

CHAPTER 6

PACKING METHODS

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INTRODUCTION

This chapter contains a survey of some of the packing methods most frequently used by Philips Semiconductors. It includes information that may be important to customers when making their purchasing decisions, for example the main dimensions, shapes, and packing quantities.

Standardization

For semiconductors, packing serves two important functions. The first and most obvious function is protection during storage and transport to customers. This, of course, applies to all products, not just semiconductors. The second is to act as a delivery medium for automatic placement machines during equipment manufacture. To do this effectively, the reels, trays and tubes that components are packed in must meet recognized standards. In this respect, Philips Semiconductors actively cooperates with standardization authorities throughout the world.

In addition, our packing methods meet all major international standards, including those of IEC (International Electrotechnical Commission), JEDEC (Joint Electron Device Engineering Council, USA) and NEDA (National Electronic Distributor Association, USA).

Environmental care

Nowadays, an important issue is environmental impact. Component and equipment manufacturers are continuously working to improve the environment friendliness of their products and packing, and have devoted much effort to eliminating the use of toxic materials and to looking at ways in which materials can be recycled.

In these respects, Philips Semiconductors has taken several important steps on the packing front. These include:

- Reducing the amount of packing material by switching to 'one piece' boxes (instead of boxes with upper and lower parts)
- Changing to 'mono material' to aid recycling. For example, from aluminium-lined boxes to carbon-coated boxes.
- Changing from white boxes to natural brown boxes to eliminate the use of bleach (chlorine) in their manufacture.

The aim is minimum waste and minimum environmental impact. We have already gone a long way towards this in the development of our packing methods. And future developments will take us even further along this route.

For more information on environmental issues, refer to Chapter 7: Environmental information.

More Information

For more information about packing methods, please contact:

Philips Semiconductors Packing Management,
BAE-09
P.O. Box 218,
5600 MD Eindhoven
The Netherlands.

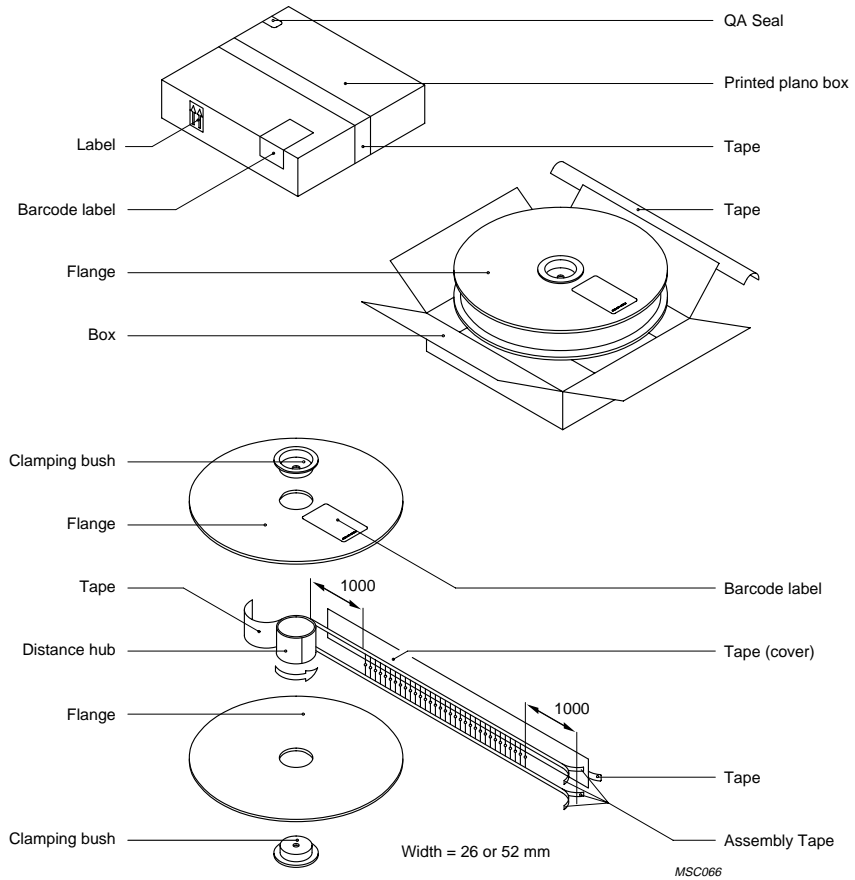
GLOSSARY OF TERMS

Carrier	Plastic tube, tray or tape with cavities, which can contain IC products
Package	Container with leads for an IC chip (also known as an envelope or outline)
Packing method	Combination of a carrier and a box to protect products during transport and storage
Pin	Rigid plastic pin that closes a tube for DIP packages by insertion through holes in its end
Plug	Flexible plastic plug that closes a tube for PLCC or SIL packages by insertion into its end
PQ	Packing Quantity, in a box containing one or more SPQs
SOD	Standard Outline Diode
SOT	Standard Outline Transistor
SPQ	Smallest Packing Quantity, mostly the quantity in one carrier
Surface mount	Mounted on the surface of a PCB
Through-hole	Mounted onto a PCB by insertion of leads into holes
Turnlock	Rigid plastic pin that closes a tube for SO packages by insertion into its end and turning to lock in place

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PACKING METHODS IN EXPLODED VIEW

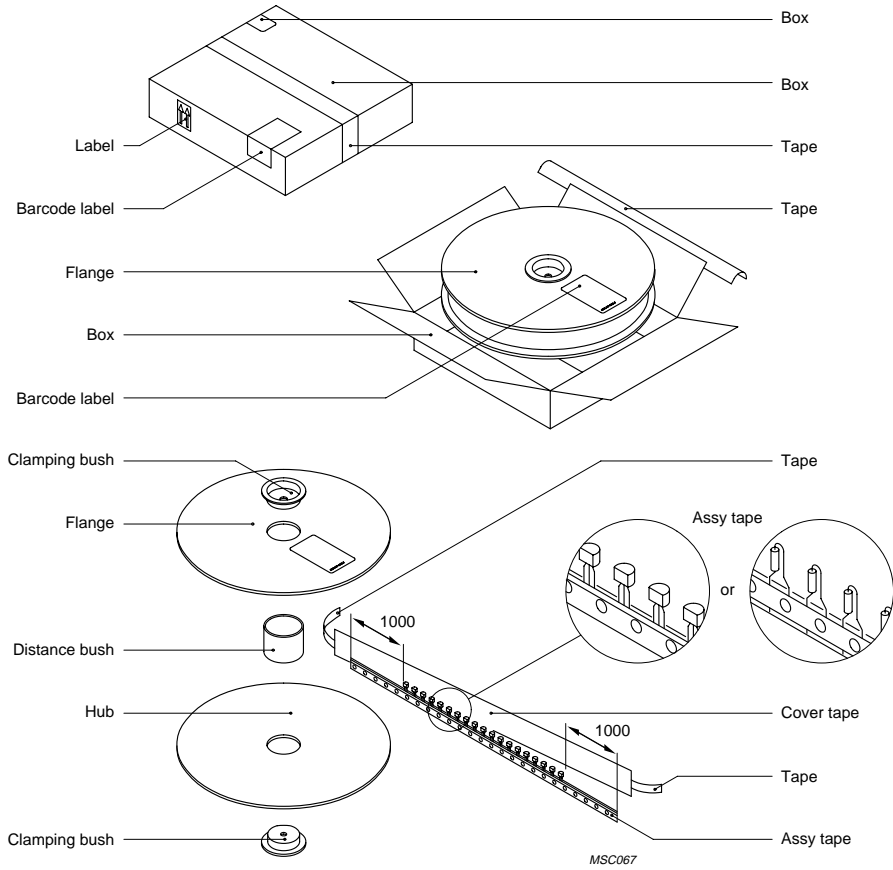


Dimensions in mm.

Fig.1 Reel pack axial taped.

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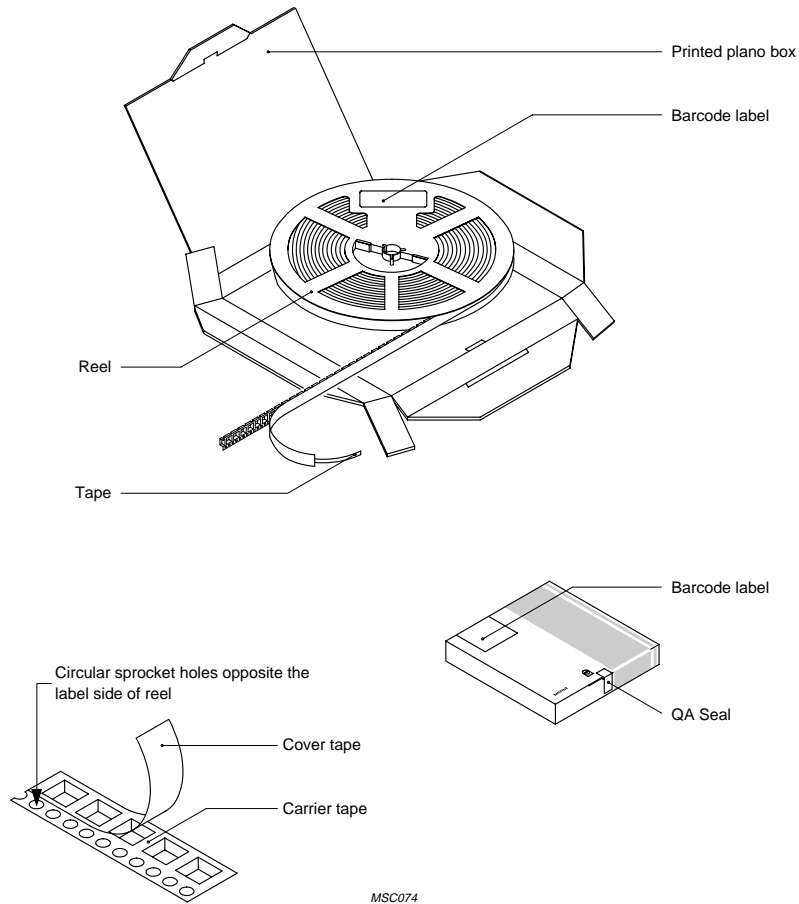


Dimensions in mm.

Fig.2 Reel pack radial taped.

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Fig.3 Reel pack for SMD.

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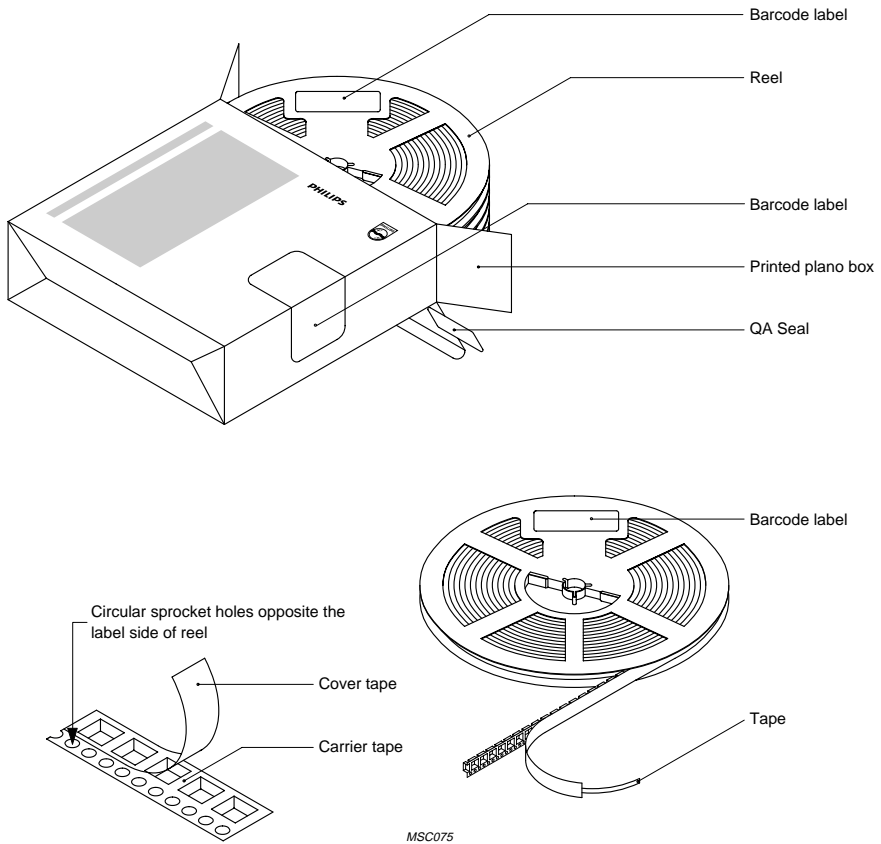


Fig.4 Five reel pack for SMD.

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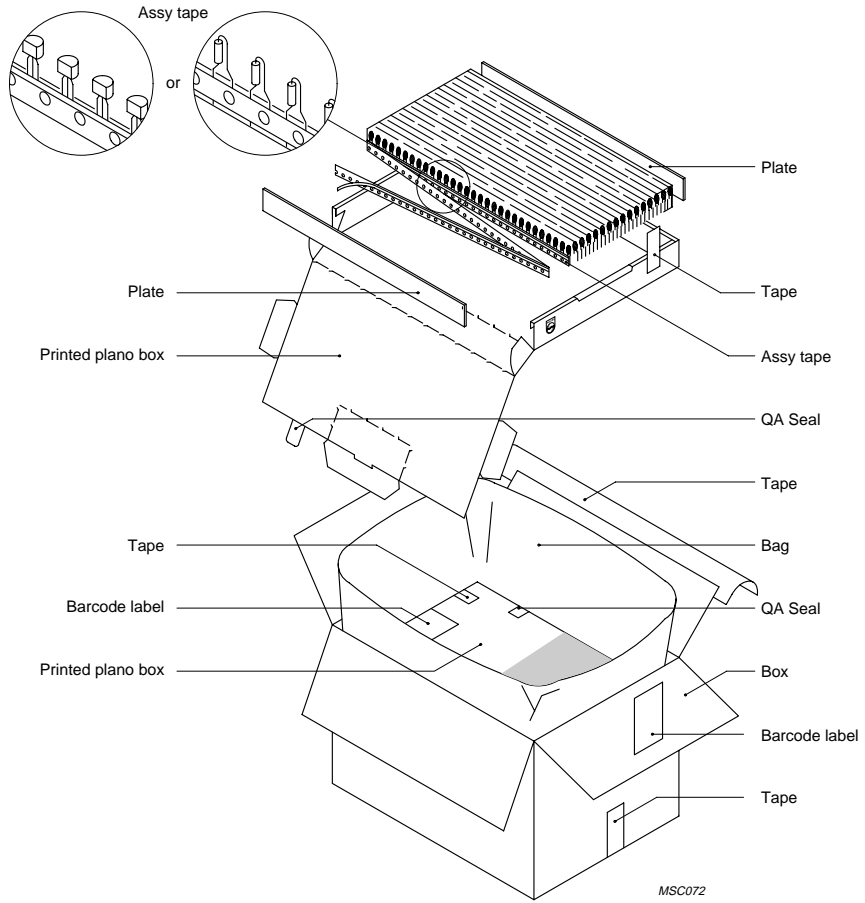


Fig.5 Five ammo pack radial taped.

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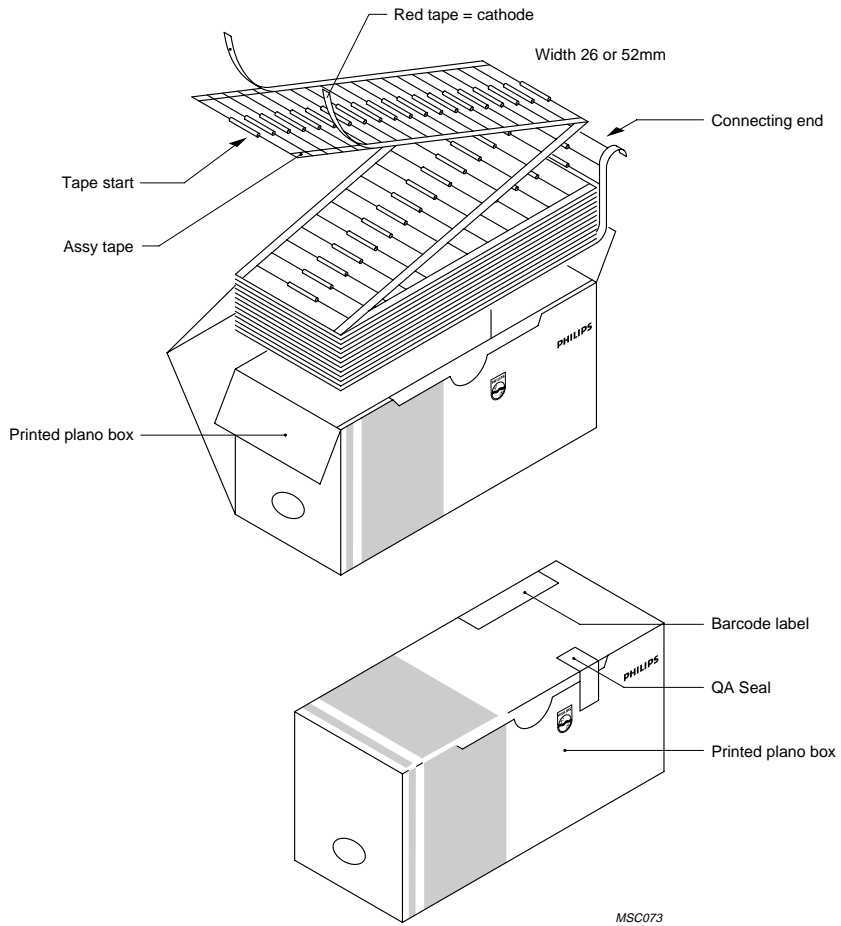


Fig.6 Ammo pack axial taped.

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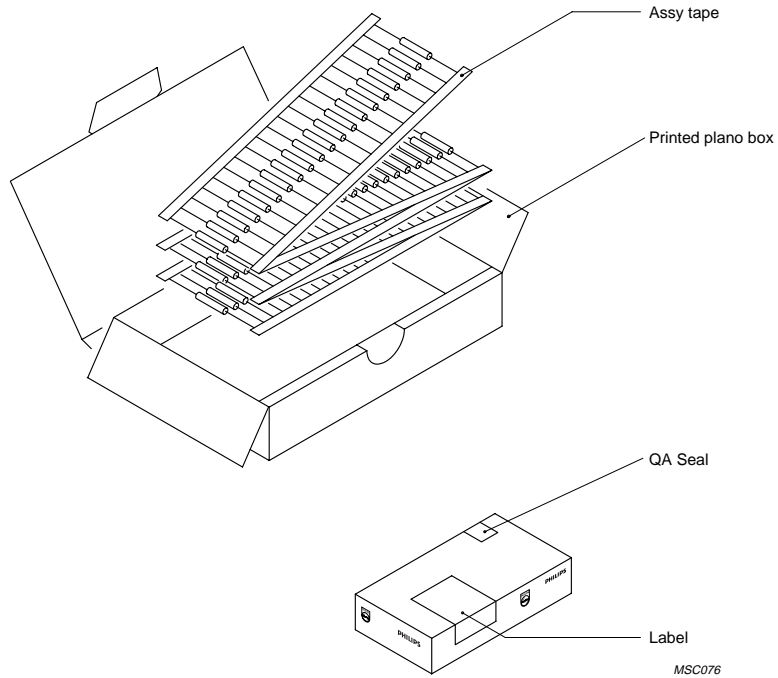


Fig.7 Ammo pack axial taped small size.

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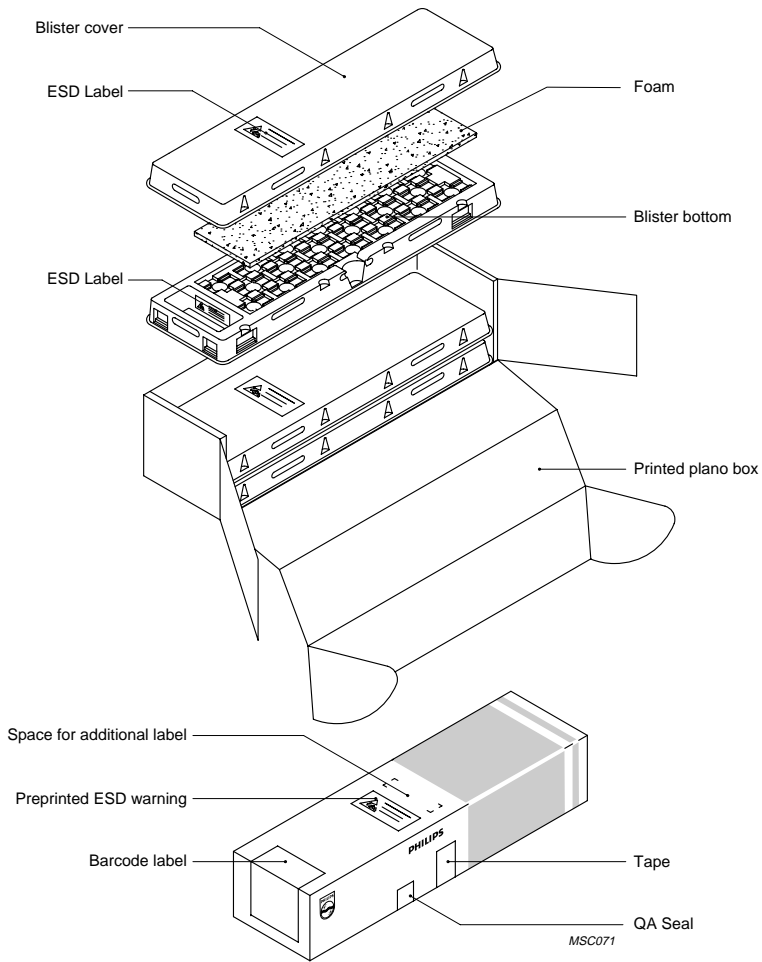


Fig.8 Blister pack.

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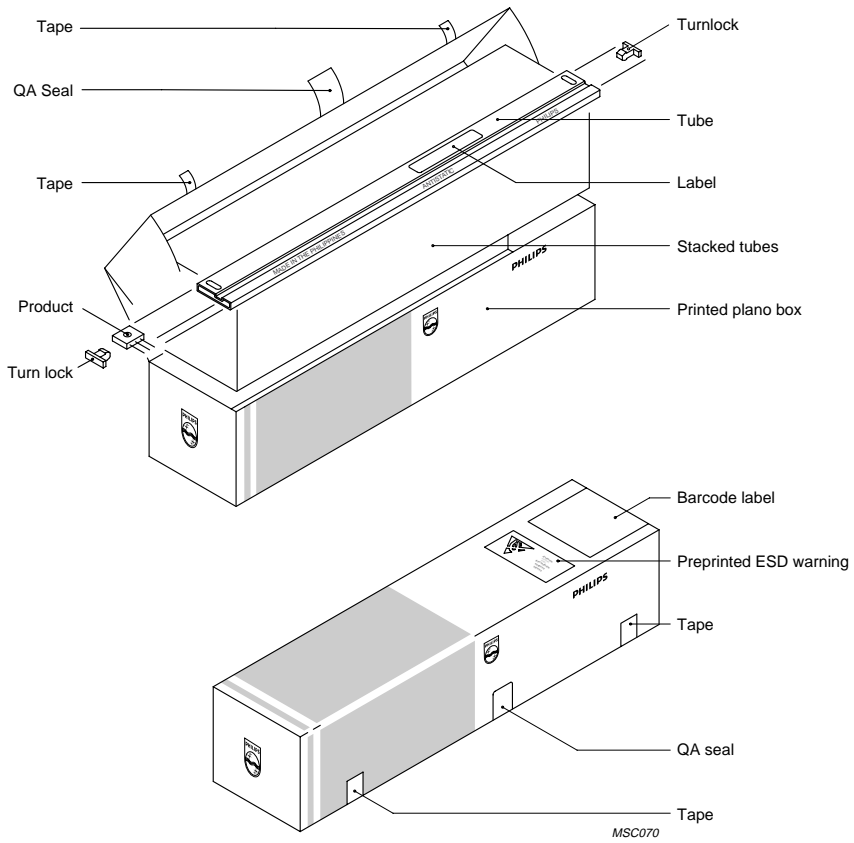


Fig.9 Tube pack.

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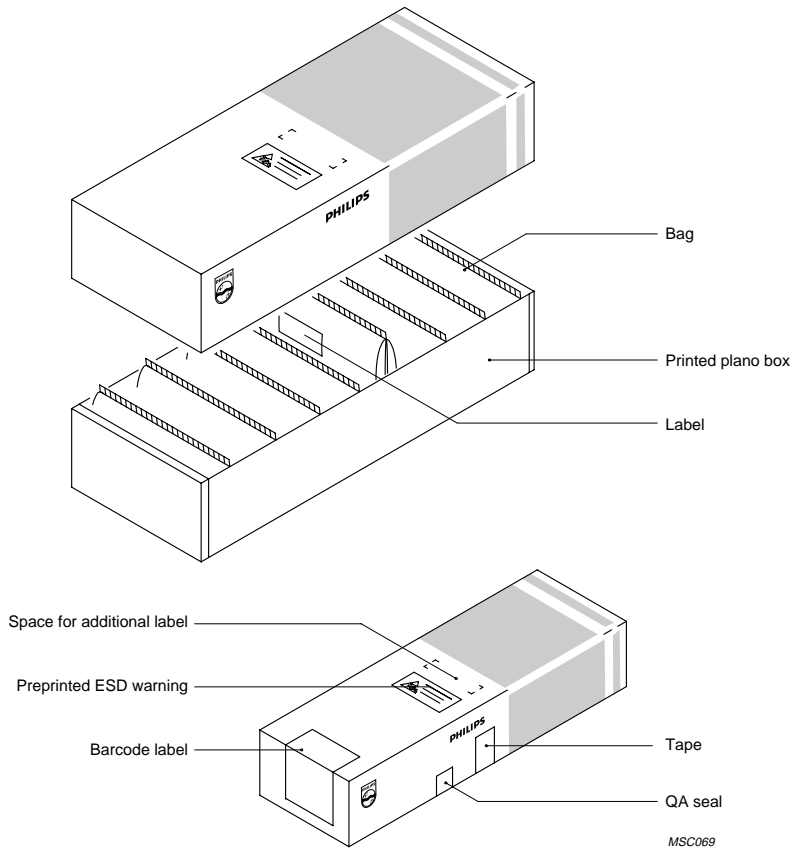


Fig.10 Bulk pack (bag).

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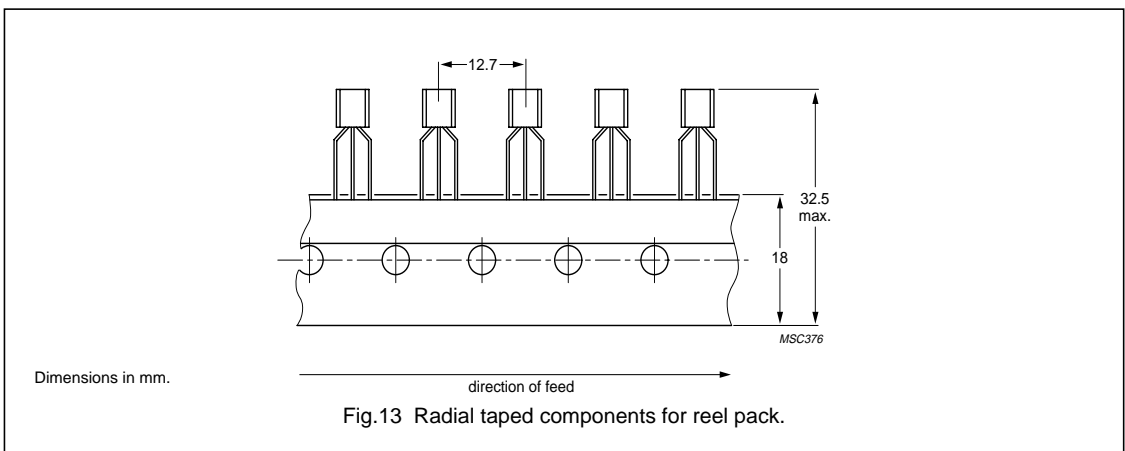
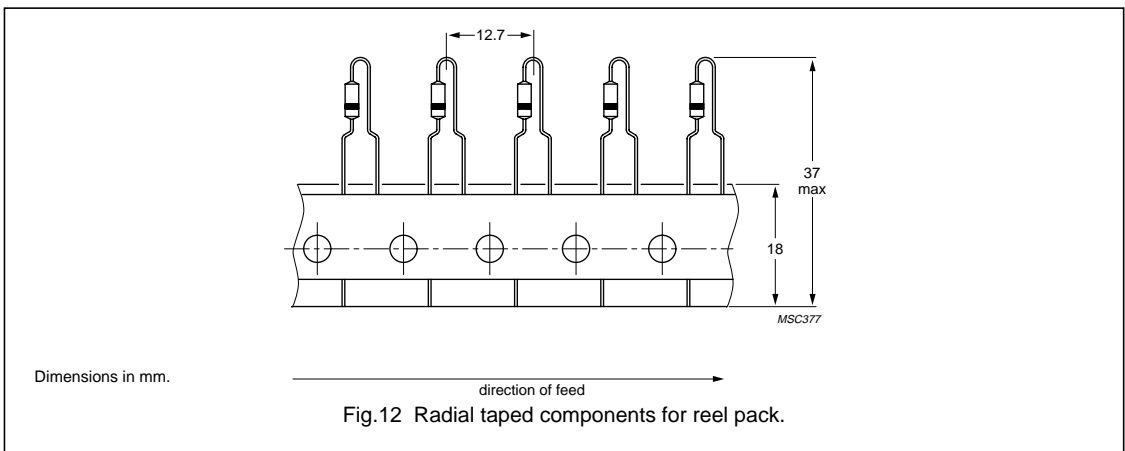
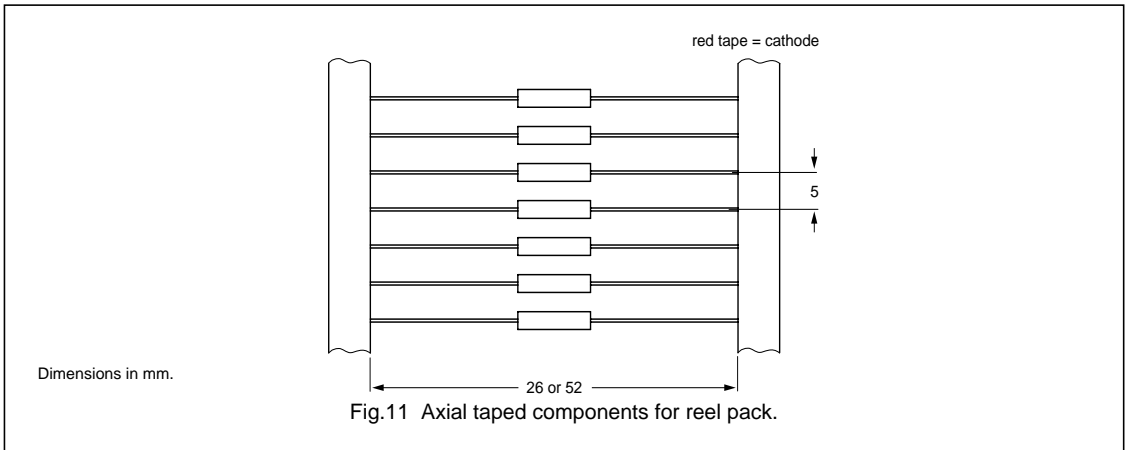
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PACKING QUANTITIES, BOX DIMENSIONS AND CARRIER SHAPES**Reel pack - axial and radial taped**

PHILIPS PACKAGE TYPE/OUTLINE CODE	TAPPING WIDTH (mm)	METHOD	SPQ	PQ	OUTER BOX DIMENSIONS L × W × H (mm)
SOD27	26	axial	10000	10000	358 × 358 × 56
	52	axial	10000	10000	356 × 356 × 88
	37	radial	5000	5000	360 × 360 × 60
SOD57	52	axial	5000	5000	356 × 356 × 88
	52	axial	10000	10000	356 × 356 × 88
SOD61	52	axial	5000	5000	356 × 356 × 102
SOD64	52	axial	5000	5000	356 × 356 × 88
SOD66	52	axial	5000	5000	356 × 356 × 88
SOD68	26	axial	10000	10000	358 × 358 × 56
	52	axial	10000	10000	356 × 356 × 88
SOD70	32	radial	2000	10000	385 × 385 × 275
SOD81	52	axial	5000	5000	356 × 356 × 88
SOD83	52	axial	2000	2000	356 × 356 × 102
SOD88	52	axial	5000	5000	356 × 356 × 102
SOD89	52	axial	2000	2000	356 × 356 × 102
SOD91	52	axial	10000	10000	356 × 356 × 88
SOT54	32	radial	2000	10000	395 × 395 × 290

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Tape and reel - surface mount devices

PHILIPS PACKAGE TYPE/OUTLINE CODE	REEL DIMENSIONS D × W (mm)	SPQ AND PQ	REELS PER BOX	OUTER BOX DIMENSIONS L × W × H (mm)
SOD80	180 × 8	2500	1	186 × 186 × 16
	330 × 8	10000	1	338 × 338 × 18
	330 × 8	50000	5	339 × 339 × 71
SOD87	180 × 8	2000	1	186 × 186 × 16
	180 × 8	10000	5	182 × 182 × 55
	330 × 8	8000	1	338 × 338 × 18
	330 × 8	40000	5	339 × 339 × 71
SOD106	180 × 12	1500	1	186 × 186 × 24
SOD110	180 × 8	3000	1	186 × 186 × 16
	330 × 8	10000	1	338 × 338 × 18
SOD323	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOD523	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOT23	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOT89	180 × 12	1000	1	186 × 186 × 24
	330 × 12	4000	1	338 × 338 × 24
SOT96-1 (SO8)	180 × 12	1000	1	190 × 190 × 26
	330 × 12	2500	1	340 × 340 × 26
SOT143	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOT163-1 (SO20)	180 × 24	500	1	190 × 190 × 38
	330 × 24	2000	1	340 × 340 × 38
SOT223	180 × 12	1000	1	186 × 186 × 24
	330 × 12	4000	1	338 × 338 × 24
SOT323	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOT343	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOT346	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOT353	180 × 8	3000	1	186 × 186 × 16
SOT363	180 × 8	3000	1	186 × 186 × 16
SOT404	330 × 24	800	1	340 × 340 × 38
SOT409	180 × 16	500	1	186 × 186 × 30
SOT416	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18

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PHILIPS PACKAGE TYPE/OUTLINE CODE	REEL DIMENSIONS D × W (mm)	SPQ AND PQ	REELS PER BOX	OUTER BOX DIMENSIONS L × W × H (mm)
SOT426	330 × 24	800	1	340 × 340 × 38
SOT428	330 × 16	2500	1	340 × 340 × 30
SOT453A	330 × 32	1300	1	340 × 340 × 49
SOT453B	330 × 32	600	1	340 × 340 × 49
SOT453C	330 × 32	800	1	340 × 340 × 49
SOT457	180 × 8	3000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18
SOT482	330 × 24	2000	1	340 × 340 × 38
SOT490	180 × 8	4000	1	186 × 186 × 16
	286 × 8	10000	1	293 × 293 × 18

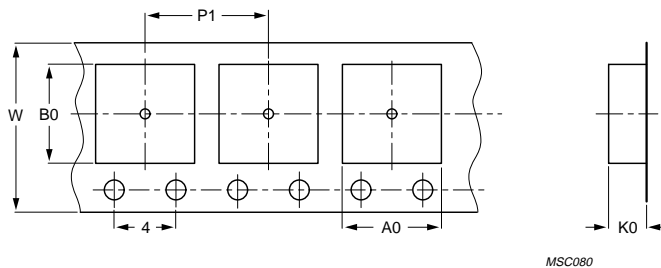
Tape and reel - carrier tape dimensions

PHILIPS PACKAGE TYPE/OUTLINE CODE	CARRIER TAPE DIMENSIONS (mm) (See Figs. 15 and 14)				
	A0	B0	K0	P1	W
SOD80	1.6	3.9	1.7	4.0	8.0
SOD87	2.0	3.9	2.3	4.0	8.0
SOD106	3.1	5.6	2.7	4.0	12.0
SOD110	1.6	2.3	1.6	4.0	8.0
SOD323	1.6	2.9	1.2	4.0	8.0
SOD523	0.9	1.4	1.0	4.0	8.0
SOT23	3.1	2.6	1.3	4.0	8.0
SOT89	4.3	4.6	1.6	8.0	12.0
SOT96-1 (SO8)	6.7	5.4	1.8	8.0	12.0
SOT143	3.1	2.6	1.3	4.0	8.0
SOT163-1 (SO20)	11.1	13.5	2.7	12.0	24.0
SOT223	7.0	7.4	1.9	8.0	12.0
SOT323	2.4	2.4	1.2	4.0	8.0
SOT343	2.4	2.4	1.2	4.0	8.0
SOT346	3.1	3.2	1.3	4.0	8.0
SOT353	2.4	2.4	1.2	4.0	8.0
SOT363	2.4	2.4	1.2	4.0	8.0
SOT404	10.6	15.8	4.9	16.0	24.0
SOT409	6.0	8.0	2.5	8.0	16.0
SOT416	1.9	1.8	1.0	4.0	8.0
SOT426	10.6	15.8	4.9	16.0	24.0
SOT428	7.0	10.5	2.5	8.0	16.0
SOT453A	10.2	21.8	2.8	16.0	32.0
SOT453B	11.1	21.8	6.6	16.0	32.0
SOT453C	10.0	20.5	4.8	16.0	32.0

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PHILIPS PACKAGE TYPE/OUTLINE CODE	CARRIER TAPE DIMENSIONS (mm) (See Figs. 15 and 14)				
	A0	B0	K0	P1	W
SOT457	3.2	3.2	1.2	4.0	8.0
SOT482A/C	8.3	13.8	2.3	12.0	24.0
SOT490	1.9	1.8	0.9	4.0	8.0



Dimensions in mm.

Fig.14 Carrier tape for surface mount devices.

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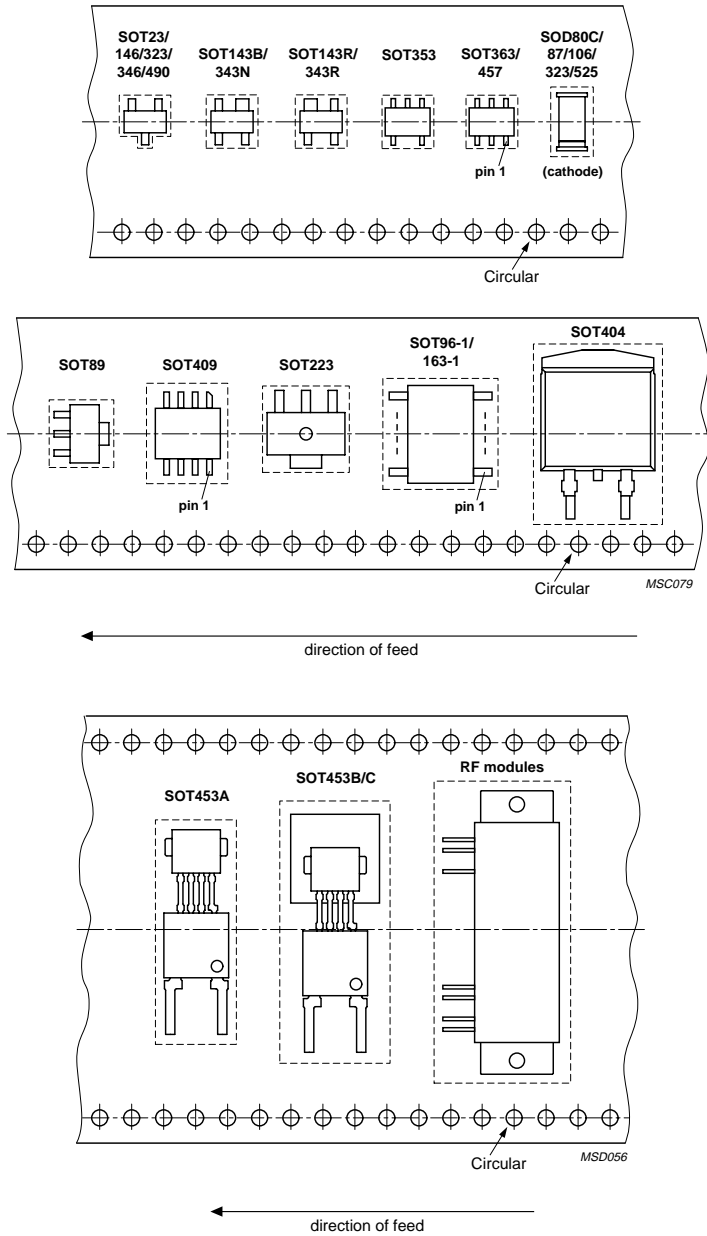


Fig.15 Product orientation in carrier tape.

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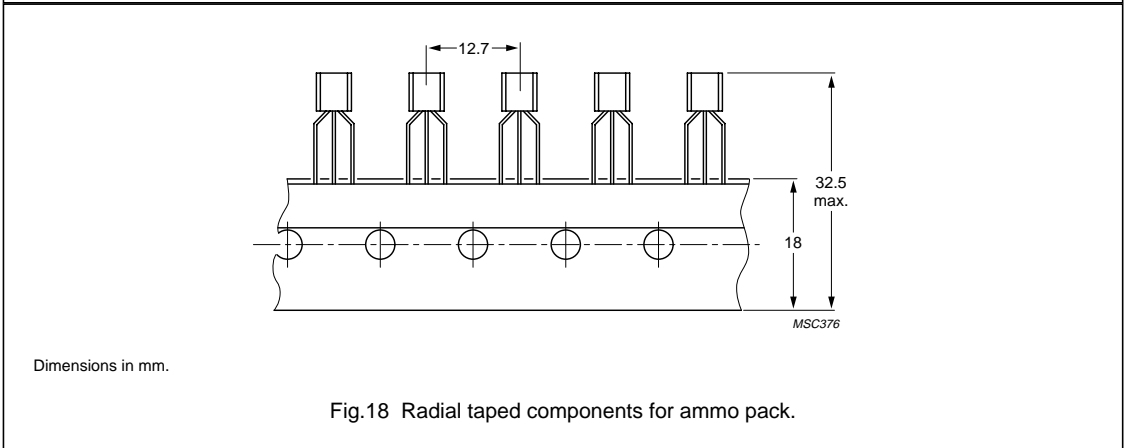
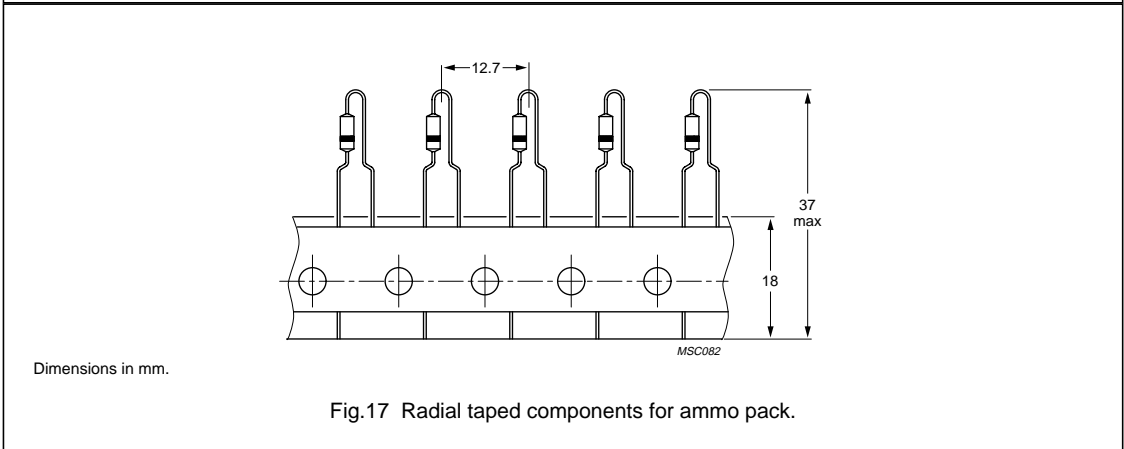
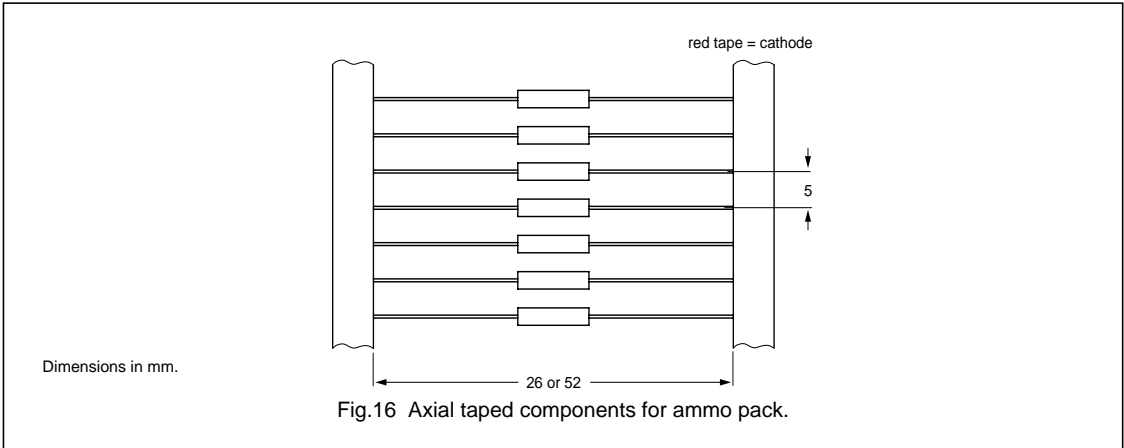
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Ammo pack - axial and radial taped

PHILIPS PACKAGE TYPE/OUTLINE CODE	TAPING WIDTH (mm)	TAPING METHOD	SPQ/PQ	OUTER BOX DIMENSIONS L × W × H (mm)
SOD27	26	axial	5000	263 × 48 × 75
	52	axial/small	1000	138 × 73 × 29
	52	axial	10000	263 × 74 × 124
	37	radial	5000	350 × 203 × 42
SOD57	52	axial/small	200	138 × 73 × 29
	52	axial	2500	263 × 73 × 87
SOD61	52	axial	500	305 × 118 × 65
	52	axial/small	50	138 × 73 × 29
SOD64	52	axial	2500	263 × 73 × 87
	52	axial/small	200	138 × 73 × 29
SOD66	52	axial	5000	263 × 73 × 122
	52	axial/small	1000	138 × 73 × 29
SOD68	26	axial	5000	263 × 48 × 75
	52	axial/small	1000	138 × 73 × 29
	52	axial	10000	263 × 73 × 124
	37	radial	5000	350 × 203 × 42
	52	axial/small	500	138 × 73 × 29
SOD70	37	radial	10000	355 × 210 × 300
SOD81	26	axial	5000	255 × 50 × 89
	52	axial	5000	263 × 73 × 87
	52	axial/small	500	138 × 73 × 29
SOD91	52	axial/small	1000	138 × 73 × 29
	52	axial	2000	263 × 73 × 102
	26	axial	5000	263 × 48 × 75
	52	axial	10000	253 × 74 × 124

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Blister pack

PHILIPS PACKAGE TYPE/OUTLINE CODE	SPQ PER CARRIER	CARRIER PER BOX	PQ	OUTER BOX DIMENSIONS L × W × H (mm)	PACKING VERSION (See Fig.19)
SOT115	25	4	100	315 × 118 × 78	B
	5	1	5	145 × 100 × 29	C
SOT119	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT120	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT121	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT122	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT123	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT160	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT161	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT171	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT172	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT233	15	5	75	315 × 118 × 78	A
SOT262	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT268	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT273	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT279	20	2	40	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT289	20	2	40	315 × 118 × 78	B
	20	3	60	315 × 118 × 78	A
	4	8	32	315 × 118 × 78	D
SOT324	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT347	16	3	48	315 × 118 × 78	B
SOT365	15	5	75	315 × 118 × 78	A
SOT390	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D

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PHILIPS PACKAGE TYPE/OUTLINE CODE	SPQ PER CARRIER	CARRIER PER BOX	PQ	OUTER BOX DIMENSIONS L × W × H (mm)	PACKING VERSION (See Fig.19)
SOT391	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
SOT409	25	8	200	315 × 118 × 78	D
SOT422	4	8	32	315 × 118 × 78	D
	20	3	60	315 × 118 × 78	A
SOT423	4	8	32	315 × 118 × 78	D
	20	3	60	315 × 118 × 78	A
SOT437	20	3	60	315 × 118 × 78	B
	4	8	32	315 × 118 × 78	D
	1	40	40	165 × 92 × 65	A
SOT439	1	40	40	165 × 92 × 65	A
SOT440	4	8	32	315 × 118 × 78	D
	1	40	40	165 × 92 × 65	A
SOT441	1	40	40	165 × 92 × 65	A
SOT443	20	3	60	315 × 118 × 78	A
	4	8	32	315 × 118 × 78	D
	1	40	40	165 × 92 × 65	A
SOT445	4	8	32	315 × 118 × 78	D
	1	40	40	165 × 92 × 65	A
SOT446	20	8	160	315 × 118 × 78	D
	1	40	40	165 × 92 × 65	A
SOT448	1	40	40	165 × 92 × 65	A
SOT468	20	3	60	315 × 118 × 78	A
SOT494	20	3	60	315 × 118 × 78	A
SOT504	20	3	60	315 × 118 × 78	B

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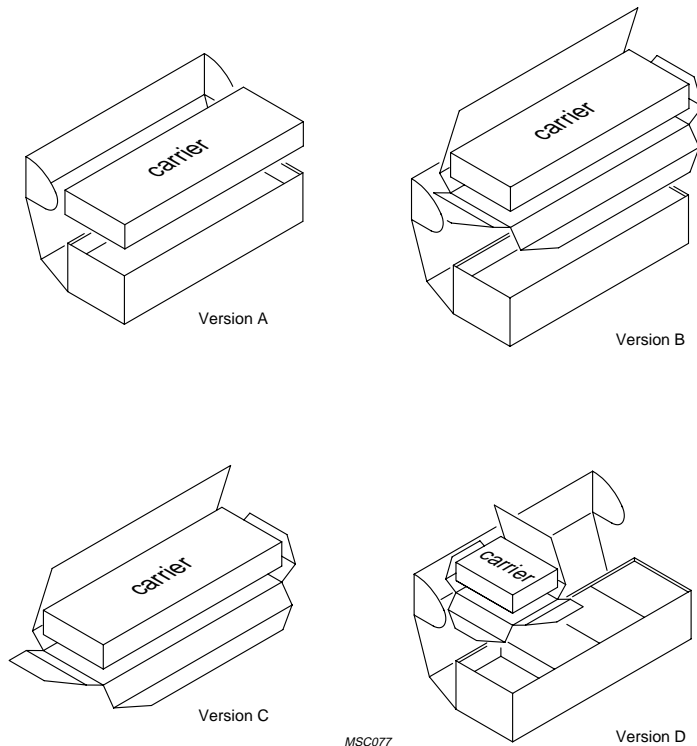
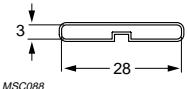
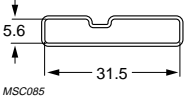
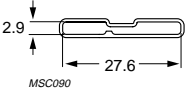
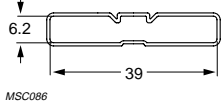
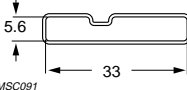
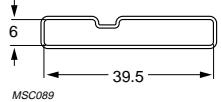


Fig.19 Packing versions of blister pack.

tube pack

PHILIPS PACKAGE TYPE/OUTLINE CODE	CARRIER LENGTH (mm)	END STOP	SPQ	CARRIERS PER BOX	PQ	OUTER BOX DIMENSIONS L × W × H (mm)	CARRIER PROFILE (mm)
SOT32	390	turnlock	50	20	1000	402 × 95 × 29	
SOT78	520	turnlock	50	20	1000	526 × 69 × 75	
SOT263	520	turnlock	50	20	1000	526 × 69 × 75	
SOT82	390	turnlock	50	20	1000	402 × 95 × 29	
SOT128	523	endstop	50	20	1000	529 × 84 × 85	
SOT186	520	turnlock	50	20	1000	526 × 69 × 75	
SOT199	396	turnlock	25	20	500	408 × 86 × 81	

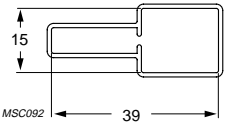
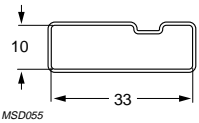
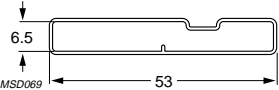
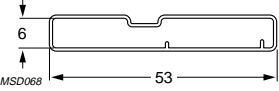
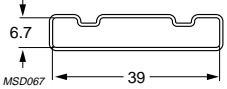
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PHILIPS PACKAGE TYPE/OUTLINE CODE	CARRIER LENGTH (mm)	END STOP	SPQ	CARRIERS PER BOX	PQ	OUTER BOX DIMENSIONS L × W × H (mm)	CARRIER PROFILE (mm)
SOT199 bent lead	396	turnlock	25	12	300	408 × 86 × 81	
SOT365	413	turnlock	8	20	160	450 × 116 × 92	
SOT501A	362	turnlock	5	20	160	450 × 116 × 92	
SOT399	413	turnlock	25	20	500	450 × 116 × 92	
SOT429	413	turnlock	25	20	500	450 × 116 × 92	
SOT451A	396	turnlock	13	18	234	432 × 95 × 87	



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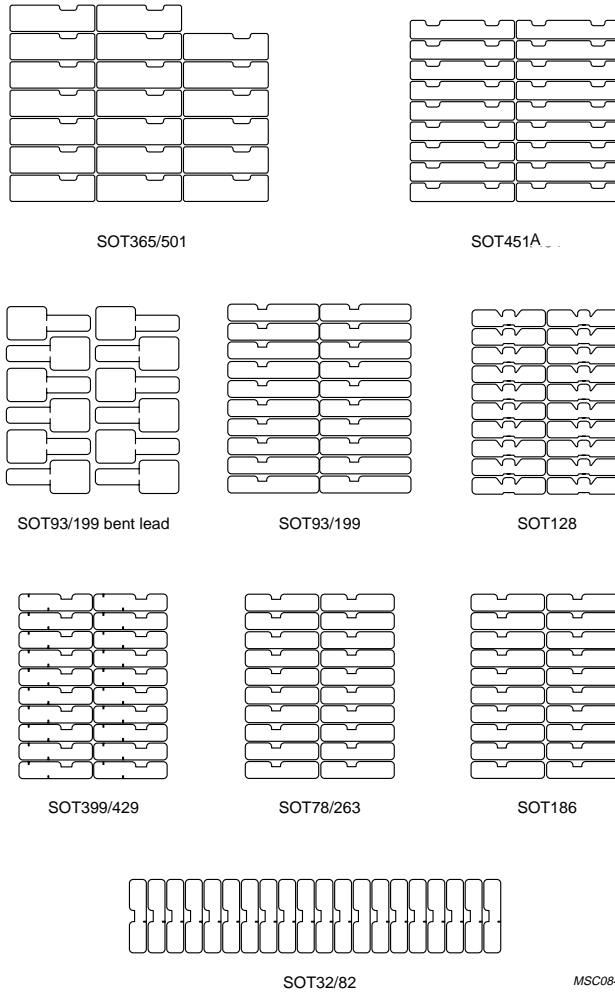


Fig.20 Stacking methods of tubes.

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Chapter 6

Bulk pack

PHILIPS PACKAGE TYPE/OUTLINE CODE	SPQ PER BAG	BAGS PER BOX	PQ	PACKING VERSION (See Fig.21)	OUTER BOX DIMENSIONS L × W × H (mm)
SOD57	100	15	1500	A	315 × 115 × 75
	250	1	250	B	138 × 73 × 30
SOD70	500	8	64000	A	305 × 120 × 67
SOD80	1000	10	10000	B	138 × 73 × 30
SOD87	1000	6	6000	B	138 × 73 × 30
SOT54	500	8	4000	A	315 × 115 × 75
SOT89	250	80	20000	A	315 × 115 × 75
SOT195	500	8	64000	A	305 × 120 × 67
SOT223	250	80	20000	A	315 × 115 × 75

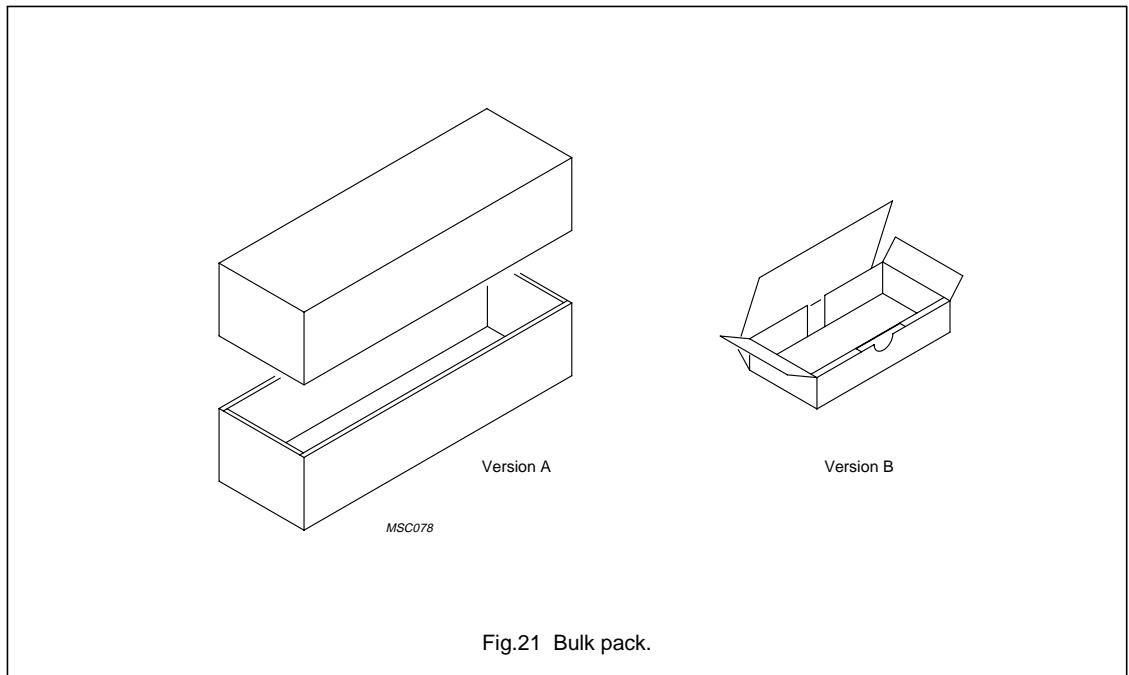


Fig.21 Bulk pack.

