

PNP/NPN Epitaxial Planar Silicon Transistor

- Relay drivers, lamp drivers, motor drivers

- Adoption of MBIT processes
- Low collector-to-emitter saturation voltage
- Large current capacitance
- High-speed switching

Absolute Maximum Ratings at Ta=25°C

Continued on next page.

2SA2169-E
2SC6017-E

1 : Base
2 : Collector
3 : Emitter
4 : Collector

SANYO : TP

Top view dimensions: 6.5 (total width), 5.0 (inner width), 4 (chip width), 1.5 (chip height), 7.0 (total height), 5.5 (height to chip), 0.85 (lead width), 0.6 (lead thickness), 0.8 (lead height), 2 (lead pitch), 2.3 (lead width).

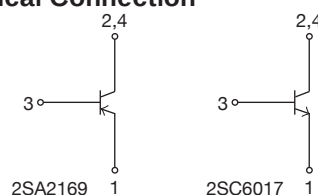
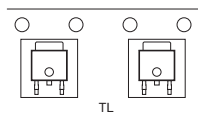
Side view dimensions: 2.3 (chip width), 0.5 (chip height), 1.2 (lead height), 0.5 (lead width), 1.2 (lead thickness), 0 to 0.2 (lead gap).

Legend:

- 1 : Base
- 2 : Collector
- 3 : Emitter
- 4 : Collector

SANYO : TP-FA

- Package : TP-FA
- JEITA, JEDEC : SC-63, TO-252, SOT-428, DPAK
- Minimum Packing Quantity : 700 pcs./reel



2SA2169/2SC6017

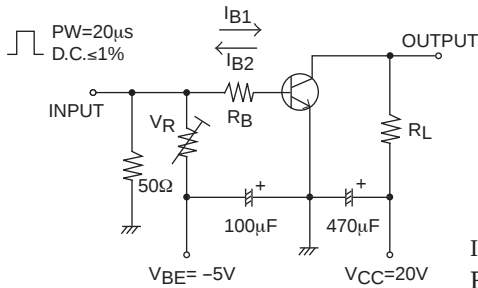
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Parameter	Symbol	Conditions	Ratings	Unit
Base Current	I_B		(-)-2	A
Collector Dissipation	P_C		0.95	W
		$T_C=25^{\circ}\text{C}$	20	W
Junction Temperature	T_J		150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^{\circ}\text{C}$

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

Parameter	Symbol	Conditions	Ratings			Unit
			min.	typ.	max.	
Collector Cutoff Current	I_{CBO}	$V_{CB}=(-)40\text{V}, I_E=0\text{A}$			(-)-10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=(-)4\text{V}, I_C=0\text{A}$			(-)-10	μA
DC Current Gain	h_{FE}	$V_{CE}=(-)2\text{V}, I_C=(-)1\text{A}$	200		(560)700	
Gain-Bandwidth Product	f_T	$V_{CE}=(-)5\text{V}, I_C=(-)1\text{A}$		(130)200		MHz
Output Capacitance	C_{ob}	$V_{CB}=(-)10\text{V}, f=1\text{MHz}$		(90)60		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)5\text{A}, I_B=(-)250\text{mA}$		(-290)180	(-580)360	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)5\text{A}, I_B=(-)250\text{mA}$		(-)-0.93	(-)-1.4	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)100\mu\text{A}, I_E=0\text{A}$	(-50)100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1\text{mA}, R_{BE}=\infty$	(-)-50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)100\mu\text{A}, I_C=0\text{A}$	(-)-6			V
Turn-On Time	t_{on}	See specified Test Circuit.		(70)40		ns
Storage Time	t_{stg}			(650)1000		ns
Fall Time	t_f			(60)80		ns

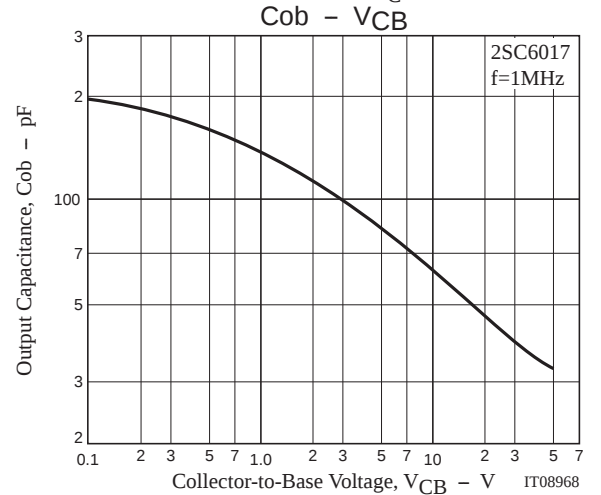
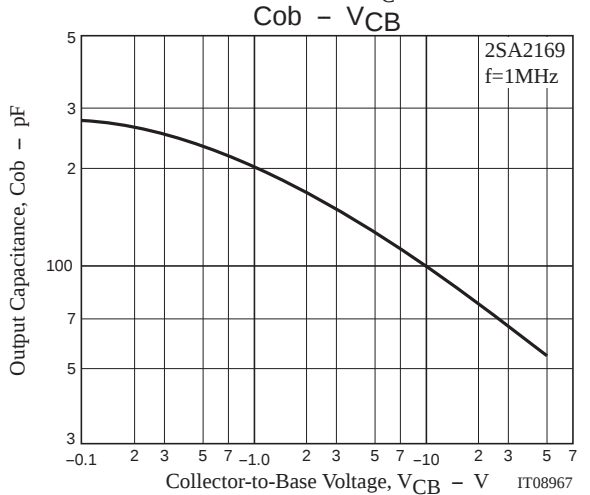
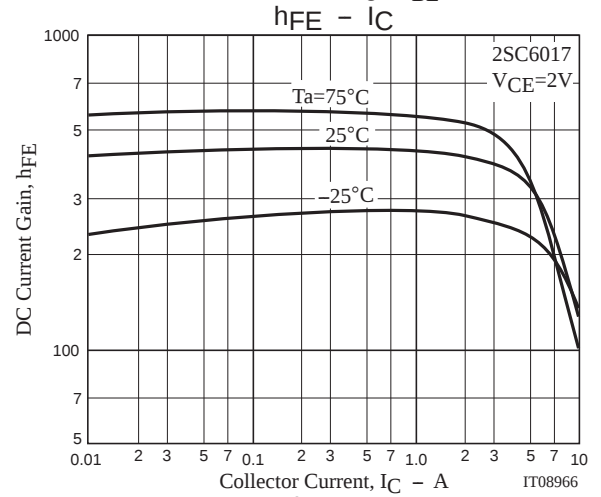
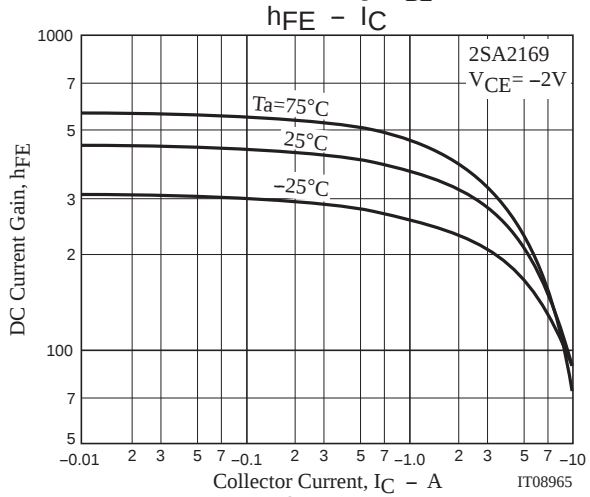
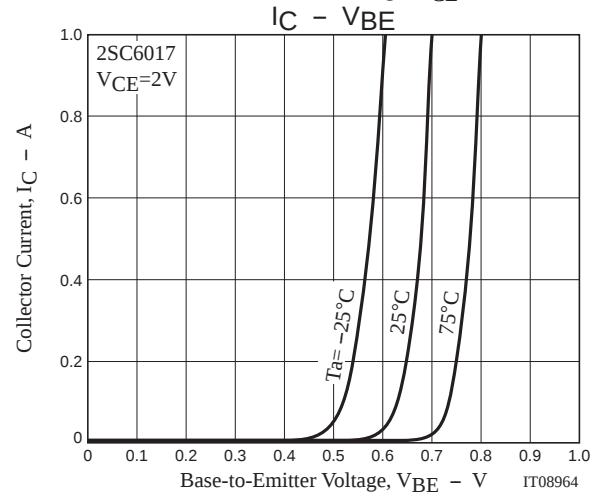
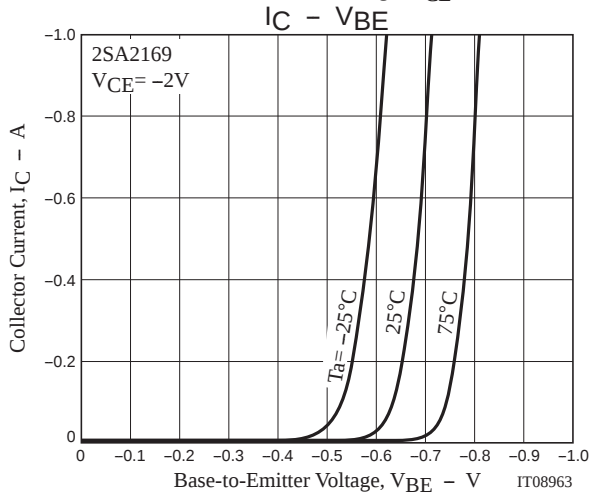
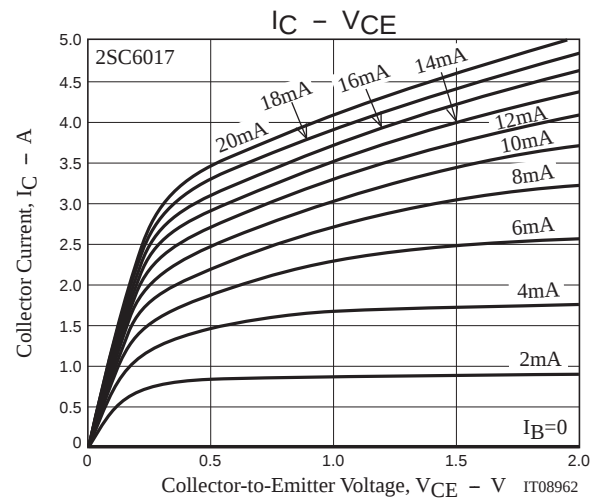
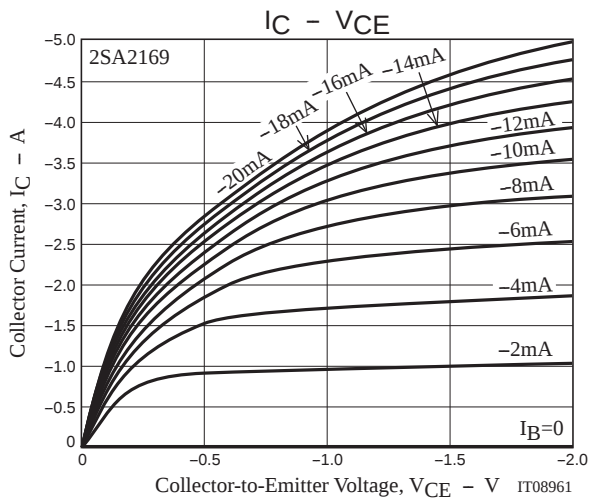
Switching Time Test Circuit

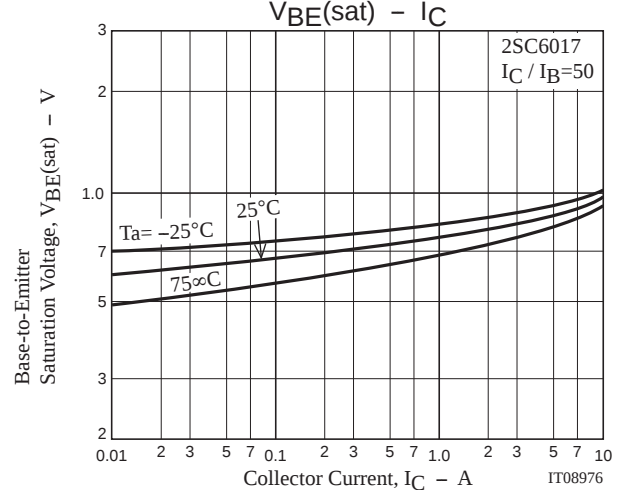
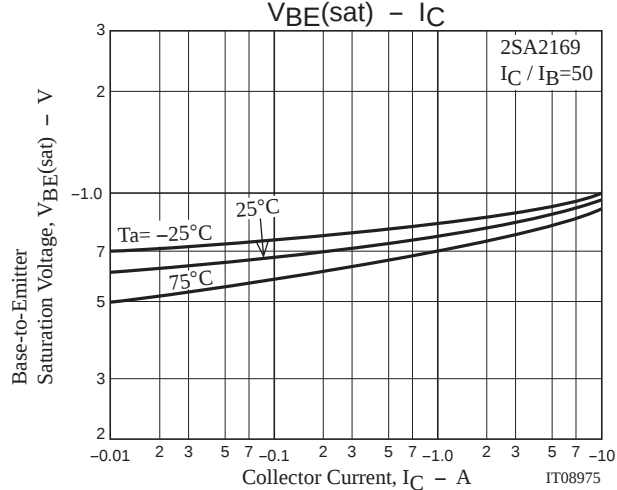
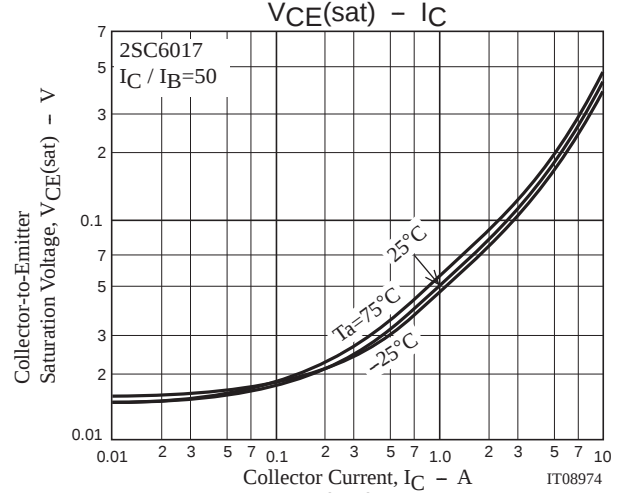
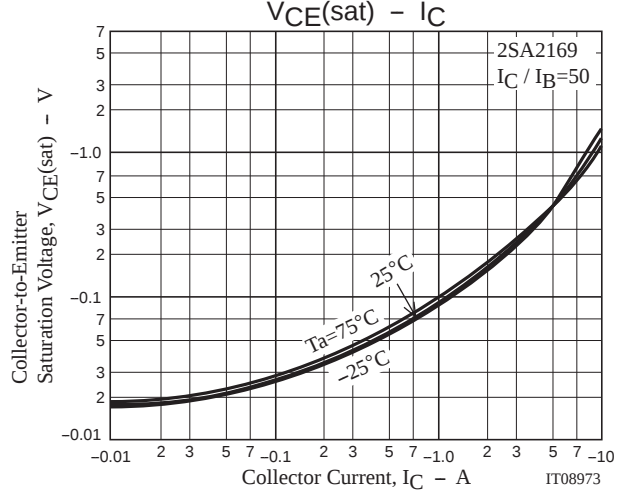
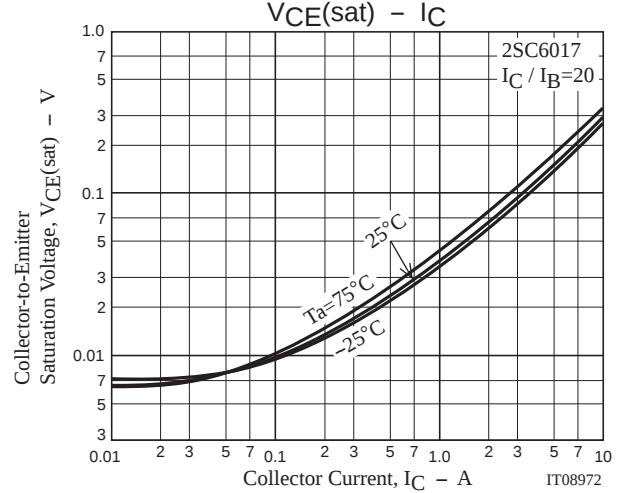
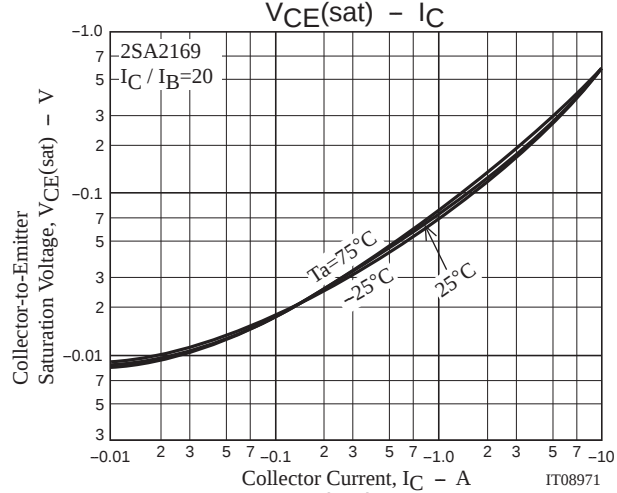
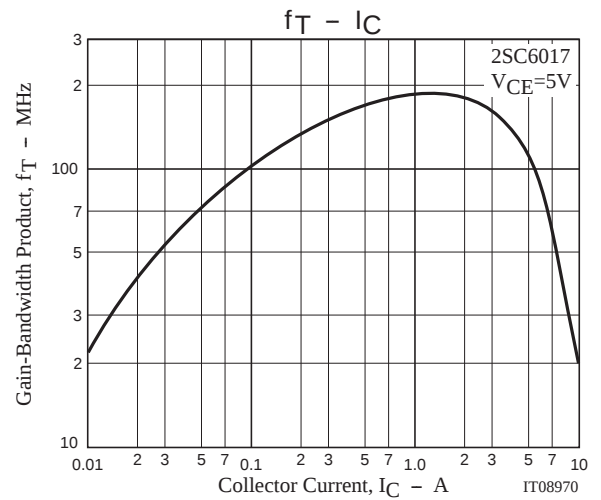
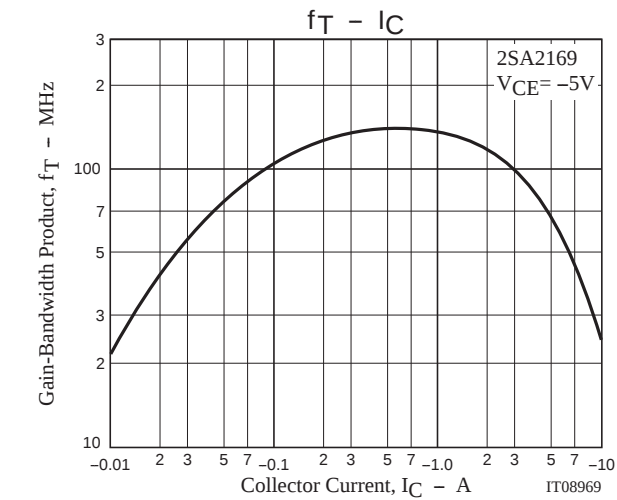


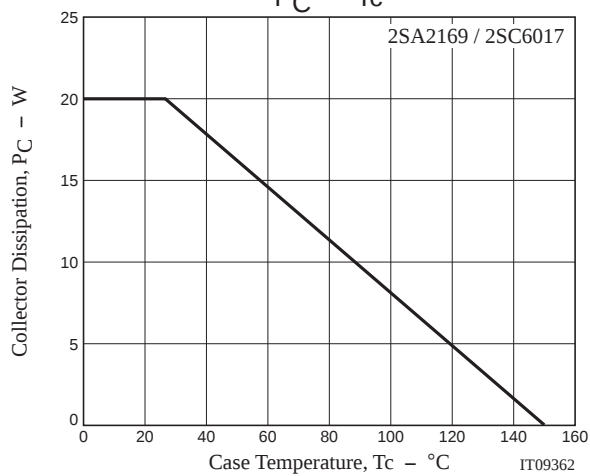
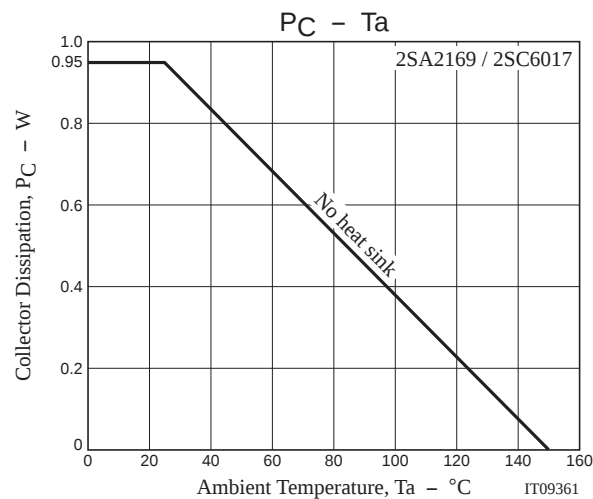
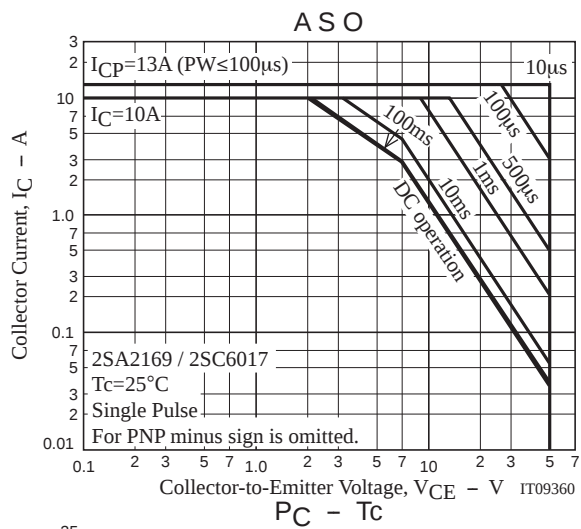
$I_C=20I_{B1} = -20I_{B2}=3\text{A}$
For PNP, the polarity is reversed.

Ordering Information

Device	Package	Shipping	memo
2SA2169-E	TP	500pcs./bag	Pb Free
2SC6017-E	TP	500pcs./bag	
2SA2169-TL-E	TP-FA	700pcs./reel	
2SC6017-TL-E	TP-FA	700pcs./reel	







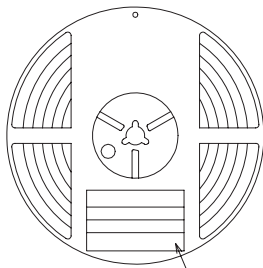
Taping Specification

2SA2169-TL-E, 2SC6017-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

Type No.
LOT No.
Quantity
Origin

Reel label, Inner box label
(unit:mm)

(P) TYPE	000000000
(1) LOT	00
(Q) QTY	0,000 (1) LEAD FREE *
(Z) SPECIAL	*20722005310C*
ASSEMBLY:**** (DIFFUSION:****)	

Outer box label

It is a label at the time of factory shipments.
The form of a label may change in physical distribution process.

TYPE CODE	
TYPE	○○○○○○○○
QTY	0,000 PCS (1) LEAD FREE *
LOT	○○○○○○○○
PACKAGE	○○○○○○○○
SPECIAL	
ASSEMBLY:**** (DIFFUSION:****)	

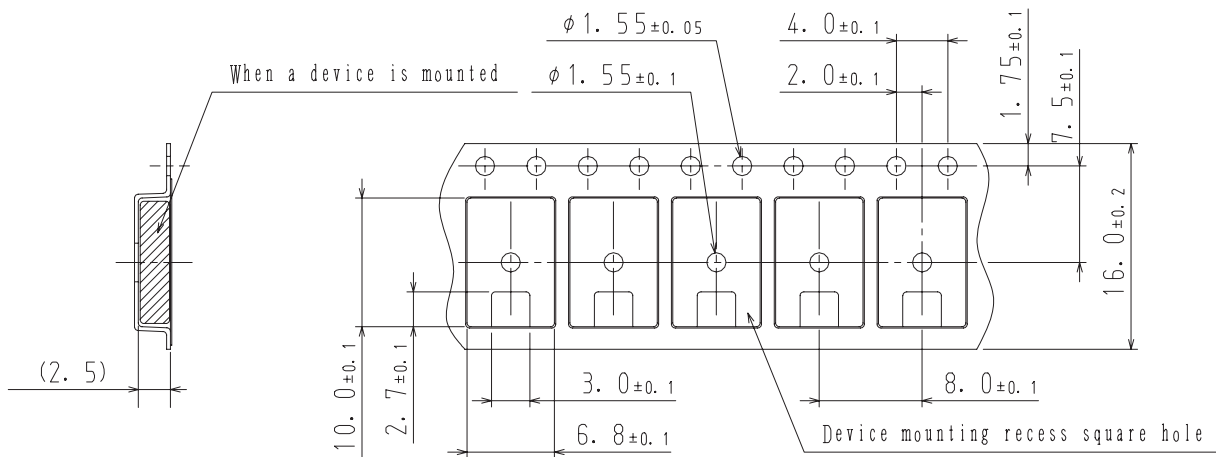
NOTE (1)

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

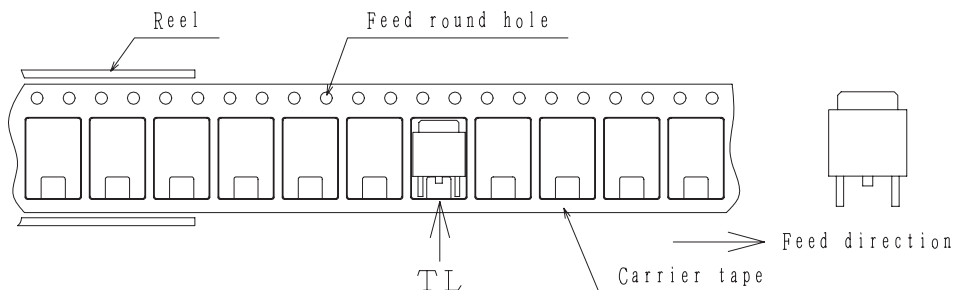
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

Taping configuration

1. Carrier tape size (unit:mm)

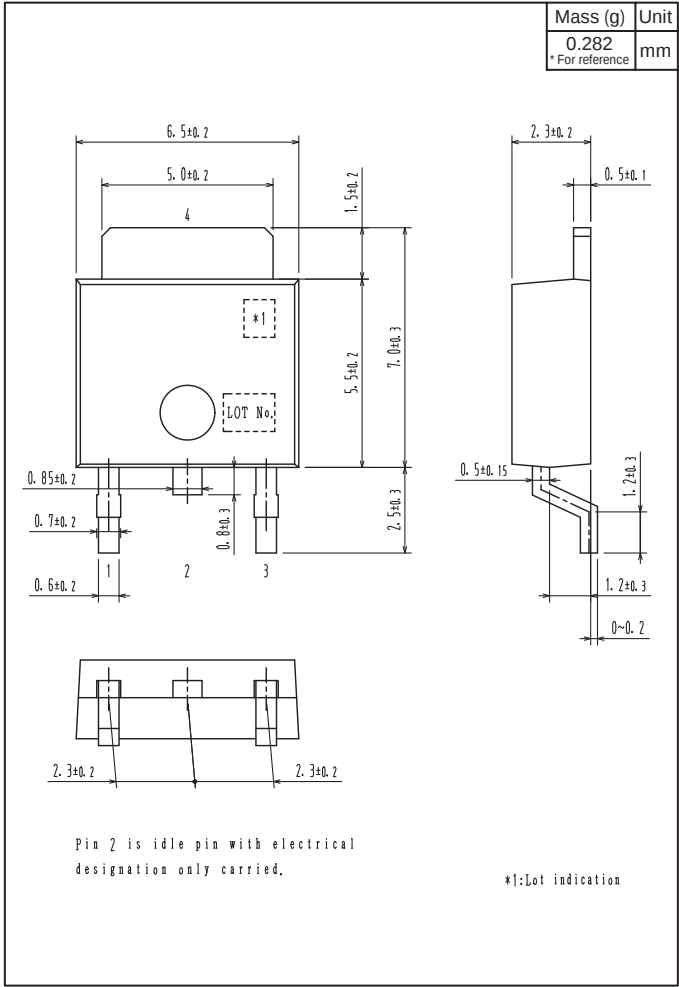


2. Device placement direction

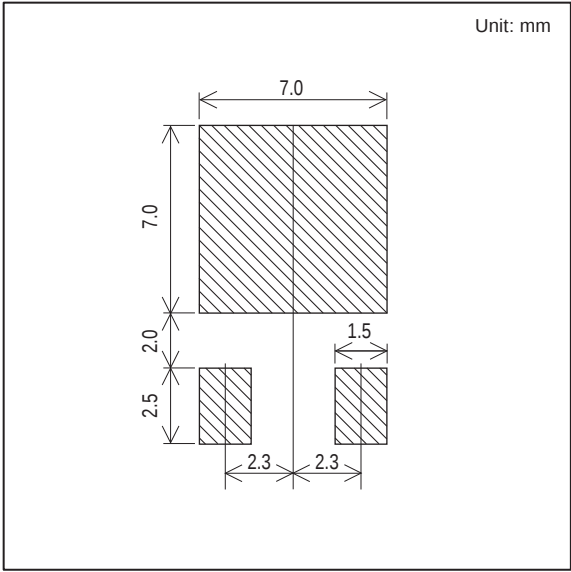


Outline Drawing

2SA2169-TL-E, 2SC6017-TL-E



Land Pattern Example

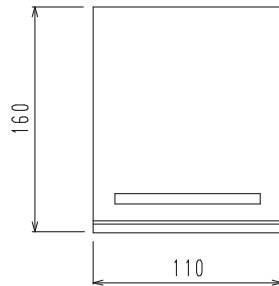
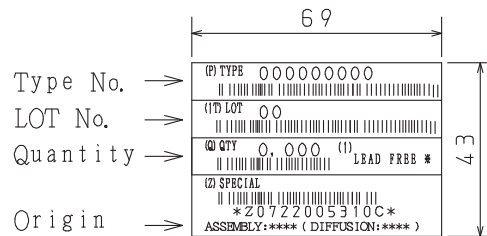


Bag Packing Specification

2SA2169-E, 2SC6017-E

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

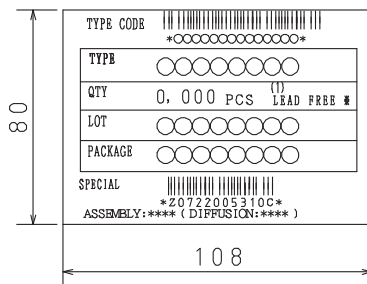
2. Bag dimensions
(unit:mm)3. Bag label, Inner box label
(unit:mm)4. Outer box label
(unit:mm)

It is a label at the time of factory shipments.
The form of a label may change in physical
distribution process,

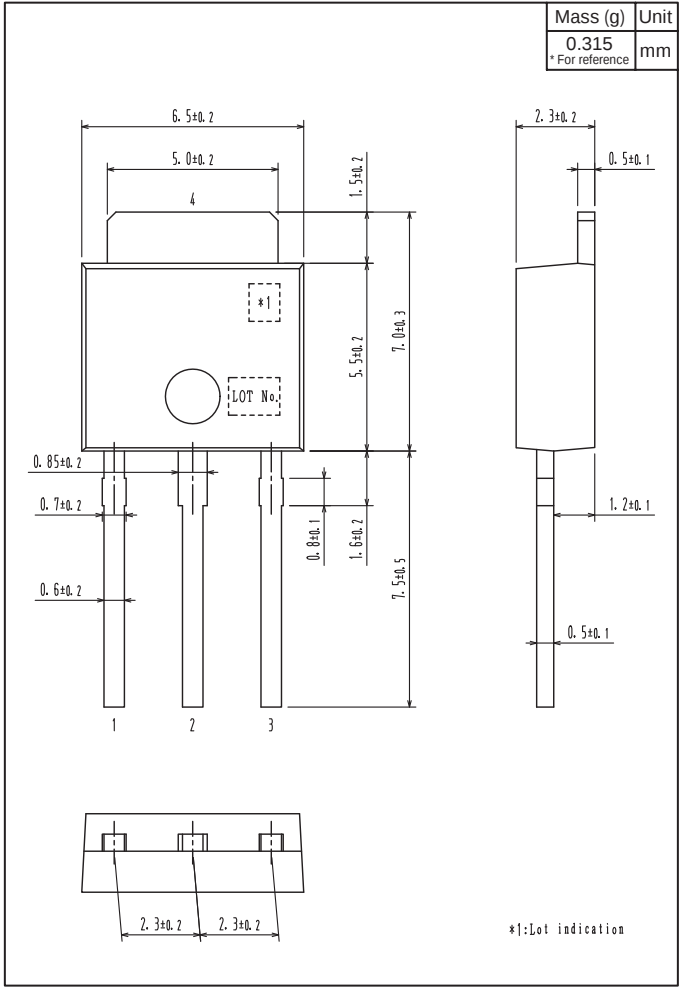
NOTE (1)

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
2SA2169-E, 2SC6017-E



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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

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moschip.ru_9