



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 2SB1202/2SD1802 — PNP/NPN Epitaxial Planar Silicon Transistor

### High-Current Switching Applications

#### Applications

- Voltage regulators, relay drivers, lamp drivers, electrical equipment

#### Features

- Adoption of FBET and MBIT processes
- Low collector-to-emitter saturation voltage
- Small and slim package making it easy to make 2SB1202/2SD1802-used sets smaller
- Large current capacitance and wide ASO
- Fast switching speed

#### Specifications ( ) : 2SB1202

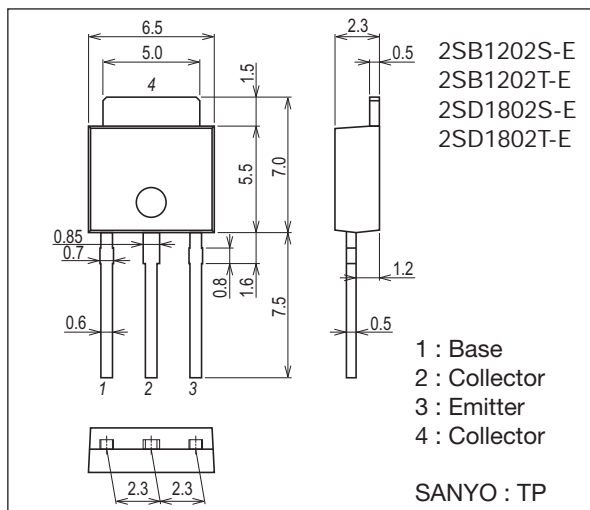
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CB0</sub>		(-)60	V
Collector-to-Emitter Voltage	V <sub>CE0</sub>		(-)50	V
Emitter-to-Base Voltage	V <sub>EB0</sub>		(-)6	V
Collector Current	I <sub>C</sub>		(-)5	A
Collector Current (Pulse)	I <sub>CP</sub>		(-)6	A

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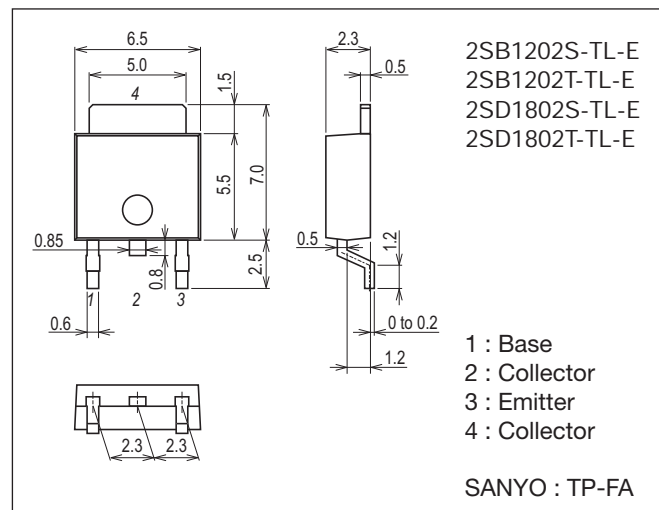
#### Package Dimensions unit : mm (typ)

7518-003



#### Package Dimensions unit : mm (typ)

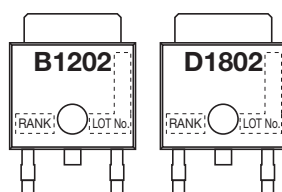
7003-003



#### Product & Package Information

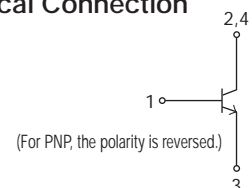
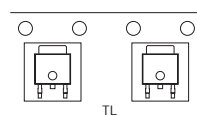
- Package : TP
- JEITA, JEDEC : SSC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

#### Marking (TP, TP-FA)



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

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



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## 2SB1202/2SD1802

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings	Unit
Collector Dissipation	P <sub>C</sub>		1	W
		T <sub>C</sub> =25°C	15	W
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

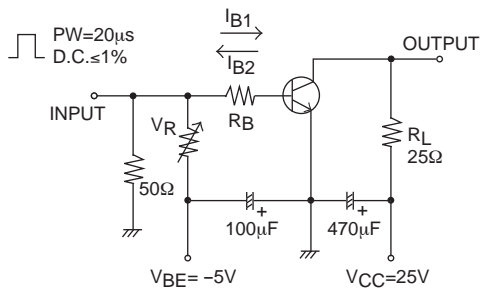
### Electrical Characteristics at T<sub>a</sub>=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> =(-)40V, I <sub>E</sub> =0A			(-)1	μA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> =(-)4V, I <sub>C</sub> =0A			(-)1	μA
DC Current Gain	h <sub>FE1</sub>	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)100mA	100*		560*	
	h <sub>FE2</sub>	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)3A	35			
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =(-)10V, I <sub>C</sub> =(-)50mA		150		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =(-)10V, f=1MHz		(39)25		pF
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =(-)2A, I <sub>B</sub> =(-)100mA		(-0.35)0.19	(-0.7)0.5	mV
Base-to-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)100mA		(-)0.94	(-)1.2	V
Collector-to-Base Breakdown Voltage	V(BR)CBO	I <sub>C</sub> =(-)10μA, I <sub>E</sub> =0A	(-)60			V
Collector-to-Emitter Breakdown Voltage	V(BR)CEO	I <sub>C</sub> =(-)1mA, R <sub>BE</sub> =∞	(-)50			V
Emitter-to-Base Breakdown Voltage	V(BR)EBO	I <sub>E</sub> =(-)10μA, I <sub>C</sub> =0A	(-)6			V
Turn-On Time	t <sub>on</sub>	See specified Test Circuit.		70		ns
Storage Time	t <sub>stg</sub>			(450)650		ns
Fall Time	t <sub>f</sub>			35		ns

\* : The 2SB1202/2SD1802 are classified by 100mA hFE as follows :

Rank	R	S	T	U
hFE	100 to 200	140 to 280	200 to 400	280 to 560

### Switching Time Test Circuit



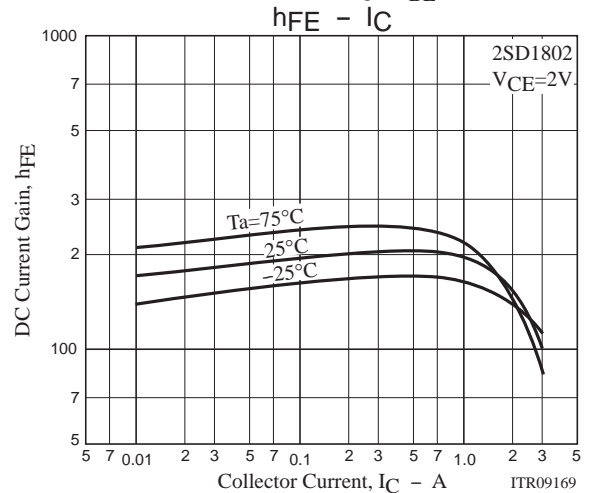
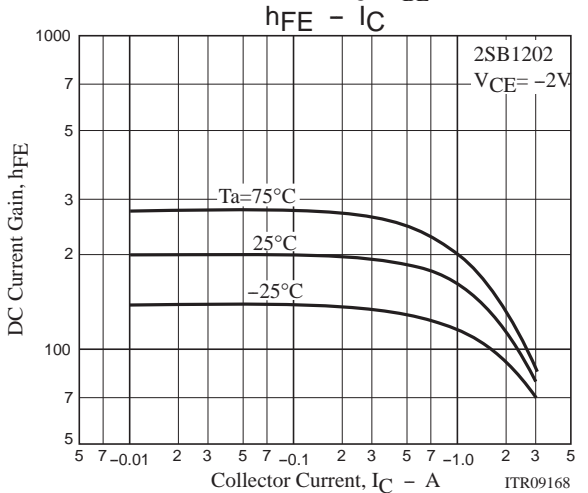
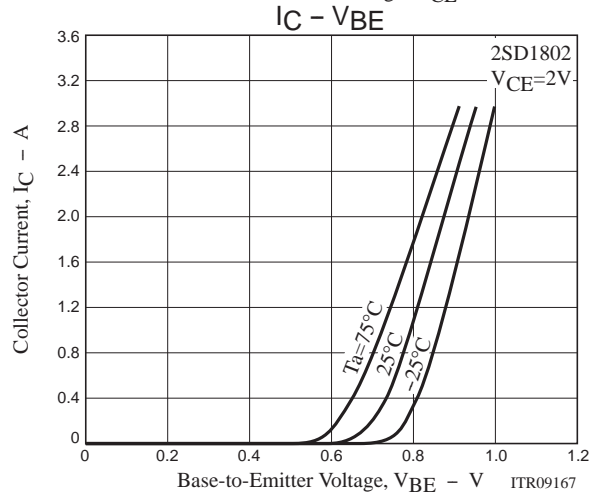
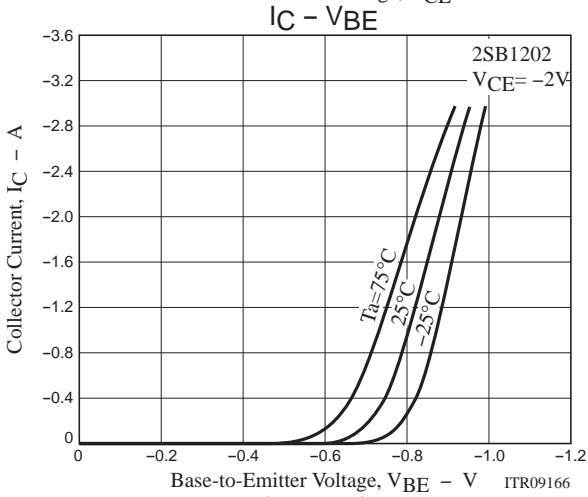
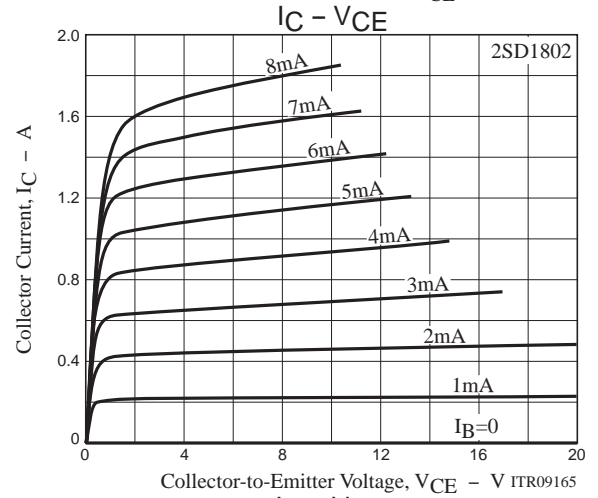
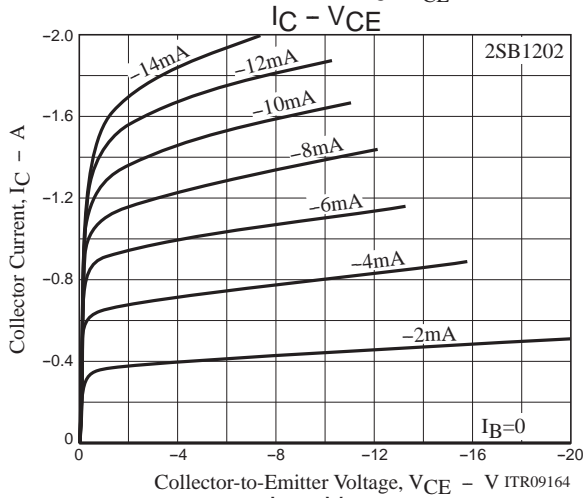
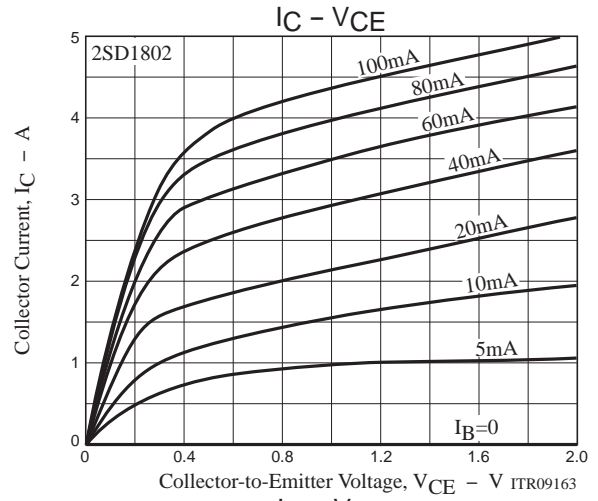
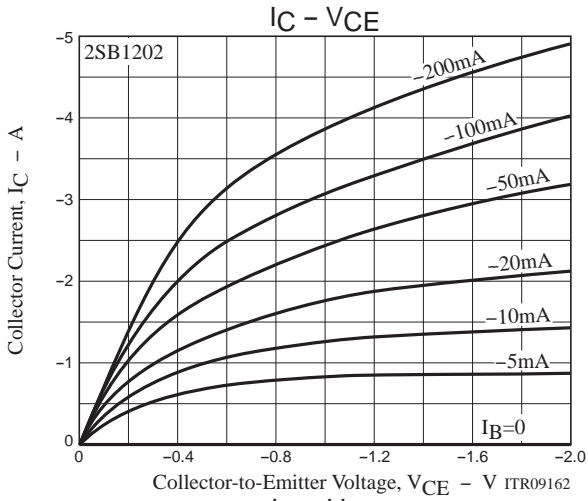
$$I_C = 10I_{B1} = -10I_{B2} = 1A$$

For PNP, the polarity is reversed.

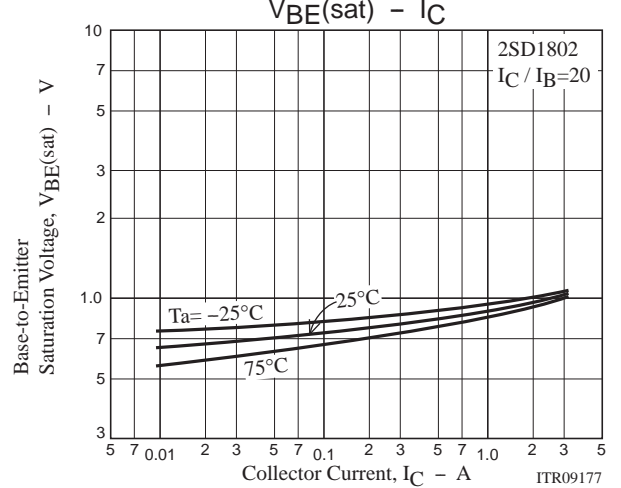
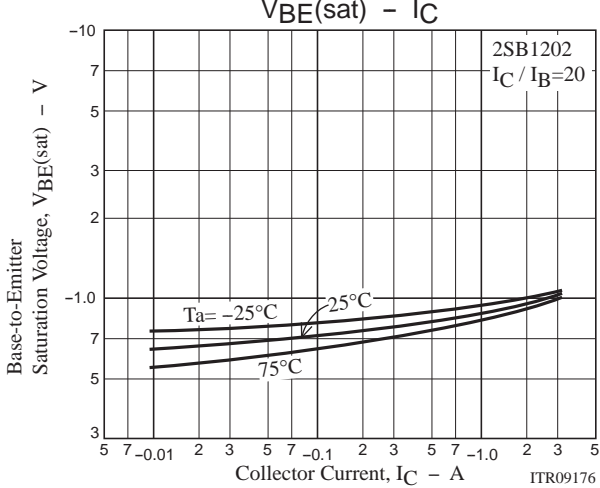
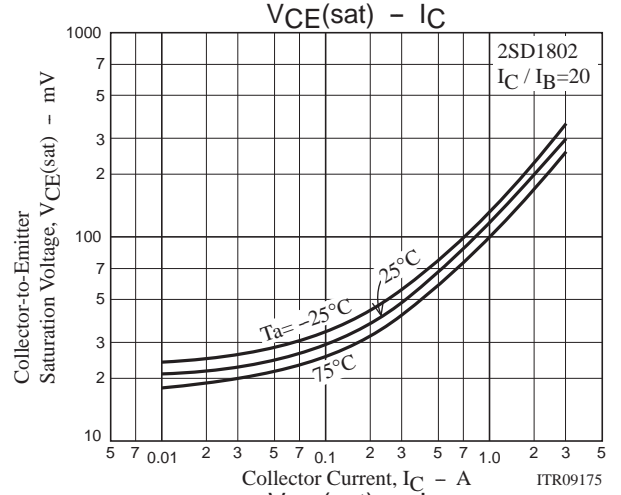
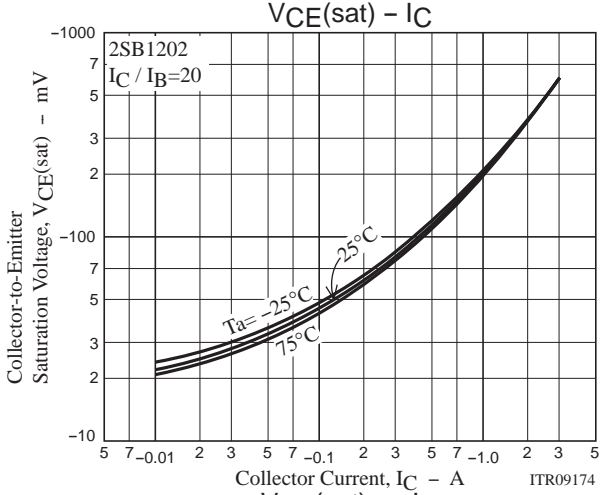
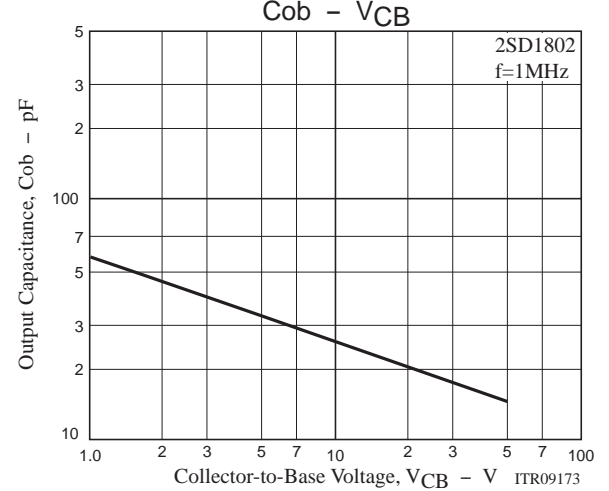
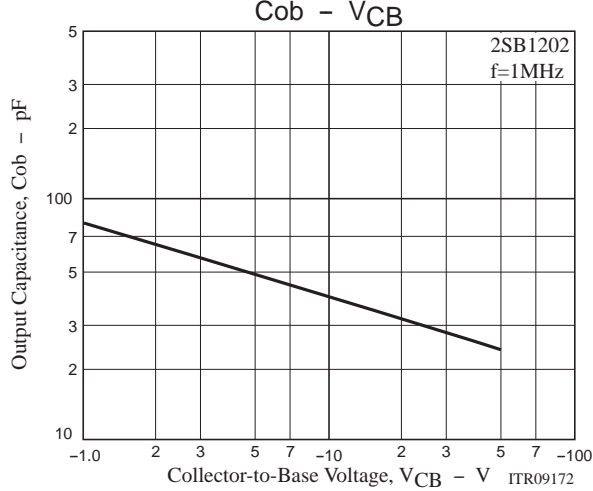
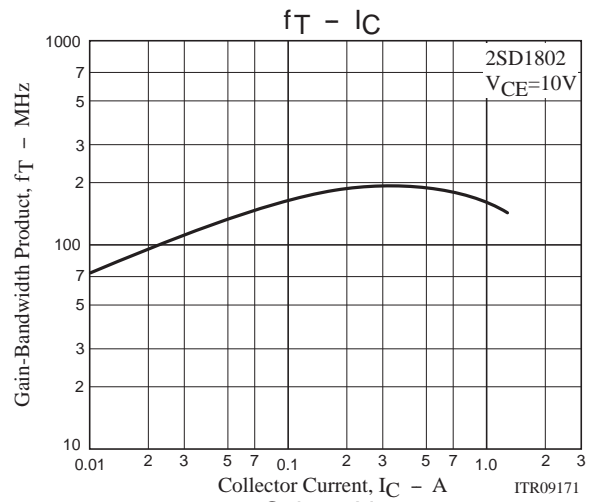
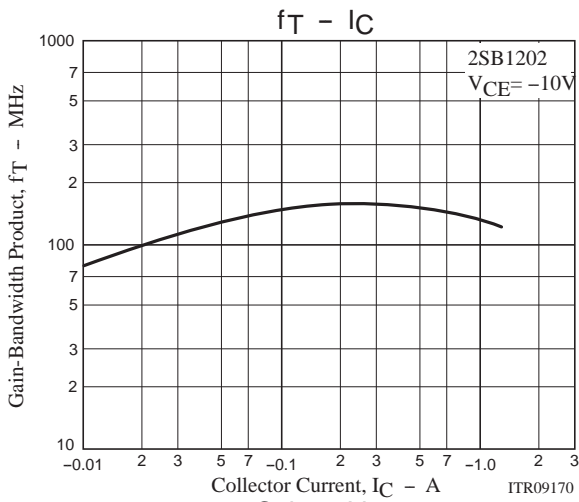
### Ordering Information

Device	Package	Shipping	memo
2SB1202S-E	TP	500pcs./bag	Pb Free
2SB1202T-E	TP	500pcs./bag	
2SD1802S-E	TP	500pcs./bag	
2SD1802T-E	TP	500pcs./bag	
2SB1202S-TL-E	TP-FA	700pcs./reel	
2SB1202T-TL-E	TP-FA	700pcs./reel	
2SD1802S-TL-E	TP-FA	700pcs./reel	
2SD1802T-TL-E	TP-FA	700pcs./reel	

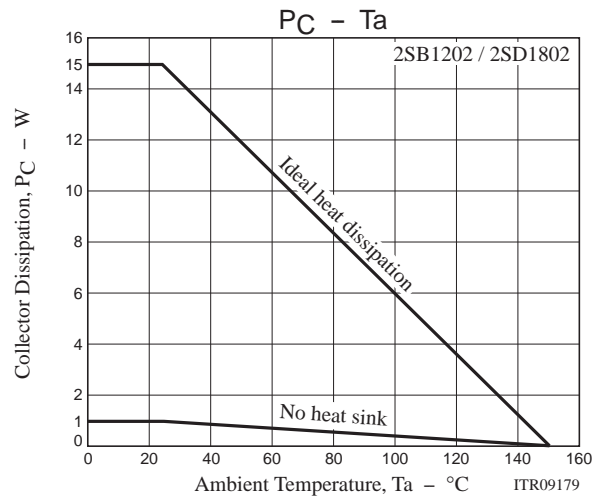
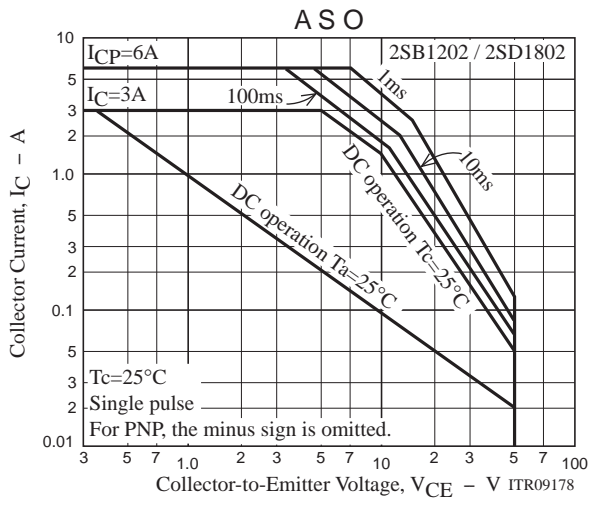
2SB1202/2SD1802



2SB1202/2SD1802



# 2SB1202/2SD1802



# 2SB1202/2SD1802

## Taping Specification

2SB1202S-TL-E, 2SB1202T-TL-E, 2SD1802S-TL-E, 2SD1802T-TL-E

### Packing Format

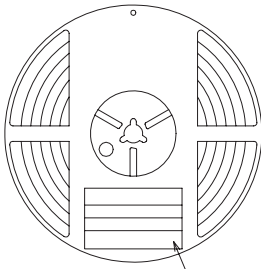
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
TP-FA	TP	700	2,100	12,600	3 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Reel label, Inner box label  
(unit:mm)

Outer box label

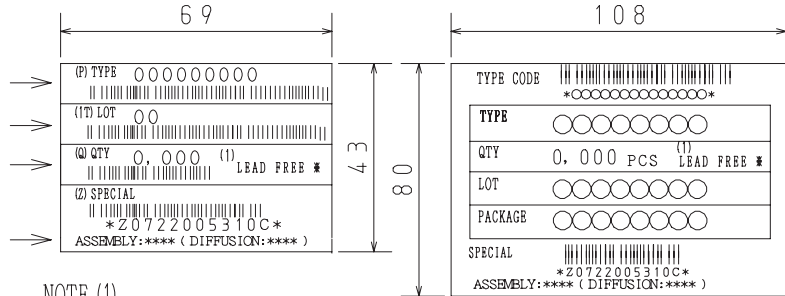
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

### Packing method



Type No.  
LOT No.  
Quantity  
Origin

Reel label



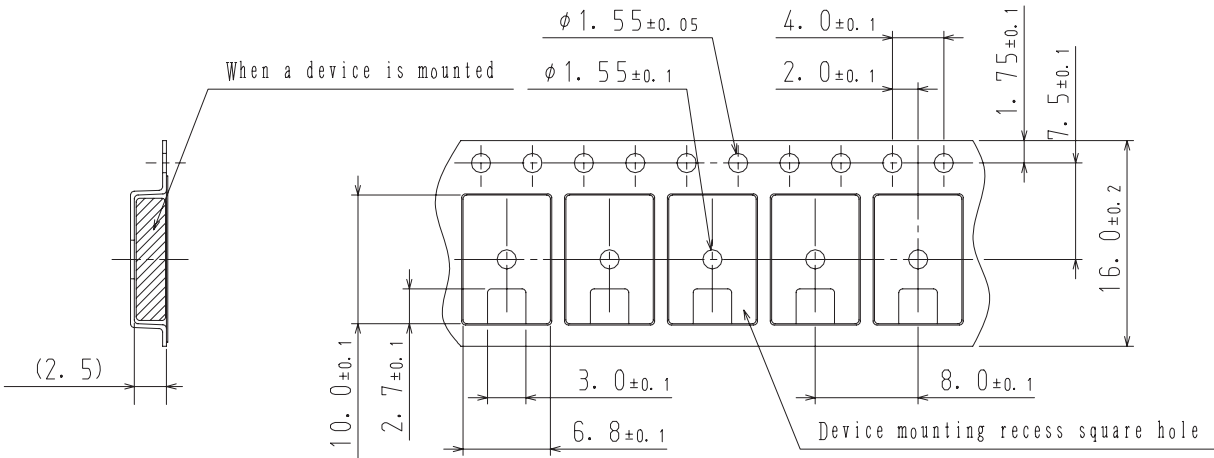
NOTE (1)

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



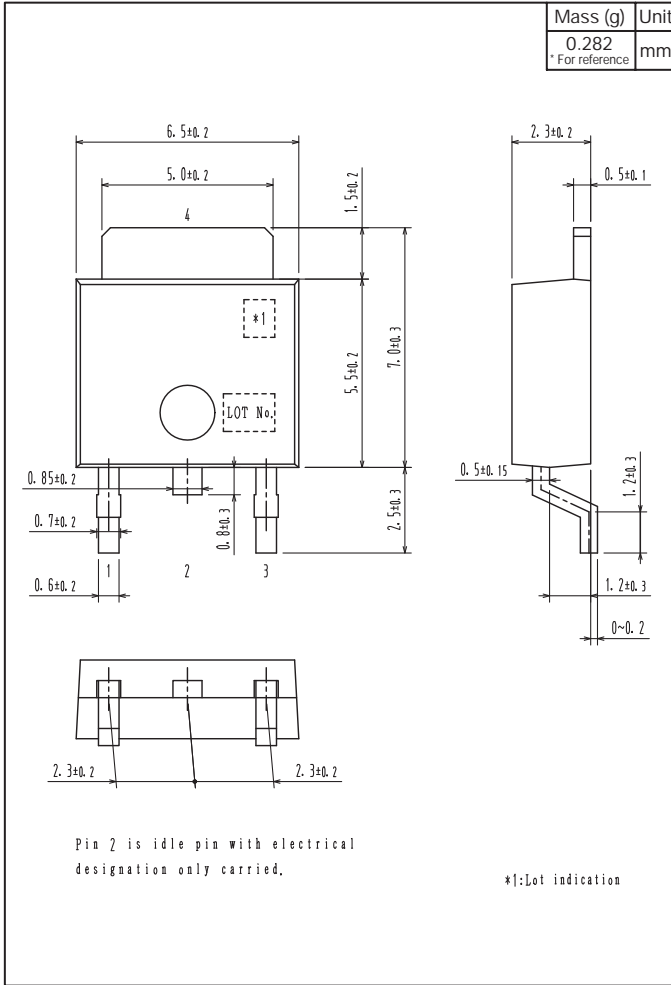
Those with one electrode terminal on the feed hole side.....TL

# 2SB1202/2SD1802

## Outline Drawing

## Land Pattern Example

2SB1202S-TL-E, 2SB1202T-TL-E, 2SD1802S-TL-E, 2SD1802T-TL-E



# 2SB1202/2SD1802

## Bag Packing Specification

2SB1202S-E, 2SB1202T-E, 2SD1802S-E, 2SD1802T-E

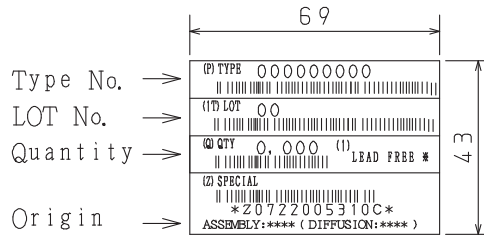
### 1. Packing Format

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)



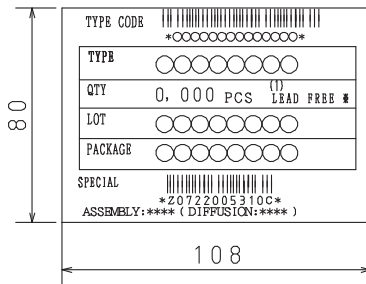
### 4. Outer box label (unit:mm)

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

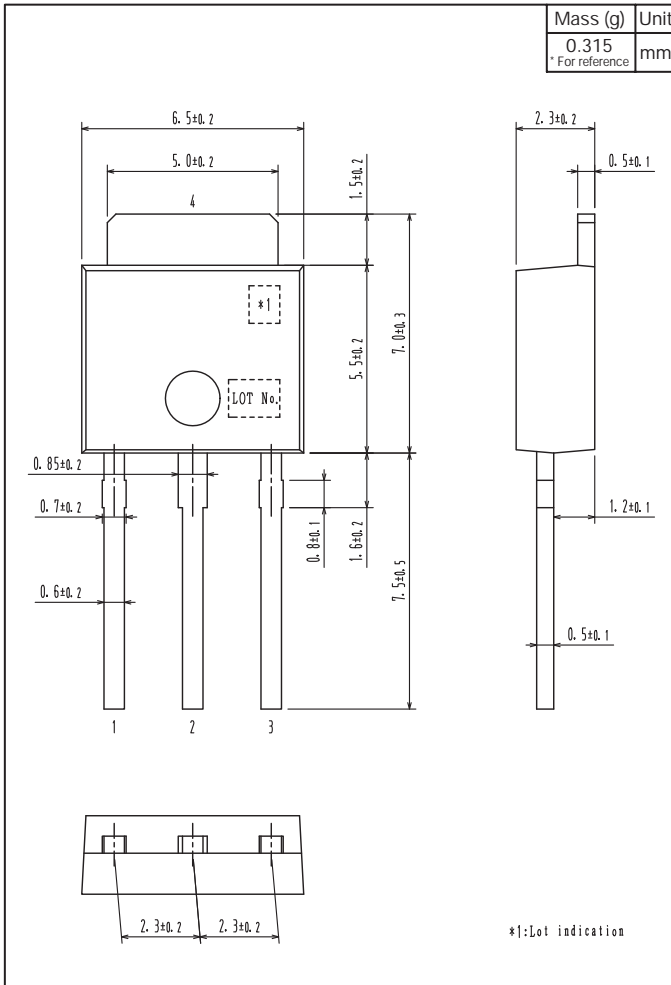




# 2SB1202/2SD1802

## Outline Drawing

2SB1202S-E, 2SB1202T-E, 2SD1802S-E, 2SD1802T-E



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