

BEADS ON WIRE FOR EMI-SUPPRESSION

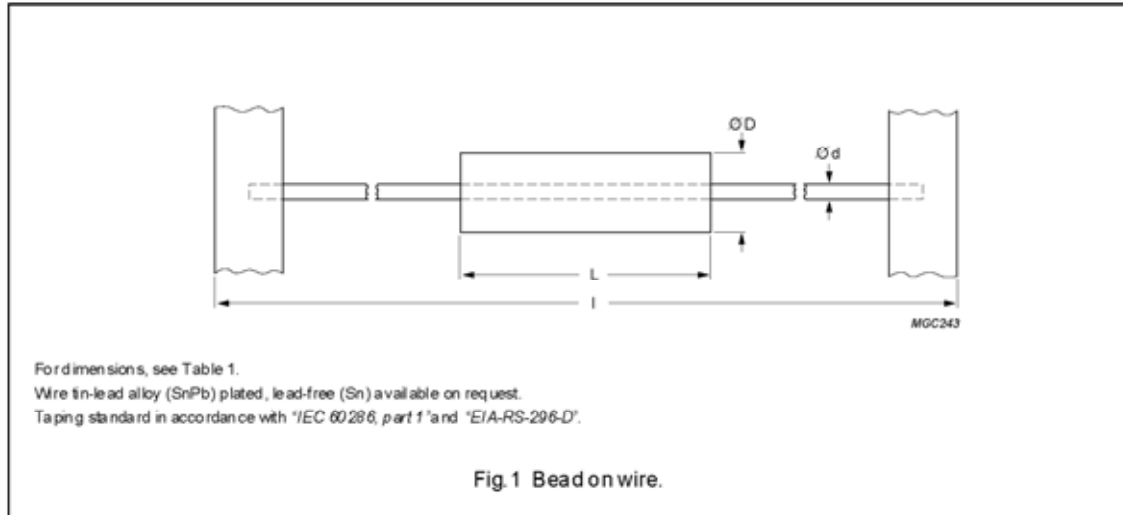


Fig. 1 Bead on wire.

Table 1 Grades, parameters and type numbers; see Fig. 1

GRADE	$ Z_{typ} $ ( $\Omega$ ) <sup>(1)</sup>							DIMENSIONS (mm)				TYPE NUMBER
	at frequency (MHz)							$\varnothing D$	L	I	$\varnothing d$	
	1	3	10	25	30	100	300					
4S2	4	13	24	-	36	58	65	3.5±0.2	3.5-0.5	64.4	0.64	BDW3.5/3.5-4S2
	5	16	33	-	49	75	88	3.5±0.2	4.7-0.5	64.4	0.64	BDW3.5/4.7-4S2
	-	-	-	54	-	82	-	3.5±0.25	5.25±0.25	64.4	0.64	BDW3.5/5.3-4S2
	6	21	44	-	66	100	119	3.5±0.2	6.0±0.25	64.4	0.64	BDW3.5/6-4S2
	8	25	49	-	74	110	131	3.5±0.2	6.7±0.25	64.4	0.64	BDW3.5/6.7-4S2
	9	28	55	-	84	131	150	3.5±0.2	7.6±0.35	64.4	0.64	BDW3.5/7.6-4S2
	10	33	65	-	98	146	175	3.5±0.2	8.9±0.35	64.4	0.64	BDW3.5/8.9-4S2
	-	-	-	96	-	150	-	3.5±0.25	9.5±0.3	64.4	0.64	BDW3.5/9.5-4S2
	-	-	-	117	-	180	-	3.5±0.25	11.4±0.4	64.4	0.64	BDW3.5/11-4S2
	-	-	-	143	-	220	-	3.5±0.25	13.8±0.5	64.4	0.64	BDW3.5/14-4S2

Note

1. Typical values at 25 and 100 MHz,  $|Z|_{min}$  is -20%. Other impedance values are for reference only.

## EMI-suppression products

## Multilayer suppressors

**MULTILAYER SUPPRESSORS**

Multilayer suppressors are a powerful solution for EMI/RFI attenuation for electronic equipment. Supplied in seven standard sizes (0402, 0603, 0805, 1206, 1210, 1806 and 1812), they have impedances between 6 and 2 000  $\Omega$  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 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.

**Features**

- Monolithic structure for closed magnetic path and high reliability
- Standard EIA and EIAJ sizes: 0402, 0603, 0805, 1206, 1210, 1806 and 1812
- High impedance per volume which leads to effective high density circuits
- Suitable for wave and reflow soldering
- Plating material lead-free
- Wide range of impedance values
- Superior physical properties
- Available in standard EIA and EIAJ tape-and-reel
- Operating temperature -40°C to +125°C
- 100% sorting out on impedance

**Main applications areas for multilayer suppressors are:**

- computer and peripheral equipment: mother board, notebook, CD-Rom, DVD-Rom, CD-RW, scanner, hard disc, VGA card, sound card, LCD monitor, printer, PC server thumb drive, PCMCIA card, graphic card, etc.
- network: LAN card, hub, switcher, router set top box, etc.
- telecom: cell phone, ADSL, wired modem, cable modem, ISDN, GPS satellite receiver, etc.
- consumer: walkman, walkdisc, digital still camera (DSC), sound system, HDTV, projector, DVD player, VCD player, tuner for TV, cable modem, etc.

To help designers in the trial and error process of finding the most suitable suppression component, we offer a sample box with a selection of products.

Ordering code: SAMPLEBOX12

## EMI-suppression products

## Multilayer suppressors

**TYPE NUMBER STRUCTURE**

Type numbers for these products consist of the following:

- Product type
- Size
- Impedance.

**Product type**

MLS: Multilayer Suppressor.

MLP: Multilayer Power Beads.

MLN: Multilayer Narrow Band.

**Size**

0402: 1.0 × 0.5 × 0.5 mm

0603: 1.6 × 0.8 × 0.8 mm

0805: 2.0 × 1.25 × 0.9 mm

1206: 3.2 × 1.6 × 1.1 mm

1210: 3.2 × 2.5 × 1.3 mm

1806: 4.5 × 1.6 × 1.6 mm

1812: 4.5 × 3.2 × 1.5 mm.

**Impedance value**

Expressed in ohms ( $\Omega$ )

First two digits are significant figures

Last digit is the number of zeros to follow.

**EXAMPLES**

600: 60  $\Omega$

101: 100  $\Omega$

121: 120  $\Omega$

151: 150  $\Omega$

301: 300  $\Omega$

102: 1000  $\Omega$

**Multilayer Suppressor MLS0603-4S7-600**

TYPE	SIZE	INTERNAL CODE	IMPEDANCE
MLS	0603	4S7	60

**Multilayer Power Bead MLP0603-121**

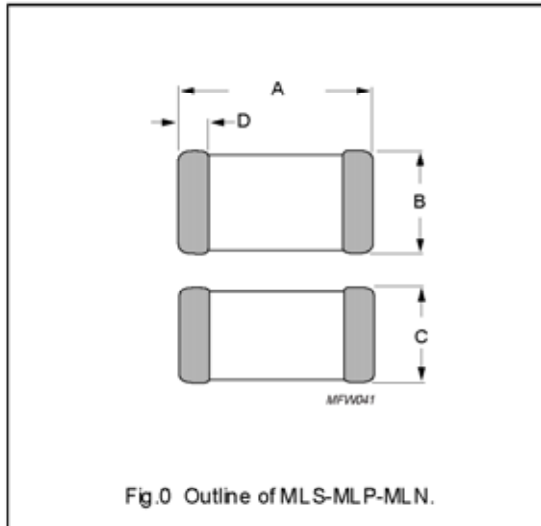
TYPE	SIZE	IMPEDANCE
MLP	0603	120

**Multilayer Narrow Band MLN0603-601**

TYPE	SIZE	IMPEDANCE
MLN	0603	600

Standard products are delivered taped on reel and have a tolerance on impedance of 25%.

## MULTILAYER SUPPRESSORS



Product dimensions of Multilayer Suppressors MLS - MLP - MLN

SIZE	A	B	C	D	mass (mg)
0402	$1.0 \pm 0.15$	$0.5 \pm 0.15$	$0.5 \pm 0.15$	$0.25 \pm 0.15$	≈ 1
0603	$1.6 \pm 0.20$	$0.8 \pm 0.15$	$0.8 \pm 0.15$	$0.3 \pm 0.20$	≈ 5
0805	$2.0 \pm 0.20$	$1.25 \pm 0.20$	$0.9 \pm 0.20$	$0.5 \pm 0.30$	≈ 11
1206	$3.2 \pm 0.20$	$1.6 \pm 0.20$	$1.1 \pm 0.20$	$0.5 \pm 0.30$	≈ 28
1210	$3.2 \pm 0.20$	$2.5 \pm 0.20$	$1.3 \pm 0.20$	$0.5 \pm 0.30$	≈ 50
1806	$4.5 \pm 0.25$	$1.6 \pm 0.20$	$1.6 \pm 0.20$	$0.5 \pm 0.30$	≈ 55
1812	$4.5 \pm 0.25$	$3.2 \pm 0.20$	$1.5 \pm 0.20$	$0.5 \pm 0.30$	≈ 100

## EMI-suppression products

## Multilayer suppressors

## Product specifications Multilayer Suppressors MLS

SIZE	$ Z_{typ} $ at 100 MHz ( $\Omega$ )	$R_{DC}$ MAX. ( $\Omega$ )	I MAX. (mA)	TYPE NUMBER	
0402	6 $\pm$ 25%	0.05	500	MLS0402-4S4-060	<a href="#">des</a>
	10 $\pm$ 25%	0.05	500	MLS0402-4S4-100	<a href="#">des</a>
	40 $\pm$ 25%	0.3	300	MLS0402-4S4-400	<a href="#">des</a>
	80 $\pm$ 25%	0.4	200	MLS0402-4S4-800	<a href="#">des</a>
	120 $\pm$ 25%	0.5	200	MLS0402-4S4-121	<a href="#">des</a>
	240 $\pm$ 25%	0.5	200	MLS0402-4S4-241	<a href="#">des</a>
	480 $\pm$ 25%	0.8	100	MLS0402-4S4-481	<a href="#">des</a>
0603	11 $\pm$ 25%	0.05	500	MLS0603-4S4-110	<a href="#">des</a>
	19 $\pm$ 25%	0.08	500	MLS0603-4S4-190	<a href="#">des</a>
	30 $\pm$ 25%	0.1	400	MLS0603-4S7-300	<a href="#">des</a>
	40 $\pm$ 25%	0.1	400	MLS0603-4S7-400	<a href="#">des</a>
	60 $\pm$ 25%	0.1	300	MLS0603-4S7-600	<a href="#">des</a>
	80 $\pm$ 25%	0.15	300	MLS0603-4S7-800	<a href="#">des</a>
	100 $\pm$ 25%	0.25	300	MLS0603-4S7-101	<a href="#">des</a>
	120 $\pm$ 25%	0.25	300	MLS0603-4S7-121	<a href="#">des</a>
	150 $\pm$ 25%	0.3	200	MLS0603-4S7-151	<a href="#">des</a>
	220 $\pm$ 25%	0.3	200	MLS0603-4S7-221	<a href="#">des</a>
	300 $\pm$ 25%	0.4	200	MLS0603-4S7-301	<a href="#">des</a>
	450 $\pm$ 25%	0.5	200	MLS0603-4S7-451	<a href="#">des</a>
	600 $\pm$ 25%	0.5	200	MLS0603-4S7-601	<a href="#">des</a>
	750 $\pm$ 25%	0.7	200	MLS0603-4S7-751	<a href="#">des</a>
1000 $\pm$ 25%	0.7	200	MLS0603-4S7-102	<a href="#">des</a>	
1500 $\pm$ 25%	1	50	MLS0603-4S4-152	<a href="#">des</a>	
0805	7 $\pm$ 25%	0.1	600	MLS0805-4S4-070	<a href="#">des</a>
	9 $\pm$ 25%	0.1	600	MLS0805-4S4-090	<a href="#">des</a>
	11 $\pm$ 25%	0.1	600	MLS0805-4S4-110	<a href="#">des</a>
	17 $\pm$ 25%	0.1	600	MLS0805-4S4-170	<a href="#">des</a>
	30 $\pm$ 25%	0.1	600	MLS0805-4S4-300	<a href="#">des</a>
	60 $\pm$ 25%	0.15	500	MLS0805-4S4-600	<a href="#">des</a>
	70 $\pm$ 25%	0.15	500	MLS0805-4S7-700	<a href="#">des</a>
	80 $\pm$ 25%	0.15	500	MLS0805-4S7-800	<a href="#">des</a>
	120 $\pm$ 25%	0.25	300	MLS0805-4S7-121	<a href="#">des</a>
	150 $\pm$ 25%	0.25	300	MLS0805-4S7-151	<a href="#">des</a>
	220 $\pm$ 25%	0.3	300	MLS0805-4S7-221	<a href="#">des</a>
	300 $\pm$ 25%	0.3	300	MLS0805-4S7-301	<a href="#">des</a>
	400 $\pm$ 25%	0.3	300	MLS0805-4S7-401	<a href="#">des</a>
	500 $\pm$ 25%	0.4	300	MLS0805-4S7-501	<a href="#">des</a>
600 $\pm$ 25%	0.4	300	MLS0805-4S7-601	<a href="#">des</a>	
750 $\pm$ 25%	0.5	200	MLS0805-4S4-751	<a href="#">des</a>	

## EMI-suppression products

## Multilayer suppressors

SIZE	$ Z_{typ} $ at 100 MHz ( $\Omega$ )	$R_{DC}$ MAX. ( $\Omega$ )	I MAX. (mA)	TYPE NUMBER	
0805	$1000 \pm 25\%$	0.5	200	MLS0805-4S7-102	des
	$1500^{(1)} \pm 25\%$	0.6	200	MLS0805-4S7-152	des
	$2000 \pm 25\%$	0.8	100	MLS0805-4S4-202	des
1206	$19 \pm 25\%$	0.05	600	MLS1206-4S4-190	des
	$26 \pm 25\%$	0.05	600	MLS1206-4S4-260	des
	$30 \pm 25\%$	0.05	600	MLS1206-4S4-300	des
	$50 \pm 25\%$	0.1	500	MLS1206-4S4-500	des
	$60 \pm 25\%$	0.1	500	MLS1206-4S4-600	des
	$70 \pm 25\%$	0.1	500	MLS1206-4S4-700	des
	$90 \pm 25\%$	0.15	500	MLS1206-4S4-900	des
	$120 \pm 25\%$	0.15	500	MLS1206-4S4-121	des
	$150 \pm 25\%$	0.15	500	MLS1206-4S4-151	des
	$200 \pm 25\%$	0.2	400	MLS1206-4S4-201	des
	$400 \pm 25\%$	0.2	400	MLS1206-4S4-401	des
	$500 \pm 25\%$	0.2	400	MLS1206-4S4-501	des
	$600 \pm 25\%$	0.3	400	MLS1206-4S4-601	des
	$1000^{(1)} \pm 25\%$	0.4	200	MLS1206-4S7-102	des
	$1200^{(1)} \pm 25\%$	0.4	200	MLS1206-4S7-122	des
$2000^{(2)} \pm 25\%$	0.6	200	MLS1206-4S7-202	des	
1210	$32 \pm 25\%$	0.2	500	MLS1210-4S4-320	des
	$60 \pm 25\%$	0.2	500	MLS1210-4S4-600	des
	$90 \pm 25\%$	0.2	500	MLS1210-4S4-900	des
1806	$50 \pm 25\%$	0.2	600	MLS1806-4S4-500	des
	$60 \pm 25\%$	0.2	600	MLS1806-4S4-600	des
	$80 \pm 25\%$	0.2	600	MLS1806-4S4-800	des
	$100 \pm 25\%$	0.3	500	MLS1806-4S4-101	des
	$150 \pm 25\%$	0.3	500	MLS1806-4S4-151	des
	$170 \pm 25\%$	0.3	500	MLS1806-4S4-171	des
1812	$70 \pm 25\%$	0.3	500	MLS1812-4S4-700	des
	$120 \pm 25\%$	0.3	500	MLS1812-4S4-121	des

**Note**

1. at 50 MHz
2. at 30 MHz

- RDC: Resistance of component for DC current.
- Maximum rated current: measure of current capacity of the component. When the maximum rated current is applied, temperature rise shall not exceed 20°C.
- Standard tolerance on impedance is  $\pm 25\%$ .
- Other tolerances can be provided upon request.
- Operating temperature: -40°C to +125°C.

## EMI-suppression products

## Multilayer suppressors

Product specifications Multilayer Power Beads MLP

SIZE	$ Z_{typ} $ at 100 MHz ( $\Omega$ )	$R_{DC}$ MAX. ( $\Omega$ )	I MAX. (mA)	TYPE NUMBER	
0603	11 $\pm$ 25%	0.02	4000	MLP0603-110	<a href="#">des</a>
	25 $\pm$ 25%	0.03	3000	MLP0603-250	<a href="#">des</a>
	40 $\pm$ 25%	0.035	3000	MLP0603-400	<a href="#">des</a>
	60 $\pm$ 25%	0.04	3000	MLP0603-600	<a href="#">des</a>
	120 $\pm$ 25%	0.07	1800	MLP0603-121	<a href="#">des</a>
	300 $\pm$ 25%	0.14	1500	MLP0603-301	<a href="#">des</a>
	500 $\pm$ 25%	0.18	1500	MLP0603-501	<a href="#">des</a>
	600 $\pm$ 25%	0.2	1000	MLP0603-601	<a href="#">des</a>
	1000 $\pm$ 25%	0.25	800	MLP0603-102	<a href="#">des</a>
0805	11 $\pm$ 25%	0.01	6000	MLP0805-110	<a href="#">des</a>
	17 $\pm$ 25%	0.02	5000	MLP0805-170	<a href="#">des</a>
	30 $\pm$ 25%	0.02	4000	MLP0805-300	<a href="#">des</a>
	60 $\pm$ 25%	0.03	3000	MLP0805-600	<a href="#">des</a>
	80 $\pm$ 25%	0.04	3000	MLP0805-800	<a href="#">des</a>
	120 $\pm$ 25%	0.04	3000	MLP0805-121	<a href="#">des</a>
	200 $\pm$ 25%	0.05	2500	MLP0805-201	<a href="#">des</a>
	300 $\pm$ 25%	0.08	2000	MLP0805-301	<a href="#">des</a>
	600 $\pm$ 25%	0.1	2000	MLP0805-601	<a href="#">des</a>
1000 $\pm$ 25%	0.12	1500	MLP0805-102	<a href="#">des</a>	
1206	19 $\pm$ 25%	0.015	7000	MLP1206-190	<a href="#">des</a>
	32 $\pm$ 25%	0.015	4000	MLP1206-320	<a href="#">des</a>
	50 $\pm$ 25%	0.02	4000	MLP1206-500	<a href="#">des</a>
	70 $\pm$ 25%	0.025	3000	MLP1206-700	<a href="#">des</a>
	80 $\pm$ 25%	0.025	3000	MLP1206-800	<a href="#">des</a>
	100 $\pm$ 25%	0.03	2500	MLP1206-101	<a href="#">des</a>
	300 $\pm$ 25%	0.06	2000	MLP1206-301	<a href="#">des</a>
	600 $\pm$ 25%	0.1	1800	MLP1206-601	<a href="#">des</a>
	1000 <sup>(1)</sup> $\pm$ 25%	0.15	1200	MLP1206-102	<a href="#">des</a>
	1200 <sup>(1)</sup> $\pm$ 25%	0.18	1000	MLP1206-122	<a href="#">des</a>
1500 <sup>(1)</sup> $\pm$ 25%	0.2	800	MLP1206-152	<a href="#">des</a>	
1210	60 $\pm$ 25%	0.025	4000	MLP1210-600	<a href="#">des</a>
	90 $\pm$ 25%	0.025	3000	MLP1210-900	<a href="#">des</a>
1806	50 $\pm$ 25%	0.02	6000	MLP1806-500	<a href="#">des</a>
	60 $\pm$ 25%	0.02	5000	MLP1806-600	<a href="#">des</a>
	80 $\pm$ 25%	0.025	4000	MLP1806-800	<a href="#">des</a>
	150 $\pm$ 25%	0.1	2000	MLP1806-151	<a href="#">des</a>
1812	70 $\pm$ 25%	0.03	6000	MLP1812-700	<a href="#">des</a>
	120 $\pm$ 25%	0.03	4000	MLP1812-121	<a href="#">des</a>

## EMI-suppression products

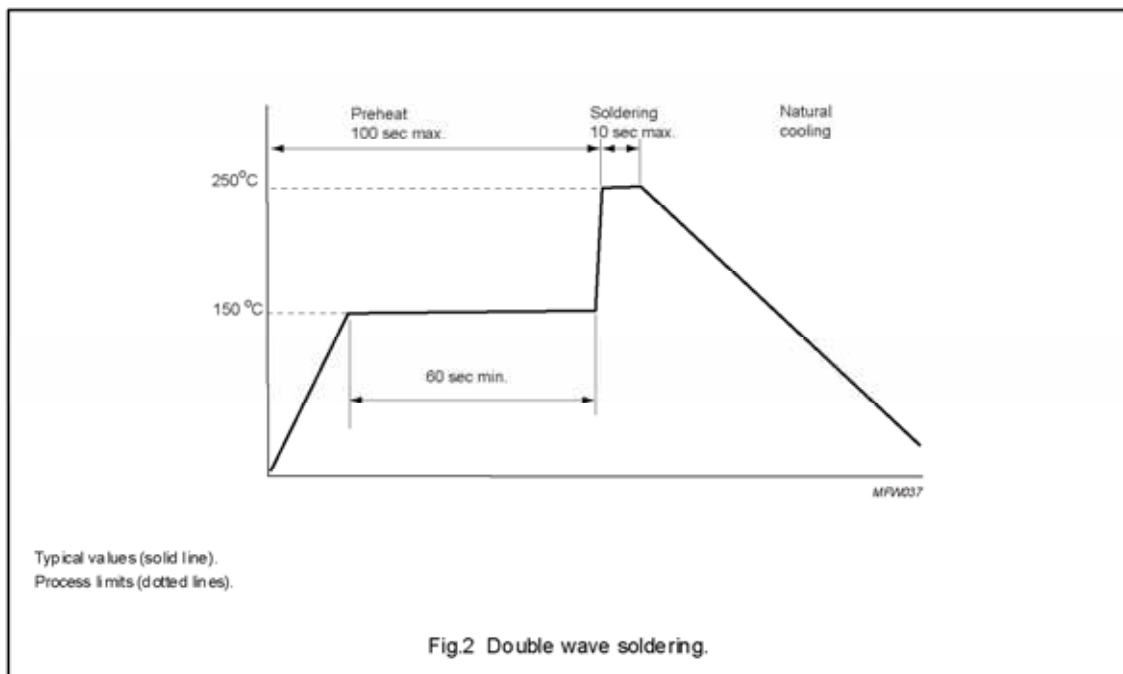
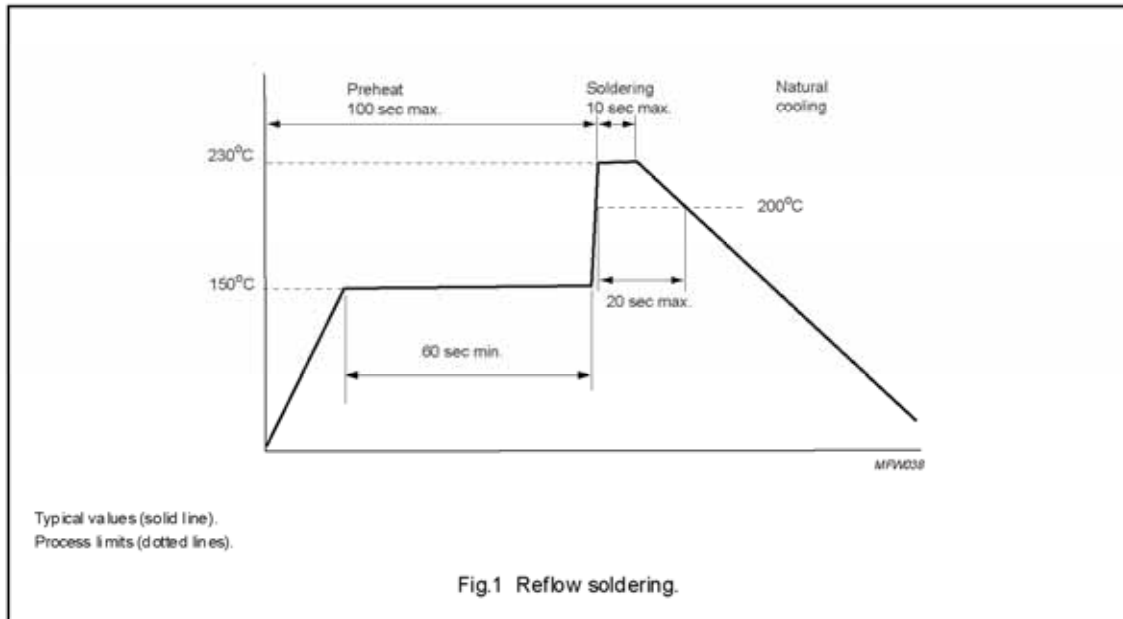
## Multilayer suppressors

## Product specifications Multilayer Narrow Band MLN

SIZE	$ Z_{typ} $ at 100 MHz ( $\Omega$ )	$R_{DC}$ MAX. ( $\Omega$ )	I MAX. (mA)	TYPE NUMBER	
0603	6 $\pm$ 25%	0.05	500	MLN0603-060	des
	10 $\pm$ 25%	0.07	400	MLN0603-100	des
	40 $\pm$ 25%	0.30	300	MLN0603-400	des
	80 $\pm$ 25%	0.50	300	MLN0603-800	des
	120 $\pm$ 25%	0.40	300	MLN0603-121	des
	240 $\pm$ 25%	0.60	200	MLN0603-241	des
	300 $\pm$ 25%	0.60	200	MLN0603-301	des
	480 $\pm$ 25%	0.70	150	MLN0603-481	des
	600 $\pm$ 25%	0.60	100	MLN0603-601	des
0805	6 $\pm$ 25%	0.07	800	MLN0805-060	des
	11 $\pm$ 25%	0.10	700	MLN0805-110	des
	26 $\pm$ 25%	0.20	600	MLN0805-260	des
	32 $\pm$ 25%	0.20	600	MLN0805-320	des
	60 $\pm$ 25%	0.30	500	MLN0805-600	des
	75 $\pm$ 25%	0.30	500	MLN0805-750	des
	90 $\pm$ 25%	0.30	500	MLN0805-900	des
	120 $\pm$ 25%	0.40	400	MLN0805-121	des
	150 $\pm$ 25%	0.40	400	MLN0805-151	des
	170 $\pm$ 25%	0.50	400	MLN0805-171	des
	220 $\pm$ 25%	0.50	300	MLN0805-221	des
	300 $\pm$ 25%	0.50	300	MLN0805-301	des
	400 $\pm$ 25%	0.60	300	MLN0805-401	des
	500 $\pm$ 25%	0.70	200	MLN0805-501	des
	600 $\pm$ 25%	0.50	200	MLN0805-601	des
	1000 $\pm$ 25%	1.0	100	MLN0805-102	des
1200 $\pm$ 25%	0.70	100	MLN0805-122	des	
1500 $\pm$ 25%	0.70	100	MLN0805-152	des	
1206	32 $\pm$ 25%	0.20	600	MLN1206-320	des
	60 $\pm$ 25%	0.30	500	MLN1206-600	des
	80 $\pm$ 25%	0.30	500	MLN1206-800	des
	90 $\pm$ 25%	0.30	500	MLN1206-900	des
	120 $\pm$ 25%	0.40	400	MLN1206-121	des
	150 $\pm$ 25%	0.40	400	MLN1206-151	des
	200 $\pm$ 25%	0.50	300	MLN1206-201	des
	220 $\pm$ 25%	0.50	300	MLN1206-221	des
	350 $\pm$ 25%	0.60	300	MLN1206-351	des
	400 $\pm$ 25%	0.60	300	MLN1206-401	des
	600 $\pm$ 25%	0.80	300	MLN1206-601	des
	1200 $\pm$ 25%	1.00	200	MLN1206-122	des

**MOUNTING**

**Soldering profiles**



Dimensions of solderlands

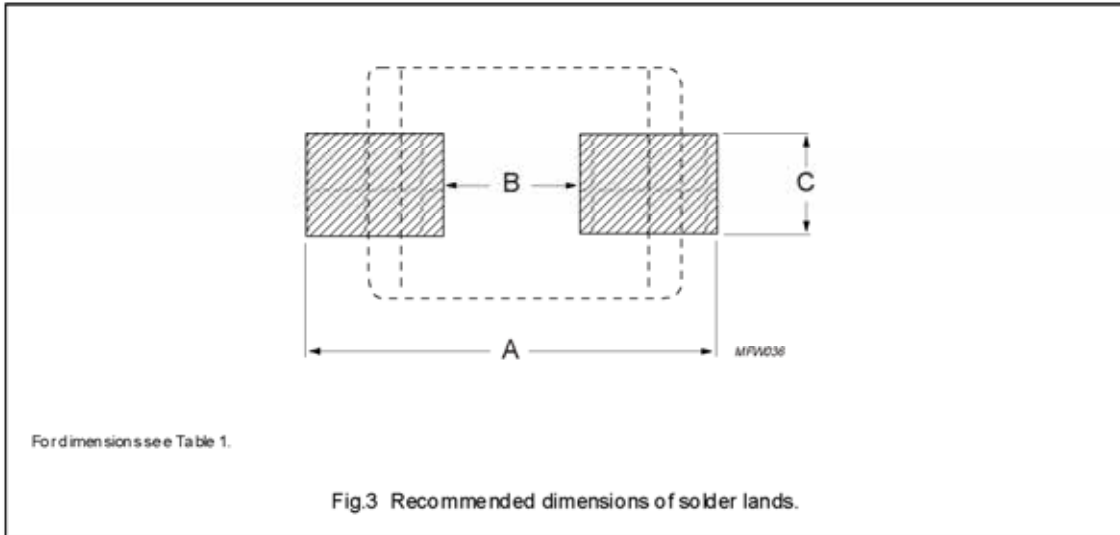
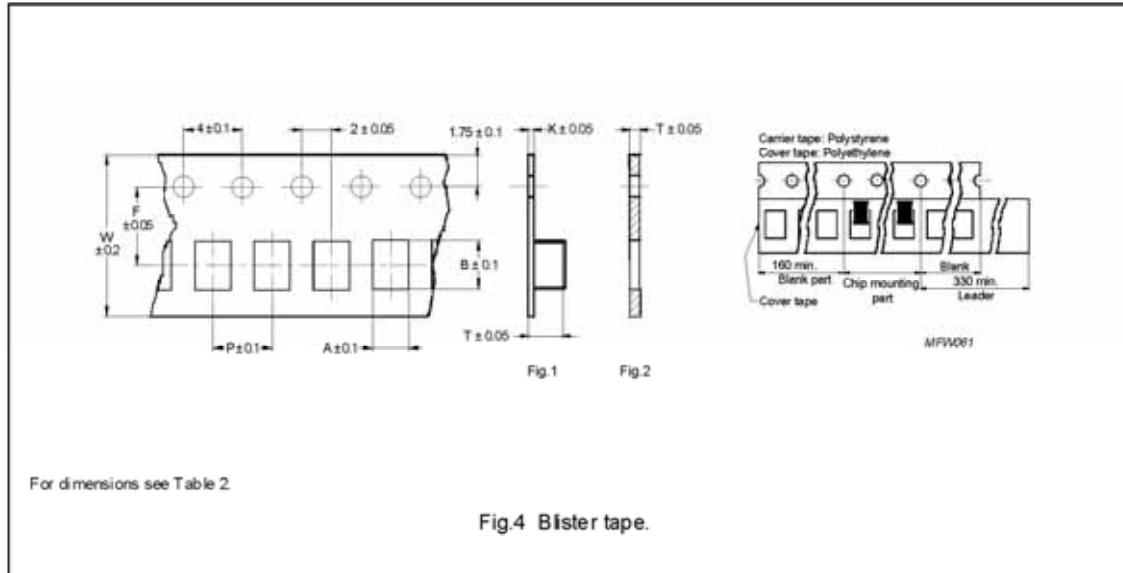


Table 1 Solder land dimensions for MLS, MLP and MLN types; see Fig.3

SIZE	FOOTPRINT DIMENSIONS (mm)		
	A	B	C
0402	1.2 – 1.4	0.4	0.4
0603	2.4 – 3.4	0.8	0.6
0805	3.0 – 4.0	1.2	1.0
1206	4.2 – 5.2	2.0	1.2
1210	5.5 – 6.5	2.0	1.8
1806	5.5 – 6.5	3.0	1.2
1812	5.5 – 6.5	3.0	2.4

**BLISTER TAPE AND REEL DIMENSIONS**



**Table 2** Dimensions of blister tape for relevant product size code; see Fig.4

DIMENSION	PRODUCT SIZE CODE						
	0402	0603	0805	1206	1210	1806	1812
A	0.65	0.975	1.54	1.94	2.80	1.94	3.64
B	1.15	1.8	2.32	3.54	3.42	4.94	4.94
T	0.7	1.05	1.15	1.29	1.64	1.90	1.80
W	8.0	8.0	8.0	8.0	8.0	12	12
P	2.0	4.0	4.0	4.0	4.0	4.0	8.0
F	3.5	3.5	3.5	3.5	3.5	5.5	5.5
K	-	-	0.2	0.2	0.2	0.3	0.3
Tape fig.	2	2	1	1	1	1	1

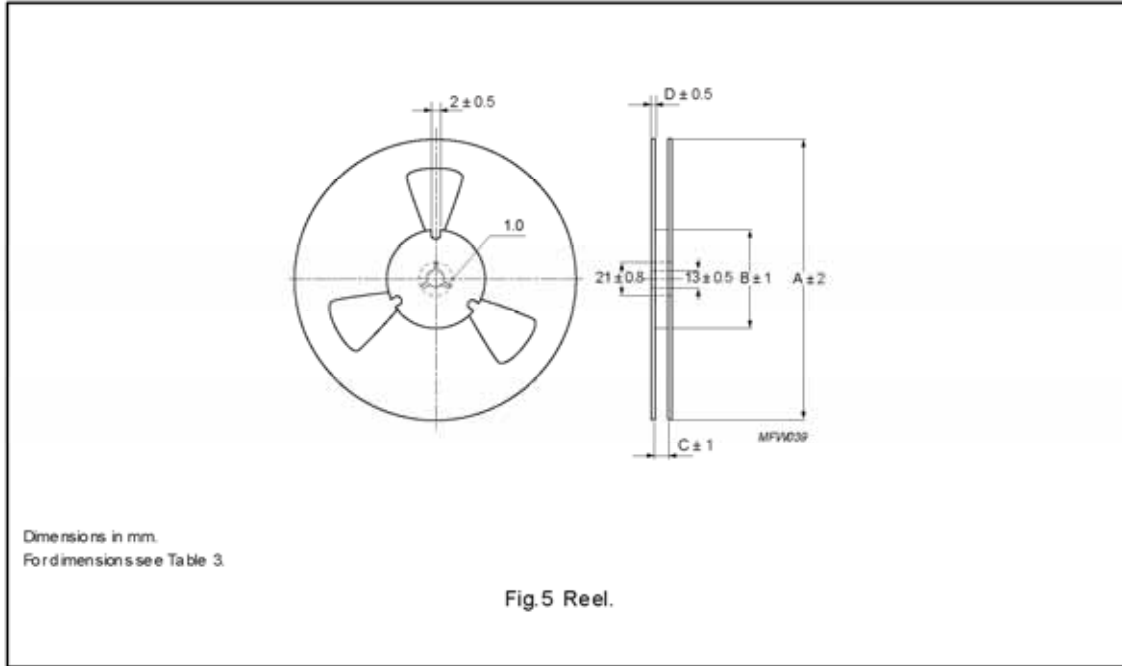
**MATERIAL BLISTER TAPE:**

- Sizes 0402 and 0603: paper
- Other sizes: Polystyrene

**MATERIAL COVER FILM:**

- Polyethylene

EMI-suppression products



**Table 3** Reel dimensions; see Fig.5

DIMENSION	PRODUCT SIZE CODE						
	0402	0603	0805	1206	1210	1806	1812
A	178	178	178	178	178	178	178
B	60	60	60	60	60	60	60
C	10	10	10	10	10	14	14
D	2	2	2	2	2	2	2

**Table 4** Packing quantities

	PRODUCT SIZE CODE						
	0402	0603	0805	1206	1210	1806	1812
Pcs./reel	10 000	4 000	4 000	3 000	2 500	2 000	1 000

EMI-suppression products

SMD beads

SMD BEADS FOR EMI SUPPRESSION

General data

ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	"IEC 60 068-2-58", Part 2, Test Ta, method 1
Taping method	"IEC 60 286-3", "EIA 481-1" and "EIA 481-2"

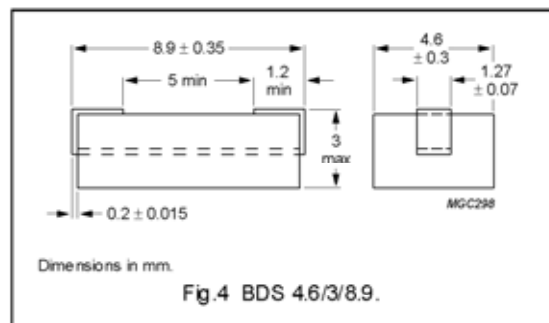
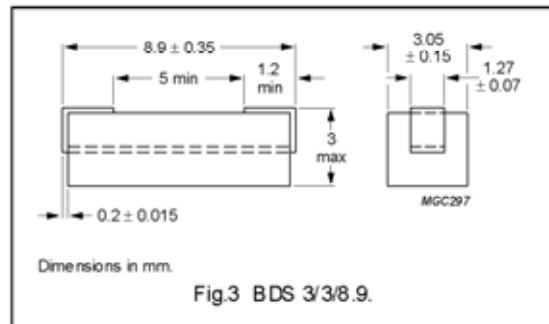
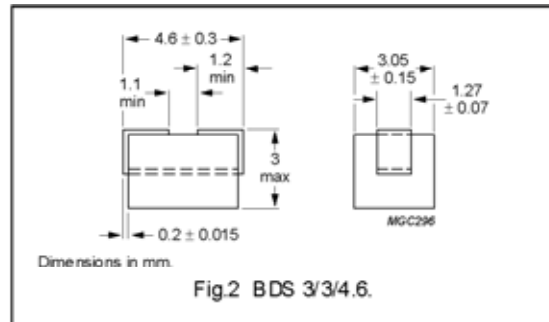
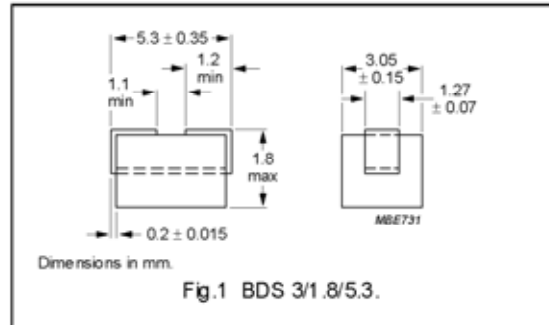
Grades, parameters and type numbers

GRADE	$ Z_{typ} ^{(1)}$ ( $\Omega$ )	at f (MHz)	TYPE NUMBER
<b>BDS 3/1.8/5.3; mass = 0.1 g <sup>(2)</sup></b>			
3S1	28	10	BDS 3/1.8/5.3-3S1
	33	25	
	25	100	
4S2	25	25	BDS 3/1.8/5.3-4S2
	38	100	
	45	300	
<b>BDS 3/3/4.6; mass = 0.15 g <sup>(2)</sup></b>			
3S1	25	3	BDS 3/3/4.6-3S1
	45	10	
	35	25	
4S2	30	25	BDS 3/3/4.6-4S2
	50	100	
	55	300	
<b>BDS 3/3/8.9; mass = 0.3 g <sup>(3)</sup></b>			
3S1	55	3	BDS 3/3/8.9-3S1
	80	10	
	55	25	
4S2	65	25	BDS 3/3/8.9-4S2
	100	100	
	110	300	
<b>BDS 4.6/3/8.9; mass = 0.5 g <sup>(3)</sup></b>			
4S2	65	25	BDS 4.6/3/8.9-4S2
	100	100	
	110	300	

Note

1. Typical values,  $|Z|_{min}$  is -20%.
2. DC resistance <0.6 m $\Omega$ .
3. DC resistance <1.0 m $\Omega$ .

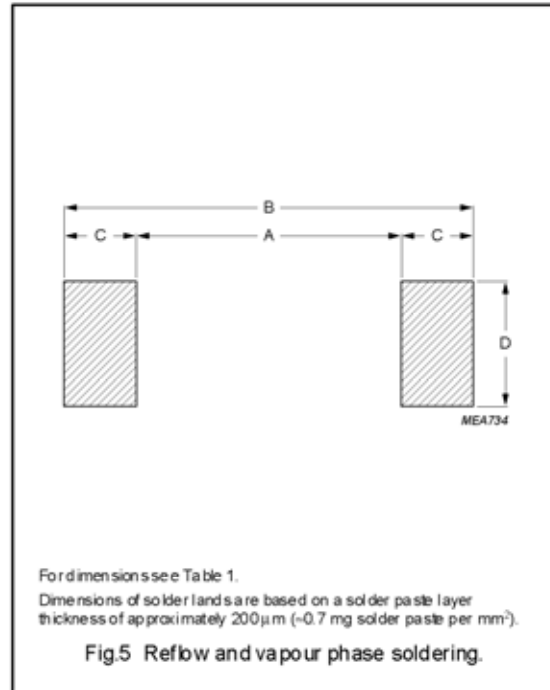
Mechanical data



**RECOMMENDED DIMENSIONS OF SOLDER LANDS**

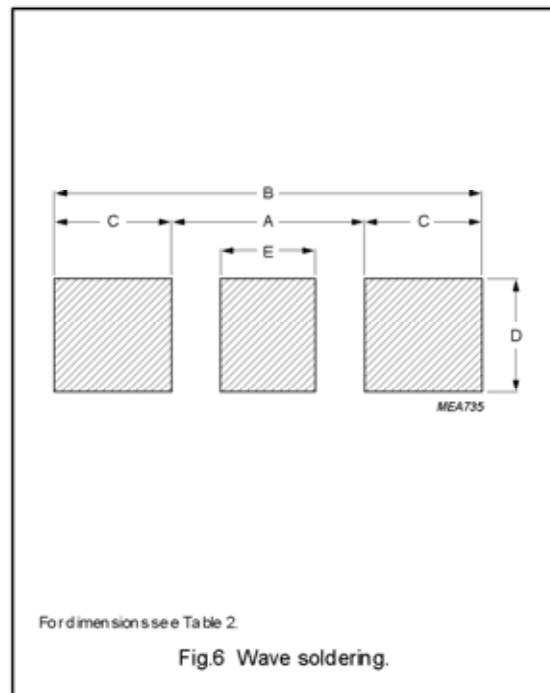
**Table 1** Reflow soldering

SIZE	DIMENSIONS (mm)			
	A	B	C	D
BDS 3/1.8/5.3	2.8	7.2	2.2	3.3
BDS 3/3/4.6	2.8	6.4	1.8	3.3
BDS 3/3/8.9	7.0	10.8	1.9	3.3
BDS 4.6/3/8.9	7.0	10.8	1.9	3.3

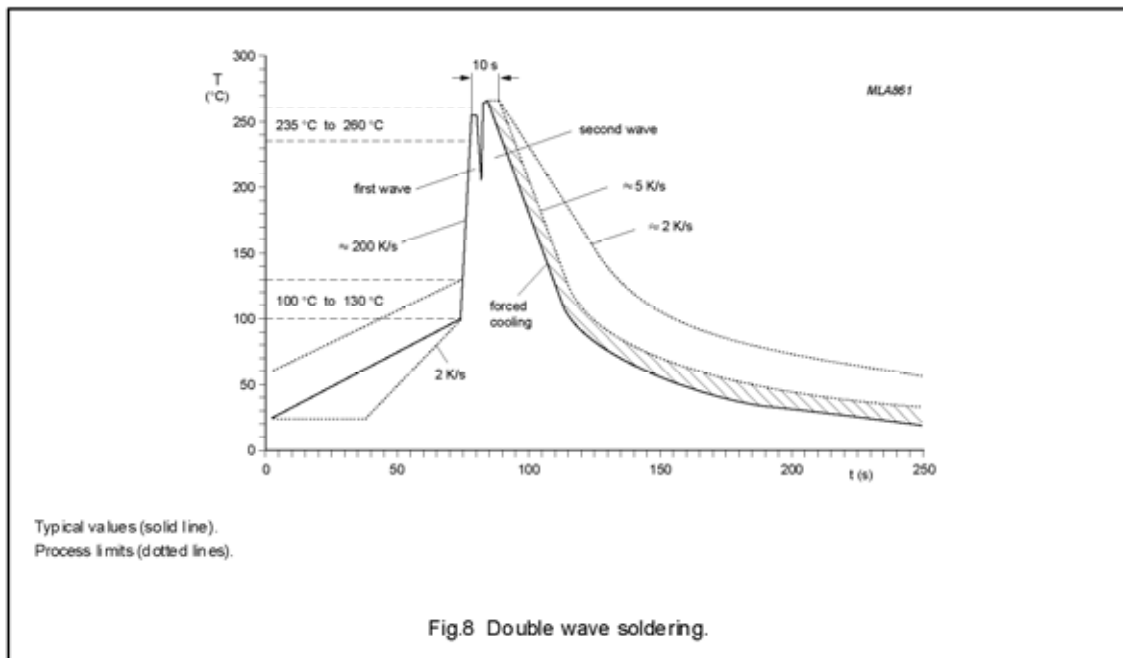
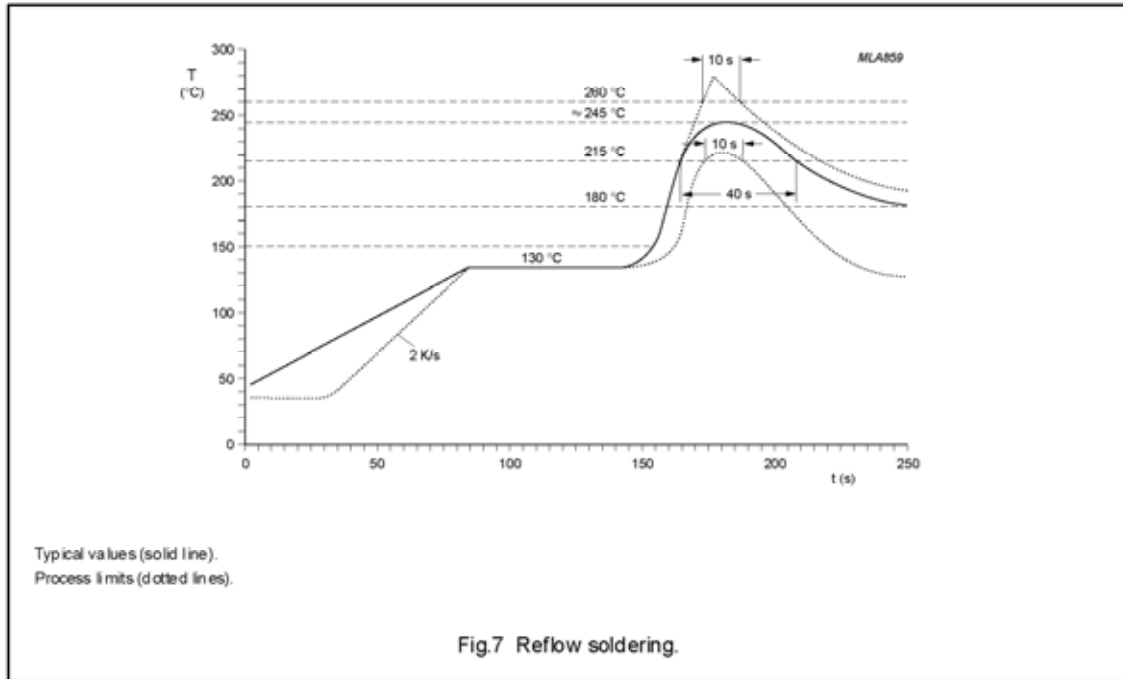


**Table 2** Wave soldering

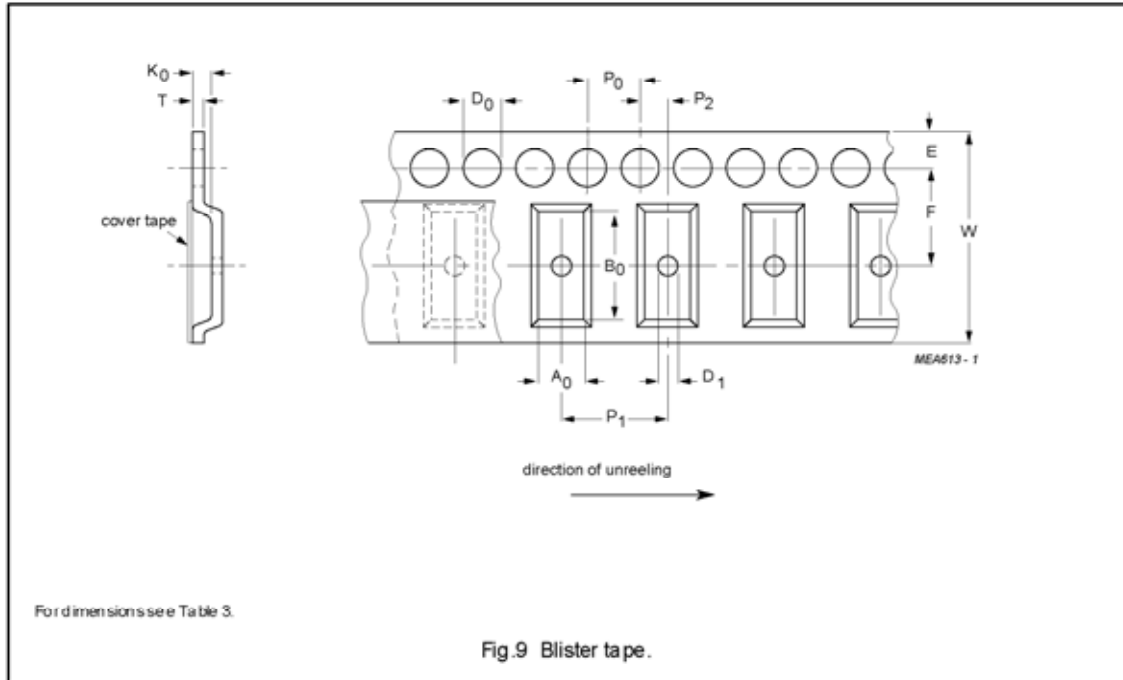
SIZE	DIMENSIONS (mm)				
	A	B	C	D	E
BDS 3/1.8/5.3	2.0	7.2	2.6	3.0	0.8
BDS 3/3/4.6	2.0	6.4	2.2	3.0	0.8
BDS 3/3/8.9	6.0	12.2	3.1	3.0	2.5
BDS 4.6/3/8.9	6.0	12.2	3.1	3.0	2.5



Soldering profiles

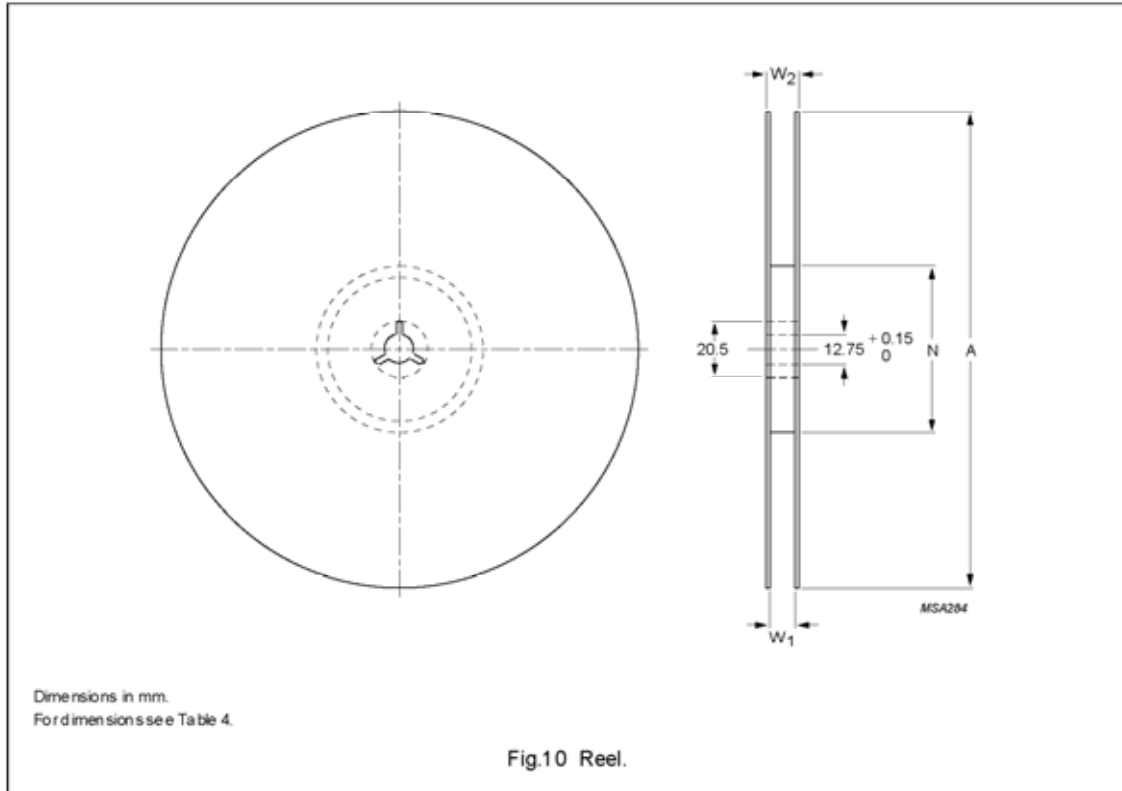


**BLISTER TAPE AND REEL DIMENSIONS**



**Table 3** Physical dimensions of blister tape; see Fig.9

SIZE	DIMENSIONS (mm)			
	BDS3/1.8/5.3	BDS3/3/4.6	BDS3/3/8.9	BDS4.6/3/8.9
$A_0$	$3.25 \pm 0.1$	$3.45 \pm 0.1$	$3.45 \pm 0.1$	$5.1 \pm 0.1$
$B_0$	$5.85 \pm 0.1$	$5.1 \pm 0.1$	$9.4 \pm 0.1$	$9.4 \pm 0.1$
$K_0$	$2.0 \pm 0.1$	$3.1 \pm 0.1$	$3.1 \pm 0.1$	$3.1 \pm 0.1$
$T$	$0.3 \pm 0.05$	$0.25 \pm 10\%$	$0.35 \pm 0.05$	$0.3 \pm 0.05$
$W$	$12.0 \pm 0.3$	$12.0 \pm 0.3$	$16.0 \pm 0.3$	$16.0 \pm 0.3$
$E$	$1.75 \pm 0.1$	$1.75 \pm 0.1$	$1.75 \pm 0.1$	$1.75 \pm 0.1$
$F$	$5.5 \pm 0.05$	$5.5 \pm 0.05$	$7.5 \pm 0.1$	$7.5 \pm 0.1$
$D_0$	$1.5 \pm 0.1$	$1.5 \pm 0.1$	$1.5 \pm 0.1$	$1.5 \pm 0.1$
$D_1$	$\geq 1.5$	$\geq 1.5$	$\geq 1.5$	$\geq 1.5$
$P_0$	$4.0 \pm 0.1$	$4.0 \pm 0.1$	$4.0 \pm 0.1$	$4.0 \pm 0.1$
$P_1$	$8.0 \pm 0.1$	$8.0 \pm 0.1$	$8.0 \pm 0.1$	$8.0 \pm 0.1$
$P_2$	$2.0 \pm 0.1$	$2.0 \pm 0.05$	$2.0 \pm 0.1$	$2.0 \pm 0.1$



**Table 4** Reel dimensions; see Fig.10

SIZE	DIMENSIONS (mm)			
	A	N	W <sub>1</sub>	W <sub>2</sub>
12	330	100 ±5	12.4	≤16.4
16	330	100 ±5	16.4	≤20.4

**SMD WIDEBAND CHOKES**

**SMD wideband choke WBS 1.5-5/4.8/10**

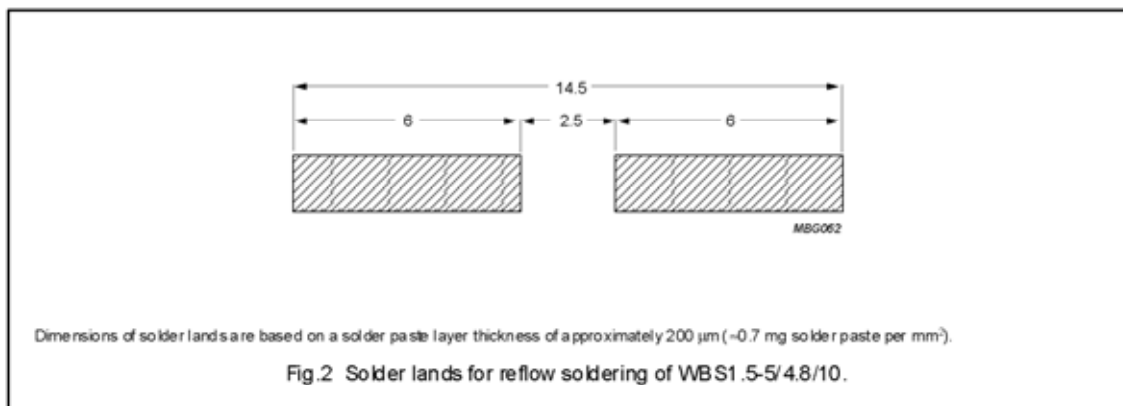
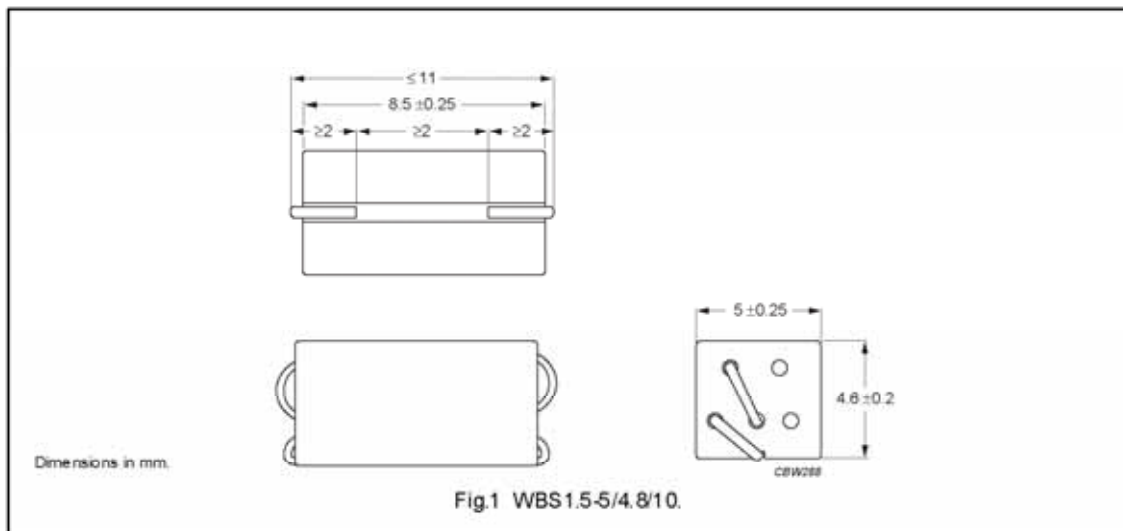
ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	1EC 60 068-2-58", Part 2, Test Ta, method 1
Mass	≈0.9 g
Taping method	1EC 60 286-3" and "EIA 481-2"

Grades, parameters and type numbers; see Fig.1

GRADE	$ Z_{typ} ^{(1)}$ ( $\Omega$ )	at f (MHz)	TYPE NUMBER
3S4	230	10	WBS1.5-5/4.8/10-3S4
	400	50	
	430	100	
4B1	275	25	WBS1.5-5/4.8/10-4B1
	500	100	
	350	300	

**Note**

1. Typical values,  $|Z|_{min}$  is -20%.



EMI-suppression products

SMD wideband chokes

SMD wideband choke WBS2.5-5/4.8/10

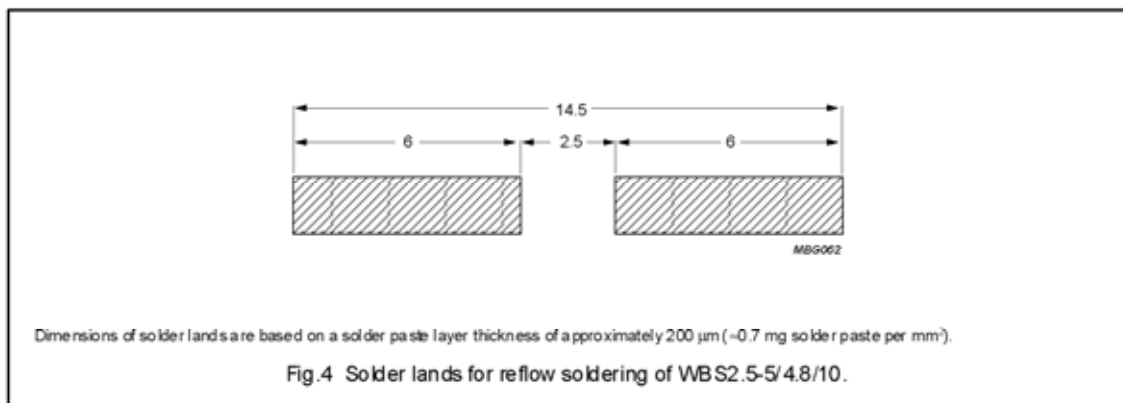
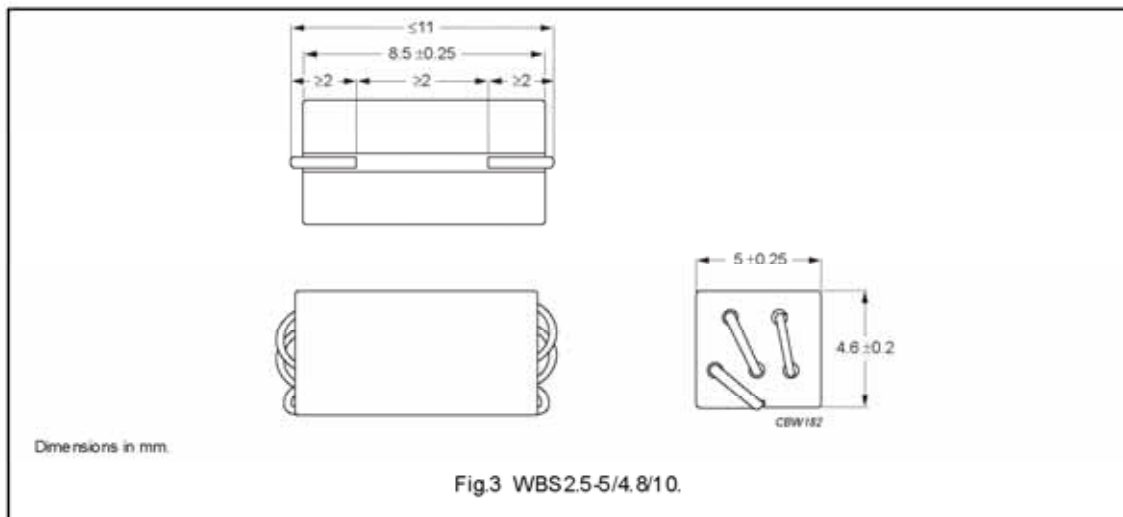
ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	1EC 60 068-2-58", Part 2, Test Ta, method 1
Mass	±0.9 g
Taping method	1EC 60 286-3" and "EIA 481-2"

Grades, parameters and type numbers; see Fig.3

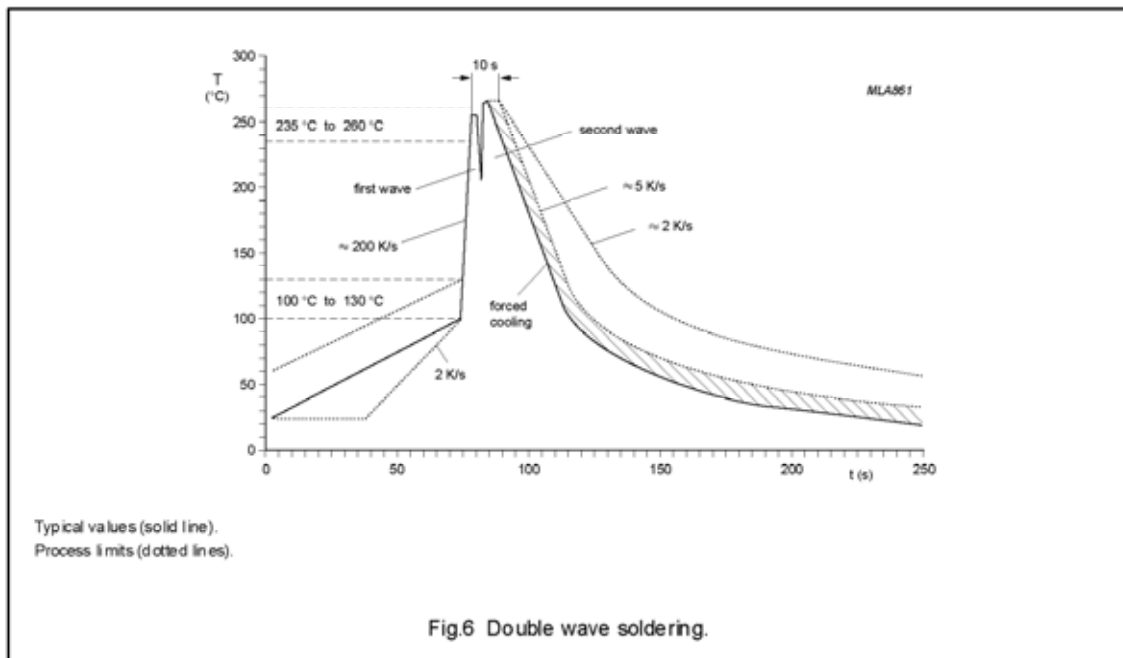
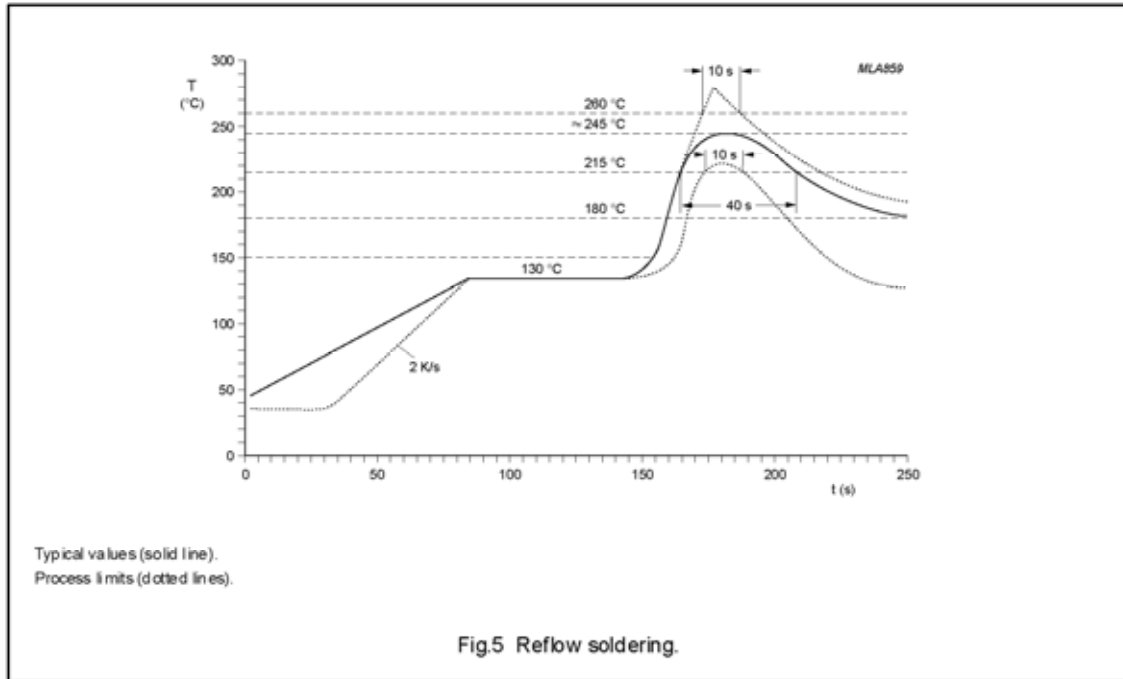
GRADE	$ Z_{typ} ^{(1)}$ ( $\Omega$ )	at f (MHz)	TYPE NUMBER
3S4	300	10	WBS2.5-5/4.8/10-3S4
	625	50	
	600	100	
4B1	485	25	WBS2.5-5/4.8/10-4B1
	850	100	
	350	300	

Note

1. Typical values,  $|Z|_{min}$  is -20%.



Soldering profiles



## BLISTER TAPE AND REEL DIMENSIONS

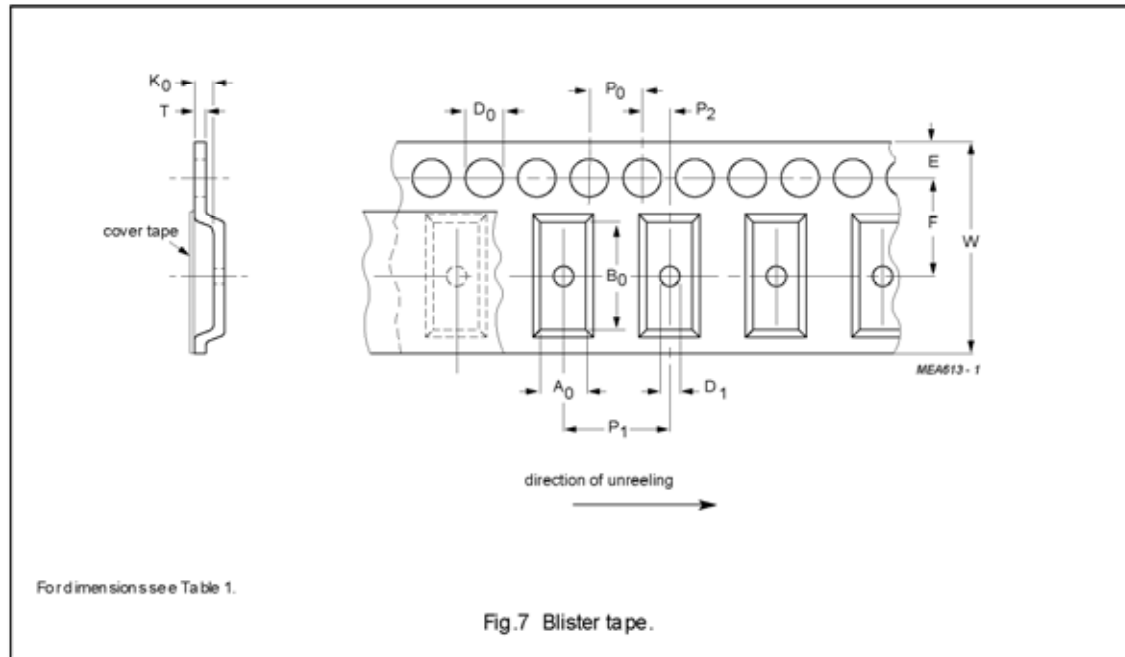
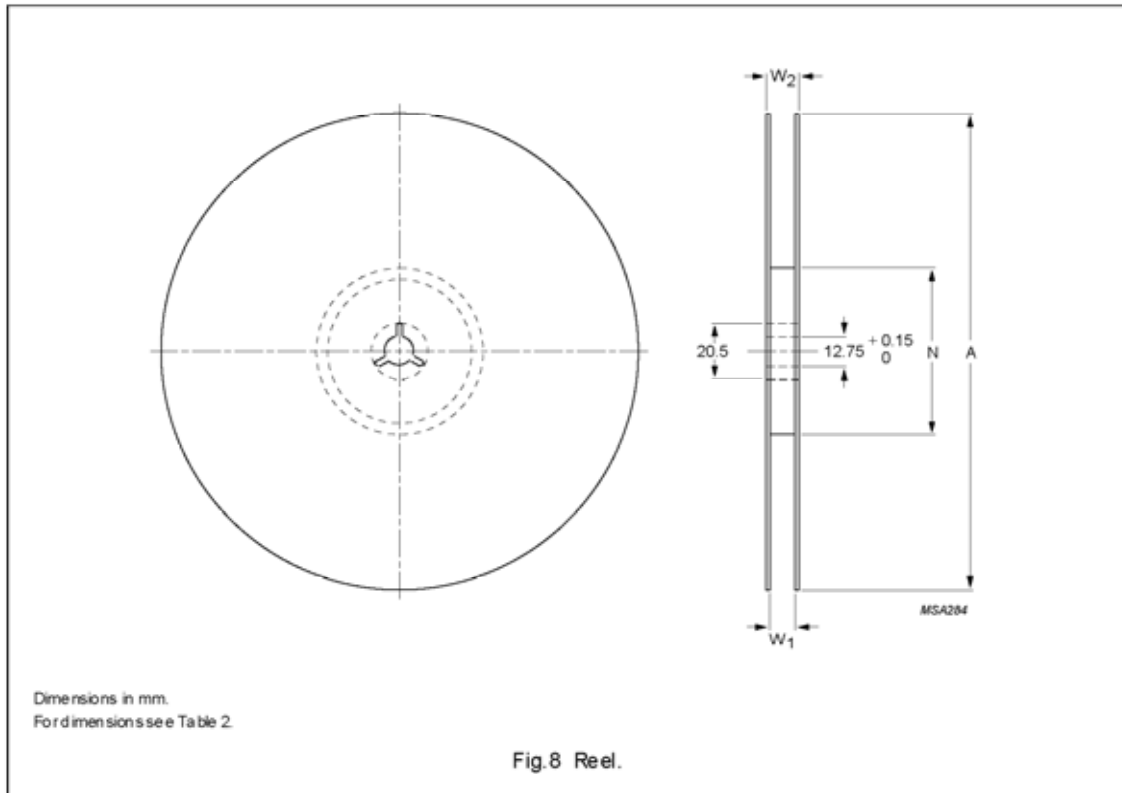


Table 1 Physical dimensions of blister tape; see Fig.7

SIZE	DIMENSIONS (mm)	
	WBS1.5-5/4.8/10	WBS2.5-5/4.8/10
A <sub>0</sub>	5.51	5.51
B <sub>0</sub>	11	11
K <sub>0</sub>	5.03	5.03
T	0.36	0.36
W	24	24
E	1.75	1.75
F	11.5	11.5
D <sub>0</sub>	1.5	1.5
D <sub>1</sub>	≥1.5	≥1.5
P <sub>0</sub>	4.0	4.0
P <sub>1</sub>	8.0	8.0
P <sub>2</sub>	2.0	2.0



**Table 2** Reel dimensions; see Fig.8

SIZE	DIMENSIONS (mm)			
	A	N	W <sub>1</sub>	W <sub>2</sub>
24	330	100 ±5	24.4	≤28.4

EMI-suppression products

SMD wideband chokes metallized

SMD wideband choke metallized WBSM2.5-5/4.8/10

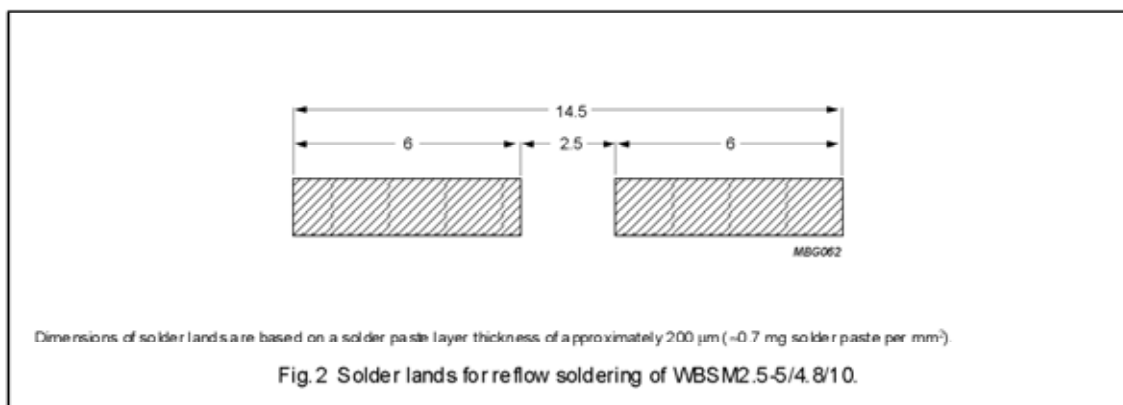
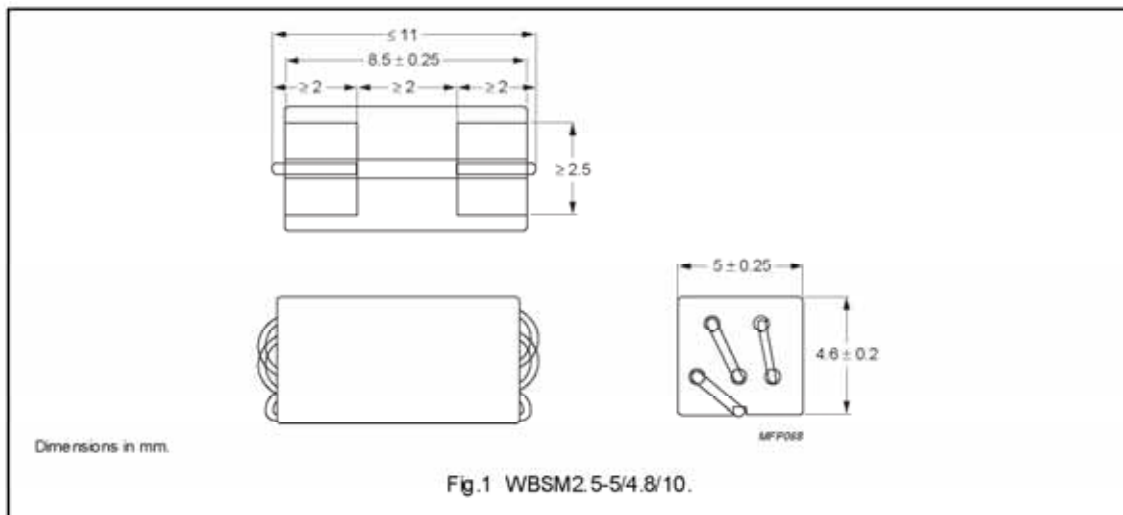
ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Metallization	copper-tin (CuSn)
Solderability	IEC 60 068-2-58, Part 2, Test Ta, method 1
Mass	≈0.9 g
Taping method	IEC 60 286-3 and "EIA 481-2"

Grades, parameters and type numbers; see Fig. 1

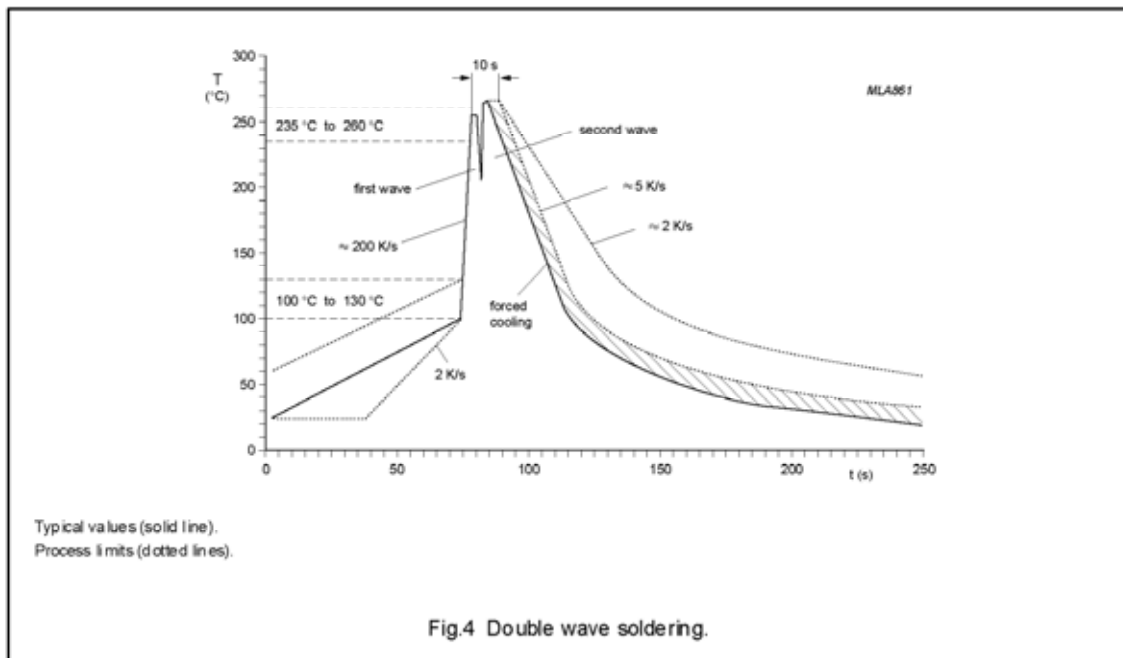
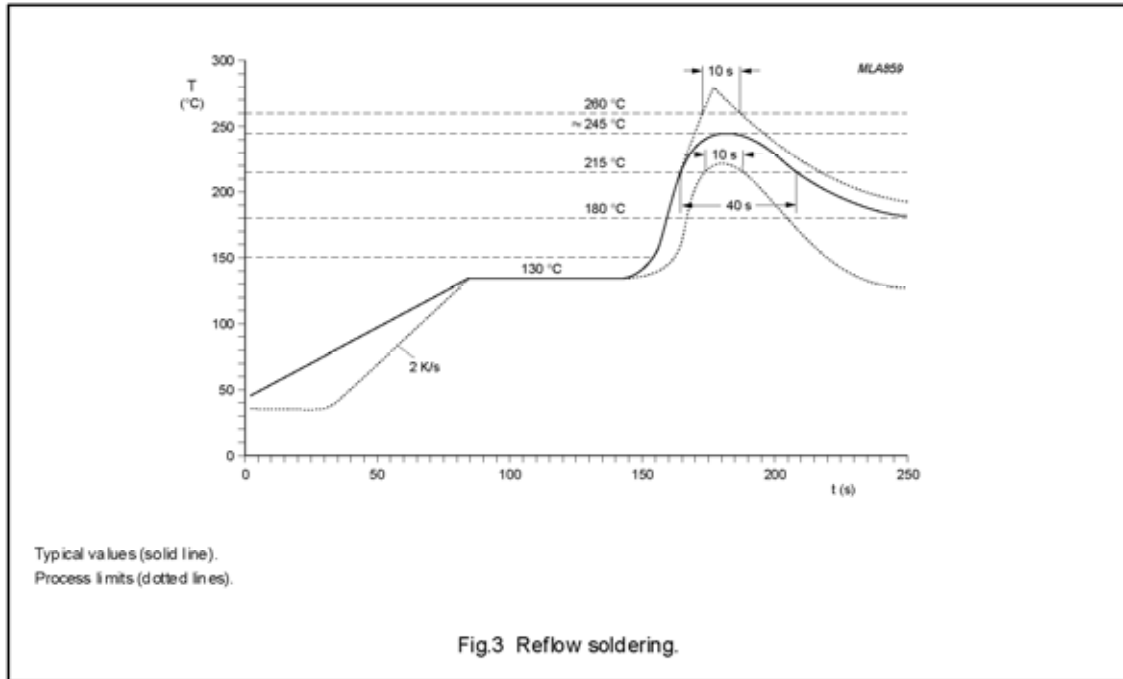
GRADE	$ Z_{typ} ^{(1)}$ ( $\Omega$ )	at f (MHz)	TYPE NUMBER
4B1	485	25	WBSM2.5-5/4.8/10-4B1
	850	100	
	350	300	

Note

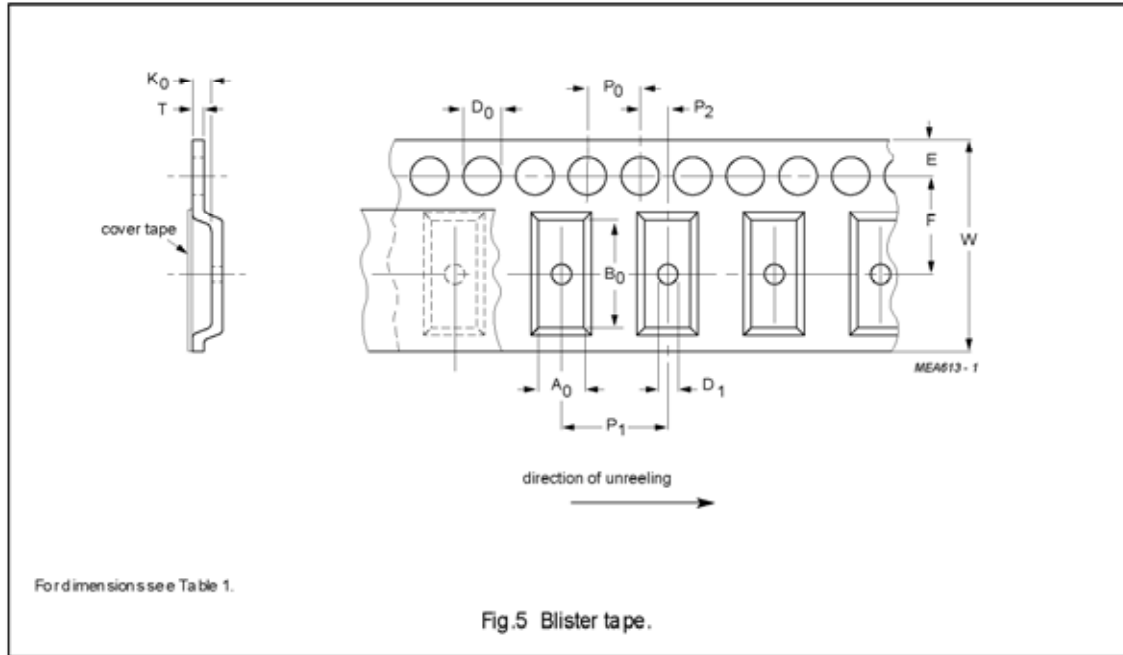
1. Typical values,  $|Z|_{min}$  is -20%.



Soldering profiles

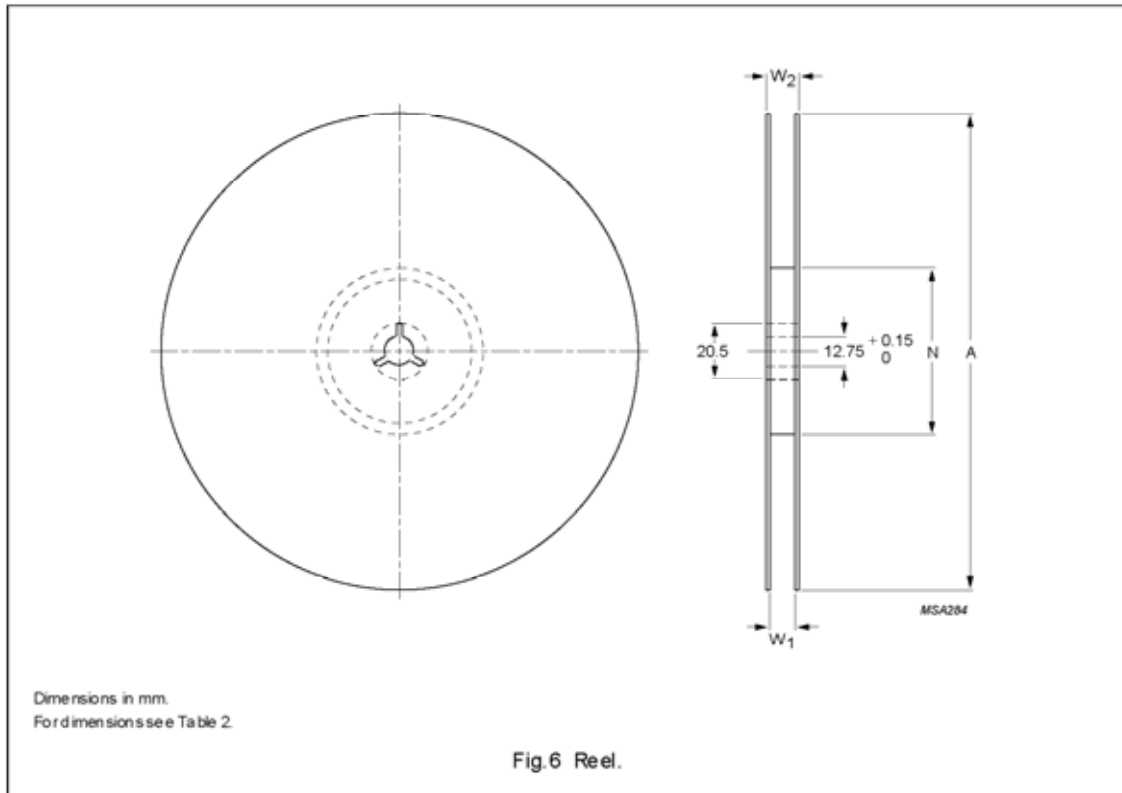


**BLISTER TAPE AND REEL DIMENSIONS**



**Table 1** Physical dimensions of blister tape; see Fig. 5

SIZE	DIMENSIONS (mm)
	WBSM2.5-5/4.8/10
$A_0$	5.51
$B_0$	11
$K_0$	5.03
$T$	0.36
$W$	24
$E$	1.75
$F$	11.5
$D_0$	1.5
$D_1$	$\geq 1.5$
$P_0$	4.0
$P_1$	8.0
$P_2$	2.0



**Table 2** Reel dimensions; see Fig.6

SIZE	DIMENSIONS (mm)			
	A	N	W <sub>1</sub>	W <sub>2</sub>
24	330	100 ±5	24.4	≤28.4

EMI-suppression products

Wideband chokes

WIDEBAND CHOKES FOR EMI-SUPPRESSION

General data WBC1.5/A

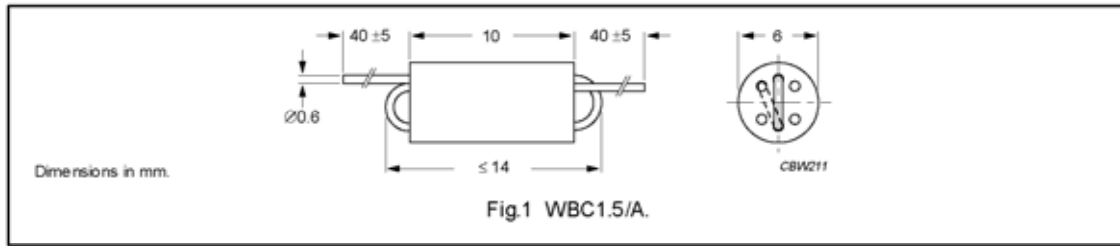
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	IEC 60 068-2-20", Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.1

GRADE	No. OF TURNS	Z <sub>typ</sub>   at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	1.5	≥300	120	WBC1.5/A-3S4
4B1	1.5	≥350	250	WBC1.5/A-4B1
4S2	1.5	213 <sup>(1)</sup>	10	WBC1.5/A-4S2
		400 <sup>(1)</sup>	50	
		470 <sup>(1)</sup>	100	

Note

1. Minimum guaranteed impedance is |Z<sub>typ</sub>|-20%.
2. Also available with insulated



General data WBC1.5/1.5/A

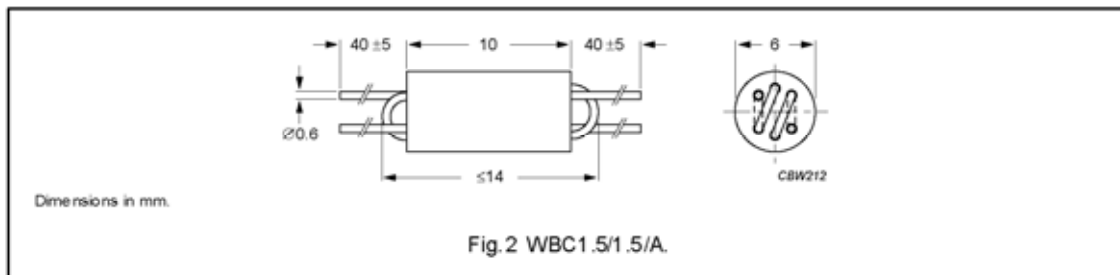
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	IEC 60 068-2-20", Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.2

GRADE	No. OF TURNS	Z <sub>typ</sub>   at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2 × 1.5	≥700 <sup>(1)</sup>	50	WBC1.5/1.5/A-3S4
4B1	2 × 1.5	≥800 <sup>(1)</sup>	110	WBC1.5/1.5/A-4B1
4S2	2 × 1.5	213 <sup>(2)</sup>	10	WBC1.5/1.5/A-4S2
		400 <sup>(2)</sup>	50	
		470 <sup>(2)</sup>	100	
4A15	2 × 1.5	1000	50	WBC1.5/1.5/A-4A15
		1000	180	

Notes

1. |Z| measured with both windings connected in series.
2. Minimum guaranteed impedance is |Z<sub>typ</sub>|-20%; measured with one winding.



EMI-suppression products

Wideband chokes

General data WBC2/R

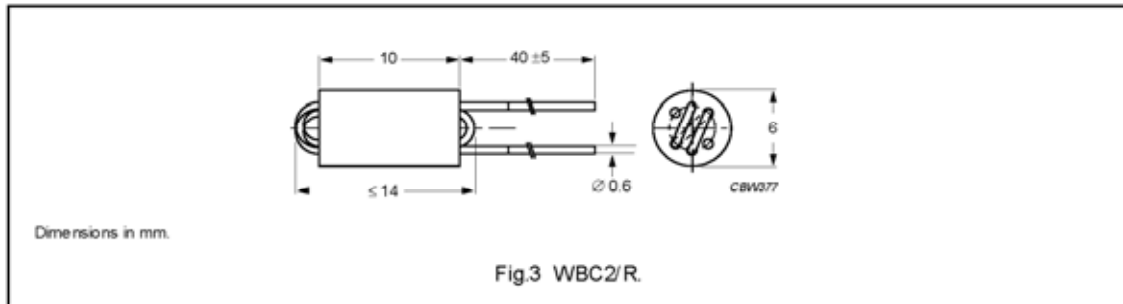
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	IEC 60 068-2-20, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.3

GRADE	No. OF TURNS	Z <sub>typ</sub>   <sup>(1)</sup> at f		TYPE NUMBER
		(Ω)	(MHz)	
4S2	2	300	10	WBC2/R-4S2
		650	50	
		600	100	
4A15	2	≥730	50	WBC2/R-4A15
		≥750	180	

Note

1. Minimum guaranteed impedance is |Z<sub>typ</sub>|-20%.



General data WBC2.5/A

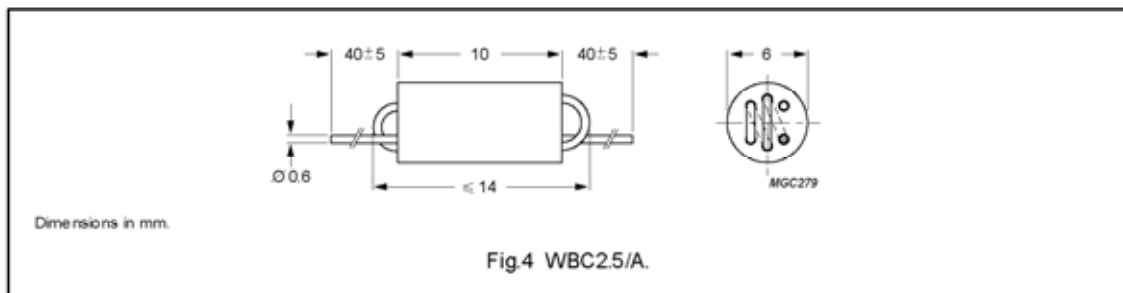
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	IEC 60 068-2-20, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.4

GRADE	No. OF TURNS	Z <sub>typ</sub>   at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2.5	≥600	50	WBC2.5/A-3S4 <sup>(2)</sup>
4B1	2.5	≥700	180	WBC2.5/A-4B1 <sup>(2)</sup>
4S2	2.5	400 <sup>(1)</sup>	10	WBC2.5/A-4S2
		850 <sup>(1)</sup>	50	
		725 <sup>(1)</sup>	100	
4A15	2.5	800	50	WBC2.5/A-4A15
		820	180	

Note

1. Minimum guaranteed impedance is |Z<sub>typ</sub>|-20%.
2. Also available with insulated wires, sleeves, encapsulated and taped and reeled.



EMI-suppression products

Wideband chokes

General data WBC2.5/R

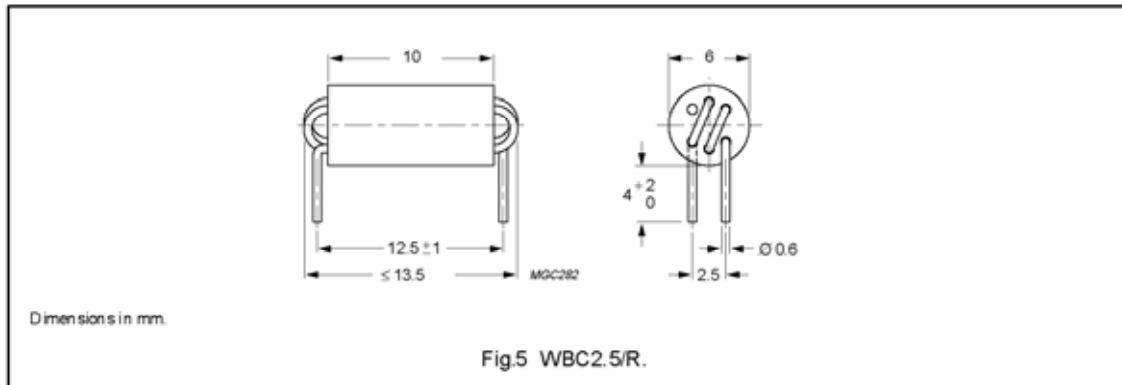
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	"IEC 60068-2-20", Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.5

GRADE	No. OF TURNS	Z <sub>typ</sub>   at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2.5	≥600	50	WBC2.5/R-3S4 <sup>(1)</sup> <b>sup</b>
4B1	2.5	≥700	75	WBC2.5/R-4B1 <sup>(2)</sup> <b>sup</b>
4S2	2.5	400	10	WBC2.5/R-4S2 <b>sup</b>
		850	50	
		725	100	

Note

1. Also available with insulated wires, sleeves and moulded.
2. Also available with insulated wires, sleeves.



General data WBC2.5/SP

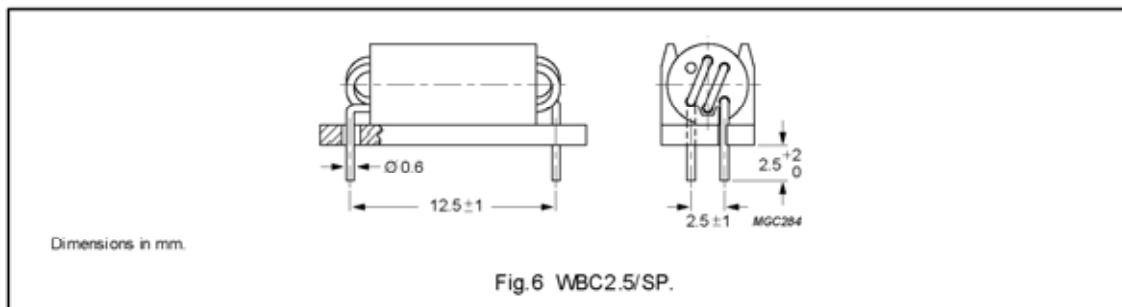
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Support	polyamide (PA6.6) plate to allow mounting across circuit tracks; flame retardant in accordance with UL 94V-0
Solderability	"IEC 60068-2-20", Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.6

GRADE note 1	No. OF TURNS	Z <sub>typ</sub>   at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2.5	≥600	50	WBC2.5/SP-3S4 <b>sup</b>
4B1	2.5	≥700	75	WBC2.5/SP-4B1 <b>sup</b>

Note

1. Colour code 3S4 = blue, 4B1 = green.



EMI-suppression products

Wideband chokes

General data WBC3/R

ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated, lead-free (Sn) available on request.
Solderability	'IEC 60 068-2-20', Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.7

GRADE	No. OF TURNS	Z <sub>typ</sub>   at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	3	≥650	63	WBC3/R-3S4 <sup>(2)</sup>
4B1	3	≥800	110	WBC3/R-4B1 <sup>(2)</sup>
4S2	3	500 <sup>(1)</sup>	10	WBC3/R-4S2
		1 000 <sup>(1)</sup>	50	
		688 <sup>(1)</sup>	100	
4A15	3	≥1000	50	WBC3/R-4A15
		≥1000	180	

Note

1. Minimum guaranteed impedance is |Z<sub>typ</sub> -20%.
2. Also available with encapsulation and/or taped and reeled.

