Ordering number : EN2086C

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

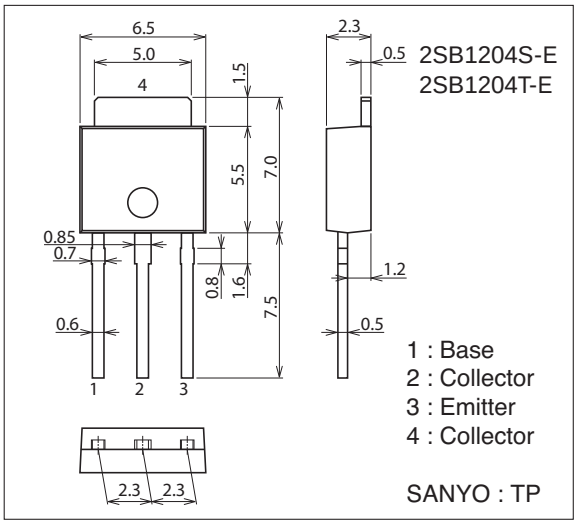
- Low collector-to-emitter saturation voltage
- High current and high f_T
- Excellent linearity of h_{FE}
- Fast switching speed
- Small and slim package making it easy to make 2SB1204-applied sets smaller

Specifications

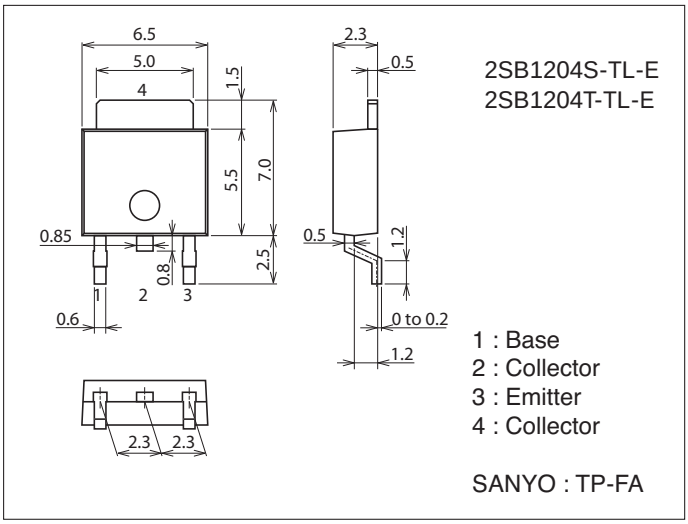
Absolute Maximum Ratings at Ta=25°C

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		−8	A
Collector Current (Pulse)	I_{CP}		−12	A
Collector Dissipation	P_C		1	W
		Tc=25°C	20	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Package Dimensions unit : mm (typ)
7518-003



Package Dimensions unit : mm (typ)
7003-003

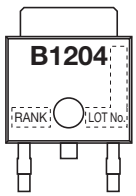


Product & Package Information

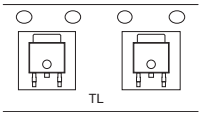
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

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

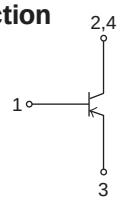
Marking (TP, TP-FA)



Packing Type (TP-FA) : TL



Electrical Connection



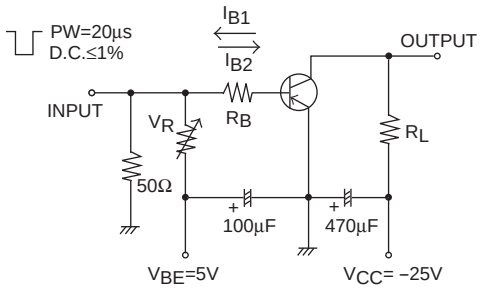
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}= −40V, I_E=0A			−1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}= −4V, I_C=0A			−1	μA
DC Current Gain	$h_{FE}1$	V_{CE}= −2V, I_C= −0.5A	70*		400*	
	$h_{FE}2$	V_{CE}= −2V, I_C= −6A	35			
Gain-Bandwidth Product	f_T	V_{CE}= −5V, I_C= −1A		130		MHz
Output Capacitance	Cob	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= −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		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

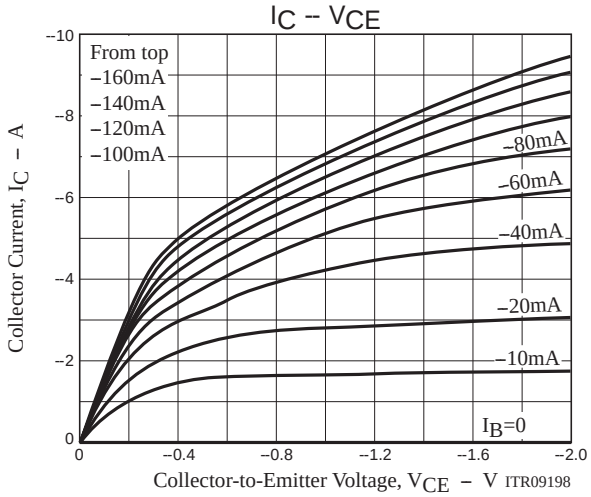
Switching Time Test Circuit

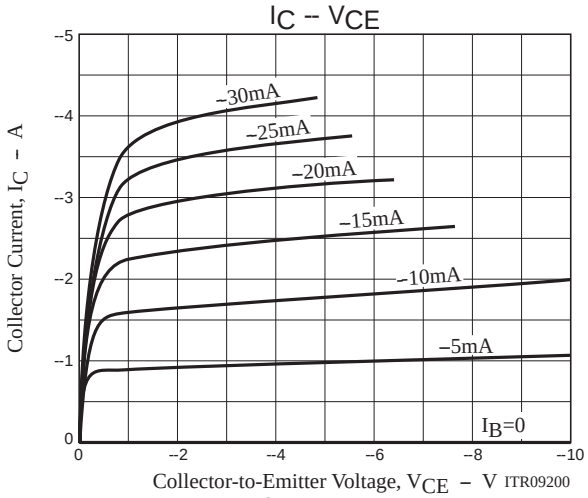


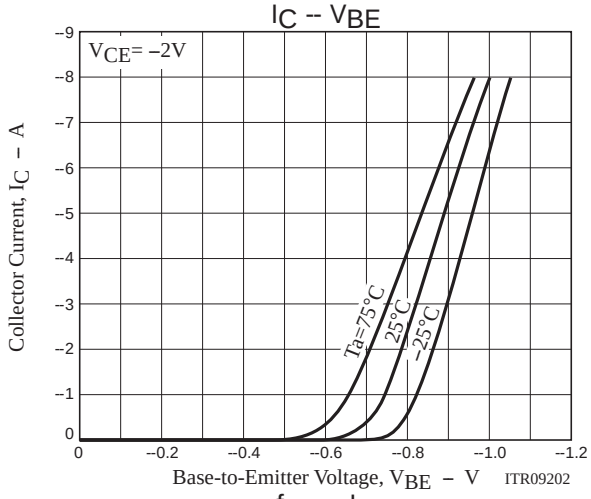
I_C= −10I_{B1}=10I_{B2}= −4A

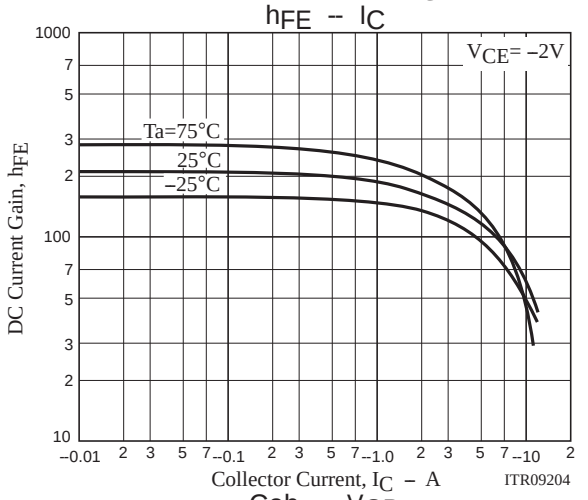
Ordering Information

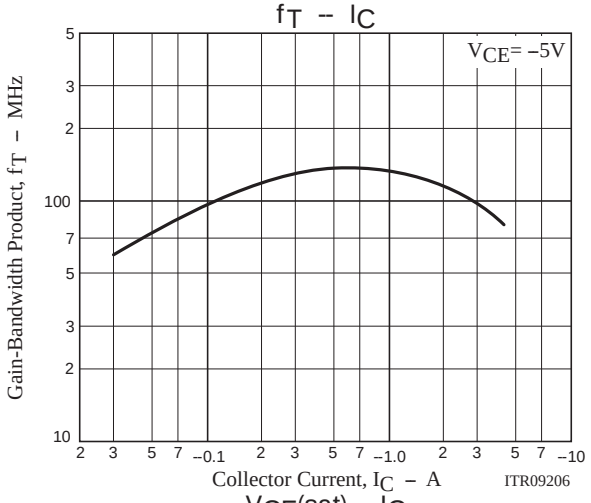
Device	Package	Shipping	memo
2SB1204S-E	TP	500pcs./bag	Pb Free
2SB1204T-E	TP	500pcs./bag	
2SB1204S-TL-E	TP-FA	700pcs./reel	
2SB1204T-TL-E	TP-FA	700pcs./reel	

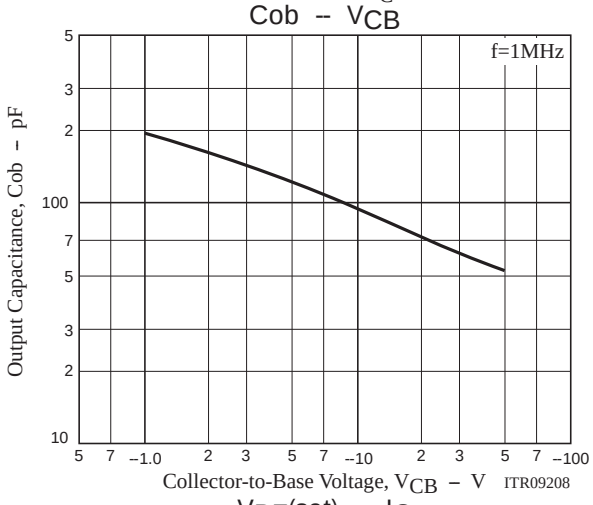

IC -- VCE
From top
–160mA
–140mA
–120mA
–100mA
–80mA
–60mA
–40mA
–20mA
–10mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09198

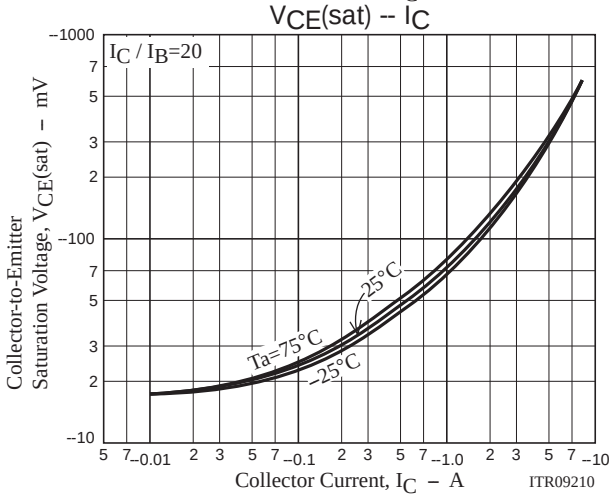

IC -- VCE
–30mA
–25mA
–20mA
–15mA
–10mA
–5mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09200

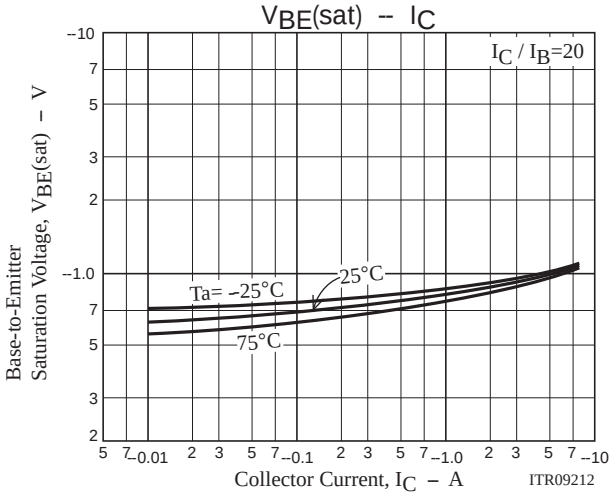

IC -- VBE
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR09202

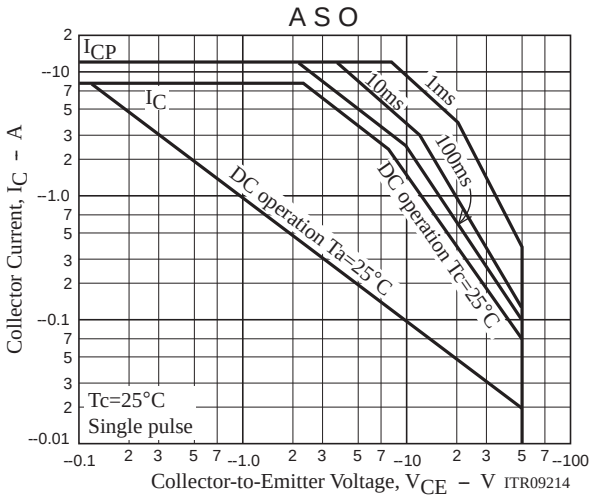

hFE -- IC
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR09204

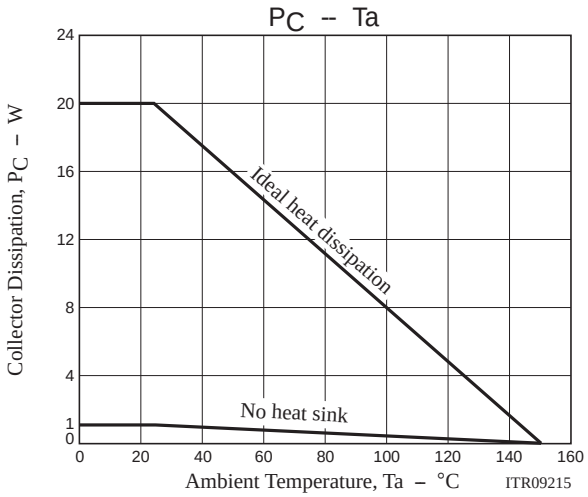

fT -- IC
VCE= –5V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR09206


Cob -- VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR09208


VCE(sat) -- IC
IC / IB=20
Ta=75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR09210


VBE(sat) -- IC
IC / IB=20
Ta= –25°C
25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
ITR09212


A S O
Collector Current, I_C – A
I_{CP}
I_C
10ms
1ms
100ms
DC operation Tc=25°C
DC operation Ta=25°C
Tc=25°C
Single pulse
Collector-to-Emitter Voltage, V_{CE} – V
ITR09214


P_C – Ta
Collector Dissipation, P_C – W
Ideal heat dissipation
No heat sink
Ambient Temperature, Ta – °C
ITR09215

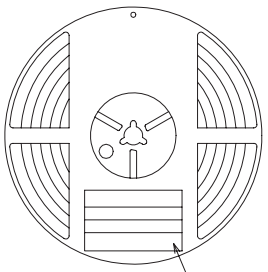
Taping Specification

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

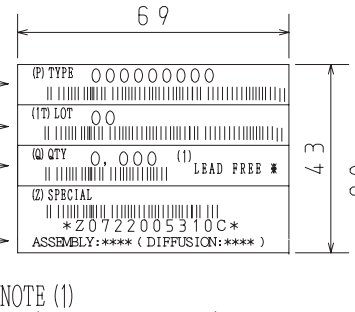
Packing method



Reel label

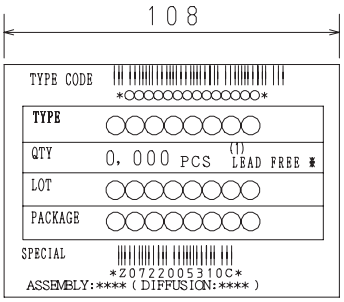
Reel label, Inner box label

(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.

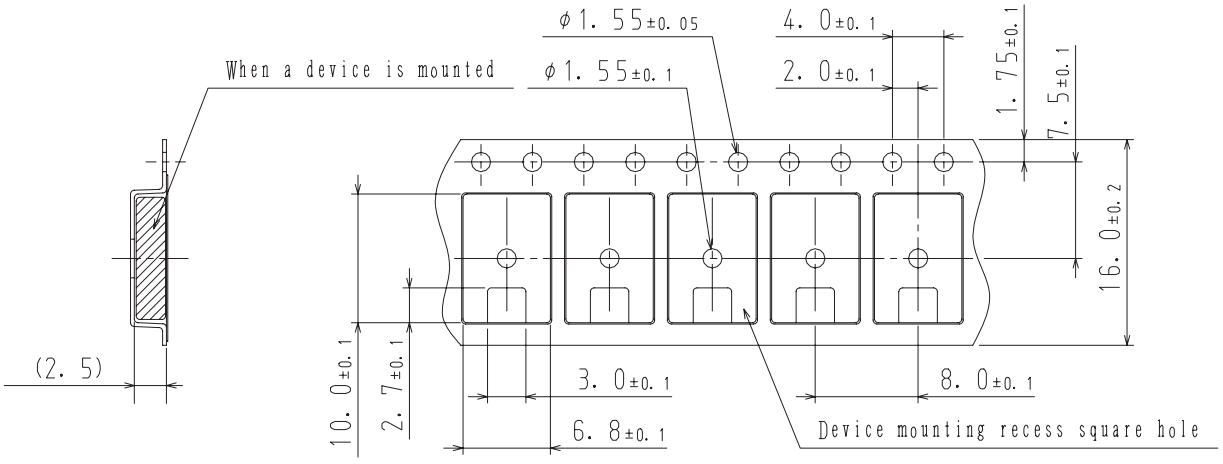


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

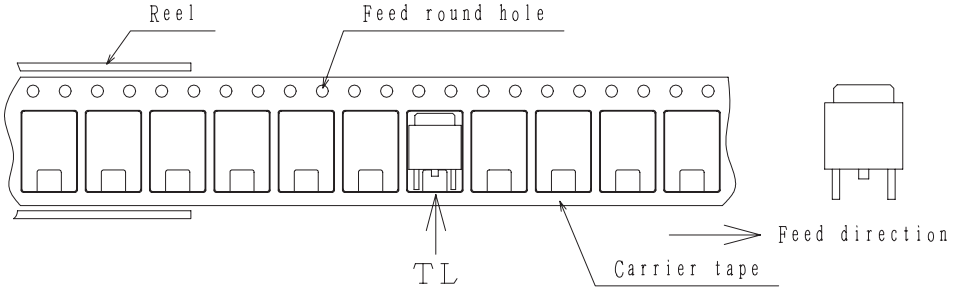
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



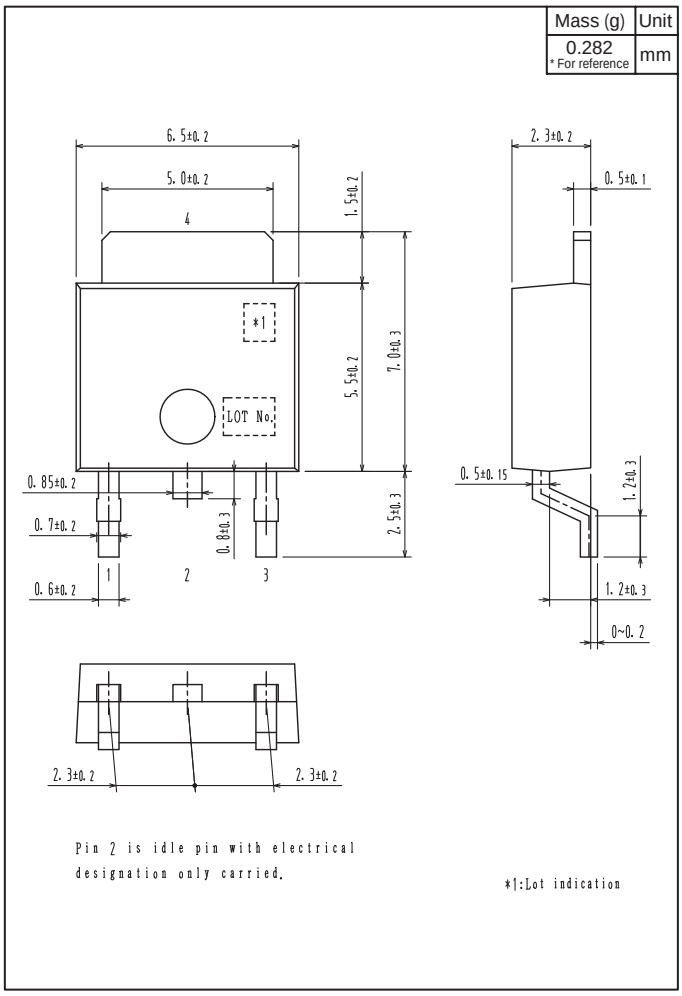
2. Device placement direction



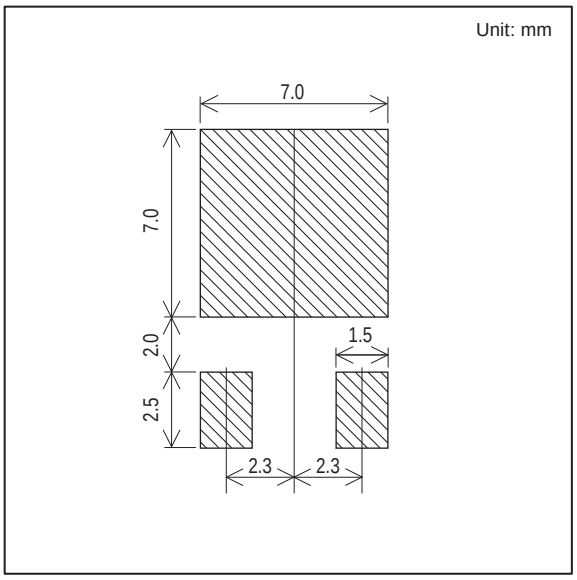
Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

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



Land Pattern Example



Bag Packing Specification

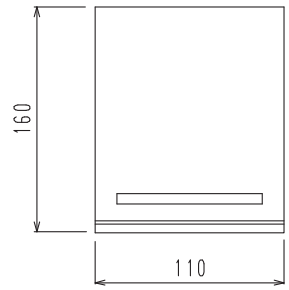
2SB1204S-E, 2SB1204T-E

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

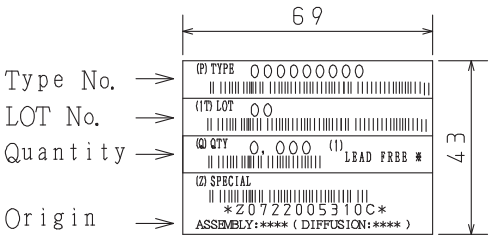
2. Bag dimensions

(unit: mm)



3. Bag label, Inner box label

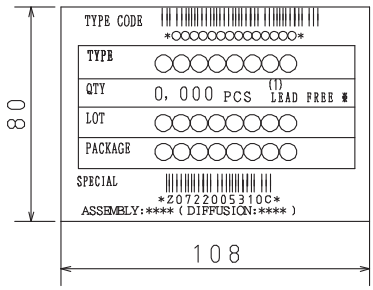
(unit: mm)



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.

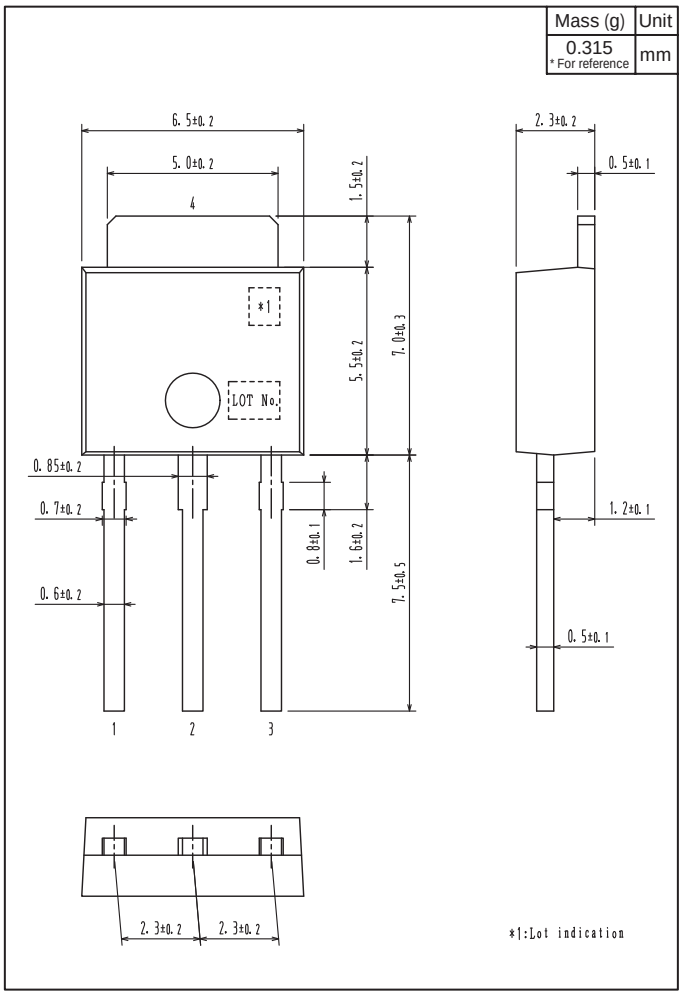


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

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

Outline Drawing

2SB1204S-E, 2SB1204T-E



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