

## SECTION 18

### PACKING AND PACKING QUANTITIES

contents	page
SCOPE	18 - 2
SURFACE-MOUNT DEVICES	18 - 2
Tape specification	18 - 2
Reel specification	18 - 7
Packing quantities	18 - 8
LEADED DEVICES	18 - 9
Axial diodes	18 - 9
Tape specification	18 - 9
Reel specification	18 - 10
Ammopack specification	18 - 11
SOD64 with preformed leads	18 - 12
Radial diodes	18 - 13
Tape specification	18 - 13
Reel specification	18 - 15
Packing quantities	18 - 16

## Small-signal and Medium-power Diodes

## Packing and packing quantities

### SCOPE

This chapter covers packing and packing quantity details for surface-mount and leaded diodes in the following packages:

**Table 1** Survey of packages

PACKAGE	
SURFACE-MOUNT	THROUGH-HOLE
SC59 (SOT346)	SOD27 (DO-35)
SC70-3 (SOT323)	SOD57
SOD80(C)	SOD61
SOD87	SOD64
SOD106 (DO-214AC)	SOD66 (DO-41)
SOD106A	SOD68 (DO-34)
SOD110	SOD81
SOD323	SOD83A
SOT23	SOD88A
SOT89	SOD91
SOT143	SOT18/15 (TO-18)
SOT223	
SO20 (SOT163-1)	

### SURFACE-MOUNT DEVICES

Tape and reel packing for surface-mount devices meets the feed requirements for automatic pick and place equipment (packing conforms to IEC publication 286-3). Tape is an ideal shipping container making handling easy and providing secure blister cavities in which the devices are sealed with peel-off cover tape.

#### Tape specification

Tape dimensions are specified in Tables 3 and 4 and in Figs.1 through 7 for 8, 12 and 24 mm tape respectively. For diodes with only two terminations, the cathode side of the device is adjacent to the sprocket holes in the tape.

**Table 2** Carrier tape widths

8 mm	12 mm	24 mm
SC59 (SOT346)	SOD106(A)	SO20
SC70 (SOT323)	SOT89	
SOD80(C)	SOT223	
SOD87		
SOD110		
SOD323		
SOT23		
SOT143		

**Table 3** Variable tape dimensions

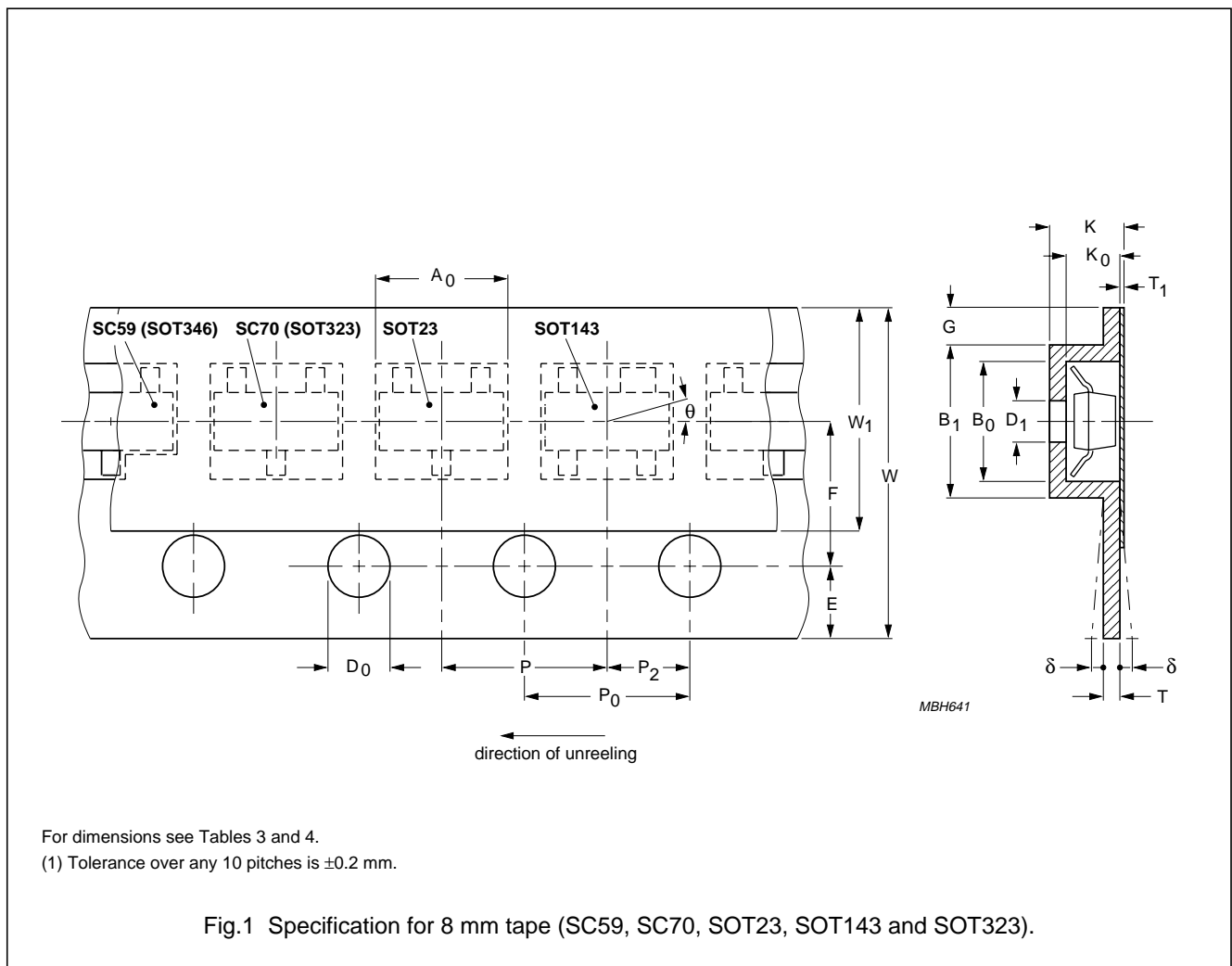
PACKAGE	SYMBOL					
	W (mm)	F (mm)	P (mm)	K (mm)	B <sub>1</sub> (mm)	D <sub>1</sub> (mm)
SO20	24.0	11.5	12.0	3.6	14.1	1.5
Tolerance	±0.3	±0.1	±0.1	max.	max.	min.
SC59 (SOT346)	8.0	3.5	4.0	1.5	4.2	1.0
SC70 (SOT323)	8.0	3.5	4.0	1.5	4.2	1.0
SOD80(C)	8.0	3.5	4.0	2.0	4.2	1.0
SOD87	8.0	3.5	4.0	2.5	4.2	1.0
SOD106(A)	12.0	5.5	4.0	3.0	6.0	1.5
SOD110	8.0	3.5	4.0	2.5	4.2	1.0
SOD323	8.0	3.5	4.0	1.5	4.2	1.0
SOT23	8.0	3.5	4.0	1.5	4.2	1.0
SOT89	12.0	5.5	8.0	2.3	8.2	1.5
SOT143	8.0	3.5	4.0	1.5	4.2	1.0
SOT223	12.0	5.5	8.0	2.4	8.2	1.5
Tolerance	±0.2	0.05	±0.1	max.	max.	min.

Small-signal and Medium-power Diodes

Packing and packing quantities

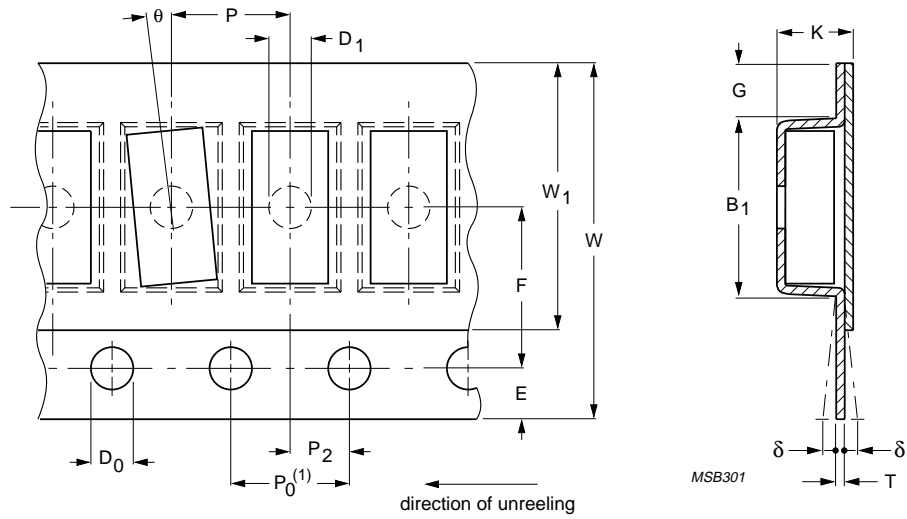
Table 4 Fixed tape dimensions

PACKAGE	SYMBOL							
	E (mm)	D <sub>0</sub> (mm)	P <sub>0</sub> (mm)	P <sub>2</sub> (mm)	G (mm)	T (mm)	δ (mm)	θ (deg)
SO20	1.75	1.5	4.0	2.0	3.7	0.4	0.3	10
Tolerance	±0.1	-0/+0.1	±0.1	±0.1	±0.1	max.	max.	max.
All other	1.75	1.5	4.0	2.0	0.75	0.4	0.3	15
Tolerance	±0.1	-0/+0.1	±0.1	±0.05	min.	max.	max.	max.



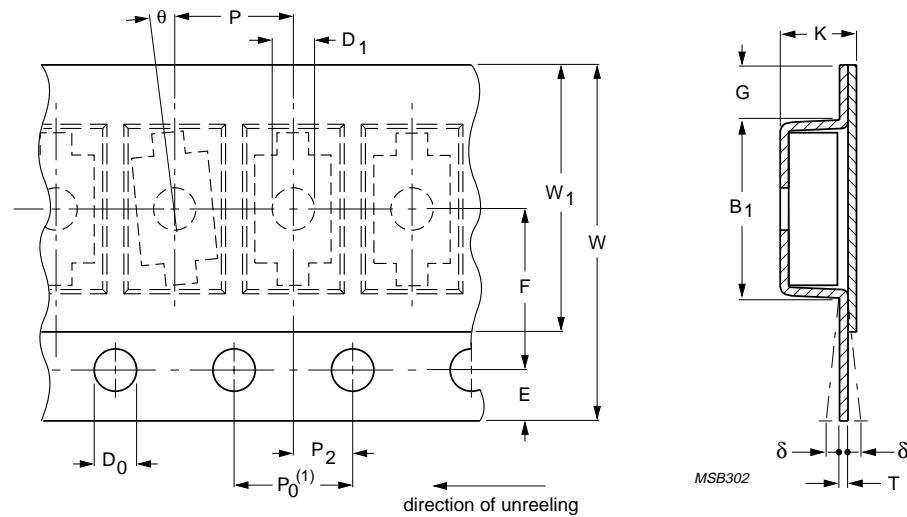
Small-signal and Medium-power Diodes

Packing and packing quantities



For dimensions see Tables 3 and 4.  
 (1) Tolerance over any 10 pitches is 0.2 mm.

Fig.2 Specification for 8 mm tape (SOD80, SOD80C, SOD87 and SOD110).

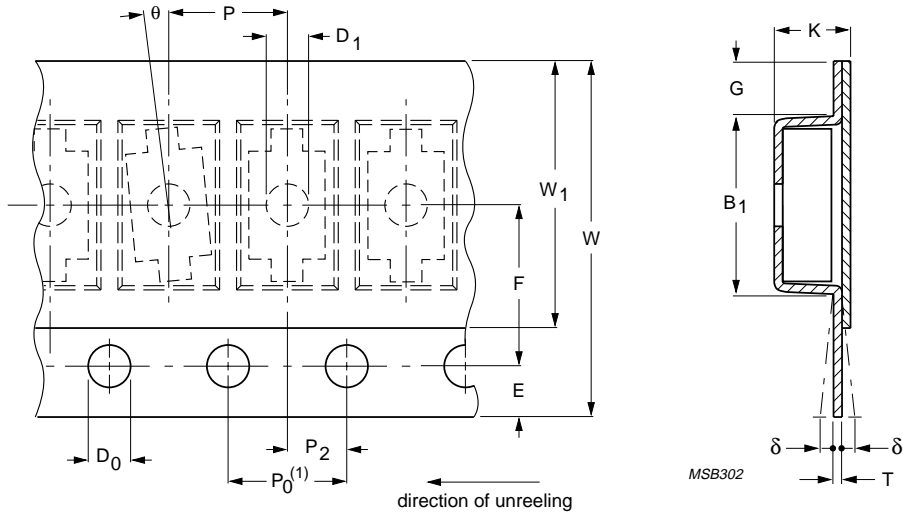


For dimensions see Tables 3 and 4.  
 (1) Tolerance over any 10 pitches is 0.2 mm.

Fig.3 Specification for 8 mm tape (SOD323).

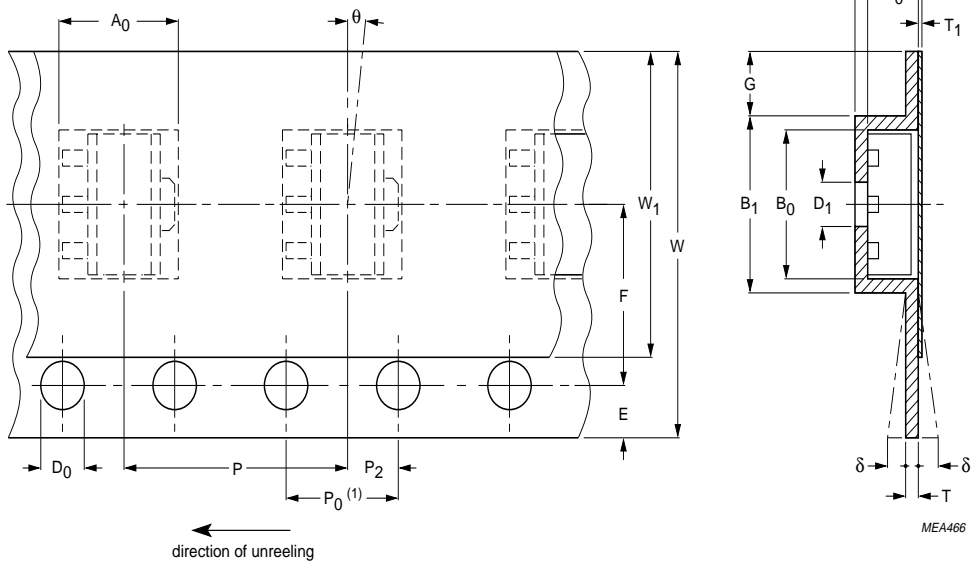
Small-signal and Medium-power Diodes

Packing and packing quantities



For dimensions see Tables 3 and 4.  
 (1) Tolerance over any 10 pitches is 0.2 mm.

Fig.4 Specification for 12 mm tape (SOD106 and SOD106A).

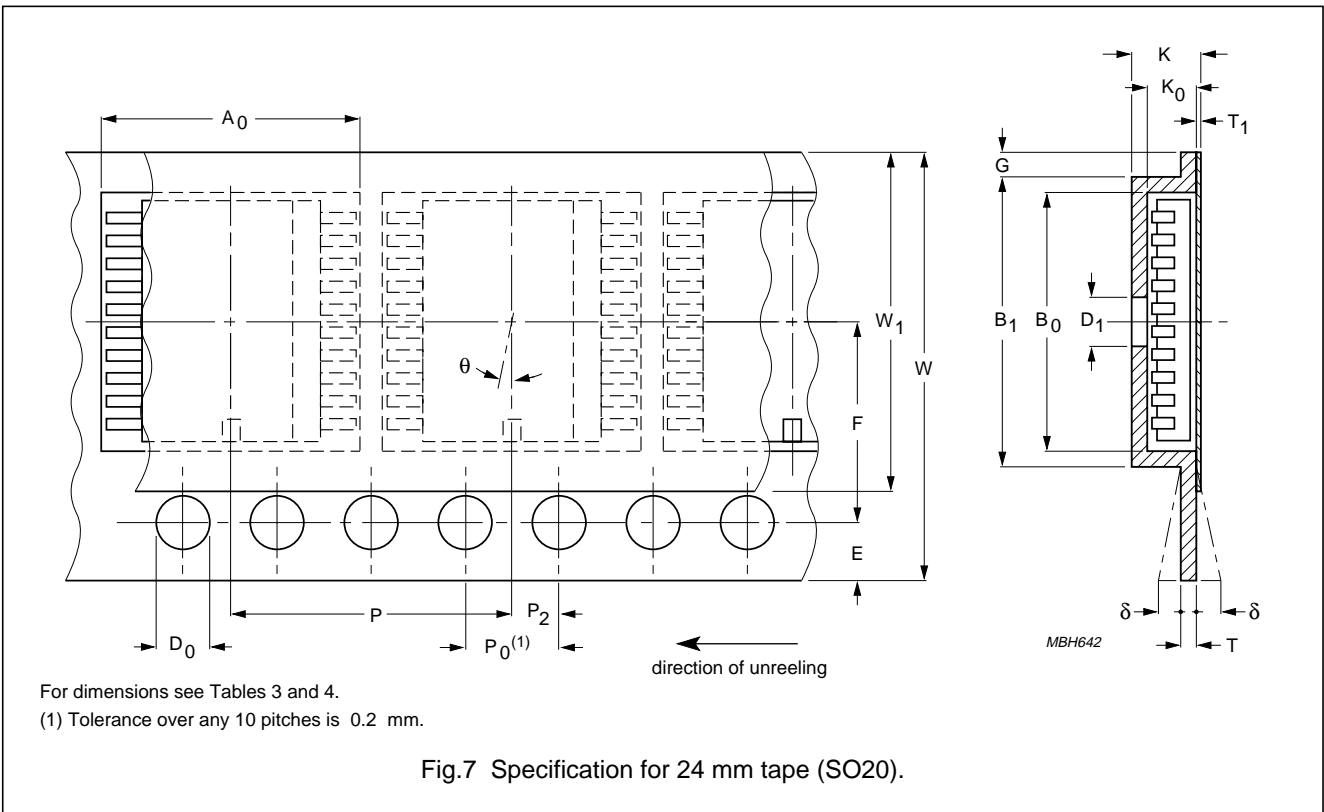
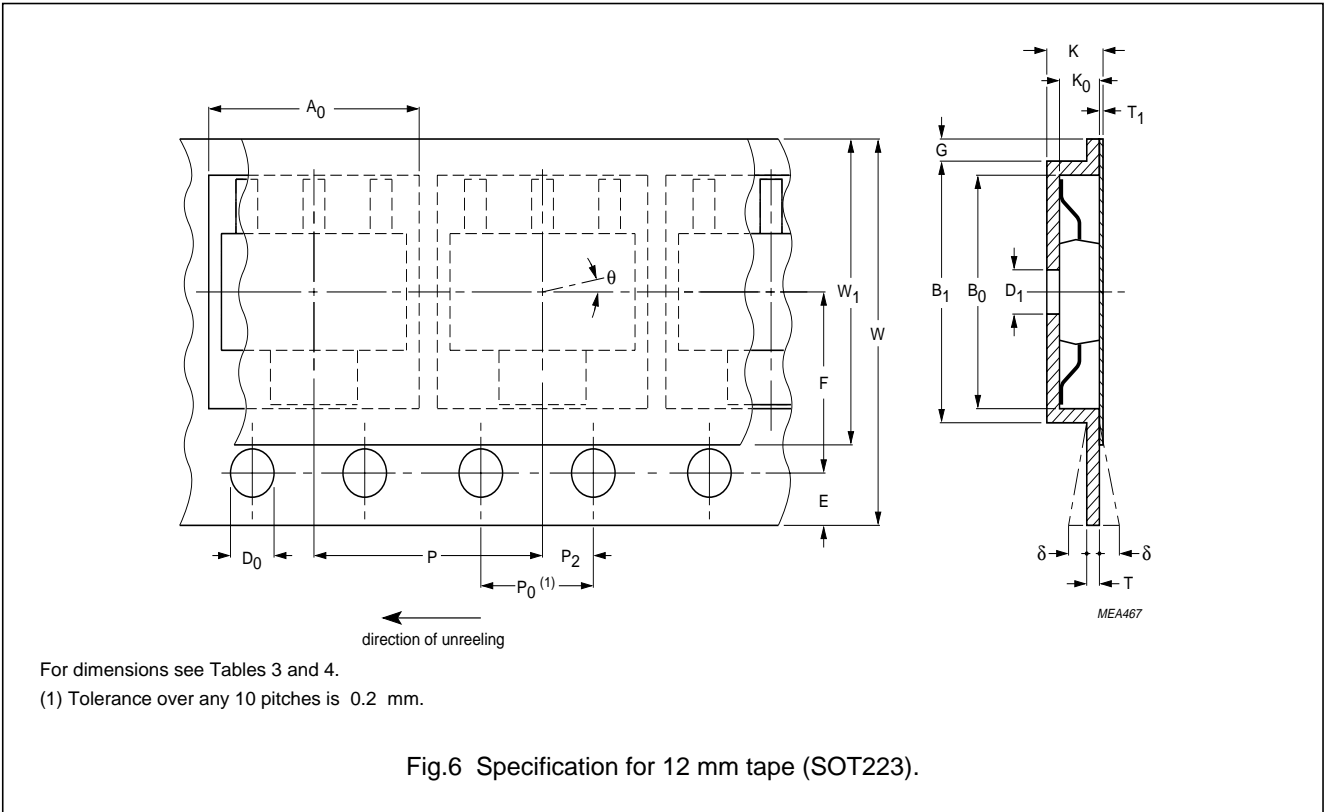


For dimensions see Tables 3 and 4.  
 (1) Tolerance over any 10 pitches is 0.2 mm.

Fig.5 Specification for 12 mm tape (SOT89).

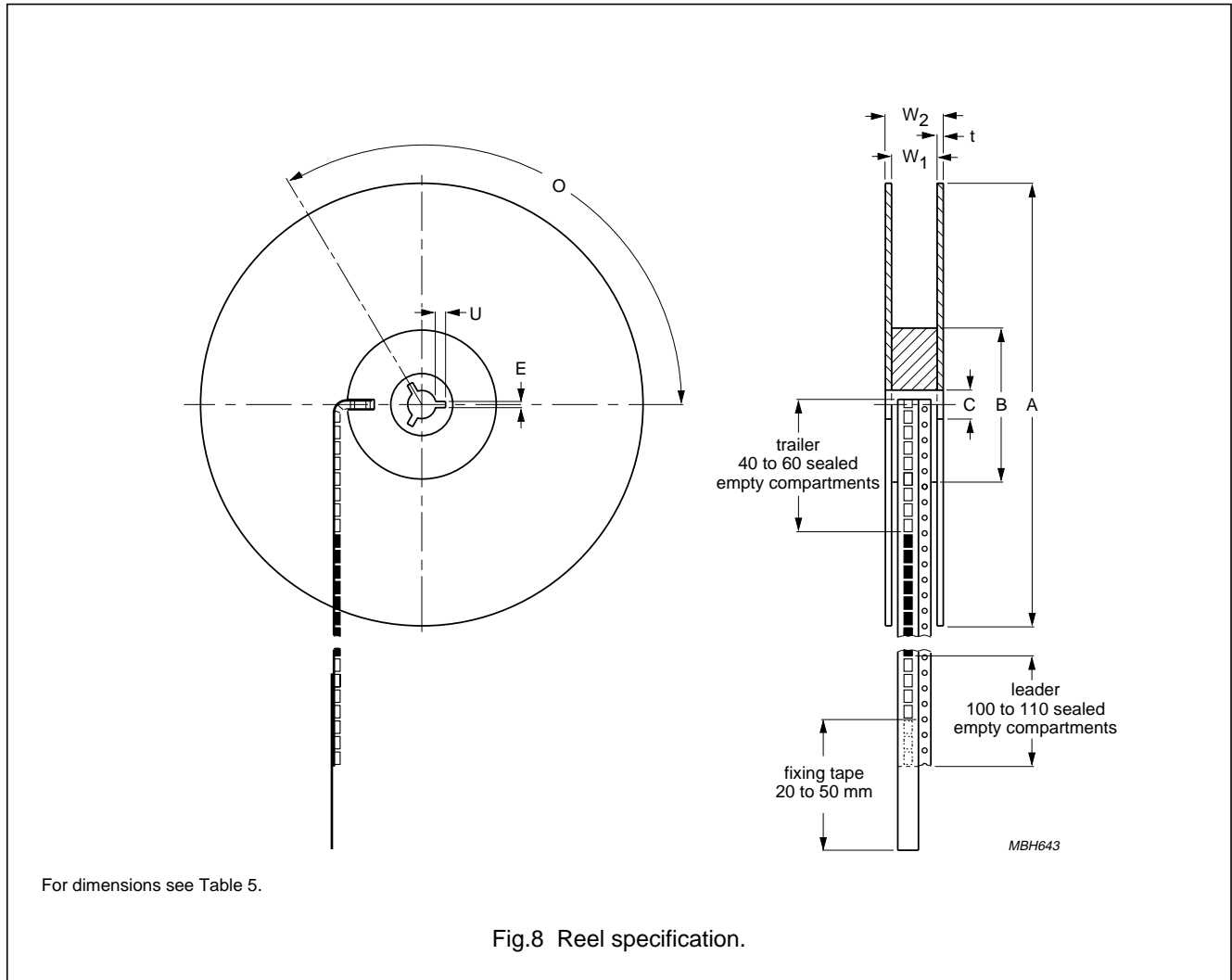
Small-signal and Medium-power Diodes

Packing and packing quantities



**Reel specification**

Reel dimensions are specified in Fig.8 and Table 5 for 8, 12 and 24 mm tape.



**Table 5** Reel dimensions

TAPE WIDTH	SYMBOL							
	A (mm)	B (mm)	C (mm)	W <sub>1</sub> (mm)	W <sub>2</sub> (mm)	E (mm)	U (mm)	O (deg)
8 mm	180/286 or 180/330	62	12.75	8.4	14.4	1.5	3.6	120
12 mm	180/330	62	12.75	12.4	18.4	1.5	3.6	120
Tolerance	±0.5	±1.5	-0/+0.15	-0/+1.5	max.	min.	min.	-
24 mm	180/330	62	12.75	24.4	30.4	1.5	3.6	120
Tolerance	±0.5	±1.5	-0/+0.15	-0/+2	max.	min.	min.	-

## Small-signal and Medium-power Diodes

Packing and  
packing quantities**Packing quantities**

Table 6 shows the packing quantities for a single box for each package style.

**Table 6** Packing quantities per package with relevant ordering code

PACKAGE	PACKING QUANTITY	ORDERING CODE ENDING	KIND OF PACKING	REEL DIAMETER (mm/inch)	REMARKS
SC59 (SOT346)	3000	115	8 mm tape and reel	180/7	
	10000	135	8 mm tape and reel	286/11 $\frac{1}{4}$	
SC70-3 (SOT323)	3000	115	8 mm tape and reel	180/7	
	10000	135	8 mm tape and reel	286/11 $\frac{1}{4}$	
SOD80(C)	1000	112	bulk	–	BB215 only
	2500	115	8 mm tape and reel	180/7	
	10000	135	8 mm tape and reel	330/13	
SOD87	2000	115	8 mm tape and reel	180/7	
	8000	135	8 mm tape and reel	330/13	
SOD106(A)	1500	115	12 mm tape and reel	180/7	
SOD110	3000	115	8 mm tape and reel	180/7	
	10000	135	8 mm tape and reel	330/13	
SOD323	3000	115	8 mm tape and reel	180/7	
	10000	135	8 mm tape and reel	286/11 $\frac{1}{4}$	
SOT23	500	212	bulk	–	
	3000	215	8 mm tape and reel	180/7	
	10000	235	8 mm tape and reel	286/11 $\frac{1}{4}$	
SOT89	250	112	bulk	–	
	1000	115	12 mm tape and reel	180/7	
	4000	135	12 mm tape and reel	330/13	
SOT143	500	212	bulk	–	
	3000	215	8 mm tape and reel	180/7	
	10000	235	8 mm tape and reel	286/11 $\frac{1}{4}$	
SOT223	1000	115	12 mm tape and reel	180/7	
	4000	135	12 mm tape and reel	330/13	
SO20	1000	118	24 mm tape and reel	330/13	BZA100 only

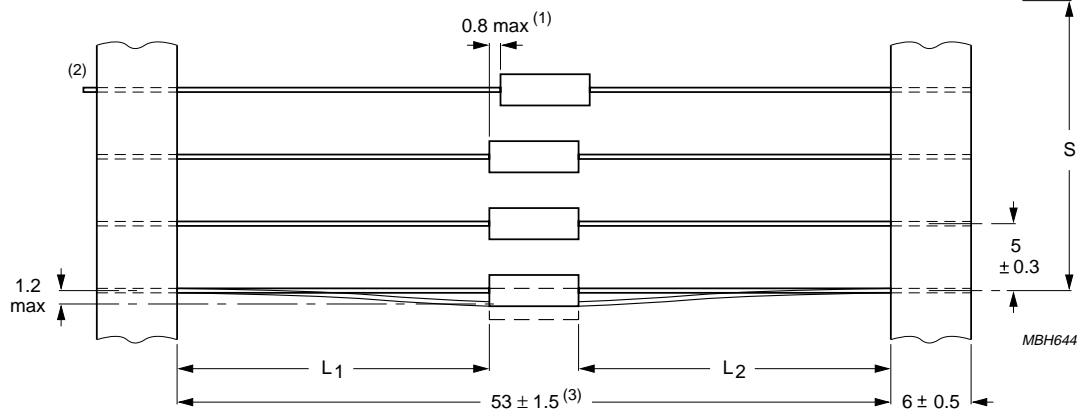


**LEADED DEVICES**

**Axial diodes**

Axial diodes are available on tape according to IEC 286-1. They are most suitable for use in automatic insertion machines, cutting and forming tools, and are supplied on reels or in boxes (ammopacks).

**TAPE SPECIFICATION**



Dimensions in mm.

The red tape indicates the cathode terminal of the diode.

The cumulative space (S) measured over ten spacings is  $50 \pm 2$  mm; for 26 mm tape, this is  $100 \pm 2$  mm for 20 spaces.

The diodes are centered so that  $L_1 - L_2 \leq 1.2$  mm.

A black marker is printed on the white tape of the bandolier to mark every 50 diodes.

The axial tape specification is compatible with automatic insertion equipment from Universal, U.S.M. (Dynapert) and M.E.I. (Panaset).

**Notes**

(1) Displacement between any two diodes: maximum 0.4 mm for SOD68 (DO-34).

(2) No protruding leads.

(3) For 26 mm tape, this dimension is  $26 + 1.5/-0$  mm; for SOD61, SOD83A and SOD88A packages, this dimension is  $58 \pm 2$  mm.

Fig.9 Tape specification for axial diodes.

REEL SPECIFICATION

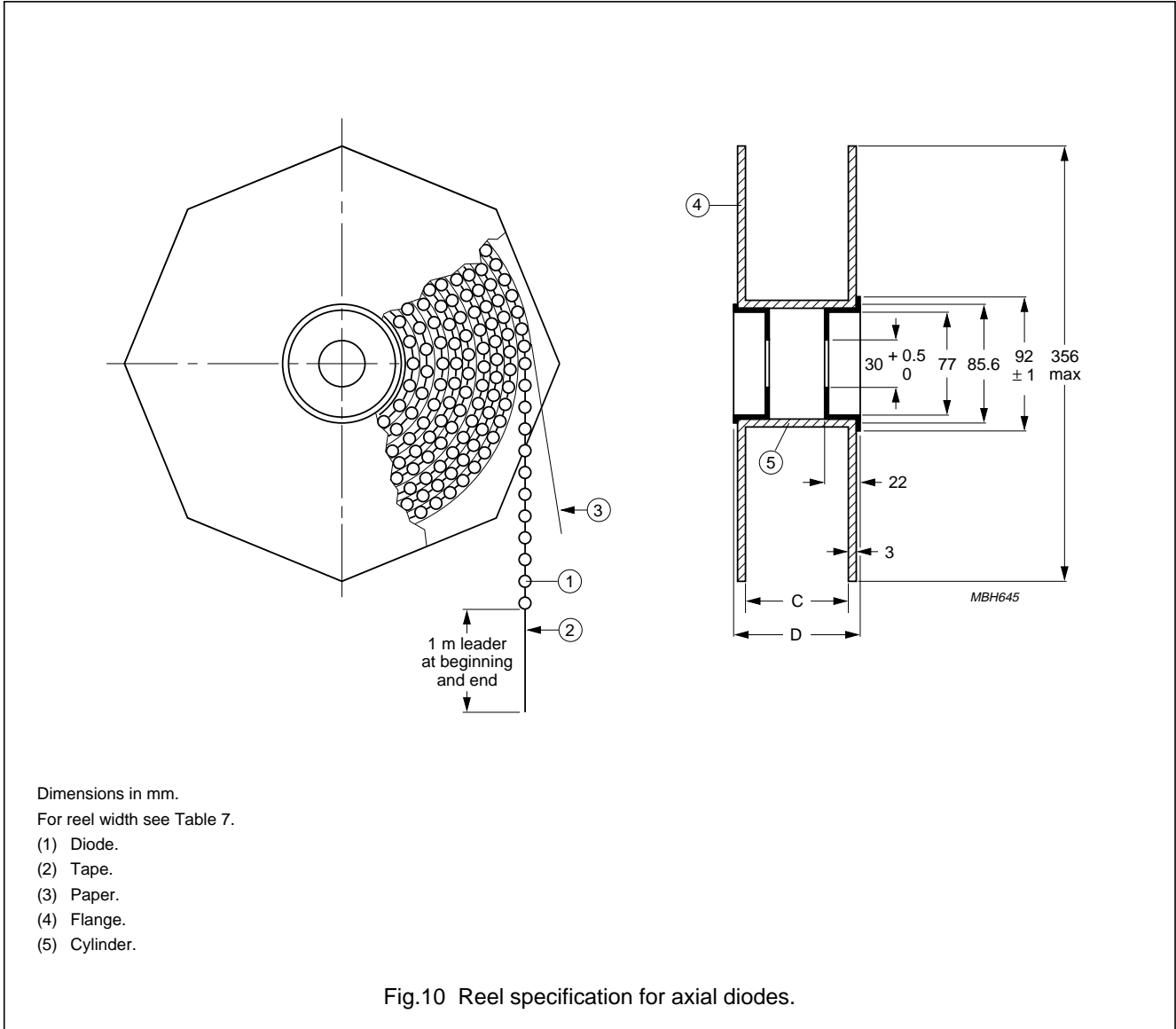
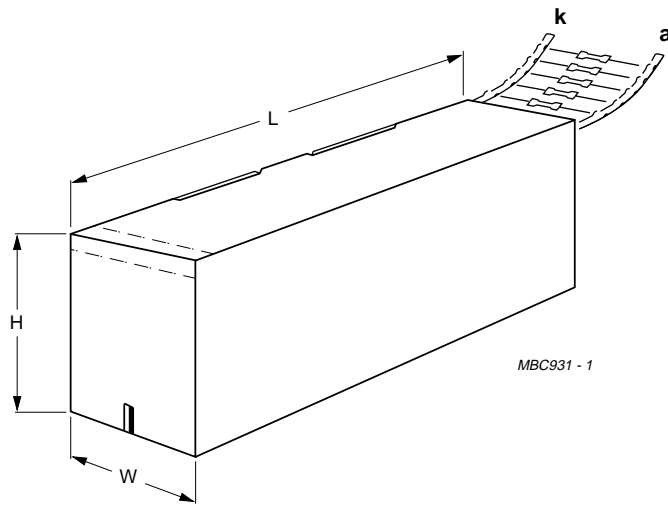


Table 7 Reel width

TAPE WIDTH (mm)	SYMBOL	
	C (mm)	D (mm)
26	40	50
53	70	80
58	75	85

AMMOPACK SPECIFICATION



For dimensions see Table 10.

Fig.11 Ammopack specification for axial diodes.

Small-signal and Medium-power Diodes

Packing and packing quantities

SOD64 WITH PREFORMED LEADS

Some types of automatic insertion machines have problems in bending the relatively thick leads of the SOD64 package. To overcome this, diodes in SOD64 are also available with preformed leads. They can be ordered by adding a slash number to the type number, e.g.

BY228/20. Diodes with preformed leads are supplied in bulk quantities of 1500 pieces. The available preforms are depicted in Figs.12 and 13. Dimensions and ordering codes are in Table 8.

The preferred preforms are /20, /21 and /40.

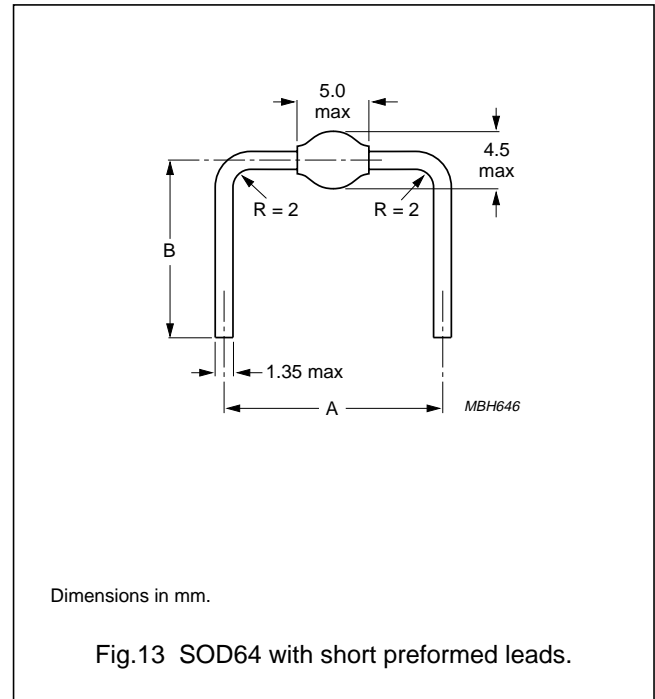
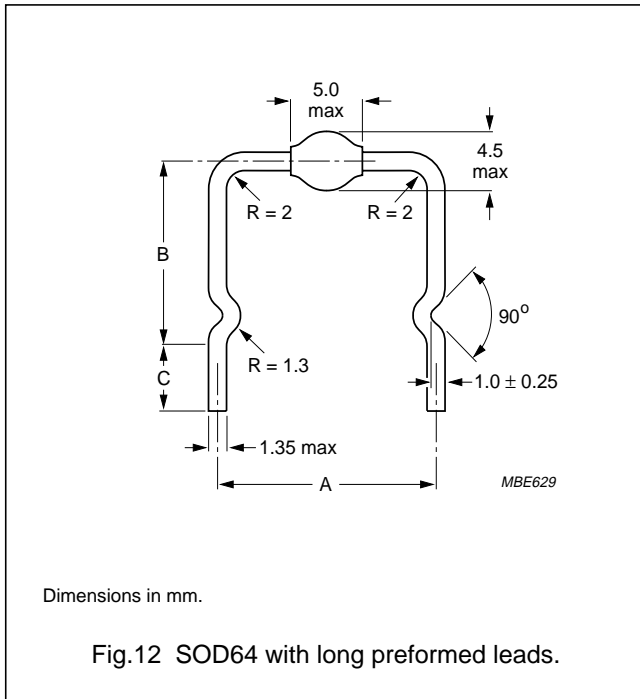


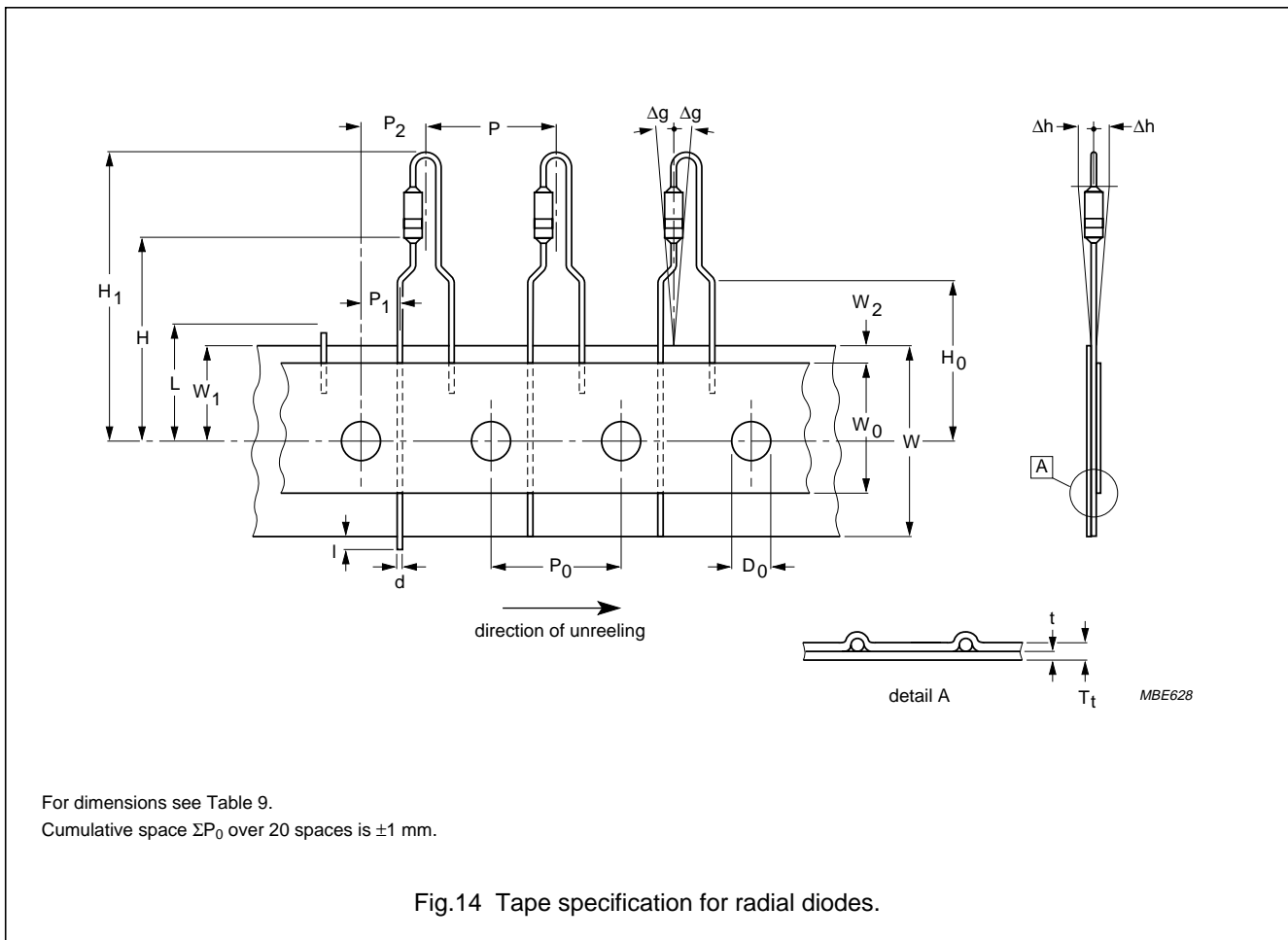
Table 8 SOD64 with preformed leads

PITCH	SYMBOL			FIGURE	ORDERING CODE SUFFIX
	A (mm)	B (mm)	C (mm)		
6e	15.24 ±1	10.0 ±1	5.0 ±1	12	/20
6e	15.24 ±1	5.5 ±0.5	–	13	/21
6e	15.24 ±1	8.0 ±1	3.0 +1/–0	12	/22
7e	17.8 ±1	10.0 ±1	5.0 ±1	12	/30
7e	17.8 ±1	10.0 ±1	3.0 +1/–0	12	/31
7e	17.5 ±0.3	7.0 ±0.5	5.0 ±0.5	12	/33
8e	20.32 ±1	10.0 ±1	5.0 ±1	12	/40
8e	20.32 ±1	15.0 ±1	–	13	/41
10e	25.4 ±1	7.0 ±1	5.0 ±1	12	/50

**Radial diodes**

Radial diodes (diodes with unidirectional leads) are available on tape according to IEC 286-2. They are most suitable for use on automatic insertion machines, and are supplied on reels. The specification below only applies to radial diodes in SOD27 (DO-35) and SOD68 (DO-34) packages. They are available in anode-leading ('+'-ve leading, see Fig.16) and cathode-leading ('-'-ve leading, see Fig.17) configurations.

**TAPE SPECIFICATION**

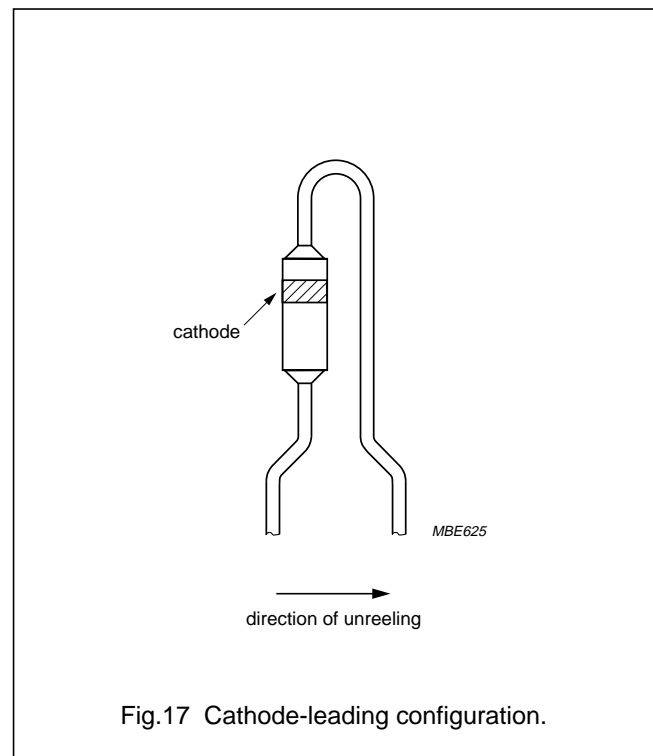
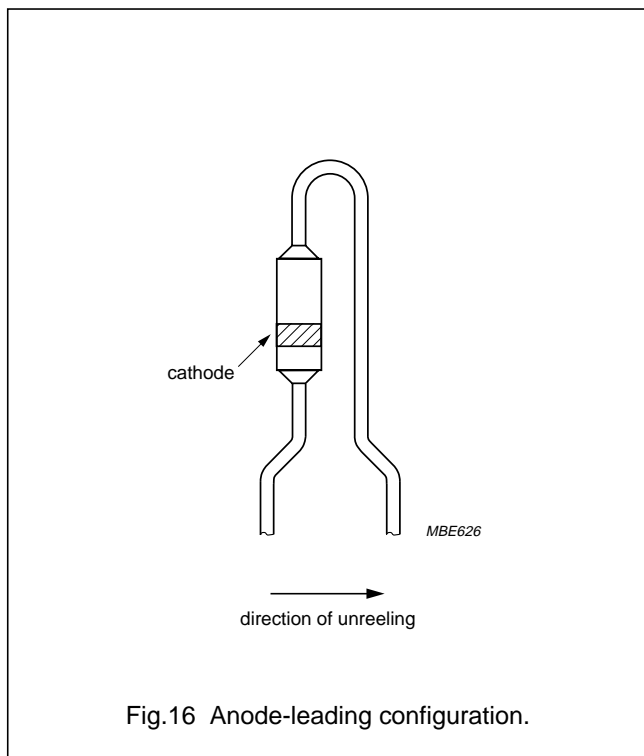
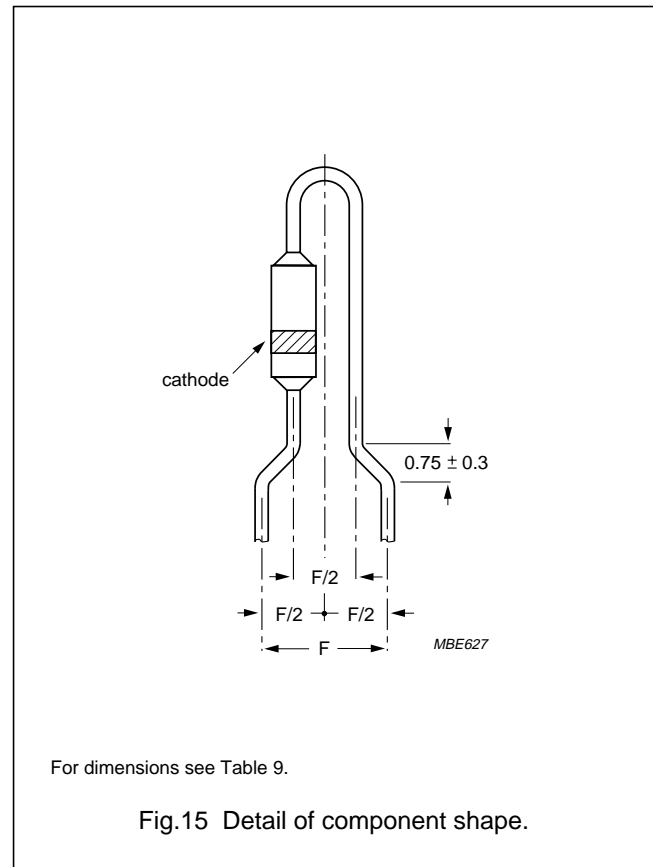


Small-signal and Medium-power Diodes

Packing and packing quantities

**Table 9** Tape dimensions for radial diodes (see Figures 14 and 15)

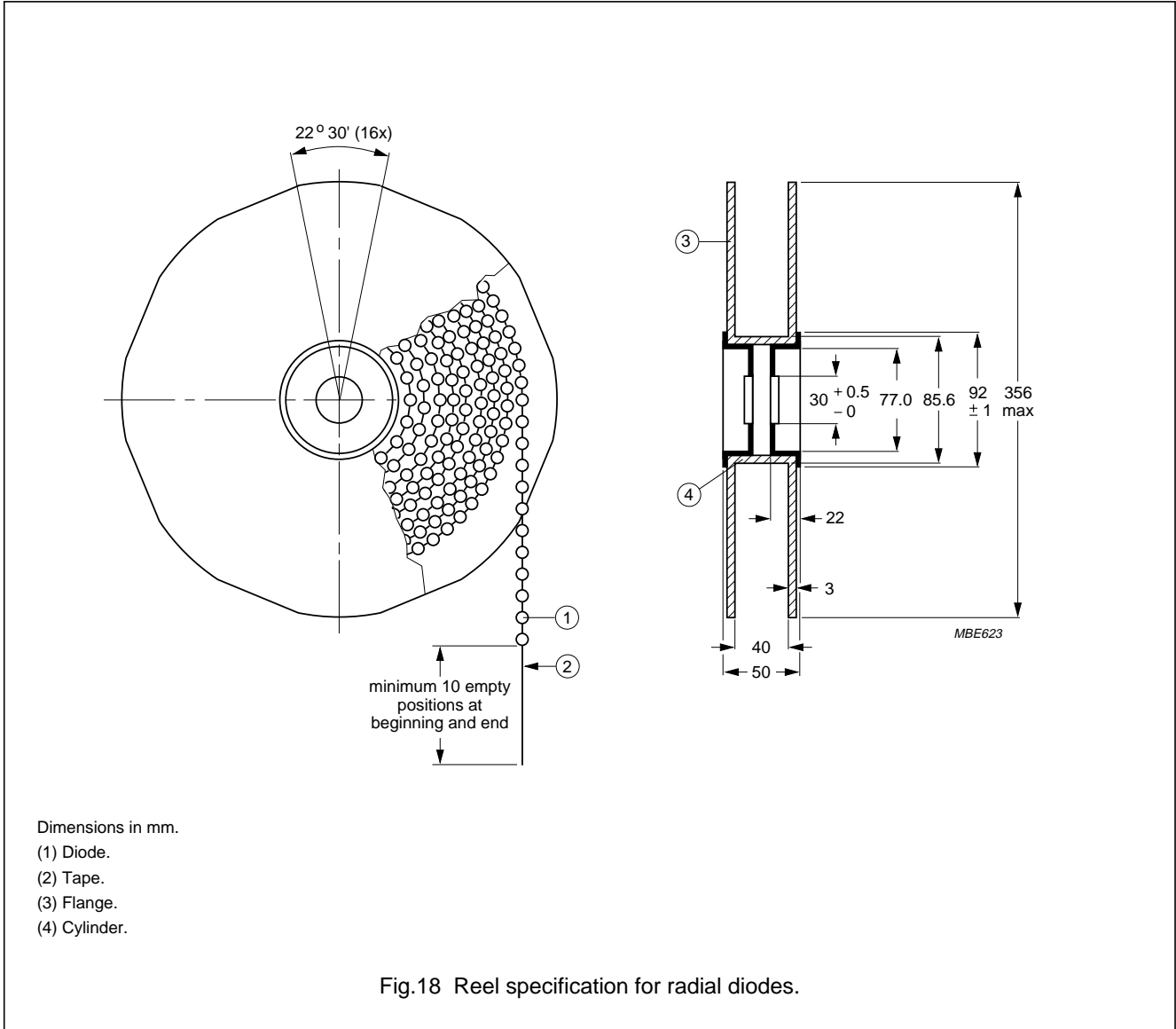
SYMBOL	VALUE	TOLERANCE	UNIT
F	5.08	+0.6/-0.1	mm
H <sub>1</sub>	27.5	max.	mm
H	19	±1	mm
H <sub>0</sub>	16	±0.5	mm
L	11	max.	mm
I	0	max.	mm
P	12.7	±1	mm
P <sub>2</sub>	6.35	±1	mm
P <sub>1</sub>	3.81	±0.7	mm
P <sub>0</sub>	12.7	±0.3	mm
T <sub>t</sub>	1.5	max.	mm
t	0.7	±0.2	mm
D <sub>0</sub>	4	±0.2	mm
W <sub>2</sub>	0	+1.5	mm
W <sub>0</sub>	3.5	min.	mm
W <sub>1</sub>	9	±0.5	mm
W	18	+1.0/-0.5	mm
Δg	0	+5	deg
Δh	0	±2	mm



Small-signal and Medium-power Diodes

Packing and packing quantities

REEL SPECIFICATION



## Small-signal and Medium-power Diodes

Packing and  
packing quantities

## Packing quantities

Table 10 Packing quantities per package with relevant ordering code

PACKAGE	PACKING QUANTITY	ORDERING CODE ENDING	KIND OF PACKING	REEL DIAM. or BOX SIZE (mm/inch)	REMARKS
SOD27 (DO-35)	10000	113	53 mm tape and reel	356/14	+ leading
	5000	116	37 mm radial tape and reel	356/14	
	10000	133	53 mm tape, ammopack	263 × 73 × 122	- leading  small quantities
	5000	136	37 mm radial, tape and reel	356/14	
	5000	143	26 mm tape, ammopack	263 × 47 × 72	
	1000	153	53 mm tape, ammopack	138 × 73 × 29	
SOD57	5000	113	53 mm tape and reel	356/14	
	2500	133	53 mm tape, ammopack	263 × 73 × 87	
SOD61	5000	113	58 mm tape and reel	356/14	small quantities
	500	153	58 mm tape, blister	304 × 118 × 65	
SOD64	1500	112	bulk	304 × 118 × 65	preformed leads
	4000	113	53 mm tape and reel	356/14	
	2000	133	53 mm tape, ammopack	263 × 73 × 87	
SOD66 (DO-41)	5000	113	53 mm tape and reel	356/14	small quantities
	5000	133	53 mm tape, ammopack	263 × 73 × 122	
	500	153	53 mm tape, ammopack	138 × 73 × 29	
SOD68 (DO-34)	10000	113	53 mm tape and reel	356/14	+ leading
	5000	116	37 mm radial, tape and reel	356/14	
	10000	133	53 mm tape, ammopack	263 × 73 × 102	- leading  small quantities
	5000	136	37 mm radial, tape and reel	356/14	
	5000	143	26 mm tape, ammopack	263 × 47 × 59	
	1000	153	53 mm tape, ammopack	138×73×29	
SOD81	5000	113	53 mm tape and reel	356/14	
	5000	133	53 mm tape, ammopack	263 × 73 × 87	
	5000	143	26 mm tape, ammopack	263 × 47 × 87	
SOD83A	2000	113	58 mm tape and reel	356/14	small quantities
	500	153	58 mm tape, blister	304 × 118 × 65	
SOD88A	5000	113	58 mm tape and reel	356/14	small quantities
	500	153	58 mm tape, blister	304 × 118 × 65	
SOD91	10000	113	53 mm tape and reel	356/14	
	10000	133	53 mm tape, ammopack	263 × 73 × 102	
	5000	143	26 mm tape, ammopack	263 × 47 × 72	
SOT18/15	5000	112	bulk, 1000 pieces per bag	not applicable	BAV45 only