



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 2SB1204 — PNP Epitaxial Planar Silicon Transistor High-Current Switching Applications

### Applications

- Relay drivers, high-speed inverters, converters, and other general high-current switching applications

### Features

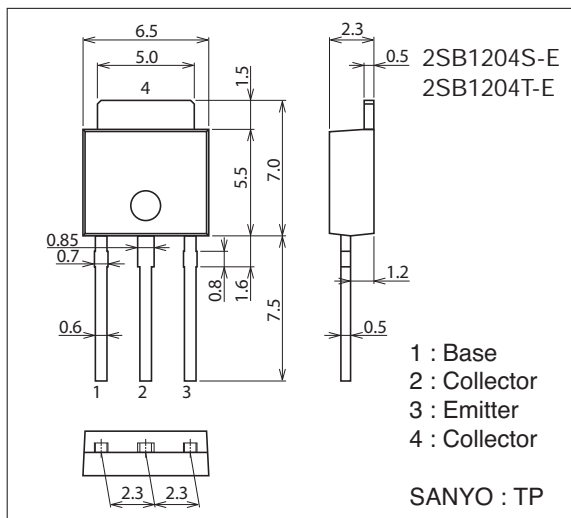
- Low collector-to-emitter saturation voltage
- High current and high  $f_T$
- Excellent linearity of  $h_{FE}$
- Fast switching speed
- Small and slim package making it easy to make 2SB1204-applied sets smaller

### Specifications

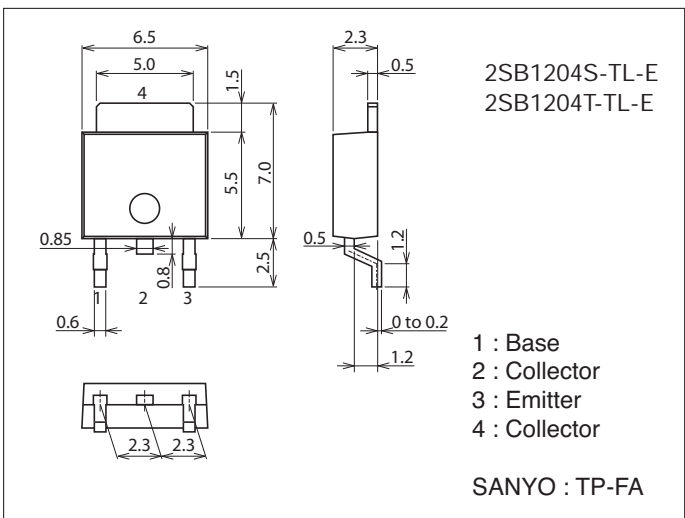
Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		-60	V
Collector-to-Emitter Voltage	$V_{CE0}$		-50	V
Emitter-to-Base Voltage	$V_{EB0}$		-6	V
Collector Current	$I_C$		-8	A
Collector Current (Pulse)	$I_{CP}$		-12	A
Collector Dissipation	$P_C$	$T_c=25^\circ\text{C}$	1	W
			20	W
Junction Temperature	$T_j$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

### Package Dimensions unit : mm (typ) 7518-003



### Package Dimensions unit : mm (typ) 7003-003

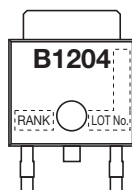


### Product & Package Information

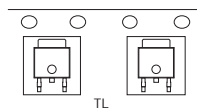
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

- Package : TP-FA
- JEITA, JEDEC : SC-63, TO-252
- Minimum Packing Quantity : 700 pcs./reel

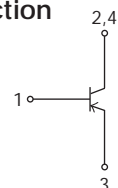
### Marking (TP, TP-FA)



### Packing Type (TP-FA) : TL



### Electrical Connection



SANYO Semiconductor Co., Ltd.

<http://semicon.sanyo.com/en/network>

## 2SB1204

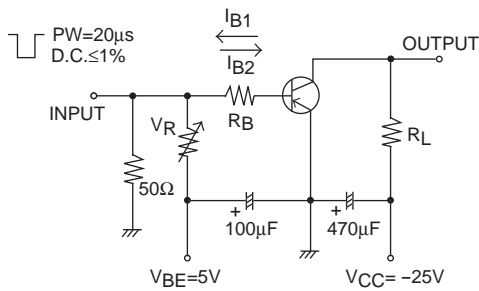
### Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = -40V, I_E = 0A$			-1	$\mu A$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = -4V, I_C = 0A$			-1	$\mu A$
DC Current Gain	$h_{FE1}$	$V_{CE} = -2V, I_C = -0.5A$	70*		400*	
	$h_{FE2}$	$V_{CE} = -2V, I_C = -6A$	35			
Gain-Bandwidth Product	$f_T$	$V_{CE} = -5V, I_C = -1A$		130		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = -10V, f = 1MHz$		95		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = -4A, I_B = -0.2A$		-250	-500	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = -4A, I_B = -0.2A$		-0.95	-1.3	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -10\mu A, I_E = 0A$	-60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -1mA, R_{BE} = \infty$	-50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = -10\mu A, I_C = 0A$	-6			V
Turn-On Time	$t_{on}$	See specified Test Circuit		50		ns
Storage Time	$t_{stg}$			450		ns
Fall Time	$t_f$			20		ns

\* : The 2SB1204 are classified by 0.5A  $h_{FE}$  as follows :

Rank	Q	R	S	T
$h_{FE}$	70 to 140	100 to 200	140 to 280	200 to 400

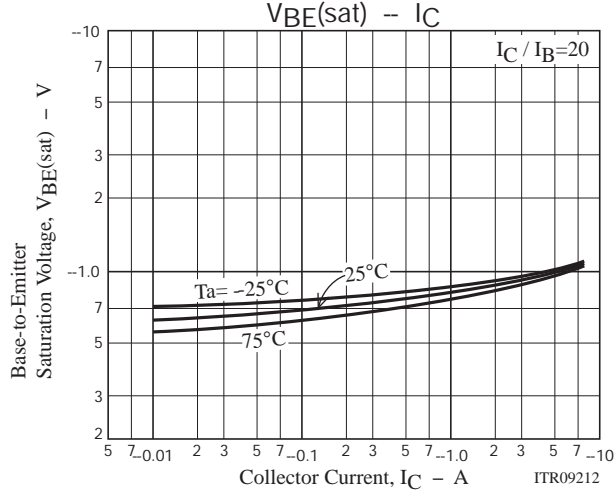
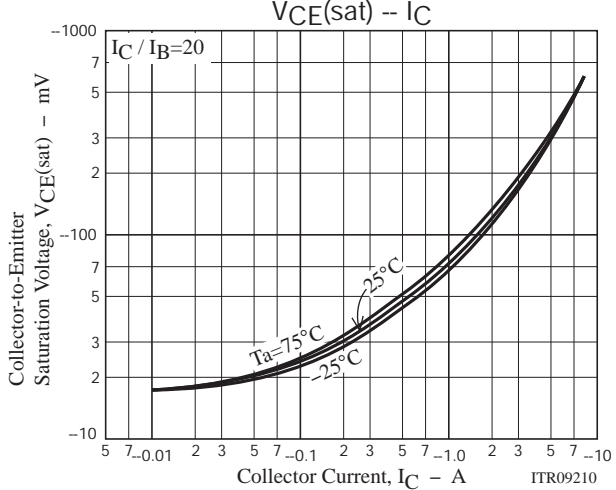
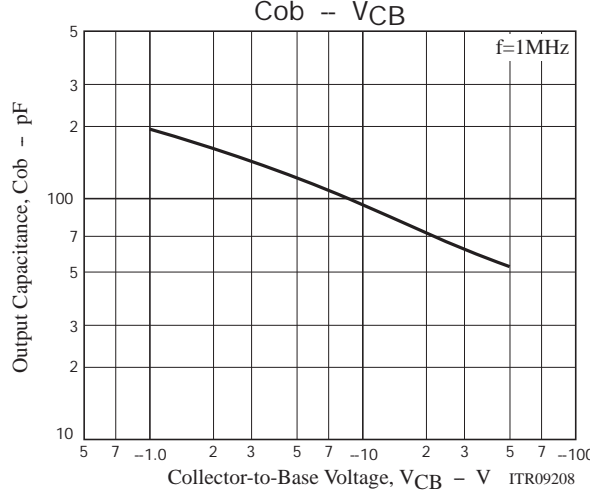
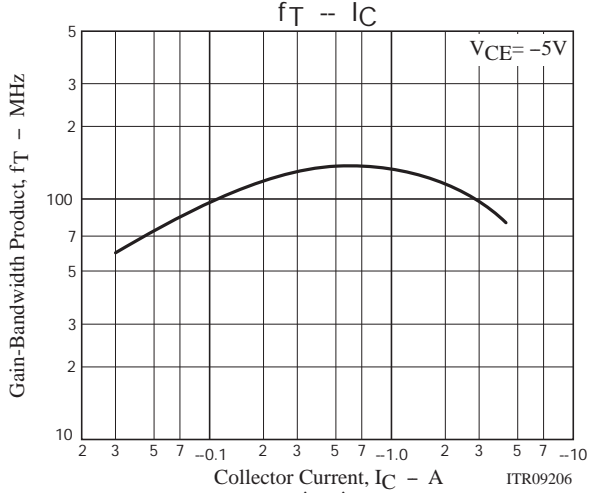
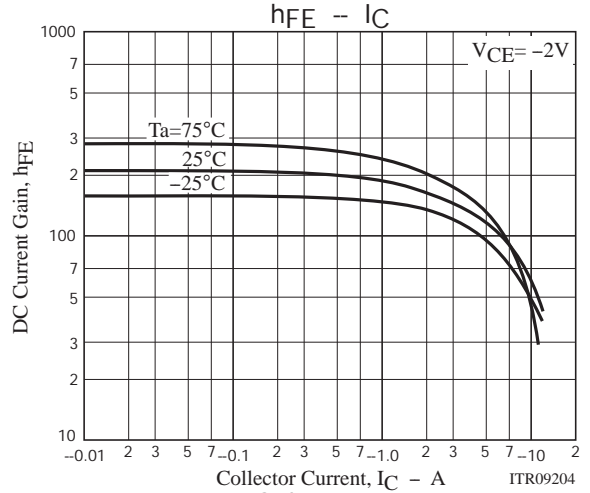
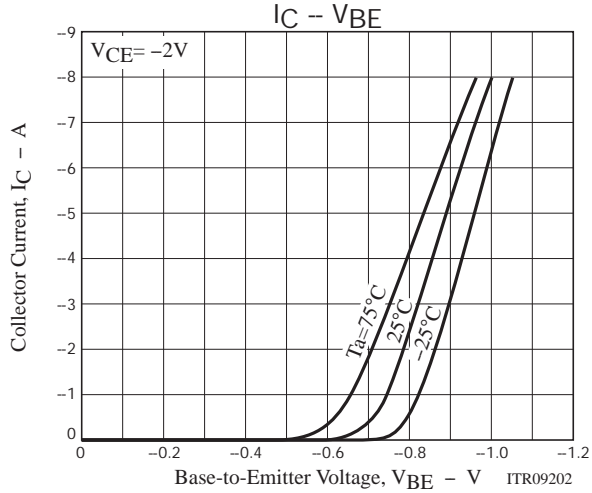
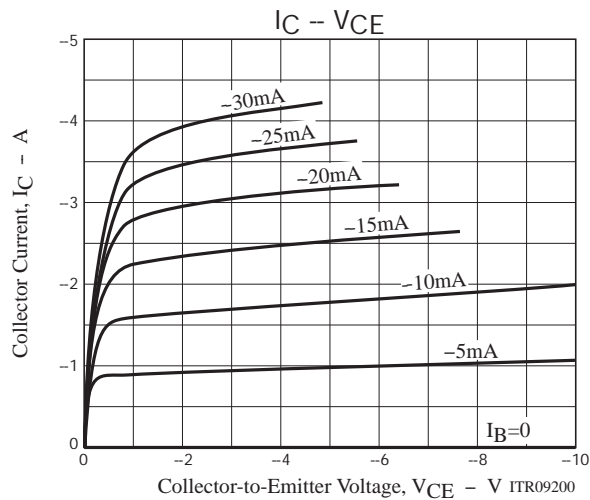
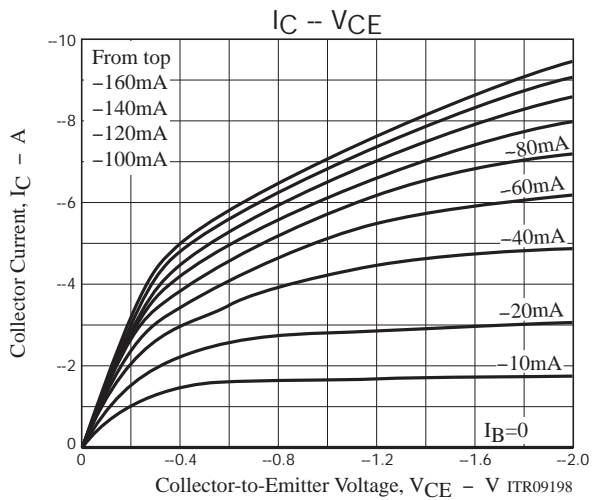
### Switching Time Test Circuit

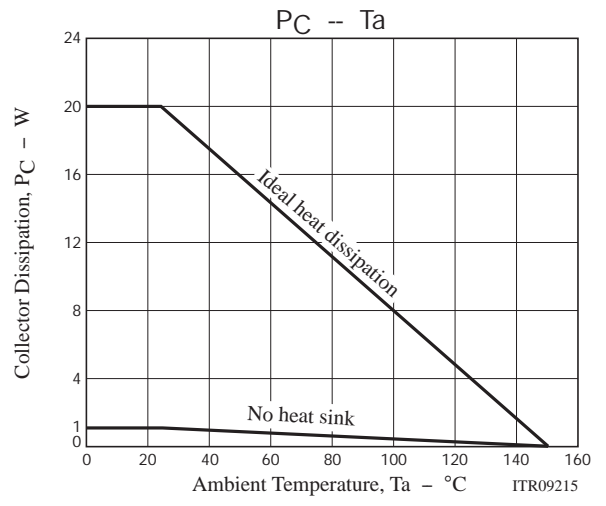
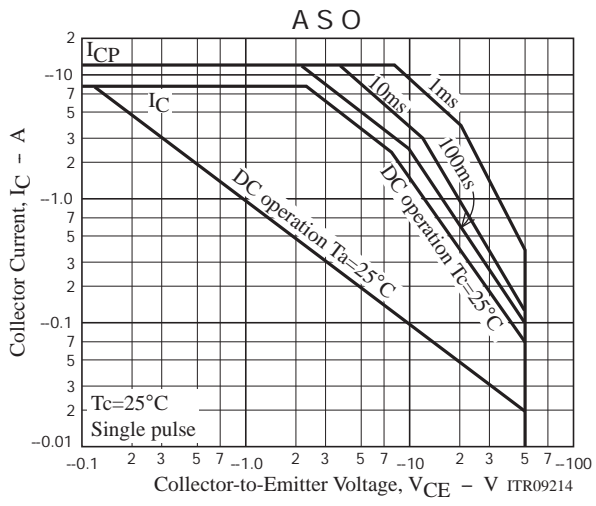


$$I_C = -10I_{B1} = 10I_{B2} = -4A$$

### Ordering Information

Device	Package	Shipping	memo
2SB1204S-E	TP	500pcs./bag	Pb Free
2SB1204T-E	TP	500pcs./bag	
2SB1204S-TL-E	TP-FA	700pcs./reel	
2SB1204T-TL-E	TP-FA	700pcs./reel	





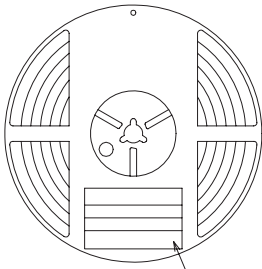
Taping Specification

2SB1204S-TL-E, 2SB1204T-TL-E

Packing Format

Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
TP-FA	TP	700	2,100	12,600	3 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Packing method



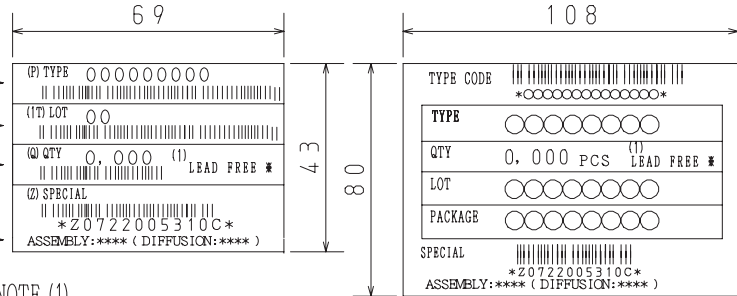
Type No.  
LOT No.  
Quantity  
Origin

Reel label

Reel label, Inner box label  
(unit:mm)

Outer box label

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



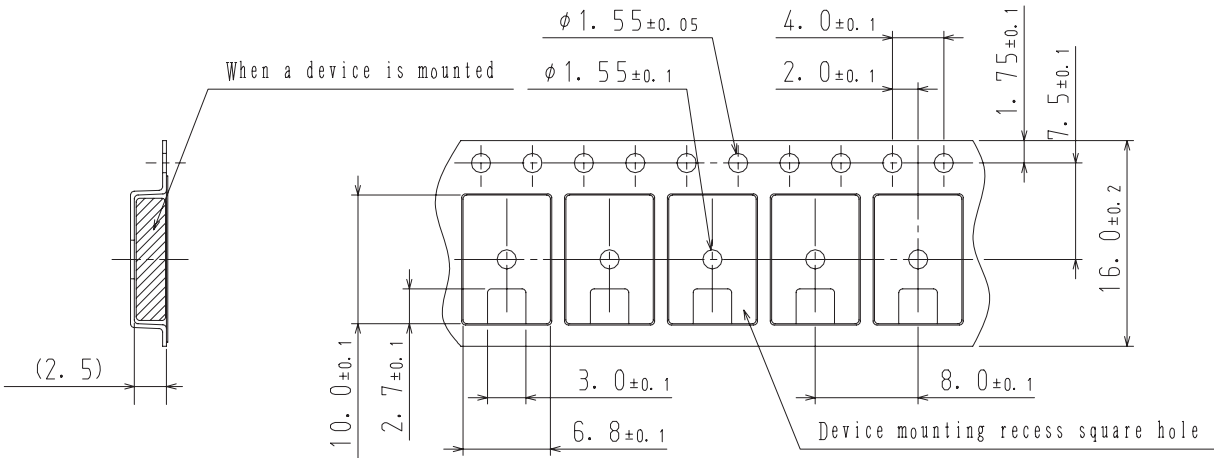
NOTE (1)

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

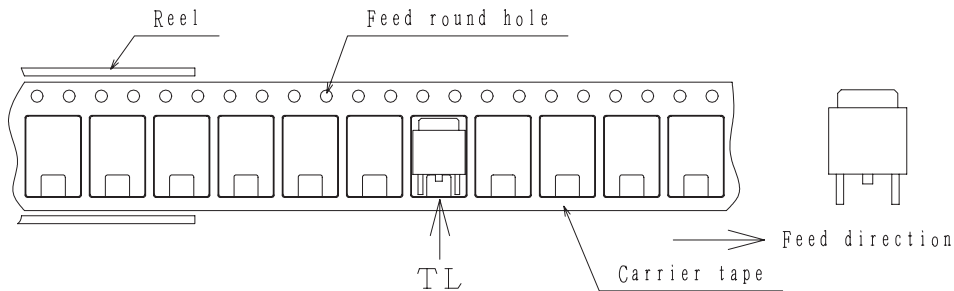
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



2. Device placement direction

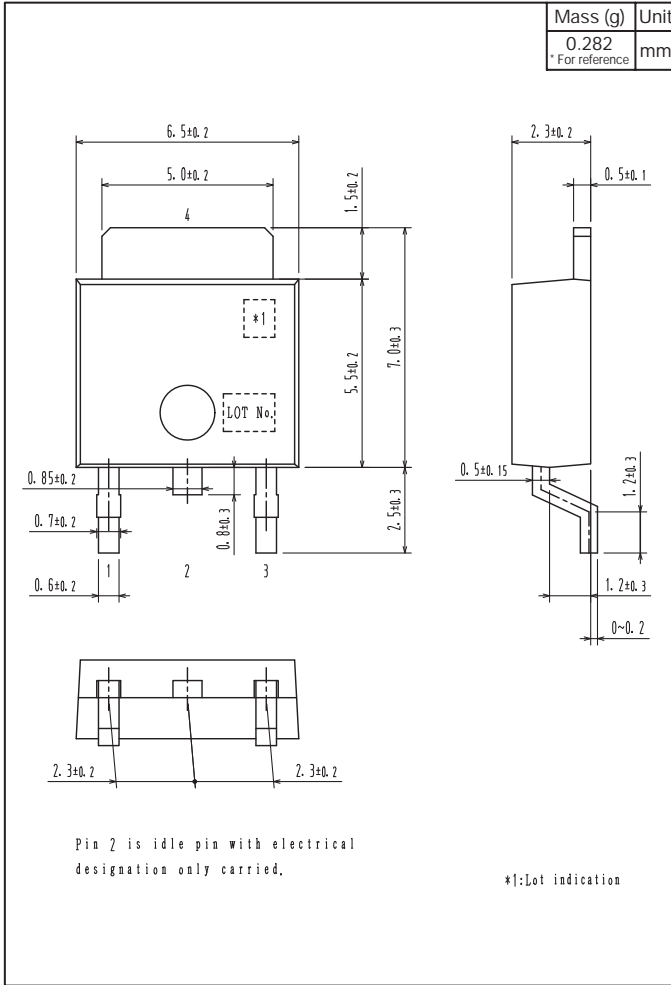


Those with one electrode terminal on the feed hole side.....TL

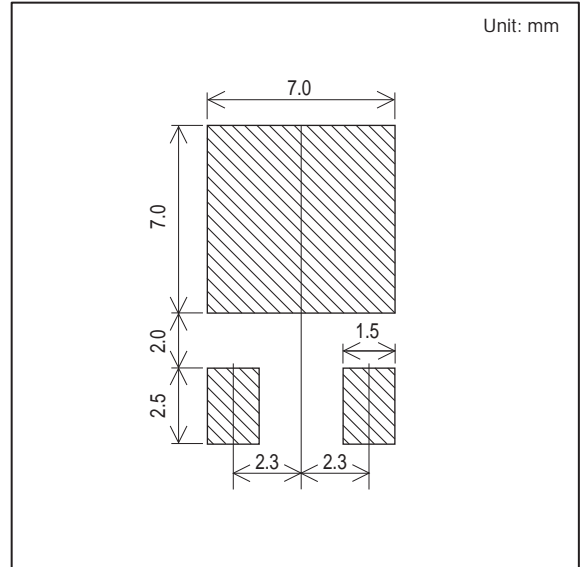
# 2SB1204

## Outline Drawing

2SB1204S-TL-E, 2SB1204T-TL-E



## Land Pattern Example



# 2SB1204

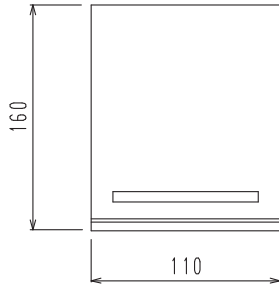
## Bag Packing Specification

2SB1204S-E, 2SB1204T-E

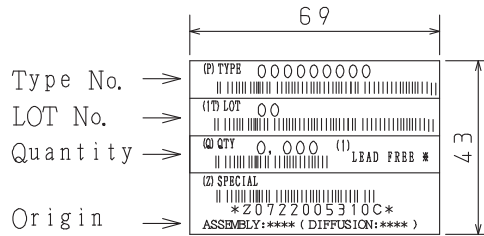
### 1. Packing Format

Package Name	Maximum Number of devices contained (pcs)			
	Bag	Inner box	Outer box	
TP	500	B-1	A-1	A-2
		10,000	50,000	30,000
	Packing format (Dimensions:mm (external))			
		Inner box	Outer box	
		B-1	A-1	A-2
		445×225×55	470×250×300	470×250×190

### 2. Bag dimensions (unit:mm)



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



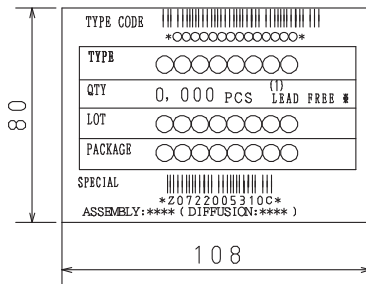
### 4. Outer box label (unit:mm)

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.

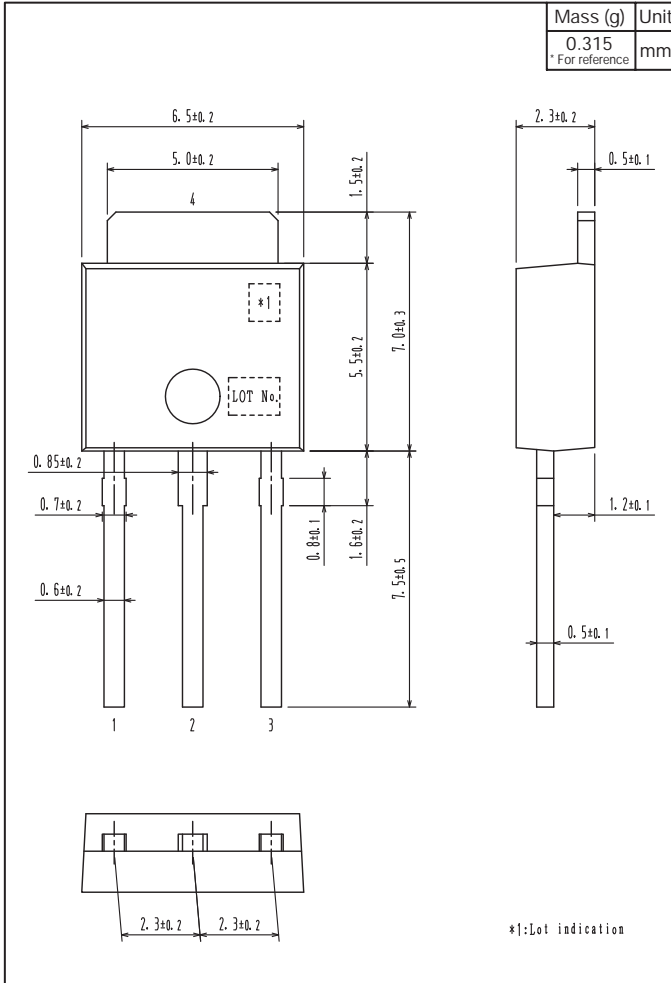
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3



# 2SB1204

## Outline Drawing

2SB1204S-E, 2SB1204T-E





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