



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 2SA1418/2SC3648 — PNP / NPN Epitaxial Planar Silicon Transistor

### High-Voltage Switching, Preriver Applications

#### Applications

- Color TV audio output, inverter

#### 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 IC's

#### Specifications ( ) : 2SA1418

Absolute Maximum Ratings at Ta=25°C

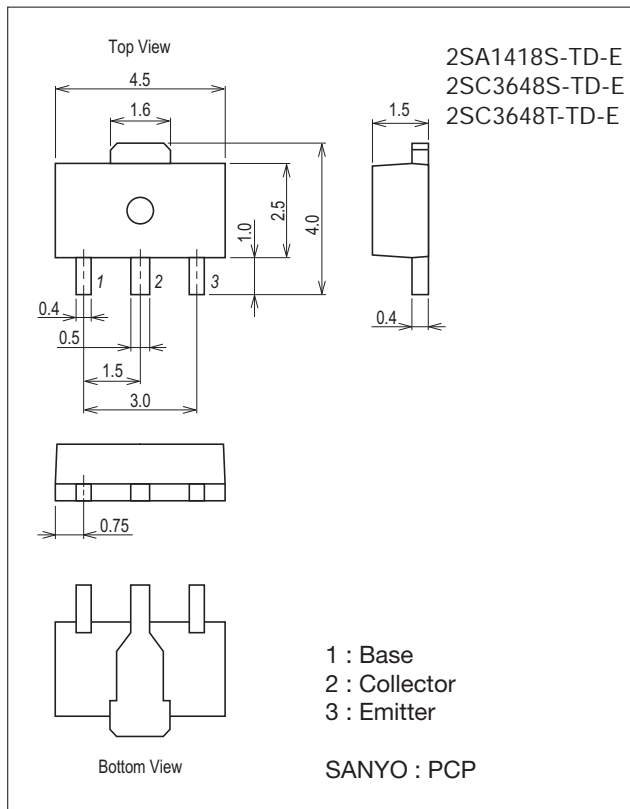
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CBO</sub>		(-)180	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		(-)160	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		(-)6	V
Collector Current	I <sub>C</sub>		(-)0.7	A
Collector Current (Pulse)	I <sub>CP</sub>		(-)1.5	A

Continued on next page.

#### Package Dimensions

unit : mm (typ)

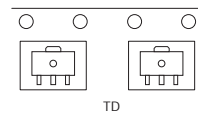
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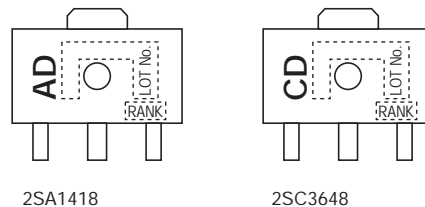
#### Product & Package Information

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

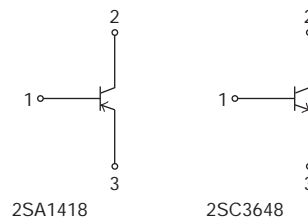
#### Packing Type: TD



#### Marking



#### Electrical Connection



## 2SA1418 / 2SC3648

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings	Unit
Collector Dissipation	PC		500	mW
		When mounted on ceramic substrate (250mm <sup>2</sup> ×0.8mm)	1.3	W
Junction Temperature	T <sub>j</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

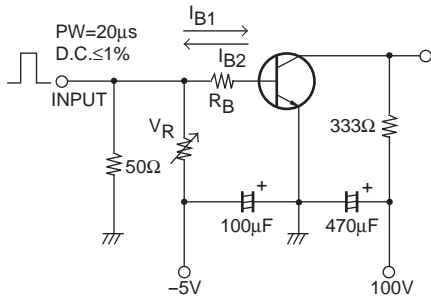
### Electrical Characteristics at T<sub>a</sub>=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> =(-)120V, I <sub>E</sub> =0A			(-)0.1	μA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> =(-)4V, I <sub>C</sub> =0A			(-)0.1	μA
DC Current Gain	h <sub>FE1</sub>	V <sub>CE</sub> =(-)5V, I <sub>C</sub> =(-)100mA	100*		400*	
	h <sub>FE2</sub>	V <sub>CE</sub> =(-)5V, I <sub>C</sub> =(-)10mA	90			
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =(-)10V, I <sub>C</sub> =(-)50mA		120		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =(-)10V, f=1MHz		(1)8		pF
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =(-)250mA, I <sub>B</sub> =(-)25mA	(-0.2)0.12		(-0.5)0.4	V
Base-to-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =(-)250mA, I <sub>B</sub> =(-)25mA	(-)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	(-)180			V
Collector-to-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =(-)1mA, R <sub>BE</sub> =∞	(-)160			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.		(60)50		ns
Storage Time	t <sub>stg</sub>			(900)1000		ns
Fall Time	t <sub>f</sub>			(60)60		ns

\* : The 2SA1418 / 2SC3648 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

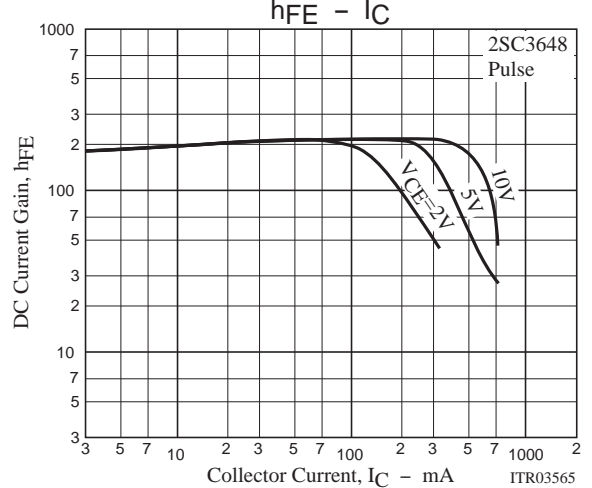
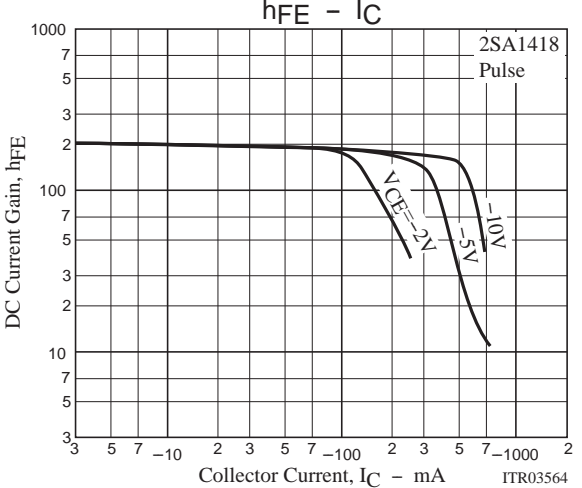
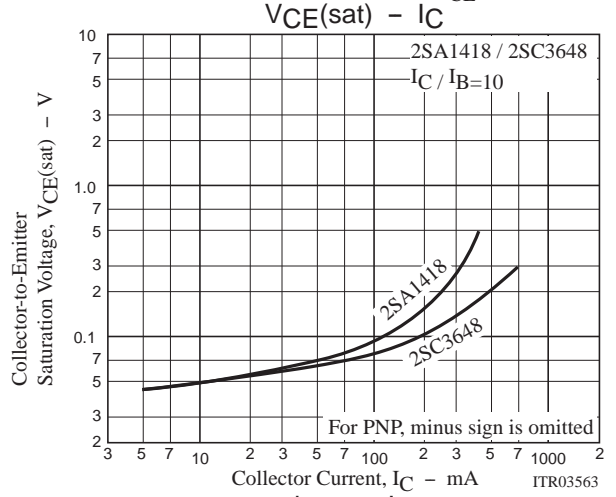
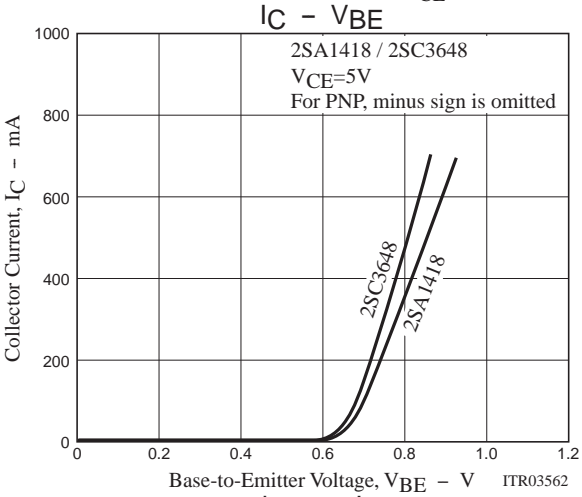
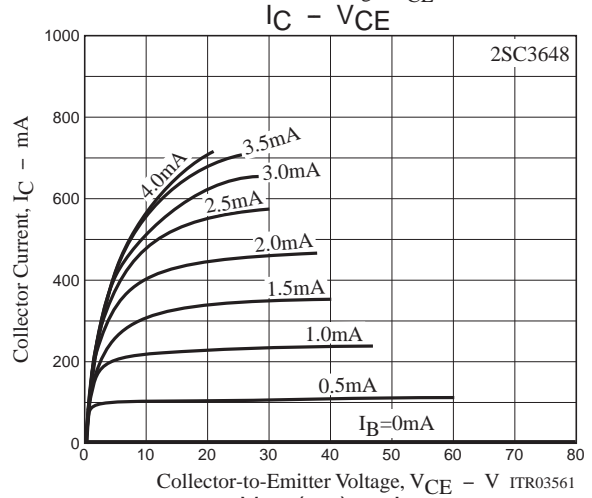
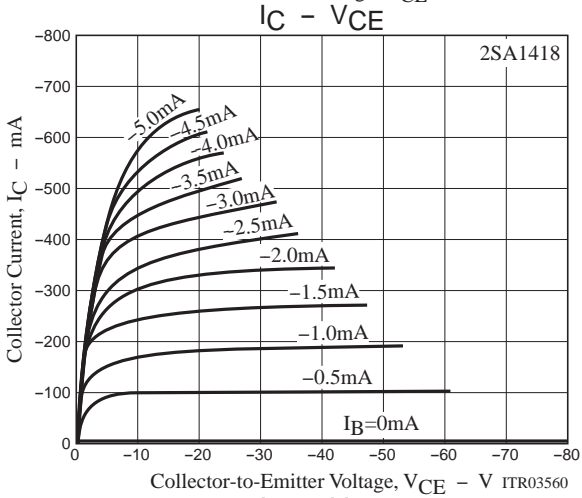
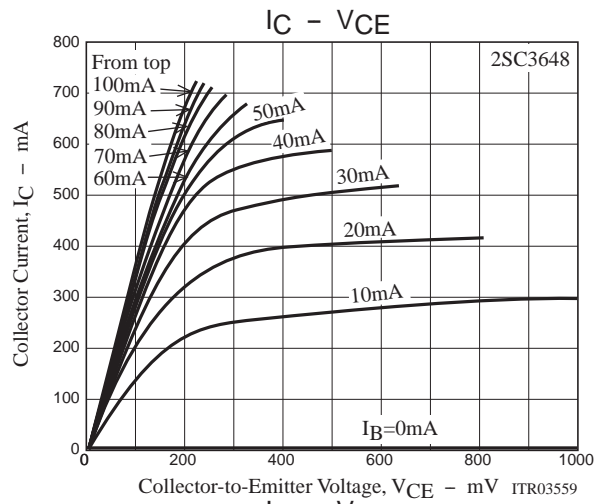
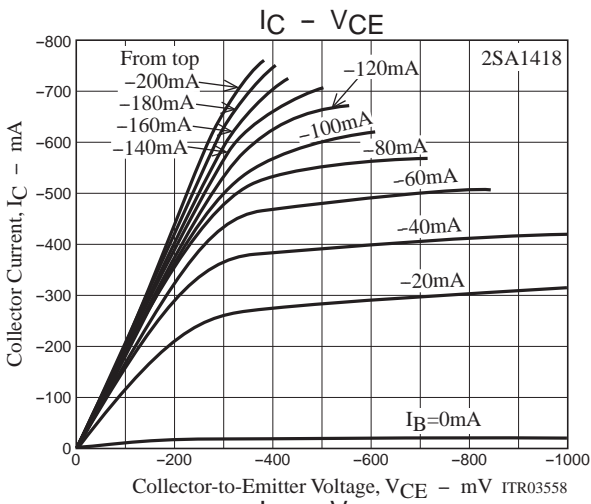
### Switching Time Test Circuit

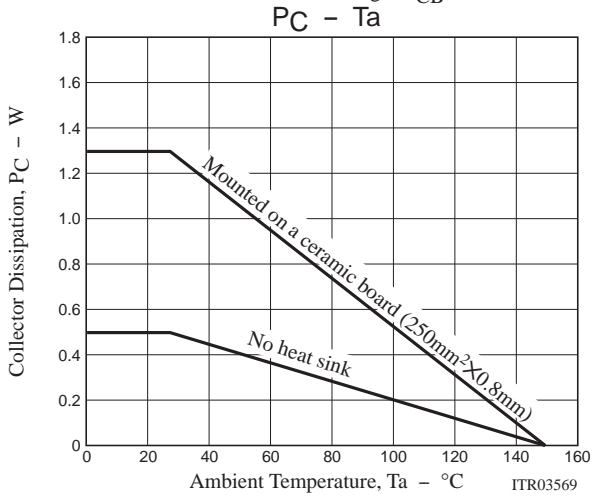
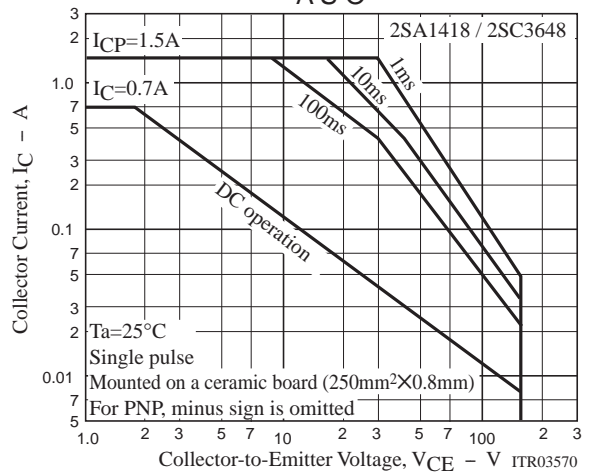
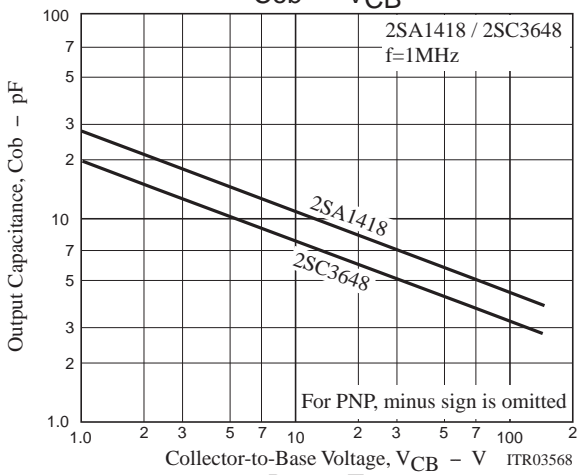
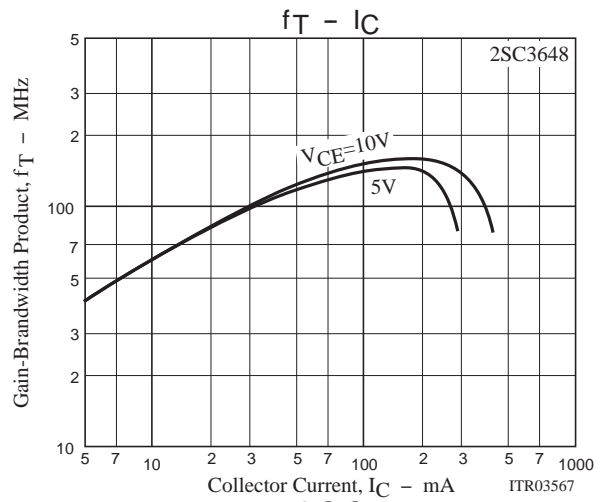
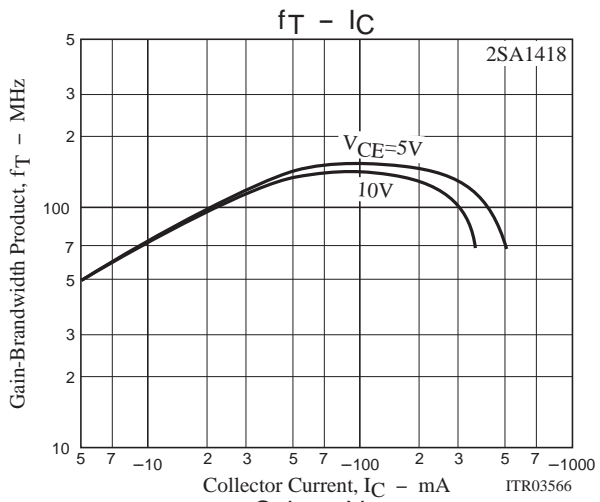


I<sub>C</sub>=20I<sub>B1</sub>=-20I<sub>B2</sub>=300mA  
(For PNP, the polarity is reversed)

### Ordering Information

Device	Package	Shipping	memo
2SA1418S-TD-E	PCP	1,000pcs./reel	Pb Free
2SC3648S-TD-E	PCP	1,000pcs./reel	
2SC3648T-TD-E	PCP	1,000pcs./reel	





Bag Packing Specification

2SA1418S-TD-E, 2SC3648S-TD-E, 2SC3648T-TD-E

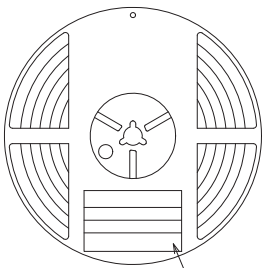
1. Packing Format

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)

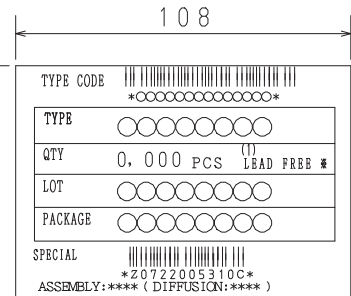
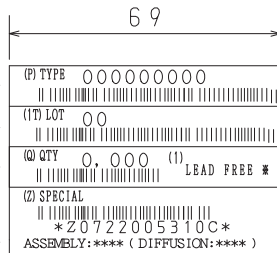
Outer box label  
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

Packing method



Reel label

Type No.  
LOT No.  
Quantity  
Origin



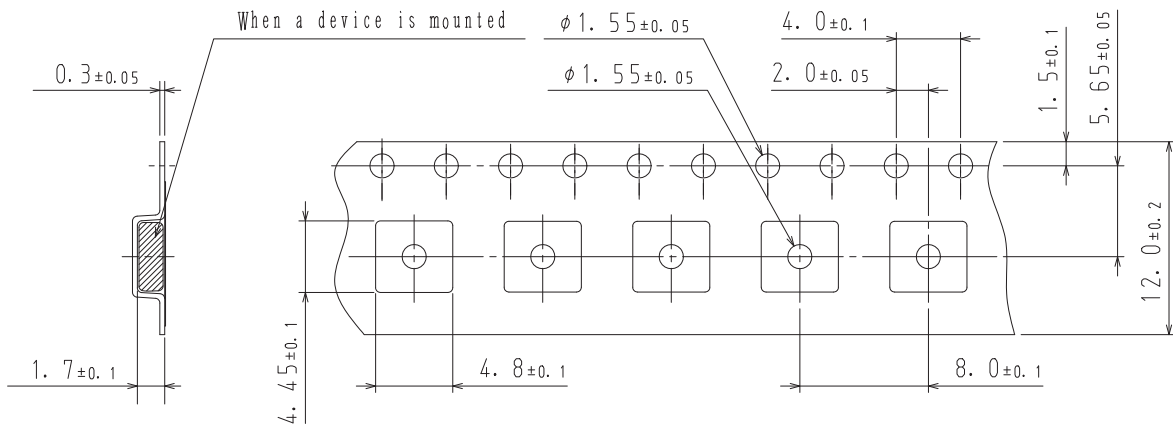
NOTE (1)

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

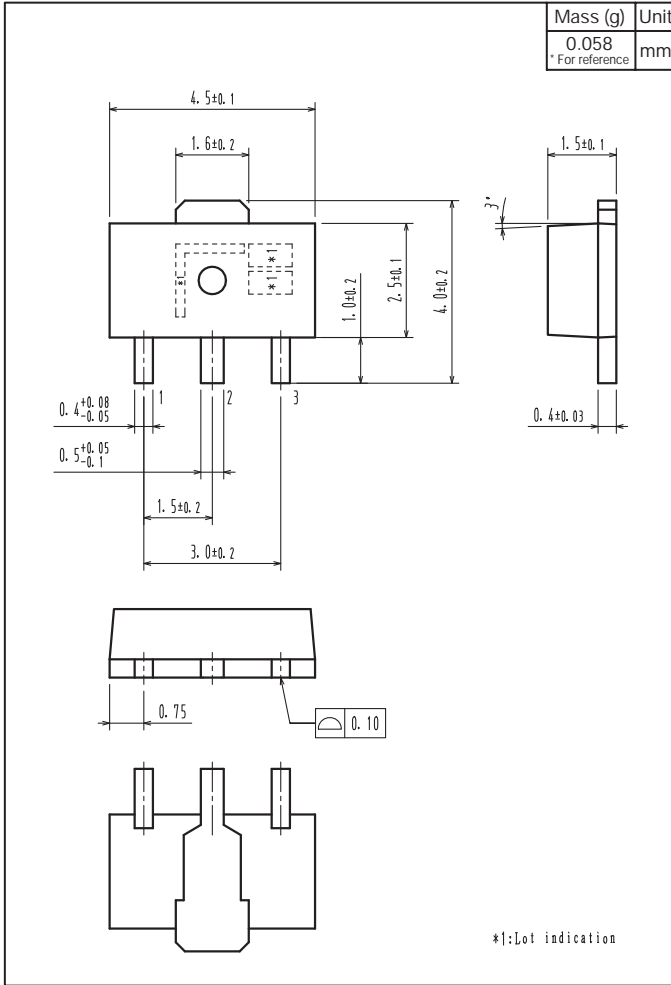


Those with pin 1 index on the feed hole side.....TD

2SA1418 / 2SC3648

Outline Drawing

2SA1418S-TD-E, 2SC3648S-TD-E, 2SC3648T-TD-E



Land Pattern Example



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