



# 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  $T_a=25^\circ\text{C}$

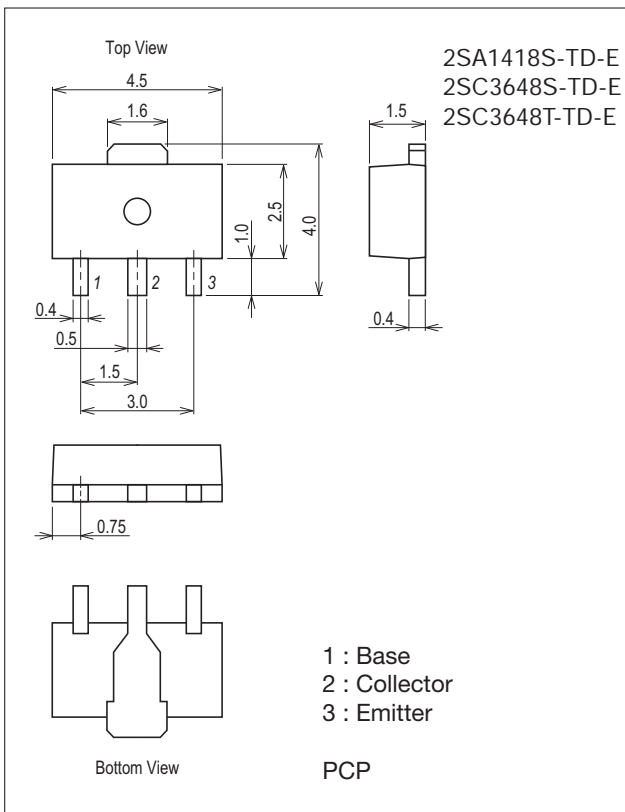
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		(-)180	V
Collector-to-Emitter Voltage	$V_{CE0}$		(-)160	V
Emitter-to-Base Voltage	$V_{EB0}$		(-)6	V
Collector Current	$I_C$		(-)0.7	A
Collector Current (Pulse)	$I_{CP}$		(-)1.5	A

Continued on next page.

### Package Dimensions

unit : mm (typ)

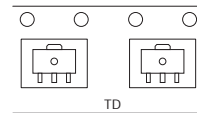
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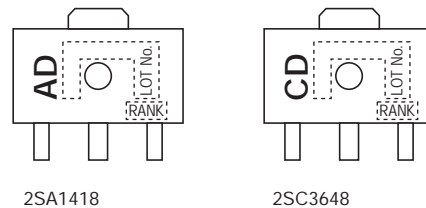
### Product & Package Information

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

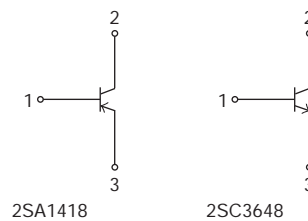
### Packing Type: TD



### 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

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.

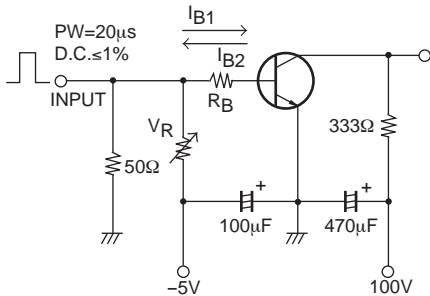
### Electrical Characteristics at T<sub>a</sub>=25°C

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

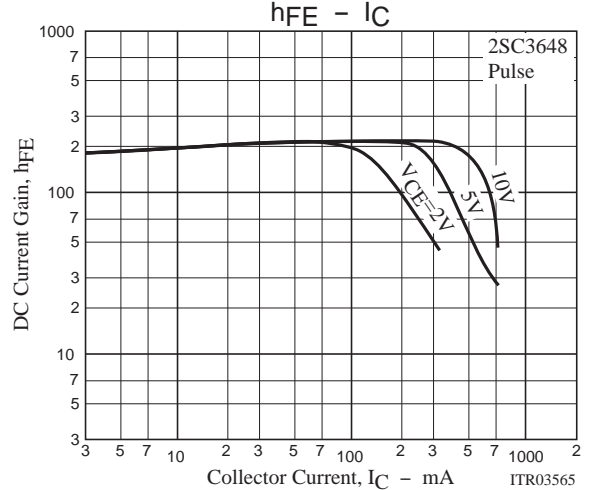
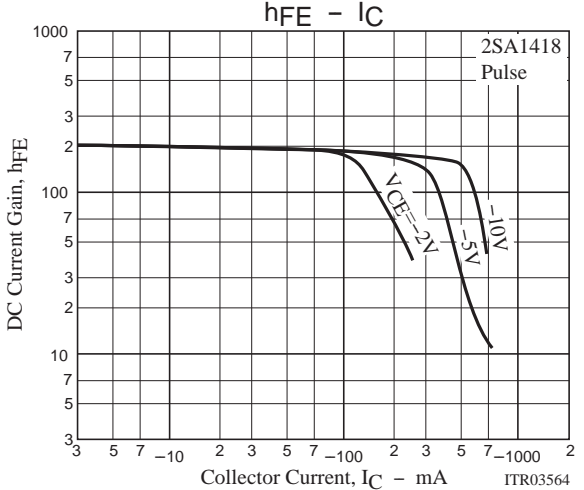
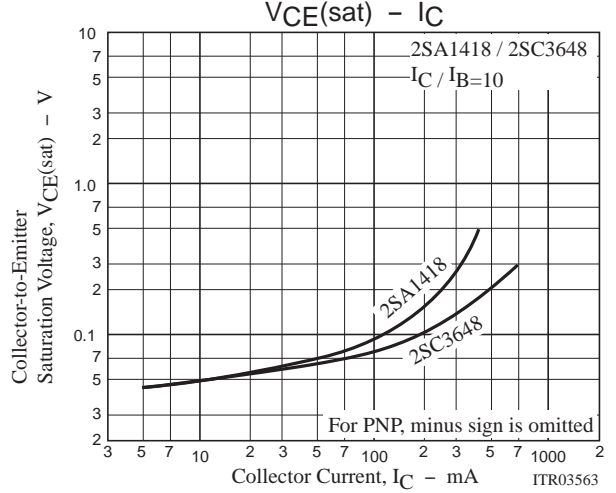
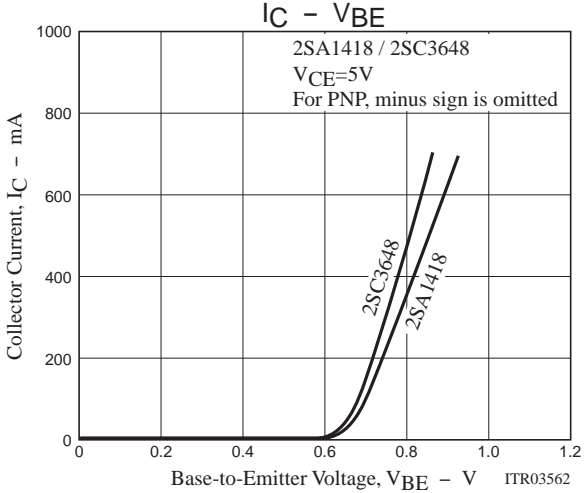
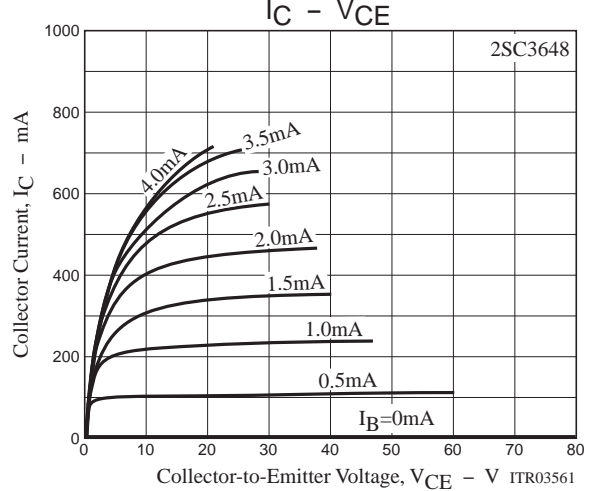
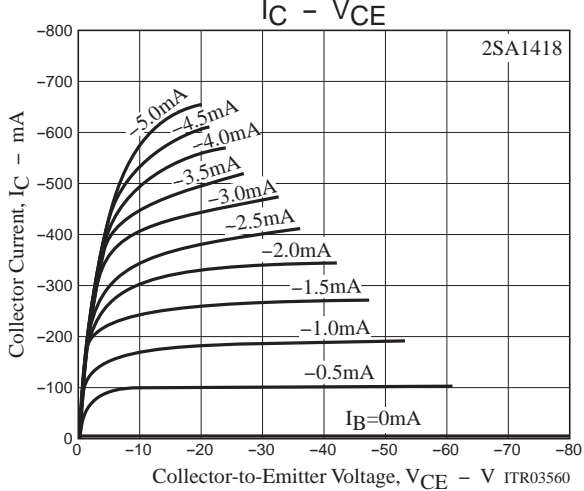
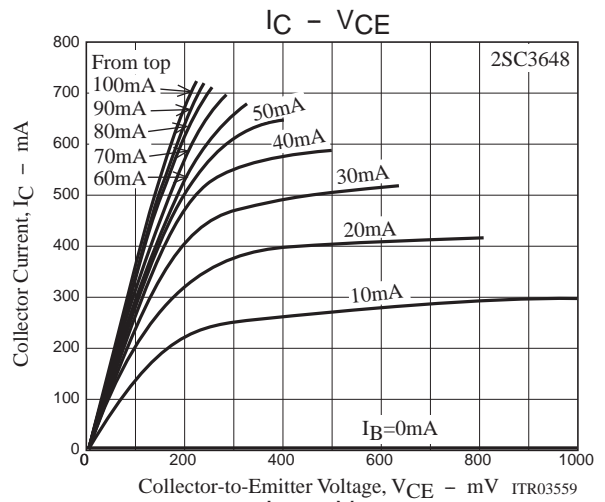
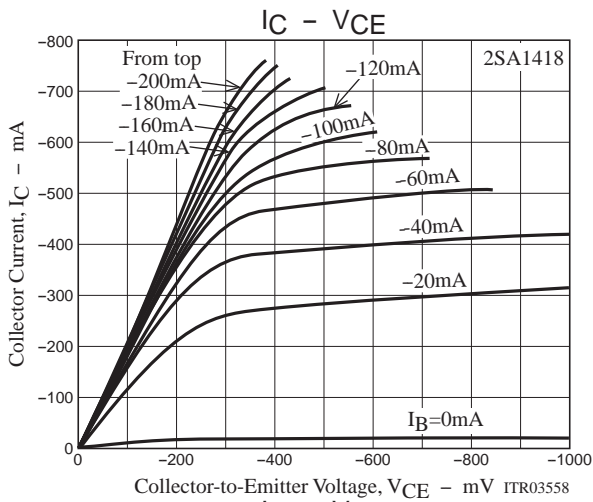
### Switching Time Test Circuit

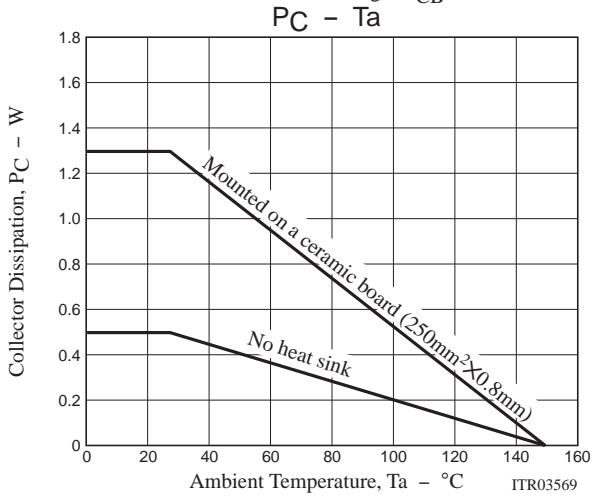
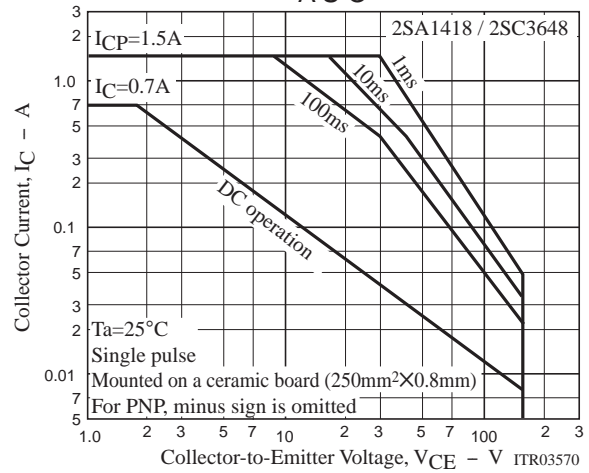
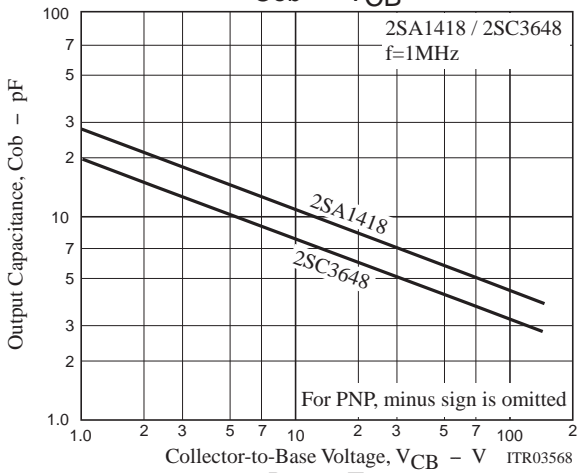
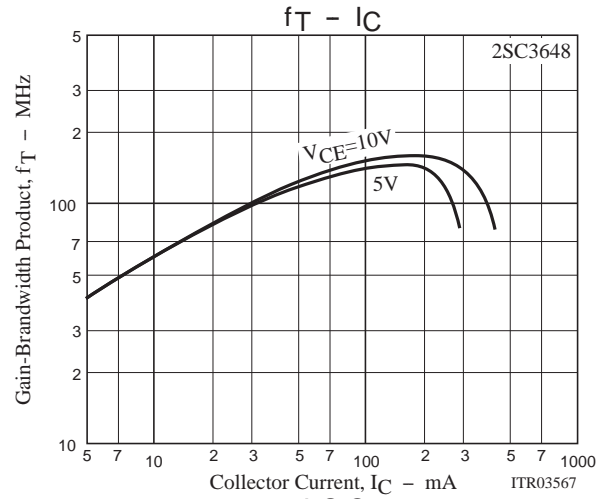
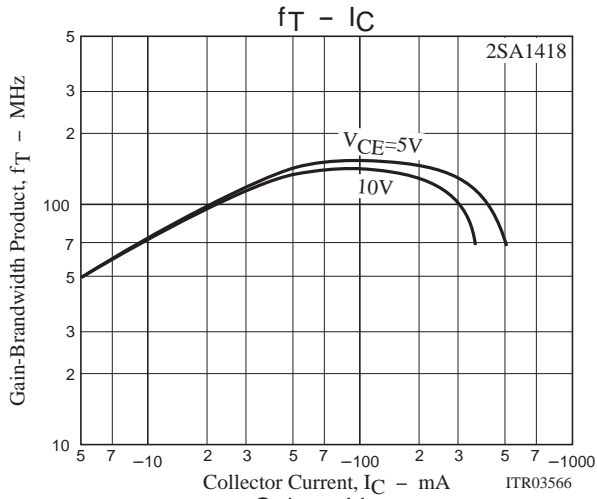


I<sub>C</sub>=20I<sub>B1</sub>=-20I<sub>B2</sub>=300mA  
(For PNP, the polarity is reversed)

### 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

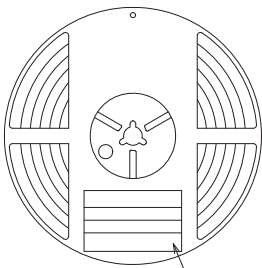
1. Packing Format

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 Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

Reel label, Inner box label  
(unit : mm)

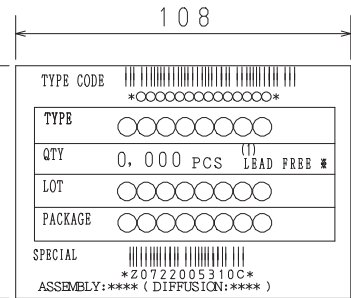
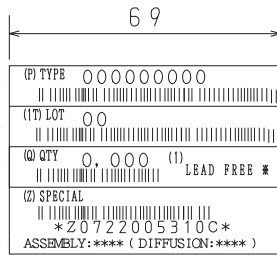
Outer box label  
It is a label at the time of factory shipments.  
The form of a label may change in physical distribution process.

Packing method



Reel label

Type No.  
LOT No.  
Quantity  
Origin



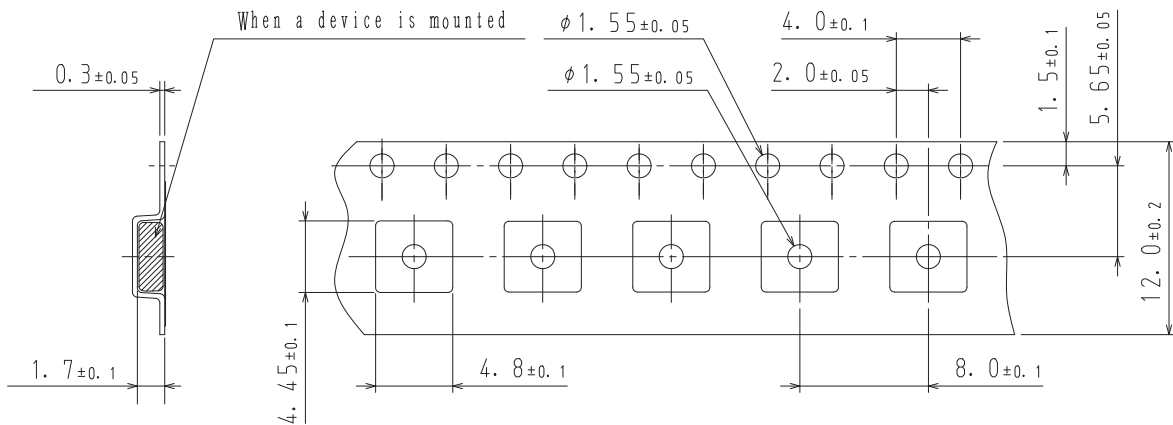
NOTE (1)

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

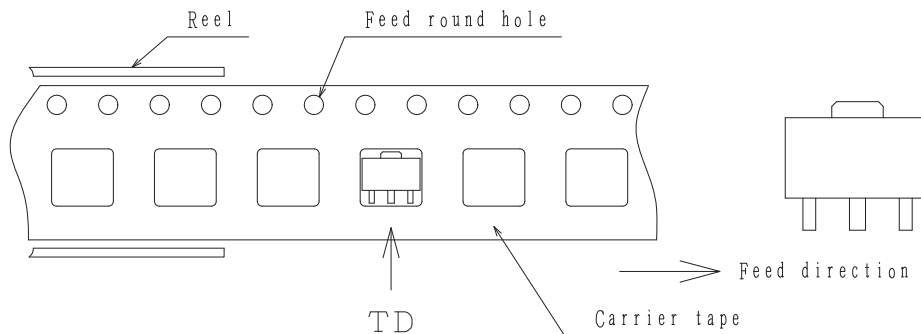
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



2-2. Device placement direction

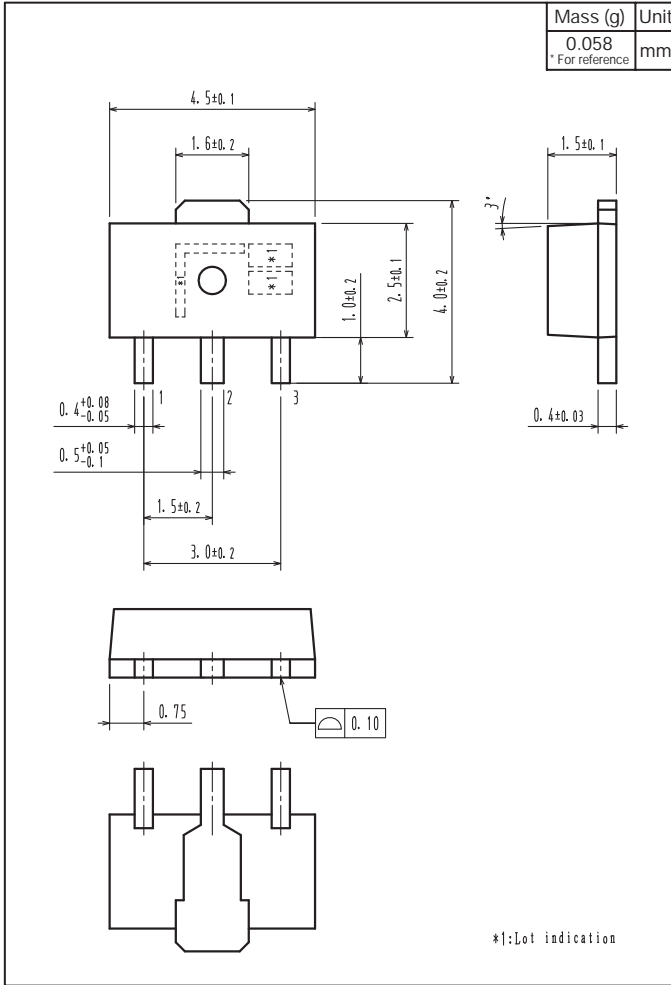


Those with pin 1 index on the feed hole side.....TD

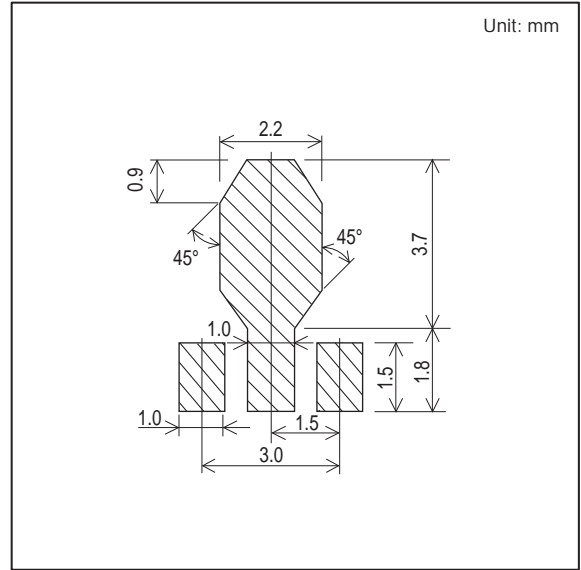
2SA1418 / 2SC3648

Outline Drawing

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





Land Pattern Example



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