



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

2SB1203/2SD1803 — High-Current Switching Applications

PNP/NPN Epitaxial Planar Silicon Transistor

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

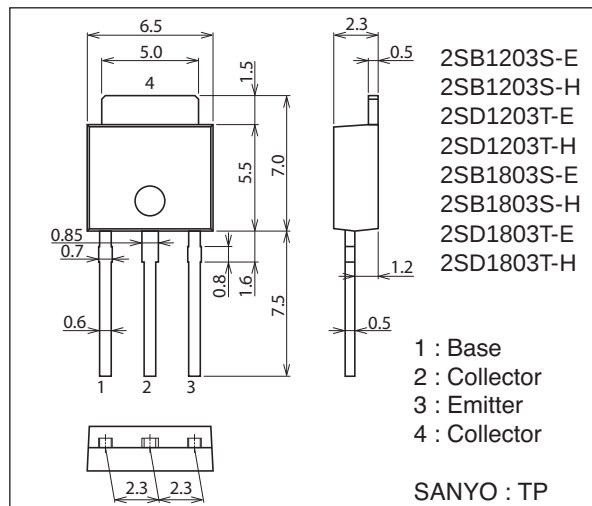
Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

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

Continued on next page.

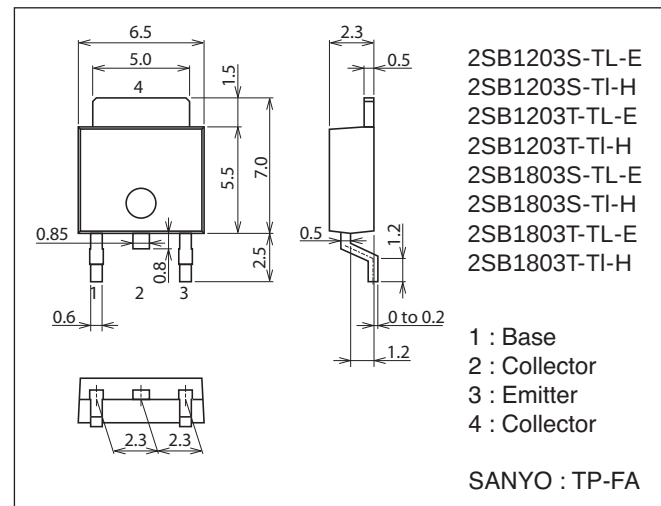
Package Dimensions unit : mm (typ)

7518-003



Package Dimensions unit : mm (typ)

7003-003

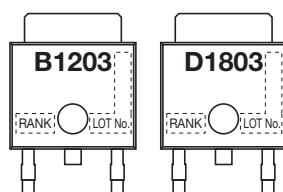


Product & Package Information

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

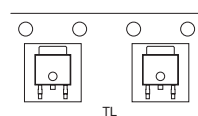
Marking

(TP, TP-FA)

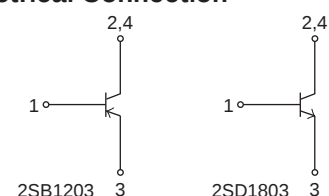


- Package : TP-FA
- JEITA, JEDEC : SC-63, TO-252
- Minimum Packing Quantity : 700 pcs./reel

Packing Type (TP-FA) : TL



Electrical Connection



SANYO Semiconductor Co., Ltd.

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

2SB1203/2SD1803

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings	Unit
Collector Dissipation	P _C		1	W
		T _C =25°C	20	W
Junction Temperature	T _J		150	°C
Storage Temperature	T _{stg}		-55 to +150	°C

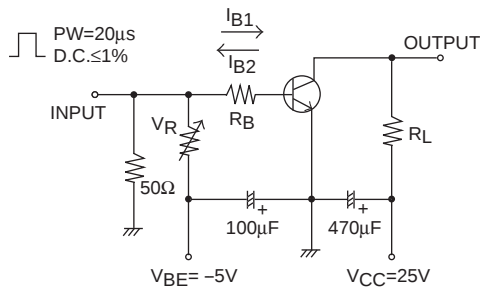
Electrical Characteristics at T_a=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I _{CBO}	V _{CB} =(-)40V, I _E =0A			(-)1	μA
Emitter Cutoff Current	I _{EBO}	V _{EB} =(-)4V, I _C =0A			(-)1	μA
DC Current Gain	h _{FE1}	V _{CE} =(-)2V, I _C =(-)0.5A	70*		400*	
	h _{FE2}	V _{CE} =(-)2V, I _C =(-)4A	35			
Gain-Bandwidth Product	f _T	V _{CE} =(-)5V, I _C =(-)1A		(130)180		MHz
Output Capacitance	C _{ob}	V _{CB} =(-)10V, f=1MHz		(60)40		pF
Collector-to-Emitter Saturation Voltage	V _{CE(sat)}	I _C =(-)3A, I _B =(-)0.15A		(-280)220	(-550)400	mV
Base-to-Emitter Saturation Voltage	V _{BE(sat)}	I _C =(-)3A, I _B =(-)0.15A		(-)0.95	(-)1.3	V
Collector-to-Base Breakdown Voltage	V _{(BR)CBO}	I _C =(-)10μA, I _E =0A	(-)60			V
Collector-to-Emitter Breakdown Voltage	V _{(BR)CEO}	I _C =(-)1mA, R _{BE} =∞	(-)50			V
Emitter-to-Base Breakdown Voltage	V _{(BR)EBO}	I _E =(-)10μA, I _C =0A	(-)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



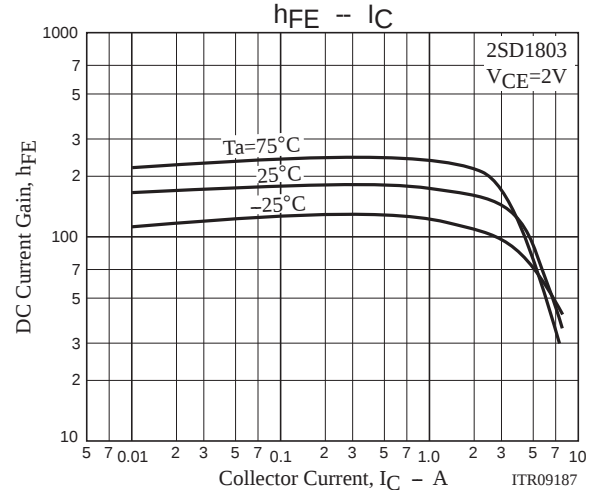
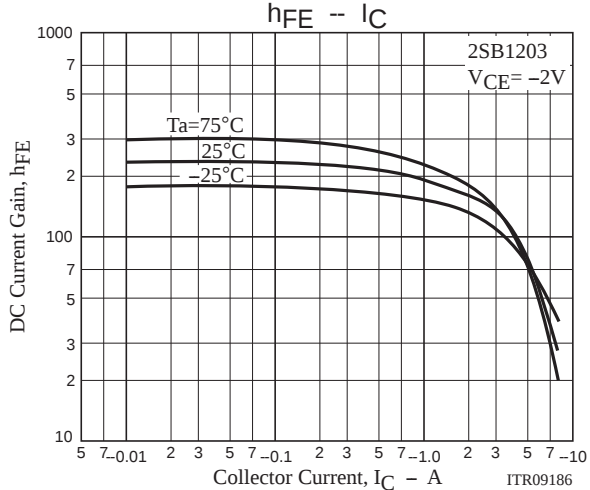
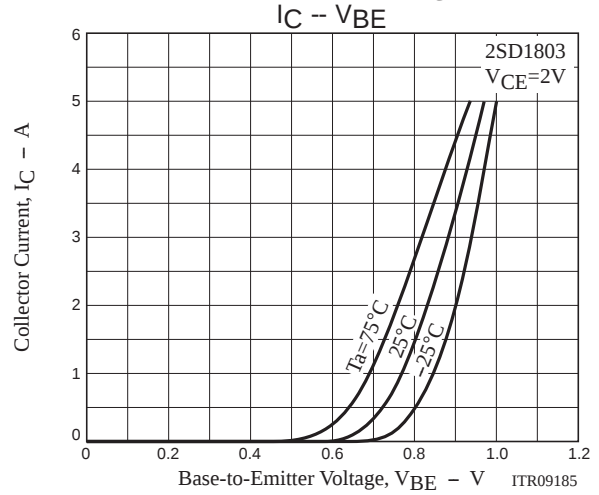
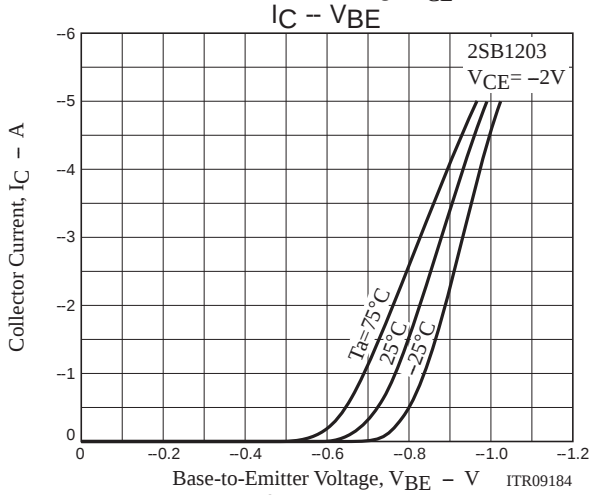
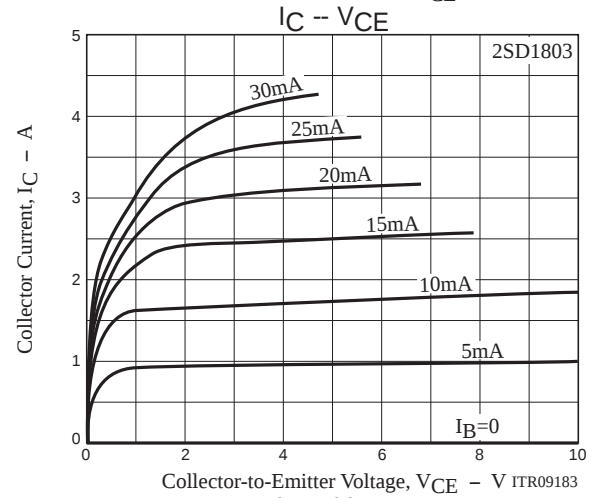
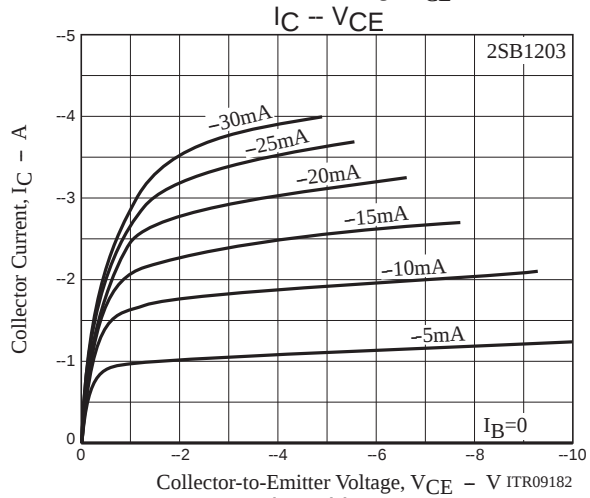
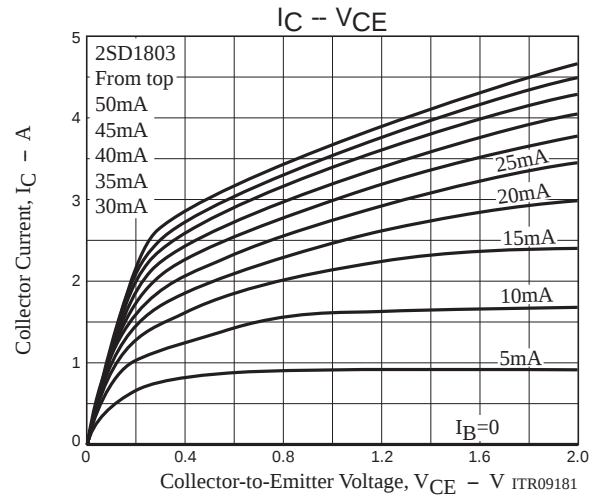
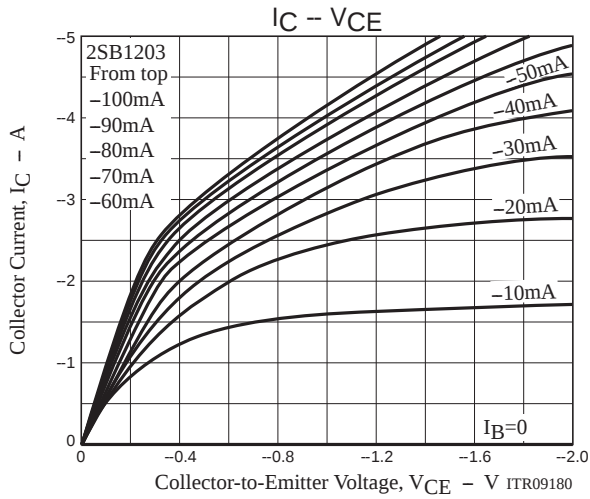
$$I_C = 10I_{B1} = -10I_{B2} = 2A$$

For PNP, the polarity is reversed.

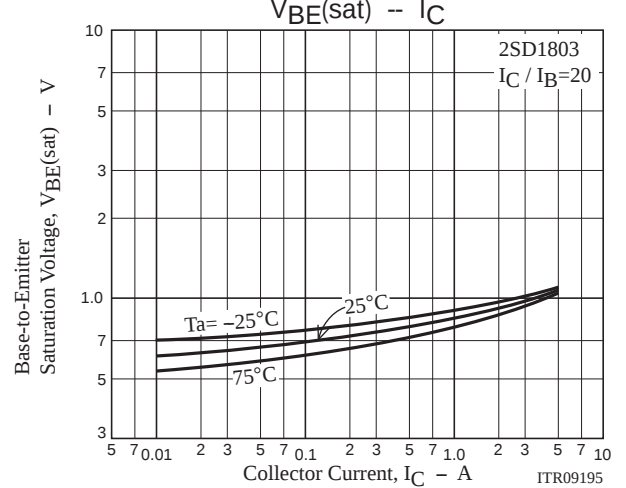
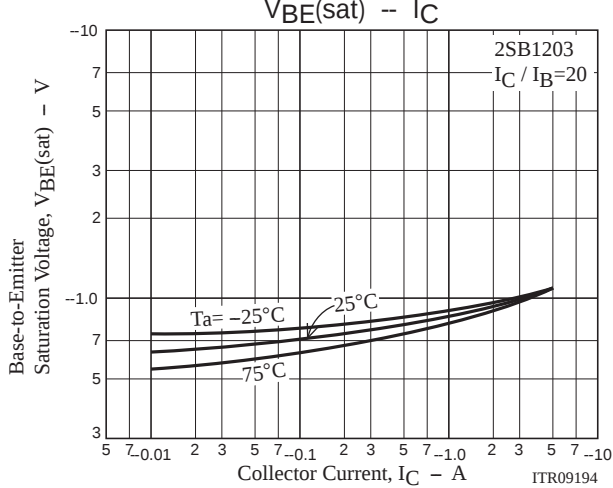
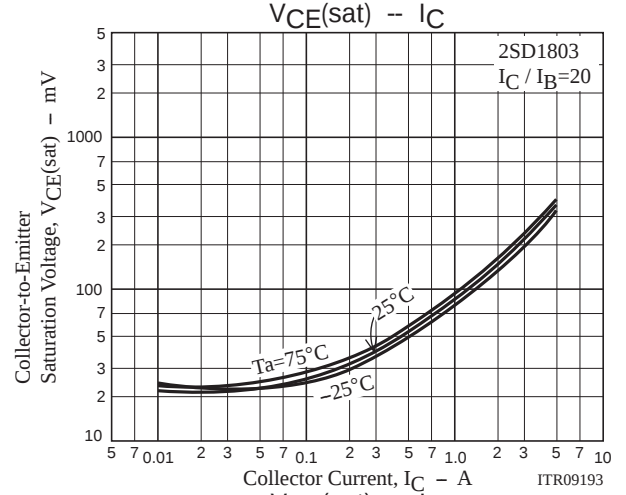
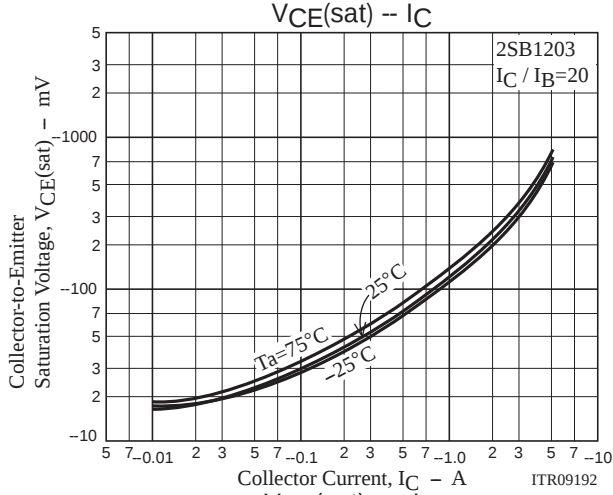
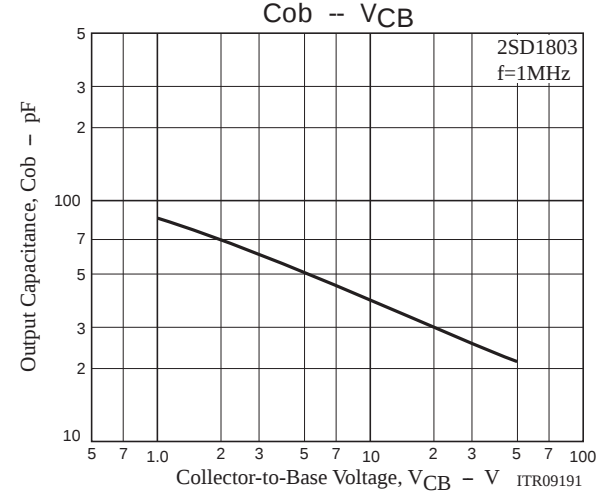
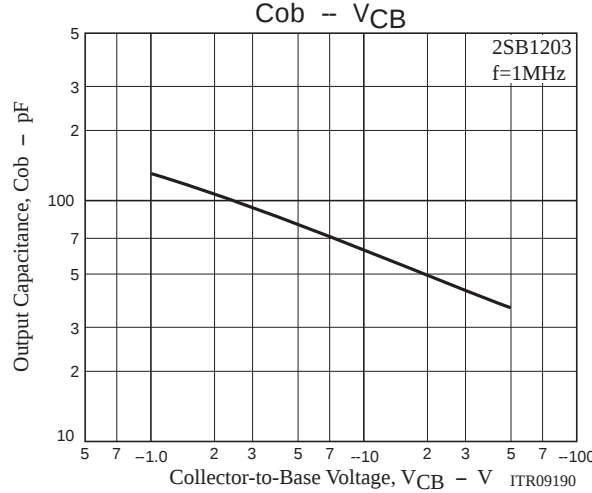
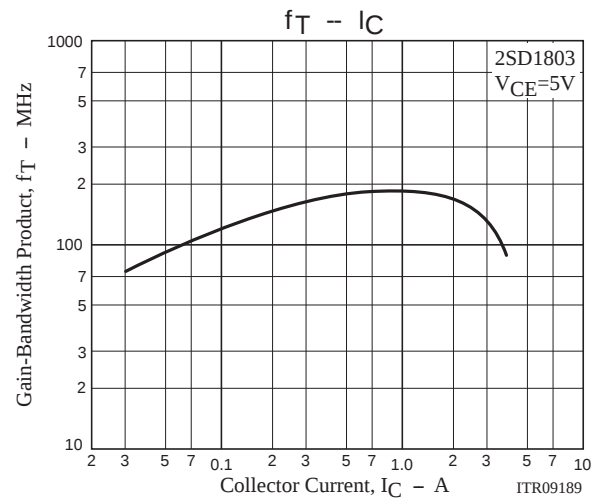
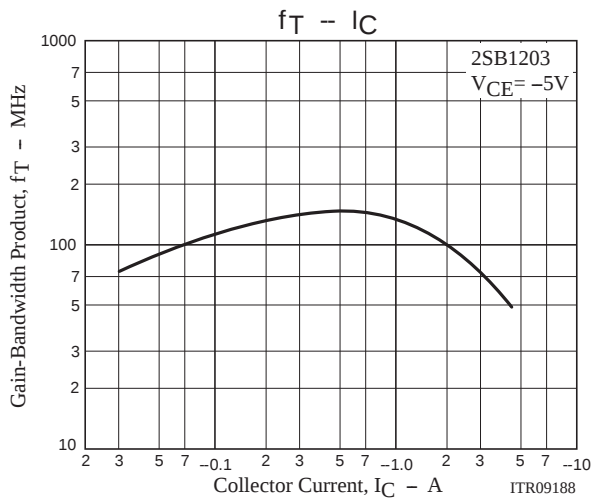
Ordering Information

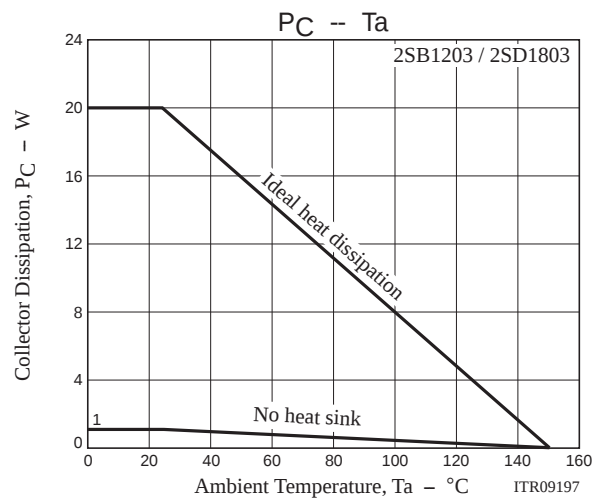
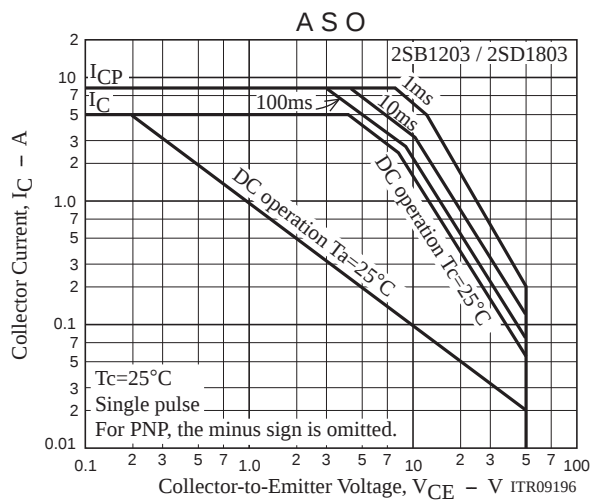
Device	Package	Shipping	memo
2SB1203S-E	TP	500pcs./bag	Pb Free
2SB1203S-H	TP	500pcs./bag	Pb Free and Halogen Free
2SD1203T-E	TP	500pcs./bag	Pb Free
2SD1203T-H	TP	500pcs./bag	Pb Free and Halogen Free
2SB1803S-E	TP	500pcs./bag	Pb Free
2SB1803S-H	TP	500pcs./bag	Pb Free and Halogen Free
2SD1803T-E	TP	500pcs./bag	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

2SB1203/2SD1803



2SB1203/2SD1803





Taping Specification

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

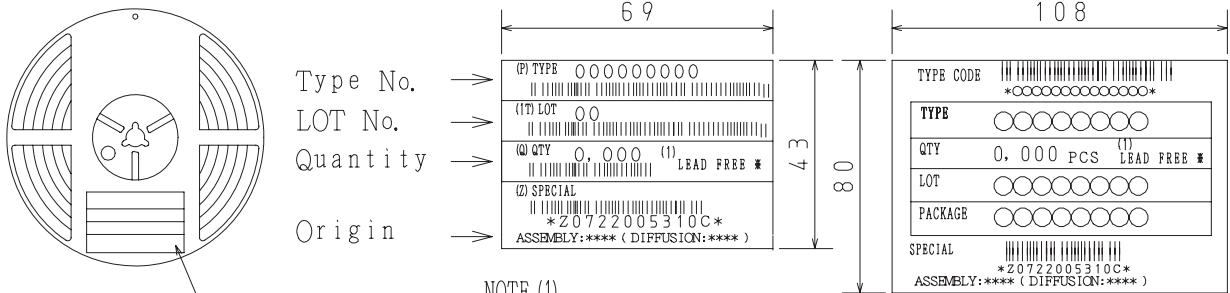
Packing Format

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

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.

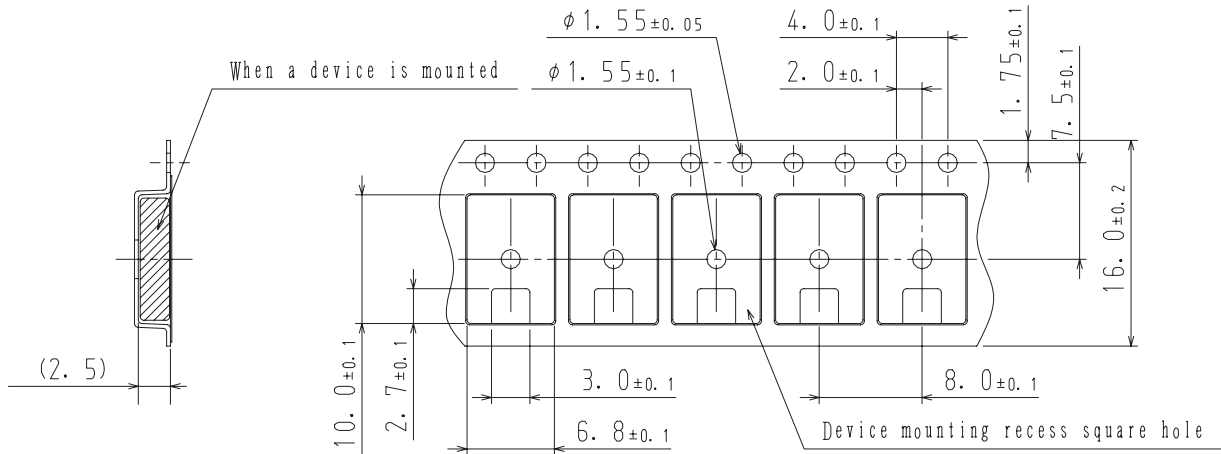
Packing method



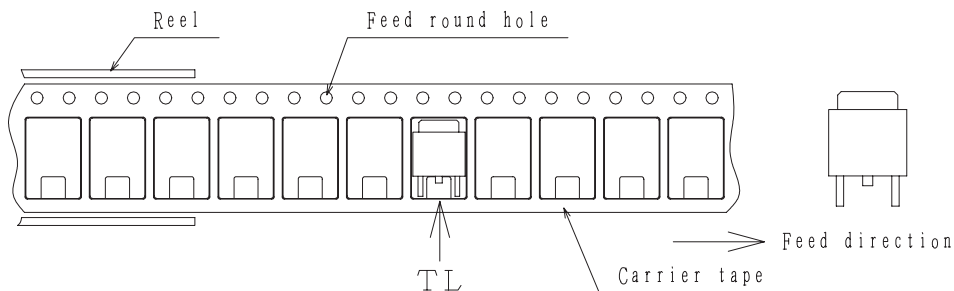
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



2. Device placement direction

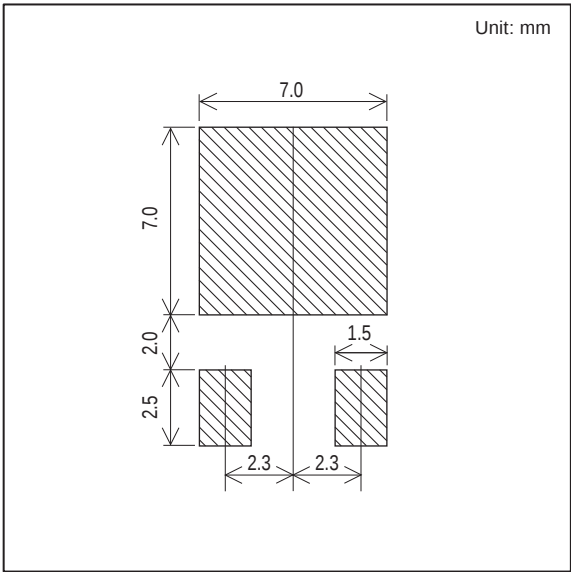
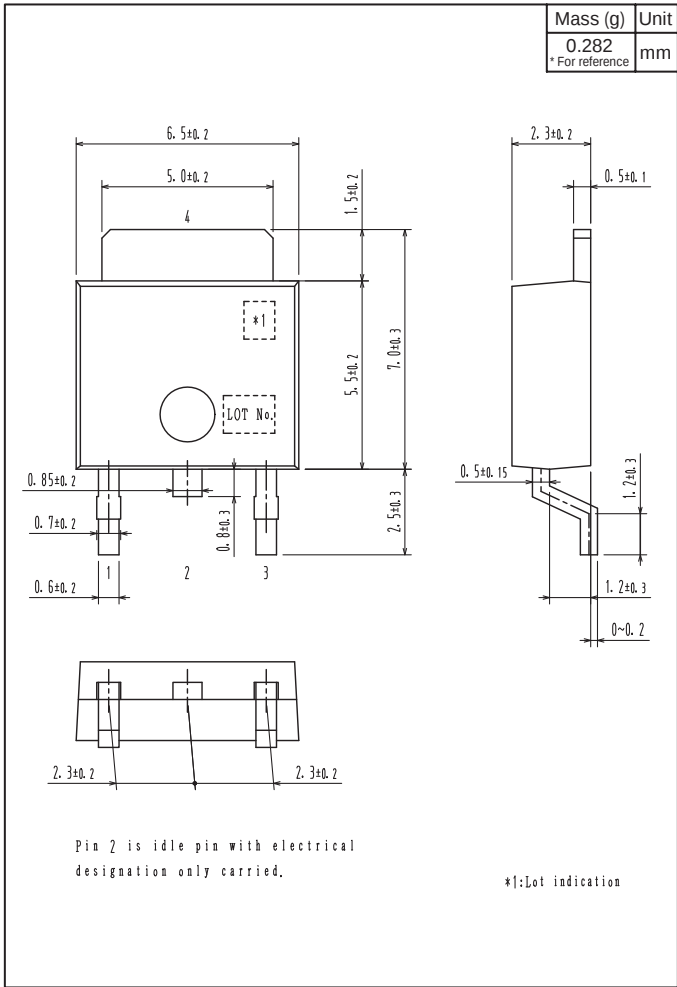


Those with one electrode terminal on the feed hole side.....TL

Outline Drawing

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

Land Pattern Example



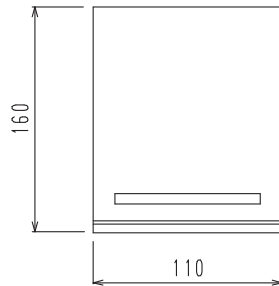
Bag Packing Specification

2SB1203S-E, 2SB1203S-H, 2SD1203T-E, 2SD1203T-H, 2SB1803S-E, 2SB1803S-H, 2SD1803T-E, 2SD1803T-H

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)

Type No.	→	(P) TYPE 0000000000	43
LOT No.	→	(1) LOT 00	
Quantity	→	(Q) QTY 0,000 (1) LEAD FREE *	
Origin	→	(2) SPECIAL *20722005310C* ASSEMBLY:**** (DIFFUSION:****)	

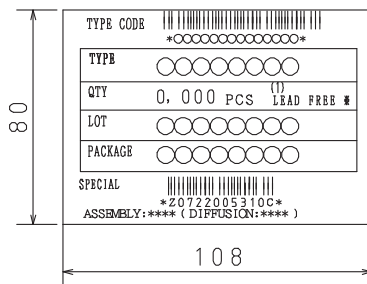
4. Outer box label (unit:mm)

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.

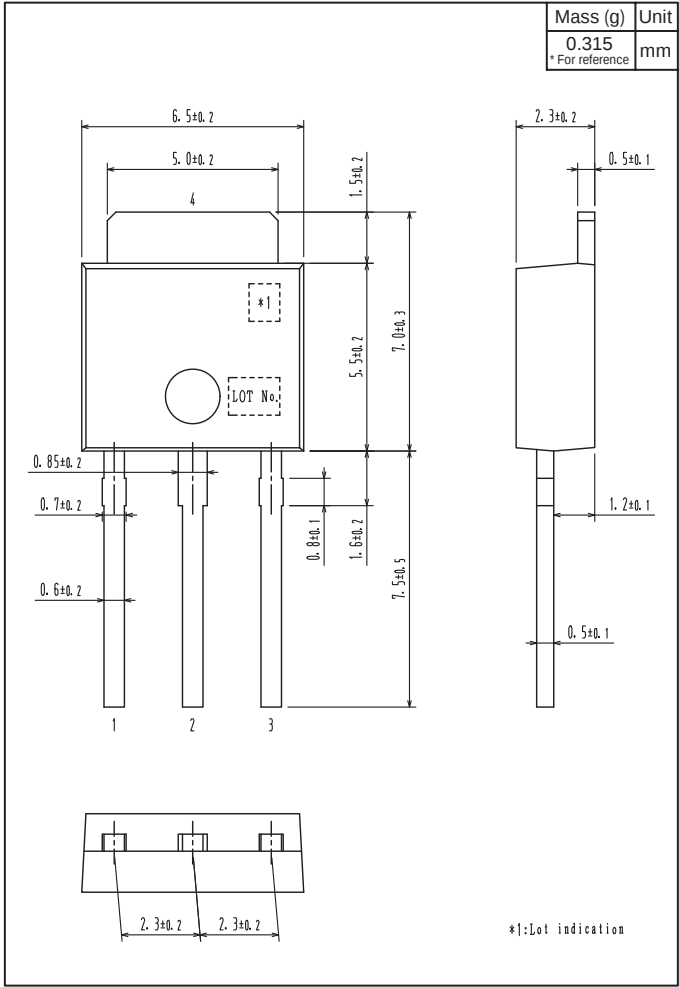
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3



2SB1203/2SD1803

Outline Drawing

2SB1203S-E, 2SB1203S-H, 2SD1203T-E, 2SD1203T-H, 2SB1803S-E, 2SB1803S-H, 2SD1803T-E, 2SD1803T-H



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