



# 2SA1418/2SC3648

## Bipolar Transistor

(-)160V, (-)0.7A, Low  $V_{CE(sat)}$ , (PNP)NPN Single PCP

ON Semiconductor®

<http://onsemi.com>

### Applicaitons

- Color TV audio output, inverter

### Features

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

### Specifications ( ) : 2SA1418

Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

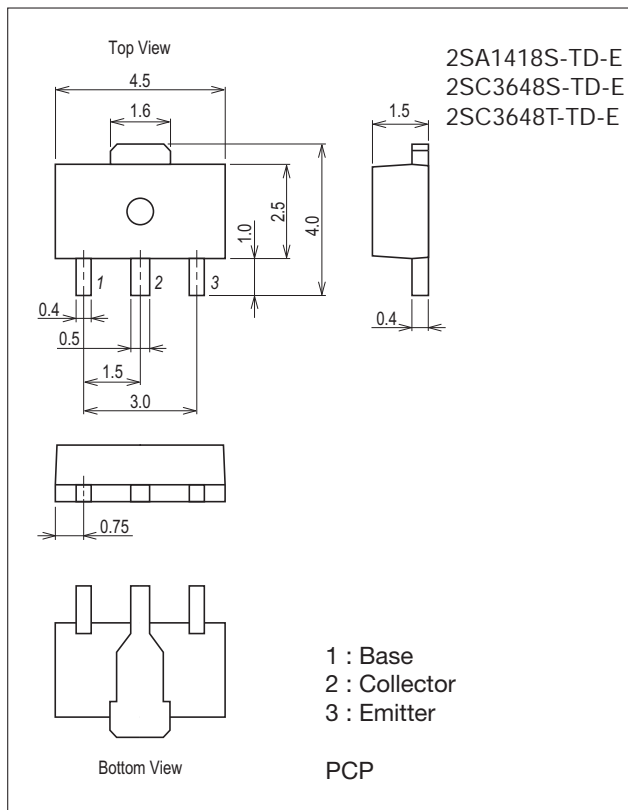
| Parameter                    | Symbol    | Conditions | Ratings | Unit |
|------------------------------|-----------|------------|---------|------|
| Collector-to-Base Voltage    | $V_{CB0}$ |            | (-)180  | V    |
| Collector-to-Emitter Voltage | $V_{CE0}$ |            | (-)160  | V    |
| Emitter-to-Base Voltage      | $V_{EB0}$ |            | (-)6    | V    |
| Collector Current            | $I_C$     |            | (-)0.7  | A    |
| Collector Current (Pulse)    | $I_{CP}$  |            | (-)1.5  | A    |

Continued on next page.

### Package Dimensions

unit : mm (typ)

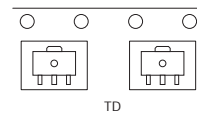
7007B-004



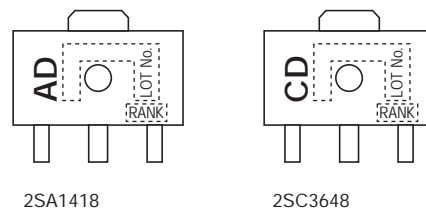
### Product & Package Information

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

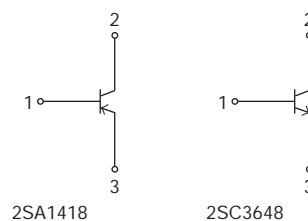
### Packing Type: TD



### Marking



### Electrical Connection



## 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   |

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.

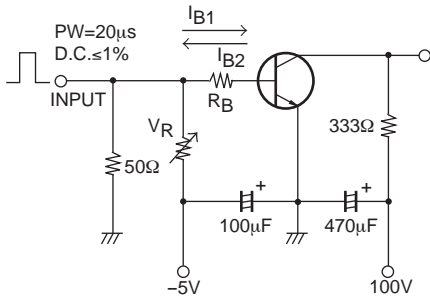
### Electrical Characteristics at T<sub>a</sub>=25°C

| 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                   |         | (11)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 |

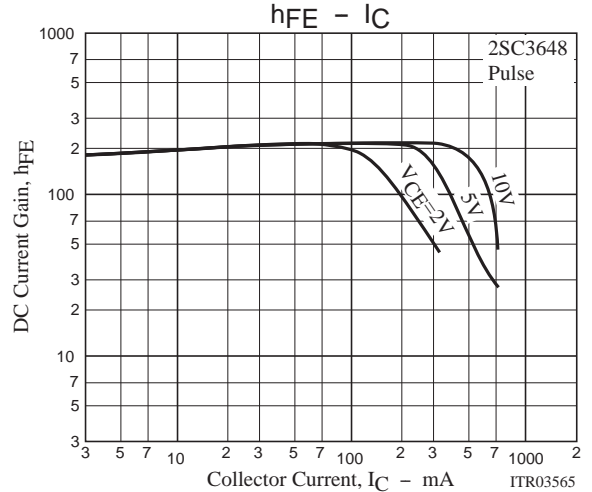
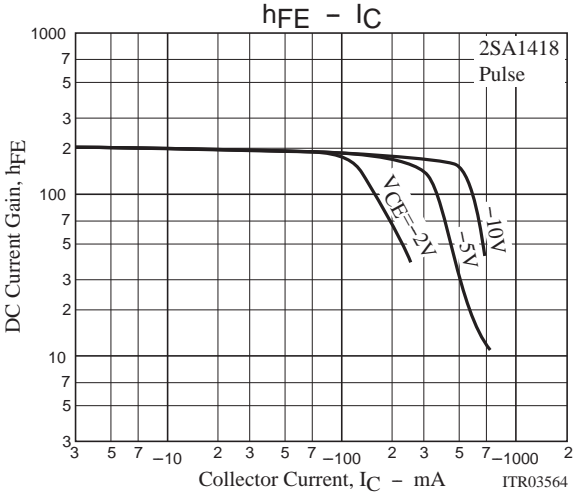
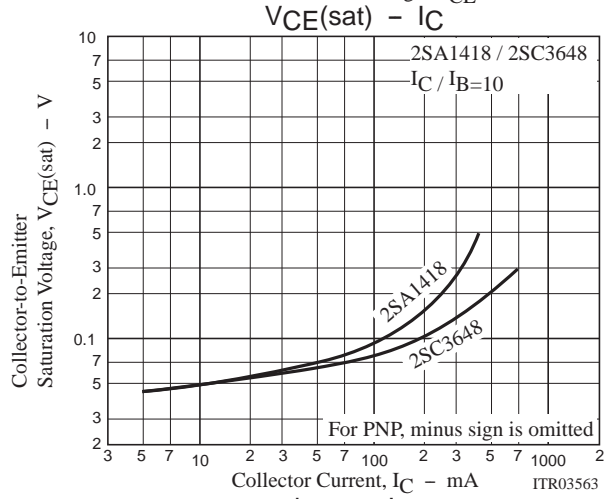
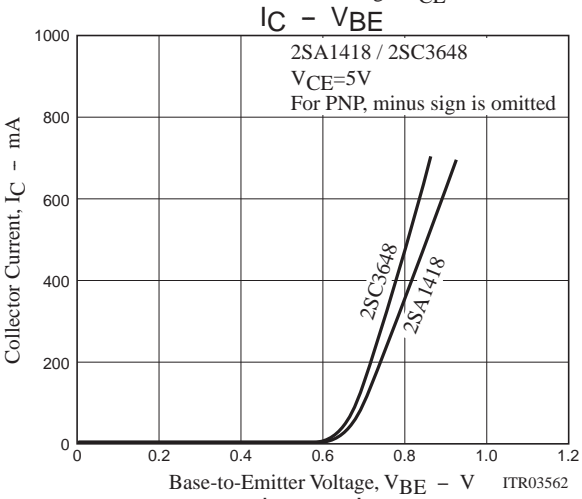
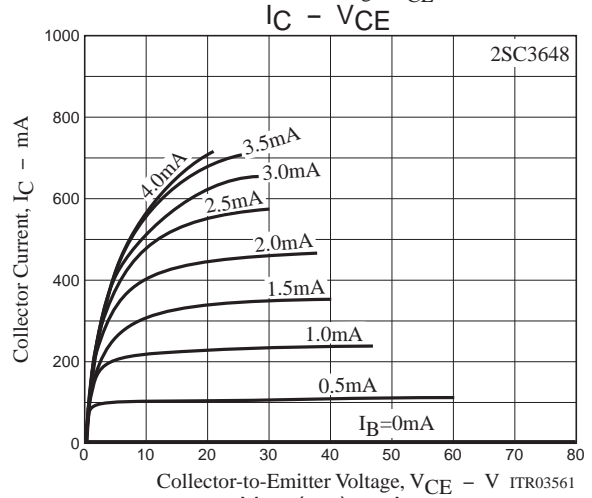
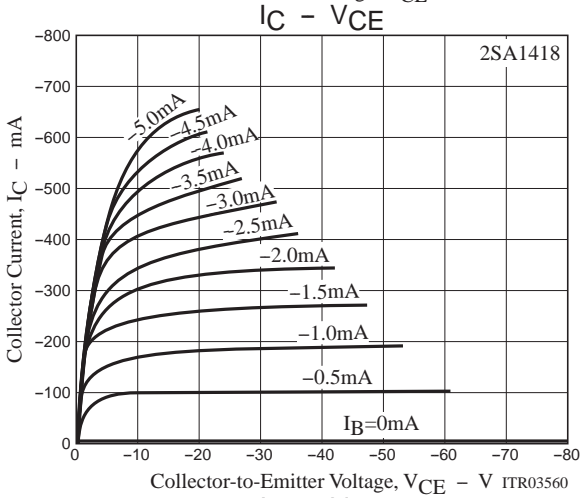
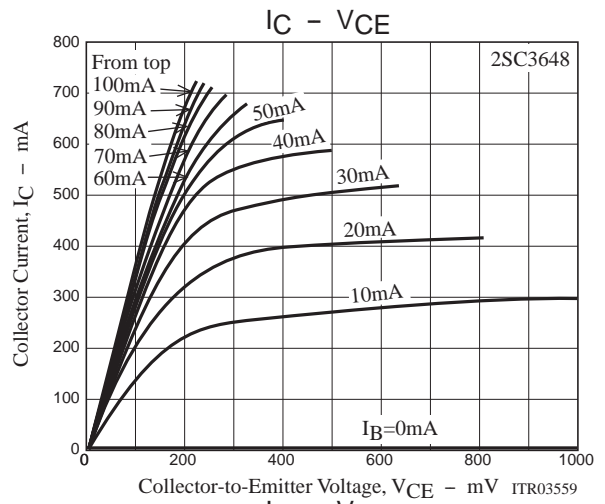
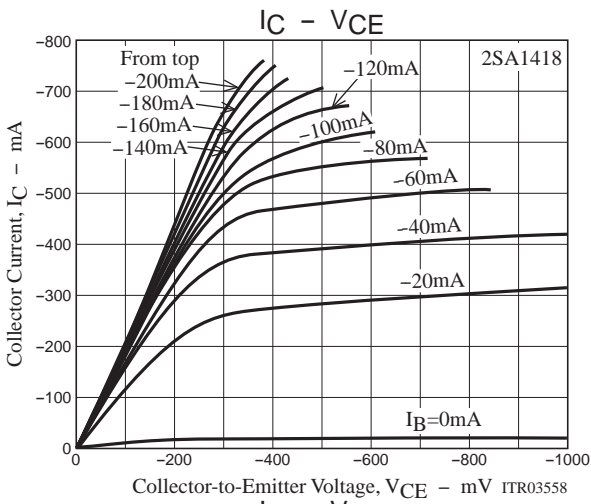
### Switching Time Test Circuit

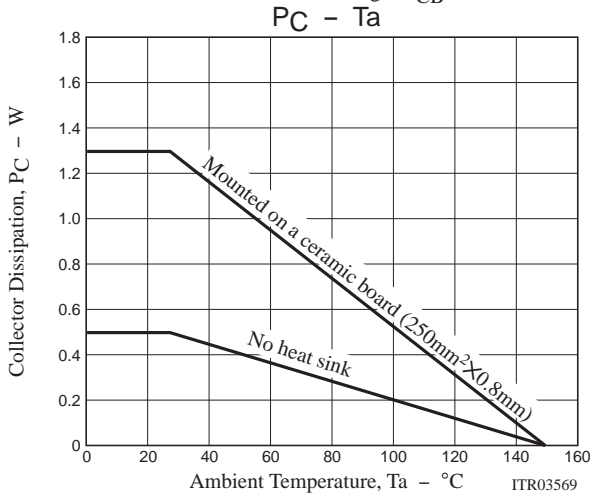
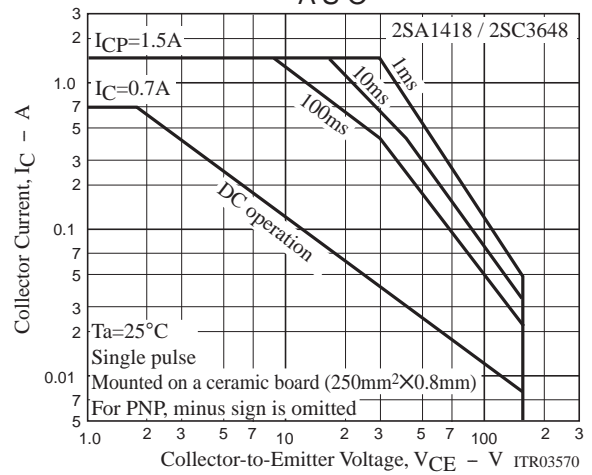
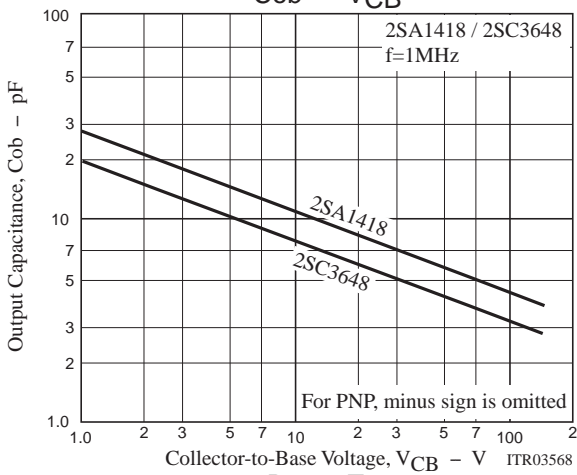
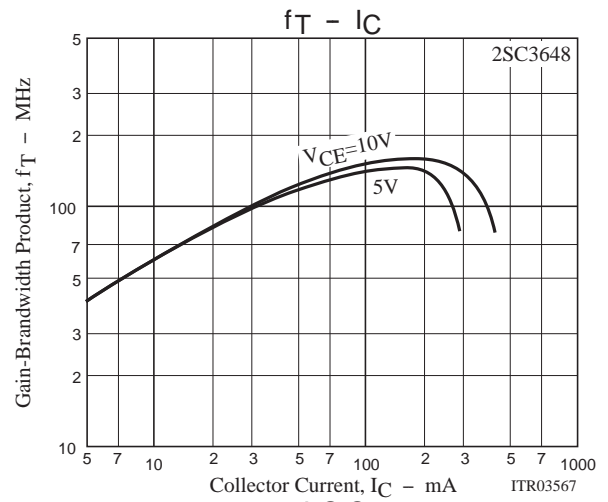
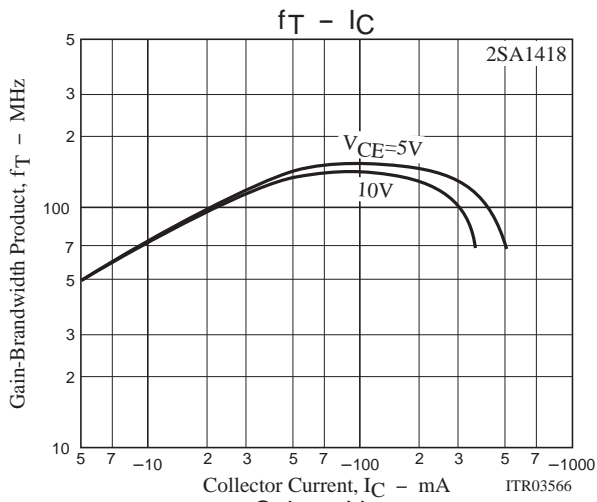


I<sub>C</sub>=20I<sub>B1</sub>=-20I<sub>B2</sub>=300mA  
(For PNP, the polarity is reversed)

### 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<br>Dimensions:mm (external)<br>183×72×185 | 6 inner boxes contained<br>Dimensions:mm (external)<br>440×195×210 |

Reel label, Inner box label  
(unit : mm)

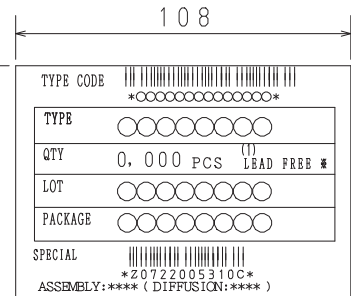
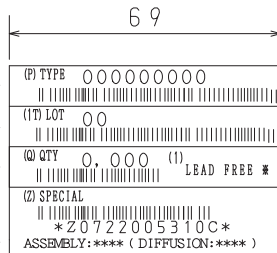
Outer box label  
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

Packing method



Type No.  
LOT No.  
Quantity  
Origin

Reel label



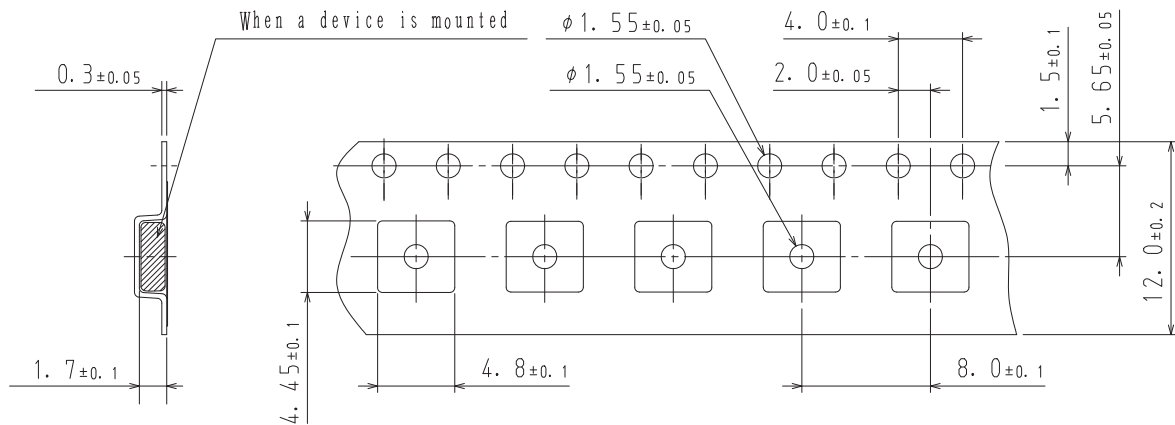
NOTE (1)

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

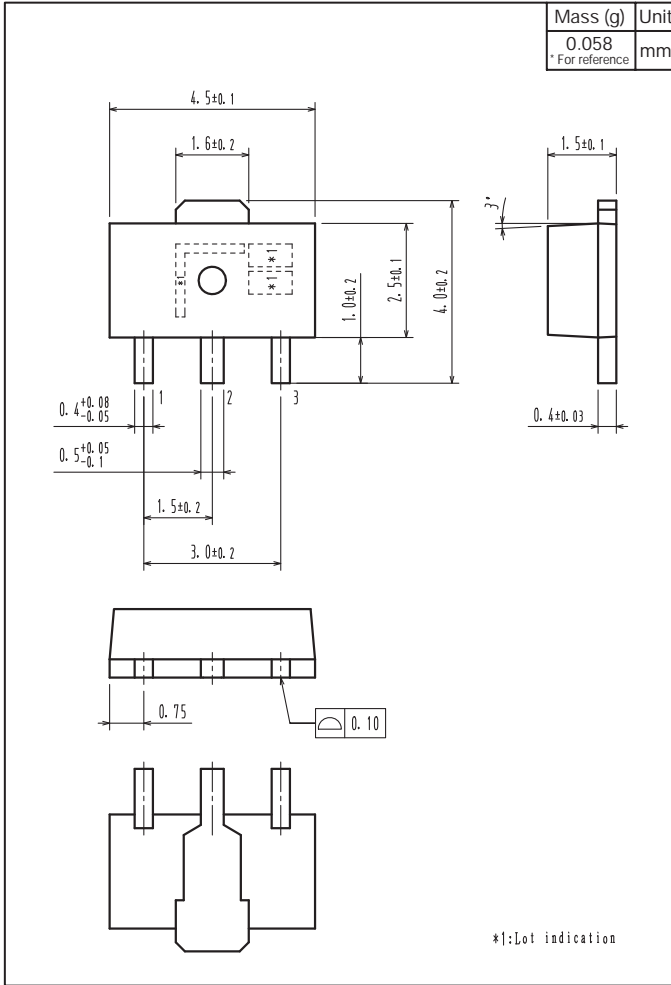


Those with pin 1 index on the feed hole side.....TD

2SA1418 / 2SC3648

Outline Drawing

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



Land Pattern Example



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