

2SD1837

2041 NPN Planar Silicon Darlington Transistor

T-33-29

Driver Applications

©2231A

Applications

- Suitable for use in switching of L load (motor drivers, printer hammer drivers, relay drivers)

Features

- High DC current gain
- Large current capacity and wide ASO
- On-chip zener diode of $60 \pm 10V$ between collector and base
- Uniformity in collector to base breakdown voltage due to accurate impurity diffusion process
- Large inductive load handling capability
- Micaless package facilitating mounting

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

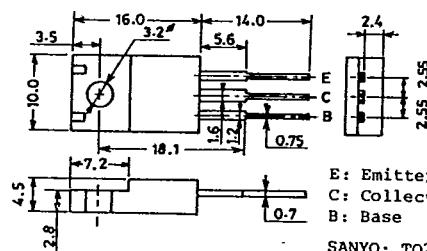
		unit
Collector to Base Voltage	V_{CB0}	50* V
Collector to Emitter Voltage	V_{CEO}	50* V
Emitter to Base Voltage	V_{EBO}	6 V
Collector Current	I_C	3 A
Peak Collector Current	i_{cp}	5 A
Base Current	I_B	0.5 A
Collector Dissipation	P_C	2.0 W
Junction Temperature	T_J	20 $^\circ C$
Storage Temperature	T_{stg}	150 $^\circ C$
		-55 to +150 $^\circ C$

 $T_c = 25^\circ C$ *: On-chip zener diode ($60 \pm 10V$)**Electrical Characteristics at $T_a = 25^\circ C$**

		min	typ	max	unit
Collector Cutoff Current	I_{CBO}			100	μA
Emitter Cutoff Current	I_{EBO}			3	mA
DC Current Gain	h_{FE}	1000	4000		
Gain-Bandwidth Product	f_T		20		MHz

 $V_{CB} = 40V, I_E = 0$ $V_{EB} = 5V, I_C = 0$ $V_{CE} = 3V, I_C = 1.5A$ $V_{CE} = 5V, I_C = 1.5A$

Continued on next page.

Case Outline 2041
(unit:mm)E: Emitter
C: Collector
B: Base

SANYO: TO220ML

4277TA, TS No. 2231-1/3

2SD1837

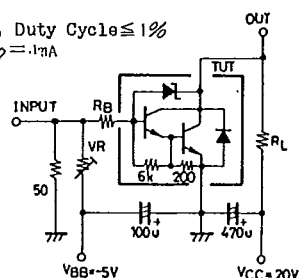
T-33-29

Continued from preceding page.

			min	typ	max	unit
C-E Saturation Voltage	$V_{CE(sat)}$	$I_C=1.5A, I_B=3mA$		0.9	1.5	V
B-E Saturation Voltage	$V_{BE(sat)}$	$I_C=1.5A, I_B=3mA$			2.0	V
C-B Breakdown Voltage	$V_{(BR)CBO}$	$I_C=5mA, I_E=0$	50	60	70	V
C-E Breakdown Voltage	$V_{(BR)CEO}$	$I_C=50mA, R_{BE}=\infty$	50	60	70	V
Inductive Load	E_s/b	$L=100mH, R_{BE}=100ohms$	40			mJ
Handling Capability						
Turn-on Time	t_{on}	See specified Test Circuit.		0.5		us
Storage Time	t_{stg}	$V_{CC}=20V, I_C=2.0A$		4.0		us
Fall Time	t_f	$I_{B1}=-I_{B2}=4mA$		1.5		us

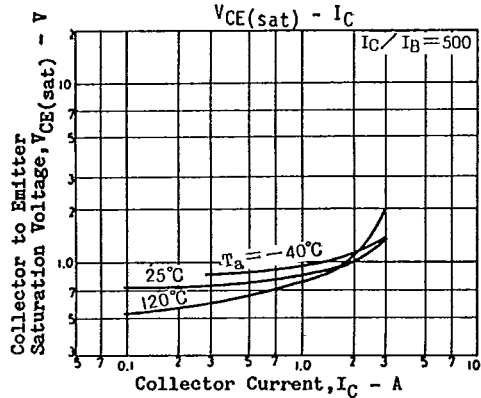
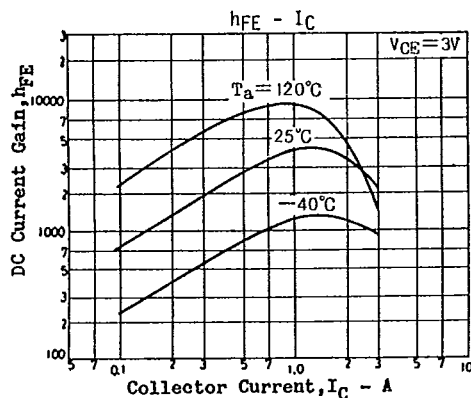
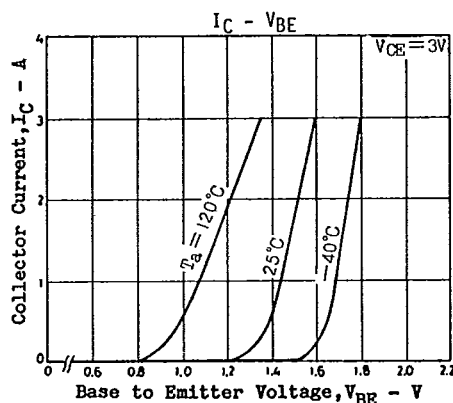
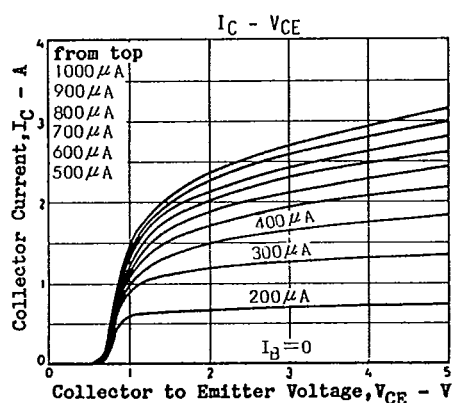
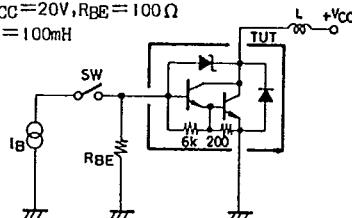
Switching Time Test Circuit

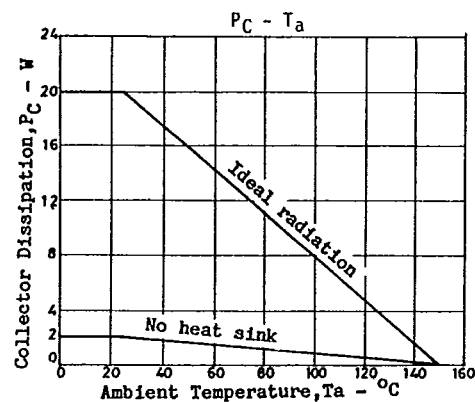
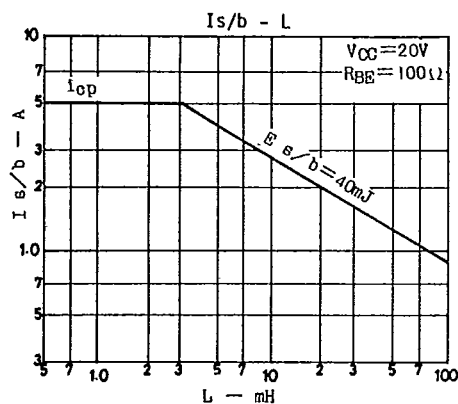
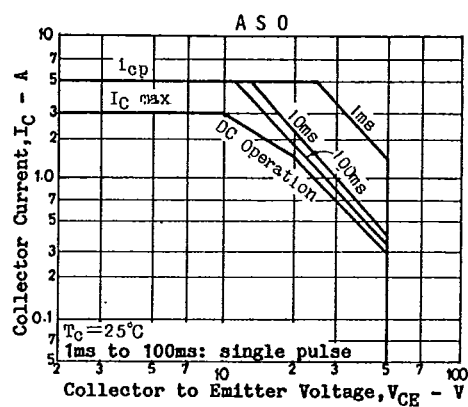
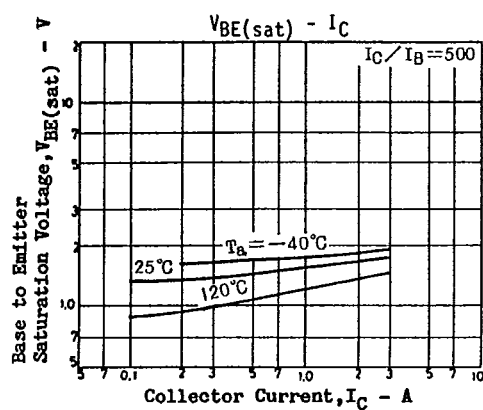
$PW=50\mu s$, Duty Cycle $\leq 1\%$
 $I_{B1}=-I_{B2}=4mA$



Es/b Test Circuit

$V_{CC}=20V, R_{BE}=100\Omega$
 $L=100mH$





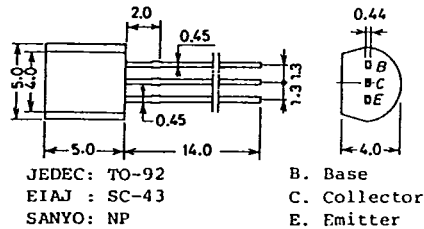
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CASE OUTLINES AND ATTACHMENTS

- 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.

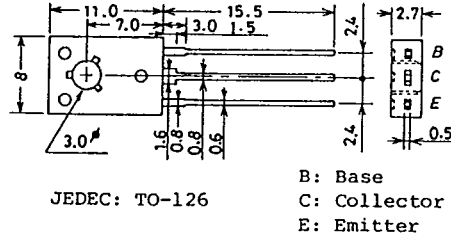
Case Outline—[2003A]

unit:mm



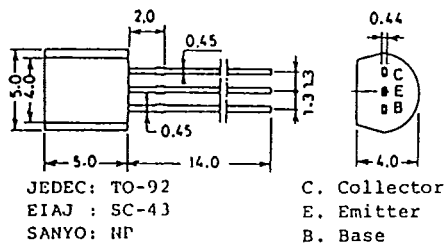
Case Outline—[2009A]

unit:mm



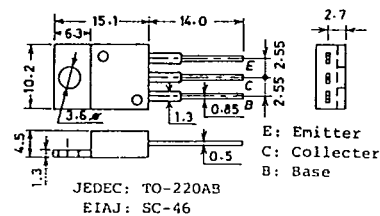
Case Outline—[2004A]

unit:mm



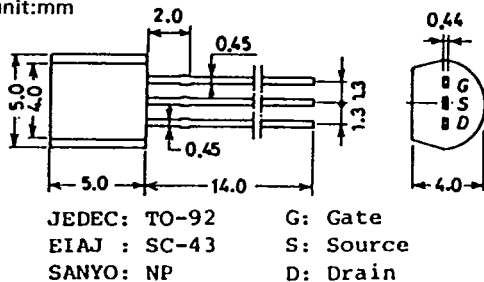
Case Outline—[2010A]

unit:mm



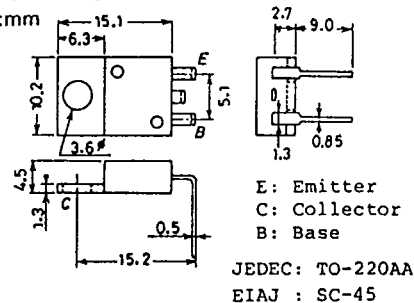
Case Outline—[2005A]

unit:mm



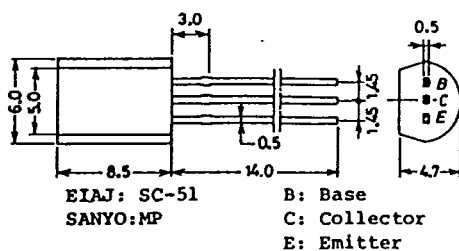
Case Outline—[2012]

unit:mm



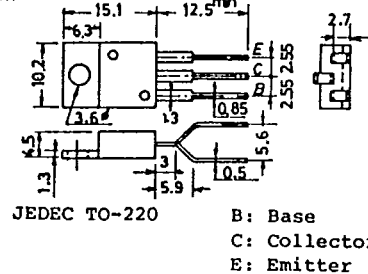
Case Outline—[2006A]

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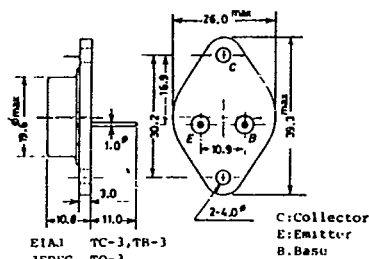


Case Outline—[2013]

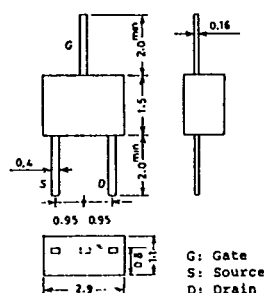
unit:mm



unit:mm

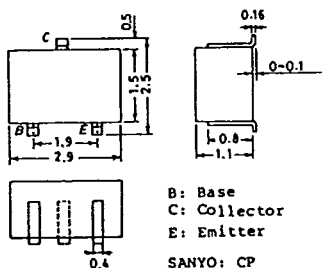


unit:mm

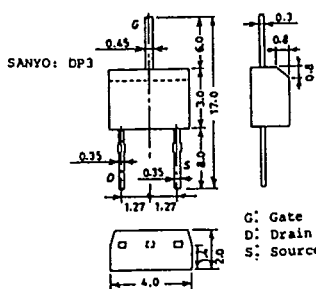


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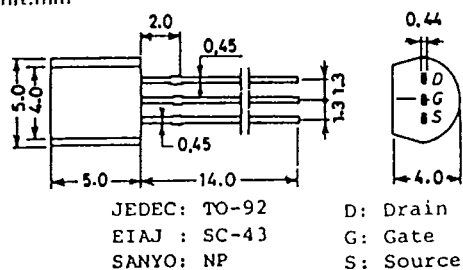
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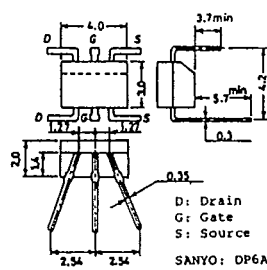
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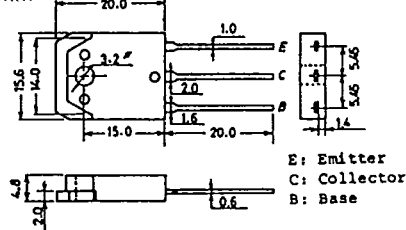
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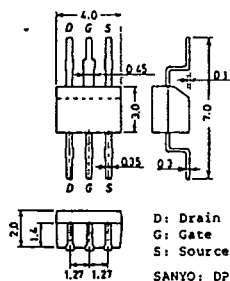
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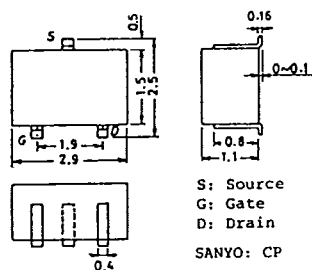
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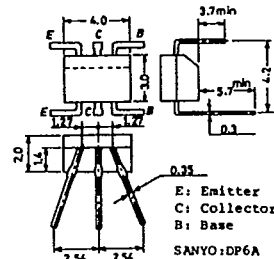
unit:mm



unit:mm



unit:mm



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

E: Emitter
C: Collector
B: Base

G1: Catw1
\$: Source
D-r Drain
G2: Gate2
SANYO: OP4A

E: Emitter
C: Collector
B: Base

SANYO:TO3PML

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

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

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

SANYO: TO220ML

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

SANYO: TO126ML

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The mechanical drawing shows three views of the SANYO CP package:

- Top View:** A rectangle with overall width 2.9 and height 5.2. It features a central rectangular area with width 1.9 and height 3.7. There are four small squares at the corners, labeled G (top), S (left), D (right), and another S (bottom).
- Side View:** Shows the profile of the package with a total height of 0.16 and a base width of 1.1. The top edge has a thickness of 0.01.
- Bottom View:** Shows the underside with two vertical pins separated by a distance of 0.4.

G : Gate
S : Source
D : Drain

SANYO CP

G : Gate
S : Source
D : Drain

SANYO : CP

Technical drawing of a three-wire cable with dimensions. The drawing shows a cross-section of the cable with three conductors. Dimensions include: overall diameter 15.0, conductor diameter 3.0, insulation thickness 0.6, and conductor spacing 1.3. A detail view shows the conductor insulation thickness 2.2 and the conductor diameter 0.4.

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

2.7

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

1:Source
2:Drain
3:Gate

JEDEC: TO-220AB
EIAJ: SC-46

E : Emitter
 C : Collector
 B : Base

SANYO : TO- 3PBL

E : Emitter
C : Collector
B : Base

SANYO : TO- 3PBL

0.16

0.9 8.8 11.0 1.3 10.2 1.6 11.3 9.4 0.8 4.5 1.3 0.5 2.7 5.1 2.53

E : Emitter
C : Collector
B : Base

SANVO TO-220MF

E : Emitter
C : Collector
B : Base

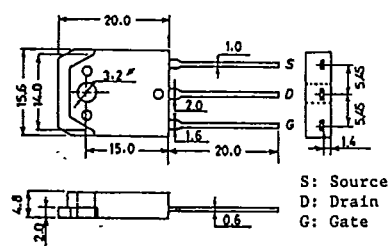
SANYO: TO-220MF

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

E: Emitter
C: Collector
B: Base

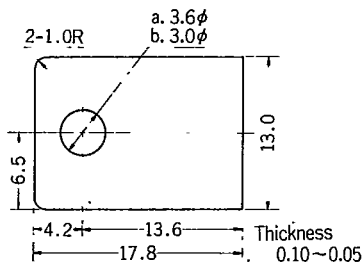
SANYO: CP

Case Outline—[2056] unit:mm



SANYO: TO3PB

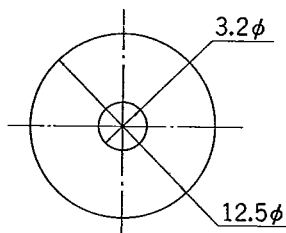
Case Outline—[0008] unit:mm

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

SANYO

Case Outline—[0004] unit:mm

unit:mm

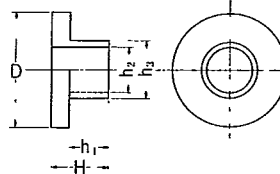


SANYO IS-126

Thickness : 0.075

Case Outline—[0009] unit:mm

unit:mm

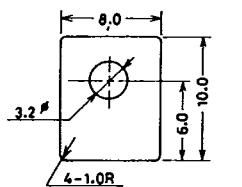


SANYO Bush

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

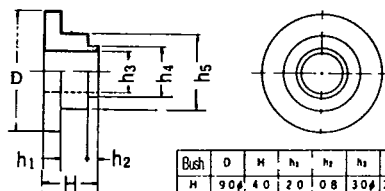


Thickness : 0.075

SANYO IS-126A Mica

Case Outline—[0010] unit:mm

unit:mm

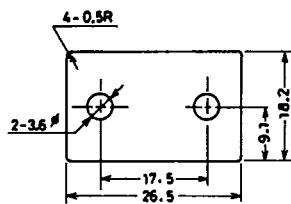


SANYO Bush

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

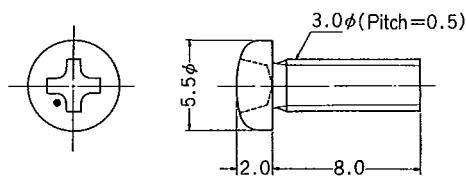


Thickness : 0.05~0.1

SANYO IS-20MA Mica

Case Outline—[0011] unit:mm

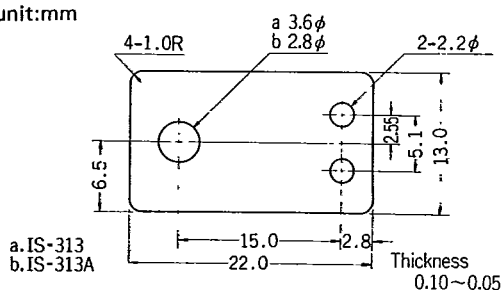
unit:mm



JIS No. B1111 M3×0.5

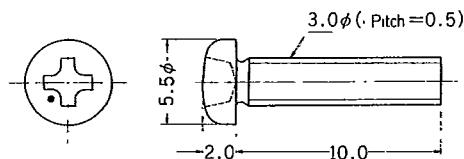
Case Outline—[0007] unit:mm

unit:mm



Case Outline—[0012] unit:mm

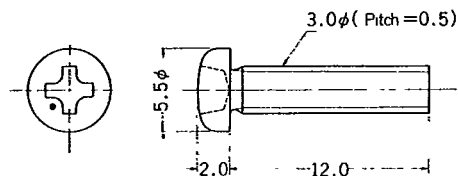
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JIS No. B1111 M3×0.5

Case Outline—[0013]

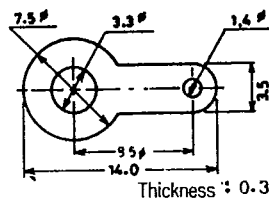
unit:mm



JIS No. B1111 M3×0.5

Case Outline—[0018]

unit:mm

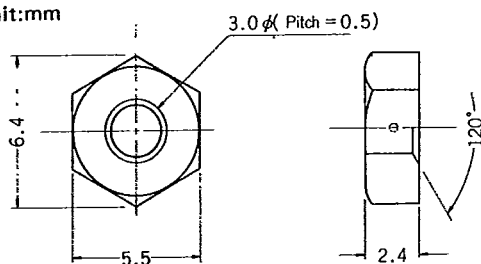


SANYO Lug 1.4

T=91-20

Case Outline—[0014]

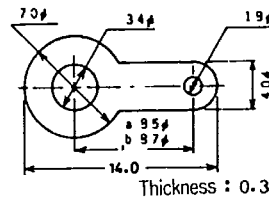
unit:mm



JIS No. B1181 M3×0.5

Case Outline—[0019]

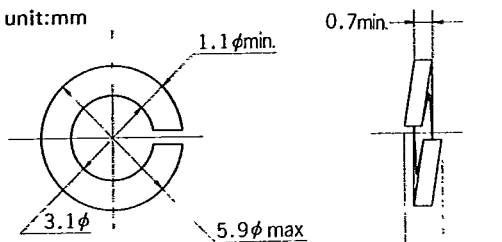
unit:mm



SANYO Lug 1.8φ

Case Outline—[0015]

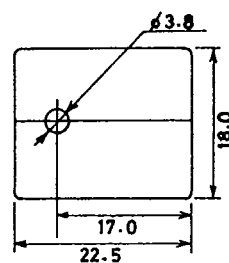
unit:mm



JIS No. B 1251 Spring washer (M3)

Case Outline—[0020]

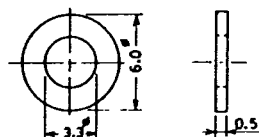
unit:mm



SANYO IS-3MP Mica

Case Outline—[0016]

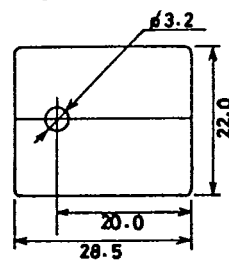
unit:mm



JIS No. B1252 Flat washer

Case Outline—[0021]

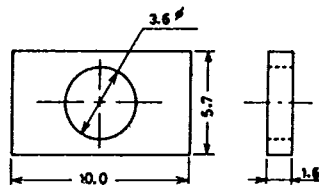
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SANYO IS-MPC Mica

Case Outline—[0017]

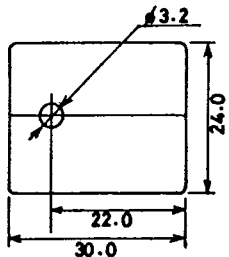
unit:mm



JIS No. G3141 Rectangular washer

Case Outline—[0022]

unit:mm



SANYO IS-3PBL Mica