



# 2SA1417/2SC3647

## Bipolar Transistor (-100V, (-)2A, Low VCE(sat), (PNP)NPN Single PCP

**ON Semiconductor®**
<http://onsemi.com>

### Features

- Adoption of FBET, MBIT processes
- High breakdown voltage and large current capacity
- Fast switching speed
- Ultrasmall size making it easy to provide high-density small-sized hybrid ICs

### Specifications ( ) : 2SA1417

#### Absolute Maximum Ratings at Ta=25°C

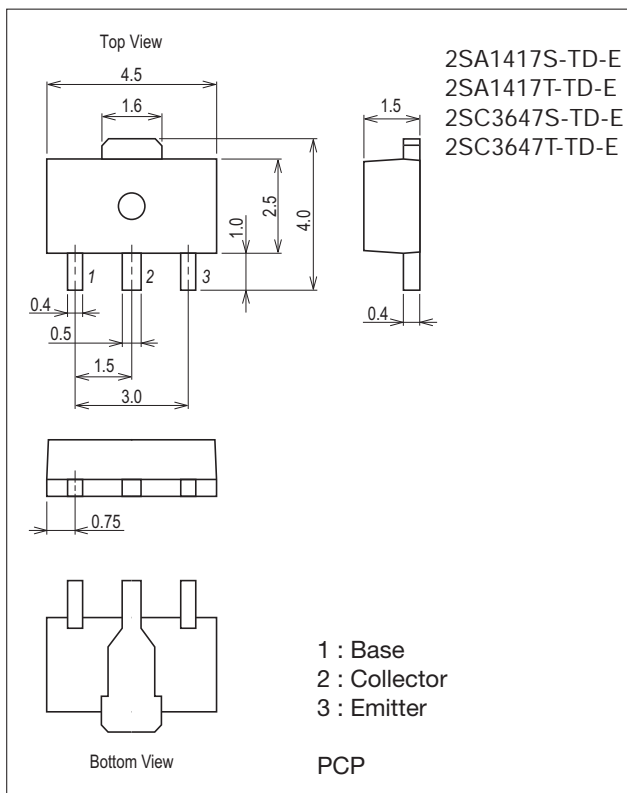
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CB0</sub>		(-)120	V
Collector-to-Emitter Voltage	V <sub>CE0</sub>		(-)100	V
Emitter-to-Base Voltage	V <sub>EB0</sub>		(-)6	V
Collector Current	I <sub>C</sub>		(-)2	A
Collector Current (Pulse)	I <sub>CP</sub>		(-)3	A
Collector Dissipation	P <sub>C</sub>		500	mW
		When mounted on ceramic substrate (250mm <sup>2</sup> ×0.8mm)	1.5	W
Junction Temperature	T <sub>j</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-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.

### Package Dimensions

unit : mm (typ)

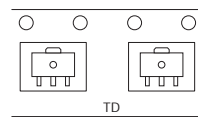
7007B-004



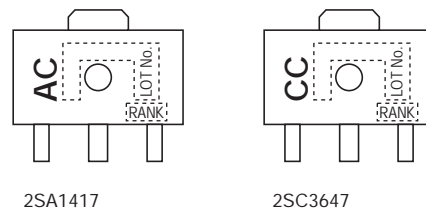
### Product & Package Information

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

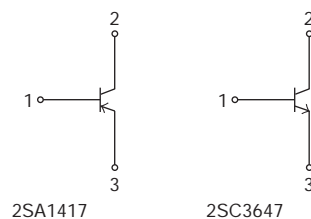
### Packing Type: TD



### Marking



### Electrical Connection



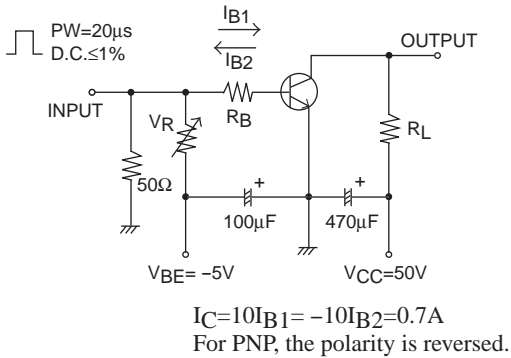
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	ICBO	V <sub>CB</sub> =(-)100V, I <sub>E</sub> =0A			(-)100	nA
Emitter Cutoff Current	IEBO	V <sub>EB</sub> =(-)4V, I <sub>C</sub> =0A			(-)100	nA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =(-)5V, I <sub>C</sub> =(-)100mA	100*		400*	
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =(-)10V, I <sub>C</sub> =(-)100mA		120		MHz
Output Capacitance	Cob	V <sub>CB</sub> =(-)10V, f=1MHz		(25)16		pF
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =(-)1A, I <sub>B</sub> =(-)100mA		(-0.22)0.13	(-0.6)0.4	V
Base-to-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =(-)1A, I <sub>B</sub> =(-)100mA		(-)0.85	(-)1.2	V
Collector-to-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =(-)10μA, I <sub>E</sub> =0A	(-)120			V
Collector-to-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =(-)1mA, R <sub>BE</sub> =∞	(-)100			V
Emitter-to-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =(-)10μA, I <sub>C</sub> =0A	(-)6			V
Turn-On Time	t <sub>on</sub>	See specified Test Circuit.		(80)80		ns
Storage Time	t <sub>stg</sub>			(750)1000		ns
Fall Time	t <sub>f</sub>			(40)50		ns

\* : The 2SA1417 / 2S3647 are classified by 100mA h<sub>FE</sub> as follows :

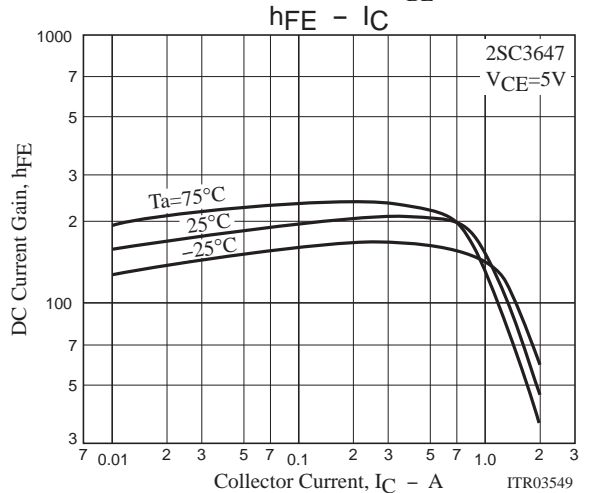
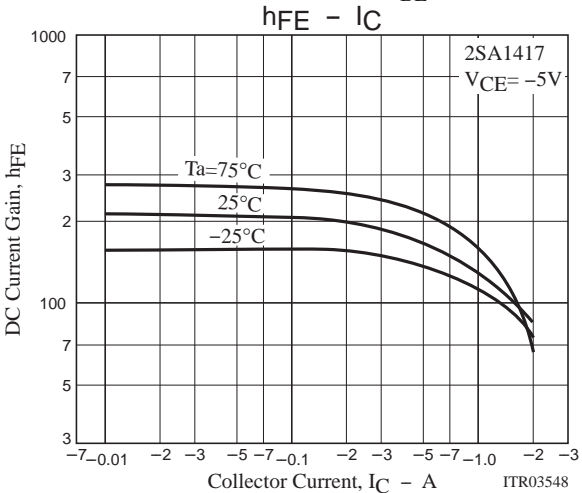
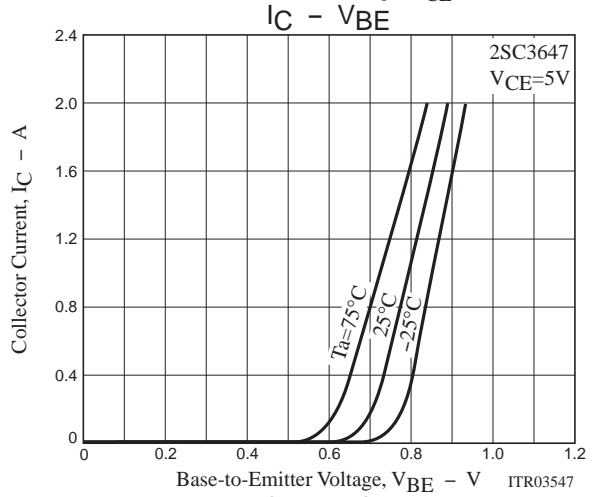
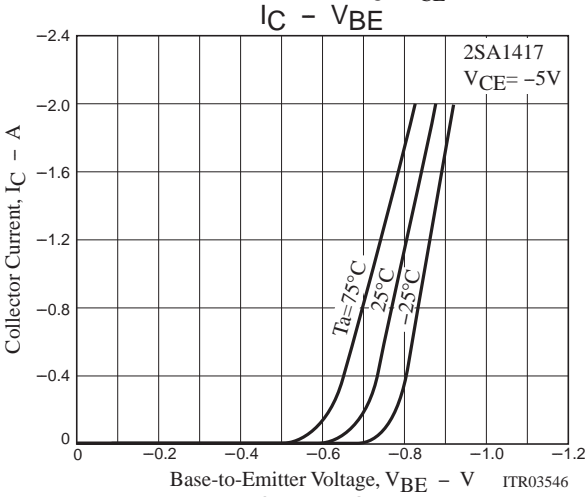
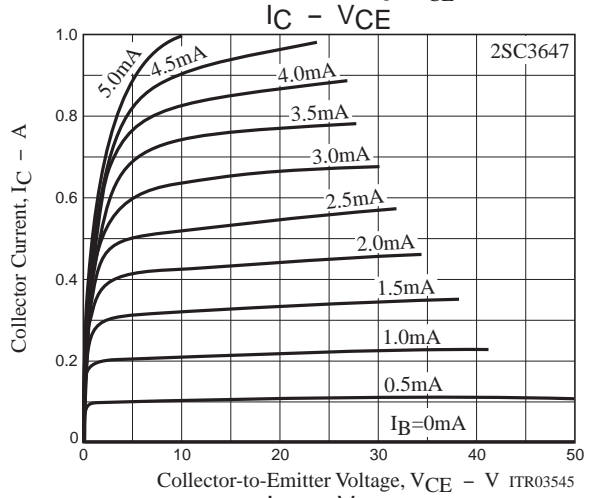
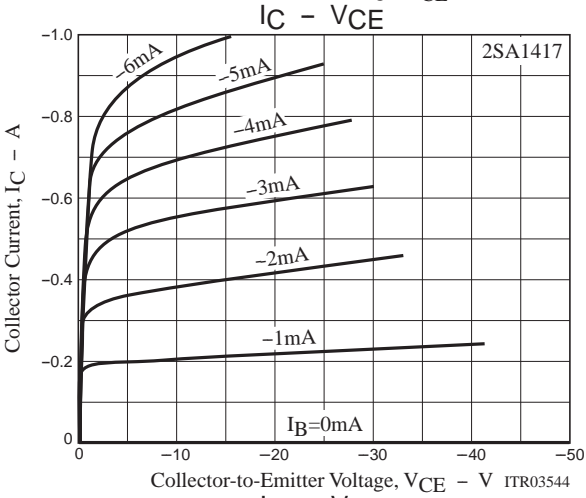
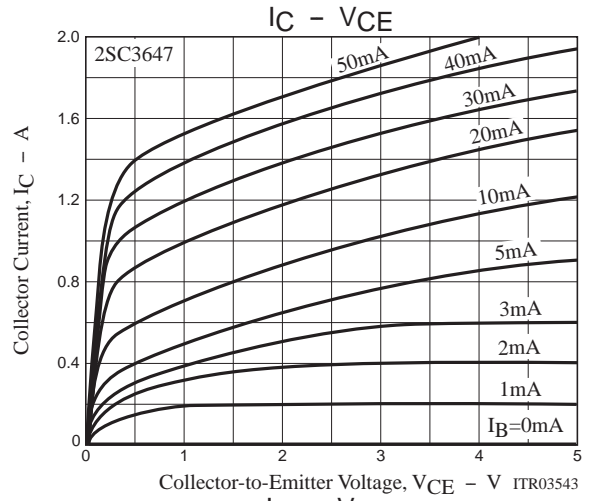
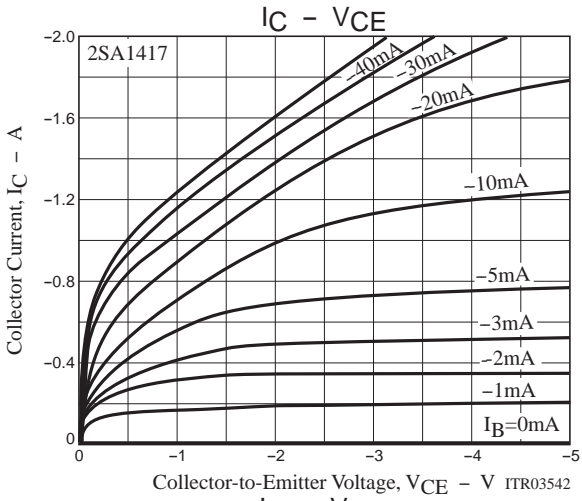
Rank	R	S	T
h <sub>FE</sub>	100 to 200	140 to 280	200 to 400

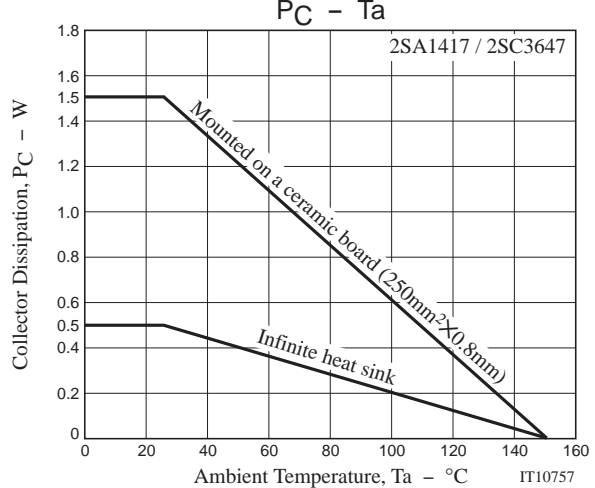
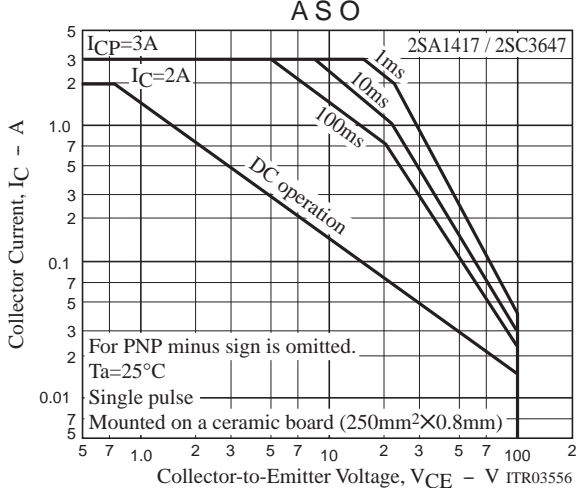
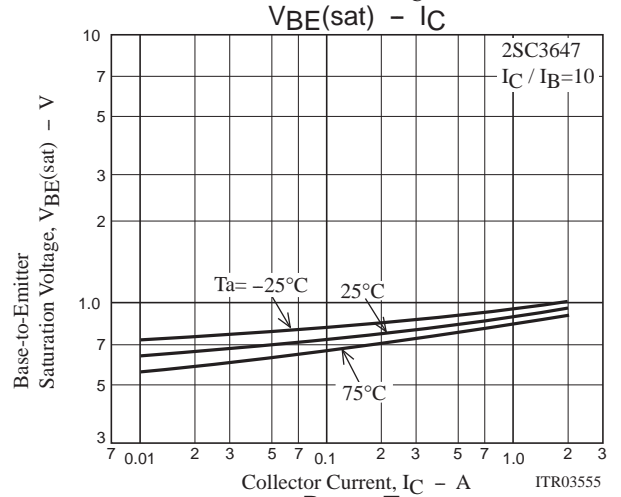
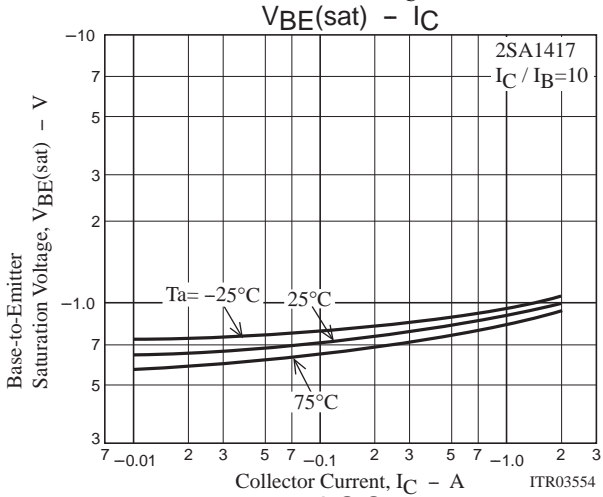
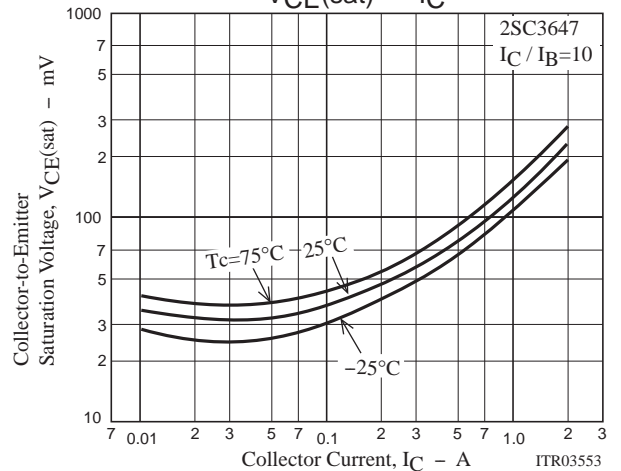
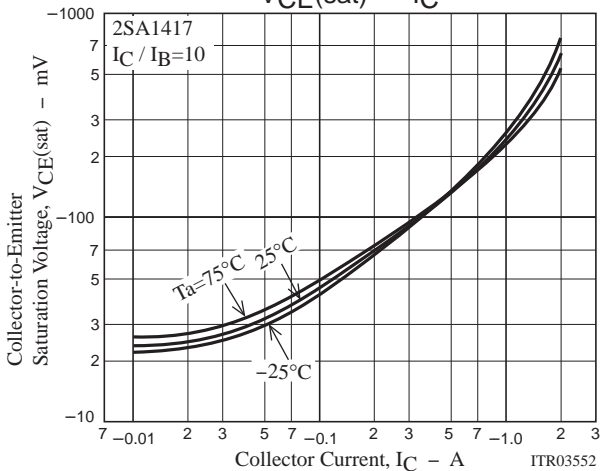
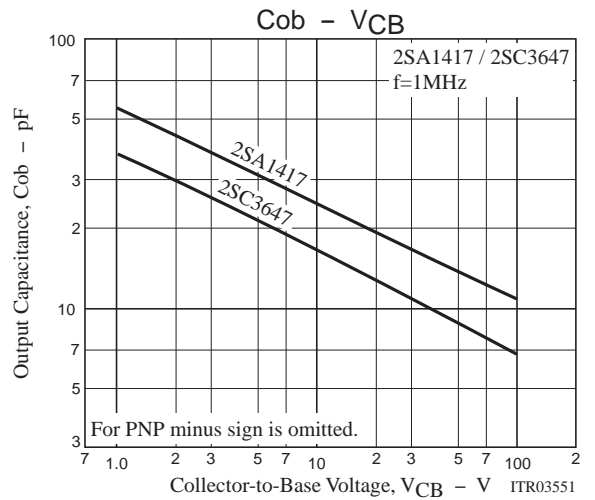
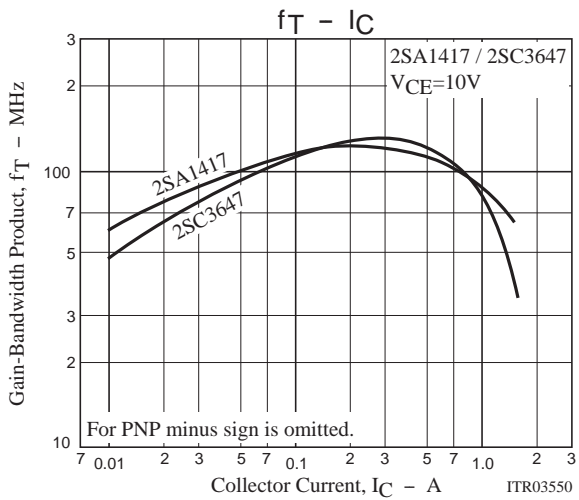
Switching Time Test Circuit



Ordering Information

Device	Package	Shipping	memo
2SA1417S-TD-E	PCP	1,000pcs./reel	Pb Free
2SA1417T-TD-E	PCP	1,000pcs./reel	
2SC3647S-TD-E	PCP	1,000pcs./reel	
2SC3647T-TD-E	PCP	1,000pcs./reel	





Embossed Taping Specification

2SA1417S-TD-E, 2SA1417T-TD-E, 2SC3647S-TD-E, 2SC3647T-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)

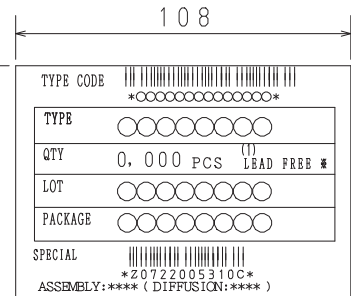
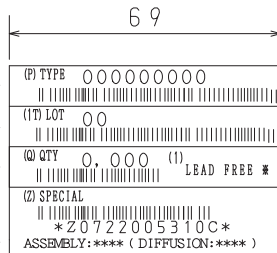
Outer box label  
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

Packing method



Reel label

Type No.  
LOT No.  
Quantity  
Origin



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



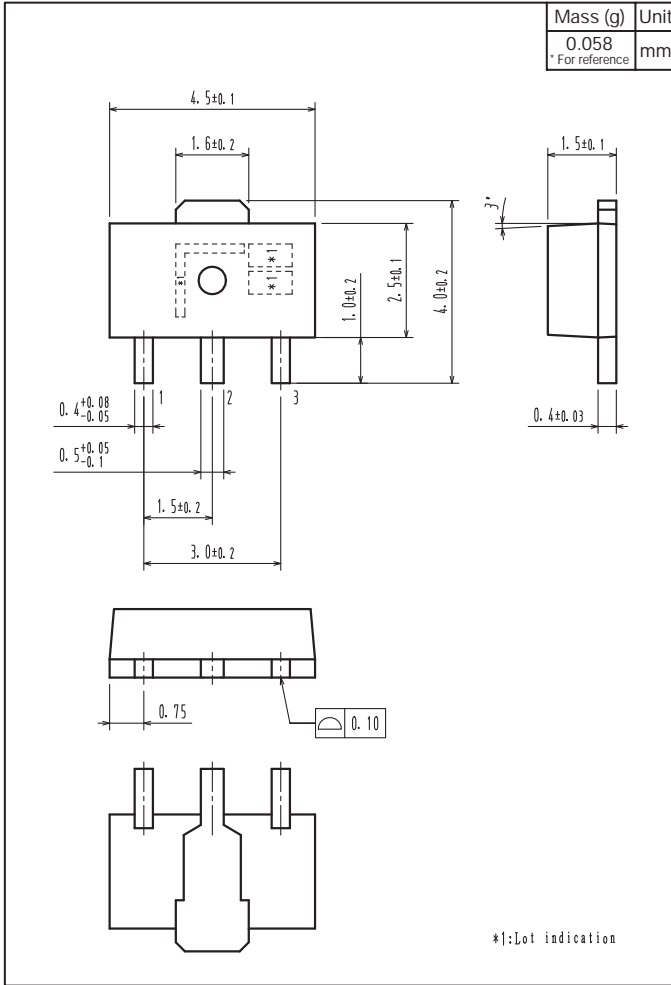
Those with pin 1 index on the feed hole side.....TD

2SA1417 / 2SC3647

Outline Drawing

Land Pattern Example

2SA1417S-TD-E, 2SA1417T-TD-E, 2SC3647S-TD-E, 2SC3647T-TD-E



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