



2010A

NPN Epitaxial Planar Silicon Transistor

T-33-11

CRT Display Horizontal Deflection Output Applications

©1313A

- . High switching speed.
- . Especially suited for high-definition CRT displays.
- . Wide ASO and highly resistant to breakdown.

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

Collector to Base Voltage	V _{CB0}	250	V
Collector to Emitter Voltage	V _{CE0}	100	V
Emitter to Base Voltage	V _{EB0}	6	V
Collector Current	I _C	7.5	A
Peak Collector Current	i _{cp}	15	A
Base Current	I _B	4	A
Collector Dissipation	P _C	50	W
Junction Temperature	T _j	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

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

Collector Characteristics at $I_A=25^\circ\text{C}$		min	typ	max	unit
Collector Cutoff Current	I_{CBO}	$V_{CB}=200\text{V}, I_E=0$		100	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=5\text{V}, I_C=0$		100	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}, I_C=5\text{A}$	15	75	
Gain Bandwidth Product	f_T	$V_{CE}=10\text{V}, I_C=0.5\text{A}$	10	40	MHz
Collector to Emitter Saturation Voltage	$V_{CE}(\text{sat})$	$I_C=5\text{A}, I_B=0.5\text{A}$		1.2	V
Base to Emitter Saturation Voltage	$V_{BE}(\text{sat})$	$I_C=5\text{A}, I_B=0.5\text{A}$		1.2	V
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=1\text{mA}, I_E=0$	250		V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}, R_{BE}=\infty$	100		V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=1\text{mA}, I_C=0$	6		V
Fall Time	t_f	$I_C=5\text{A}, I_{B1}=-I_{B2}=0.5\text{A}$		0.5	μs

15.1 14.0 6.3 10.2 3.6 4.5 1.3 18.0 0.5 2.7 2.95 2.55 0.85 1.3

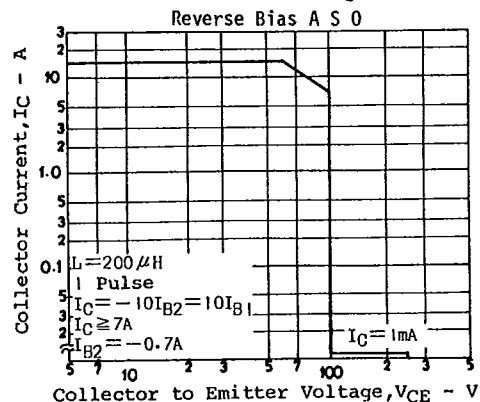
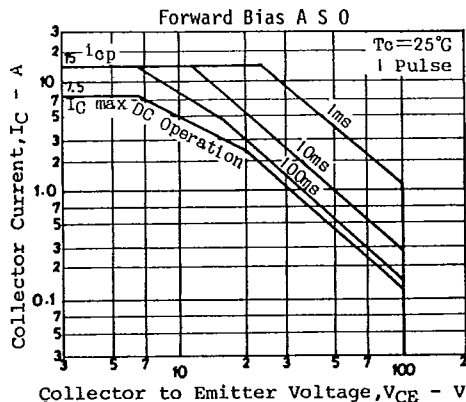
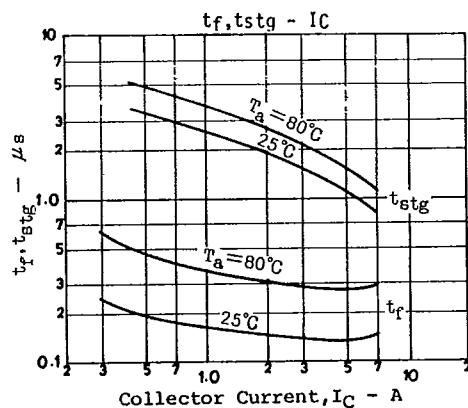
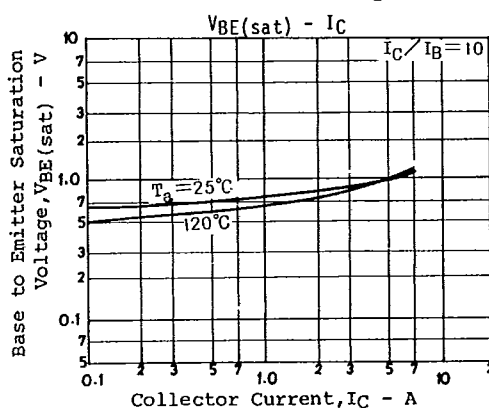
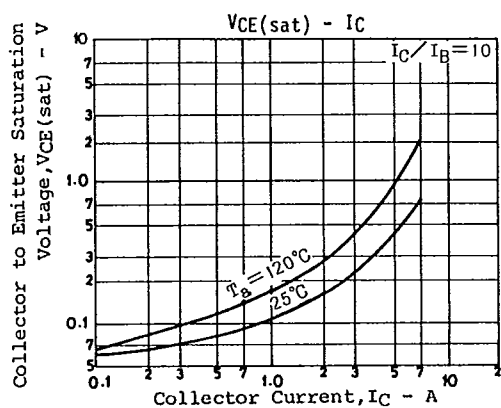
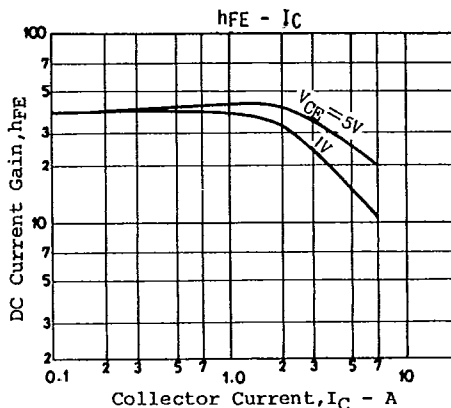
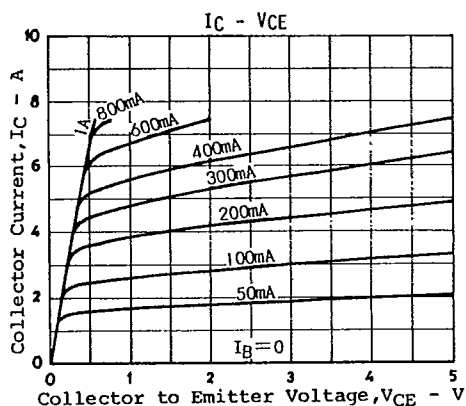
E: Emitter
C: Collector
B: Base

JEDEC: TO-220AB
EIAJ: SC-46

4217KI/O064MW, TS No.1313-1/2

2SC3189

T-33-11



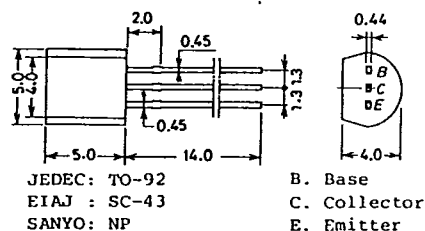
T-91-20

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.

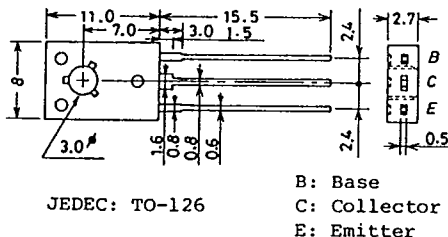
Case Outline—[2003A]

unit:mm



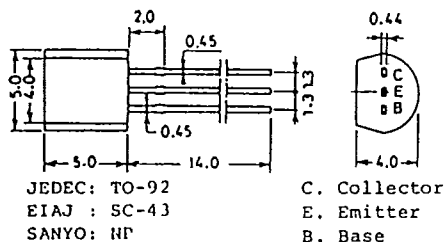
Case Outline—[2009A]

unit:mm



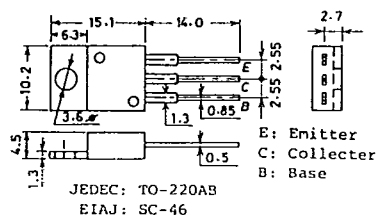
Case Outline—[2004A]

unit:mm



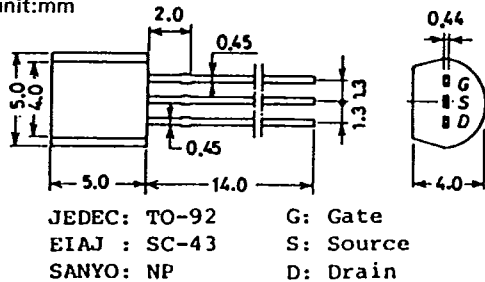
Case Outline—[2010A]

unit:mm



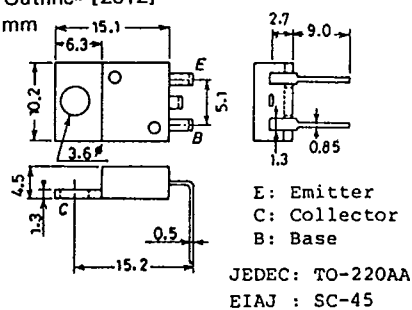
Case Outline—[2005A]

unit:mm



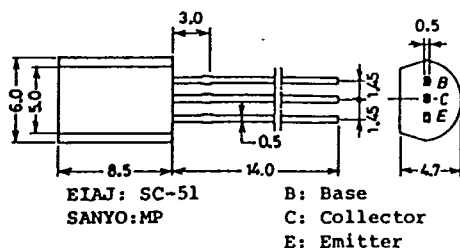
Case Outline—[2012]

unit:mm



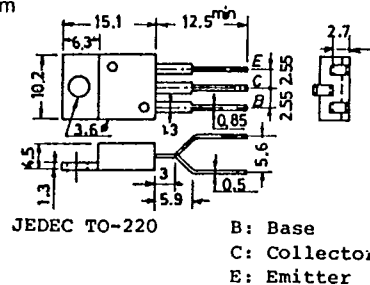
Case Outline—[2006A]

unit:mm

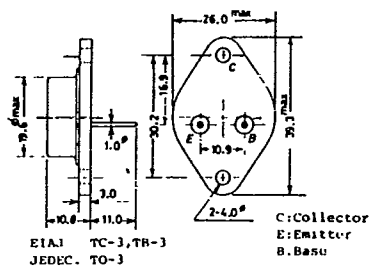


Case Outline—[2013]

unit:mm

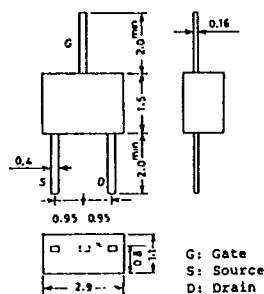


unit:mm



Case Outline—[2025]

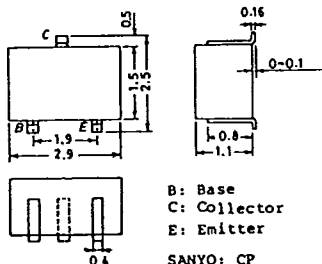
unit:mm



G: Gate
S: Source
D: Drain

Case Outline—[2018A]

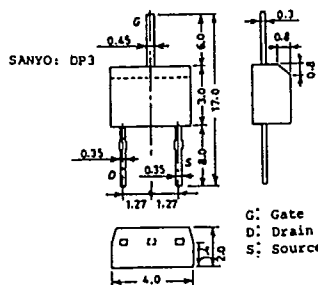
unit:mm



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

Case Outline—[2026]

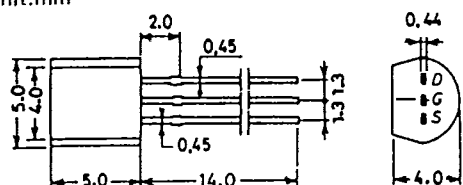
unit:mm



G: Gate
D: Drain
S: Source

Case Outline—[2019A]

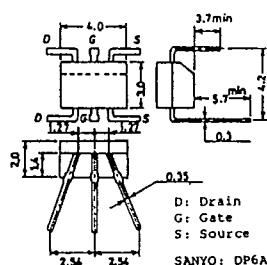
unit:mm



JEDEC: TO-92 D: Drain
EIAJ : SC-43 G: Gate
SANYO: NP S: Source

Case Outline—[2027A]

unit:mm

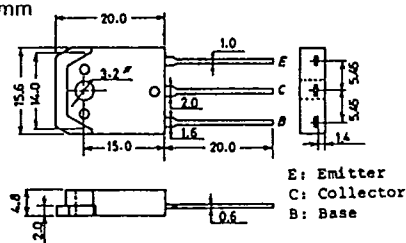


D: Drain
G: Gate
S: Source

SANYO: DP6A

Case Outline--[2022]

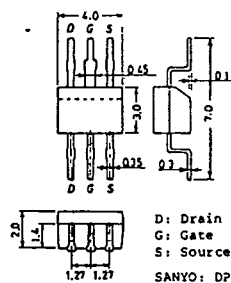
unit:mm



SANYO: TO3PB

Case Outline--[2028A]

unit:mm

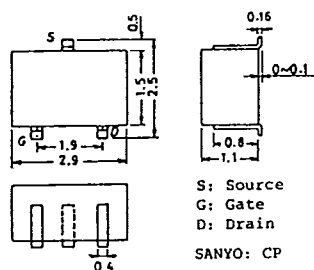


D: Drain
G: Gate
S: Source

SANYO: D26B

Case Outline—[2024A]

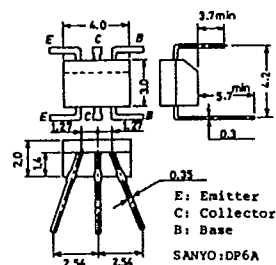
unit:mm



S: Source
G: Gate
D: Drain
SANYO: CP

Case Outline—[2029A]

unit:mm



E: Emitter
C: Collector
B: Base

SANYO:DP6A

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

E: Emitter
C: Collector
B: Base

SANYO: PCP

G1: Cat1
\$: Source
D-r Drain
G2: Cat2
SANYO: OP4A

E: Emitter
C: Collector
B: Base
SANYO:TO3PML

B: Base
C: Collector
E: Emitter

G: Gate
S: Source
D: Drain
SANYO: SPA

D: Drain
G: Gate
S: Source

SANYO: SPA

E: Emitter
C: Collector
B: Base

SANYO: T0220ML

D: Drain
G: Gate
S: Source
SANYO: SP'

B: Base
C: Collector
E: Emitter

SANYO: TO126ML

T-91-20

SANYO: TO126LP



SANYO : CP

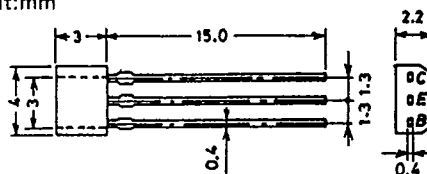
6.5
5.0
1.5
2.3
0.9
0.65
0.6
3.5
7.0
1.2
0.5
1.8mm
2.5
2.3
2.3

B:Base
C:Collector
E:Emitter

SANYO: TP

B:Base
C:Collector
E:Emitter

2.3 ————— 2.3 SANYO:TP

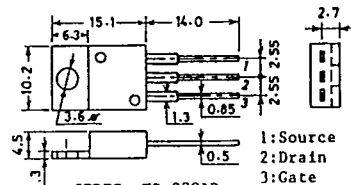


C : Collector
E : Emitter
B : Base

SANYO: SPA

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

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



JEDEC: TO-220AB
EIAJ: SC-46

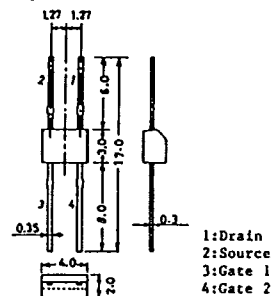
1:Source
2:Drain
3:Gate

The drawing shows the TO-3PBL package with the following dimensions and features:

- Top View:**
 - Overall width: 26.0
 - Distance from left edge to center of mounting holes: 6.0
 - Distance between mounting holes: 20.7
 - Mounting hole diameter: $\phi 3.3$
 - Distance from center of mounting holes to center of pin: 1.2
 - Pin diameter: $\phi 1.5$
 - Pin length: 5.45
- Side View:**
 - Package height: 5.0
 - Distance from base to mounting holes: 1.0
 - Distance from base to pin: 2.0
 - Pin diameter: $\phi 1.5$
 - Pin length: 5.45
 - Pin diameter: $\phi 2.8$
- Pin Connections:**
 - E: Emitter
 - C: Collector
 - B: Base

SANYO : TO-3PBL

SANYO : TO- 3PBL



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

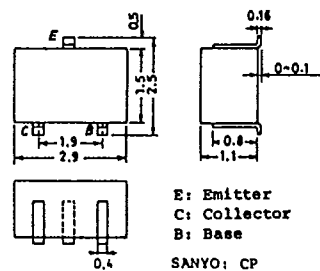
0.9 8.8 11.0 1.3 E
10.2 C
11.3 1.6 0.8 B
4.5 9.4 0.5
1.3

2.7 1.3 5.1 2.55

E : Emitter
C : Collector
B : Base

SANYO TO-220MF

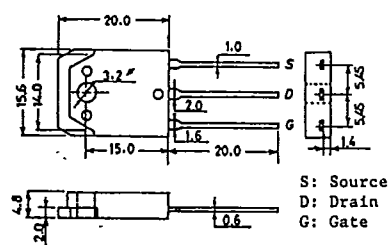
SANYO:TO-220MF



E: Emitter
C: Collector
B: Base

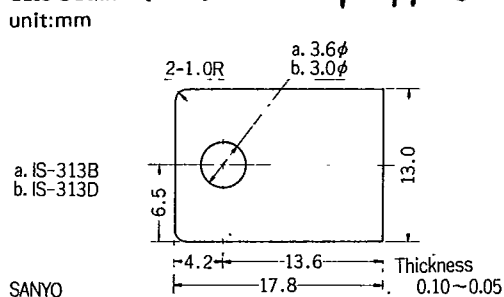
SANYO: CP

Case Outline—[2056] unit:mm

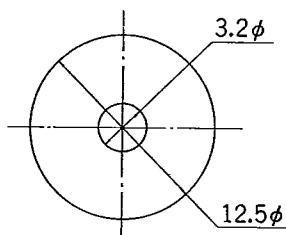


SANYO: TO3PB

Case Outline—[0008] unit:mm



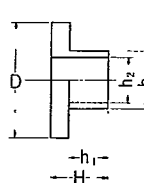
Case Outline—[0004] unit:mm



SANYO IS-126

Thickness : 0.075

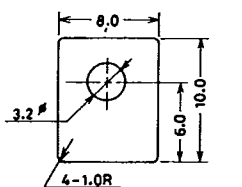
Case Outline—[0009] unit:mm



SANYO Bush

Bush	D	H	h ₁	h ₂	h ₃
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

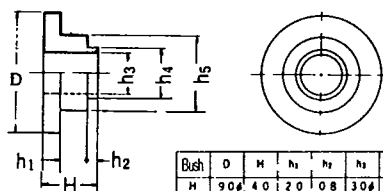
Case Outline—[0005] unit:mm



SANYO IS-126A Mica

Thickness : 0.075

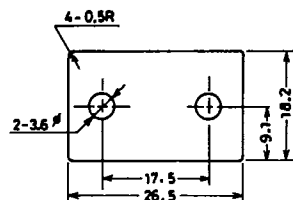
Case Outline—[0010] unit:mm



SANYO Bush

Bush	D	H	h ₁	h ₂	h ₃	h ₄	h ₅
H	9.0φ	4.0	2.0	0.8	3.0φ	3.99φ	5.6φ
T	9.0φ	5.8	2.0	2.6	3.0φ	3.99φ	5.6φ
UB	16.0φ	6.8	1.5	3.3	3.0φ	3.89φ	8.0φ

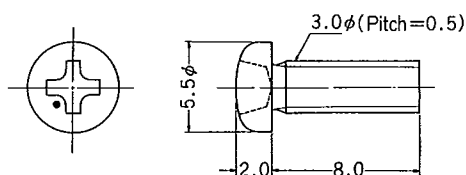
Case Outline—[0006] unit:mm



SANYO IS-20MA Mica

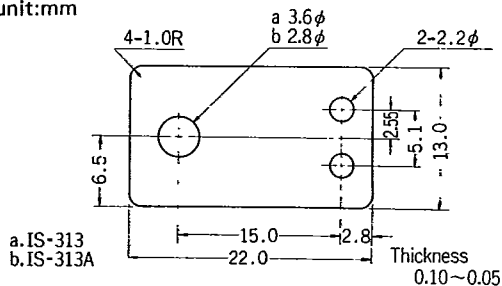
Thickness : 0.05~0.1

Case Outline—[0011] unit:mm

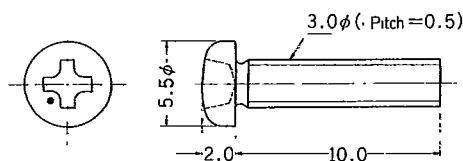


JIS No. B1111 M3×0.5

Case Outline—[0007] unit:mm



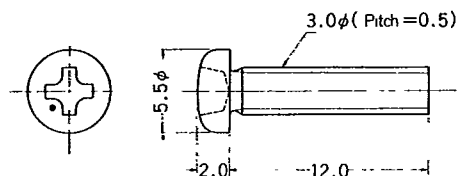
Case Outline—[0012] unit:mm



JIS No. B1111 M3×0.5

Case Outline—[0013]

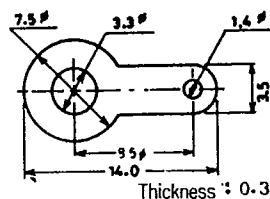
unit:mm



JIS No. B1111 M3×0.5

Case Outline—[0018]

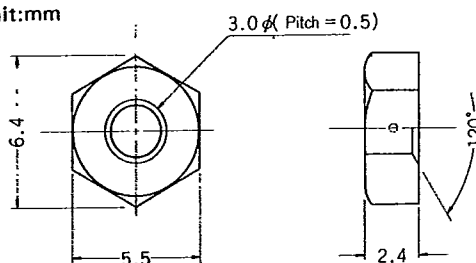
unit:mm



SANYO Lug 1.4

Case Outline—[0014]

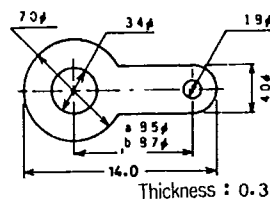
unit:mm



JIS No. B1181 M3×0.5

Case Outline—[0019]

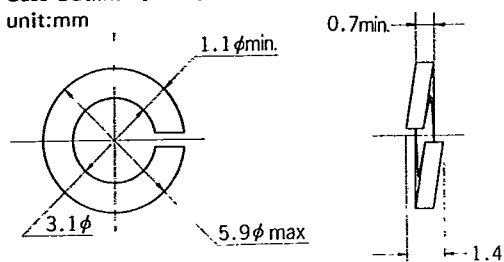
unit:mm



SANYO Lug 1.8

Case Outline—[0015]

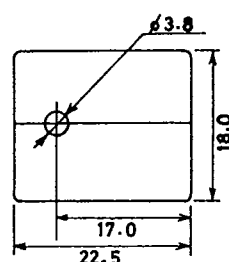
unit:mm



JIS No. B 1251 Spring washer (M3)

Case Outline—[0020]

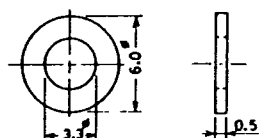
unit:mm



SANYO IS-3MP Mica

Case Outline—[0016]

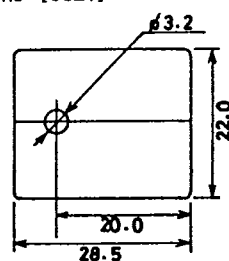
unit:mm



JIS No. B1252 Flat washer

Case Outline—[0021]

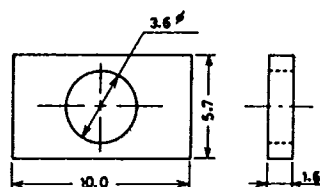
unit:mm



SANYO IS-MPC Mica

Case Outline—[0017]

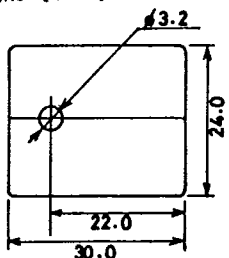
unit:mm



JIS No. G3141 Rectangular washer

Case Outline—[0022]

unit:mm



SANYO IS-3PBL Mica