DATA SHEET

Multilayer suppressors
EMI-suppression products

Supersedes data of November 2000 2001 Jan 20

FERROXCUBE
A YAGEO COMPANY

MULTILAYER SUPPRESSORS

Multilayer suppressors are a powerful solution for EMI/RFI attenuation for electronic equipment. Supplied in four standard sizes (0603, 0805, 1206 and 1806), they have impedances between 30 and 1 000 Ω at 100 MHz.

When installed in series with signal and/or power circuits, high frequency noise is suppressed. There is no need for ground termination, which makes these devices very suitable for circuits with difficult ground. Typical suppression frequencies range from 10 MHz to 1 000 MHz and rated currents are between 0.1 and 0.6 A.

Multilayer suppressors are specially designed to reduce noise in low impedance circuits while keeping the signal free from distortion. This is because at the interfering frequencies these components behave as a resistor. The high frequency noise is converted into heat rather than reflected to the source. This dissipation prevents ringing and parasitic oscillations.

These characteristics can be used for many different purposes:

- Absorption of generated noise.
- Filtering and wave-shape correction of digital signals from high speed clock oscillators.
- Prevention of high frequency interference entering circuit electronics.

Product construction

The use of silver for electrodes and terminations in multilayer suppressors ensures high electrical conductivity, which minimizes heat generation and crosstalk.

The internal construction can be single layer or multilayer, depending on impedance requirements. Single layer products have a meander design and are suitable for lower impedances, while multilayer types have alternating layers of ferrite and conductor stacked up to achieve higher impedance levels.

The terminal electrode forms a conductive connection to the circuit. It is formed by three layers:

- Silver: for good conductivity
- Nickel: to protect silver termination against leaching
- Tin-lead: applied to ensure good solderability.

The products are suitable for both reflow and wave soldering.

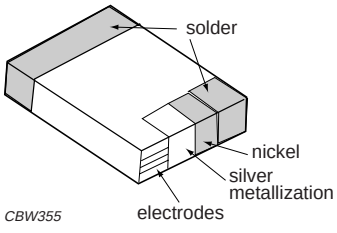


Fig.1 Structure of electrodes.

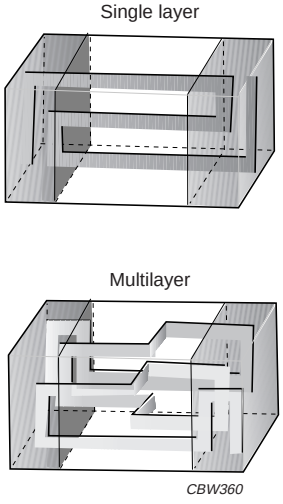


Fig.2 Internal structure of multilayer suppressors..

TYPE NUMBER STRUCTURE

Type numbers for these products consist of the following:

- Product type
- Size
- Material
- Impedance.

Product type

MLS: multilayer suppressor.

Size

0603: 1.6 × 0.80 mm

0805: 2.0 × 1.25 mm

1206: 3.2 × 1.60 mm

1806: 4.5 × 1.60 mm.

Material

4S4

4S7

Impedance value

Expressed in ohms (Ω)

First two digits are significant figures

Last digit is the number of zeros to follow.

EXAMPLES

600: 60 Ω

101: 100 Ω

121: 120 Ω

151: 150 Ω

301: 300 Ω

102: 1000 Ω

Example of the ordering code: MLS0603-4S7-600

TYPE	SIZE	MATERIAL	IMPEDANCE
MLS	0603	4S7	60

Standard products are delivered taped on reel and have a tolerance on impedance of 25%. For different specifications a fifth group is added to the type number.

MULTILAYER SUPPRESSORS MLS0603

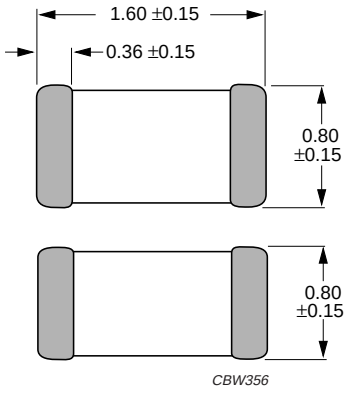


Fig.3 Outline of MLS0603.

Mass

Approximately 5 mg.

Product specifications

GRADE	SIZE	∉Z∉ at 100 MHz (Ω)	R_{DC} MAX. (Ω)	I MAX. (mA)	TYPE NUMBER	
4S7	0603	60	0.2	300	MLS0603-4S7-600	des
		100	0.3	250	MLS0603-4S7-101	des
		120	0.3	250	MLS0603-4S7-121	des
		150	0.3	250	MLS0603-4S7-151	des
		300	0.35	230	MLS0603-4S7-301	des
		600	0.45	210	MLS0603-4S7-601	des
		1000	0.6	190	MLS0603-4S7-102	des

MULTILAYER SUPPRESSORS MLS0805

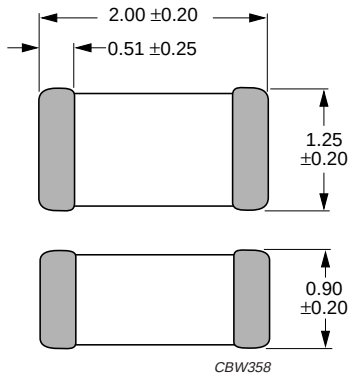


Fig.4 Outline of MLS0805.

Mass

Approximately 11 mg.

Product specifications

GRADE	SIZE	∉Z∉ at 100 MHz (Ω)	R_{DC} MAX. (Ω)	I MAX. (mA)	TYPE NUMBER
4S4	0805	30	0.1	600	MLS0805-4S4-300 des
		60	0.1	600	MLS0805-4S4-600 des
4S7	0805	120	0.2	400	MLS0805-4S7-121 des
		150	0.3	200	MLS0805-4S7-151 des
		300	0.3	200	MLS0805-4S7-301 des
		600	0.3	200	MLS0805-4S7-601 des
		1000	0.4	200	MLS0805-4S7-102 des

MULTILAYER SUPPRESSORS MLS1206

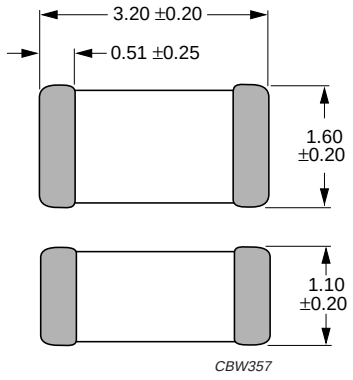


Fig.5 Outline of MLS1206.

Mass

Approximately 28 mg.

Product specifications

GRADE	SIZE	∉Z∉ at 100 MHz (Ω)	R_{DC} MAX. (Ω)	I MAX. (mA)	TYPE NUMBER	
4S4	1206	30	0.1	600	MLS1206-4S4-300	des
		70	0.1	600	MLS1206-4S4-700	des
		90	0.2	400	MLS1206-4S4-900	des
		120	0.2	300	MLS1206-4S4-121	des
		600	0.4	200	MLS1206-4S4-601	des
4S7	1206	1000	0.6	150	MLS1206-4S7-102	des

MULTILAYER SUPPRESSORS MLS1806

Product specifications

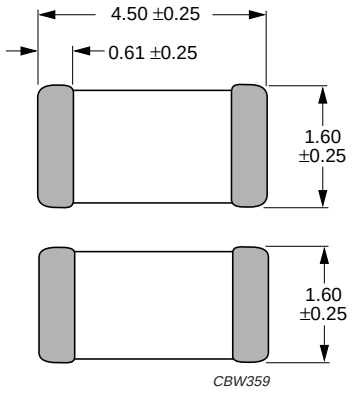


Fig.6 Outline of MLS1806.

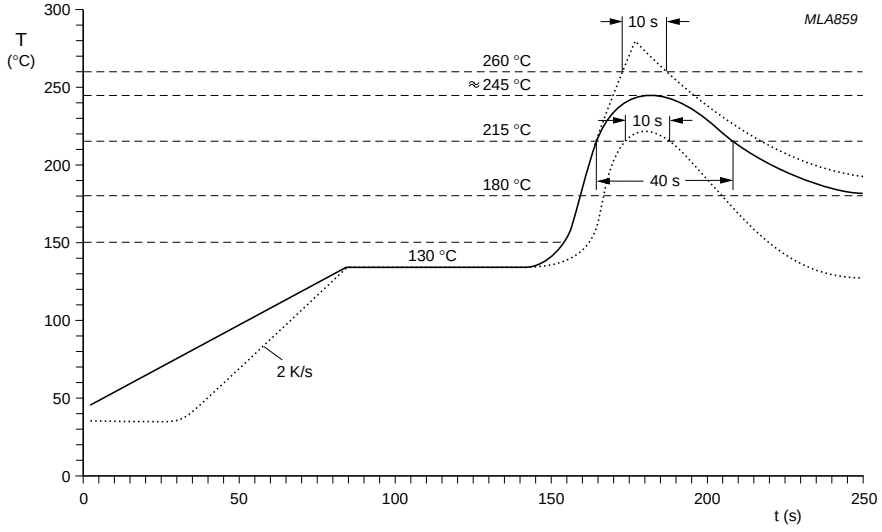
Mass

Approximately 55 mg.

GRADE	SIZE	∉Z∉ at 100 MHz (Ω)	R_{DC} MAX. (Ω)	I MAX. (mA)	TYPE NUMBER
4S4	1806	80	0.1	600	MLS1806-4S4-800 des
		150	0.2	500	MLS1806-4S4-151 des

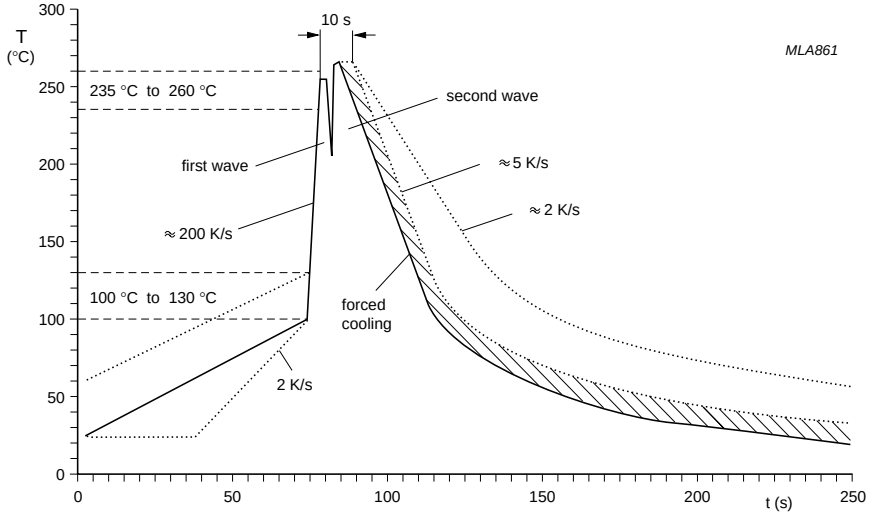
MOUNTING

Soldering profiles



Typical values (solid line).
Process limits (dotted lines).

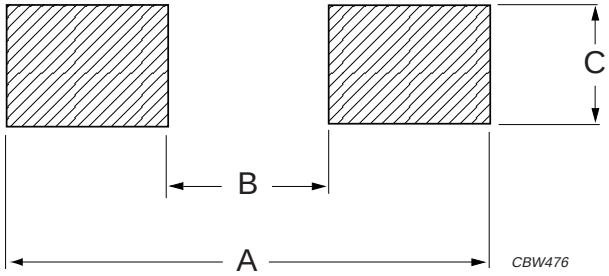
Fig.7 Reflow soldering.



Typical values (solid line).
Process limits (dotted lines).

Fig.8 Double wave soldering.

Dimensions of solderlands



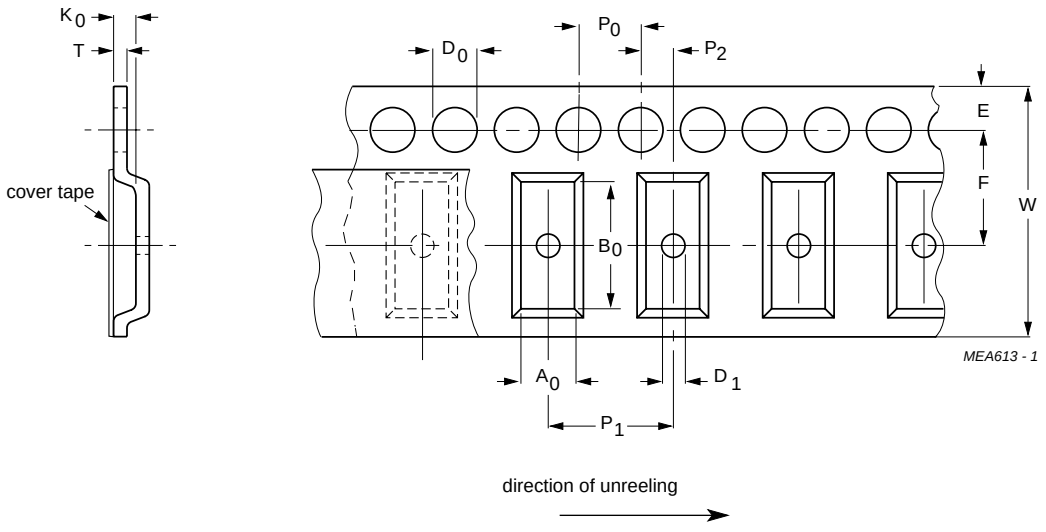
For dimensions see Table 1.

Fig.9 Recommended dimensions of solder lands.

Table 1 Solder land dimensions; see Fig.9

CASE SIZE	FOOTPRINT DIMENSIONS (mm)		
	A	**B**	**C**
0603	2.1	0.7	0.7
0805	2.6	1.0	1.0
1206	4.4	2.2	1.35
1806	6.0	3.0	1.35

BLISTER TAPE AND REEL DIMENSIONS



For dimensions see Table 2.

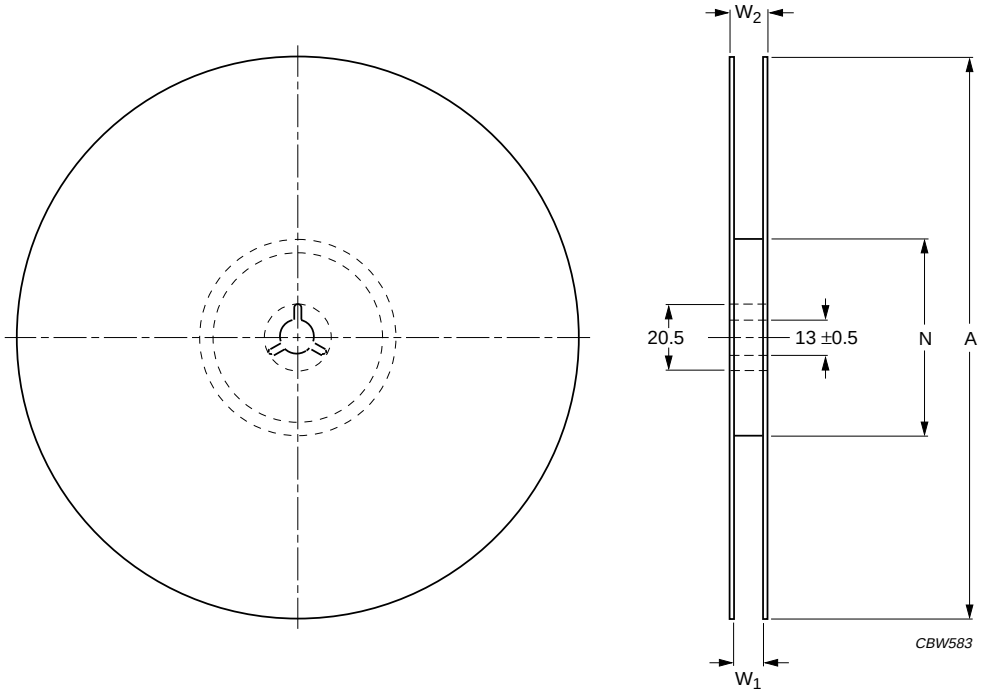
Fig.10 Blister tape.

Table 2 Dimensions of blister tape for relevant product size code; see Fig.10

DIMENSION	PRODUCT SIZE CODE			
	0603	**0805**	**1206**	**1806**
A_0	1.1 ±0.1	1.6 ±0.1	2.0 ±0.1	2.0 ±0.1
B_0	1.9 ±0.1	2.4 ±0.1	3.6 ±0.1	5.0 ±0.2
K_0 minimum clearance; note 1	1.1	1.2	1.2	2.0
W	8.0 ±0.2	8.0 ±0.2	8.0 ±0.2	12.0 ±0.3
E	–	–	–	–
F	–	–	–	–
$D_{0\ min}$	0.5	0.5	0.5	0.5
$D_{1\ min}$	0.5	0.5	0.5	0.5
P_0	4.0	4.0	4.0	8.0
P_1	4.0 ±0.1	4.0 ±0.1	4.0 ±0.1	4.0 ±0.1
P_2	–	–	–	–
T_{max}	0.3	0.3	0.3	0.3

Note

1. Typical product displacement in pocket.



Dimensions in mm.

For dimensions see Table 3.

Fig.11 Reel.

Table 3 Reel dimensions; see Fig.11

TAPE WIDTH	DIMENSIONS (mm)			
	A	N MIN.	W_1	W_2
8	178 ±2	50	10 ±1.5	–
12			14 ±1.5	–

DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Philips Components reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Components reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Components customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Components for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype	prot	These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in	des	These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support	sup	These products are **not** recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.