



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

2SD1012 — NPN Epitaxial Planar Silicon Transistor

Low-Voltage Large-Current Amplifier Applications

Specifications

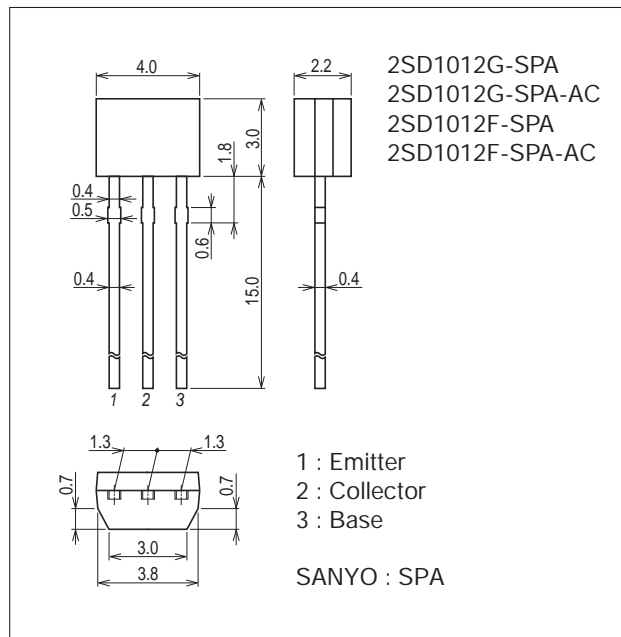
Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		15	V
Emitter-to-Base Voltage	V_{EBO}		5	V
Collector Current	I_C		0.7	A
Collector Current (Pulse)	I_{CP}		1.5	A
Collector Dissipation	P_C		250	mW
Junction Temperature	T_j		125	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +125	$^\circ\text{C}$

Package Dimensions

unit : mm (typ)

7524-004



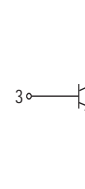
Product & Package Information

- Package : SPA
- JEITA, JEDEC : SC-72
- Minimum Packing Quantity : 2,500 pcs./box, 500pcs./bag

Marking



Electrical Connection



2SD1012

Electrical Characteristics at Ta=25°C

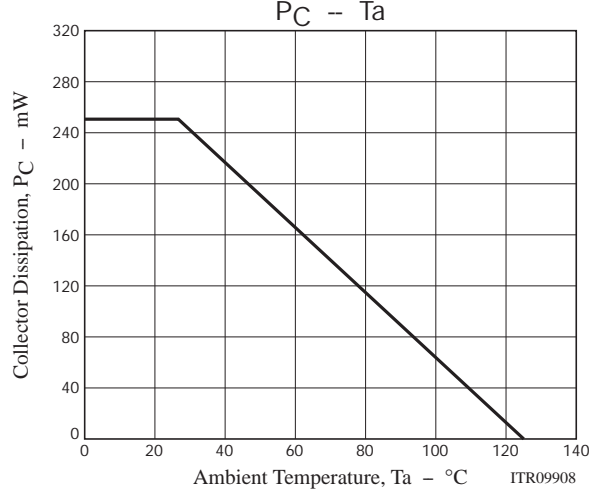
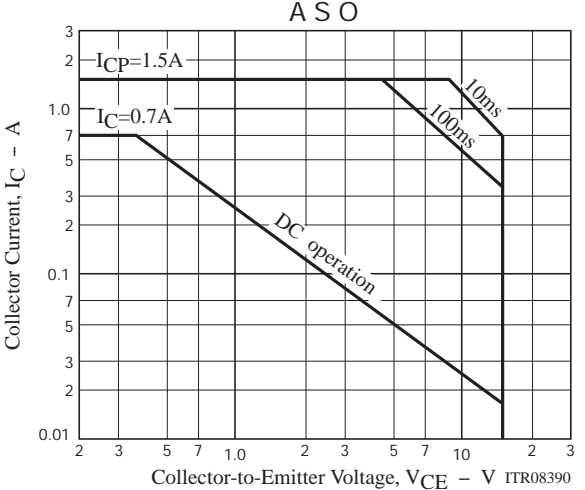
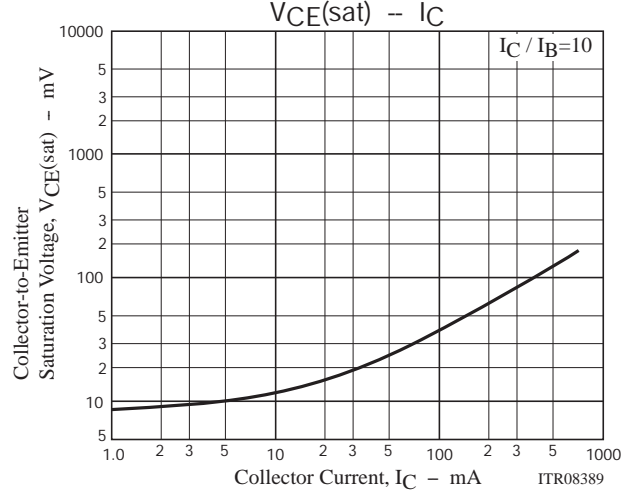
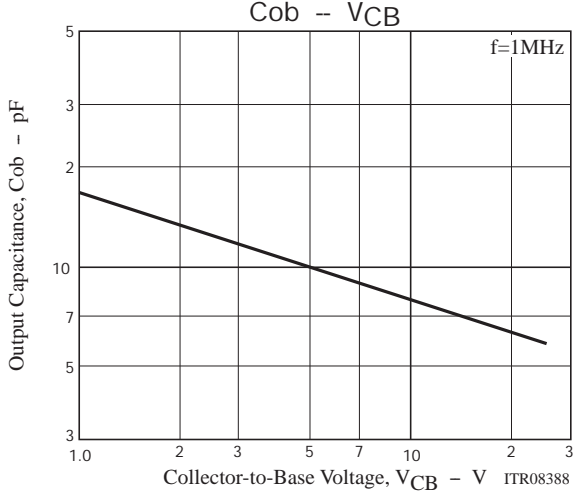
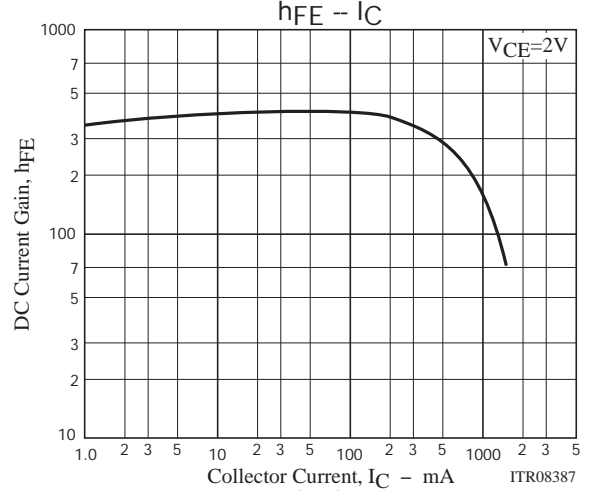
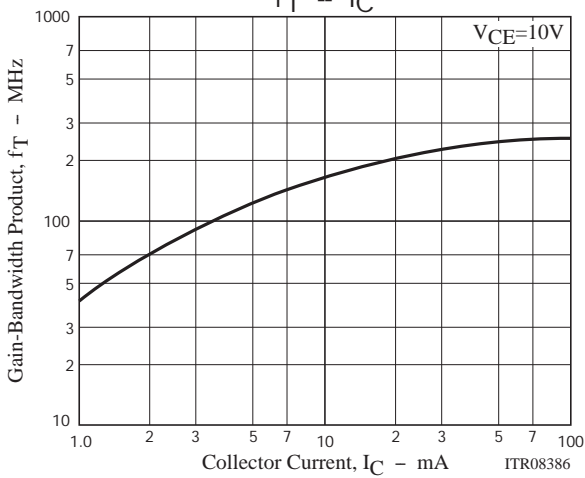
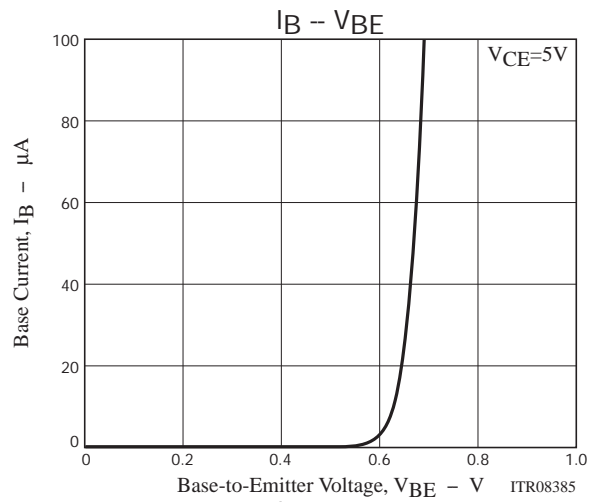
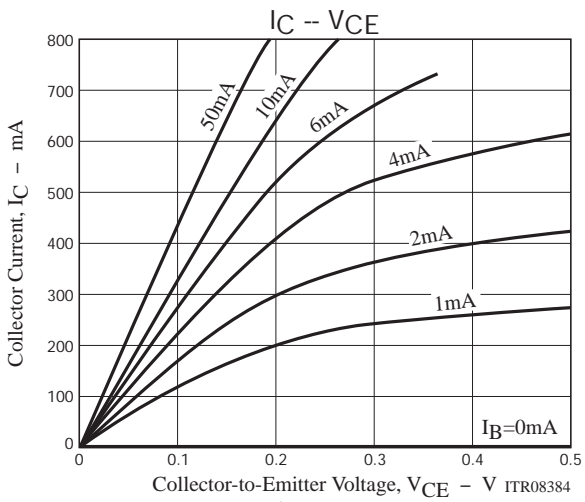
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	ICBO	V _{CB} =15V, I _E =0A			1.0	μA
Emitter Cutoff Current	IEBO	V _{EB} =4V, I _C =0A			1.0	μA
DC Current Gain	h _{FE1}	V _{CE} =2V, I _C =50mA	160*		960*	
	h _{FE2}	V _{CE} =2V, I _C =500mA Pulse	80			
Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =50mA		250		MHz
Common Base Output Capacitance	Cob	V _{CB} =10V, f=1MHz		8		pF
Collector-to-Emitter Saturation Voltage	V _{CE(sat)1}	I _C =5mA, I _B =0.5mA		10	25	mV
	V _{CE(sat)2}	I _C =100mA, I _B =10mA		30	80	mV
Base-to-Emitter Saturation Voltage	V _{BE(sat)}	I _C =100mA, I _B =10mA		0.8	1.2	V
Collector-to-Base Breakdown Voltage	V(BR)CBO	I _C =10μA, I _E =0A	20			V
Collector-to-Emitter Breakdown Voltage	V(BR)CEO	I _C =1mA, R _{BE} =∞	15			V
Emitter-to-Base Breakdown Voltage	V(BR)EBO	I _E =10μA, I _C =0A	5			V

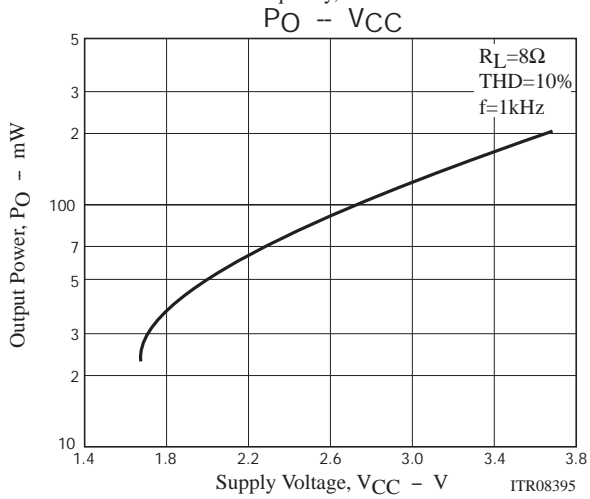
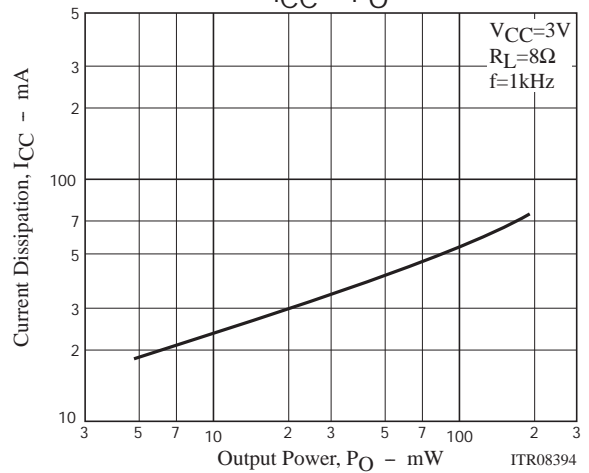
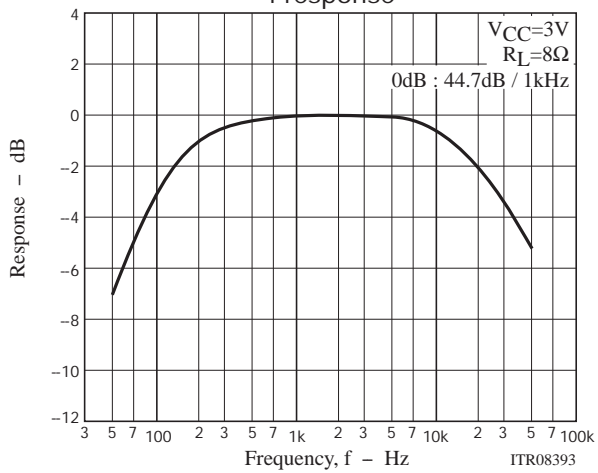
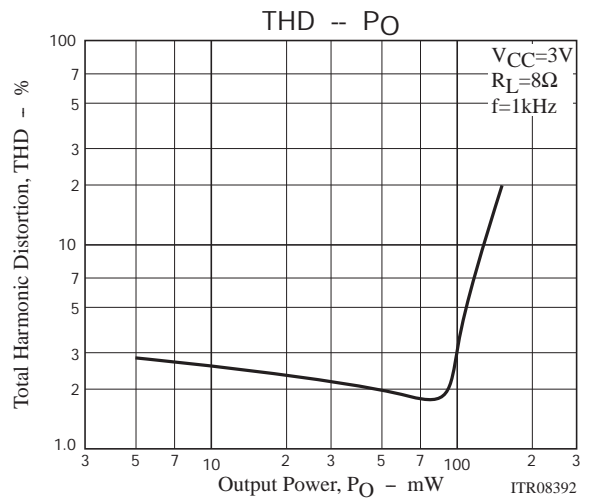
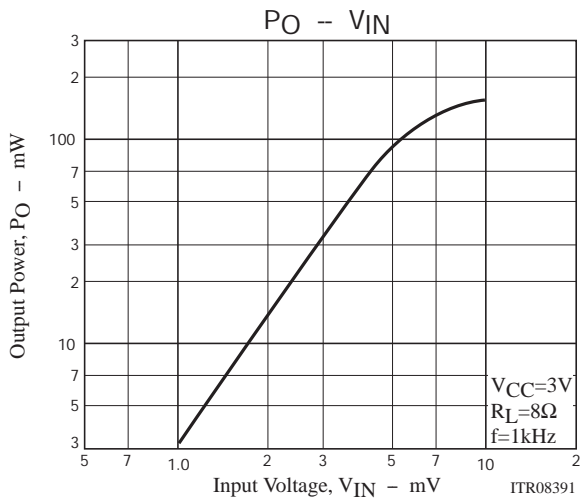
* : The 2SD1012 is classified by 50mA h_{FE} as follows :

Rank	F	G	H
h _{FE}	160 to 320	280 to 560	480 to 960

Ordering Information

Device	Package	Shipping	memo
2SD1012G-SPA	SPA	500pcs./bag	Pb Free
2SD1012G-SPA-AC	SPA-WA	2,500pcs./box	
2SD1012F-SPA	SPA	500pcs./bag	
2SD1012F-SPA-AC	SPA-WA	2,500pcs./box	





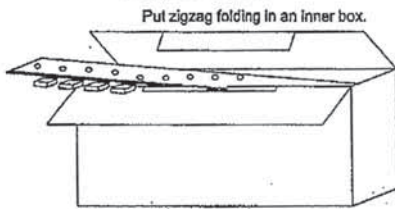
Taping Specification

2SD1012G-SPA-AC, 2SD1012F-SPA-AC

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)
SPA	A C	C-2 Inner box Dimensions :mm(external) 330×45×145	2,500	16 inner boxes contained(40,000pcs.) Outer box Dimensions:mm(external) 585×345×200	8 inner boxes contained(20,000pcs.) Outer box Dimensions:mm(external) 345×300×200
	A L	C-2 Inner box Dimensions :mm(external) 330×45×145	2,400	16 inner boxes contained(38,400pcs.) Outer box Dimensions:mm(external) 585×345×200	8 inner boxes contained(19,200pcs.) Outer box Dimensions:mm(internal) 345×300×200
	A P	C-4 Inner box Dimensions :mm(external) 330×45×285	5,000	8 inner boxes contained(40,000pcs.) Outer box Dimensions:mm(external) 585×345×200	4 inner boxes contained(20,000pcs.) Outer box Dimensions:mm(internal) 345×300×200
	A S	C-2 Inner box Dimensions :mm(external) 330×45×145	1,200	16 inner boxes contained(9,200pcs.) Outer box Dimensions:mm(external) 585×345×200	8 inner boxes contained(9,600 pcs.) Outer box Dimensions:mm(internal) 345×300×200

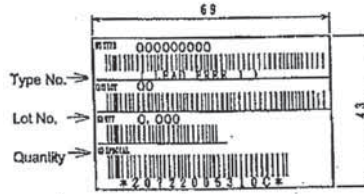
1. Packing format

Packing method



Sample bar code label

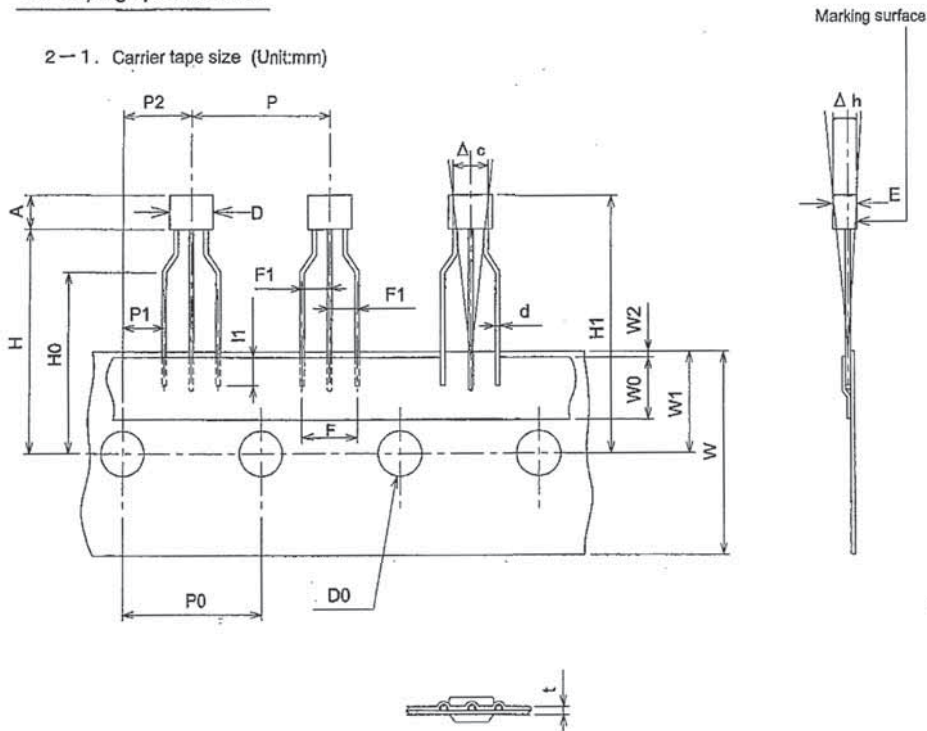
(Unit : mm)



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

2. Taping specifications

2-1. Carrier tape size (Unit:mm)



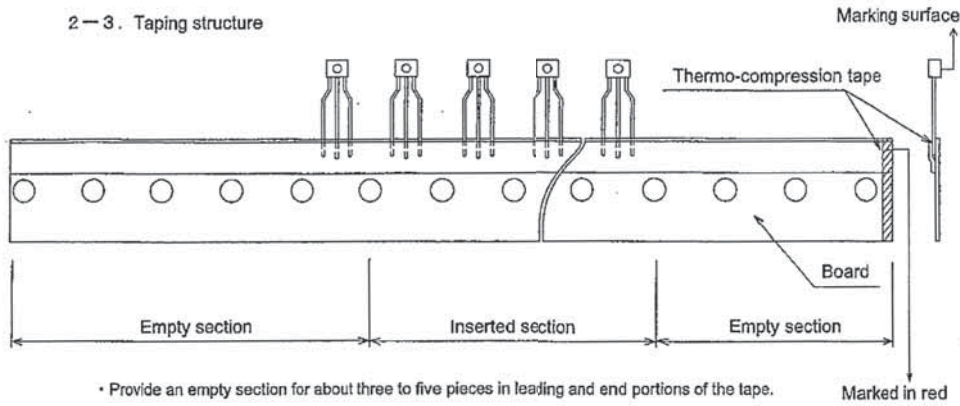
2-2. Taping size standard

Unit:mm

Item	Symbol	Standard	Tolerance
Work piece outside diameter	D	4.0	±0.2
	E	2.2	±0.2
Work piece height	A	3.0	±0.2
Lead wire diameter	d	0.4 × 0.4 t	±0.1
Bonded lead wire	l1	2.5MIN	
Pitch between products	P	12.7	±1.0
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	2.5	+0.4 -0.1
Product inclination	Δ h	0	±2.0
Displacement of perforations	P1	3.85	±0.3
	P2	6.35	±0.3
Displacement of tape	W2	0.5MAX	Not to be displaced to the outside of the board

Item	Symbol	Standard	Tolerance
Tape width	W	18.0	+1.0 -0.5
Adhesive tape	W0	6.0	±1.0
Displacement of perforations	W1	9.0	+0.75 -0.5
Work piece bottom surface position	H	19.8	+1.0 -0.3
Lead wire clinch height	H0	16.0	±0.5
Work piece upper limit position	H1	22.8	±1.5
Perforations diameter	D0	φ 4.0	±0.2
Tape thickness (total thickness)	t	0.6	±0.2
Product inclination	Δ c	0	±1.0

2-3. Taping structure

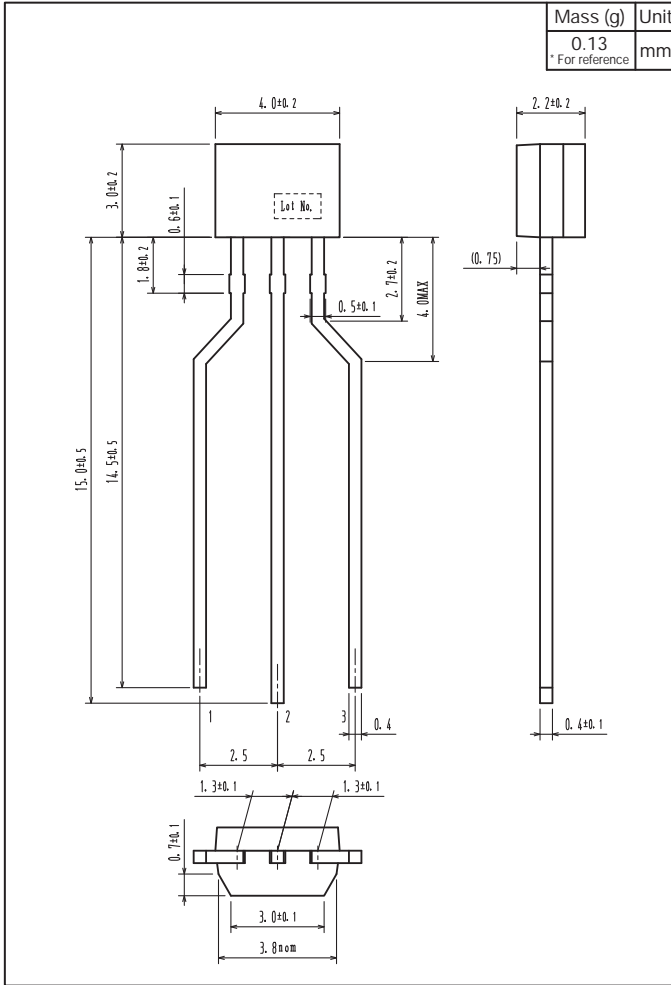


- Provide an empty section for about three to five pieces in leading and end portions of the tape.
- Provide marking in red to the E-side end of the board.

2SD1012

Outline Drawing

2SD1012G-SPA-AC, 2SD1012F-SPA-AC



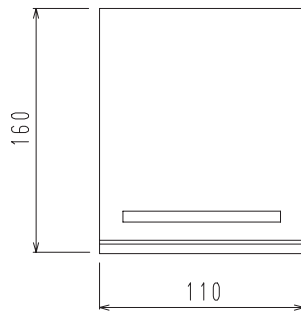
Bag Packing Specification

2SD1012G-SPA, 2SD1012F-SPA

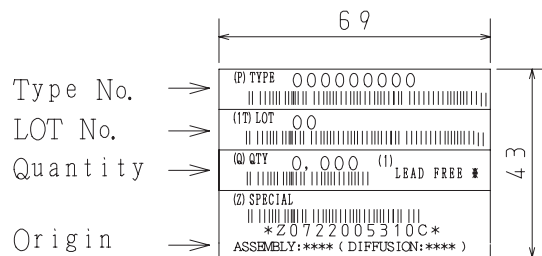
1. Packing Format

Package Name	Maximum Number of devices contained (pcs)				
	Bag	Inner BOX		Outer BOX	
SPA	500	B-1	B-1/2	A-1	A-2
		20,000	10,000	100,000	60,000
Packing format (Dimensions:mm (external))					
		Inner BOX		Outer BOX	
		B-1	B-1/2	A-1	A-2
		445×225×55	445×225×55	470×250×300	470×250×190

2. Bag dimensions
(unit:mm)

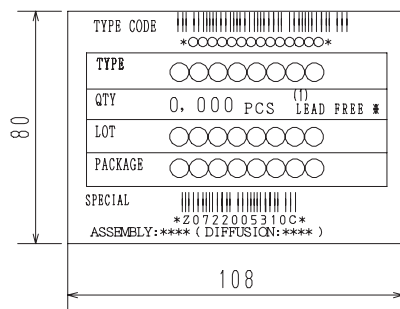


3. Bag label, Inner box label
(unit:mm)



4. Outer box label
(unit:mm)

It is a label at the time of factory shipments.
The form of a label may change in physical
distribution process.



NOTE (1)

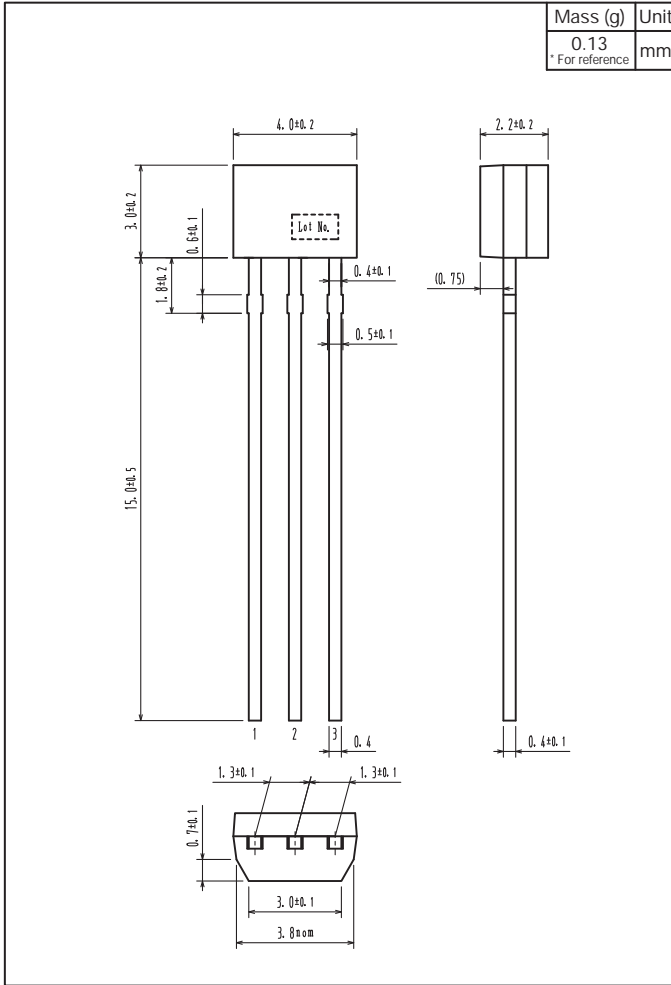
The LEAD FREE * description shows that the
surface treatment of the terminal is lead free.

Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2SD1012

Outline Drawing

2SD1012G-SPA, 2SD1012F-SPA



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