



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 2SA2016/2SC5569 — PNP / NPN Epitaxial Planar Silicon Transistor DC / DC Converter Applications

### Applications

- Relay drivers, lamp drivers, motor drivers, flash

### Features

- Adoption of FBET and MBIT processes
- Low collector-to-emitter saturation voltage
- Ultrasmall package facilitates miniaturization in end products
- High allowable power dissipation
- Large current capacity
- High-speed switching

( )2SA2016

### Specifications

Absolute Maximum Ratings at Ta=25°C

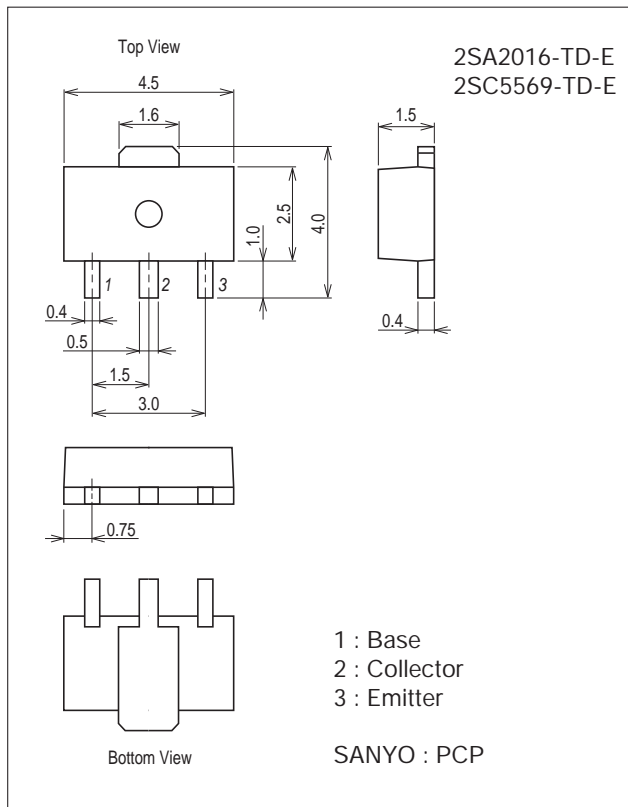
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CB0</sub>		(-50)100	V
Collector-to-Emitter Voltage	V <sub>CES</sub>		(-50)100	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		(-)50	V
Emitter-to-Base Voltage	V <sub>EB0</sub>		(-)6	V

Continued on next page.

### Package Dimensions

unit : mm (typ)

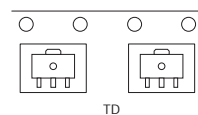
7008B-003



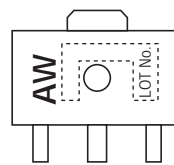
### Product & Package Information

- Package : PCP
- JEITA, JEDEC : SC-62, SOT-89, TO-243
- Minimum Packing Quantity : 1,000 pcs./reel

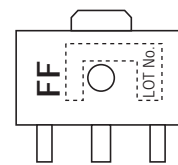
### Packing Type: TD



### Marking

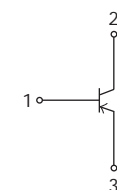


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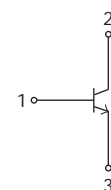


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### Electrical Connection



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<http://www.sanyosemi.com/en/network/>

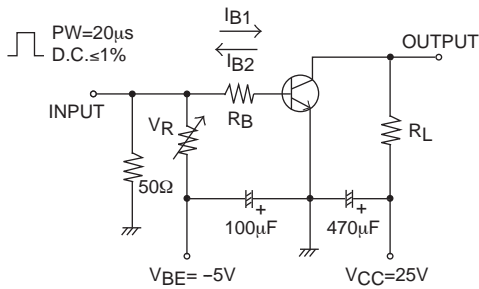
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Parameter	Symbol	Conditions	Ratings	Unit
Collector Current	$I_C$		(-)7	A
Collector Current (Pulse)	$I_{CP}$		(-)10	A
Base Current	$I_B$		(-)1.2	A
Collector Dissipation	$P_C$	When mounted on ceramic substrate (250mm <sup>2</sup> x0.8mm)	1.3	W
		$T_c=25^\circ\text{C}$	3.5	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	$I_{CBO}$	$V_{CB}=(-)40\text{V}, I_E=0\text{A}$			(-)0.1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=(-)4\text{V}, I_C=0\text{A}$			(-)0.1	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE}=(-)2\text{V}, I_C=(-)500\text{mA}$	200		560	
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)10\text{V}, I_C=(-)500\text{mA}$		(290)330		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10\text{V}, f=1\text{MHz}$		(50)28		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_C=(-)3.5\text{A}, I_B=(-)175\text{mA}$		(-230)160	(-390)240	mV
	$V_{CE(sat)2}$	$I_C=(-)2\text{A}, I_B=(-)40\text{mA}$		(-240)110	(-400)170	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)2\text{A}, I_B=(-)40\text{mA}$		(-)0.83	(-)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu\text{A}, I_E=0\text{A}$	(-50)100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C=(-)100\mu\text{A}, R_{BE}=0\Omega$	(-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	$V_{(BR)EBO}$	$I_E=(-)10\mu\text{A}, I_C=0\text{A}$	(-)6			V
Turn-On Time	$t_{on}$	See specified Test Circuit.		(40)30		ns
Storage Time	$t_{stg}$			(225)420		ns
Fall Time	$t_f$			25		ns

**Switching Time Test Circuit**

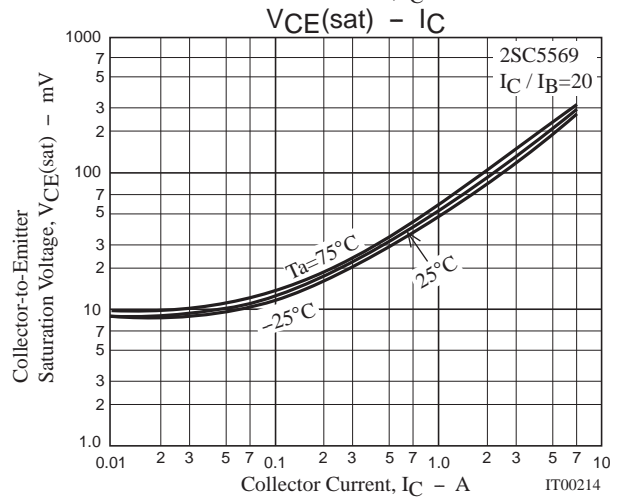
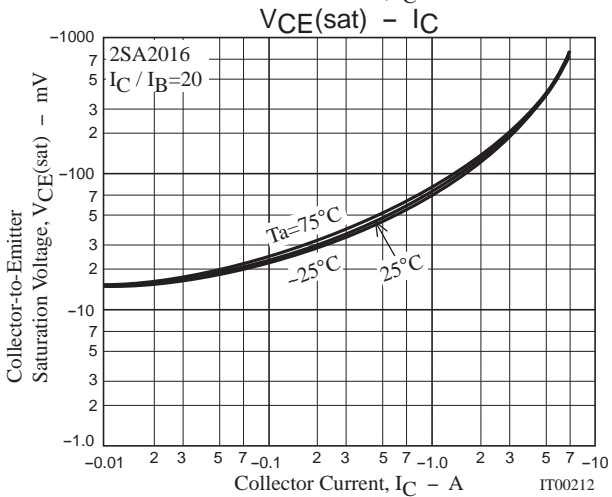
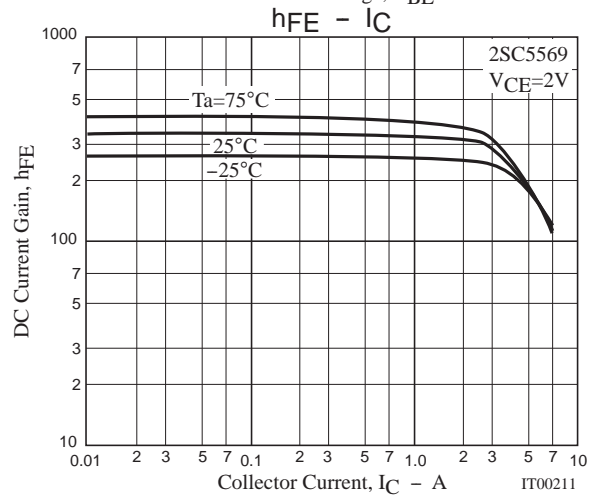
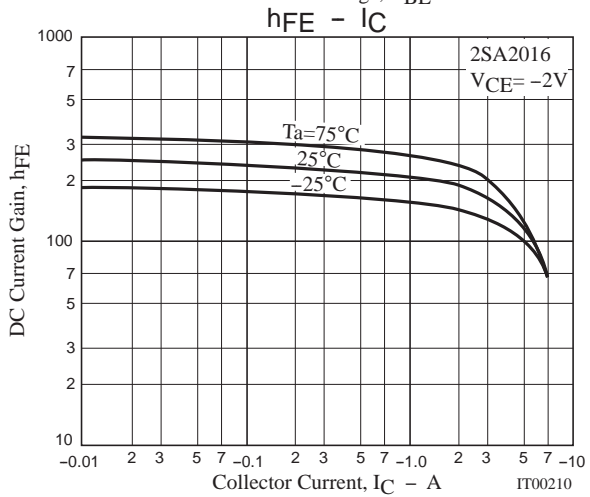
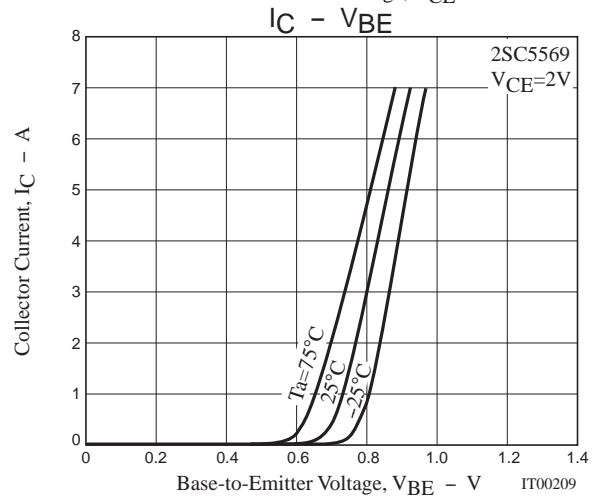
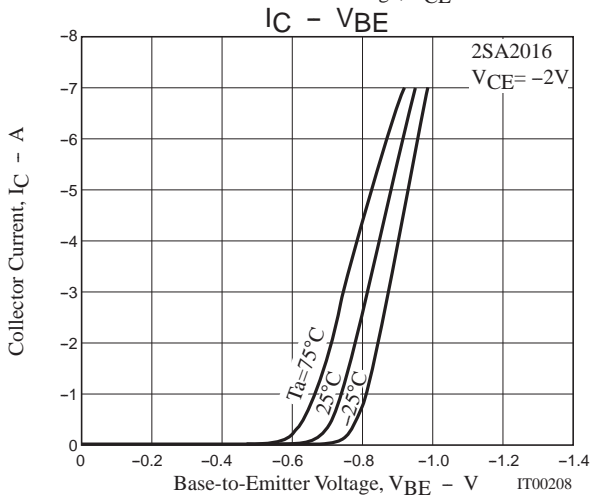
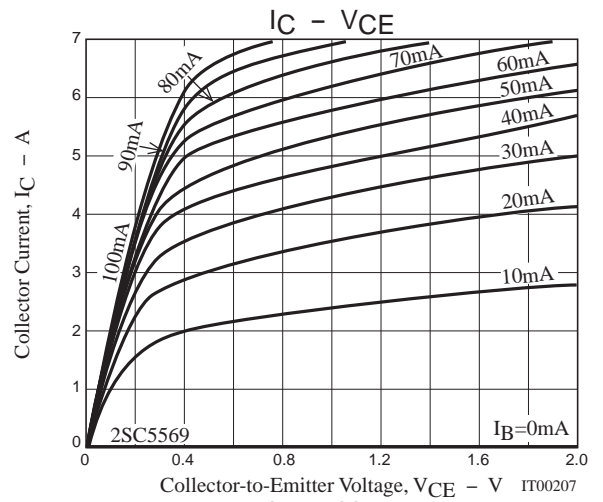
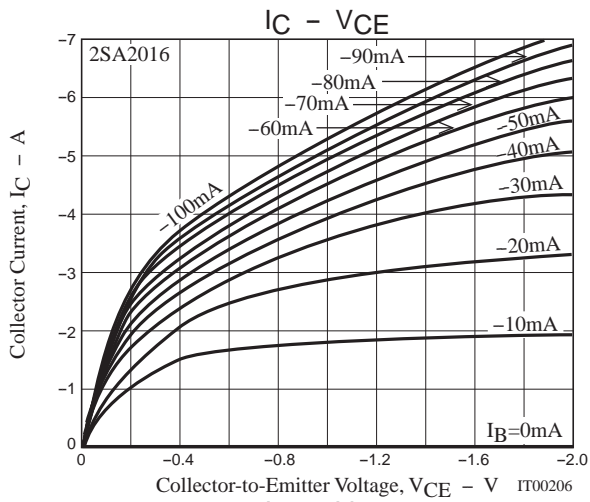


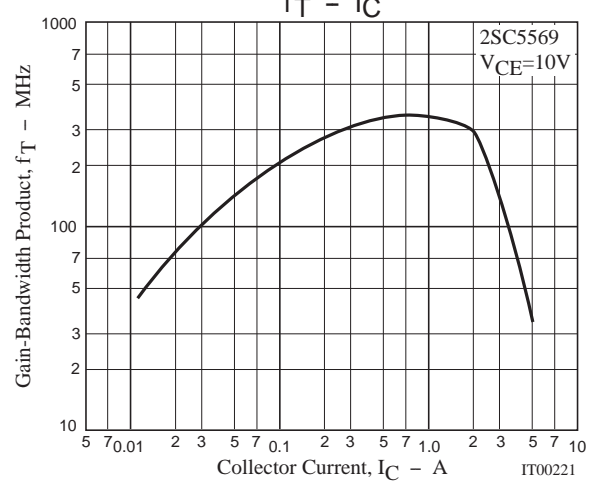
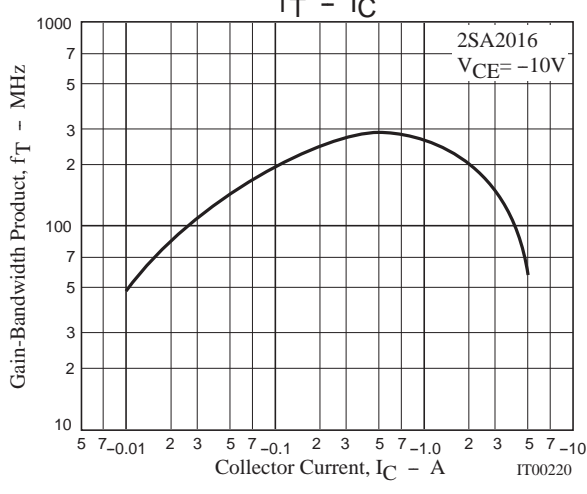
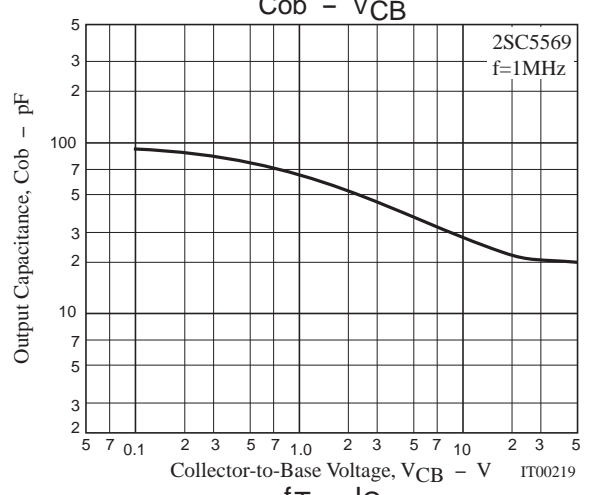
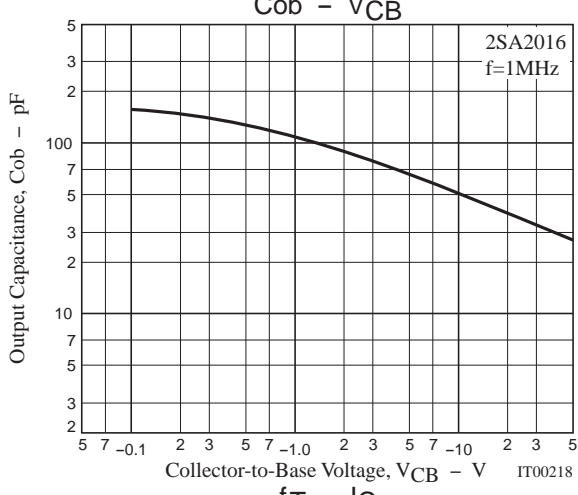
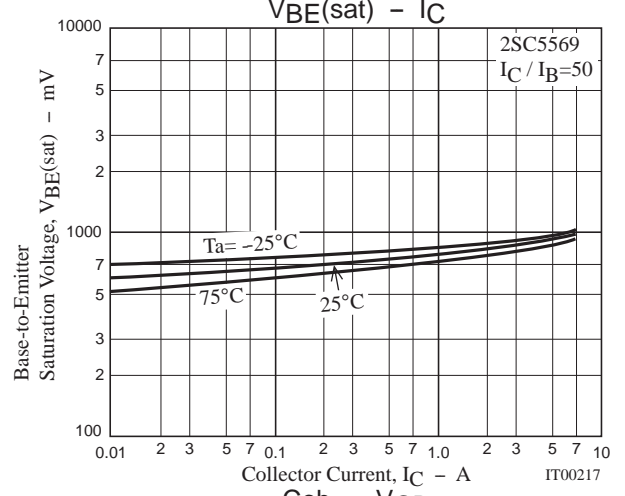
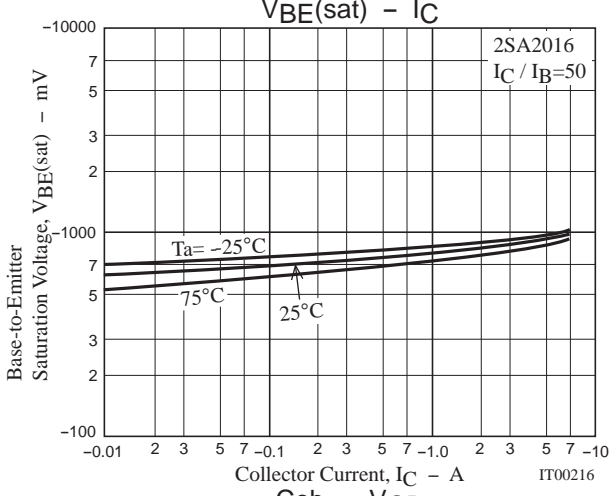
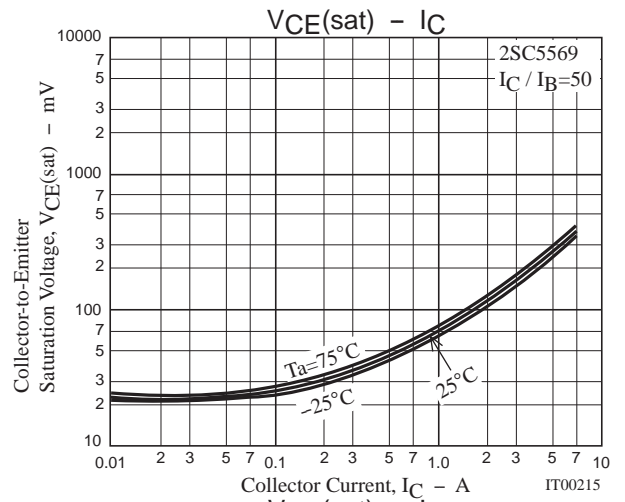
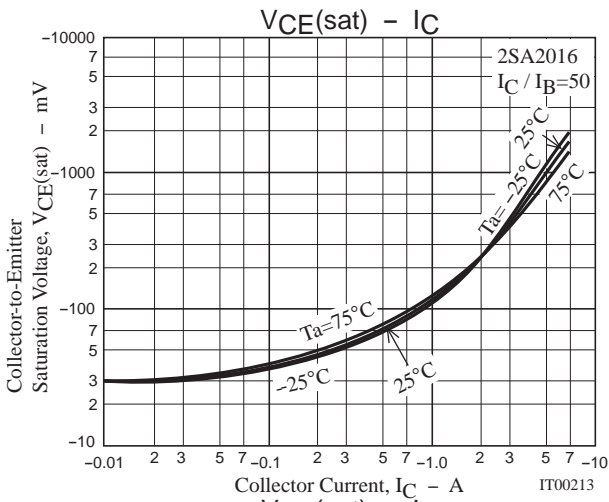
$I_C=20I_{B1} = -20I_{B2}=2.5\text{A}$

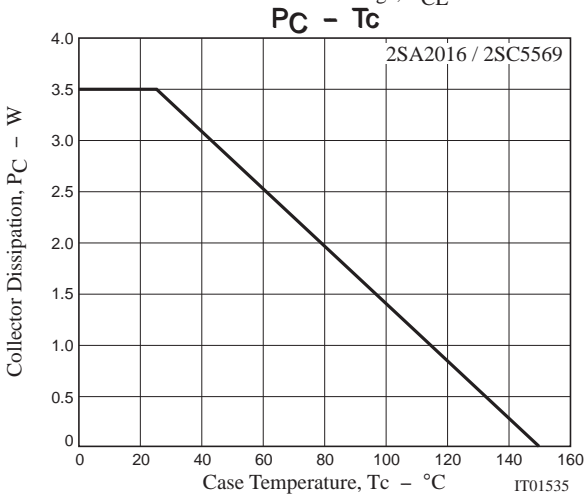
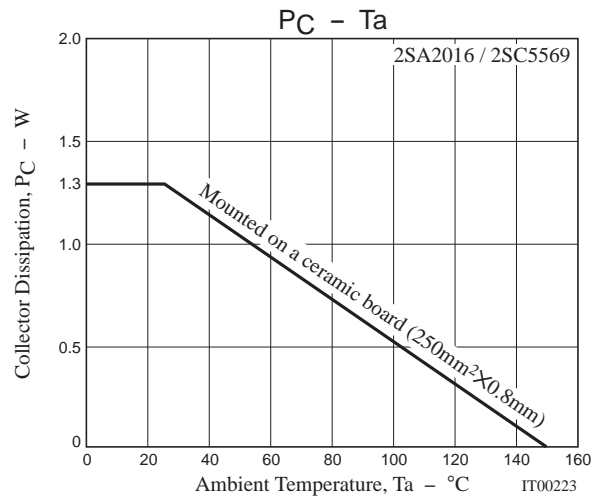
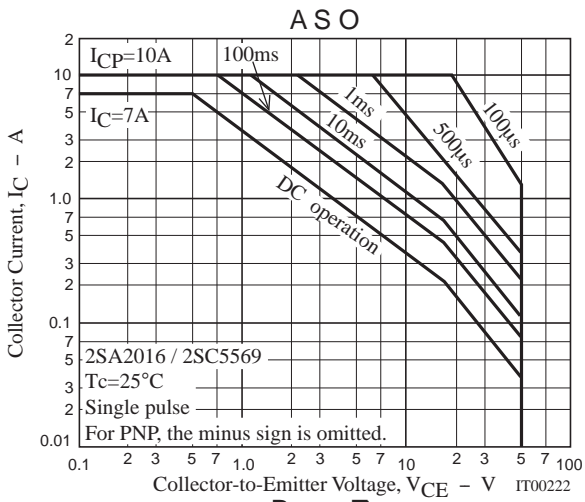
For PNP, the polarity is reversed.

**Ordering Information**

Device	Package	Shipping	memo
2SA2016-TD-E	PCP	1,000pcs./reel	Pb Free
2SC5569-TD-E	PCP	1,000pcs./reel	







Bag Packing Specification

2SA2016-TD-E, 2SC5569-TD-E

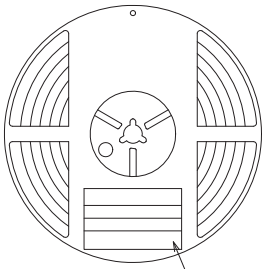
1. Packing Format

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)
PCP	PCP	1,000	4,000	24,000	4 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)

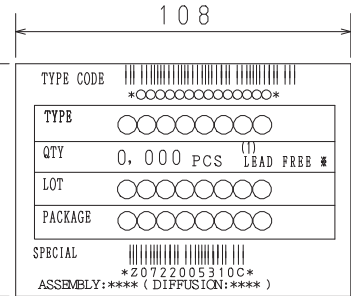
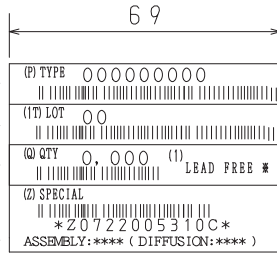
Outer box label  
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

Packing method



Type No.  
LOT No.  
Quantity  
Origin

Reel label



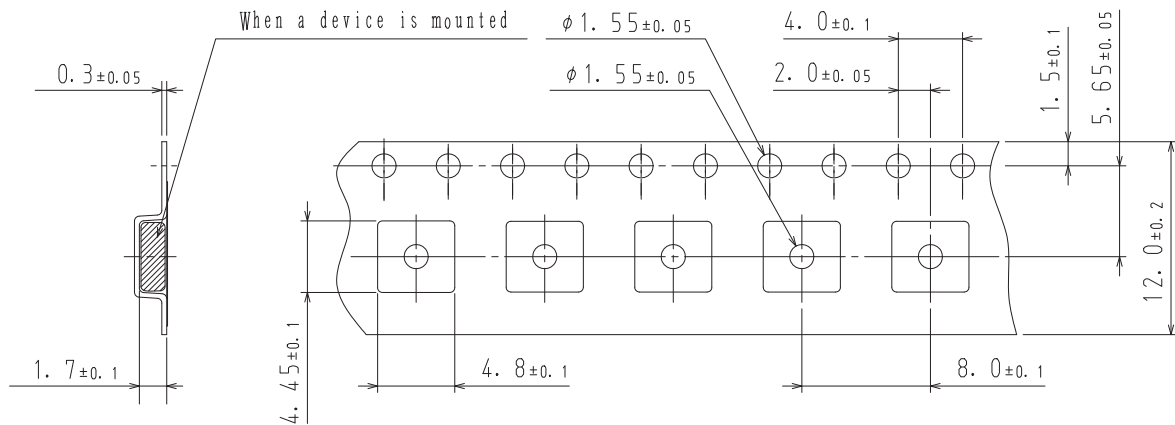
NOTE (1)

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

2. Taping configuration

2-1. Carrier tape size (unit:mm)



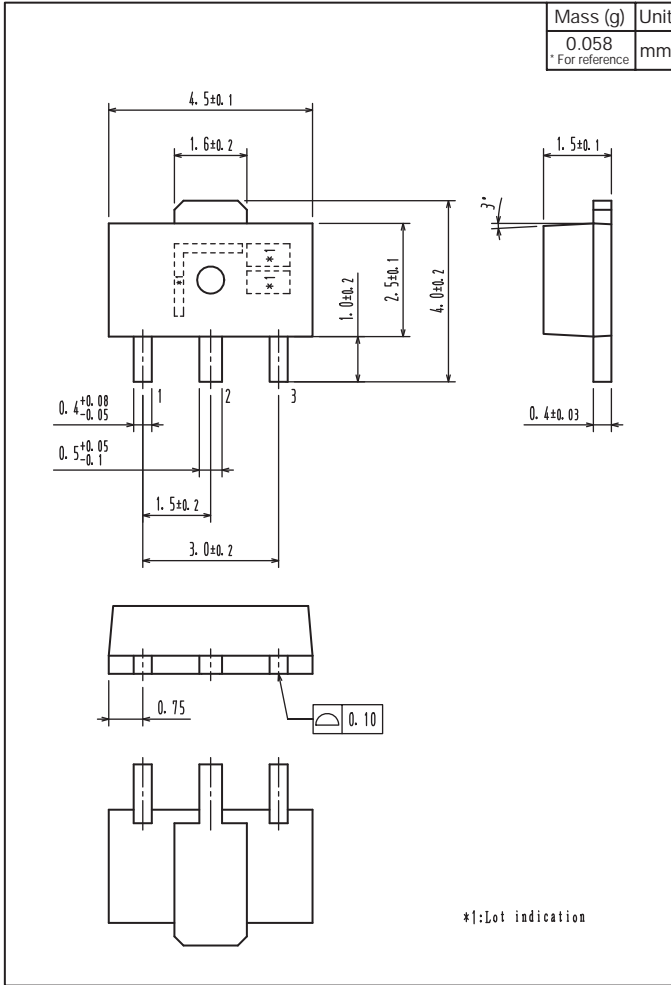
2-2. Device placement direction



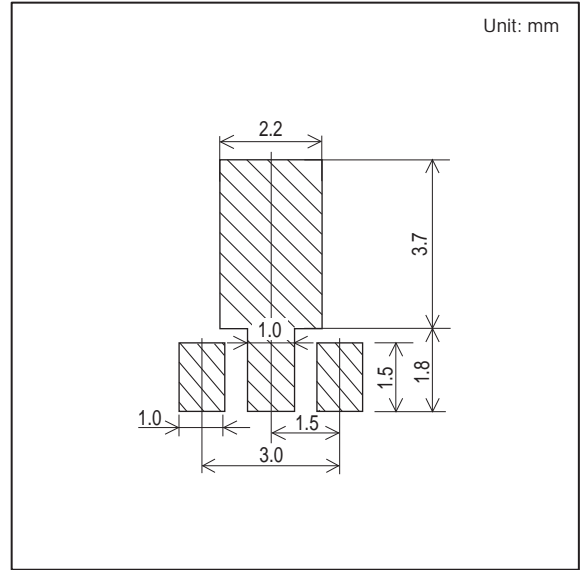
Those with pin 1 index on the feed hole side.....TD

Outline Drawing

2SA2016-TD-E, 2SC5569-TD-E



Land Pattern Example



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