2SC2998

2003A

T-35-13

NPN Epitaxial Planar Silicon Transistor

High Speed Switching Applications

©922B

Features

- Fast switching speed.
- High breakdown voltage.

Absolute Maximum Ratings at Ta=25°C

			unit
Collector to Base Voltage	V_{CBO}	60	V
Collector to Emitter Voltage	V_{CEO}	50	V
Emitter to Base Voltage	V_{EBO}	5	V
Collector Current	I_C	150	mA
Peak Collector Current	i_{cp}	400	mA
Collector Dissipation	P_C	500	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

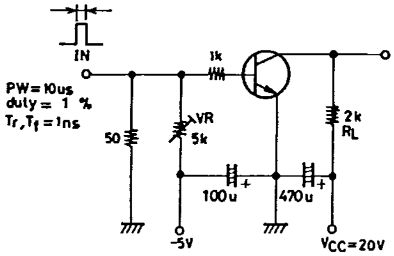
Electrical Characteristics at Ta=25°C

			min	typ	max	unit
Collector Cutoff Current	I_{CBO}	V_{CB}=40V,I_E=0			0.1	uA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V,I_C=0			0.1	uA
DC Current Gain	h_{FE}	V_{CE}=6V,I_C=1mA	100*		560*	
Gain Bandwidth Product	f_T	V_{CE}=6V,I_C=1mA		100		MHz
Output Capacitance	c_{ob}	V_{CB}=6V,f=1MHz		2.7		pF
C-E Saturation Voltage	$V_{CE(sat)}$	I_C=10mA,I_B=1mA		0.1	0.4	V
B-E Saturation Voltage	$V_{BE(sat)}$	I_C=10mA,I_B=1mA		0.75	1.1	V
C-B Breakdown Voltage	$V_{(BR)CBO}$	I_C=10uA,I_E=0	60			V
C-E Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA,R_{BE}=∞	50			V
E-B Breakdown Voltage	$V_{(BR)EBO}$	I_E=10uA,I_C=0	5			V
Delay Time	t_d	See specified Test Circuit.		40	60	ns
Rise Time	t_r	" "		80	130	ns
Storage Time	t_{stg}	" "		230	450	ns
Fall Time	t_f	" "		160	250	ns

*:The 2SC2998 is classified by h_{FE} at 1mA.

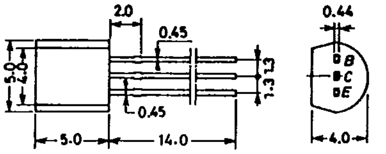
100 E 200	160 F 320	280 G 560

Switching Time Test Circuit



$10I_{B1} = -10I_{B2} = I_C = 10\text{mA}$

Case Outline 2003A
(unit:mm)



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

B. Base
C. Collector
E. Emitter

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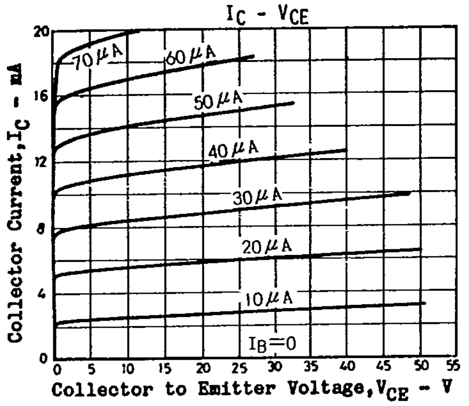
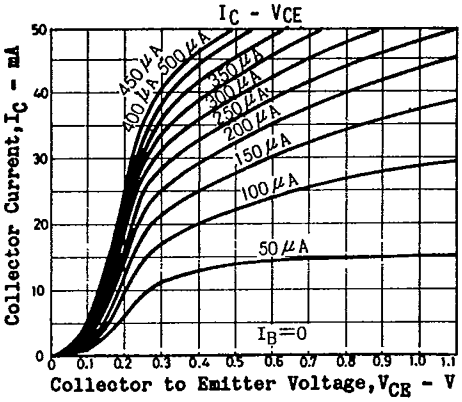
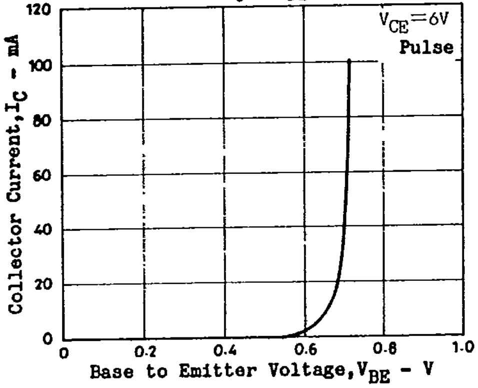
$I_C - V_{CE}$



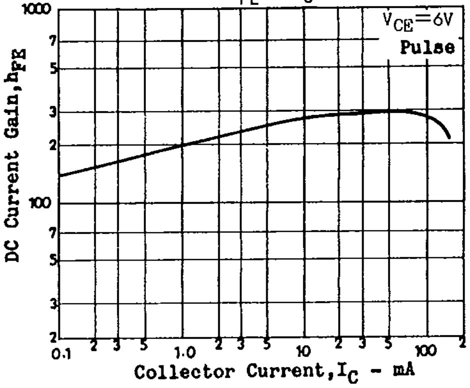
$I_C - V_{CE}$



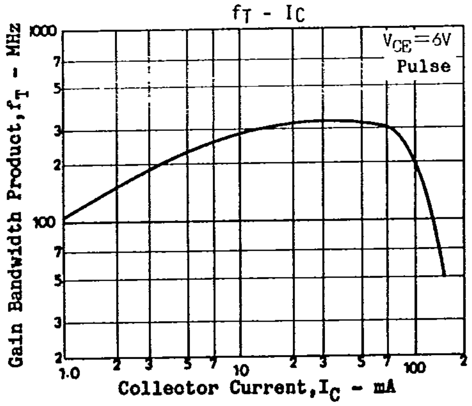
$I_C - V_{BE}$



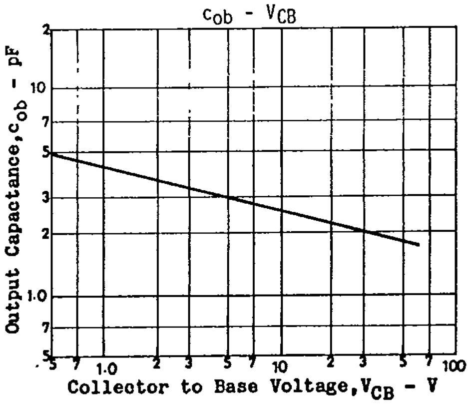
$h_{FE} - I_C$



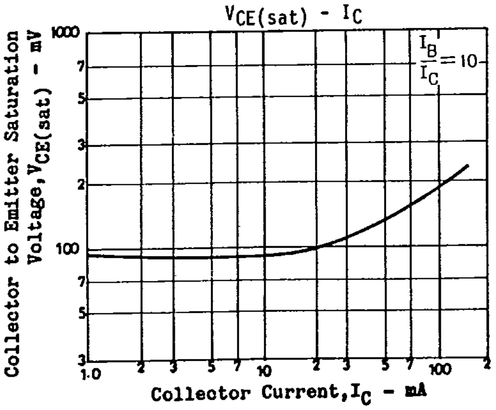
$f_T - I_C$



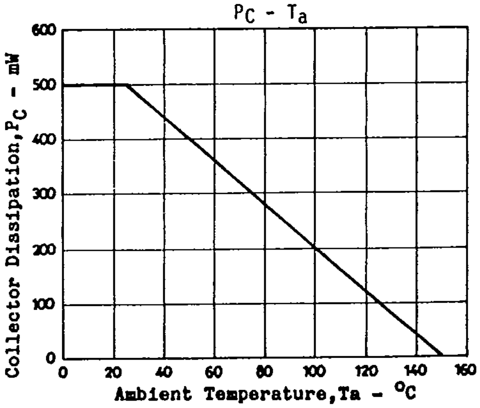
$c_{ob} - V_{CB}$



$V_{CE}(sat) - I_C$



$P_C - T_a$



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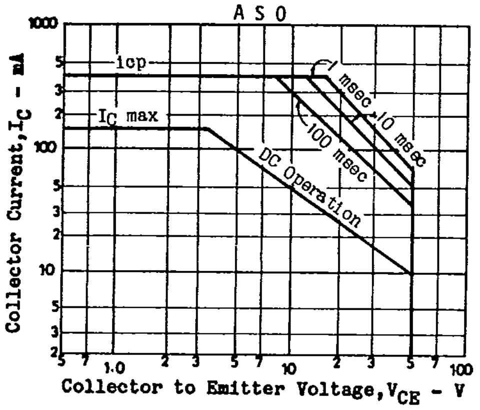
A S O
Collector Current, I_C - mA
1000
5
3
2
100
5
3
2
10
5
3
2
icp
I_C max
1 msec
10 msec
100 msec
DC Operation
5
7
1.0
2
3
5
7
10
2
3
5
7
100
Collector to Emitter Voltage, V_{CE} - V

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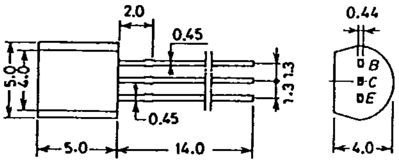
CASE OUTLINES AND ATTACHMENTS

- 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.

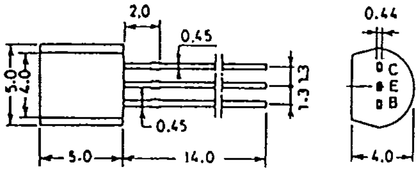
Case Outline—[2003A]
unit:mm



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

B. Base
C. Collector
E. Emitter

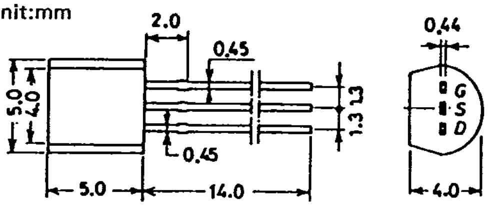
Case Outline—[2004A]
unit:mm



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

C. Collector
E. Emitter
B. Base

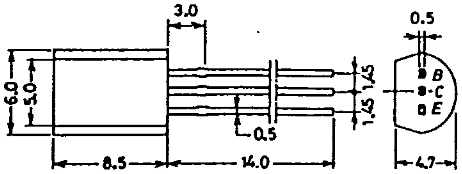
Case Outline—[2005A]
unit:mm



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

G: Gate
S: Source
D: Drain

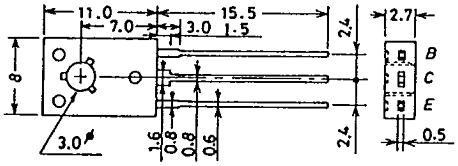
Case Outline—[2006A]
unit:mm



EIAJ: SC-51
SANYO: MP

B: Base
C: Collector
E: Emitter

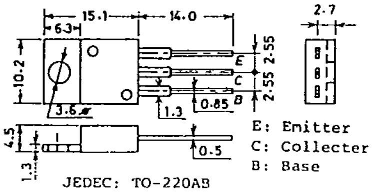
Case Outline—[2009A]
unit:mm



JEDEC: TO-126

B: Base
C: Collector
E: Emitter

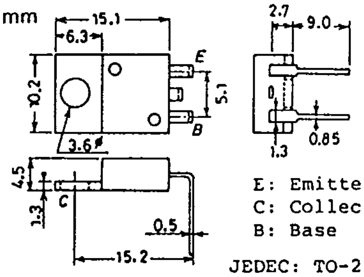
Case Outline—[2010A]
unit:mm



E: Emitter
C: Collecter
B: Base

JEDEC: TO-220AB
EIAJ: SC-46

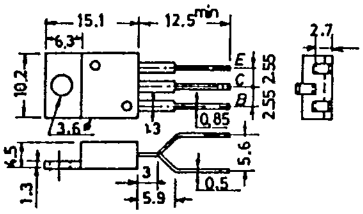
Case Outline—[2012]
unit:mm



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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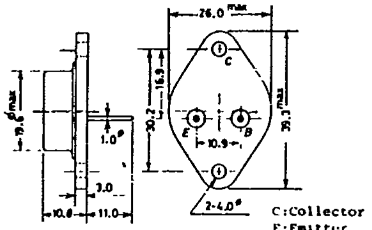
Case Outline—[2017]

unit:mm

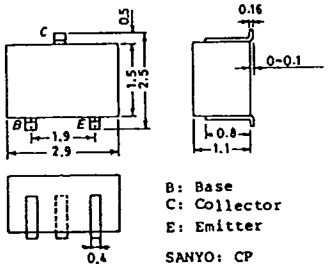


C:Collector
E:Emitter
B:Base

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

Case Outline—[2018A]

unit:mm

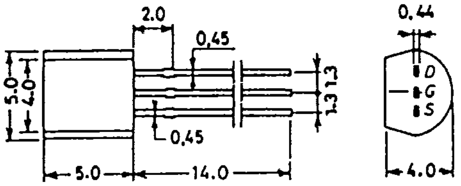


B: Base
C: Collector
E: Emitter

SANYO: CP

Case Outline—[2019A]

unit:mm

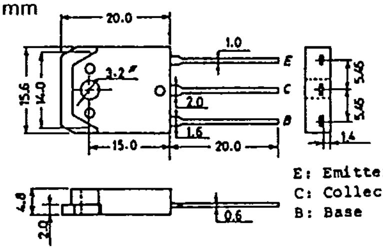


JEDEC: TO-92
EIAJ : SC-43
SANYO: NP

D: Drain
G: Gate
S: Source

Case Outline—[2022]

unit:mm

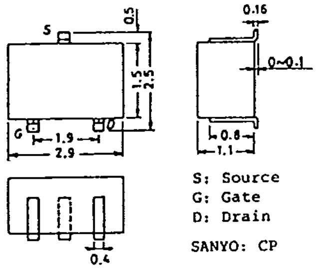


E: Emitter
C: Collector
B: Base

SANYO: TO3PB

Case Outline—[2024A]

unit:mm

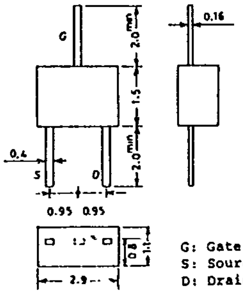


S: Source
G: Gate
D: Drain

SANYO: CP

Case Outline—[2025]

unit:mm

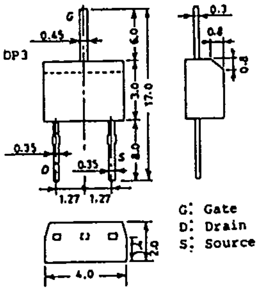


G: Gate
S: Source
D: Drain

Case Outline—[2026]

unit:mm

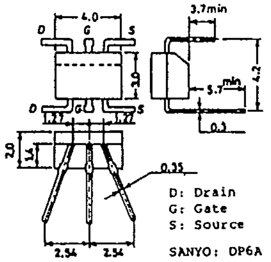
SANYO: DP3



G: Gate
D: Drain
S: Source

Case Outline—[2027A]

unit:mm

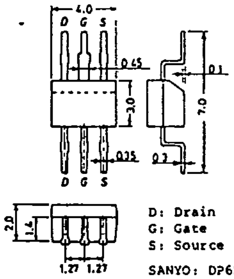


D: Drain
G: Gate
S: Source

SANYO: DP6A

Case Outline—[2028A]

unit:mm

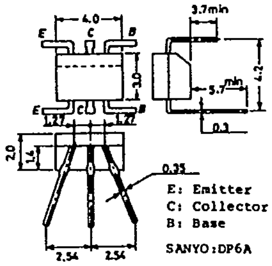


D: Drain
G: Gate
S: Source

SANYO: DP6B

Case Outline—[2029A]

unit:mm



E: Emitter
C: Collector
B: Base

SANYO:DP6A

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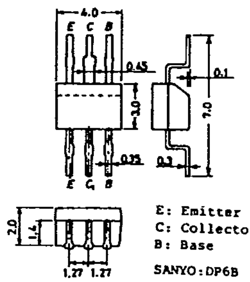
Case Outline—[2030A]

unit:mm

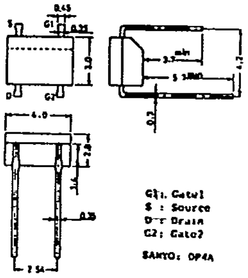


E: Emitter
C: Collector
B: Base

SANYO: DP6B

Case Outline—[2031A]

unit:mm

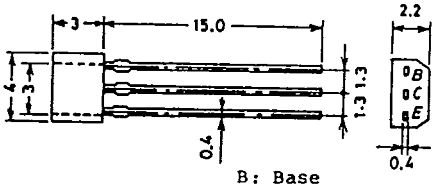


G1: Gate1
S: Source
D: Drain
G2: Gate2

SANYO: DP4A

Case Outline—[2033]

unit:mm

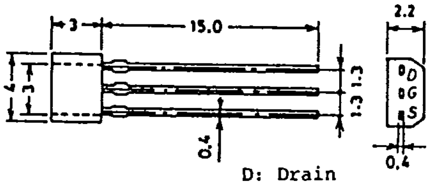


B: Base
C: Collector
E: Emitter

SANYO: SPA

Case Outline—[2034]

unit:mm

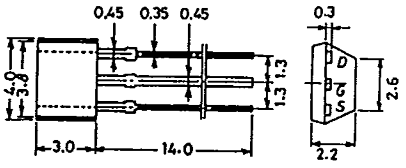


D: Drain
G: Gate
S: Source

SANYO: SPA

Case Outline—[2037]

unit:mm

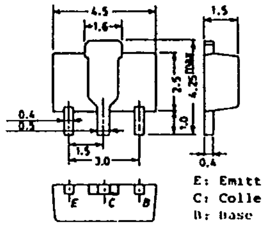


D: Drain
G: Gate
S: Source

SANYO: SP'

Case Outline—[2038]

unit:mm

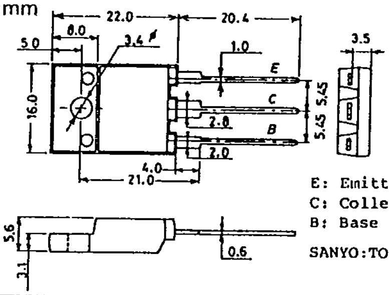


E: Emitter
C: Collector
B: Base

SANYO: PCP

Case Outline—[2039]

unit:mm

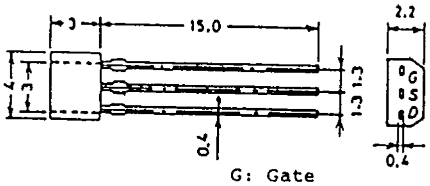


E: Emitter
C: Collector
B: Base

SANYO: TO3PML

Case Outline—[2040]

unit:mm

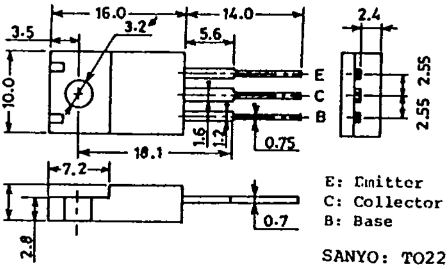


G: Gate
S: Source
D: Drain

SANYO: SPA

Case Outline—[2041]

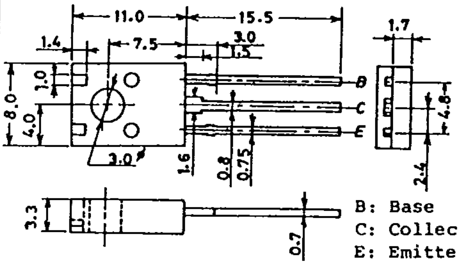
unit:mm



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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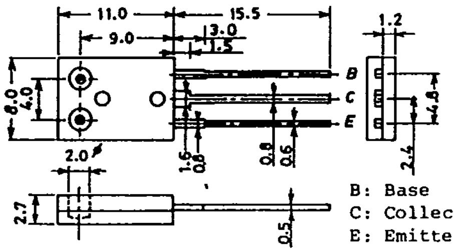
Case Outline—[2043A] unit:mm

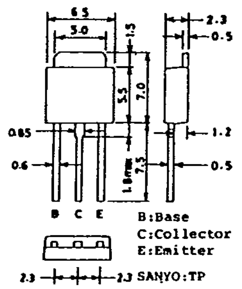


B: Base
C: Collector
E: Emitter

SANYO: TO126LP

Case Outline—[2045]

unit:mm

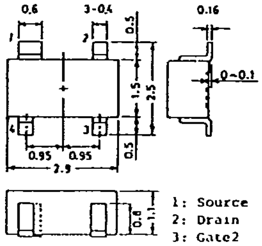


B:Base
C:Collector
E:Emitter

SANYO:TP

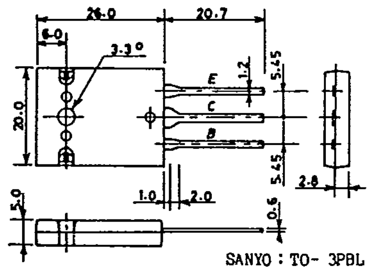
Case Outline—[2046]

unit:mm



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

Case Outline—[2048] unit:mm

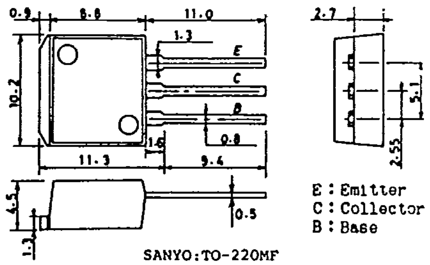


E : Emitter
C : Collector
B : Base

SANYO : TO- 3PBL

Case Outline—[2049]

unit:mm

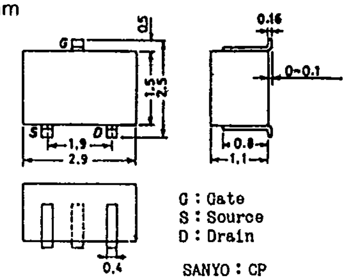


E : Emitter
C : Collector
B : Base

SANYO:TO-220MF

Case Outline—[2050]

unit:mm

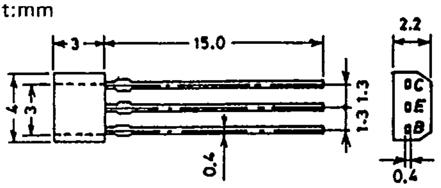


G : Gate
S : Source
D : Drain

SANYO : CP

Case Outline—[2051]

unit:mm

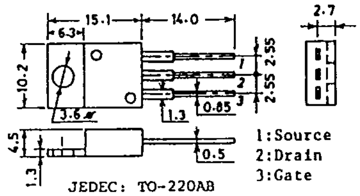


C : Collector
E : Emitter
B : Base

SANYO: SPA

Case Outline—[2052A]

unit:mm

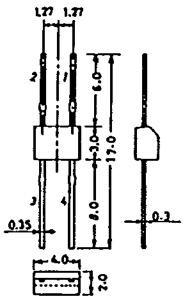


1:Source
2:Drain
3:Gate

JEDEC: TO-220AB
EIAJ: SC-46

Case Outline—[2053]

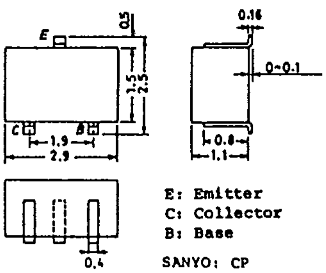
unit:mm



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

Case Outline—[2054]

unit:mm



E: Emitter
C: Collector
B: Base

SANYO: CP

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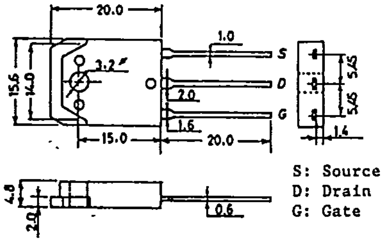
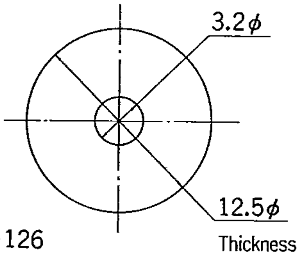
Case Outline—[2056] unit:mm



S: Source
D: Drain
G: Gate

SANYO: TO3PB

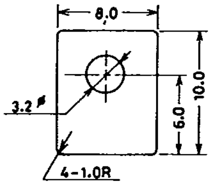
Case Outline—[0004]
unit:mm



SANYO IS-126

Thickness : 0.075

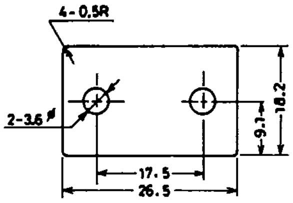
Case Outline—[0005]
unit:mm



Thickness : 0.075

SANYO IS-126A Mica

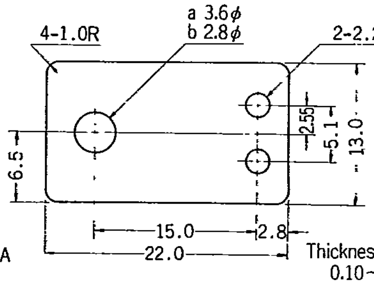
Case Outline—[0006]
unit:mm



Thickness : 0.05~0.1

SANYO IS-20MA Mica

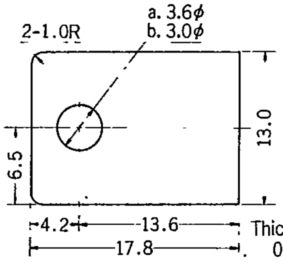
Case Outline—[0007]
unit:mm



a. IS-313
b. IS-313A

Thickness
0.10~0.05

Case Outline—[0008]
unit:mm

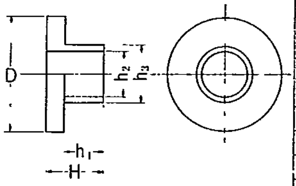


a. IS-313B
b. IS-313D

SANYO

Thickness
0.10~0.05

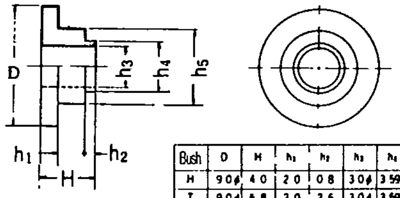
Case Outline—[0009]
unit:mm



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

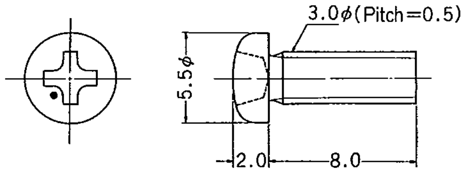
Case Outline—[0010]
unit:mm



Bush	D	H	h1	h2	h3	h4	h5
H	90φ	40	20	08	30φ	359φ	56φ
T	90φ	58	20	26	30φ	3.59φ	56φ
UB	160φ	68	15	33	30φ	389φ	80φ

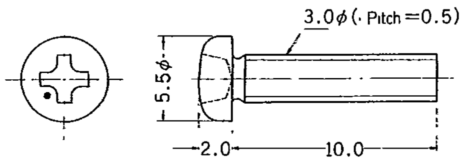
SANYO Bush

Case Outline—[0011]
unit:mm



JIS No.B1111 M3×0.5

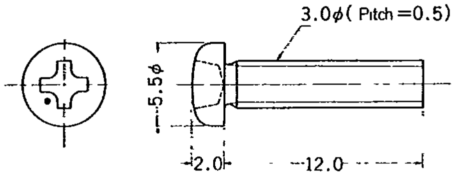
Case Outline—[0012]
unit:mm



JIS No.B1111 M3×0.5

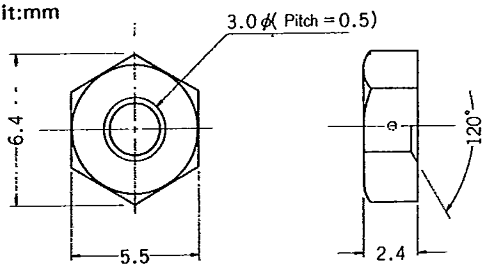
T-91-20

Case Outline—[0013]
unit:mm



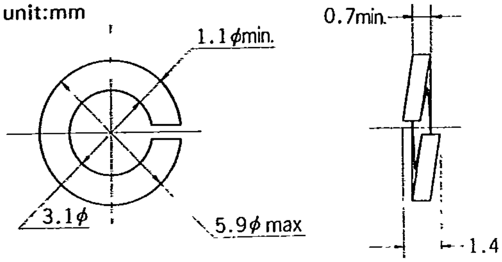
JIS No.B1111 M3×0.5

Case Outline—[0014]
unit:mm



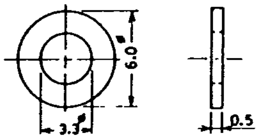
JIS No. B1181 M3×0.5

Case Outline—[0015]
unit:mm



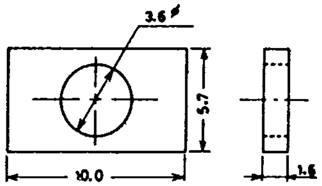
JIS No. B 1251 Spring washer (M3)

Case Outline—[0016]
unit:mm



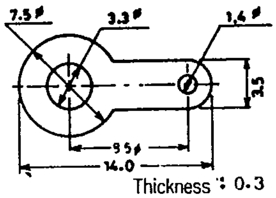
JIS No.B1252 Flat washer

Case Outline—[0017]
unit:mm



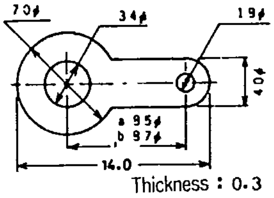
JIS No.G3141 Rectangular washer

Case Outline—[0018]
unit:mm



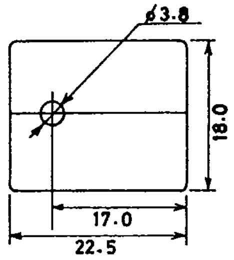
SANYO Lug 1.4

Case Outline—[0019]
unit:mm



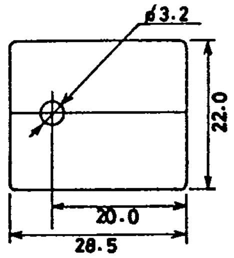
SANYO Lug 1.8ϕ

Case Outline—[0020]
unit:mm



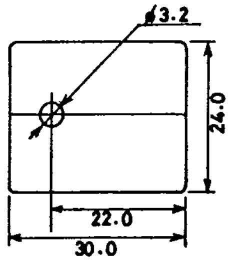
SANYO IS-3MP Mica

Case Outline—[0021]
unit:mm



SANYO IS-MPC Mica

Case Outline—[0022]
unit:mm



SANYO IS-3PBL Mica