

# 2SA1210



2009A

## PNP/NPN Epitaxial Planar Silicon Transistors

**2SC2912**

# High Voltage Switching, AF 150W Predriver Applications

⑤780C

## Features

- Adoption of FBET process
- High breakdown voltage
- Good linearity of  $h_{FE}$  and small  $c_{ob}$
- Fast switching speed

( ): 2SA1210

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

|                              |                       |            |    |
|------------------------------|-----------------------|------------|----|
| Collector to base voltage    | V <sub>CB0</sub>      | (-)200     | V  |
| Collector to emitter voltage | V <sub>CE0</sub>      | (-)200     | V  |
| Emitter to base voltage      | V <sub>EB0</sub>      | (-)15      | V  |
| Collector current            | I <sub>C</sub>        | (-)140     | mA |
| Peak collector current       | i <sub>cp</sub>       | (-)200     | mA |
| Collector dissipation        | P <sub>C</sub>        | 1          | W  |
|                              | T <sub>C</sub> = 25°C | 150        | °C |
| Junction temperature         | T <sub>j</sub>        | 150        | °C |
| Storage temperature          | T <sub>sta</sub>      | -55 ~ +150 | °C |

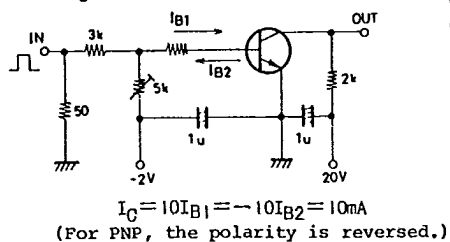
**Electrical Characteristics/ $T_a = 25^{\circ}\text{C}$** 

| Electrical Characteristics/ $T_a = 25^\circ\text{C}$ |               |                                                  | min  | typ     | max       | unit          |
|------------------------------------------------------|---------------|--------------------------------------------------|------|---------|-----------|---------------|
| Collector cutoff current                             | $I_{CBO}$     | $V_{CB} = (-)160, I_E = 0$                       |      |         | (-) $0.1$ | $\mu\text{A}$ |
| Emitter cutoff current                               | $I_{EBO}$     | $V_{EB} = (-)4\text{ V}, I_C = 0$                |      |         | (-) $0.1$ | $\mu\text{A}$ |
| Common emitter DC current gain                       | $h_{FE}$      | $V_{CE} = (-)5\text{ V}, I_C = (-)10\text{ mA}$  | 100* |         | 400*      |               |
| Gain band-width product                              | $f_T$         | $V_{CE} = (-)10\text{ V}, I_C = (-)10\text{ mA}$ |      | 150     |           | MHz           |
| Common base output capacitance                       | $C_{ob}$      | $V_{CB} = (-)10\text{ V}, f = 1\text{ MHz}$      |      | (4.0)   |           | pF            |
|                                                      |               |                                                  |      | 3.0     |           |               |
| Collector to emitter saturation voltage              | $V_{CE(sat)}$ | $I_C = (-)50\text{ mA}, I_B = (-)5\text{ mA}$    |      | (-0.14) | (-0.4)    | V             |
|                                                      |               |                                                  |      | 0.07    | 0.3       |               |
| Turn-on time                                         | $T_{on}$      | At specified test circuit                        |      | 0.1     |           | $\mu\text{s}$ |
| Storage time                                         | $t_{stg}$     | At specified test circuit                        |      | 1.5     |           | $\mu\text{s}$ |
| Fall time                                            | $t_f$         | At specified test circuit                        |      | 0.1     |           | $\mu\text{s}$ |

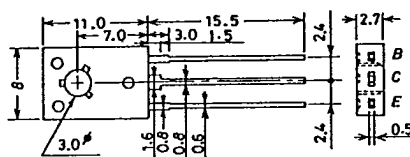
\*: The 2SA1210/2SC2912 are classified by 10 mA hFE as follows:

|           |           |           |
|-----------|-----------|-----------|
| 100 R 200 | 140 S 280 | 200 T 400 |
|-----------|-----------|-----------|

### Switching Time Test Circuit



**Case Outline 2009A**  
(unit: mm)



JEDEC: TO-126

B: Base  
C: Collector  
E: Emitter

For details, refer to the description of the 2SC2912.

3187AT/3135KI/0193Kİ, TS № No. 780-1/3

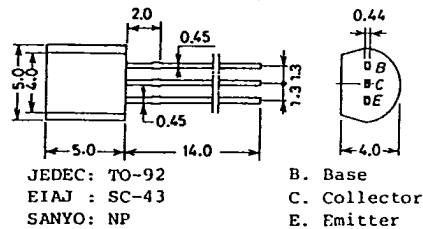
T-91-20

## CASE OUTLINES AND ATTACHMENTS

- All of Sanyo Transistor case outlines are illustrated below.
- All dimensions are in mm, and dimensions which are not followed by min. or max. are represented by typical values.
- No marking is indicated.

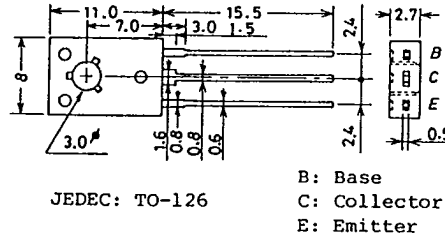
Case Outline—[2003A]

unit:mm



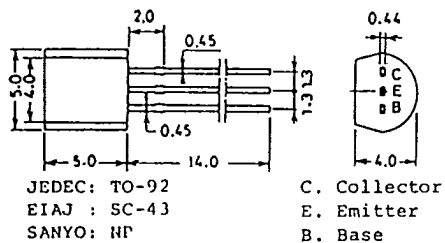
Case Outline—[2009A]

unit:mm



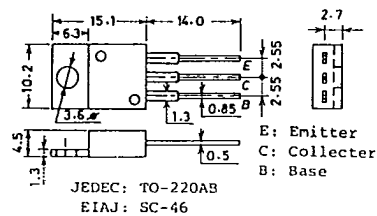
Case Outline—[2004A]

unit:mm



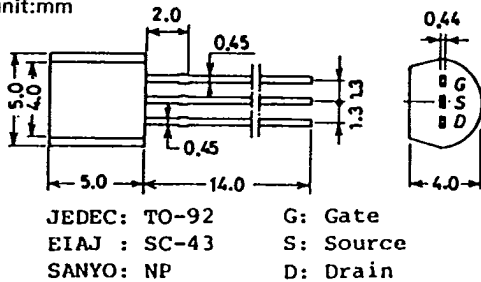
Case Outline—[2010A]

unit:mm



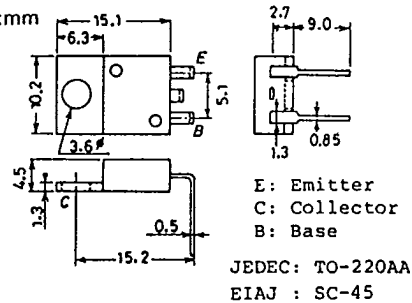
Case Outline—[2005A]

unit:mm



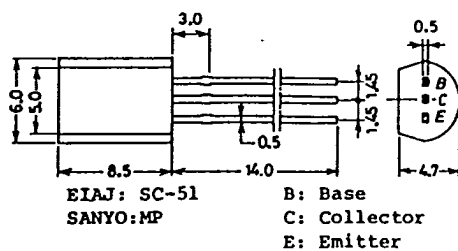
Case Outline—[2012]

unit:mm



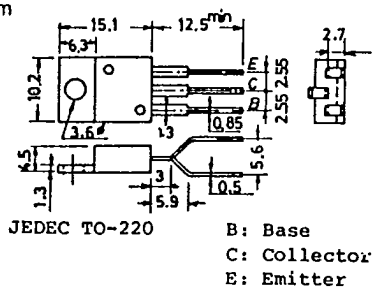
Case Outline—[2006A]

unit:mm



Case Outline—[2013]

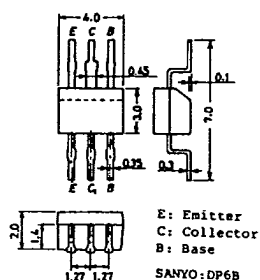
unit:mm



EIAI TC-3, TR-3  
JEDEC TO-3

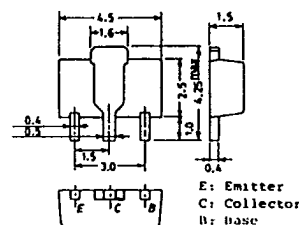
THIS MATERIAL CONTAINED BY IT IS RESTRICTIVE MANUFACTURING

unit:mm



E: Emitter  
C: Collector  
B: Base  
SANYO:DP6B

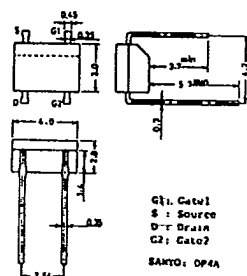
unit:mm



E: Emitter  
C: Collector  
B: Base

SANYO: PCP

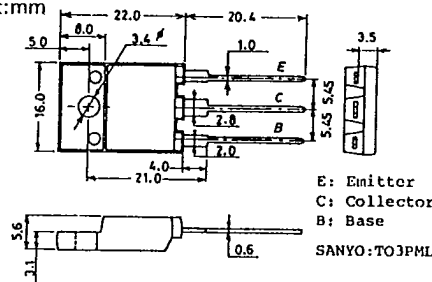
unit:mm



G1: Cat1  
\$ : Source  
D-r Drain  
G2: Gate2  
SANKO: OP4A

SANTO: OP4A

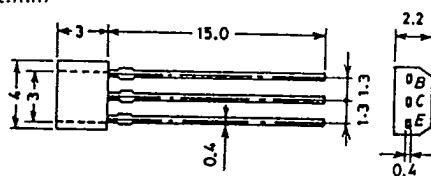
unit:mm



E: Emitter  
C: Collector  
B: Base

SANYO:TO3PML

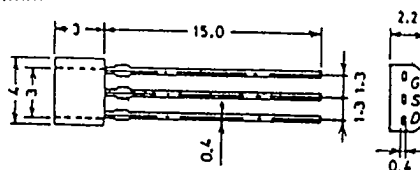
unit:mm



B: Base  
C: Collector  
E: Emitter

SANYO: SPA

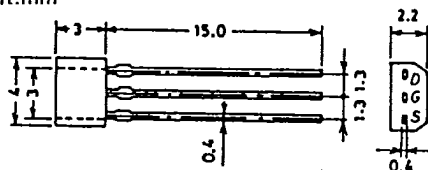
unit:mm



G: Gate  
S: Source  
D: Drain

SANYO: SPA

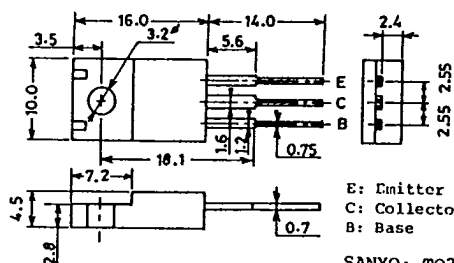
unit:mm



D: Drain  
G: Gate  
S: Source

**SANYO: SPA**

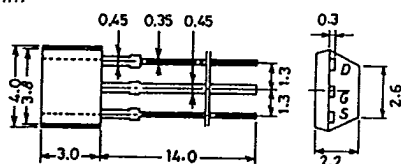
unit:mm



E: Emitter  
C: Collector  
B: Base

SANYO: TO220ML

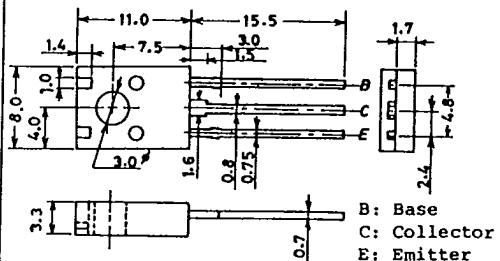
unit:mm



D: Drain  
G: Gate  
S: Source

SANYO: SP'

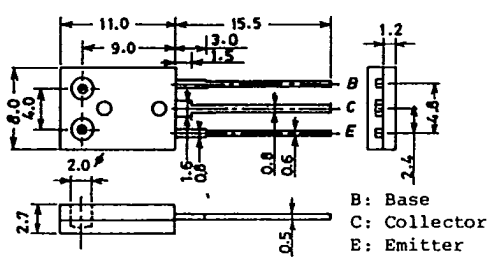
11.0



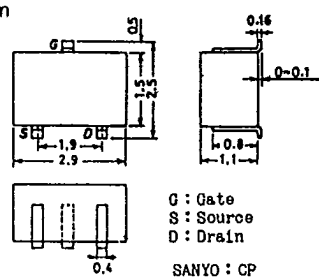
B: Base  
C: Collector  
E: Emitter

SANYO: TO126ML

Case Outline—[2043A] unit:mm

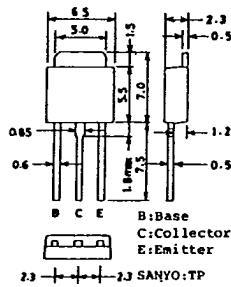


SANYO: TO126LP

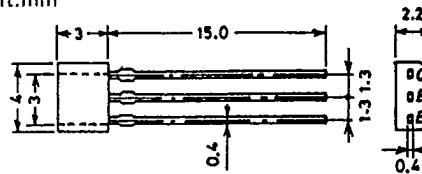
Case Outline—[2050]  
unit:mm

SANYO: CP

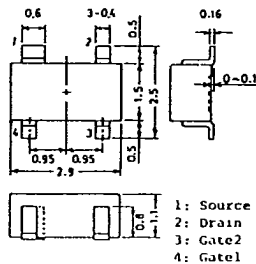
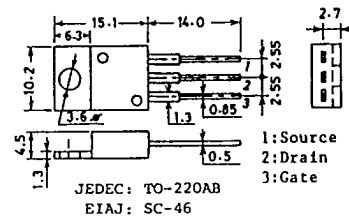
T-91-20

Case Outline—[2045]  
unit:mm

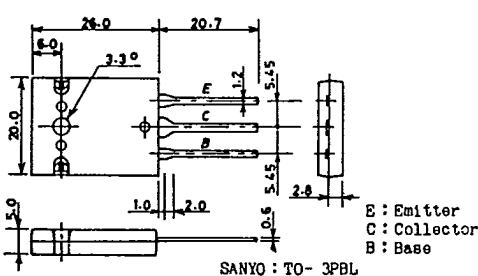
SANYO: TP

Case Outline—[2051]  
unit:mm

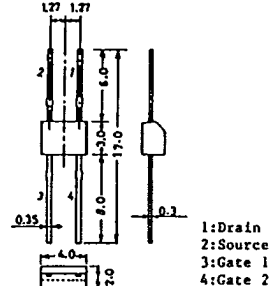
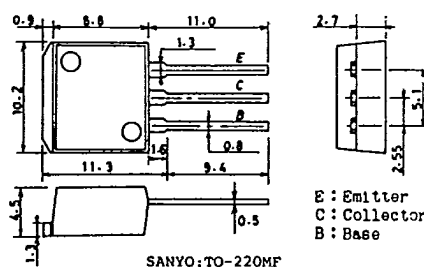
SANYO: SPA

Case Outline—[2046]  
unit:mmCase Outline—[2052A]  
unit:mmJEDEC: TO-220AB  
EIAJ: SC-46

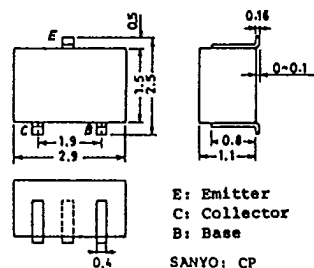
Case Outline—[2048] unit:mm



SANYO: TO-3PBL

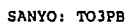
Case Outline—[2053]  
unit:mmCase Outline—[2049]  
unit:mm

SANYO: TO-220MF

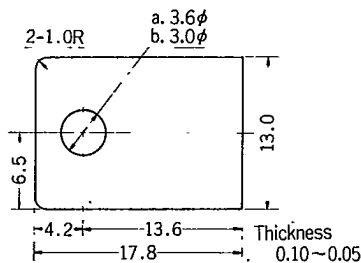
Case Outline—[2054]  
unit:mm

SANYO: CP

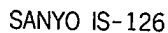
T-91-20



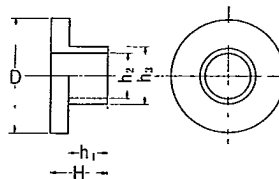
- IS-313B
- IS-313D



Case Outline—[0009]  
unit:mm



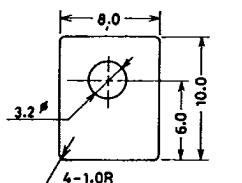
Thickness : 0.075



SANYO Bush

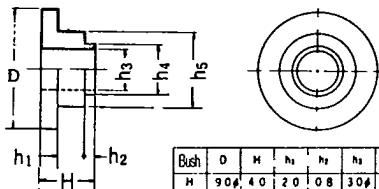
| Bush | D           | H   | $h_1$ | $h_2$      | $h_3$       |
|------|-------------|-----|-------|------------|-------------|
| A    | 8.0 $\phi$  | 4.0 | 2.8   | 3.1 $\phi$ | 3.89 $\phi$ |
| B    | 8.0 $\phi$  | 3.0 | 1.8   | 3.1 $\phi$ | 3.89 $\phi$ |
| C    | 8.0 $\phi$  | 5.7 | 4.5   | 3.1 $\phi$ | 3.89 $\phi$ |
| D    | 8.0 $\phi$  | 2.7 | 1.5   | 3.1 $\phi$ | 3.89 $\phi$ |
| E    | 8.0 $\phi$  | 3.4 | 2.2   | 3.1 $\phi$ | 3.89 $\phi$ |
| F    | 8.0 $\phi$  | 4.0 | 2.8   | 3.0 $\phi$ | 3.59 $\phi$ |
| K    | 16.0 $\phi$ | 3.4 | 1.4   | 3.1 $\phi$ | 6.0 $\phi$  |
| L    | 6.0 $\phi$  | 3.1 | 1.5   | 2.6 $\phi$ | 3.5 $\phi$  |
| M    | 6.0 $\phi$  | 3.1 | 1.5   | 3.0 $\phi$ | 3.5 $\phi$  |
| P    | 6.0 $\phi$  | 2.3 | 1.1   | 3.0 $\phi$ | 3.59 $\phi$ |

Case Outline—[0010]  
unit:mm



Thickness : 0.075

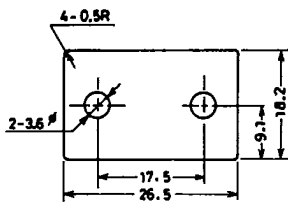
**SANYO IS-126A Mica**



**SANYO** Bush

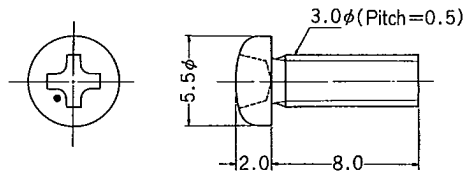
| Bush | D    | H  | $h_1$ | $h_2$ | $h_3$ | $h_4$ | $h_5$ |
|------|------|----|-------|-------|-------|-------|-------|
| H    | 90¢  | 40 | 20    | 08    | 30¢   | 3.59¢ | 56¢   |
| T    | 90¢  | 58 | 20    | 26    | 30¢   | 3.59¢ | 56¢   |
| UB   | 160¢ | 68 | 15    | 33    | 30¢   | 3.89¢ | 80¢   |

Case Outline—[0011]  
unit:mm



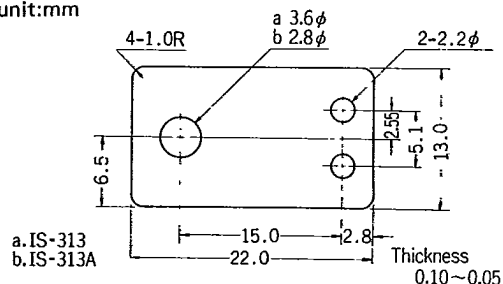
Thickness : 0.05~0.1

SANYO IS-20MA Mica

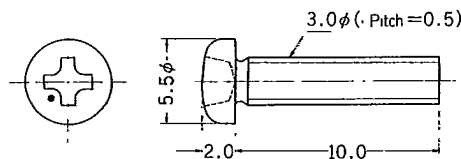


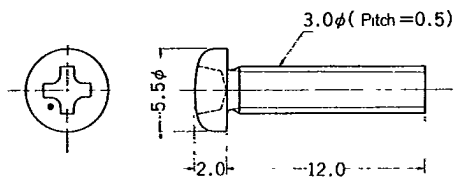
JIS No.B1111 M3×0.5

Case Outline—[0012]  
unit:mm

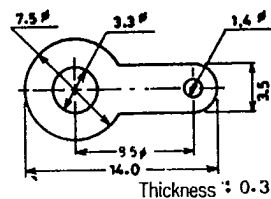


JIS No.B1111 M3×0.5

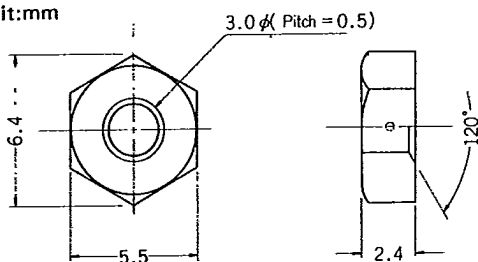


Case Outline—[0013]  
unit:mm

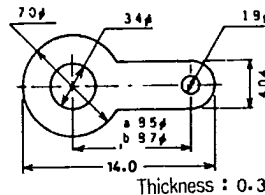
JIS No. B1111 M3×0.5

Case Outline—[0018]  
unit:mm

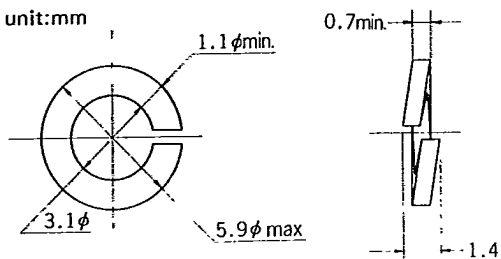
SANYO Lug 1.4

Case Outline—[0014]  
unit:mm

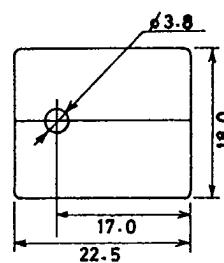
JIS No. B1181 M3×0.5

Case Outline—[0019]  
unit:mm

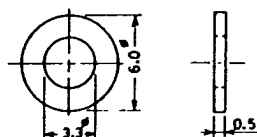
SANYO Lug 1.8φ

Case Outline—[0015]  
unit:mm

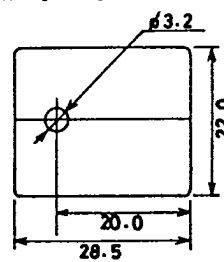
JIS No. B 1251 Spring washer (M3)

Case Outline—[0020]  
unit:mm

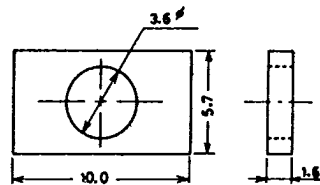
SANYO IS-3MP Mica

Case Outline—[0016]  
unit:mm

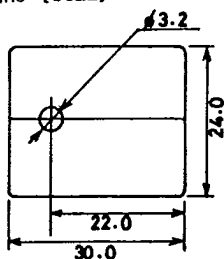
JIS No. B1252 Flat washer

Case Outline—[0021]  
unit:mm

SANYO IS-MPC Mica

Case Outline—[0017]  
unit:mm

JIS No. G3141 Rectangular washer

Case Outline—[0022]  
unit:mm

SANYO IS-3PBL Mica