Ordering number : EN2114C

2SB1205

Bipolar Transistor
−20V, −5A, Low V_{CE}(sat), PNP Single TP/TP-FA

ON Semiconductor®
http://onsemi.com

Applications

- Flash, voltage regulators, relay drivers, lamp drivers

Features

- Adoption of FBET, MBIT processes
- Fast switching speed
- Small and slim package making it easy to make 2SB1205-applied sets smaller
- Low saturation voltage
- Large current capacity

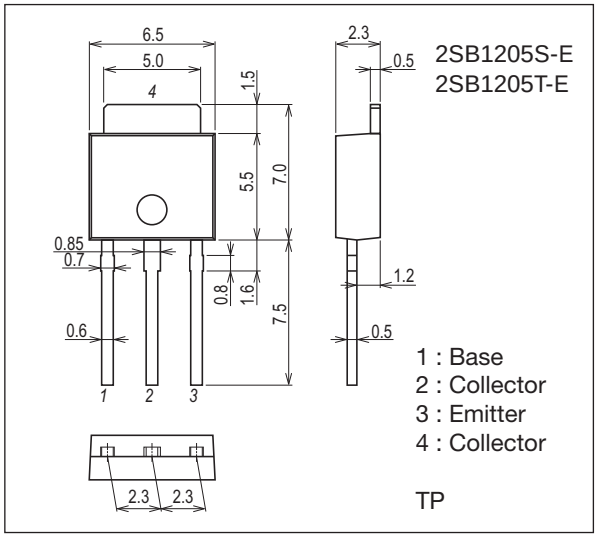
Specifications

Absolute Maximum Ratings at Ta=25°C

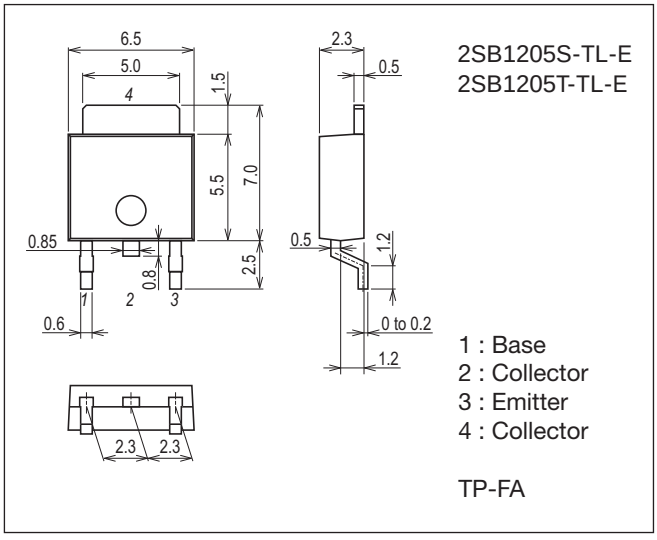
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		−25	V
Collector-to-Emitter Voltage	V_{CEO}		−20	V
Emitter-to-Base Voltage	V_{EBO}		−5	V
Collector Current	I_C		−5	A
Collector Current (Pulse)	I_{CP}		−8	A

Continued on next page.

Package Dimensions unit : mm (typ)
7518-003



Package Dimensions unit : mm (typ)
7003-003

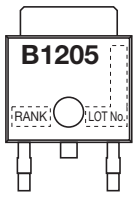


Product & Package Information

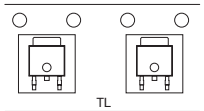
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

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

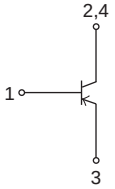
Marking (TP, TP-FA)



Packing Type (TP-FA) : TL



Electrical Connection



Semiconductor Components Industries, LLC, 2013

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings	Unit
Base Current	I_B		−0.5	A
Collector Dissipation	P_C		1	W
		Tc=25°C	10	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

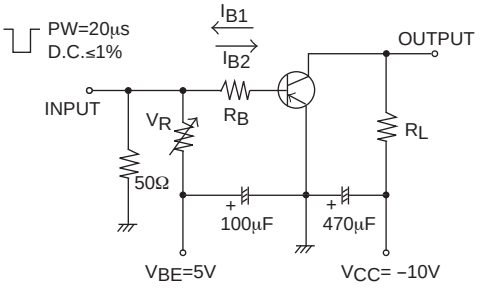
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=−20V, I_E=0A			−500	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=−4V, I_C=0A			−500	nA
DC Current Gain	$h_{FE}1$	V_{CE}=−2V, I_C=500mA	100*		400*	
	$h_{FE}2$	V_{CE}=−2V, I_C=−4A	60			
Gain-Bandwidth Product	f_T	V_{CE}=−5V, I_C=−200mA		320		MHz
Output Capacitance	Cob	V_{CB}=−10V, f=1MHz		60		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=−3A, I_B=−60mA		−250	−500	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=−3A, I_B=−60mA		−1.0	−1.3	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=−10μA, I_E=0A	−25			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=−1mA, R_{BE}=∞	−20			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=−10μA, I_C=0A	−5			V
Turn-On Time	t_{on}	See specified Test Circuit.		40		ns
Storage Time	t_{stg}			200		ns
Fall Time	t_f			10		ns

* : The 2SB1205 is classified by 500mA h_{FE} as follows :

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

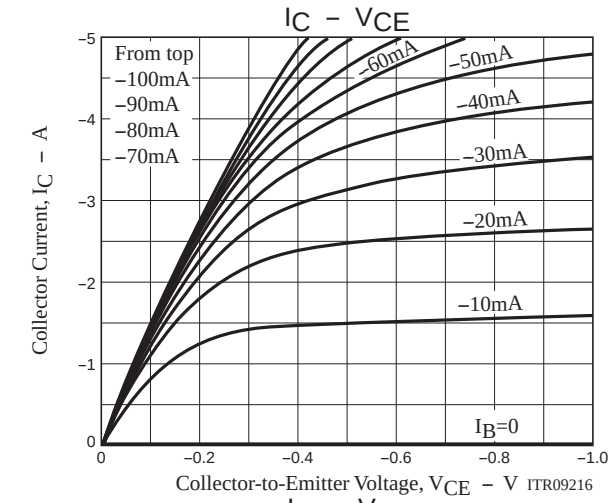
Switching Time Test Circuit

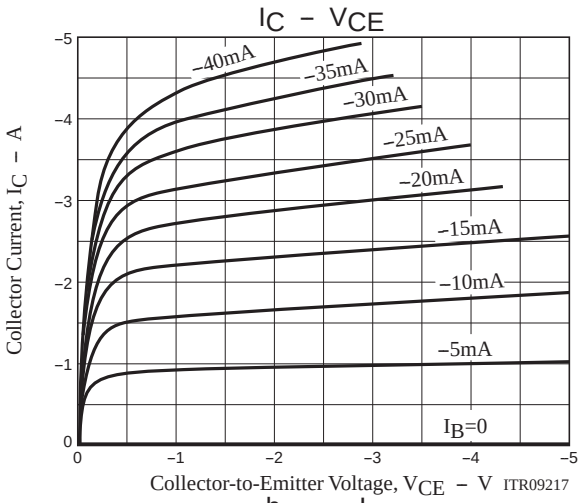


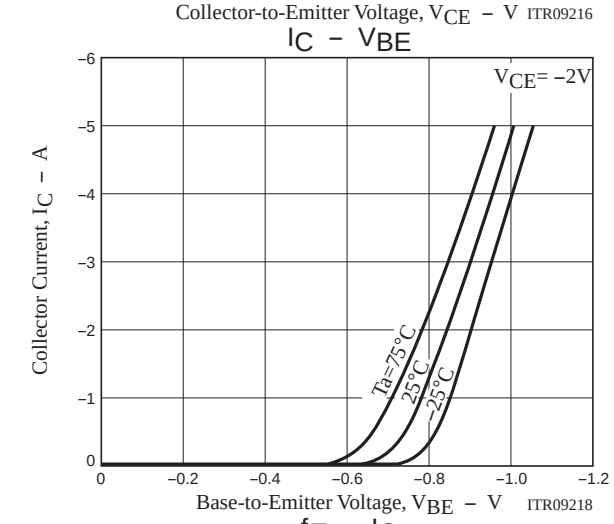
I_C=10I_{B1}= −10I_{B2}= −2A

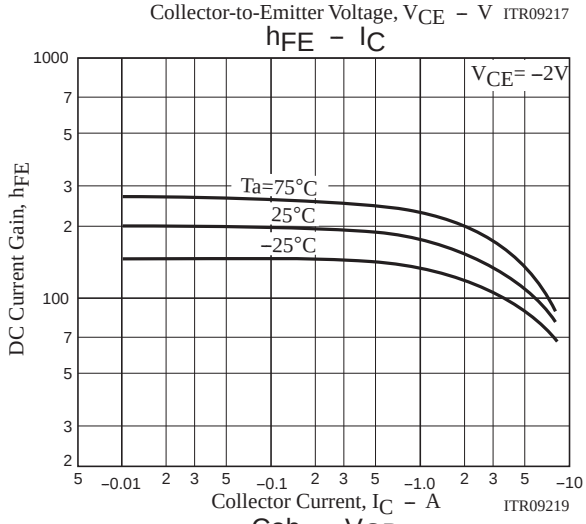
Ordering Information

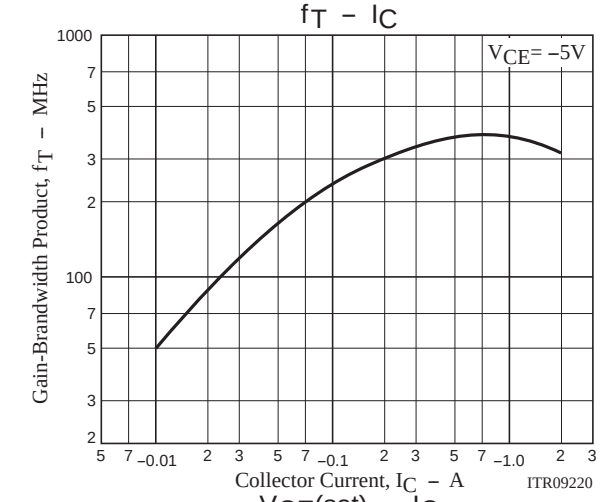
Device	Package	Shipping	memo
2SB1205S-E	TP	500pcs./bag	Pb Free
2SB1205T-E	TP	500pcs./bag	
2SB1205S-TL-E	TP-FA	700pcs./reel	
2SB1205T-TL-E	TP-FA	700pcs./reel	

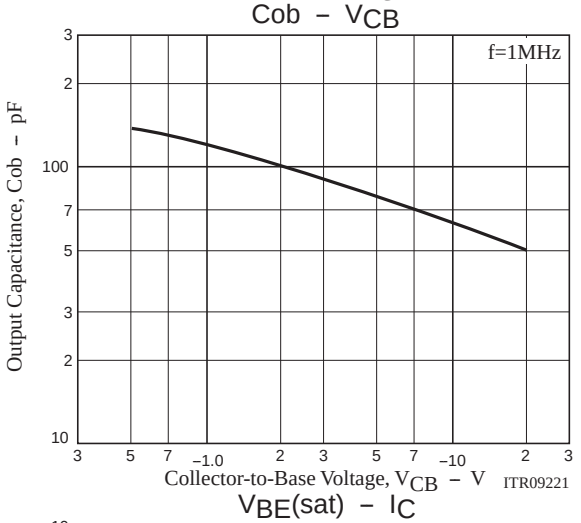

IC – VCE
From top
–100mA
–90mA
–80mA
–70mA
–60mA
–50mA
–40mA
–30mA
–20mA
–10mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09216

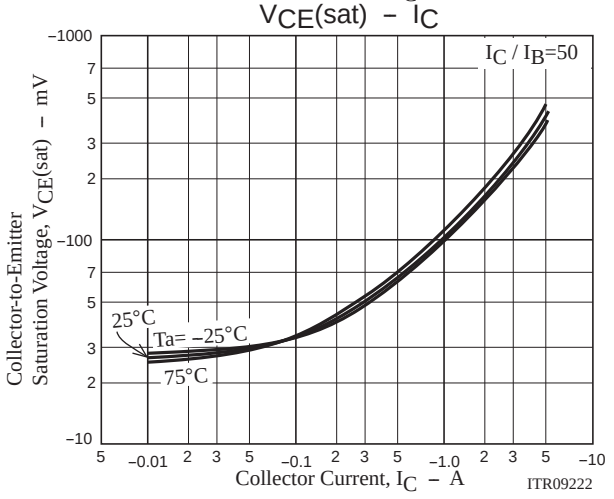

IC – VCE
–40mA
–35mA
–30mA
–25mA
–20mA
–15mA
–10mA
–5mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
ITR09217

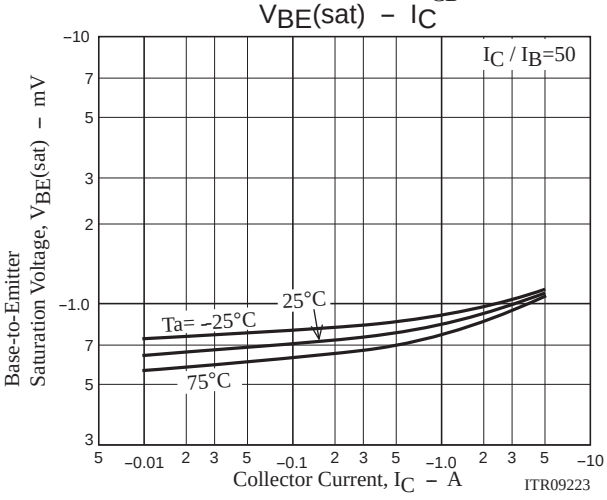

IC – VBE
VCE= –2V
Ta=75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
ITR09218

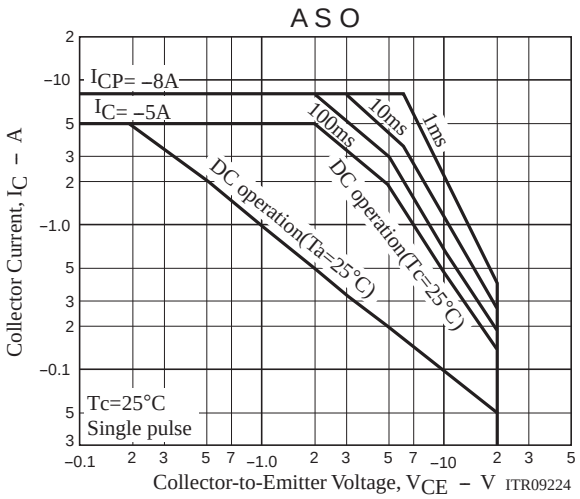

hFE – IC
VCE= –2V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A
ITR09219

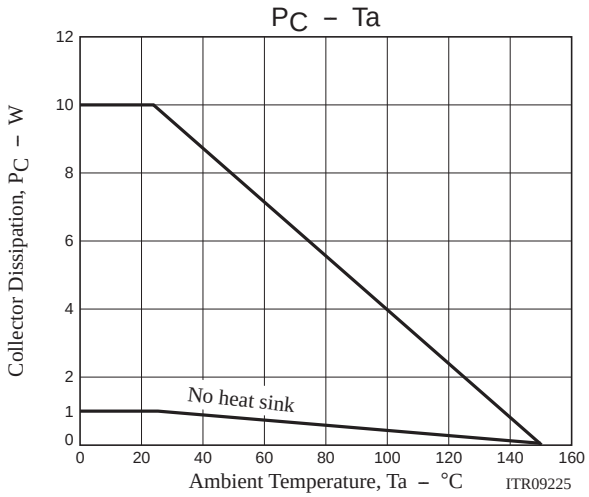

fT – IC
VCE= –5V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
ITR09220


Cob – VCB
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR09221


VCE(sat) – IC
IC / IB=50
25°C
Ta= –25°C
75°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A
ITR09222


VBE(sat) – IC
IC / IB=50
25°C
Ta= –25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – mV
Collector Current, IC – A
ITR09223


A S O
Collector Current, I_C – A
Collector-to-Emitter Voltage, V_{CE} – V
ITR09224
I_{CP}= –8A
I_C= –5A
100ms
10ms
1ms
DC operation(Tc=25°C)
DC operation(Ta=25°C)
Tc=25°C
Single pulse


P_C – Ta
Collector Dissipation, P_C – W
Ambient Temperature, Ta – °C
ITR09225
No heat sink

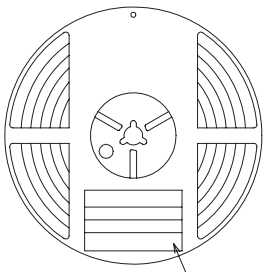
Taping Specification

2SB1205S-TL-E, 2SB1205T-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

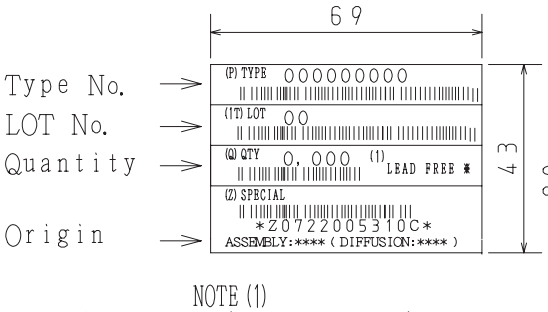
Packing method



Reel label

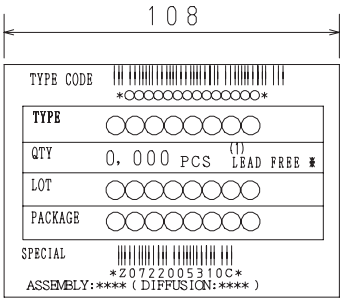
Reel label, Inner box label

(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.

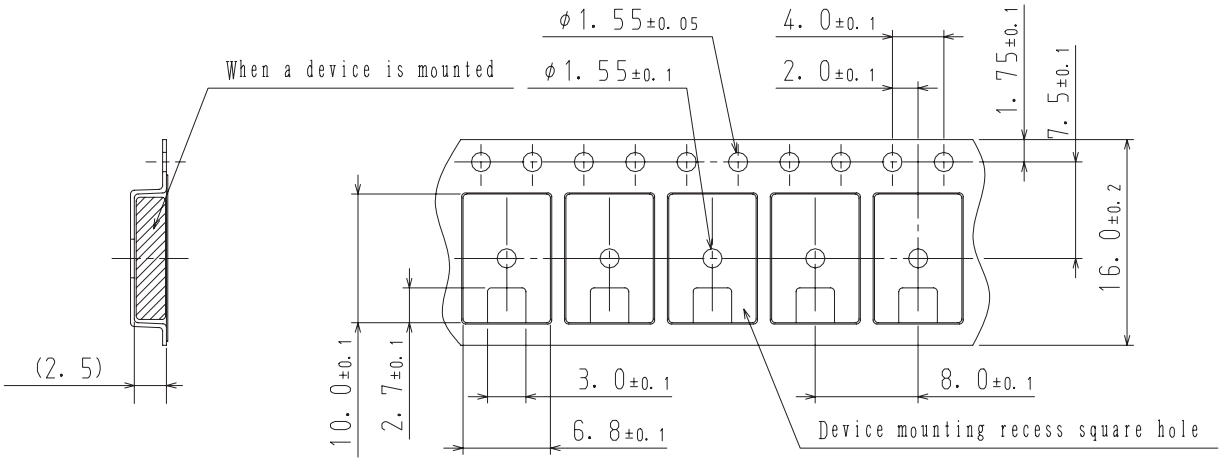


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

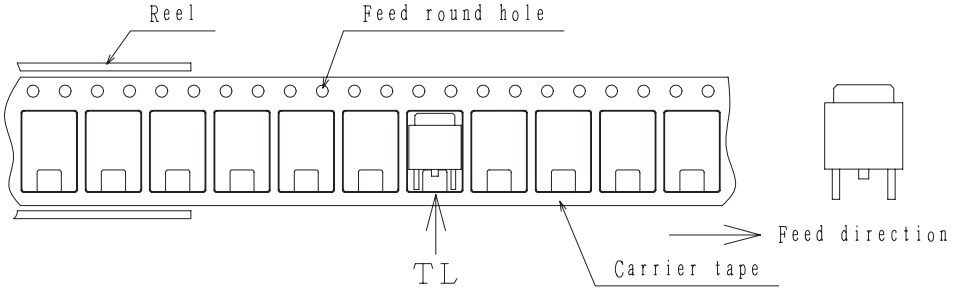
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)



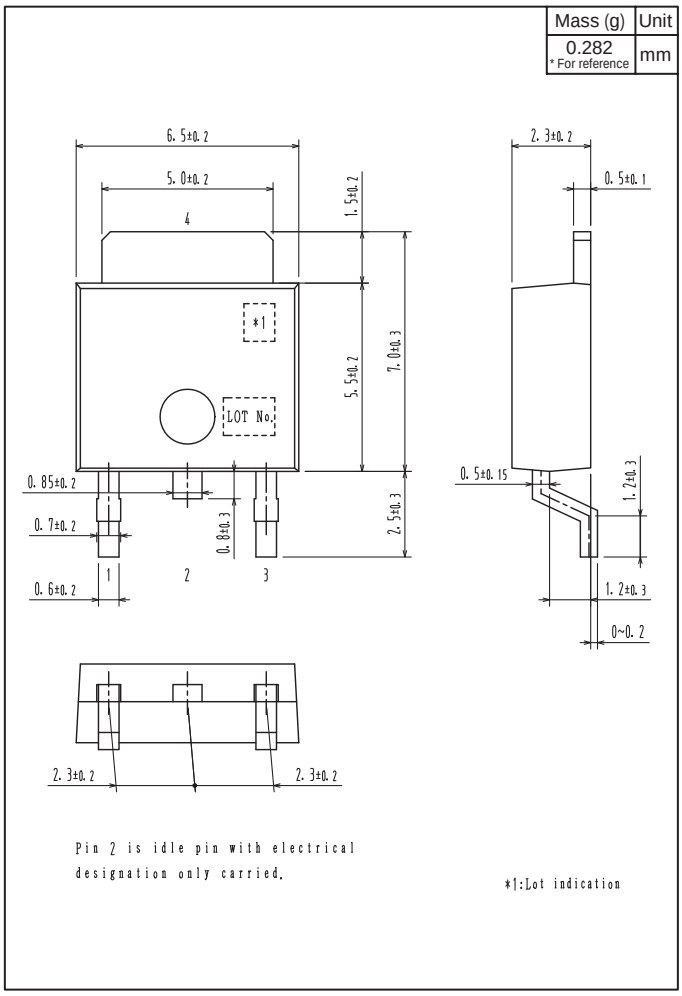
2. Device placement direction



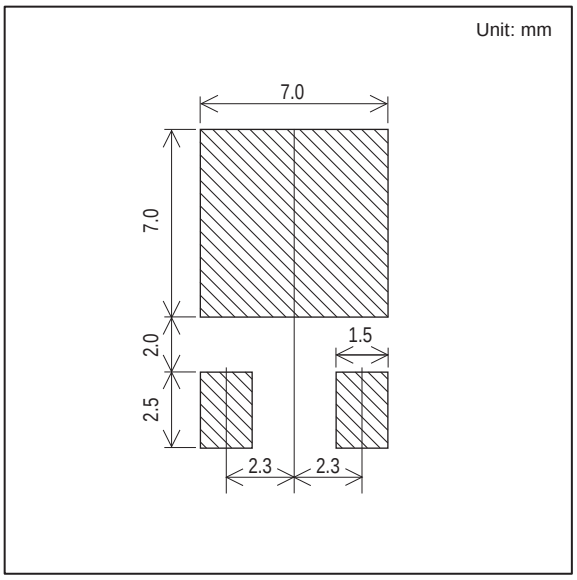
Those with one electrode terminal on the feed hole side·····TL

Outline Drawing

2SB1205S-TL-E, 2SB1205T-TL-E



Land Pattern Example



Bag Packing Specification

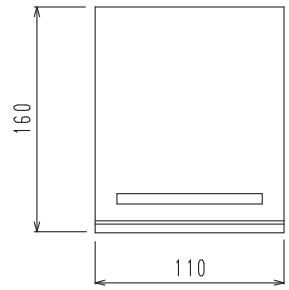
2SB1205S-E, 2SB1205T-E

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

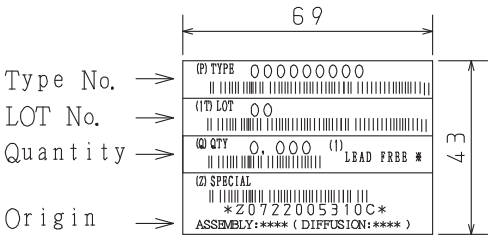
2. Bag dimensions

(unit: mm)



3. Bag label, Inner box label

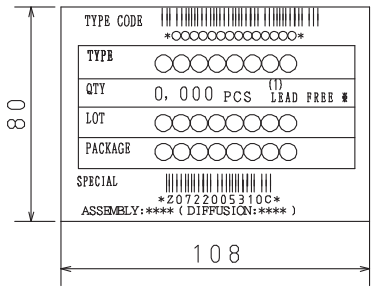
(unit: mm)



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.

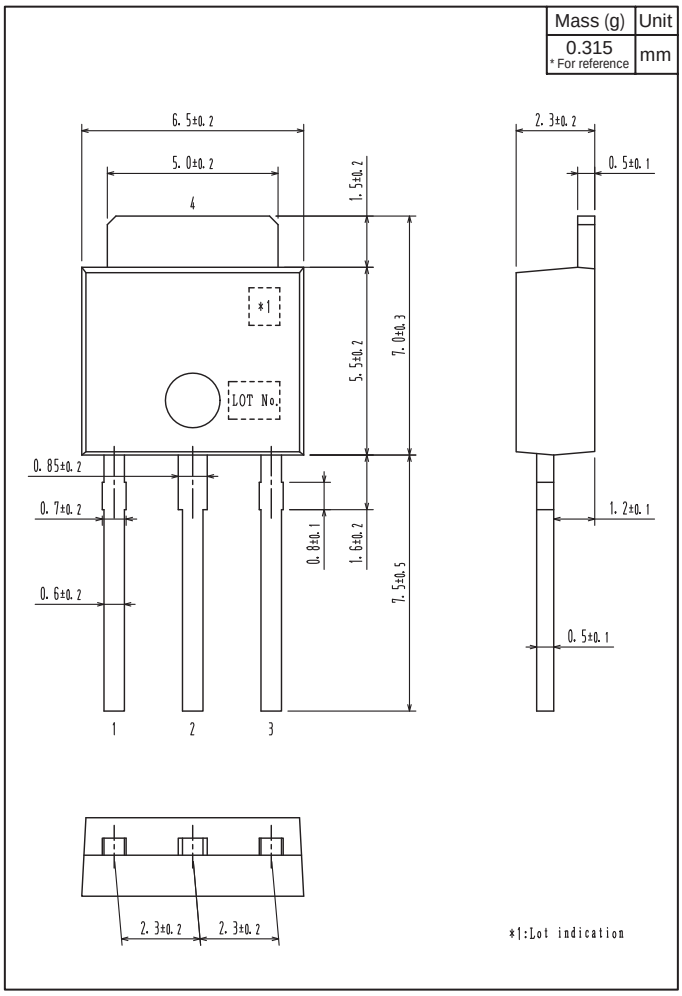


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

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

Outline Drawing

2SB1205S-E, 2SB1205T-E



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