Ordering number : EN2112C

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

2SB1201/2SD1801 — High-Current Switching Applications

PNP/NPN Epitaxial Planar Silicon Transistor

Applications

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

Features

- Adoption of FBET, MBIT processes
- Low collector-to-emitter saturation voltage
- Small and slim package making it easy to make 2SB1201/2SD1801-used sets smaller
- Large current capacitance and wide ASO
- Fast switching speed

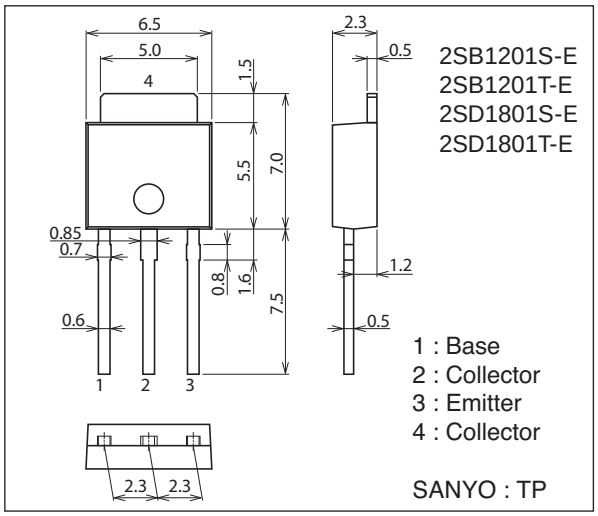
Specifications ( ): 2SB1201

Absolute Maximum Ratings at Ta=25°C

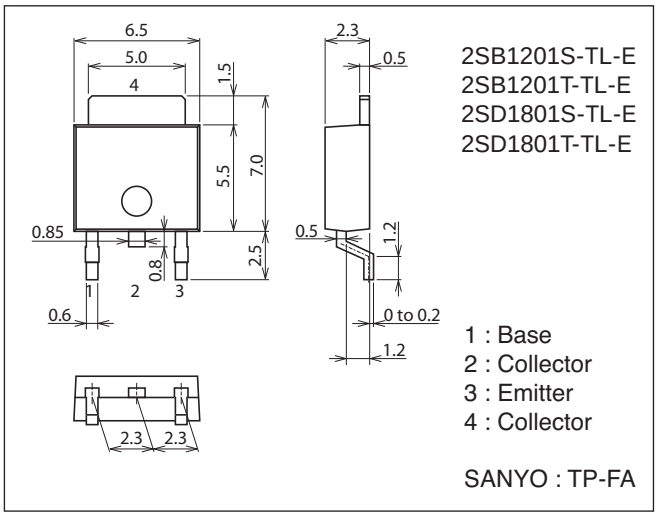
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)60	V
Collector-to-Emitter Voltage	V_{CEO}		(–)50	V
Emitter-to-Base Voltage	V_{EBO}		(–)6	V
Collector Current	I_C		(–)2	A
Collector Current (Pulse)	I_{CP}		(–)4	A

Continued on next page.

Package Dimensions unit : mm (typ)
7518-003



Package Dimensions unit : mm (typ)
7003-003

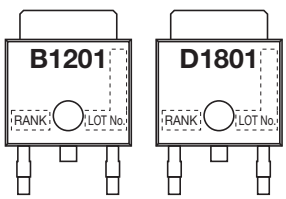


Product & Package Information

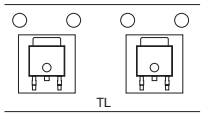
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

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

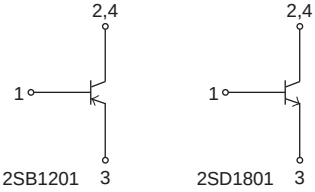
Marking (TP, TP-FA)



Packing Type (TP-FA) : TL



Electrical Connection



Continued from preceding page.

Parameter	Symbol	Conditions	Ratings	Unit
Collector Dissipation	P_C		0.8	W
		Tc=25°C	15	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

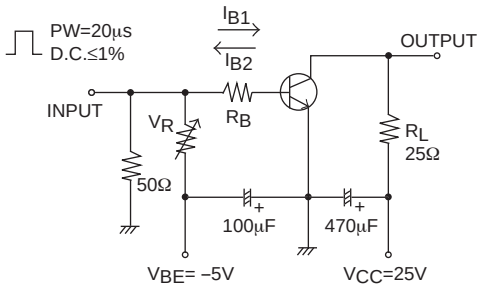
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(−)50V, I_E=0A			(−)100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(−)4V, I_C=0A			(−)100	nA
DC Current Gain	$h_{FE}1$	V_{CE}=(−)2V, I_C=(−)100mA	100*		560*	
	$h_{FE}2$	V_{CE}=(−)2V, I_C=(−)1.5A	40			
Gain-Bandwidth Product	f_T	V_{CE}=(−)10V, I_C=(−)50mA		150		MHz
Output Capacitance	Cob	V_{CB}=(−)10V, f=1MHz		(22)12		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(−)1A, I_B=(−)50mA		(−0.3)0.15	(−0.7)0.4	V
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	V_{CE}=(−)1A, I_C=(−)50mA		(−)0.9	(−)1.2	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.		60		ns
Storage Time	t_{stg}			(450)550		ns
Fall Time	t_f			30		ns

* : The 2SB1201/2SD1801 are classified by 100mA h_{FE} as follows :

Rank	R	S	T	U
h_{FE}	100 to 200	140 to 280	200 to 400	280 to 560

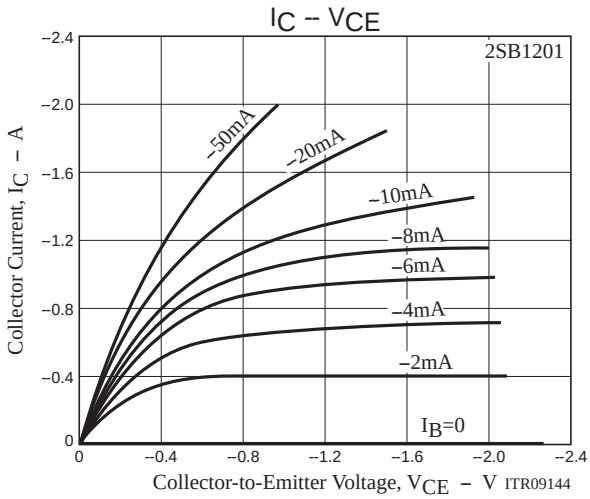
Switching Time Test Circuit

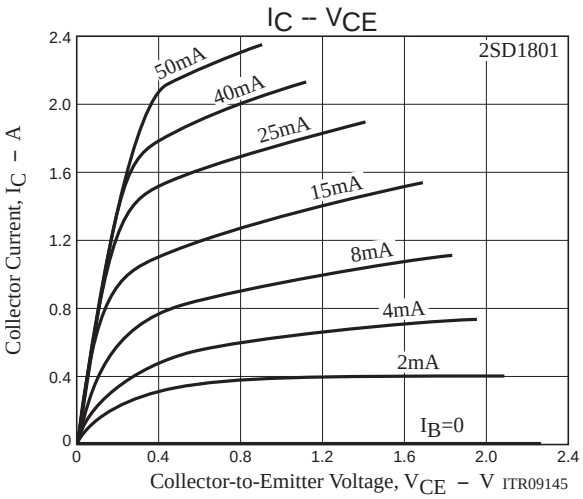


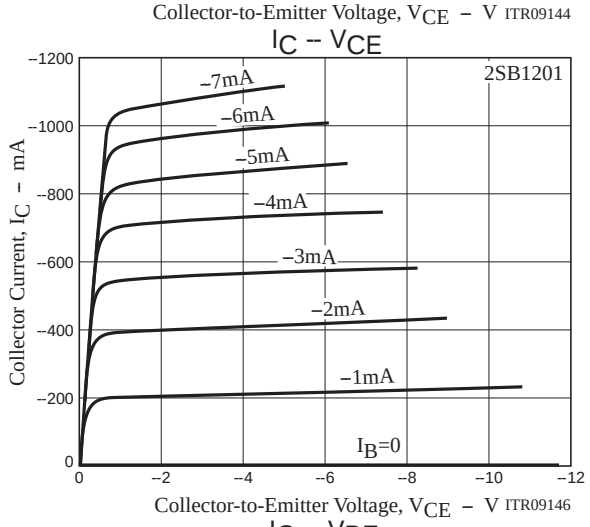
I_C=10I_{B1}= −10I_{B2}=500mA, V_{CC}=25V
For PNP, the polarity is reversed.

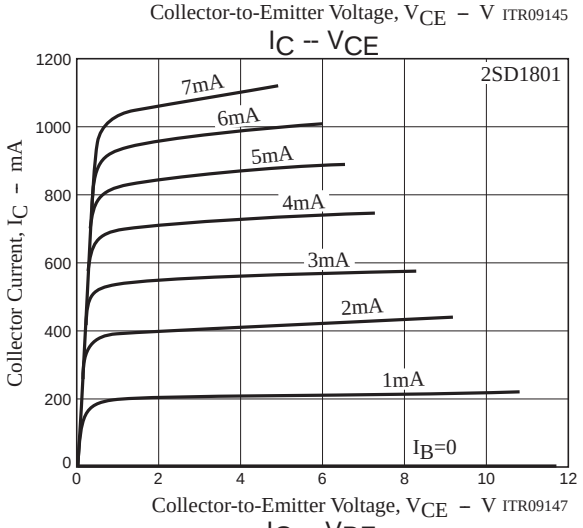
Ordering Information

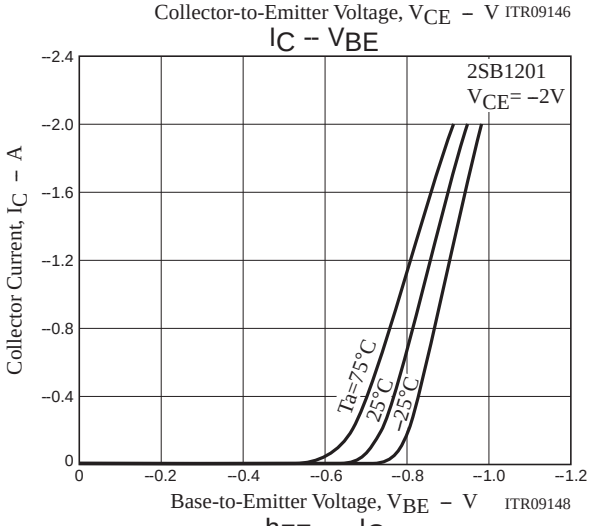
Device	Package	Shipping	memo
2SB1201S-E	TP	500pcs./bag	Pb Free
2SB1201T-E	TP	500pcs./bag	
2SD1801S-E	TP	500pcs./bag	
2SD1801T-E	TP	500pcs./bag	
2SB1201S-TL-E	TP-FA	700pcs./reel	
2SB1201T-TL-E	TP-FA	700pcs./reel	
2SD1801S-TL-E	TP-FA	700pcs./reel	
2SD1801T-TL-E	TP-FA	700pcs./reel	

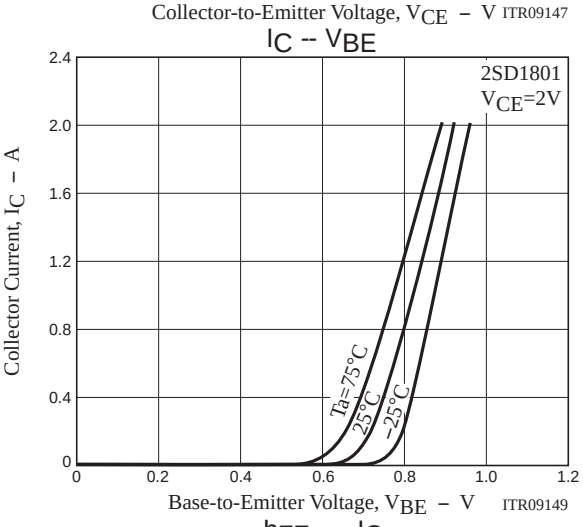

IC – VCE
2SB1201
–50mA
–20mA
–10mA
–8mA
–6mA
–4mA
–2mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09144

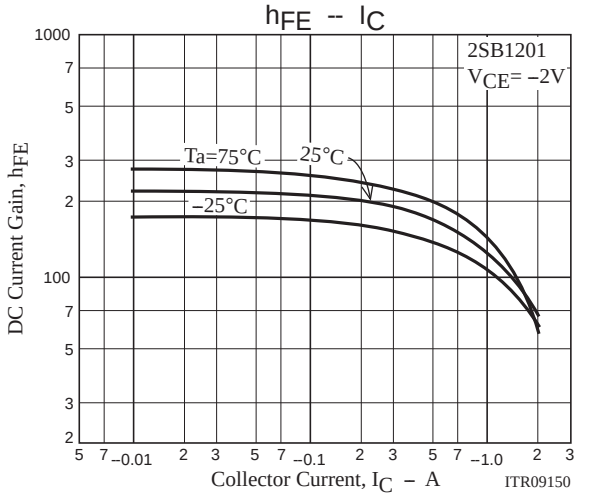

IC – VCE
2SD1801
50mA
40mA
25mA
15mA
8mA
4mA
2mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09145

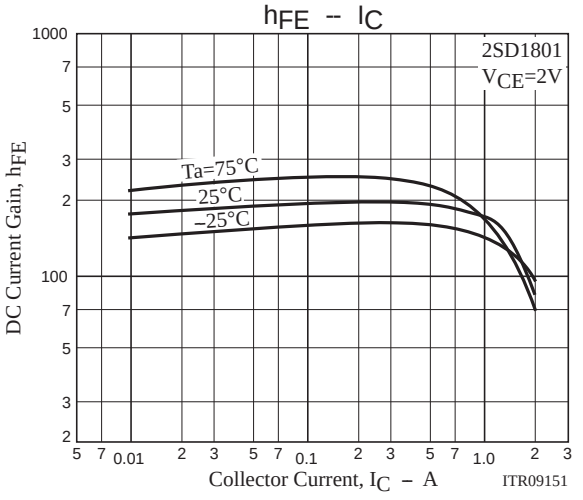

IC – VCE
2SB1201
–7mA
–6mA
–5mA
–4mA
–3mA
–2mA
–1mA
IB=0
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – V
ITR09146

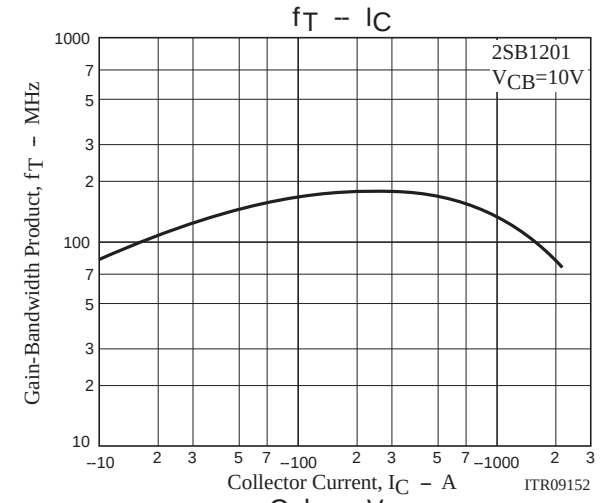

IC – VCE
2SD1801
7mA
6mA
5mA
4mA
3mA
2mA
1mA
IB=0
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – V
ITR09147

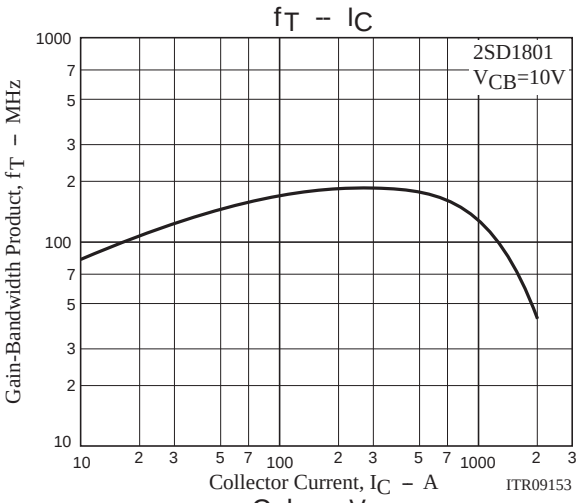

IC – VBE
2SB1201
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR09148

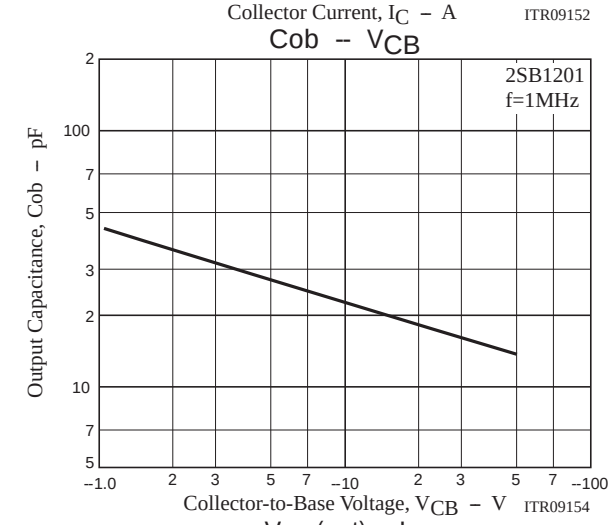

IC – VBE
2SD1801
VCE=2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR09149

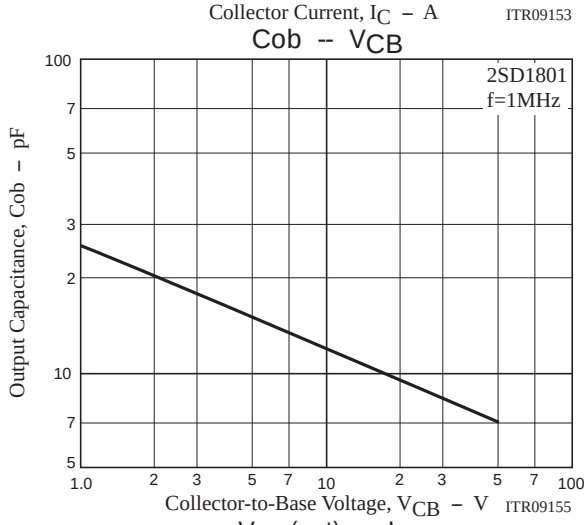

hFE – IC
2SB1201
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR09150

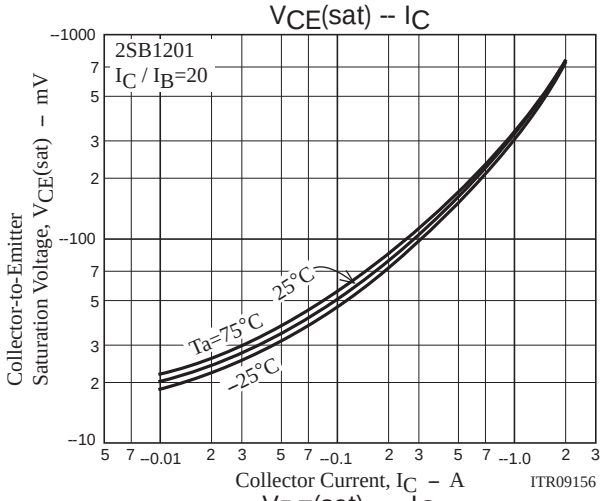

hFE – IC
2SD1801
VCE=2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR09151

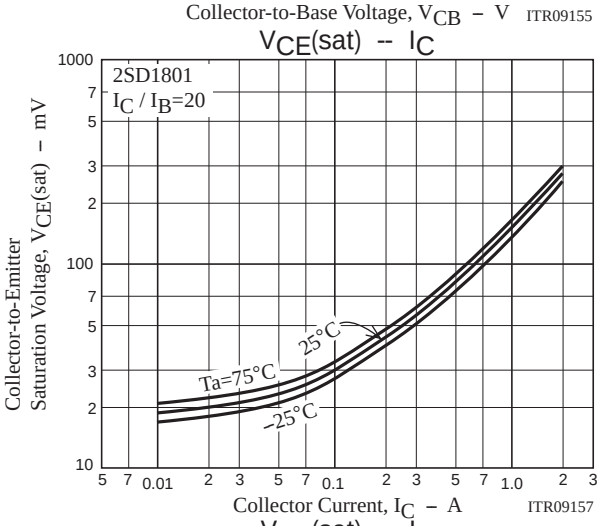

fT – IC
2SB1201
VCB=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR09152

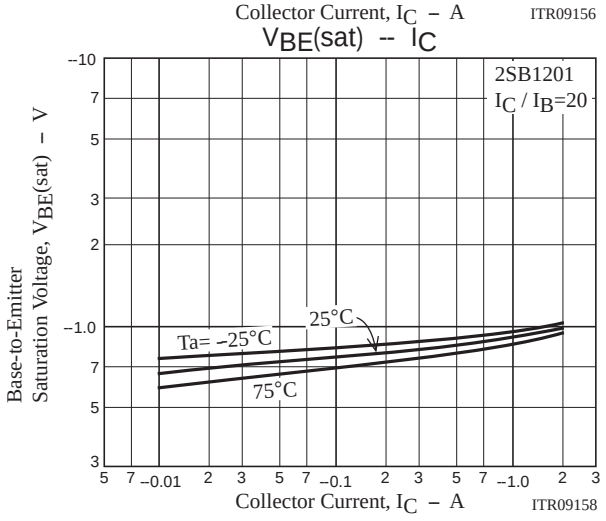

fT – IC
2SD1801
VCB=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR09153

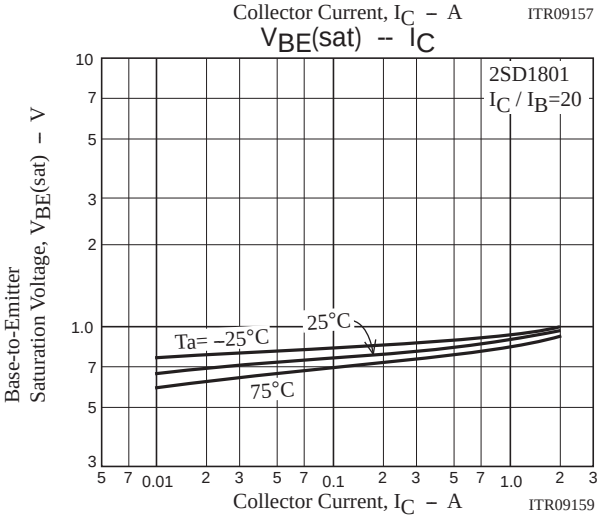

Cob – VCB
2SB1201
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR09154

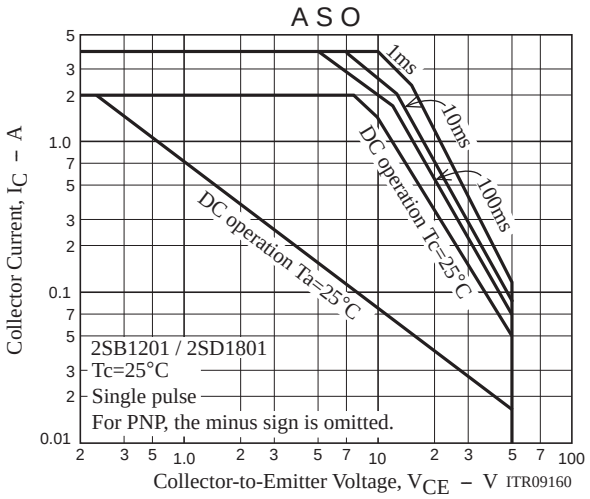

Cob – VCB
2SD1801
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR09155

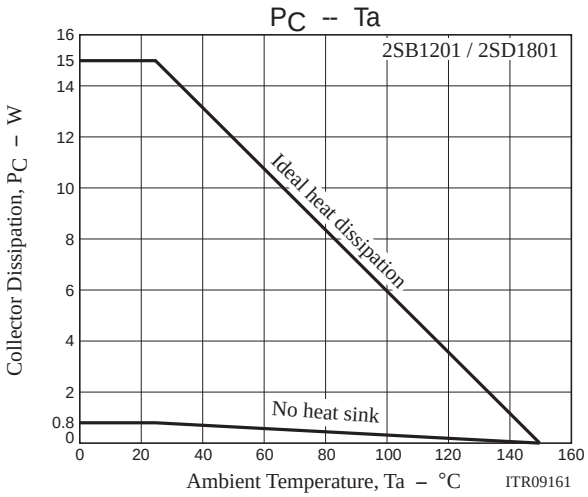

VCE(sat) – IC
2SB1201
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR09156


VCE(sat) – IC
2SD1801
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR09157


VBE(sat) – IC
2SB1201
IC / IB=20
Ta= –25°C
25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR09158


VBE(sat) – IC
2SD1801
IC / IB=20
Ta= –25°C
25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR09159


A S O
Collector Current, I_C – A
Collector-to-Emitter Voltage, V_{CE} – V
ITR09160
1ms
10ms
100ms
DC operation Tc=25°C
DC operation Ta=25°C
2SB1201 / 2SD1801
Tc=25°C
Single pulse
For PNP, the minus sign is omitted.


P_C -- Ta
Collector Dissipation, P_C – W
Ambient Temperature, Ta – °C
ITR09161
2SB1201 / 2SD1801
Ideal heat dissipation
No heat sink

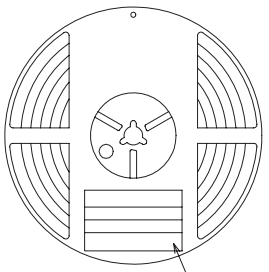
Taping Specification

2SB1201S-TL-E, 2SB1201T-TL-E, 2SD1801S-TL-E, 2SD1801T-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

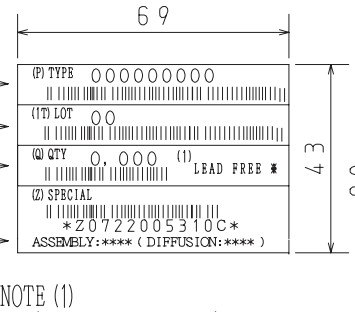
Packing method



Reel label

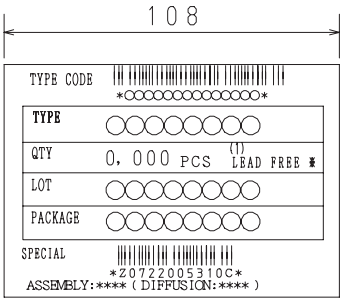
Reel label, Inner box label

(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.

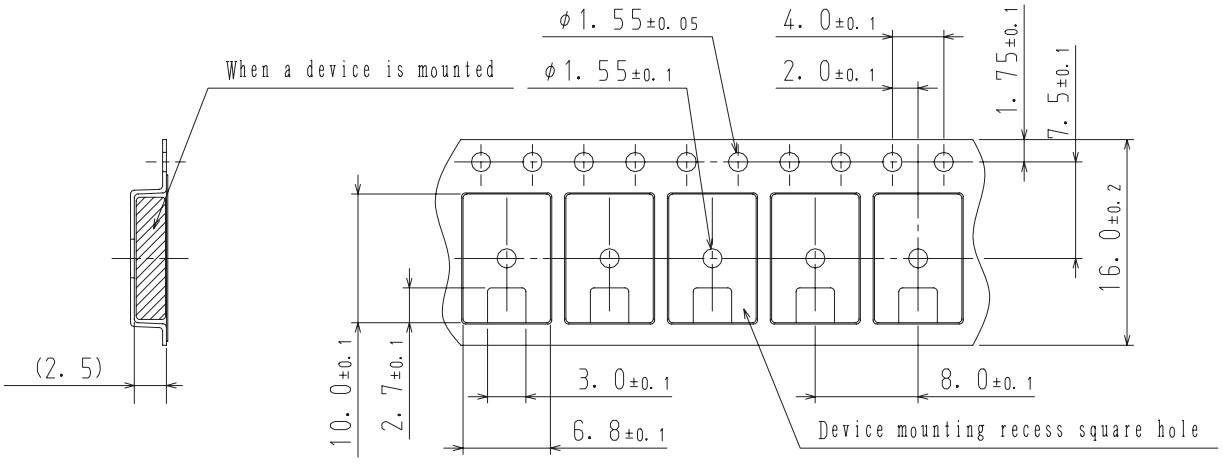


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

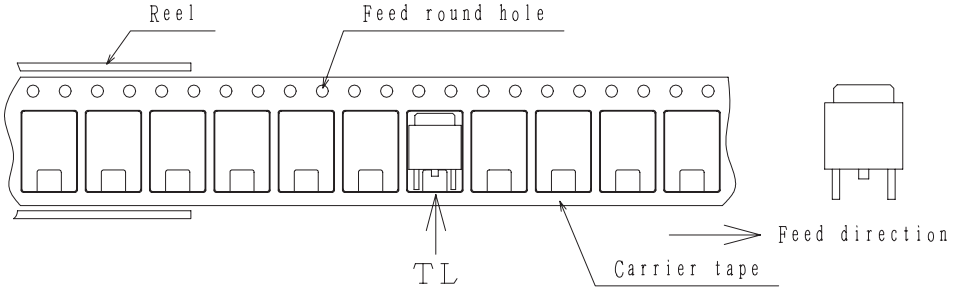
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



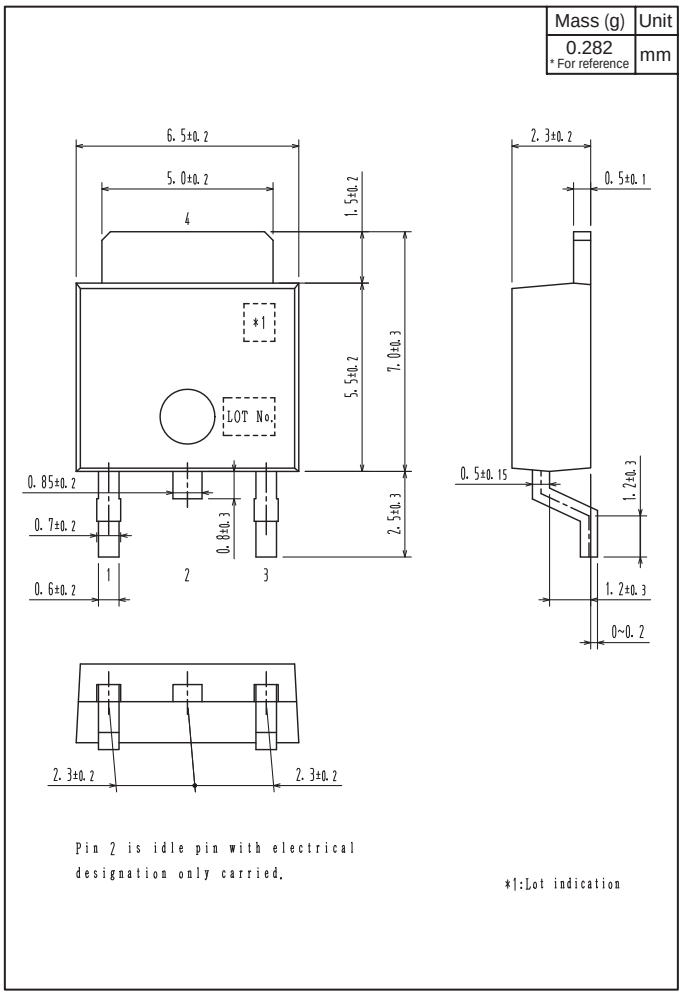
2. Device placement direction



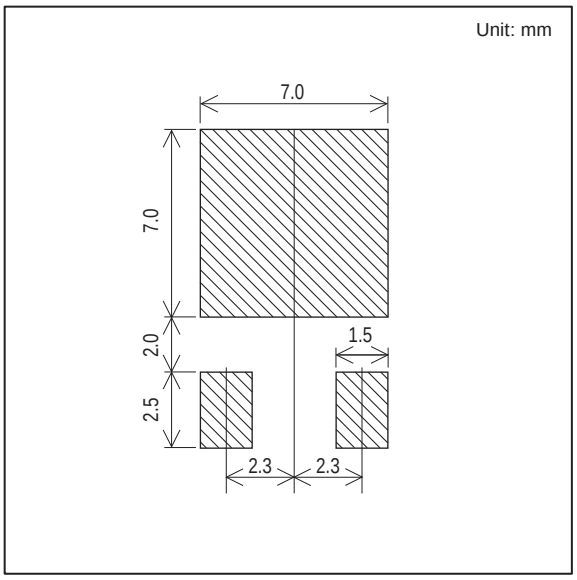
Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

2SB1201S-TL-E, 2SB1201T-TL-E, 2SD1801S-TL-E, 2SD1801T-TL-E



Land Pattern Example



Bag Packing Specification

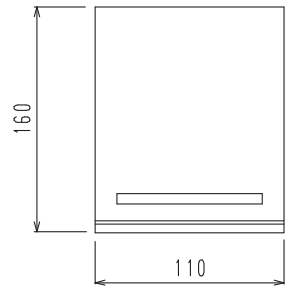
2SB1201S-E, 2SB1201T-E, 2SD1801S-E, 2SD1801T-E

1. Packing Format

Package Name	Maximum Number of devices contained (pcs)			
	Bag	Inner box	Outer box	
TP		B-1	A-1	A-2
	500	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	

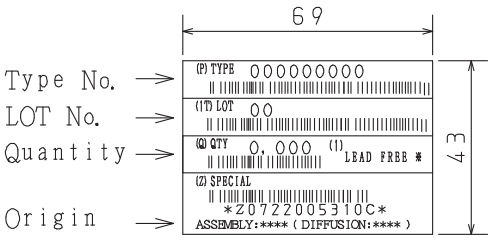
2. Bag dimensions

(unit: mm)



3. Bag label, Inner box label

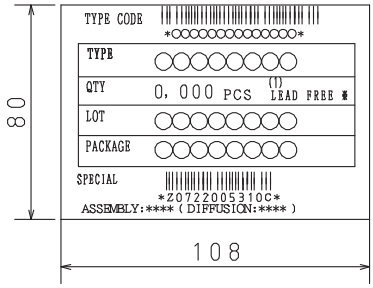
(unit: mm)



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.

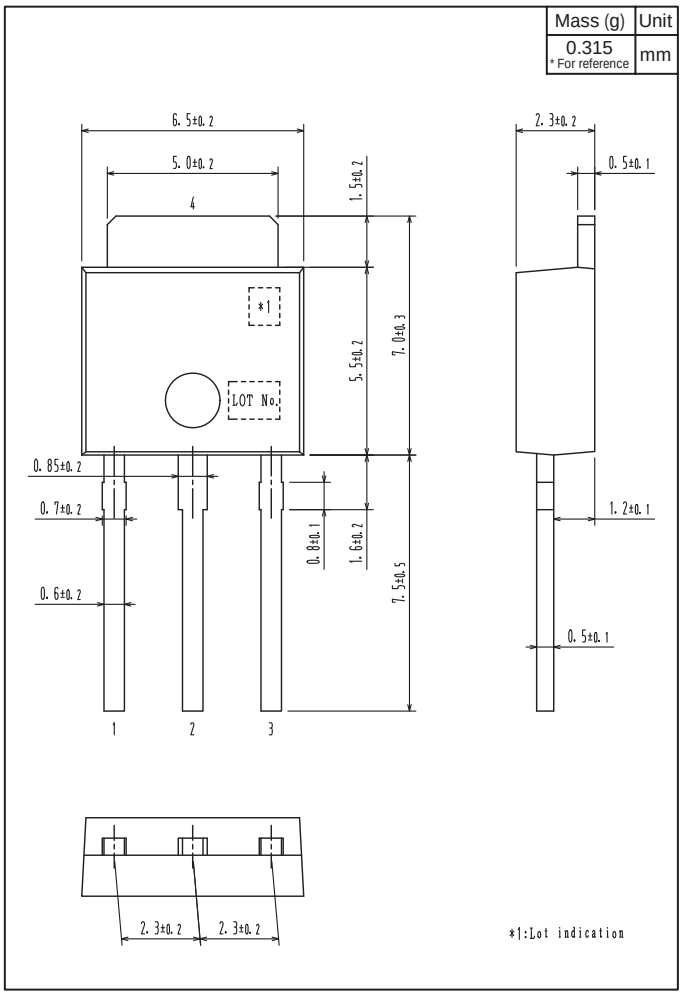


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

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

Outline Drawing

2SB1201S-E, 2SB1201T-E, 2SD1801S-E, 2SD1801T-E



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