet RoHS Requirement

•Application(應用)

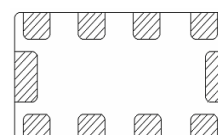
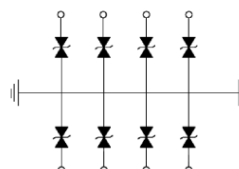
- * Mobile (手機)
- * Consumer(消費性產品)
- * Computer(電腦周邊產品)

Array Series

•Inner Structure (內部結構)



Type A



Type M

•Specification(規格)

Part NO.	Working Voltage	Breakdown Voltage	Clamping Voltage	Leakage Current	Insulation Resistance	Capacitance Value
產品編號	工作電壓	崩潰電壓	抑制電壓	漏電流	絕緣阻抗	電容值
Symbol	DC	V_{BDV}	V	uA	M ohm	pF
SFI0508-050S100NP-A4-LF	5 (Max)	24	< 60	< 5	>10	10
SFI0508-050S500NP-A4-LF	5 (Max)	18~28	<50	<1.0	>10	50
SFI0508-180S070NP-M8-LF	18 (Max)	26~36	<65	<2	>10	7





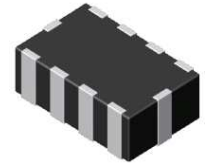
•Introduction(簡介)

SEE Series

is special designed for ESD+EMI transients protection. It meets IEC61000-4-2 ESD test standard , It provide the muti-channel for signal data line ESD protection .

SEE 系列

特別是用於ESD(靜電) +EMI 突波保護設計的方案，它符合IEC 61000-4-2 標準，且提供多通道包裝方式可以應用於多條數據線同時ESD保護應用。



•Part No. Definition(編號定義)

Logo	Series (系列)	Size (尺寸)	Working Voltage (工作電壓)	Series (系列)	Cut off Frequency (截止頻率)	Tolerance (誤差)	Type (架構)	port (通道)	Lead Free (無鉛)
S	EE	0508	050	E	100	MP	M	4	LF
SFI	EMI+ESD		050=5V		100 = 100MHz	MP=± 25%	M=LC R=RC	4 ports	

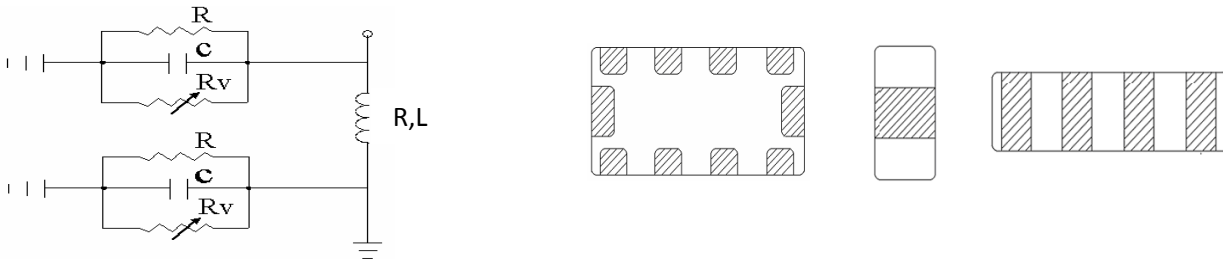
•Feature(功能)

- * Dud Function protection,EMI,ESD protection Filter (雙功能保護功能)
- * Size 0405,0508,0612
- * Meet IEC61000-4-2 Level 4 ESD standard
- * Meet RoHS Requirement

•Application(應用)

- * Mobile (手機)
- * Consumer(消費性產品)
- * Computer(電腦周邊產品)

•Structure(內部結構)



•Specification(規格)

LC Type

Part NO.	Working Voltage	Cut Off Frequency	Attenuation at 800~2000MHz	Breakdown Voltage	Clamping @8/20 μS	Capacitance Value	Inductance value	ESD Wthstanding capability
產品編號	工作電壓	截止頻率	衰減程度	崩潰電壓	抑制電壓	電容值	電感值	ESD能力
Symbol	V(Max)	MHz	dB	Vb	Vcp	pF	nH	KV
SEE0508-050E300MP-M4-LF	5	300	<-20	55~70	<110	10~20	7.5~12.5	>8

RC Type

Part NO.	Working Voltage	Cut Off Frequency	Attenuation at 1000-3000MHz	Breakdown Voltage	Clamping @8/20 μS	Capacitance Value	Resistor	ESD Wthstanding capability
產品編號	工作電壓	截止頻率	衰減程度	崩潰電壓	抑制電壓	電容值	電阻值	ESD能力
Symbol	V(Max)	MHz	dB	Vb	Vcp	pF	Ohm	KV
SEE0508-050E350MP-R4-LF	5	350	<-20	35-55	80	15	100	>8



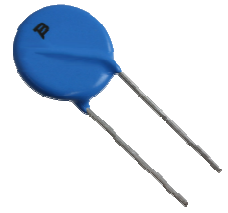
•Introduction(簡介)

MOV Series

is special designed for high voltage At power line for surge protection .

MOV 系列

特別是用於交流電源Surge(雷擊)突波保護設計的方案



•Part No. Definition(編號定義)

Dimension (尺寸)	Size (尺寸)	Breakdown Voltage (擊穿電壓)	Tolerance (誤差)	Energy (能量)	Lead Type (系列)	Package (包裝)
14	D	241	K	H	A	R
	D= Disk	241=24x10 ¹ (V)	K=± 10%	S=Standard	A=Straight	R=Bulk
	S=Square		L=± 15%	H High Surge	B=Outside crimped	A=Reel
	B=Block				C=Vertical	

•Feature(功能)

- * Surge Protection (雷擊保護功能)
- * Size 5D~53D
- * Meet IEC61000-4-5 Surge standard
- * Meet RoHS Requirement

•Application(應用)

- * AC power (交流電源)
- * Industry (工控產品)

•Specification(規格)

Part No.	Working Voltage	Breakdown Voltage	Clamping Voltage	Peak Current	Energy	Capacitance
Symbol	AC	V (1mA)	V	A	J	pF(KHz)
05D180L~05D561K	11~350	18~560	40~920	100/400	0.4~16	1400~45
07D180L~07D681K	11~420	18~680	36~1120	250/1200	0.9~33	2800~75
10D180L~10D112K	11~680	18~1100	36~1815	500/2500	2.1~115	5600~90
14D180L~14D182K	11~1000	18~1800	36~2970	1000/4500	4.0~250	11100~130
20D180L~20D182K	11~1000	18~1800	18~1800	2000/6500	11~625	28500~260
25D201K~25D112K	130~680	200~680	200~1100	15000	190~770	3200~600
32D201K~32D112K	130~680	200~1100	340~1815	25000	210~750	5200~1000
40D201K~40D112K	130~680	200~1100	340~1815	40000	310~1155	8400~1600
53D201K~53D112K	130~680	200~1100	340~1815	70000	490~2500	15000~2700
34S201K~34S162K	130~10000	200~1600	340~2640	40000	330~1500	8000~1100

Part No.	Working Voltage	Breakdown Voltage	Clamping Voltage	Peak Current	Energy	Capacitance
Symbol	AC	V (1mA)	V	A	J	pF(KHz)
05D180LH~05D561KH	11~350	18~560	40~920	250/800	0.6~24	1400~45
07D180LH~07D681KH	11~420	18~680	36~1120	500/1750	2.0~60	2800~75
10D180LH~10D112KH	11~680	18~1100	36~1815	1000/3500	3.0~155	5600~90
14D180LH~14D182KH	11~1000	18~1800	36~2970	2000/6000	7.0~335	11100~130
20D180LH~20D182KH	11~1000	18~1800	18~1800	3000/10000	13~660	28500~320
25D201KH~25D112KH	130~680	200~680	36~1815	4500/15000	20~970	3200~600
34B201KH~34B112KH	130~680	200~1100	340~1815	40000	330~1250	8000~1520
60B201KH~60B112KH	130~680	200~1100	340~1815	70000	550~2050	150000~2700



•Introduction(簡介)

EMI Series

is special designed for EMI noise filter for data line and power line .

EMI 系列

特別是用於訊號端及電源端雜訊抑制功能



•Part No. Definition(編號定義)

Logo	Series (系列)	Size (尺寸)	Working Voltage (工作電壓)	Series (系列)	Cut off 截止頻率	Tolerance (誤差)	Lead Free (無鉛)
S	E	0603	160	A	100	MP	LF
SFI	EMI	0805	160=16V	J	100 = 100M Hz	MP=± 20%	
		1206	250=25V	U		NP=± 30%	
				K			

•Specification(規格)

Part Number	Cut Off Frequency	Capacitance	Working Voltage	Rated Current	Insulation Resistance
產品編號	(MHz)	(pF)	DC (V)	DC (mA)	(MΩ)
Size 0603					
SE0603-160A020NP-LF	20	68.0±25%	16	200	Min. 1×10 ³
SE0603-160A050NP-LF	50	55.0±25%	16	200	Min. 1×10 ³
SE0603-160A100NP-LF	100	35.0±25%	16	200	Min. 1×10 ³
SE0603-160A200NP-LF	200	24.0±25%	16	200	Min. 1×10 ³
SE0603-160A400NP-LF	400	9.5±25%	16	200	Min. 1×10 ³
Size 0805					
SE0805-250J020NP-LF	20	330±25%	25	200	Min. 1×10 ³
SE0805-250J050NP-LF	50	130±25%	25	200	Min. 1×10 ³
SE0805-250J100NP-LF	100	70±25%	25	200	Min. 1×10 ³
SE0805-250J200NP-LF	200	22±25%	25	200	Min. 1×10 ³
SE0805-250J400NP-LF	400	16±25%	25	200	Min. 1×10 ³
SE0805-250U180NP-LF	180	35±30%	25	200	Min. 1×10 ⁴
SE0805-250U360NP-LF	360	18±30%	25	200	Min. 1×10 ⁴
SE0805-250U530NP-LF	530	12±30%	25	200	Min. 1×10 ⁴
Size 1206					
SE1206-250K020MP-LF	20	340±20%	25	200	Min. 1×10 ⁴
SE1206-250K030MP-LF	30	190±20%	25	200	Min. 1×10 ⁴
SE1206-250K070MP-LF	70	85±20%	25	200	Min. 1×10 ⁴
SE1206-250K140MP-LF	140	45±20%	25	200	Min. 1×10 ⁴
SE1206-250K320MP-LF	320	20±20%	25	200	Min. 1×10 ⁴
SE1206-250K660NP-LF	660	10±30%	25	200	Min. 1×10 ⁴



•Part No. Definition(編號定義)

Logo	Series (系列)	Size (尺寸)	Structure (結構)	Capacitance (電容值)	Resistance (電阻)	Tolerance (誤差)
S	E	1206	C	220	R550	NP
		1206=3.2x1.6(mm)	C=RC	220=22X10 ⁰ =22	550=55(ohm)	NP=+ 50% -20%

•Specification(規格)

Part NO.	Capacitance	Capacitance	DC Resistance	Resistance	Insulation Resistance
	(pF)	Tolerance(%)	(ohm)	Tolerance (%)	(MΩ)
SE1206C220R500NP	22	+50%, -20%	50	+30%, -30%	1000 Min.
SE1206C220R101NP	22		100		
SE1206C470R500NP	47		50		
SE1206C470R101NP	47		100		
SE1206C101R500NP	100		50		
SE1206C101R101NP	100		100		
SE1206C221R500NP	220		50		
SE1206C221R101NP	220		100		

•Part No. Definition(編號定義)

Logo	Series (系列)	Size (尺寸)	Working Voltage (工作電壓)	Structure (結構)	Cut off Freq. (截止頻率)	Tolerance (誤差)	pore (通道)	LF (無鉛)
S	E	0306	160	S	100	NP	A4	LF
		0306=0.8x1.6(mm) 0508=1.2x2.0(mm)	160=16(V)	S=array	100=100M Hz	NP=±25%	A4= 4ports	

•Specification(規格)

Part NO.	Rated Voltage	Cut Off Frequency	Rated Current	Capacitance Tolerance	Insulation Resistance
	(DC V)	(MHz)	DC (mA)	(pF)	(MΩ)
SE0306-160S050NP-A4-LF	16	50	200	20±25%	10 Min.
SE0306-160S100NP-A4-LF	16	100	200	20±25%	10 Min.
SE0306-160S300NP-A4-LF	16	300	200	12±25%	10 Min.
SE0508-160S100NP-A4-LF	16	100	200	12±25%	10 Min.
SE0508-160S200NP-A4-LF	16	200	200	24±25%	1000 Min.
SE0508-160S300NP-A4-LF	16	300	200	22±25%	1000 Min.
SE0508-160S400NP-A4-LF	16	400	200	18±25%	1000 Min.



EMI Solution Device

EMI Filter (Power Line)

•Part No. Definition(編號定義)

Logo	Series (系列)	Size (尺寸)	Working Voltage (工作電壓)	Rating (電流)	Capacitance (電容值)	Tolerance (誤差)	LF (無鉛)
S	E	0805	250	C	220	NP	LF
		0603=1.6x0.8(mm)	250=25(V)	C=2A	220=22x10 ⁰ =22	NP=±25%	
		0805=2.0x1.2(mm)		F=4A	101=10x10 ¹ =100		
		1206=3.2x1.6(mm)			223=22x10 ³ =22000		
		1812=4.5x3.2(mm)					

•Specification(規格)

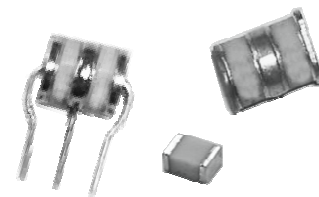
Part Number	Capacitance	Rated Voltage	Rated Current	DC Resistance	Insulation Resistance
	(pF)	(DC V)	DC (A)	(mΩ)	(MΩ)
SE0603-250C220NP-LF	22	25	2	60max	1000 Min.
SE0603-250C470NP-LF	47	25	2	60max	1000 Min.
SE0603-250C101NP-LF	100	25	2	60max	1000 Min.
SE0603-250C221NP-LF	220	25	2	60max	1000 Min.
SE0603-250C471NP-LF	470	25	2	60max	1000 Min.
SE0603-250C102NP-LF	1000	25	2	60max	1000 Min.
SE0603-250C222NP-LF	2200	25	2	60max	1000 Min.
SE0603-250C332NP-LF	3300	25	2	60max	1000 Min.
SE0603-160C223NP-LF	22000	16	2	60max	1000 Min.
SE0603-160C104NP-LF	100000	16	2	60max	1000 Min.
SE0805-500C220NP-LF	22	50	2	60max	1000 Min.
SE0805-500C470NP-LF	47	50	2	60max	1000 Min.
SE0805-500C101NP-LF	100	50	2	60max	1000 Min.
SE1206-250C221NP-LF	220	25	2	60max	1000 Min.
SE1206-250C471NP-LF	470	25	2	60max	1000 Min.
SE1206-250C102NP-LF	1000	25	2	60max	1000 Min.
SE1206-250C 222NP-LF	2200	25	2	60max	1000 Min.
SE1206-250C272NP-LF	2700	25	2	60max	1000 Min.
SE1206-250C332NP-LF	3300	25	2	60max	1000 Min.
SE1206-250C103NP-LF	10000	25	2	60max	1000 Min.
SE1206-250C104NP-LF	100000	25	2	60max	1000 Min.
SE1206-250F222NP-LF	2200	25	4	60max	1000 Min.
SE1206-160F104NP-LF	100000	16	4	60max	1000 Min.
SE1206-500C220NP-LF	22	50	2	60max	1000 Min.
SE1206-500C470NP-LF	47	50	2	60max	1000 Min.
SE1206-500C101NP-LF	100	50	2	60max	1000 Min.
SE1206-500C221NP-LF	220	50	2	60max	1000 Min.
SE1206-500C471NP-LF	470	50	2	60max	1000 Min.
SE1206-500C102NP-LF	1000	50	2	60max	1000 Min.
SE1206-350C222NP-LF	2200	35	2	60max	1000 Min.
SE1206-250C272NP-LF	2700	25	2	60max	1000 Min.
SE1206-250C332NP-LF	3300	25	2	60max	1000 Min.
SE1206-250C103NP-LF	10000	25	2	60max	1000 Min.
SE1206-250C104NP-LF	100000	25	2	60max	1000 Min.
SE1206-250F272NP-LF	2700	25	4	60max	1000 Min.
SE1206-250F332NP-LF	3300	25	4	60max	1000 Min.
SE1206-250F103NP-LF	10000	25	4	60max	1000 Min.
SE1206-250F104NP-LF	100000	25	4	60max	1000 Min.
SE1812-500F471NP-LF	470	50	4	30max	1000 Min.
SE1812-500F102NP-LF	1000	50	4	30max	1000 Min.
SE1812-500F222NP-LF	2200	50	4	30max	1000 Min.
SE1812-250F682NP-LF	6800	25	4	30max	1000 Min.



Gas Discharge Tube Arrestor

•Part No. Definition(編號定義)

Series (系列)	Breakdown Voltage (擊穿電壓)	Dimension (尺寸)	Length (長度)	Lead Type (系列)	Package (包裝)
2N	600	B	8		A
2RM = 2 elements mini series	70=70V	A=5.5 mm	4=4mm	B=No lead type	B=Box
2R= 2 elements standard series	145=145V	B=8 mm	6=6mm	L=Axial	A=Taping & Ammo
2N= 2 elements high current series	6000=6000V		8=8mm	C=Radial	R=Taping & Reel
2T=2 elements switching series			10=10mm		
2SM = 2 elements surface mount mini series					
2S= 2 elements surface mount series					
3R= 3 elements standard series					
3SM = 3 elements surface mount mini series					
3SSM = 3 elements surface mount symmetrical series					
4532 = 2 elements chip SMD series					
20B = 2 elements power protection arrester B series					



•Specification(規格)

Product	Series	Sige	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage		Maximum Impulse Discharge current (8/20 μs) (KA)		Impulse Life (10/1000μs) (100A)	DC Holdover Voltage (V)	Capacitance (1MHz 1V) (pF)
				100v/μs	1000v/μs	1times	10times			
2 Elements Mini Series			100V/s	100v/μs	1000v/μs	1times	10times	times	<150ms	
	2RM (standard)	5.5*6mm	70~800	700~1500	800~1700	5~10	2.5~5	500	52~150	1
	2RM (High Voltage)	5.5*6mm	1000~3600	1600~4400	1800~4600	3	1.5	300	150	1
	2R(Standard)	8*6mm	70~800	500~1300	600~1500	10~15	5~10	500	52~150`	1.5
	2R (High voltage)	8*8mm	600~6000	1000~7000	1100~7800	5~8	3~5	100	52~150`	1.5
	2N (High current)	8*6mm	70~600	500~1100	600~1300	20	15	500	52~150	1.5
2 Elements Surface Mount Mini Series										
	2SM	4*4.2mm	75~600	700~900	800~1000	5	3	300	52~150	0.5
	2S	6.2*4.2mm	75~800	600~900	700~1000	8	5	500	52~150	0.8
	2S (High Voltage)	6.2*4.2mm	1000~3000	1500~3600	1600~3700`	5	3	300	52~150	0.8
3 Elements Mini Series										
	3RM	6*8mm	90~600	750~900	850~1000	5~10	5~10	100	52~150	2
3 Elements Standard Series										
	3R	8*10mm	75~600	600~1200	700~1500	20	20	130	52~150	2
3 Elements Surface Mount Mini Series										
	3SM	5.0*7.2mm	75~1100	600~1450	700~1750	10~15	5~10	300	52~150	0.5
	3SSM	5.0*7.2mm	230~1100	230~1100	700~1750	10	5	300	135	2
2 ELEMENTS Surface Mount Chip Series					10/700μs			8/20 μs		
	4532	34532	75~600	2000	4KV	2000		100A		0.5
	3216	3216	150~600		4KV	2000		50A		0.3



Characteristic Definiton

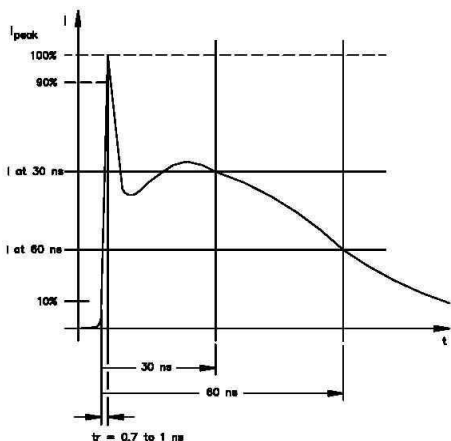
•Definition(參數定義)

Characteristics	Test Method or Description
Max. Working Voltage	Maximum steady-state DC operating voltage the device can maintain and typical leakage current at 25°C not exceed 50 μ A.
Varistor Voltage (BDV)	With the specified measuring current of 1mA DC applied. Tolerance of breakdown voltage: 5~8V= \pm 20%; 12~18V= \pm 15%; 18~430V= \pm 10%
Max. Clamping Voltage	Maximum peak voltage across the TVS measured at a specified pulse current (A) and waveform 8/20 μ s.
Surge Current	Maximum peak current within varistor voltage change of \pm 10% may be applied with the specified waveform 8/20 μ s.
Surge Shift Δ V/V	The shift of Varistor voltage after suffering the specified surge current.
Energy Absorption	Maximum energy within the varistor voltage change of \pm 10% may be dissipated with a specified waveform 10/1000 μ s .
Typical Capacitance	Device Capacitance measured with the zero voltage bias 0.5V _{RMS} 1KHz; under 100pf measure at 1MHz; Surge series the capacitance is only for reference. The tolerance is 100%
Nonlinear exponent α	$\alpha = [\log (V_{1mA} / V_{0.1mA}) / \log (I_{1mA} / I_{0.1mA})]$
Leakage Current	Typical leakage current at 25°C < 50 μ A; Maximum leakage 200 μ A
Cut-off Frequency	It is named of cut-off frequency for the frequency of -3dB insertion loss.

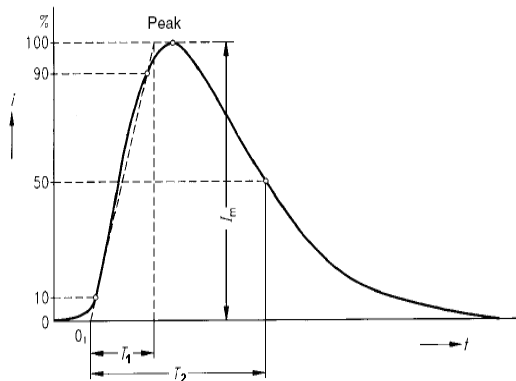
※Standard Test Condition :

Environmental condition under which every measuring is done without doubt on the measuring results.
 Unless specially specified, temperature, relative humidity are 5 to 35°C, 45 to 85% RH.

※ ESD protection waveform current



※ 8/20 μ s waveform current (A)



IEC 61000-4-5, EN 61000-4-5, This generator complies with UL 1449 August 15, 1996 Table B1.1



Typical Test

N O .	Item	Requirement	Test Condition
1	High temperature Storage	1.No mechanical damage 2.Varistor voltage change: $\pm 10\%$	1.Temperature : $125^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 2.Time : 1000 ± 2 hour 3.Test after placing in ambient temperature for 24 hours
2	Temperature cycle	1.No mechanical damage 2.Varistor voltage change: $\pm 10\%$	1.Step 1 : $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$; time : 30 ± 3 min 2.Step 2 : 25°C , time : 1hour 3.Step 3 : $125^{\circ}\text{C} \pm 3^{\circ}\text{C}$; Time : 30 ± 3 min 4.Step 4 : 25°C , time : 1hour 5.number of cycle : 5times 6.Test after placing in ambient temperature for 24 hours
3	High temp load	1.No mechanical damage 2.Varistor voltage change: $\pm 10\%$	1.Temperature: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 2.Rated working voltage Applied 3.Time : 1000 ± 2 hours 4.Test after placing in ambient temperature for 24 hours
4	Humidity load	1.No mechanical damage 2.Varistor voltage change: $\pm 10\%$	1.Temperature : $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 2.Humidity : $90 \sim 95\%$ RHmax. 3.Time : 1000 hours 4.Test after placing in ambient temperature for 24 hours
5	Low temperature storage	1.No mechanical damage 2.Varistor voltage change: $\pm 10\%$	1.Temperature : $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$; 2.time : 500 ± 2 hour 3.Test after placing in ambient temperature for 24 hours

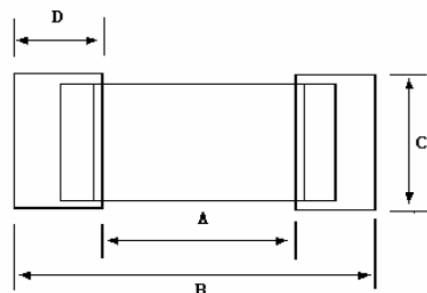


Recommendation for Solderability

•Recommended Solder Pad Layout :

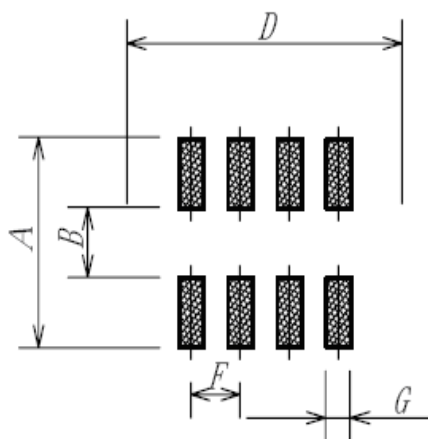
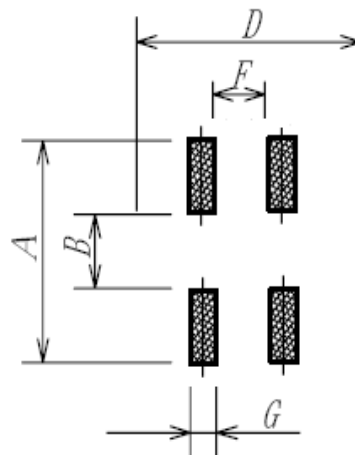
ML, ESD, CH, Low Cap.

	A (mm)	B (mm)	C (mm)	D (mm)
0201	0.25~0.35	0.65~0.95	0.25~0.35	0.3~0.6
0402	0.4~0.6	1.4~1.8	0.5~0.6	0.6~1.2
0603	0.9~1.2	2.7~3.2	0.7~1.0	0.9~1.2
0805	1.0~1.5	2.6~3.2	1.2~1.5	1.1~1.8
1206	1.8~2.5	4.2~5.2	1.2~1.8	1.2~1.8
1210	1.8~2.5	4.2~5.2	2.2~3.0	1.3~2.0
1812	2.5~3.3	5.5~6.7	2.8~3.6	1.3~2.2
2220	3.8~4.6	6.6~7.8	4.8~5.5	1.3~2.2
08CH	5.2~6.4	9.5~10.8	5.0~6.0	2.0~2.8



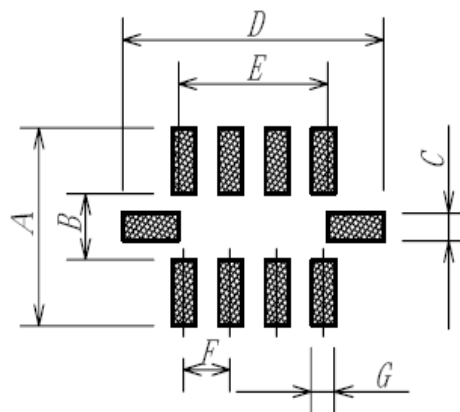
Array,SEE,SE

	0405A2	0508A4	0612A4	0508M4	0306M4
A	1.20	2.10	2.60	2.00	1.20
B	0.28	0.40	0.80	0.60	0.50
C	---	---	---	0.25	0.20
D	1.80	2.50	3.60	2.50	2.40
E	---	---	---	1.60	1.20
F	0.34	0.50	0.80	0.50	0.40
G	0.30	0.35	0.50	0.25	0.20



0508A4

0612A4



0508M4

0306M4



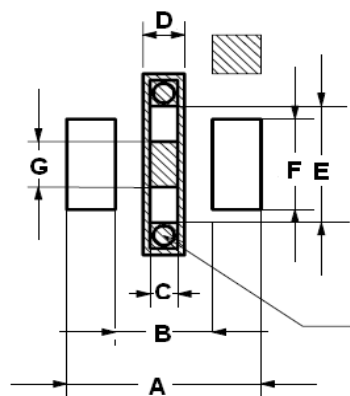
Recommendation for Solderability

Recommended Solder Pad Layout :

SE

(unit : mm)

	0603	0805	1206	1812
A	2.40	2.80	5.00	6.50
B	1.20	1.40	2.40	3.50
C	0.40	0.40	1.00	0.80
D	0.60	0.60	1.00	1.00
E	1.40	1.80	2.80	5.00
F	1.00	1.40	1.80	3.00
G	0.50	0.70	1.40	---



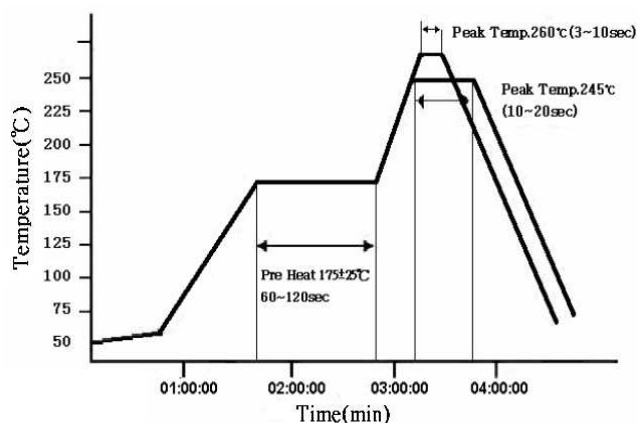
Soldering Recommendations :

Material	Sn/Ag/Cu 96/3.5/0.5 or equivalent
Temperature	260°C, 10 seconds max
Flux	None Activated.

Major Point of SMT Reflow :

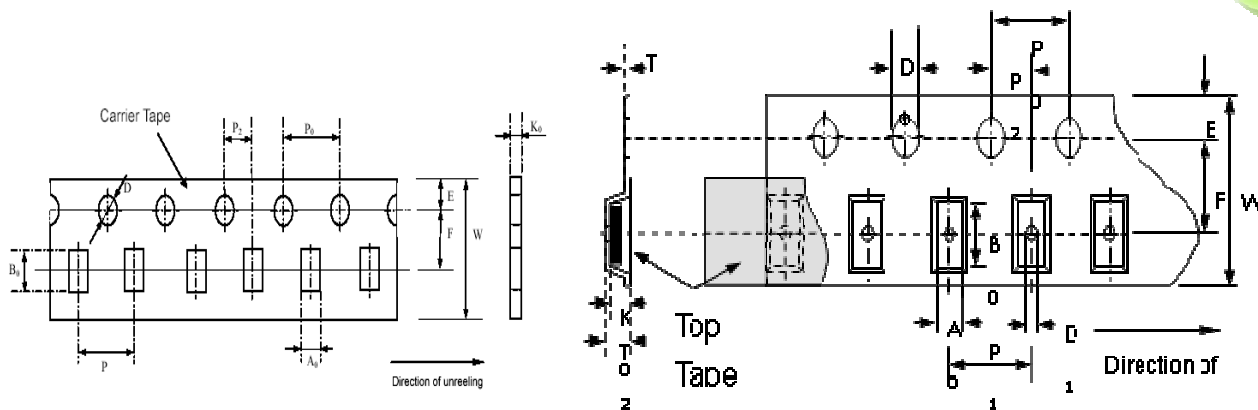
- (a) Solder pad layout: please refer to p.22.23
- (b) Steel plate and foot distance printing
- (c) Reflow and temperature

Foot Distance Printing (mm/mils)	Steel Plate Thickness (mm)
> 0.65mm/25 mils	0.18mm
0.65mm/25 mils~0.5mm/20mils	0.15mm
0.50mm/20 mils~0.40mm/16mils	0.12mm
<=0.40 mm/16 mils	0.10mm



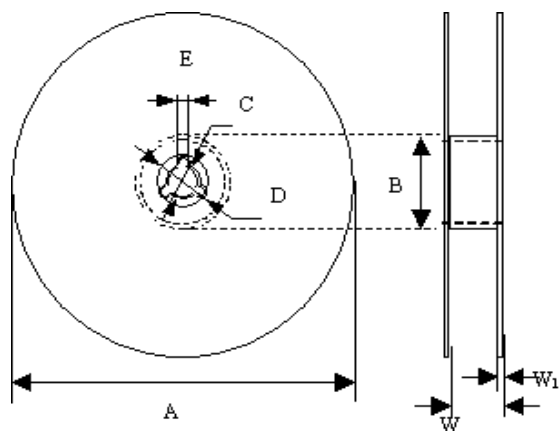


SMD Varistor /EMI/EMI+ESD Package



Symbol	A_0 ± 0.10	B_0 ± 0.10	K_0 ± 0.10	T ± 0.05	T_2 ± 0.05	D_0 $+0.10$ -0.00	D_1 ± 0.05	P_1 ± 0.10	P_2 ± 0.05	P_0 ± 0.05	W ± 0.20	E ± 0.10	F ± 0.05
0201	0.37	0.67	0.50	0.22	0.57	1.50	1.50	2.00	2.00	4.00	8.00	1.75	3.50
0402	0.85	1.25	0.65	0.22	0.87	1.50	1.00	3.00	2.00	4.00	8.00	1.75	3.50
0405	1.04	1.38	0.54	0.22	0.76	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0603	1.08	1.88	0.95	0.22	1.17	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0805	1.42	2.30	1.04	0.22	1.26	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0508	1.22	2.15	0.85	0.23	1.10	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1206	1.88	3.50	1.27	0.22	1.49	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0612	1.88	3.50	1.27	0.22	1.49	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1210	2.78	3.46	1.55	0.22	1.77	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1812	3.66	4.95	1.74	0.25	1.99	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
2220	5.10	5.97	2.80	0.25	3.05	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
08CH	5.50	8.50	2.80	0.30	3.50	1.50	1.50	8.00	2.00	4.00	16.00	1.75	7.50

Reel Dimensions



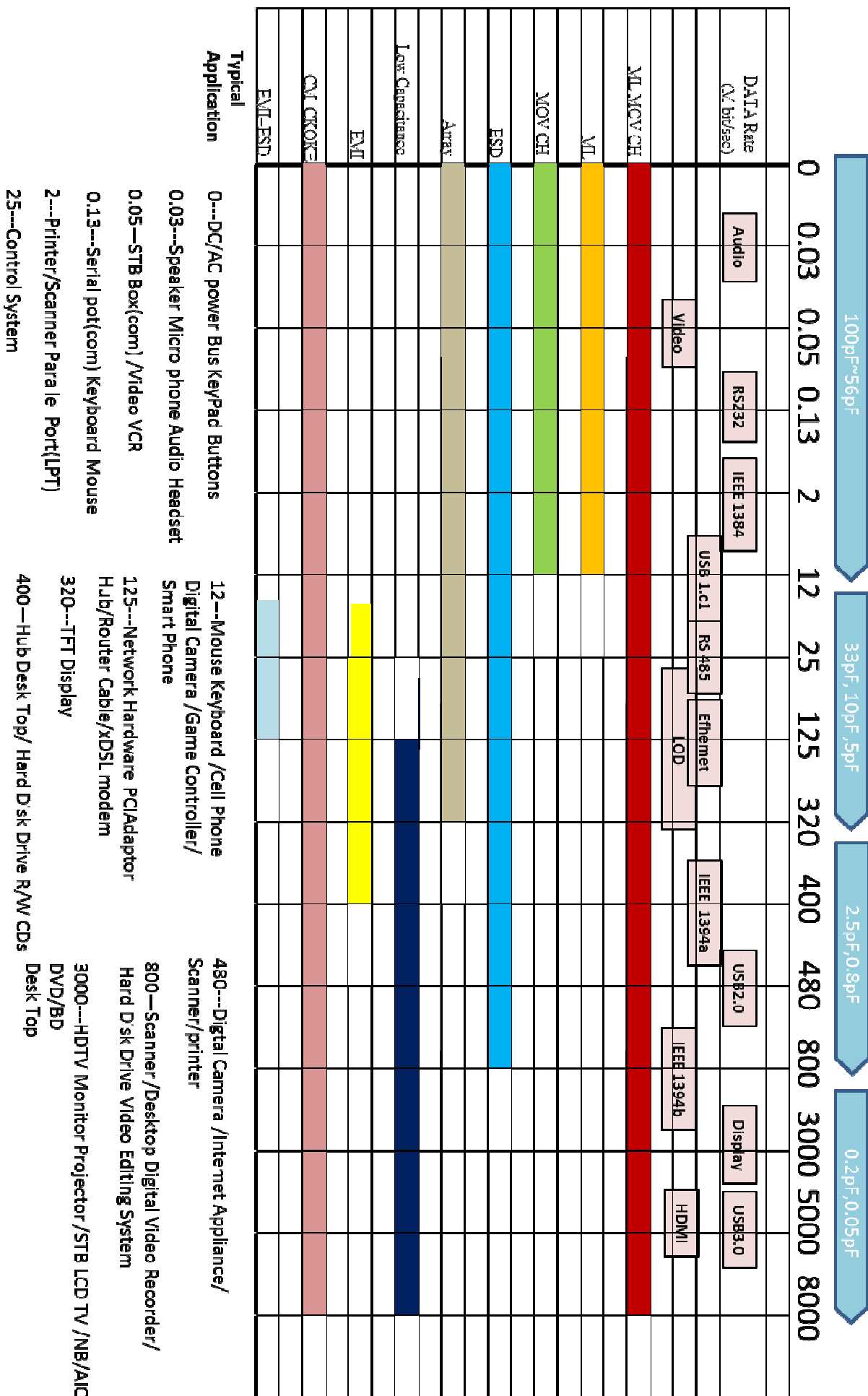
Pieces packaged per reel

Type	0201	0402	0405	0603	0805
Pieces/reel	15000	10000	4000	4000	3000
Type	0508	1206	0612	1210	1812
Pieces/reel	4000	3000	3000	2000	1000
Type	2220	08CH			
Pieces/reel	1000	1000			

Symbol	A	B	C	D	E	W	W_1
0201-1210	178.0 ± 1.0	60.0 ± 0.5	13.0 ± 0.2	21.0 ± 0.2	2.0 ± 0.5	9.0 ± 0.50	1.5 ± 0.15
1812-08CH	178.0 ± 1.0	60.0 ± 0.5	13.5 ± 0.1	21.0 ± 0.2	2.0 ± 0.5	13.6 ± 0.2	1.5 ± 0.15



Application Field





立昌先進科技股份有限公司

SFI Electronics Technology Inc.

333桃園縣龜山鄉山鶯路340巷6號

電話:03-3506998

傳真:03-3507689

統一編號:70475866

Address:

NO.6,Lane 340 Shan Ying Road,
Guishan,Taoyuan 333,Taiwan R.O.C

TEL: 886-3-3506998 FAX:886-3-3507689

E-mail:sfi@sfi.com.tw