Ordering number : EN3578A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

2SA1770 / 2SC4614 — PNP/NPN Epitaxial Planar Silicon Transistor

High-Voltage Switching Applications

Features

- Adoption of MBIT process
- High breakdown voltage and large current capacity

( )2SA1770

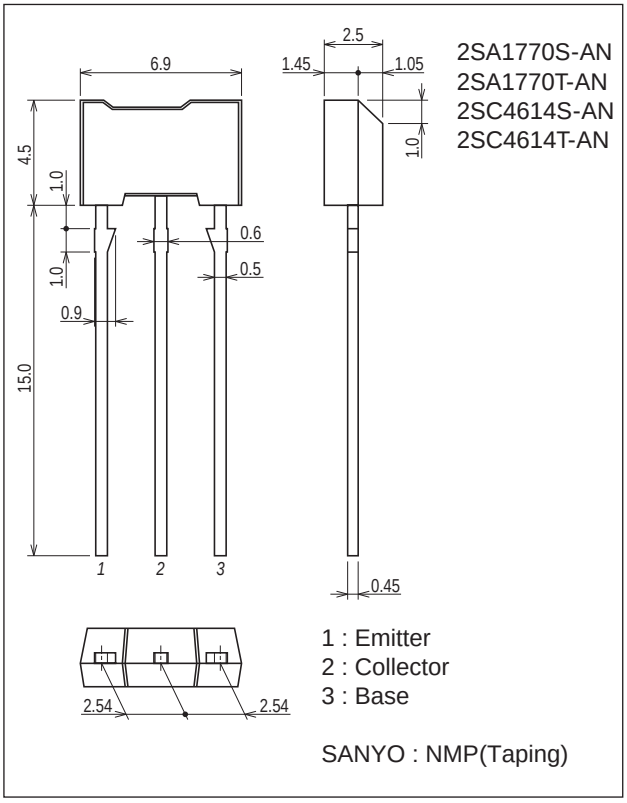
Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)180	V
Collector-to-Emitter Voltage	V_{CEO}		(–)160	V
Emitter-to-Base Voltage	V_{EBO}		(–)6	V
Collector Current	I_C		(–)1.5	A
Collector Current (Pulse)	I_{CP}		(–)2.5	A
Collector Dissipation	P_C		1	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		–55 to +150	°C

Package Dimensions

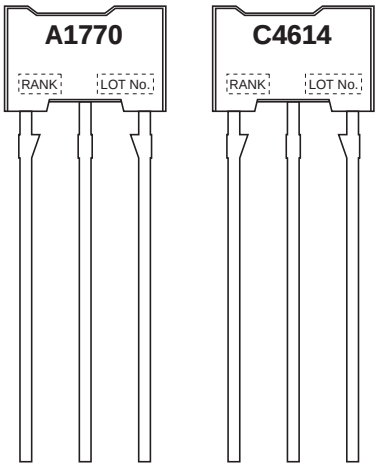
unit : mm (typ)
7540-001



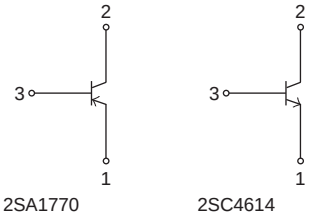
Product & Package Information

- Package : NMP(Taping)
- JEITA, JEDEC : SC-71
- Minimum Packing Quantity : 2,500 pcs./box

Marking(NMP(Taping))



Electrical Connection



Electrical Characteristics at Ta=25°C

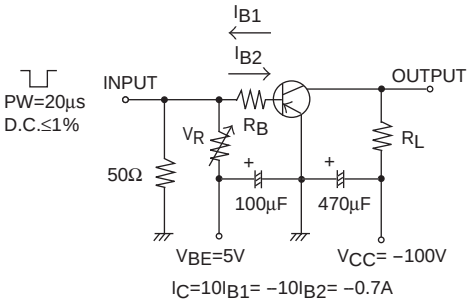
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(−)120V, I_E=0A			(−)1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(−)4V, I_C=0A			(−)1	μA
DC Current Gain	$h_{FE}1$	V_{CE}=(−)5V, I_C=(−)100mA	140*		400*	
	$h_{FE}2$	V_{CE}=(−)5V, I_C=(−)10mA	80			
Gain-Bandwidth Product	f_T	V_{CE}=(−)10V, I_C=(−)50mA		120		MHz
Output Capacitance	Cob	V_{CB}=(−)10V, f=1MHz		(22)14		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(−)500mA, I_B=(−)50mA		(−200)130	(−500)450	mV
Base-to-Emitter Saturation Voltage	VBE(sat)			(−)0.85	(−)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(−)10μA, I_E=0A	(−)180			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(−)1mA, R_{BE}=∞	(−)160			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=(−)10μA, I_C=0A	(−)6			V
Turn-On Time	t_{on}	See specified Test Circuit.		40(40)		ns
Storage Time	t_{stg}			(0.7)1.2		μs
Fall Time	t_f			(40)80		ns

* : The 2SA1770/2SC4614 are classified by 100mA h_{FE} as follows :

Rank	S	T
h_{FE}	140 to 280	200 to 400

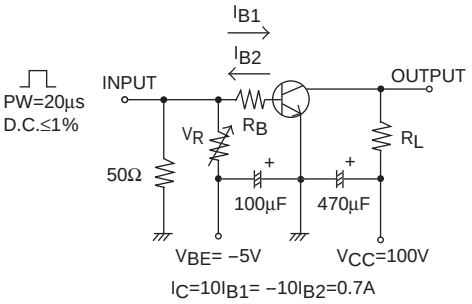
Switching Time Test Circuit

2SA1770



I_C=10I_{B1}= −10I_{B2}= −0.7A

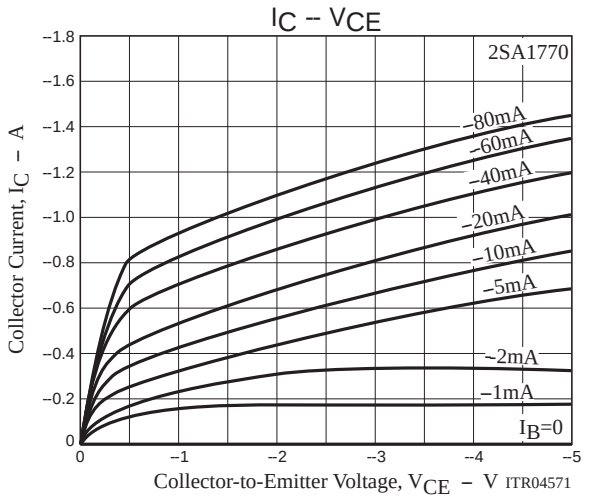
2SC4614

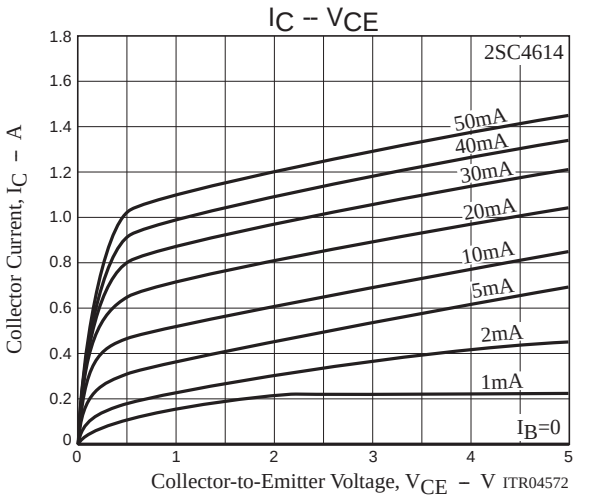


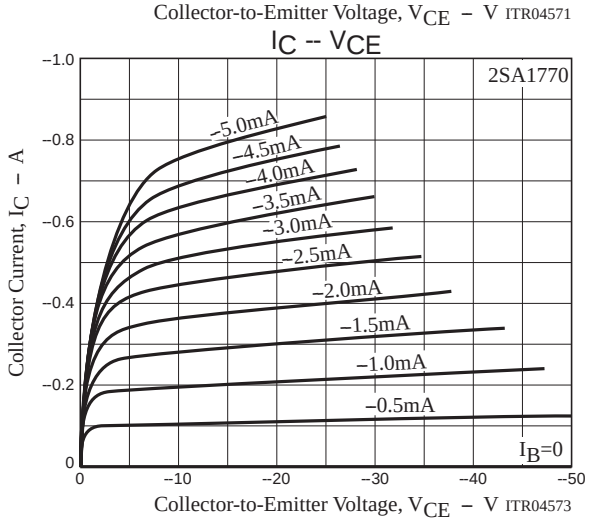
I_C=10I_{B1}= −10I_{B2}=0.7A

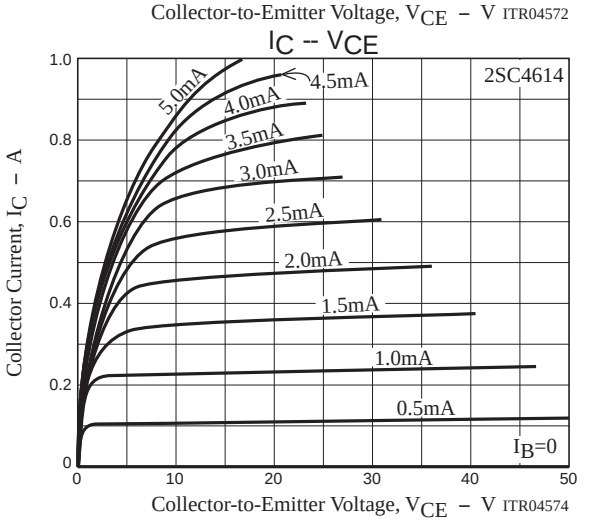
Ordering Information

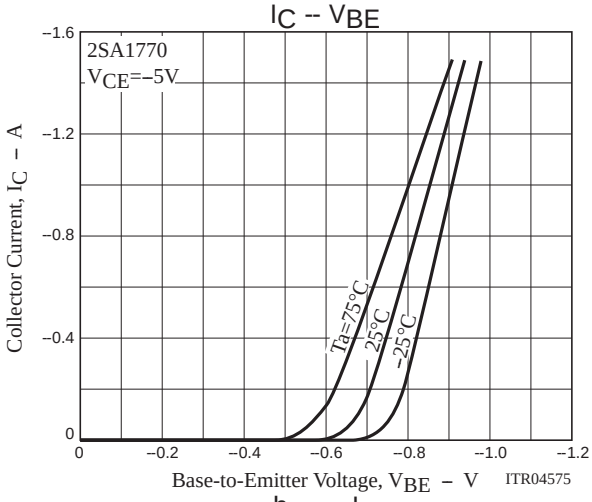
Device	Package	Shipping	memo
2SA1770S-AN	NMP(Taping)	2,500pcs./box	Pb Free
2SA1770T-AN	NMP(Taping)	2,500pcs./box	
2SC4614S-AN	NMP(Taping)	2,500pcs./box	
2SC4614T-AN	NMP(Taping)	2,500pcs./box	

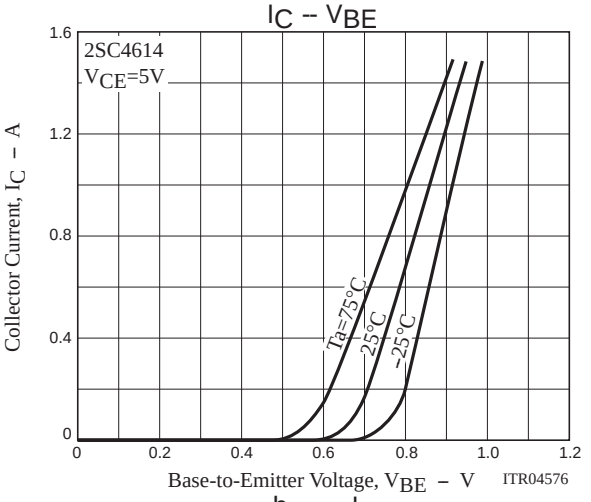

IC -- VCE
2SA1770
–80mA
–60mA
–40mA
–20mA
–10mA
–5mA
–2mA
–1mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR04571

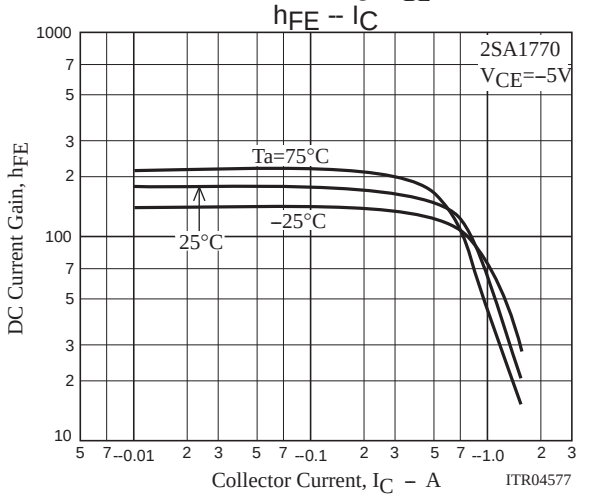

IC -- VCE
2SC4614
50mA
40mA
30mA
20mA
10mA
5mA
2mA
1mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR04572

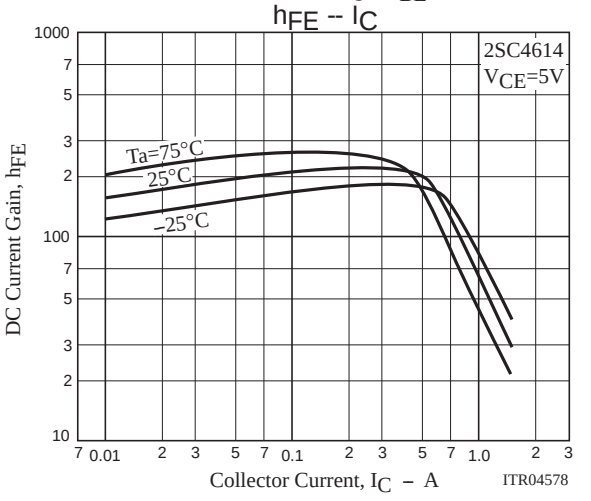

IC -- VCE
2SA1770
–5.0mA
–4.5mA
–4.0mA
–3.5mA
–3.0mA
–2.5mA
–2.0mA
–1.5mA
–1.0mA
–0.5mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR04573


IC -- VCE
2SC4614
5.0mA
4.5mA
4.0mA
3.5mA
3.0mA
2.5mA
2.0mA
1.5mA
1.0mA
0.5mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR04574

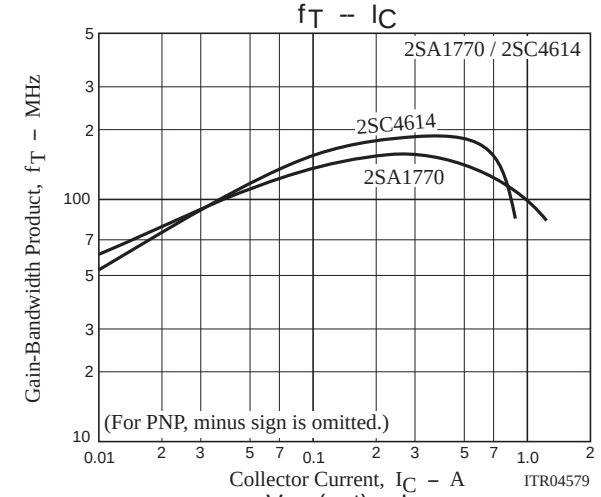

IC -- VBE
2SA1770
VCE=–5V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR04575


IC -- VBE
2SC4614
VCE=5V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR04576

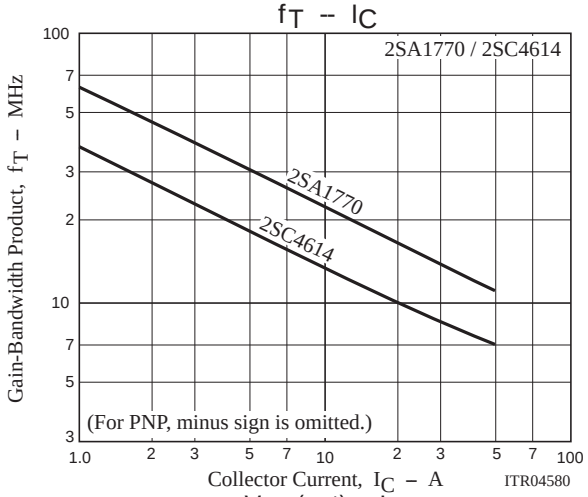

hFE -- IC
2SA1770
VCE=–5V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR04577


hFE -- IC
2SC4614
VCE=5V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR04578

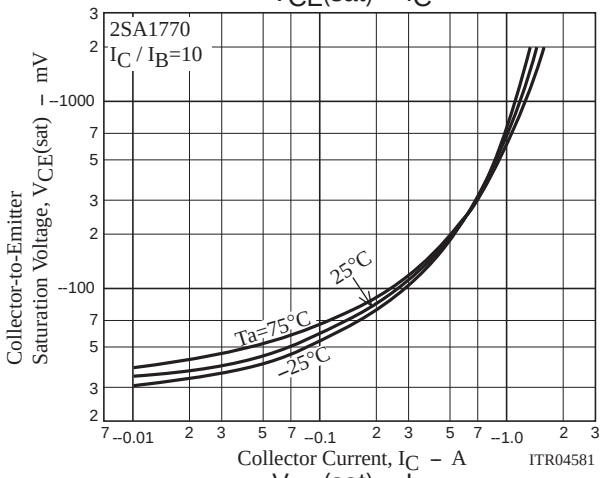
f_T -- I_C



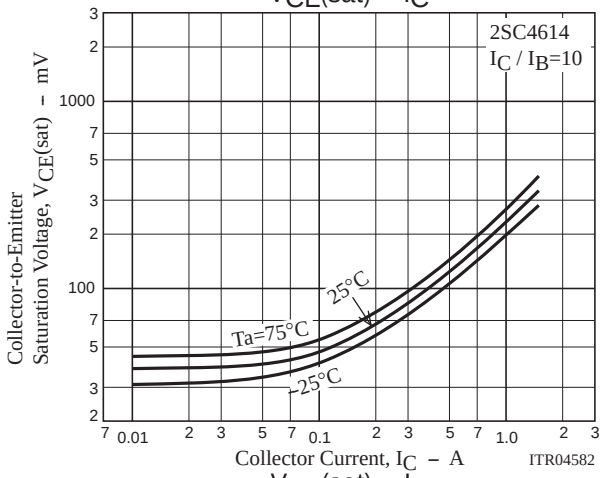
f_T -- I_C



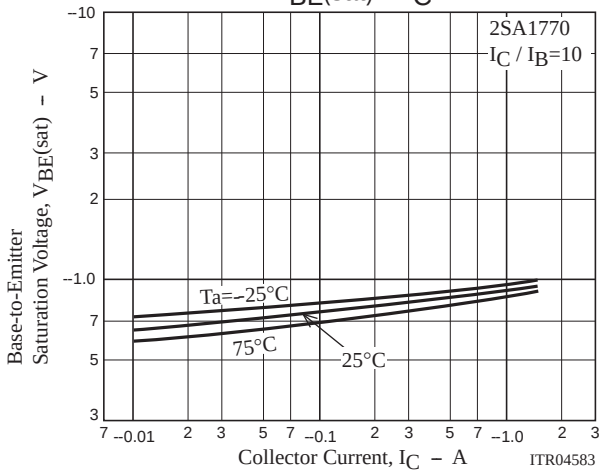
$V_{CE}(sat)$ -- I_C



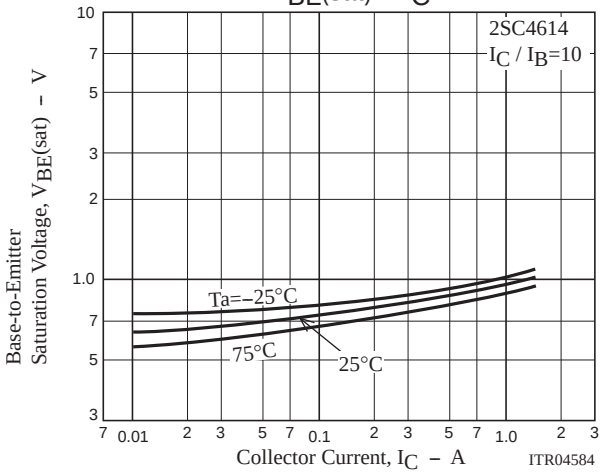
$V_{CE}(sat)$ -- I_C



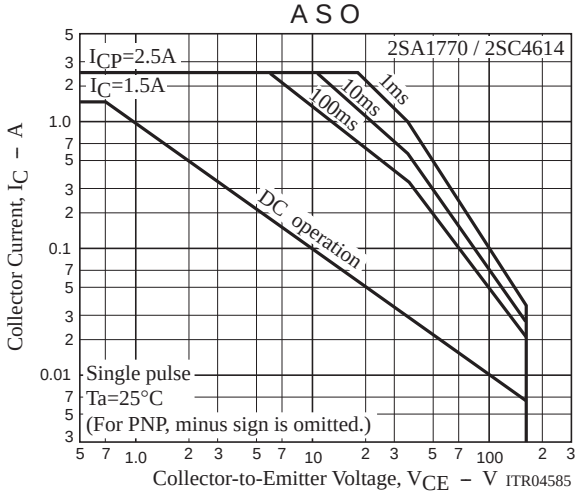
$V_{BE}(sat)$ -- I_C



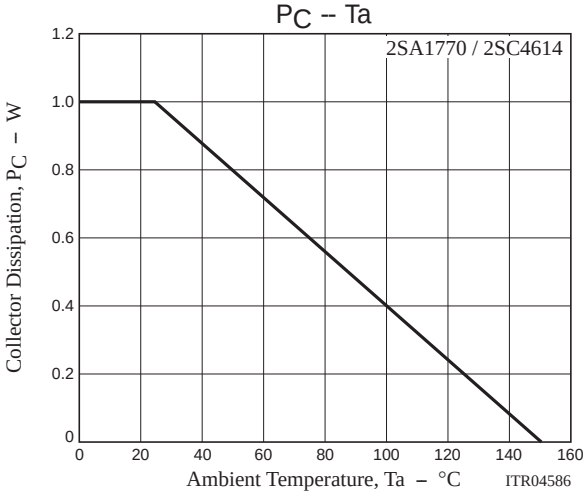
$V_{BE}(sat)$ -- I_C



A S O



P_C -- Ta



Bag Packing Specification

2SA1770S-AN, 2SA1770T-AN, 2SC4614S-AN, 2SC4614T-AN

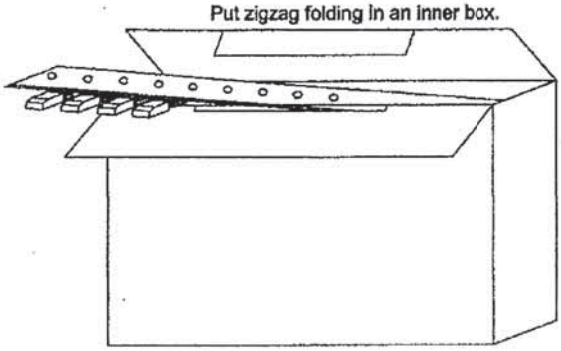
NMP (Zigzag folding)

Storage package Outline name	Package type	Maximum Number of devices contained (pcs.)		Packing format	
		Inner box No.	Storage quantity	Outer box (C—6)	Outer box (C—8)
NMP	AN/AZ	C—3 Inner box Dimensions :mm(external) 330×45×125	2,500	8 inner boxes contained(20,000pcs.) Outer box Dimensions:mm(external) 585×345×195	4 inner boxes contained(10,000pcs.) Outer box Dimensions:mm(external) 345×300×195

1. Packing format

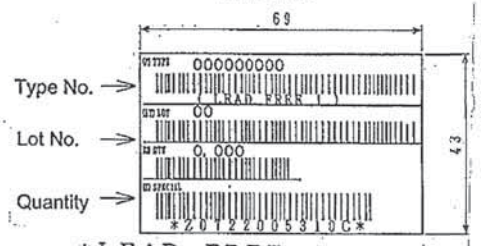
Packing method

Put zigzag folding in an inner box.



2. Bar code label

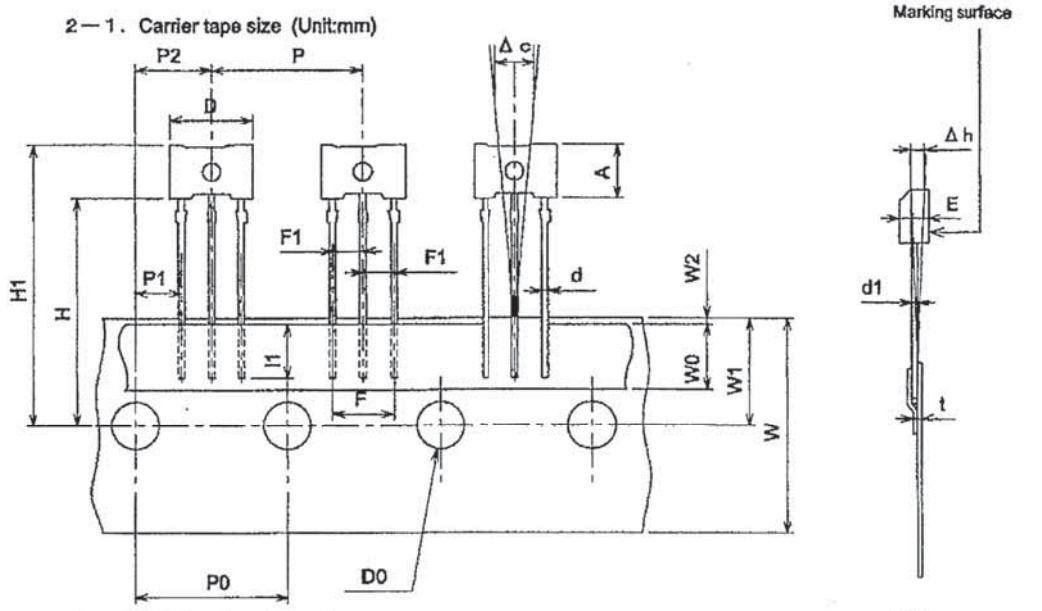
(Unit : mm)



*LEAD FREE 1:
Lead-free External terminal surface treatment product.

2. Taping specifications

2—1. Carrier tape size (Unit:mm)



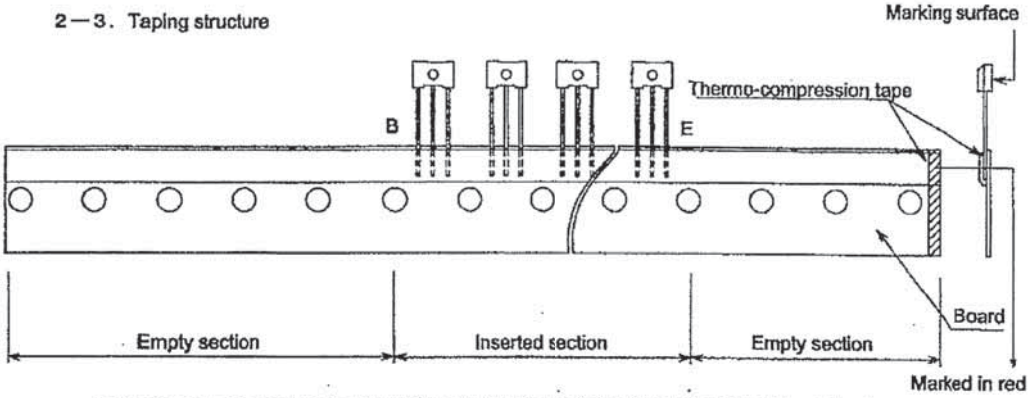
2—2. Taping size standard

Unit:mm

Item	Symbol	Standard	Tolerance
Work piece outside diameter	D	6.9	±0.2
	E	2.5	±0.2
Work piece height	A	4.5	±0.2
Lead wire diameter	d	0.5	±0.1
Lead wire thickness	d1	0.45	±0.1
Bonded lead wire	I1	3.0MIN	
Pitch between products	P	12.7	±0.5
Pitch between perforations	P0	12.7	±0.2
Total pitch for 21 perforations	P0×20	254.0	±1.0
Distance between lead wire	F	5.0	+0.8 -0.2
Lead wire pitch distance	F1	2.54	+0.4 -0.1
Displacement of perforations	P1	3.81	±0.3
	P2	6.35	±0.3
Displacement of tape	W2	0～0.5	

Item	Symbol	Standard	Tolerance
Tape width	W	18.0	±0.5
Adhesive tape	W0	6.0	±0.5
Displacement of perforations	W1	9.0	±0.5
Work piece bottom surface position	H	19.0	+1.0 -0.5
Work piece upper limit position	H1	23.5	±1.0
Perforations diameter	D0	φ4.0	±0.2
Tape thickness (total thickness)	t	0.6	±0.2
Product inclination	Δc	0	±0.7
Product inclination	Δh	0	±1.0

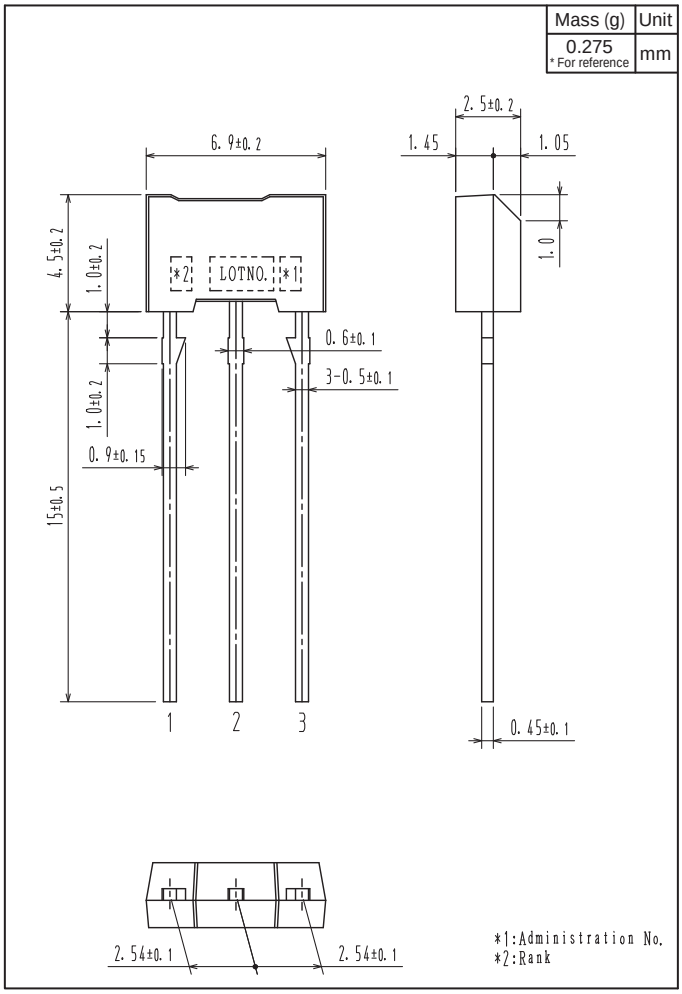
2—3. Taping structure



- Provide an empty section for about three to five pieces in leading and end portions of the tape.
- Provide an empty section in the fold-back portion.
- Provide marking in red to the E-side end of the board.

Outline Drawing

2SA1770S-AN, 2SA1770T-AN, 2SC4614S-AN, 2SC4614T-AN



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