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2SD1012

Bipolar Transistor 15V, 0.7A, Low VCE(sat), NPN Single SPA

ON Semiconductor®

<http://onsemi.com>

Specifications

Absolute Maximum Ratings at Ta=25°C

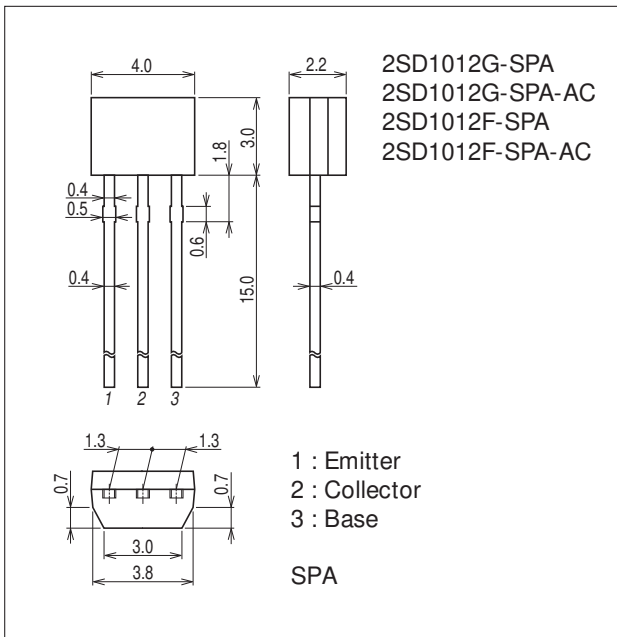
| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|------------------|------------|-------------|------|
| Collector-to-Base Voltage | V _{CB0} | | 20 | V |
| Collector-to-Emitter Voltage | V _{CEO} | | 15 | V |
| Emitter-to-Base Voltage | V _{EB0} | | 5 | V |
| Collector 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 | °C |
| Storage Temperature | T _{stg} | | -55 to +125 | °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)

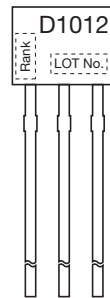
7524-004



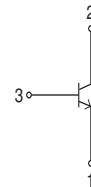
Product & Package Information

- 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 |

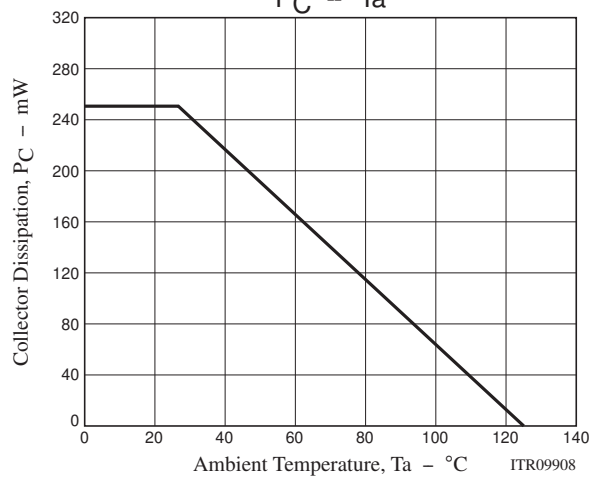
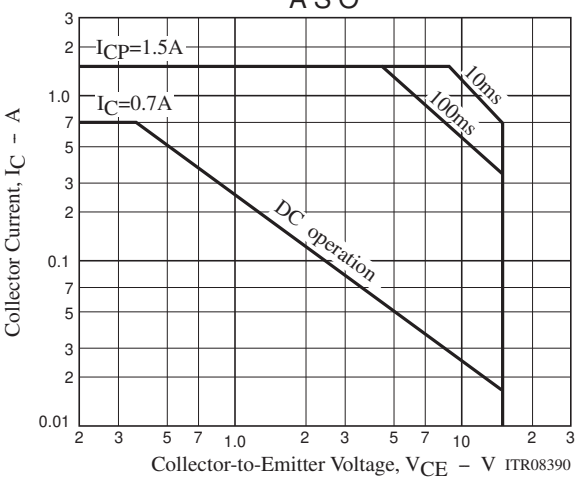
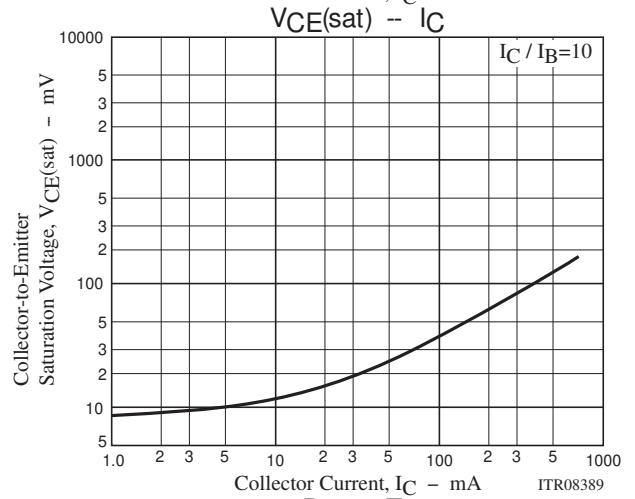
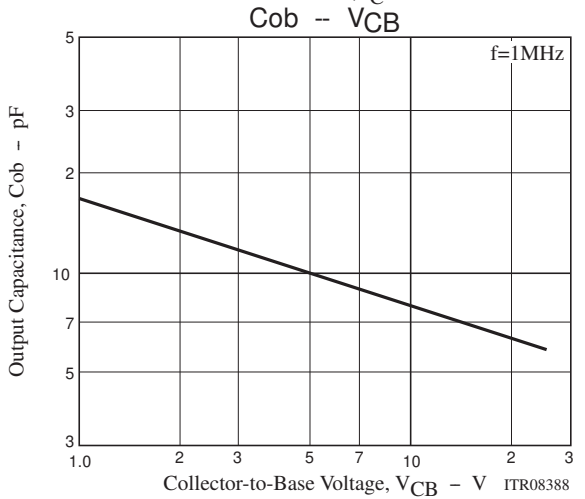
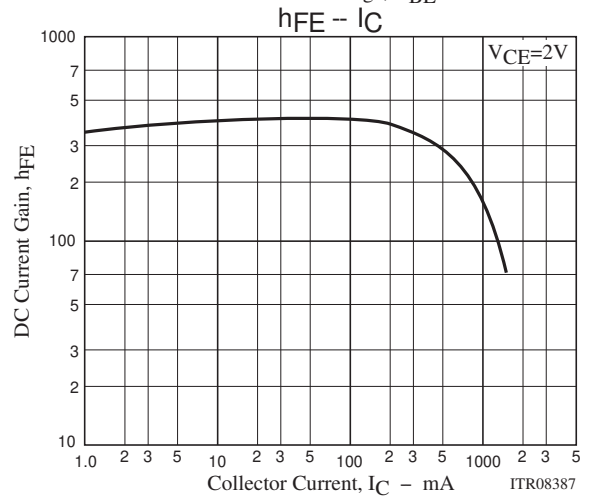
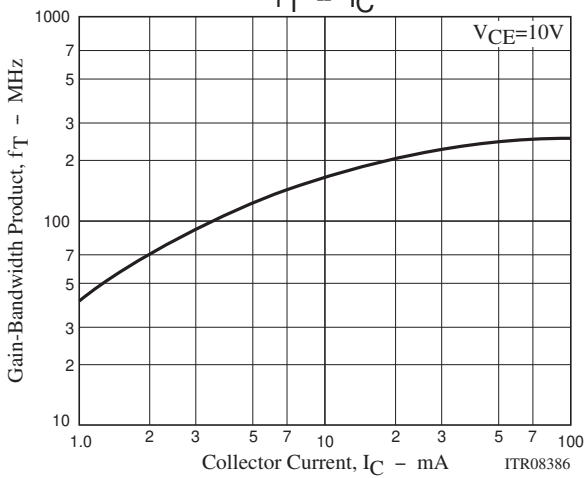
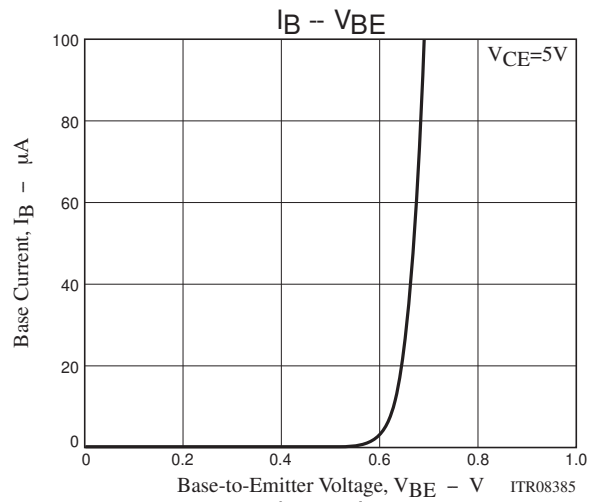
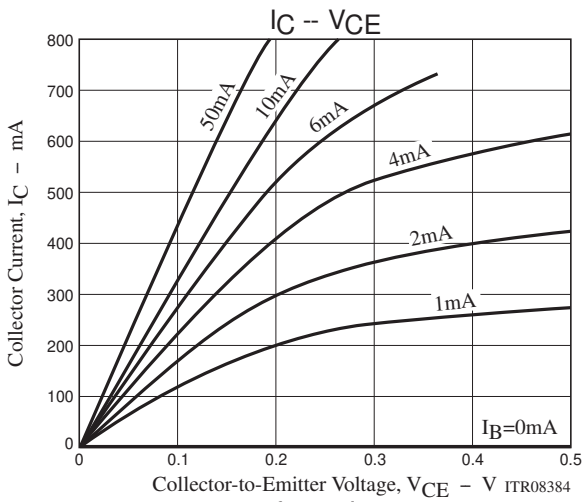
* : The 2SD1012 is classified by 50mA h_{FE} as follows :

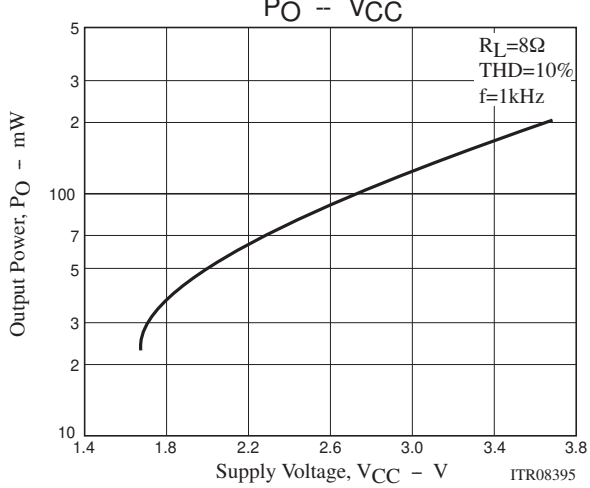
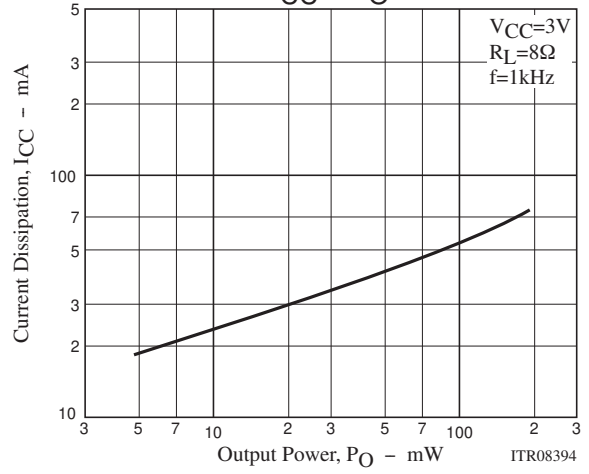
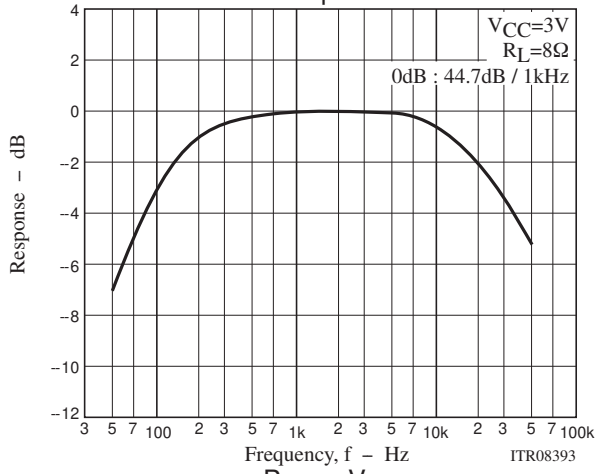
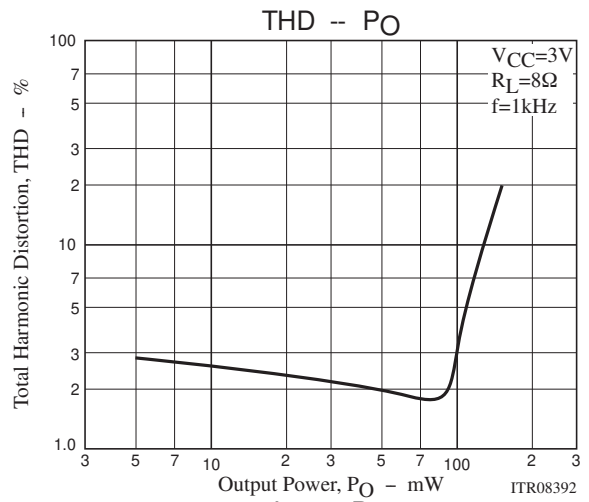
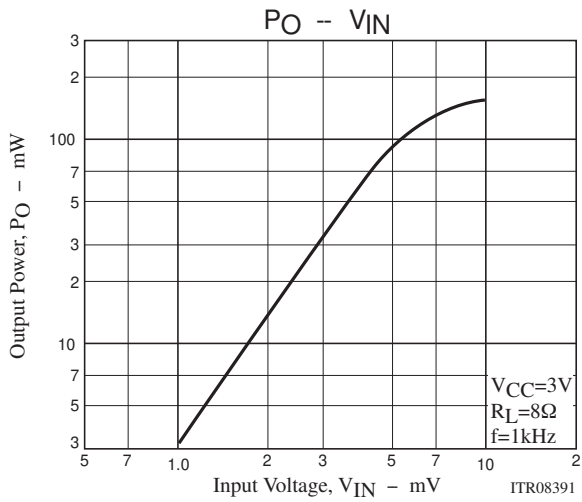
| Rank | F | G | H |
|-----------------|------------|------------|------------|
| h _{FE} | 160 to 320 | 280 to 560 | 480 to 960 |

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 | |

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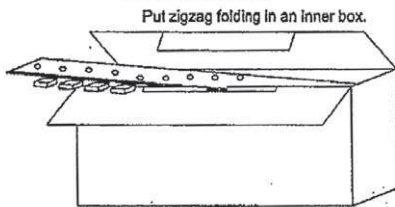
Taping Specification

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(9,600pcs.) Outer box Dimensions:mm(internal) 345×300×200 |

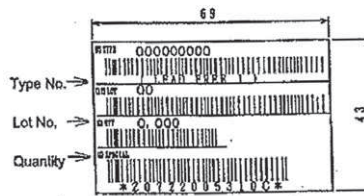
1. Packing format

Packing method



Sample bar code label

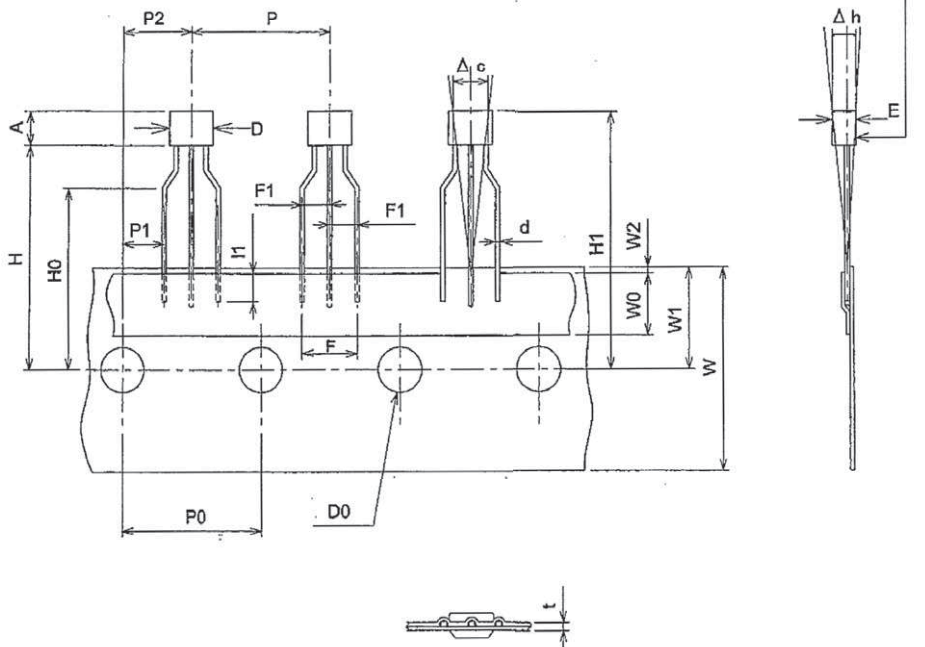
(Unit : mm)



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

2. Taping specifications

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



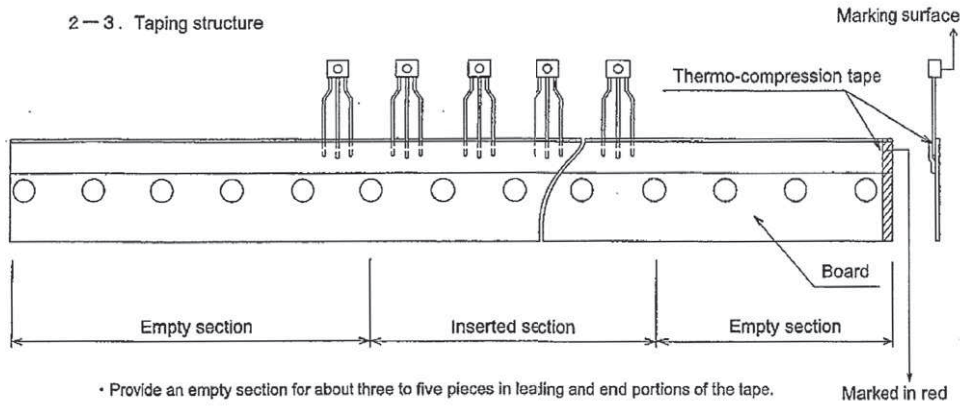
2SD1012

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 | 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

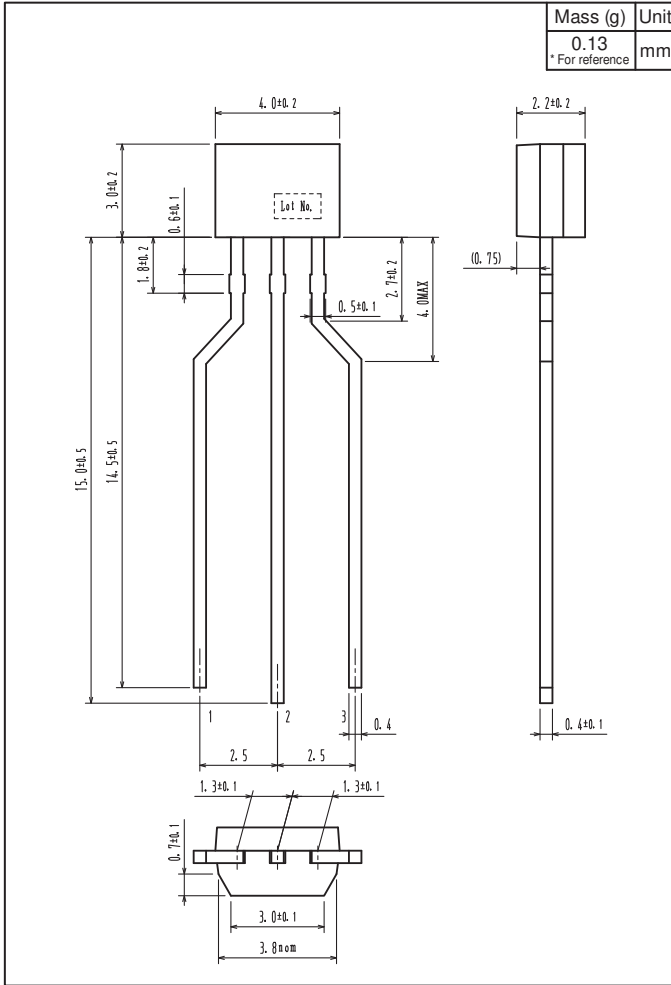


- Provide an empty section for about three to five pieces in leading and end portions of the tape.
- Provide marking in red to the E-side end of the board.

2SD1012

Outline Drawing

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



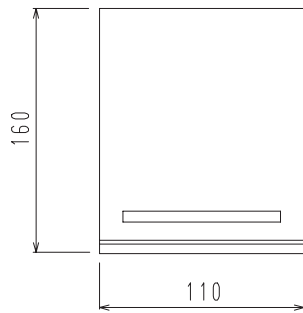
Bag Packing Specification

2SD1012G-SPA, 2SD1012F-SPA

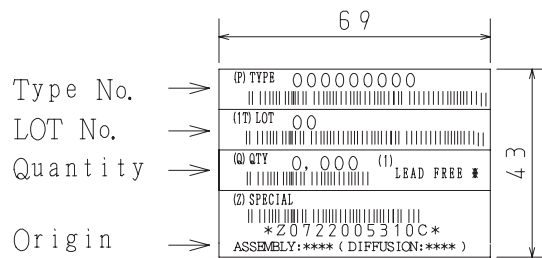
1. Packing Format

| 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)

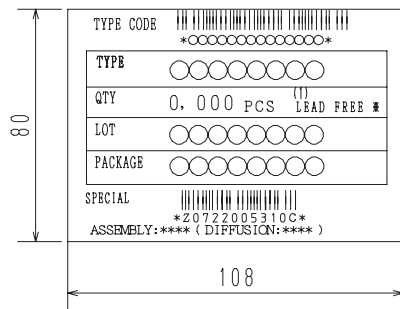


3. Bag label, Inner box label
(unit:mm)



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)

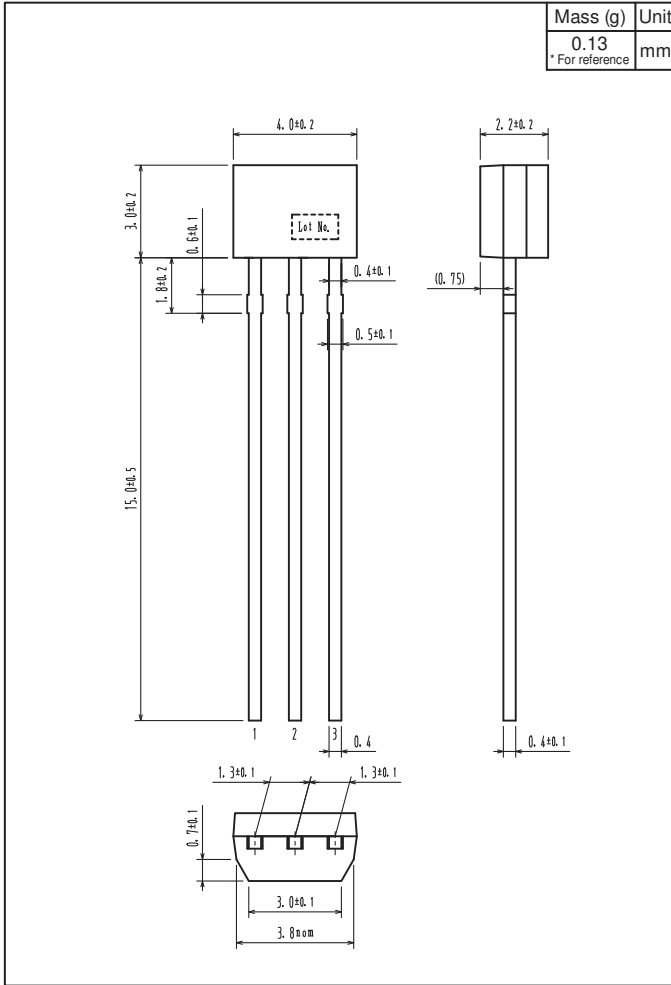
The LEAD FREE * description shows that the surface treatment of the terminal is lead free.

| 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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