# 2SC1570, 1571, 1571L

T-29-15

2003A

NPN Epitaxial Planar Silicon Transistors

## Very Low Noise Amp Applications

Ⓔ431D

- The 2SC1570, 1571, 1571L are developed as very low-noise transistors and are especially suited for use in equalizer first stage of high-grade type stereo sets.

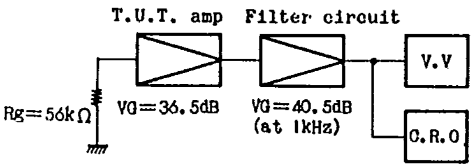
| **Absolute Maximum Ratings** at Ta=25°C | | 2SC1570 | 2SC1571 | 2SC1571L | unit |
|---|---|---|---|---|---|
| Collector to Base Voltage | $V_{CBO}$ | 55 | 40 | 40 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | 50 | 35 | 35 | V |
| Emitter to Base Voltage | $V_{EBO}$ | | 5 | | V |
| Collector Current | $I_C$ | | 100 | | mA |
| Allowable Power Dissipation | $P_C$ | | 200 | | mW |
| Junction Temperature | Tj | | 125 | | °C |
| Storage Temperature | $T_{stg}$ | | -55 to +150 | | °C |

| **Electrical Characteristics** at Ta=25°C | | | min | typ | max | unit |
|---|---|---|---|---|---|---|
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$=18V, $I_E$=0 | | | 0.1 | uA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$=3V, $I_C$=0 | | | 0.1 | uA |
| DC Current Gain | $h_{FE}$ | $V_{CE}$=6V, $I_C$=1mA | 160* | | 960* | |
| Gain Bandwidth Product | $f_T$ | $V_{CE}$=6V, $I_C$=1mA | | 100 | | MHz |
| Output Capacitance | $c_{ob}$ | $V_{CB}$=6V, f=1MHz | | 3 | | pF |
| C-E Saturation Voltage | $V_{CE(sat)}$ | $I_C$=50mA, $I_B$=5mA | | | 0.5 | V |
| Base to Emitter Voltage | $V_{BE}$ | $V_{CE}$=2V, $I_C$=1mA | | 0.58 | 0.80 | V |
| C-B Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$=10uA, $I_B$=0 [C1570] | 55 | | | V |
| | | 〃 〃 [C1571,1571L] | 40 | | | V |
| C-E Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$=1mA, $R_{BE}$=∞ [C1570] | 50 | | | V |
| | | 〃 〃 [C1571,1571L] | 35 | | | V |
| E-B Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$=10uA, $I_C$=0 | 5 | | | V |
| Noise Voltage | | at test circuit [C1570,1571] | | | 40 | mV |
| | | Vcc=30V, $I_C$=1mA [C1571L] | | | 65 | mV |
| | | Rg=56kohm, VG=77dB<br>(at 1kHz) | | | | |
| Noise Peak Level | | 〃 〃 [C1570,1571] | | | 280 | mV |
| | | 〃 〃 [C1571L] | | | 450 | mV |

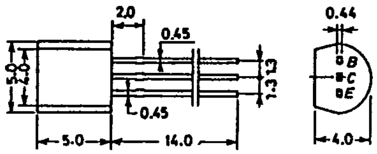
*:The 2SC1570,1571,1571L are classified by 1mA $h_{FE}$ as follows:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 160 | F | 320 | 280 | G | 560 | 480 | H | 960 |

**Noise Test Circuit**



**Case Outline** 2003A
(unit:mm)



JEDEC: TO-92
EIAJ : SC-43
SANYO: NP

B. Base
C. Collector
E. Emitter

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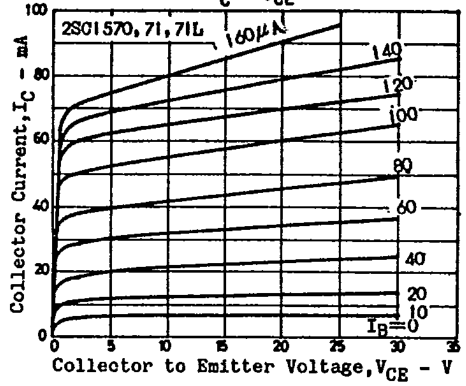
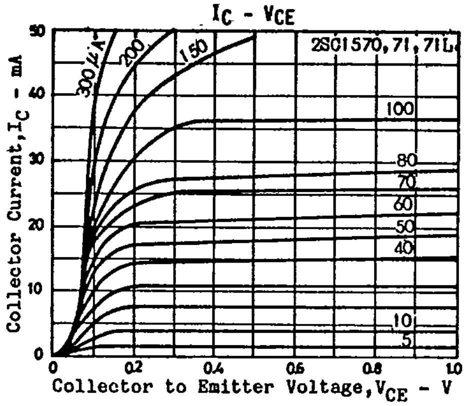
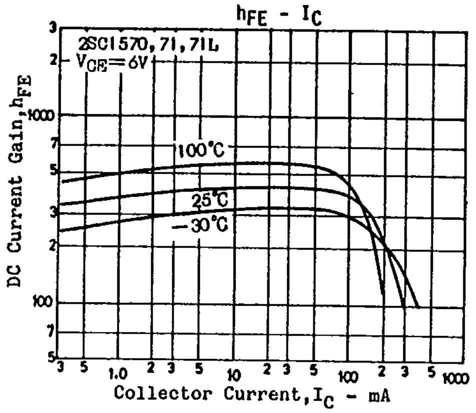
$I_C$ - $V_{CE}$



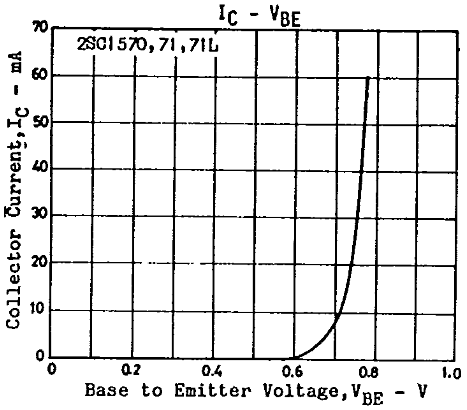
$I_C$ - $V_{CE}$



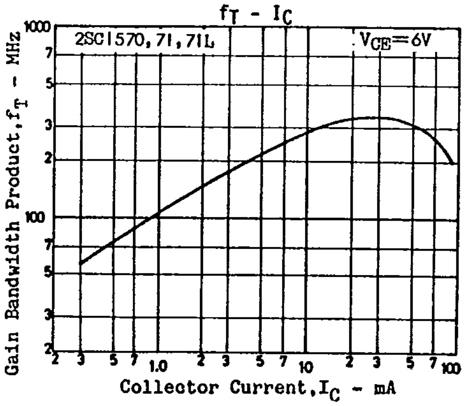
$h_{FE}$ - $I_C$



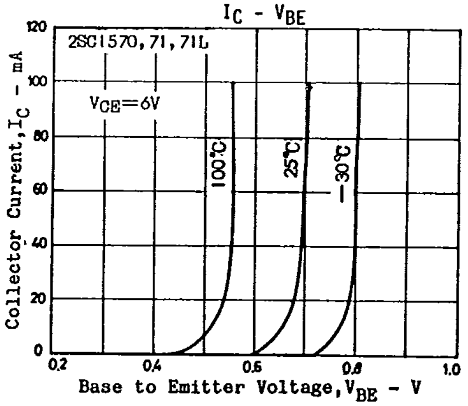
$I_C$ - $V_{BE}$



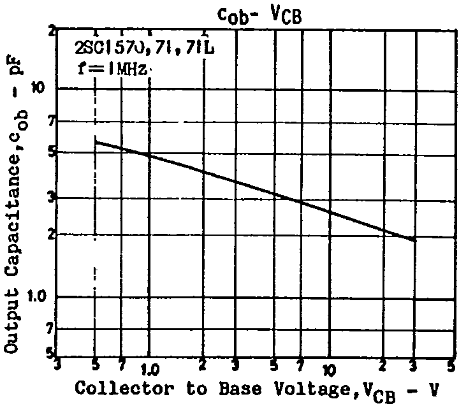
$f_T$ - $I_C$



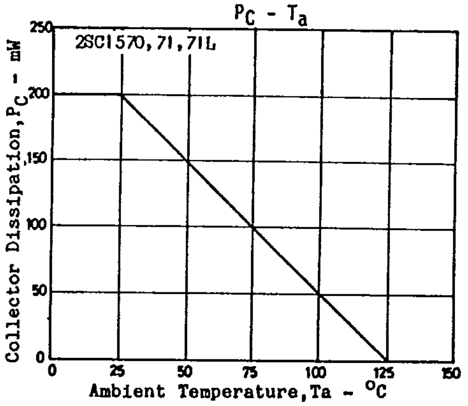
$I_C$ - $V_{BE}$



$C_{ob}$ - $V_{CB}$



$P_C$ - $T_a$



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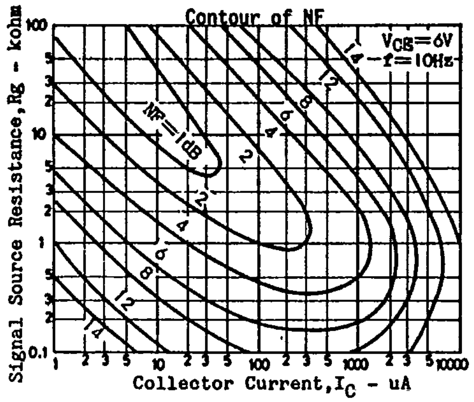
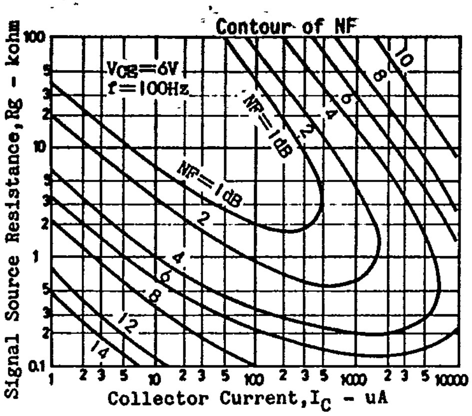
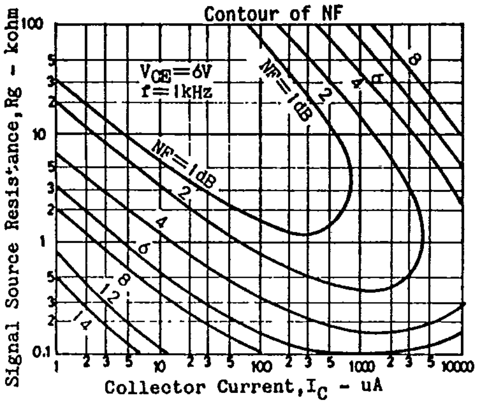

Contour of NF
VCE=6V
f=10Hz
NF=1dB
2
4
6
8
12
14
Signal Source Resistance,Rg - kohm
100
5
3
2
10
1
0.1
Collector Current,IC - uA
1
2
3
5
10
100
1000
10000


Contour of NF
VCE=6V
f=100Hz
NF=1dB
2
4
6
8
10
12
14
Signal Source Resistance,Rg - kohm
100
5
3
2
10
1
0.1
Collector Current,IC - uA
1
2
3
5
10
100
1000
10000


Contour of NF
VCE=6V
f=1kHz
NF=1dB
2
4
6
8
12
14
Signal Source Resistance,Rg - kohm
100
5
3
2
10
1
0.1
Collector Current,IC - uA
1
2
3
5
10
100
1000
10000

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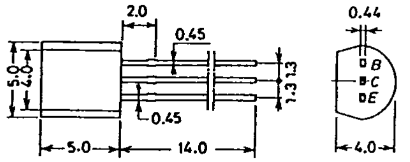
# CASE OUTLINES AND ATTACHMENTS

- 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

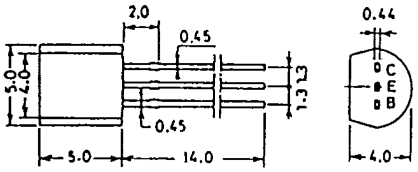


JEDEC: TO-92
EIAJ : SC-43
SANYO: NP

B. Base
C. Collector
E. Emitter

## Case Outline—[2004A]

unit:mm

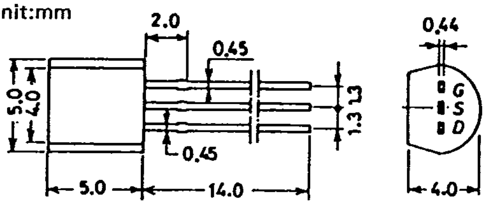


JEDEC: TO-92
EIAJ : SC-43
SANYO: NP

C. Collector
E. Emitter
B. Base

## Case Outline—[2005A]

unit:mm

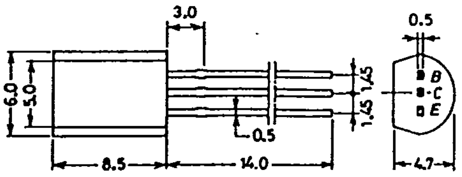


JEDEC: TO-92
EIAJ : SC-43
SANYO: NP

G: Gate
S: Source
D: Drain

## Case Outline—[2006A]

unit:mm

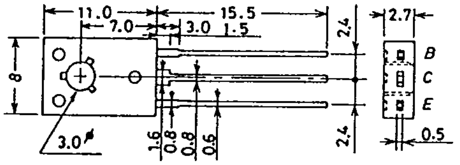


EIAJ: SC-51
SANYO: MP

B: Base
C: Collector
E: Emitter

## Case Outline—[2009A]

unit:mm

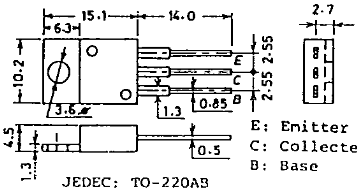


JEDEC: TO-126

B: Base
C: Collector
E: Emitter

## Case Outline—[2010A]

unit:mm

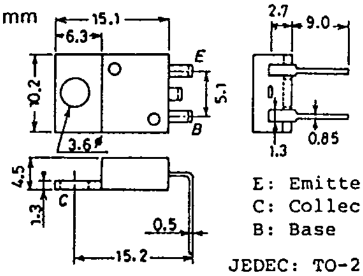


E: Emitter
C: Collecter
B: Base

JEDEC: TO-220AB
EIAJ: SC-46

## Case Outline—[2012]

unit:mm

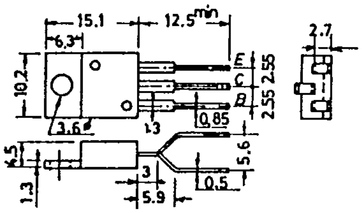


E: Emitter
C: Collector
B: Base

JEDEC: TO-220AA
EIAJ : SC-45

## Case Outline—[2013]

unit:mm



JEDEC TO-220

B: Base
C: Collector
E: Emitter

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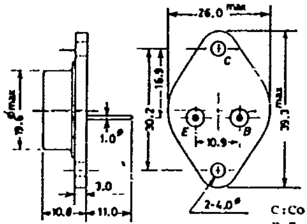
## Case Outline—[2017]

unit:mm

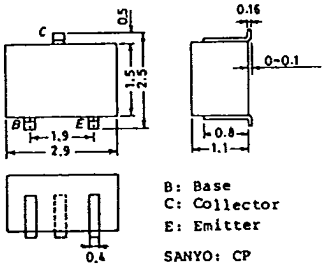


EIAJ TC-3,TB-3
JEDEC. TO-3

C:Collector
E:Emitter
B.Base

## Case Outline—[2018A]

unit:mm

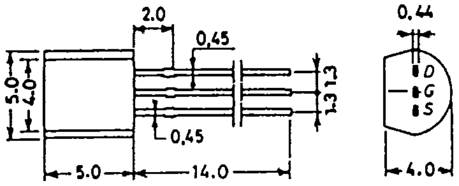


B: Base
C: Collector
E: Emitter

SANYO: CP

## Case Outline—[2019A]

unit:mm

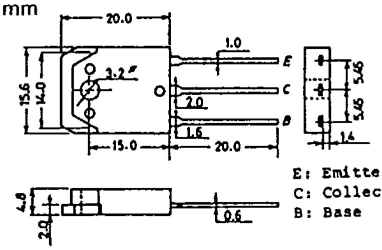


JEDEC: TO-92
EIAJ : SC-43
SANYO: NP

D: Drain
G: Gate
S: Source

## Case Outline—[2022]

unit:mm

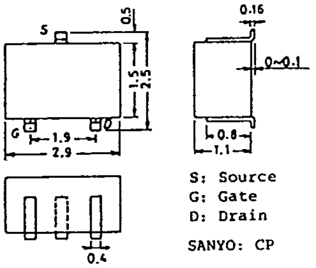


E: Emitter
C: Collector
B: Base

SANYO: TO3PB

## Case Outline—[2024A]

unit:mm

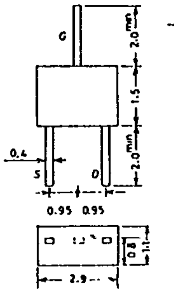


S: Source
G: Gate
D: Drain

SANYO: CP

## Case Outline—[2025]

unit:mm

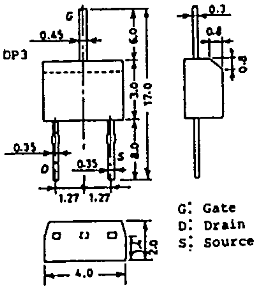


G: Gate
S: Source
D: Drain

## Case Outline—[2026]

unit:mm

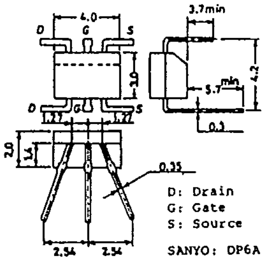
SANYO: DP3



G: Gate
D: Drain
S: Source

## Case Outline—[2027A]

unit:mm

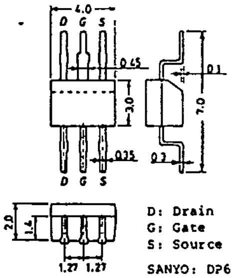


D: Drain
G: Gate
S: Source

SANYO: DP6A

## Case Outline—[2028A]

unit:mm

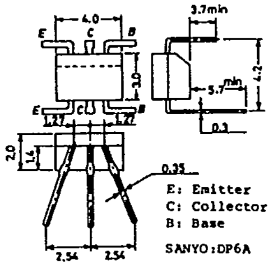


D: Drain
G: Gate
S: Source

SANYO: DP6B

## Case Outline—[2029A]

unit:mm



E: Emitter
C: Collector
B: Base

SANYO:DP6A

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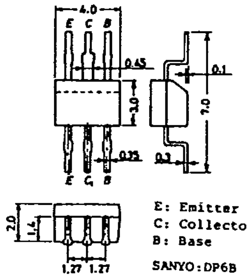
## Case Outline—[2030A]

unit:mm

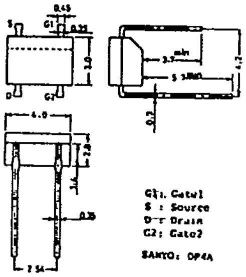


E: Emitter
C: Collector
B: Base

SANYO:DP6B

## Case Outline—[2031A]

unit:mm

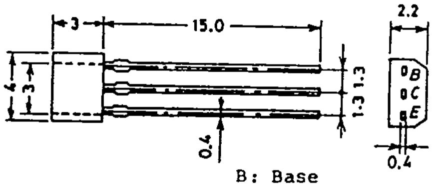


G1: Gate1
S: Source
D: Drain
G2: Gate2

SANYO: DP4A

## Case Outline—[2033]

unit:mm

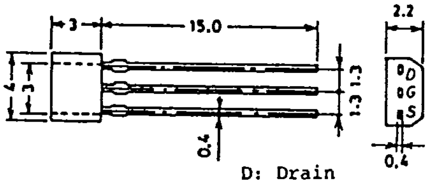


B: Base
C: Collector
E: Emitter

SANYO: SPA

## Case Outline—[2034]

unit:mm

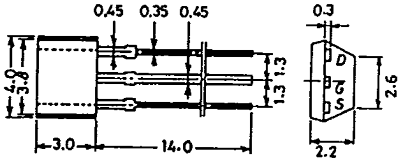


D: Drain
G: Gate
S: Source

SANYO: SPA

## Case Outline—[2037]

unit:mm

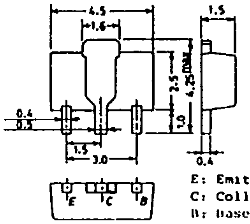


D: Drain
G: Gate
S: Source

SANYO: SP'

## Case Outline—[2038]

unit:mm

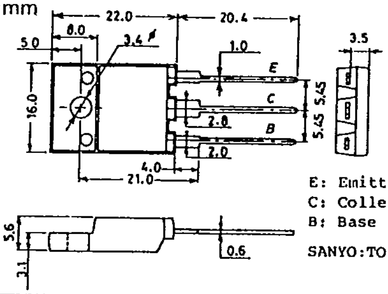


E: Emitter
C: Collector
B: Base

SANYO: PCP

## Case Outline—[2039]

unit:mm

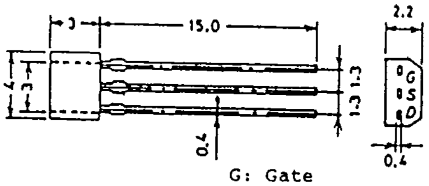


E: Emitter
C: Collector
B: Base

SANYO:TO3PML

## Case Outline—[2040]

unit:mm

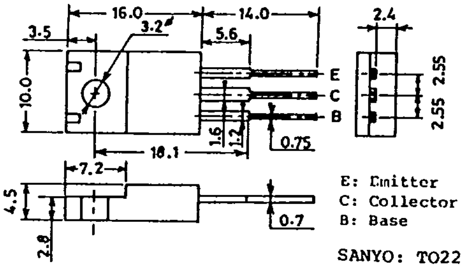


G: Gate
S: Source
D: Drain

SANYO: SPA

## Case Outline—[2041]

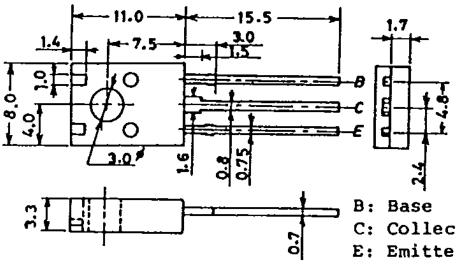
unit:mm



E: Emitter
C: Collector
B: Base

SANYO: TO220ML

## Case Outline—[2042A] unit:mm



B: Base
C: Collector
E: Emitter

SANYO: TO126ML

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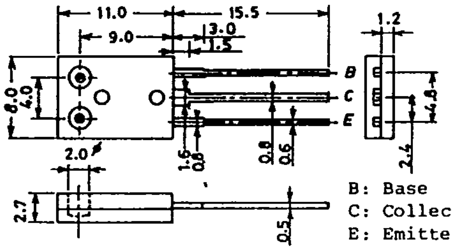
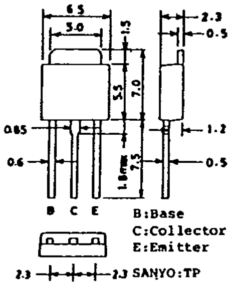
### Case Outline—[2043A] unit:mm



B: Base
C: Collector
E: Emitter

SANYO: TO126LP

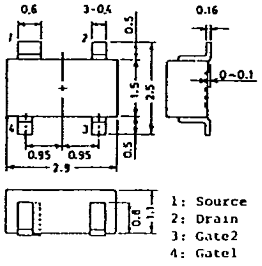
### Case Outline—[2045]
unit:mm



B:Base
C:Collector
E:Emitter

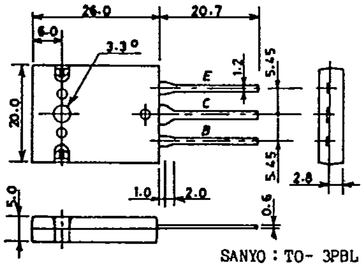
SANYO:TP

### Case Outline—[2046]
unit:mm



1: Source
2: Drain
3: Gate2
4: Gate1

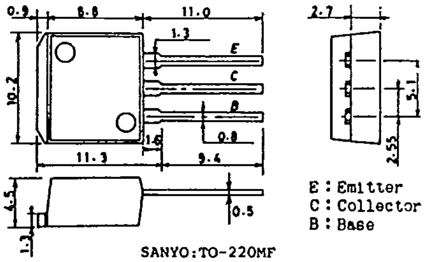
### Case Outline—[2048] unit:mm



E : Emitter
C : Collector
B : Base

SANYO : TO- 3PBL

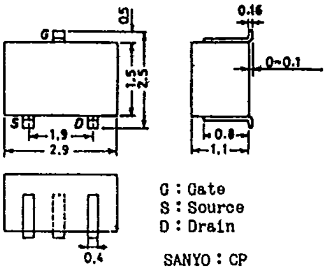
### Case Outline—[2049]
unit:mm



E : Emitter
C : Collector
B : Base

SANYO:TO-220MF

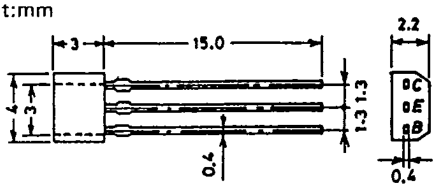
### Case Outline—[2050]
unit:mm



G : Gate
S : Source
D : Drain

SANYO : CP

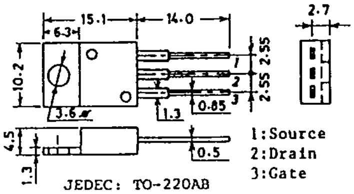
### Case Outline—[2051]
unit:mm



C : Collector
E : Emitter
B : Base

SANYO: SPA

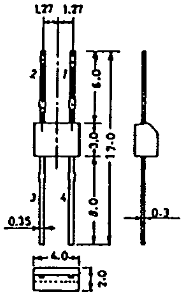
### Case Outline—[2052A]
unit:mm



1:Source
2:Drain
3:Gate

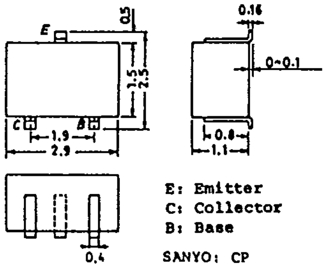
JEDEC: TO-220AB
EIAJ: SC-46

### Case Outline—[2053]
unit:mm



1:Drain
2:Source
3:Gate 1
4:Gate 2

### Case Outline—[2054]
unit:mm

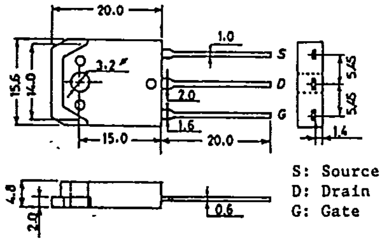


E: Emitter
C: Collector
B: Base

SANYO: CP

T-91-20

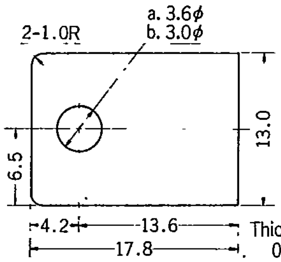
Case Outline—[2056] unit:mm



SANYO: TO3PB

Case Outline—[0008]
unit:mm

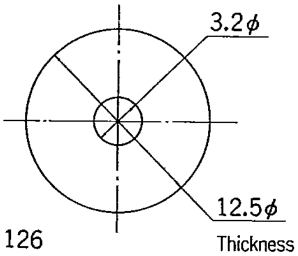
a. IS-313B
b. IS-313D



Thickness
0.10~0.05

SANYO

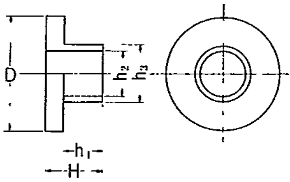
Case Outline—[0004]
unit:mm



SANYO IS-126

Thickness : 0.075

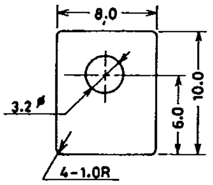
Case Outline—[0009]
unit:mm



| Bush | D | H | h1 | h2 | h3 |
|---|---|---|---|---|---|
| A | 8.0ϕ | 4.0 | 2.8 | 3.1ϕ | 3.89ϕ |
| B | 8.0ϕ | 3.0 | 1.8 | 3.1ϕ | 3.89ϕ |
| C | 8.0ϕ | 5.7 | 4.5 | 3.1ϕ | 3.89ϕ |
| D | 8.0ϕ | 2.7 | 1.5 | 3.1ϕ | 3.89ϕ |
| E | 8.0ϕ | 3.4 | 2.2 | 3.1ϕ | 3.89ϕ |
| F | 8.0ϕ | 4.0 | 2.8 | 3.0ϕ | 3.59ϕ |
| K | 16.0ϕ | 3.4 | 1.4 | 3.1ϕ | 6.0ϕ |
| L | 6.0ϕ | 3.1 | 1.5 | 2.6ϕ | 3.5ϕ |
| M | 6.0ϕ | 3.1 | 1.5 | 3.0ϕ | 3.59ϕ |
| P | 6.0ϕ | 2.3 | 1.1 | 3.0ϕ | 3.59ϕ |

SANYO Bush

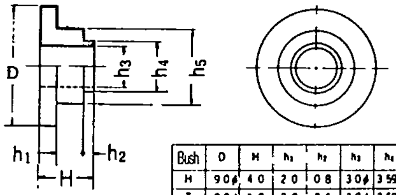
Case Outline—[0005]
unit:mm



Thickness : 0.075

SANYO IS-126A Mica

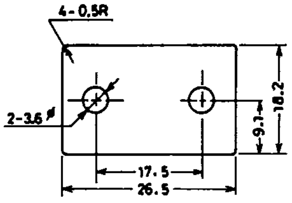
Case Outline—[0010]
unit:mm



| Bush | D | H | h1 | h2 | h3 | h4 | h5 |
|---|---|---|---|---|---|---|---|
| H | 9.0ϕ | 4.0 | 2.0 | 0.8 | 3.0ϕ | 3.59ϕ | 5.6ϕ |
| T | 9.0ϕ | 5.8 | 2.0 | 2.6 | 3.0ϕ | 3.59ϕ | 5.6ϕ |
| UB | 16.0ϕ | 6.8 | 1.5 | 3.3 | 3.0ϕ | 3.89ϕ | 8.0ϕ |

SANYO Bush

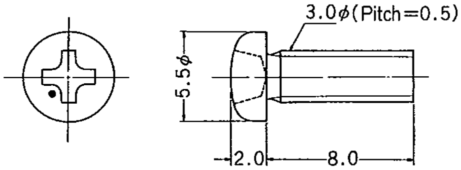
Case Outline—[0006]
unit:mm



Thickness : 0.05~0.1

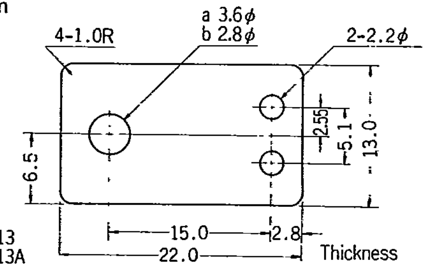
SANYO IS-20MA Mica

Case Outline—[0011]
unit:mm



JIS No.B1111 M3×0.5

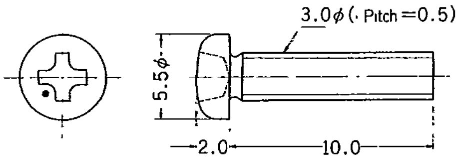
Case Outline—[0007]
unit:mm



a. IS-313
b. IS-313A

Thickness
0.10~0.05

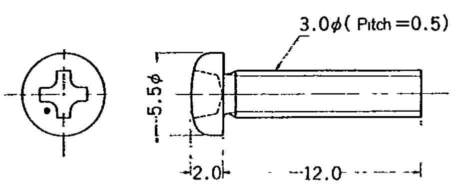
Case Outline—[0012]
unit:mm



JIS No.B1111 M3×0.5

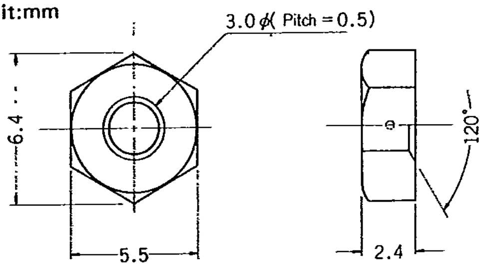
T-91-20

Case Outline–[0013]
unit:mm



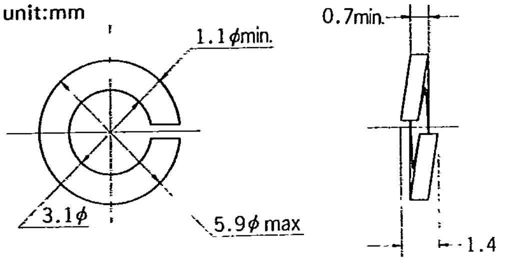
JIS No.B1111 M3×0.5

Case Outline–[0014]
unit:mm



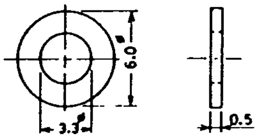
JIS No. B1181 M3×0.5

Case Outline–[0015]
unit:mm



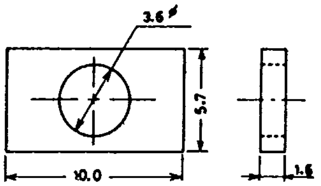
JIS No. B 1251 Spring washer (M3)

Case Outline–[0016]
unit:mm



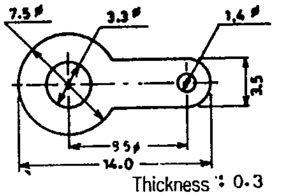
JIS No.B1252 Flat washer

Case Outline–[0017]
unit:mm



JIS No.G3141 Rectangular washer

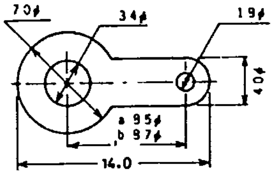
Case Outline–[0018]
unit:mm



Thickness : 0.3

SANYO Lug 1.4

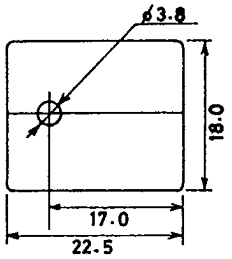
Case Outline–[0019]
unit:mm



Thickness : 0.3

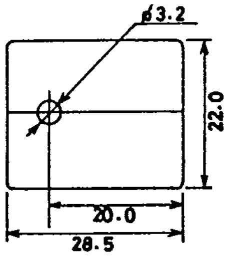
SANYO Lug 1.8ϕ

Case Outline–[0020]
unit:mm



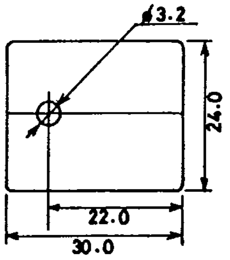
SANYO IS-3MP Mica

Case Outline–[0021]
unit:mm



SANYO IS-MPC Mica

Case Outline–[0022]
unit:mm



SANYO IS-3PBL Mica