



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

2SB1203/2SD1803 — PNP/NPN 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
- Excellent linearity of  $h_{FE}$
- Small and slim package making it easy to make 2SB1203/2SD1803-applied sets smaller
- High current and high  $f_T$
- Fast switching speed

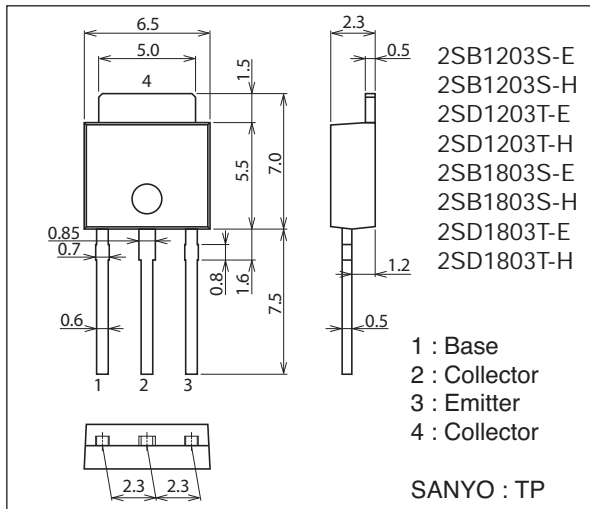
Specifications ( ) : 2SB1203

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

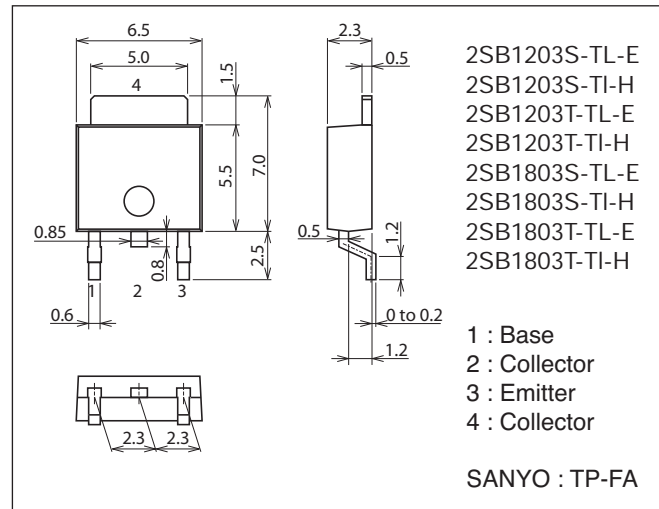
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$		(-)60	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-)50	V
Emitter-to-Base Voltage	$V_{EBO}$		(-)6	V
Collector Current	$I_C$		(-)5	A
Collector Current (Pulse)	$I_{CP}$		(-)8	A

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Package Dimensions unit : mm (typ)  
7518-003



Package Dimensions unit : mm (typ)  
7003-003

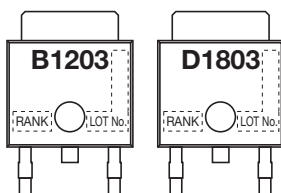


Product & Package Information

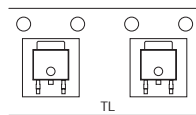
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

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

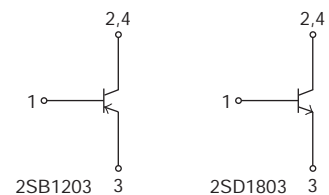
Marking  
(TP, TP-FA)



Packing Type (TP-FA) : TL



Electrical Connection



Continued from preceding page.

Parameter	Symbol	Conditions	Ratings	Unit
Collector Dissipation	PC		1	W
		$T_c=25^\circ\text{C}$	20	W
Junction Temperature	$T_j$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

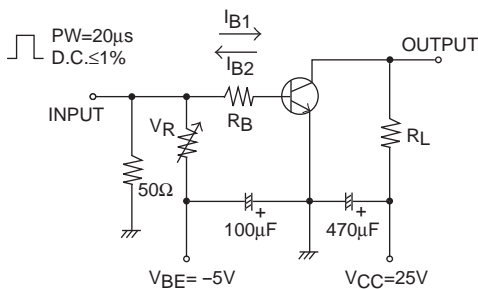
Electrical Characteristics at  $T_a=25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=(-)40\text{V}, I_E=0\text{A}$			(-) $1$	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=(-)4\text{V}, I_C=0\text{A}$			(-) $1$	$\mu\text{A}$
DC Current Gain	$h_{FE1}$	$V_{CE}=(-)2\text{V}, I_C=(-)0.5\text{A}$	70*		400*	
	$h_{FE2}$	$V_{CE}=(-)2\text{V}, I_C=(-)4\text{A}$	35			
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)5\text{V}, I_C=(-)1\text{A}$		(130)180		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10\text{V}, f=1\text{MHz}$		(60)40		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)3\text{A}, I_B=(-)0.15\text{A}$		(-280)220	(-550)400	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)3\text{A}, I_B=(-)0.15\text{A}$		(-) $0.95$	(-) $1.3$	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu\text{A}, I_E=0\text{A}$	(-) $60$			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1\text{mA}, R_{BE}=\infty$	(-) $50$			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)10\mu\text{A}, I_C=0\text{A}$	(-) $6$			V
Turn-On Time	$t_{on}$	See specified Test Circuit.		(50)50		ns
Storage Time	$t_{stg}$			(450)500		ns
Fall Time	$t_f$			(20)20		ns

\* : The 2SB1203/2SD1803 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

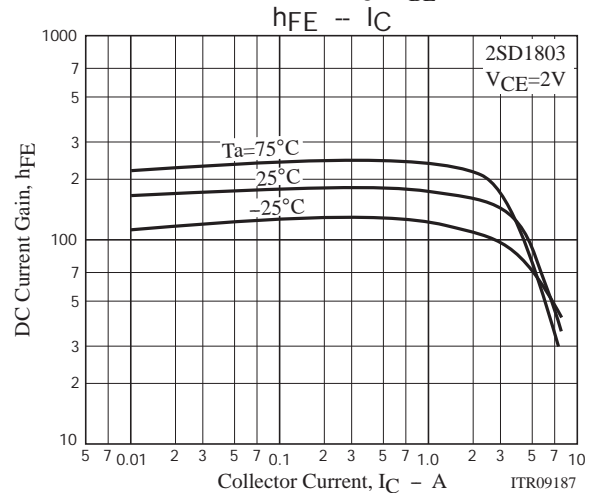
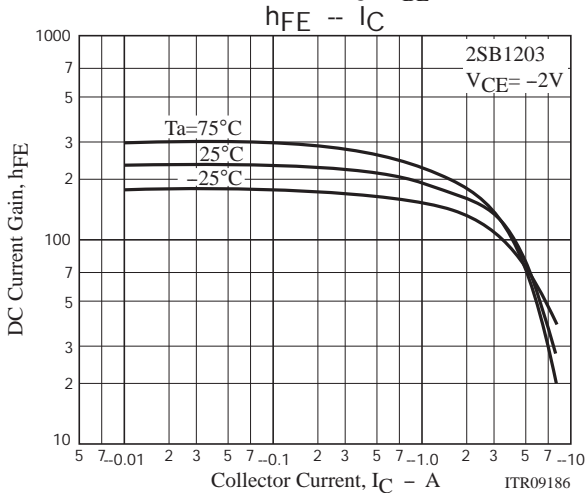
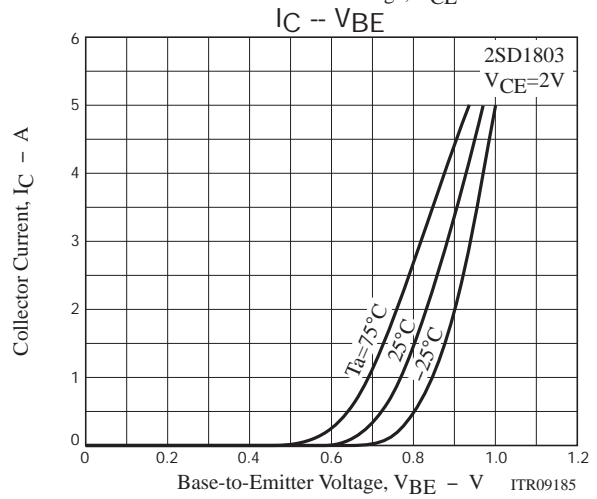
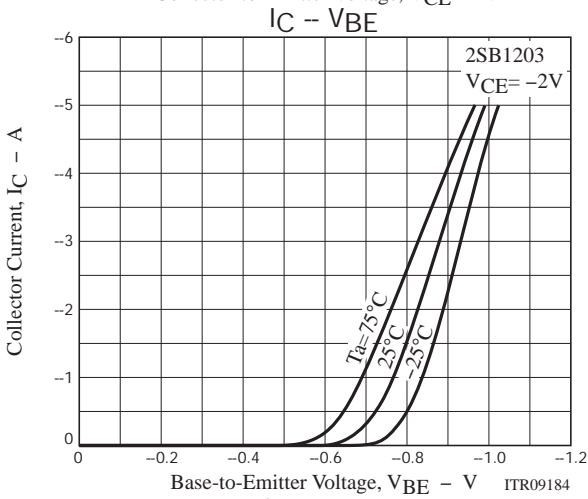
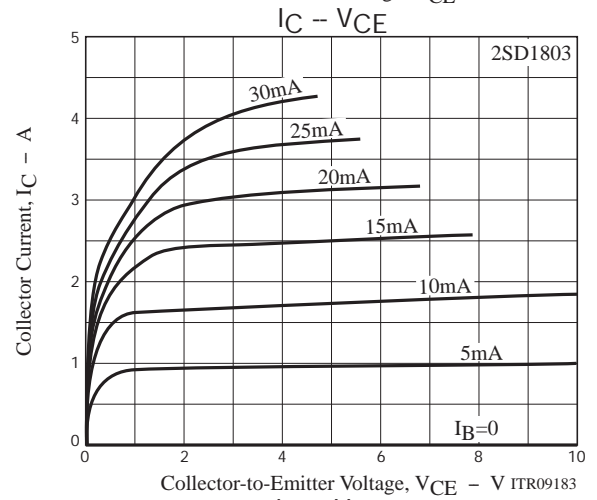
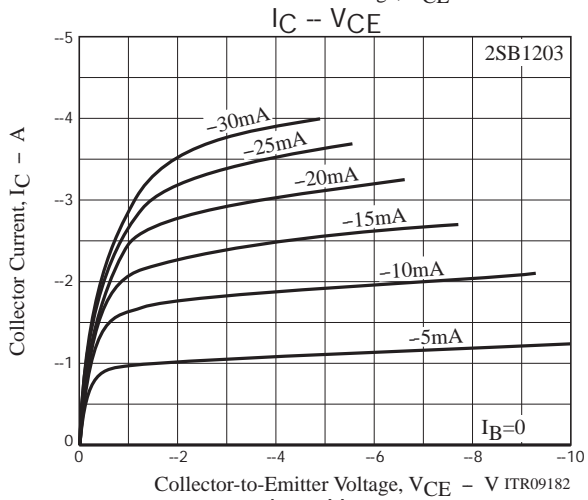
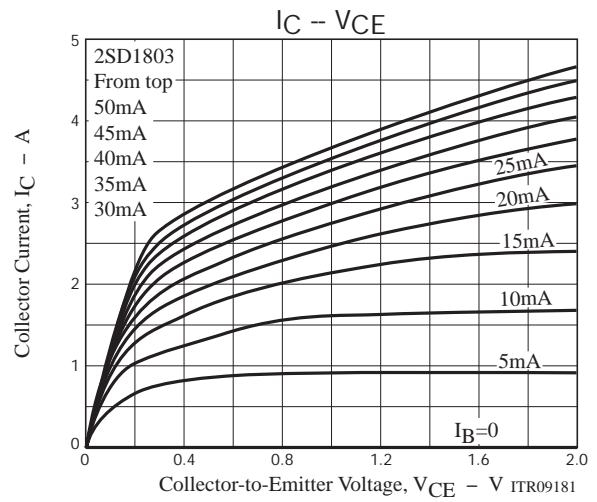
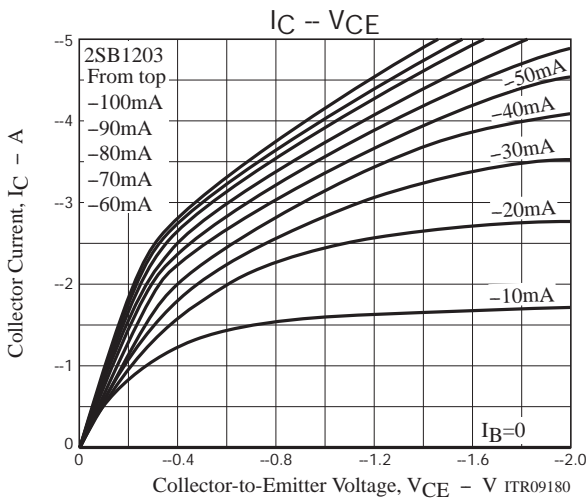


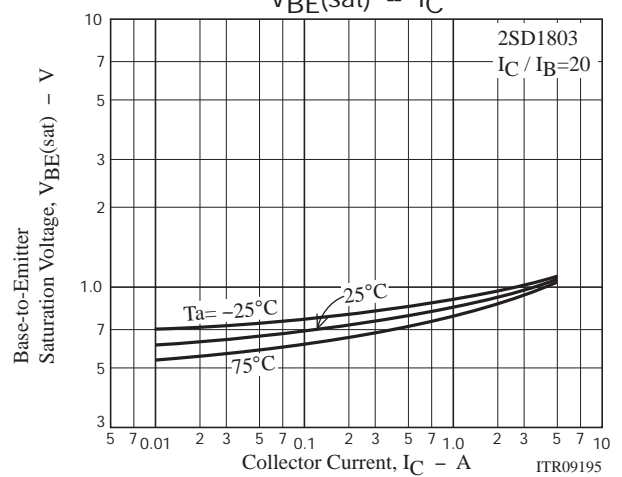
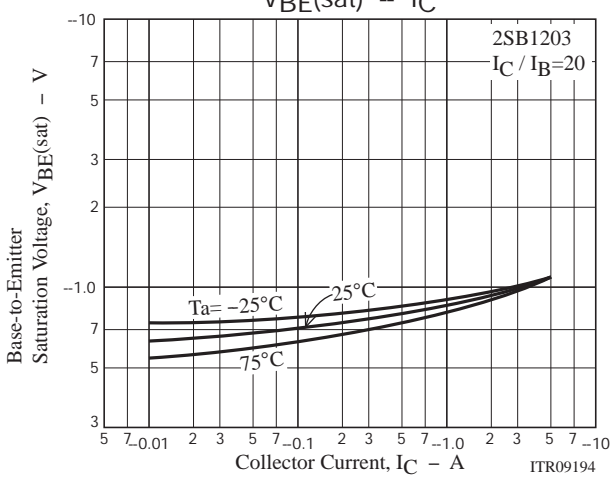
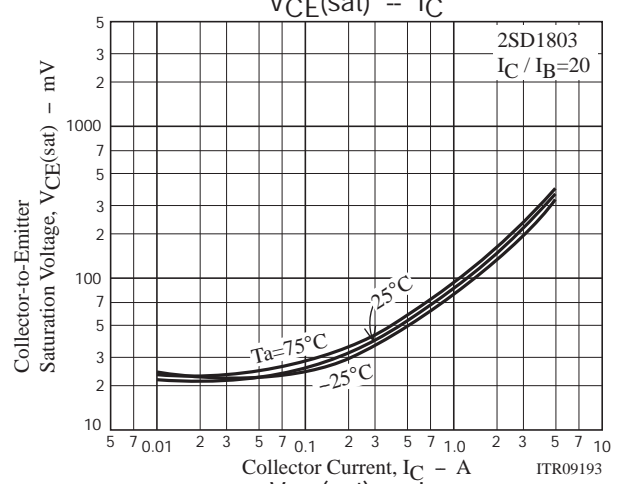
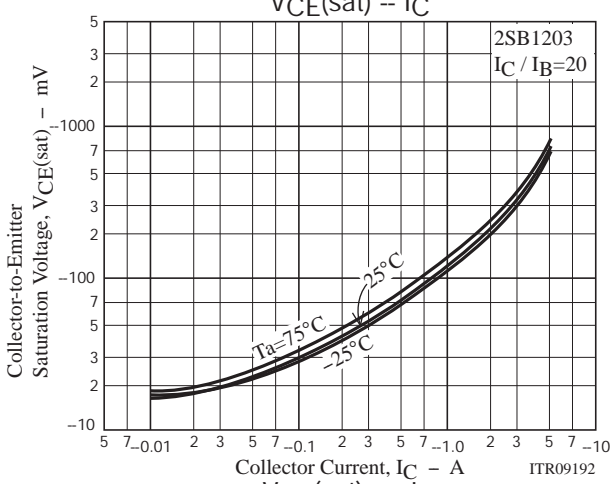
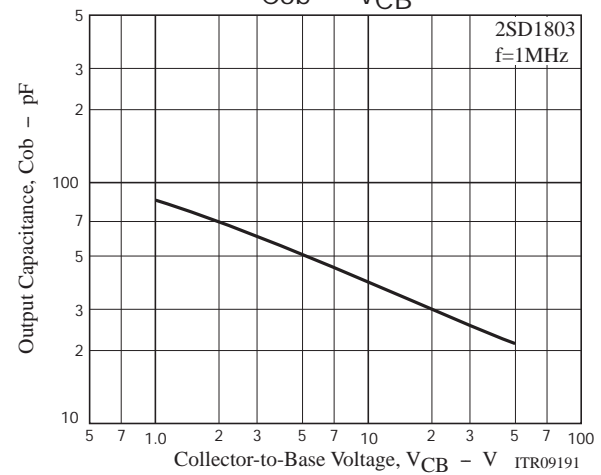
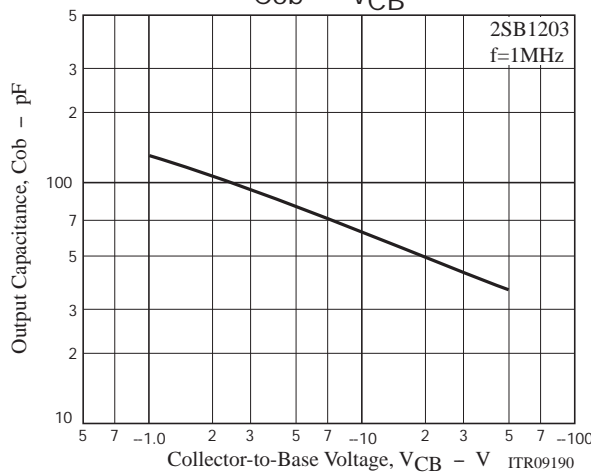
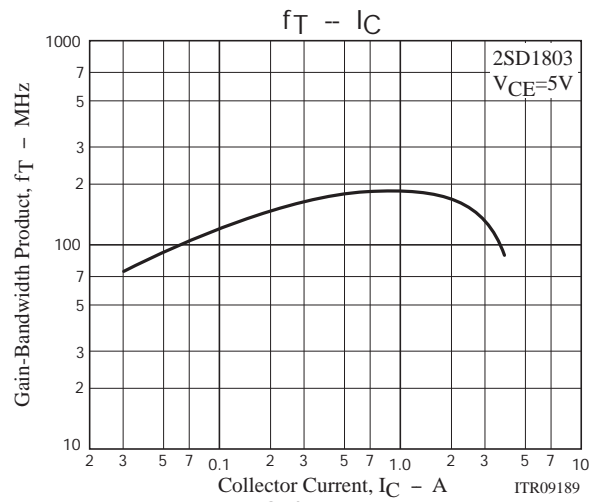
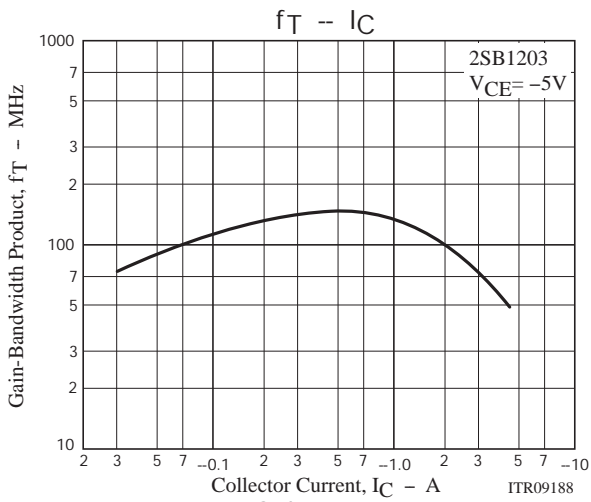
$$I_C = 10I_{B1} = -10I_{B2} = 2\text{A}$$

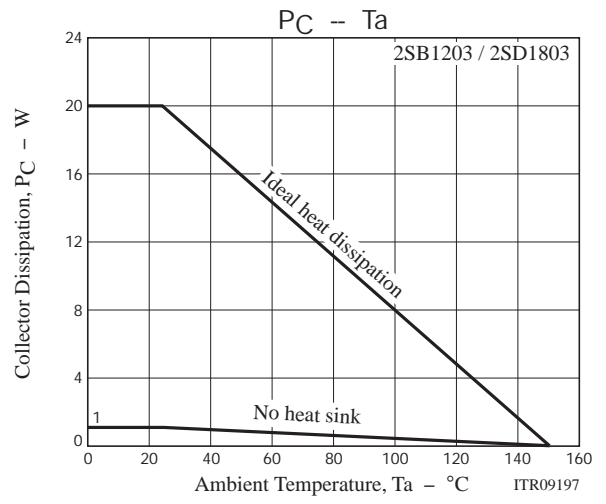
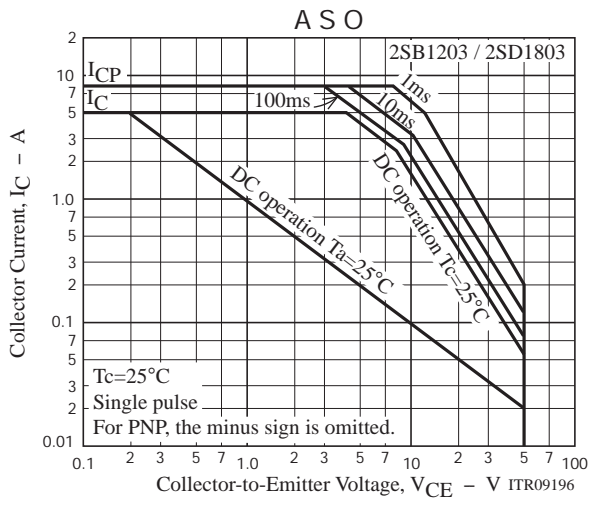
For PNP, the polarity is reversed.

## Ordering Information

Device	Package	Shipping	memo
2SB1203S-E	TP	500pcs./bag	Pb Free
2SB1203S-H	TP	500pcs./bag	Pb Free and Halogen Free
2SD1203T-E	TP	500pcs./bag	Pb Free
2SD1203T-H	TP	500pcs./bag	Pb Free and Halogen Free
2SB1803S-E	TP	500pcs./bag	Pb Free
2SB1803S-H	TP	500pcs./bag	Pb Free and Halogen Free
2SD1803T-E	TP	500pcs./bag	Pb Free
2SD1803T-H	TP	500pcs./bag	Pb Free and Halogen Free
2SB1203S-TL-E	TP-FA	700pcs./reel	Pb Free
2SB1203S-TI-H	TP-FA	700pcs./reel	Pb Free and Halogen Free
2SB1203T-TL-E	TP-FA	700pcs./reel	Pb Free
2SB1203T-TI-H	TP-FA	700pcs./reel	Pb Free and Halogen Free
2SB1803S-TL-E	TP-FA	700pcs./reel	Pb Free
2SB1803S-TI-H	TP-FA	700pcs./reel	Pb Free and Halogen Free
2SB1803T-TL-E	TP-FA	700pcs./reel	Pb Free
2SB1803T-TI-H	TP-FA	700pcs./reel	Pb Free and Halogen Free







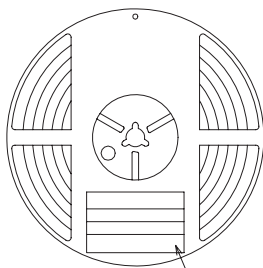
Taping Specification

2SB1203S-TL-E, 2SB1203S-TI-H, 2SB1203T-TL-E, 2SB1203T-TI-H, 2SB1803S-TL-E, 2SB1803S-TI-H, 2SB1803T-TL-E, 2SB1803T-TI-H

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

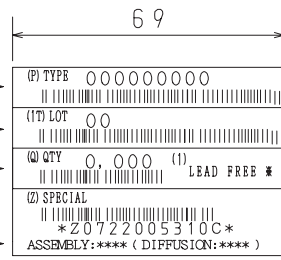
Packing method



Reel label

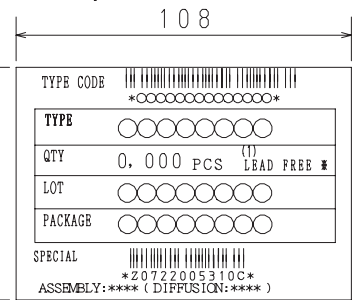
Type No.  
LOT No.  
Quantity  
Origin

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.



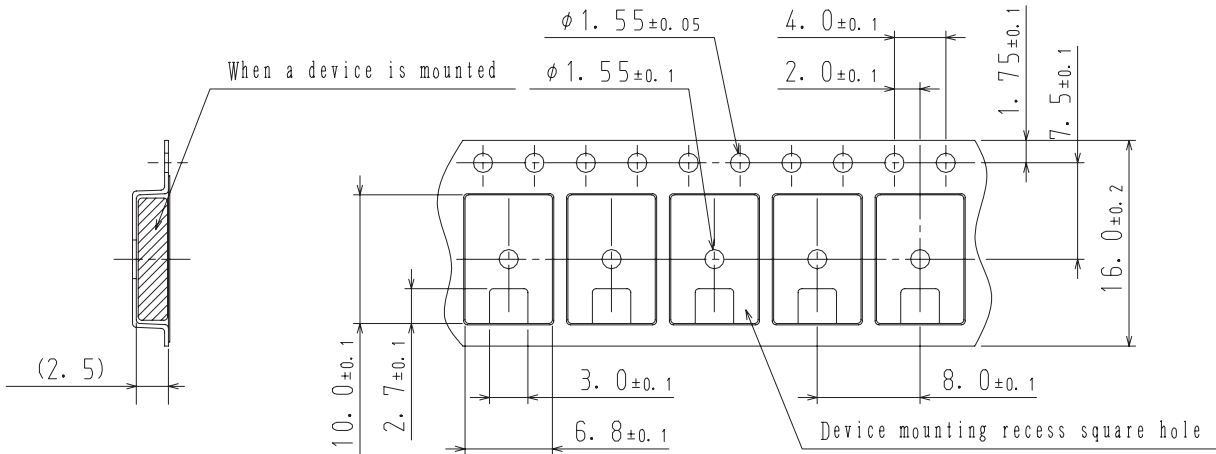
NOTE (1)

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

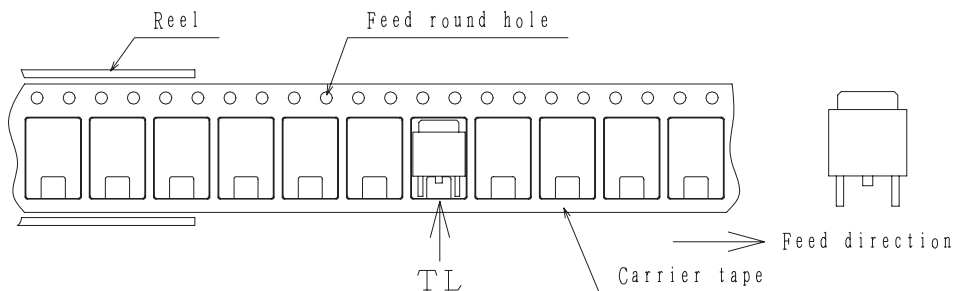
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



2. Device placement direction



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

Outline Drawing

Land Pattern Example

2SB1203S-TL-E, 2SB1203S-TI-H, 2SB1203T-TL-E, 2SB1203T-TI-H, 2SB1803S-TL-E, 2SB1803S-TI-H, 2SB1803T-TL-E, 2SB1803T-TI-H

