

2SD1649

2039

NPN Triple Diffused Planar
Silicon Transistor

T-33-11

©1755B

Color TV Horizontal Deflection Output Applications(with Damper Diode)

Applications

- High-voltage, power switching

Features

- Fast speed ($t_{max}=0.4\mu s$).
- High reliability (Adoption of HVP process).
- High breakdown voltage ($V_{CBO}=1500V$).
- Micaless package facilitating mounting operation.

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

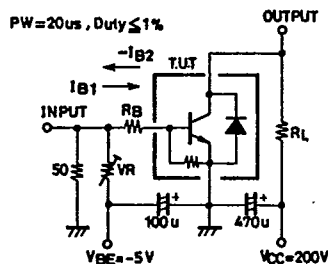
			unit
Collector to Base Voltage	V_{CBO}	1500	V
Collector to Emitter Voltage	V_{CEO}	800	V
Emitter to Base Voltage	V_{EBO}	6	V
Collector Current	I_C	2.5	A
Peak Collector Current	i_{cp}	10	A
Collector Dissipation	P_C	50	W
Junction Temperature	T_j	150	$^\circ C$
Storage Temperature	T_{stg}	-55 to +150	$^\circ C$

 $T_C=25^\circ C$

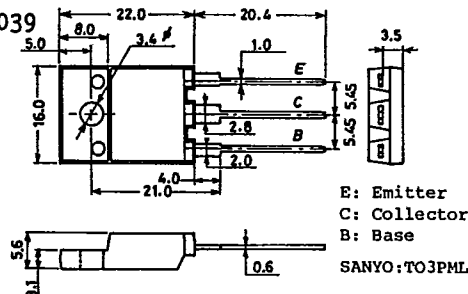
Electrical Characteristics at $T_a=25^\circ C$

		min	typ	max	unit
Collector Cutoff Current	I_{CBO} $V_{CB}=800V, I_E=0$			10	μA
Emitter Cutoff Current	I_{EBO} $V_{EB}=4V, I_C=0$	40		130	mA
DC Current Gain	h_{FE} $V_{CE}=5V, I_C=0.5A$	8			
Gain Bandwidth Product	f_T $V_{CE}=10V, I_C=0.5A$		3		MHz
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$ $I_C=2A, I_B=0.6A$			8	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$ $I_C=2A, I_B=0.6A$			1.5	V
Collector to Base Breakdown Voltage	$V_{(BR)CBO}$ $I_C=5mA, I_E=0$	1500			V
Collector to Emitter Breakdown Voltage	$V_{(BR)CEO}$ $I_C=100mA, R_{BE}=\infty$	800			V
Emitter to Base Breakdown Voltage	$V_{(BR)EBO}$ $I_E=200mA, I_C=0$	7			V
Diode Forward Voltage	V_F $I_{EC}=2.5A$			2	V
Fall Time	t_f $I_C=2A, I_{B1}=0.6A, I_{B2}=-1.2A, V_{CC}=200V, R_L=100\Omega$			0.4	μs

Switching Time Test Circuit



Case Outline 2039 (unit:mm)



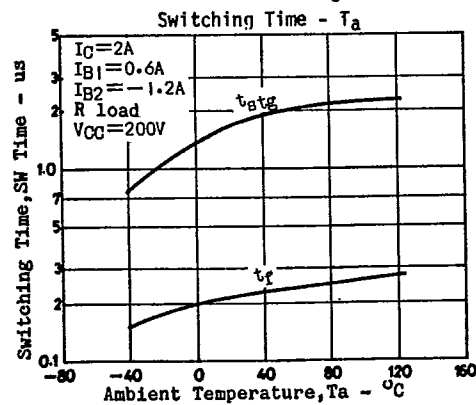
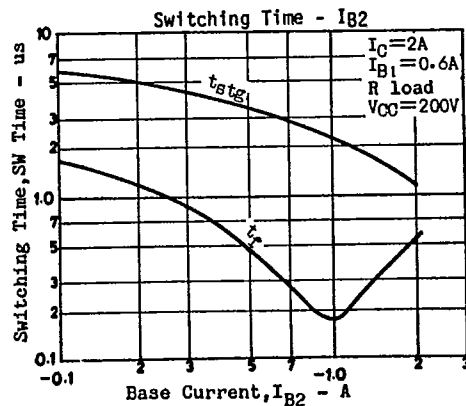
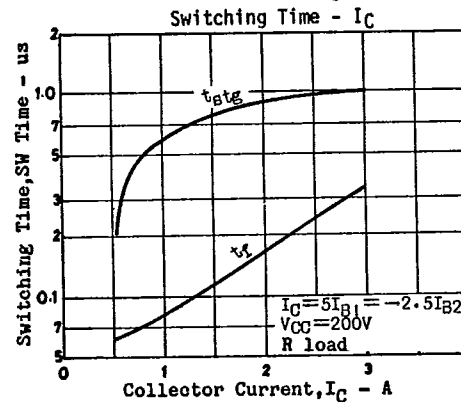
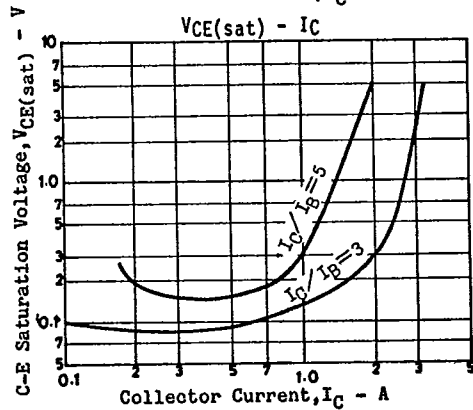
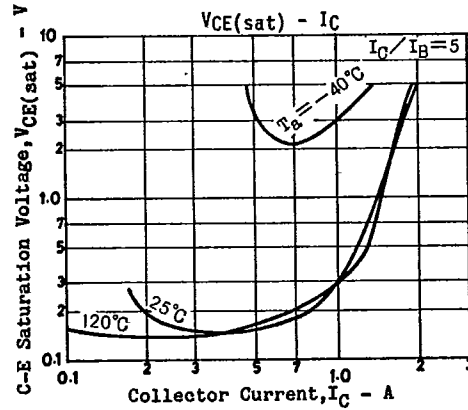
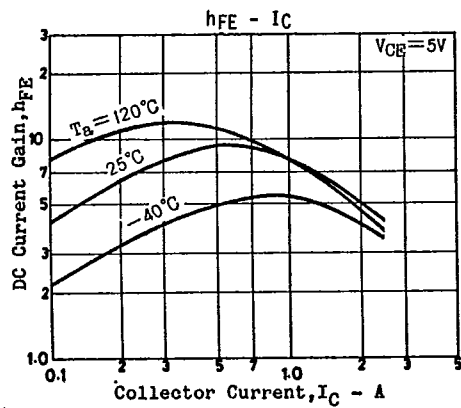
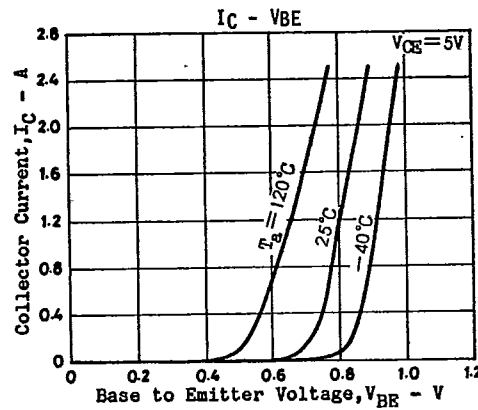
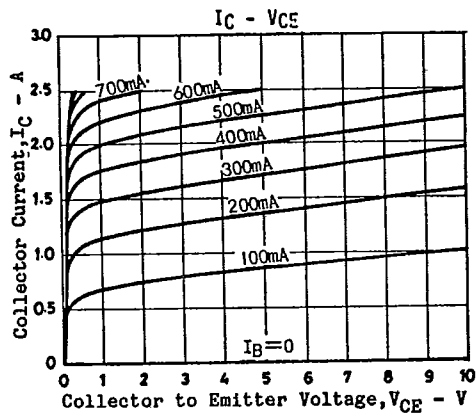
E: Emitter
C: Collector
B: Base
SANYO:TO3PML

5277KI/D244KI, TS No. 1755-1/3

1470

2SD1649

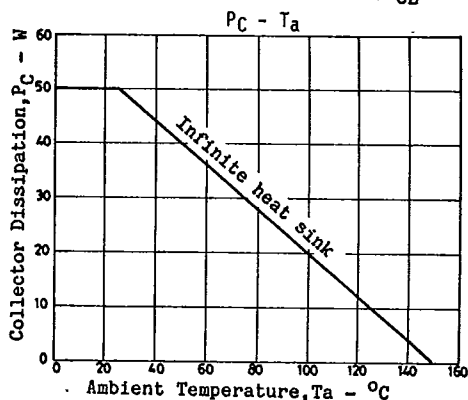
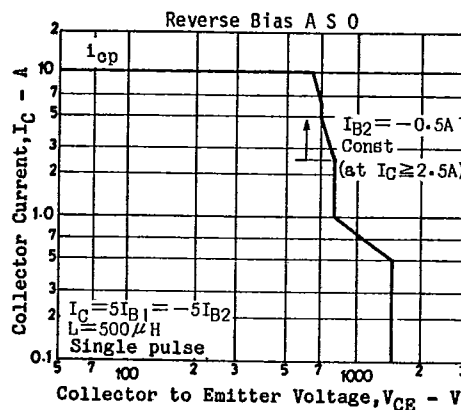
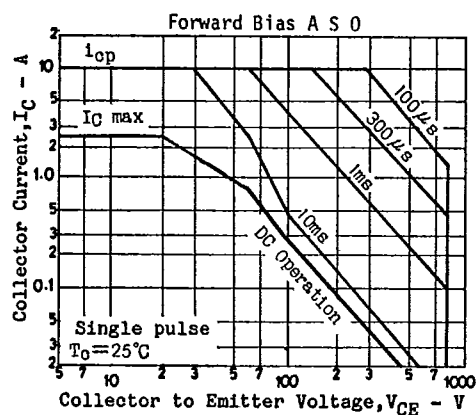
T-33-11



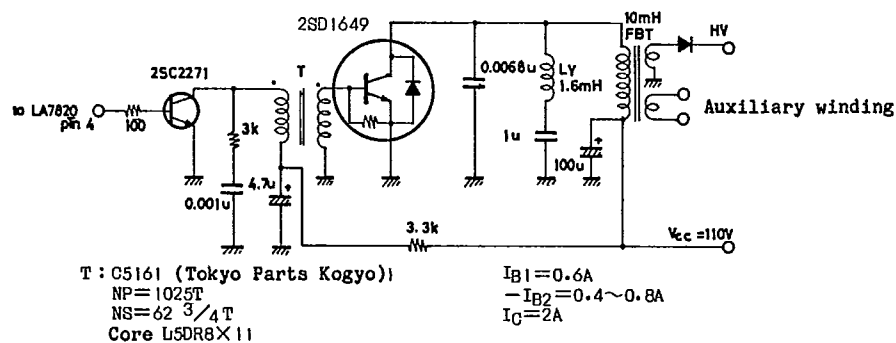
1471

2SD1649

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Sample Application Circuit



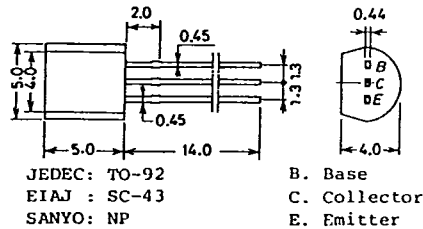
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CASE OUTLINES AND ATTACHMENTS

- 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.

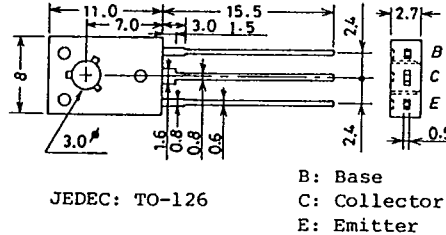
Case Outline—[2003A]

unit:mm



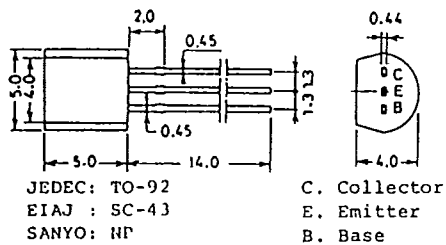
Case Outline—[2009A]

unit:mm



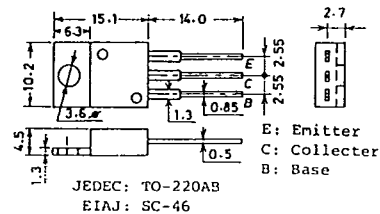
Case Outline—[2004A]

unit:mm



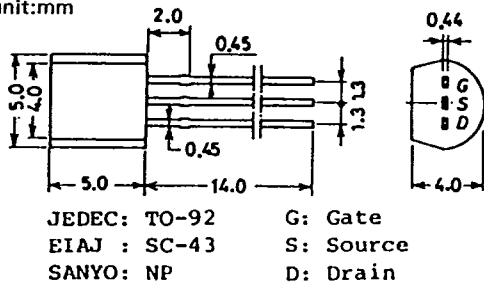
Case Outline—[2010A]

unit:mm



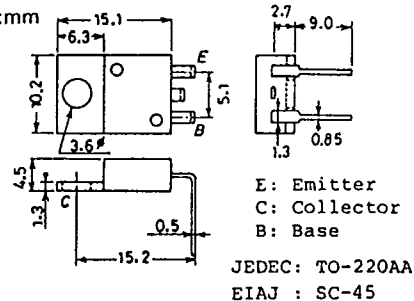
Case Outline—[2005A]

unit:mm



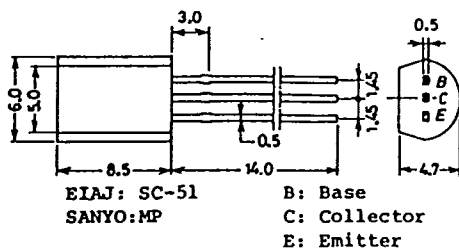
Case Outline—[2012]

unit:mm



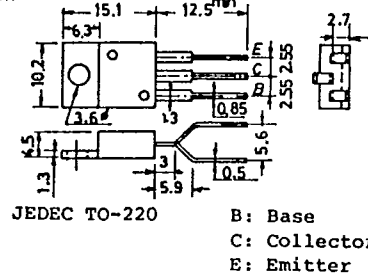
Case Outline—[2006A]

unit:mm

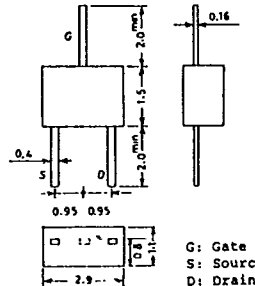


Case Outline—[2013]

unit:mm

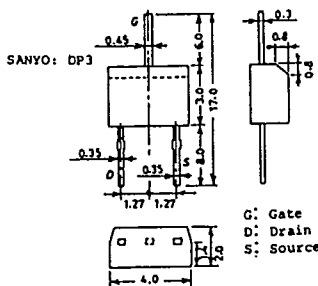


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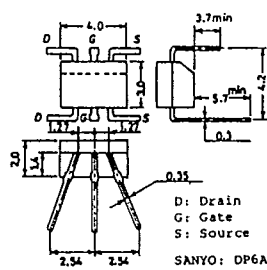
0.5
 1.2
 0.16
 0-0.1
 0.8
 1.1
 1.9
 2.9
 0.4

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



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

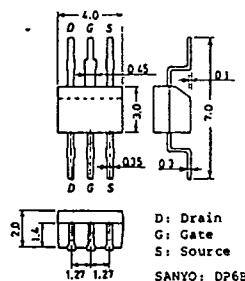
D: Drain
G: Gate
S: Source



The drawing shows the mechanical specifications of the TO3PB transistor package. The top view includes dimensions for the overall width (20.0 mm), mounting hole diameter (3.2 mm), and lead spacing (1.0 mm, 2.0 mm, 1.6 mm). The side view shows the package height (17.5 mm) and mounting hole offset (14.0 mm). The detail view shows the lead dimensions (5.0 mm, 5.6 mm, 1.4 mm) and the base lead length (0.6 mm).

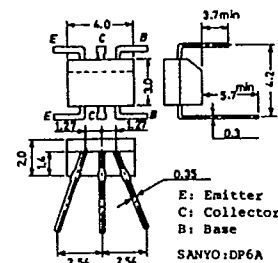
E: Emitter
C: Collector
B: Base

SANYO: TO3PB

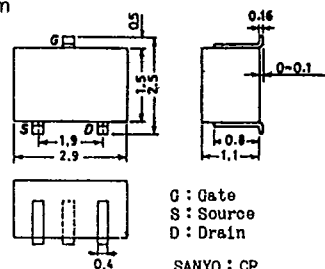


S: Source
G: Gate
D: Drain

SANYO: CP



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SANYO: TO126LP

SANYO : CP

6.5
5.0
1.5
5.5
7.0
0.85
0.6
1.8mm
2.3
2.3
2.3

2.3
0.5
1.2
0.5

B:Base
C:Collector
E:Emitter

SANYO: TP

C : Collector
E : Emitter
B : Base

SANYO: SPA

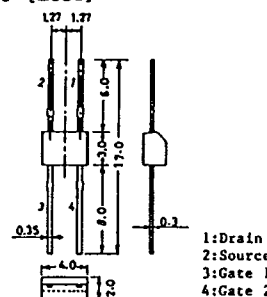
1: Source
2: Drain
Gate2
4: Gate1

1: Source
2: Drain
3: Gate

JEDEC: TO-220AB
EIAJ: SC-46

26.0
 20.7
 6.0
 3.3°
 20.0
 1.2
 5.45
 5.0
 1.0
 2.0
 0.6
 2.8
 E : Emitter
 C : Collector
 B : Base
 SANYO : TO-3PBL

SANYO : TO- 3PBL



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

Top view dimensions: 0.9, 8.8, 11.0, 1.3, 10.2, 11.3, 9.4, 0.8, 1.6.

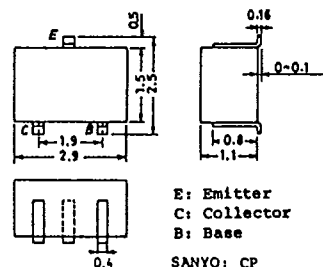
Side view dimensions: 4.5, 1.3, 0.5.

Detail view dimensions: 2.7, 2.53, 5.

Legend:
 E : Emitter
 C : Collector
 B : Base

SANYO TO-220MF

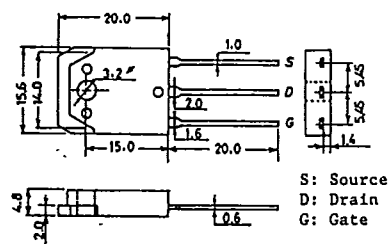
SANYO:TO-220MF



E: Emitter
C: Collector
B: Base

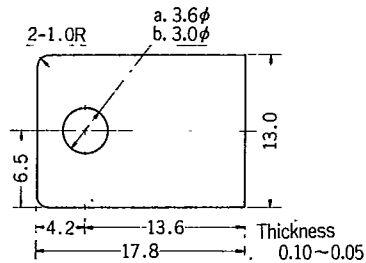
SANYO: CP

Case Outline—[2056] unit:mm



SANYO: TO3PB

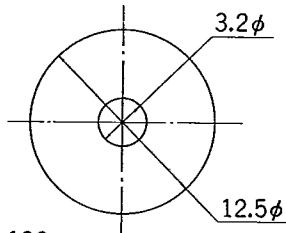
Case Outline—[0008] unit:mm

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

SANYO

Case Outline—[0004] unit:mm

unit:mm

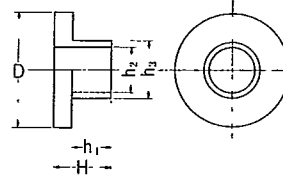


SANYO IS-126

Thickness : 0.075

Case Outline—[0009] unit:mm

unit:mm

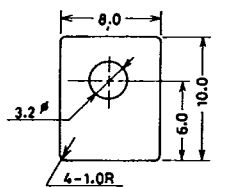


SANYO Bush

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

unit:mm

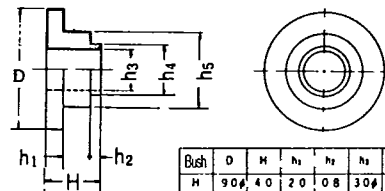


Thickness : 0.075

SANYO IS-126A Mica

Case Outline—[0010] unit:mm

unit:mm

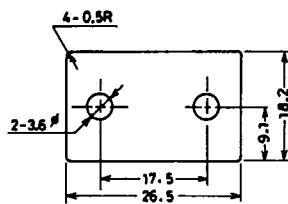


SANYO Bush

Bush	D	H	h ₁	h ₂	h ₃	h ₄	h ₅
H	9.0φ	4.0	2.0	0.8	3.0φ	3.59φ	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

Case Outline—[0006] unit:mm

unit:mm

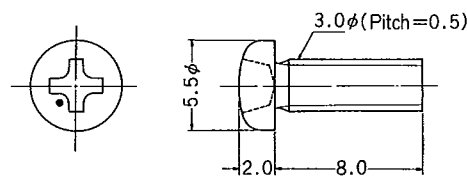


Thickness : 0.05~0.1

SANYO IS-20MA Mica

Case Outline—[0011] unit:mm

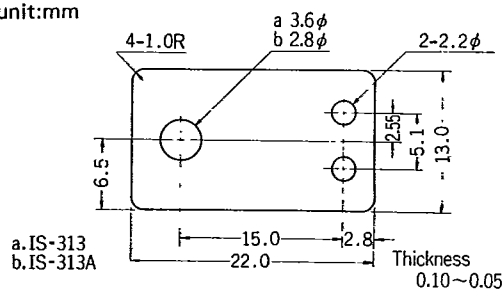
unit:mm



JIS No. B1111 M3×0.5

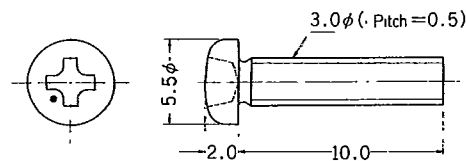
Case Outline—[0007] unit:mm

unit:mm



Case Outline—[0012] unit:mm

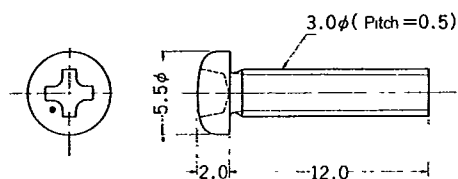
unit:mm



JIS No. B1111 M3×0.5

Case Outline—[0013]

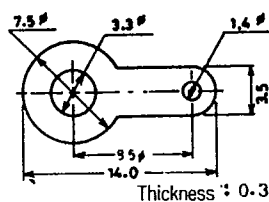
unit:mm



JIS No. B1111 M3×0.5

Case Outline—[0018]

unit:mm

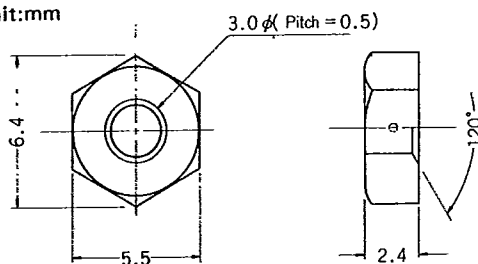


SANYO Lug 1.4

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Case Outline—[0014]

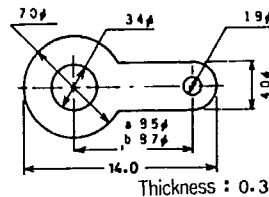
unit:mm



JIS No. B1181 M3×0.5

Case Outline—[0019]

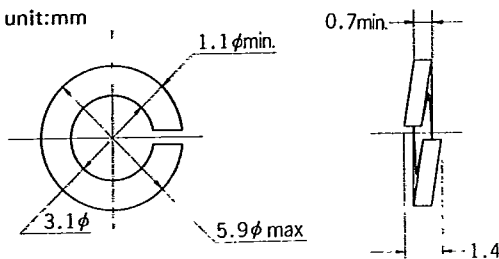
unit:mm



SANYO Lug 1.8φ

Case Outline—[0015]

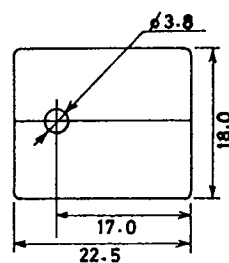
unit:mm



JIS No. B 1251 Spring washer (M3)

Case Outline—[0020]

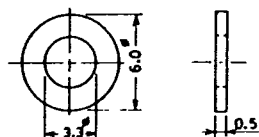
unit:mm



SANYO IS-3MP Mica

Case Outline—[0016]

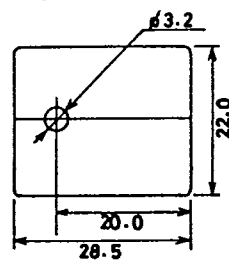
unit:mm



JIS No. B1252 Flat washer

Case Outline—[0021]

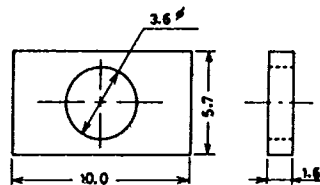
unit:mm



SANYO IS-MPC Mica

Case Outline—[0017]

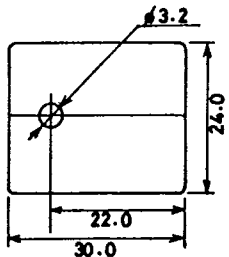
unit:mm



JIS No. G3141 Rectangular washer

Case Outline—[0022]

unit:mm



SANYO IS-3PBL Mica