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2SD1012

Bipolar Transistor 15V, 0.7A, Low $V_{CE(sat)}$, NPN Single SPA

Specifications

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

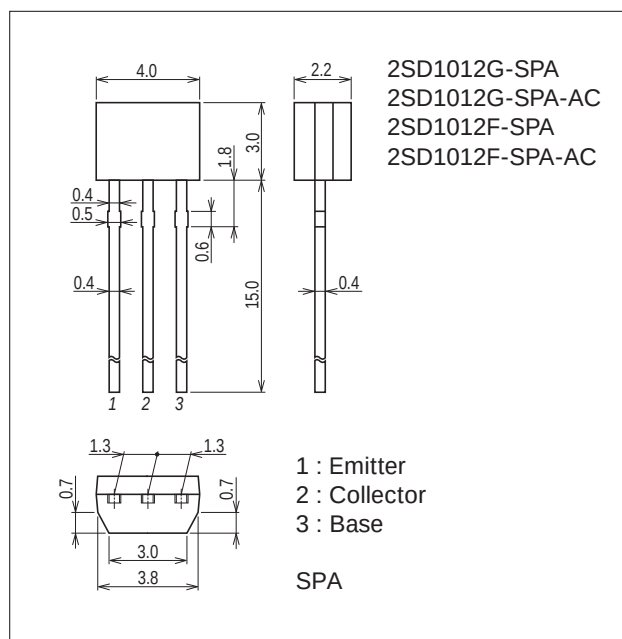
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		15	V
Emitter-to-Base Voltage	V_{EBO}		5	V
Collector Current	I_C		0.7	A
Collector Current (Pulse)	I_{CP}		1.5	A
Collector Dissipation	P_C		250	mW
Junction Temperature	T_J		125	$^\circ\text{C}$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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

unit : mm (typ)

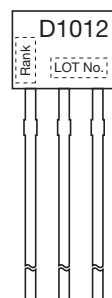
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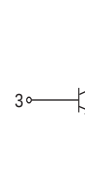
Product & Package Information

- 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

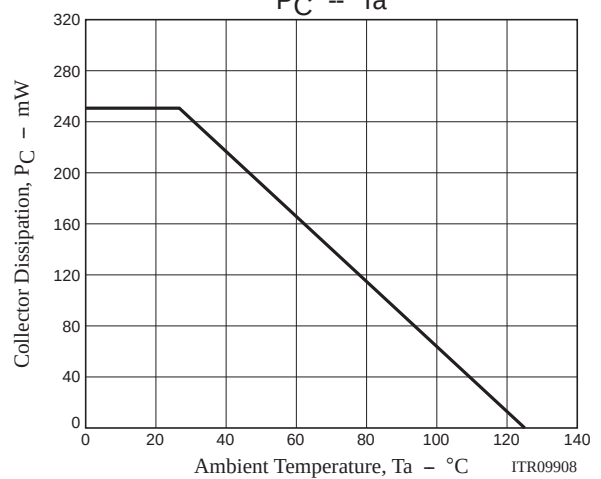
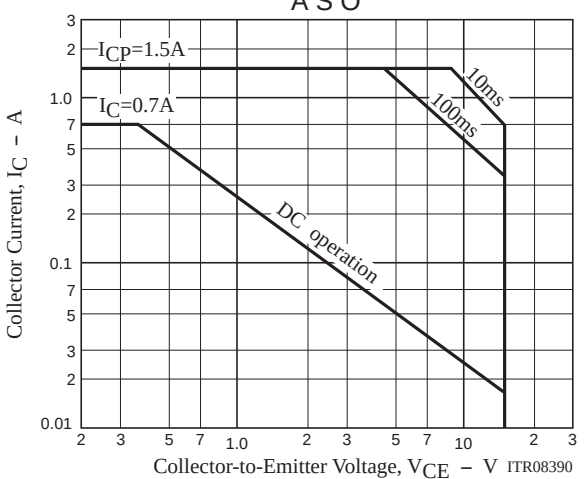
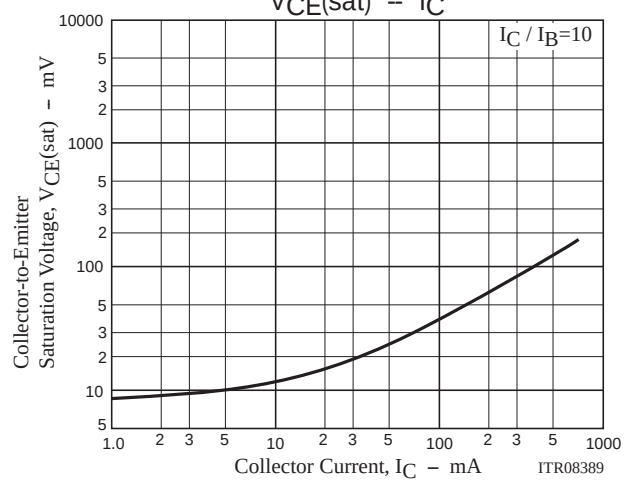
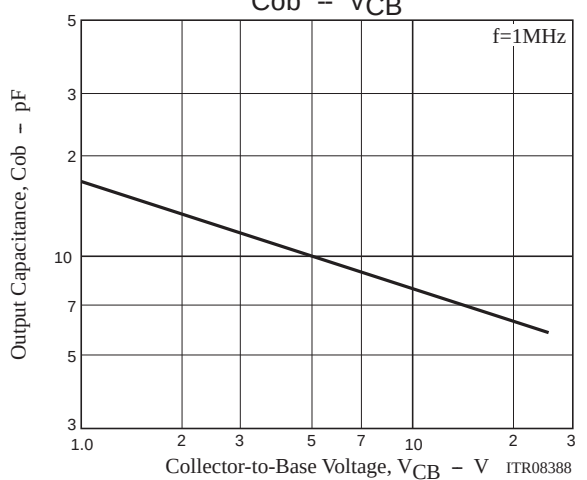
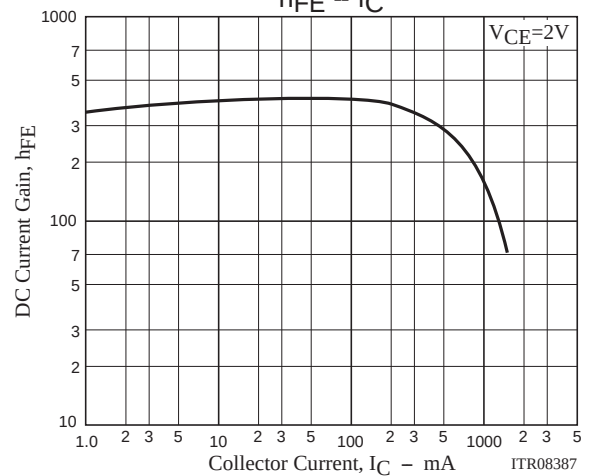
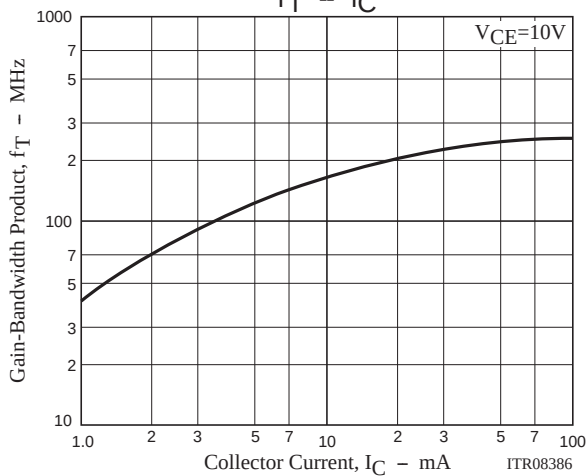
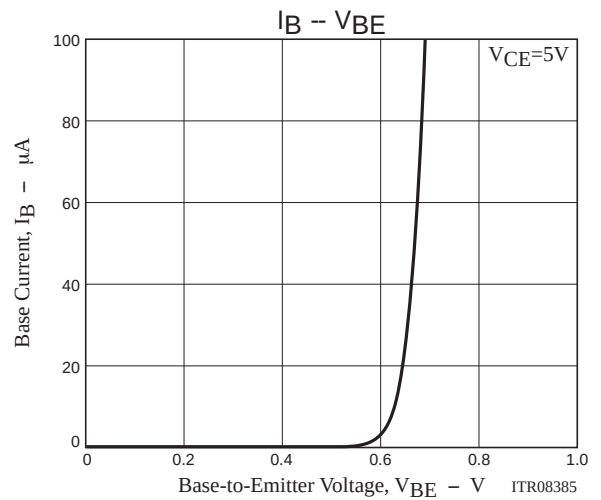
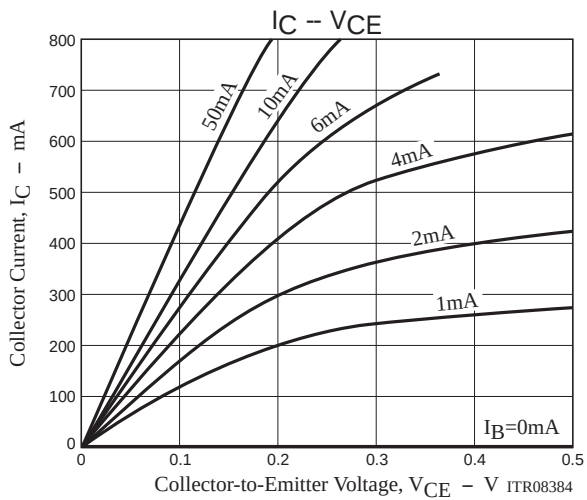
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	ICBO	V _{CB} =15V, I _E =0A			1.0	μA
Emitter Cutoff Current	IEBO	V _{EB} =4V, I _C =0A			1.0	μA
DC Current Gain	h _{FE1}	V _{CE} =2V, I _C =50mA	160*		960*	
	h _{FE2}	V _{CE} =2V, I _C =500mA Pulse	80			
Gain-Bandwidth 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

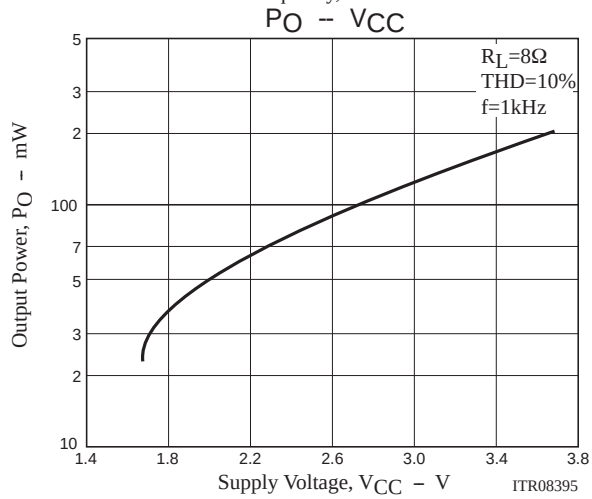
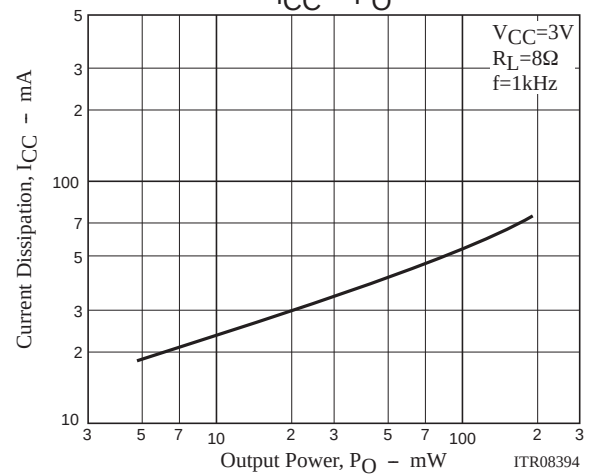
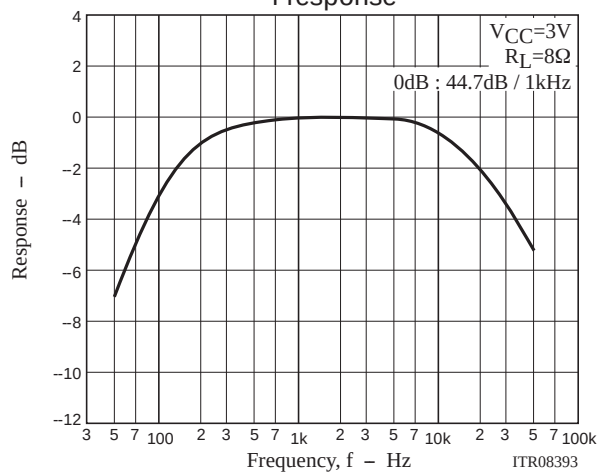
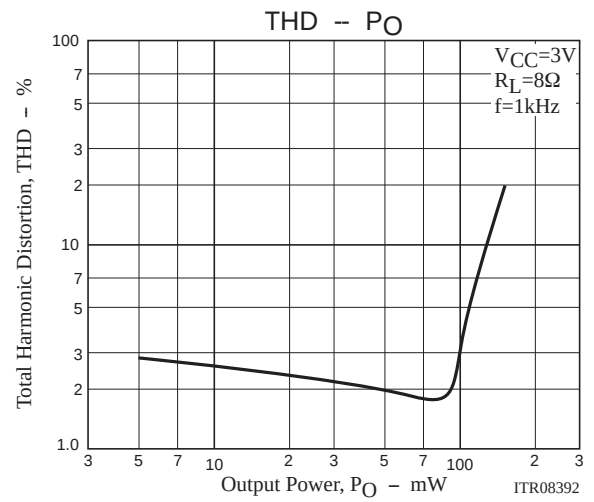
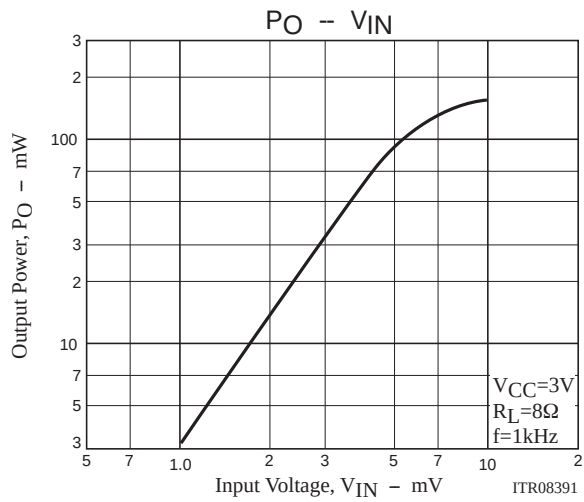
* : The 2SD1012 is classified by 50mA h_{FE} as follows :

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

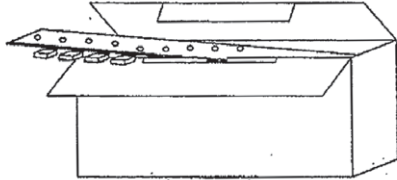
2SD1012G-SPA-AC, 2SD1012F-SPA-AC

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(19,200pcs.) Outer box Dimensions:mm(external) 585×345×200	8 inner boxes contained(9,600pcs.) Outer box Dimensions:mm(internal) 345×300×200

1. Packing format

Packing method

Put zigzag folding in an inner box.



Sample bar code label

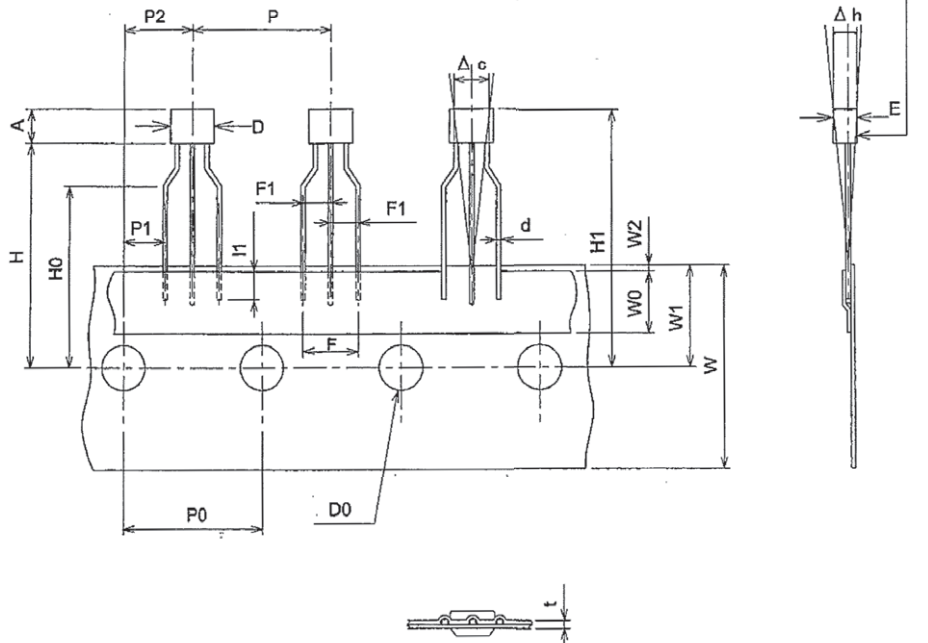
(Unit : mm)



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

2. Taping specifications

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

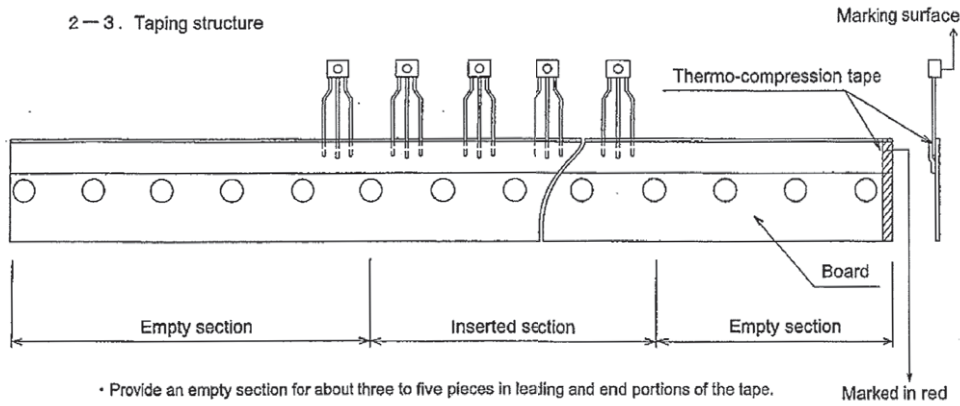


2-2. Taping size standard

Unit:mm

Item	Symbol	Standard	Tolerance	Item	Symbol	Standard	Tolerance
Work piece outside diameter	D	4.0	±0.2	Tape width	W	18.0	+1.0 -0.5
	E	2.2	±0.2	Adhesive tape	W0	6.0	±1.0
Work piece height	A	3.0	±0.2	Displacement of perforations	W1	9.0	+0.75 -0.5
Lead wire diameter	d	0.4×0.4 t	±0.1	Work piece bottom surface position	H	19.8	+1.0 -0.3
Bonded lead wire	l1	2.5MIN		Lead wire clinch height	H0	16.0	±0.5
Pitch between products	P	12.7	±1.0	Work piece upper limit position	H1	22.8	±1.5
Pitch between perforations	P0	12.7	±0.2	Perforations diameter	D0	φ 4.0	±0.2
Total pitch for 21 perforations	P0×20	254.0	±1.0	Tape thickness (total thickness)	t	0.6	±0.2
Distance between lead wire	F	5.0	+0.8 -0.2	Product inclination	Δ c	0	±1.0
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	To be measured at a position below the clinch			
	P2	6.35	±0.3				
Displacement of tape	W2	0.5MAX		Not to be displaced to the outside of the board			

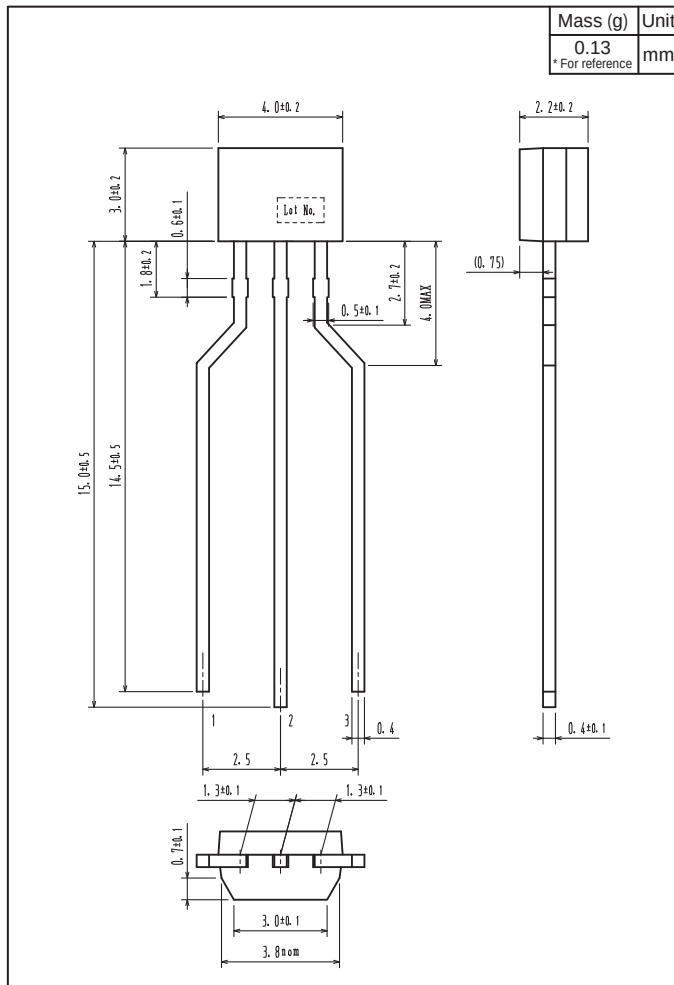
2-3. Taping structure



- 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.

Outline Drawing

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



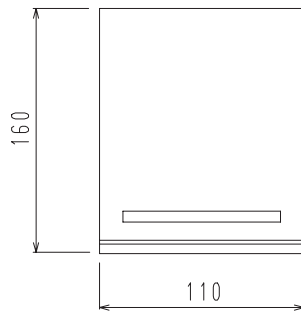
Bag Packing Specification

2SD1012G-SPA, 2SD1012F-SPA

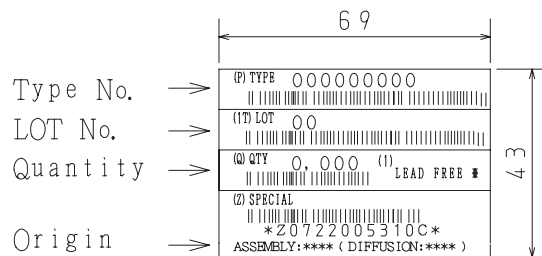
1. Packing Format

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)

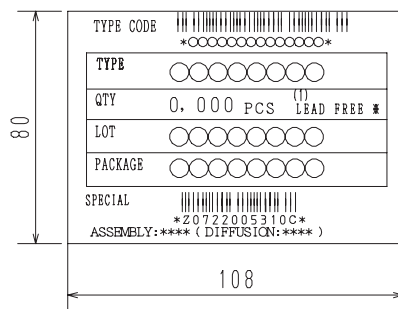


3. Bag label, Inner box label (unit:mm)



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.



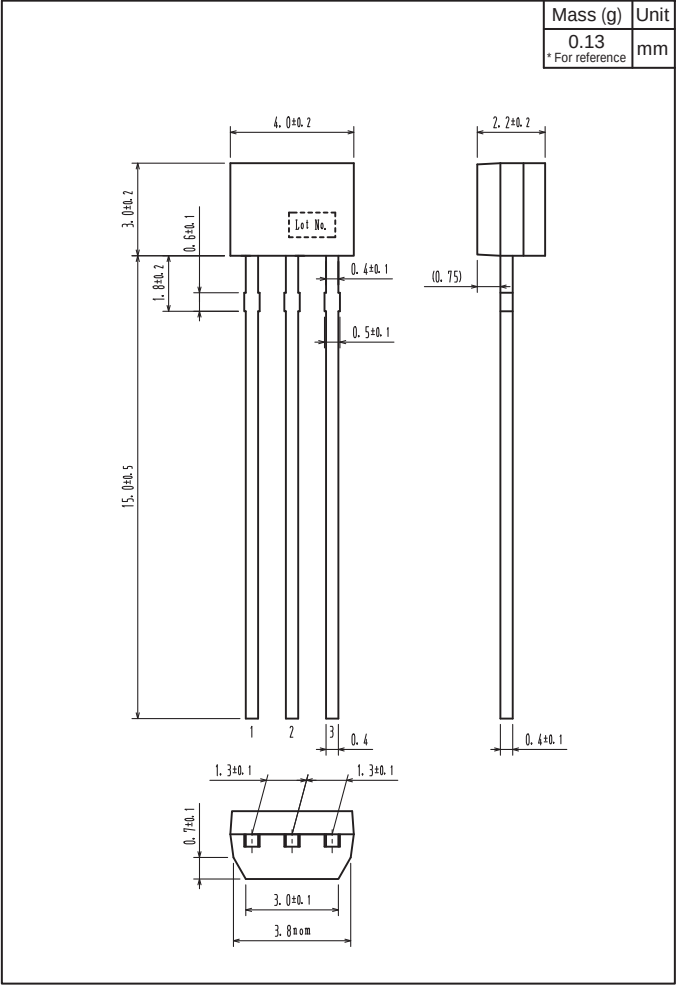
NOTE (1)

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

Outline Drawing

2SD1012G-SPA, 2SD1012F-SPA



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