

2SC930

2033



2003A

T-31-15
T-31-17NPN Epitaxial Planar
Silicon Transistor**AM Converter, FM RF · IF
Amp Applications**

©545E

The 2SC930 has two types of package: SPA and NP.

Use

- FM RF amp, mixer, OSC, converter, and IF amplifier.

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

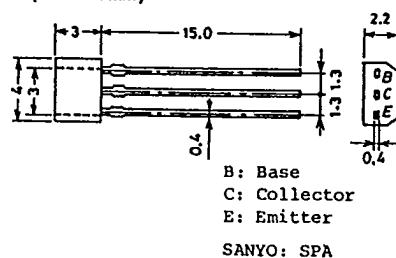
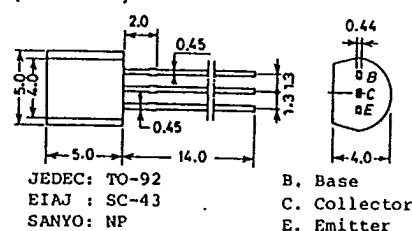
		2SC930SPA	2SC930NP	unit
Collector to Base Voltage	V_{CBO}	30	30	V
Collector to Emitter Voltage	V_{CEO}	20	20	V
Emitter to Base Voltage	V_{EBO}	5	5	V
Collector Current	I_C	30	30	mA
Collector Dissipation	P_C	120	250	mW
Junction Temperature	T_j	125	125	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +125	-55 to +125	$^\circ\text{C}$

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

			min	typ	max	unit
Collector Cutoff Current	I_{CBO}	$V_{CB}=10\text{V}, I_E=0$			1	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=4\text{V}, I_C=0$			1	μA
DC Current Gain	h_{FE}	$V_{CE}=6\text{V}, I_C=1\text{mA}$	40*	80	320*	
Gain Bandwidth Product	f_T	$V_{CE}=6\text{V}, I_C=1\text{mA}$		170	300	MHz
Reverse Transfer capacitance	C_{re}	$V_{CB}=6\text{V}, I_C=1\text{MHz}$ (2SC930SPA)	0.8		1.6	pF
		$V_{CB}=6\text{V}, f=1\text{MHz}$ (2SC930NP)	1.0	1.3	1.8	pF
Base to Collector Time Constant	$\tau_{bb'cc}$	$V_{CE}=6\text{V}, I_C=1\text{mA}$		20	36	ps
Noise Figure	NF	$f=31.9\text{MHz}$				
		$V_{CE}=6\text{V}, I_C=1\text{mA}$		4.0		dB
Turn-on Time	t_{on}	$V_{IN}=+12\text{V}, V_{BB}=-3\text{V}$, appointed circuit		30		ns
Turn-off Time	t_{off}	$V_{IN}=-12\text{V}, V_{BB}=+3\text{V}$, appointed circuit		30		ns

*The 2SC930 is graded as follows by $1\text{mA } h_{FE}$:

40	C	80	60	D	120	100	E	200	160	F	320
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Case Outline 2033
(unit:mm)**Case Outline 2003A**
(unit:mm)

The 2SC930 is scheduled to be discontinued soon. Use the 2SC2839, instead of the 2SC930, in new applications where you are planning to use the 2SC930.

4157KI/D054MW/4263KI/4092KI, MT No. 545-1/17

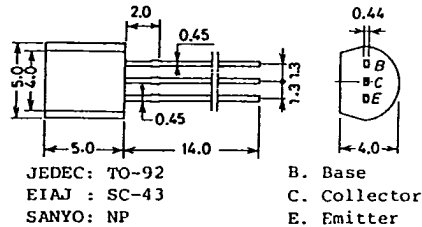
T-91-20

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.

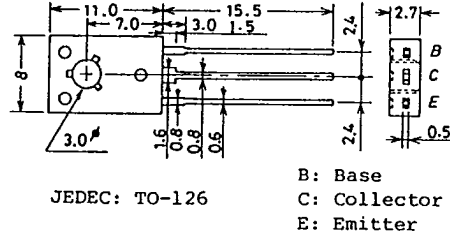
Case Outline—[2003A]

unit:mm



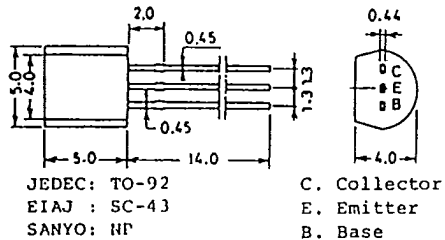
Case Outline—[2009A]

unit:mm



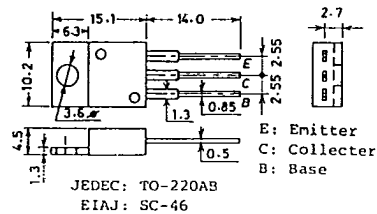
Case Outline—[2004A]

unit:mm



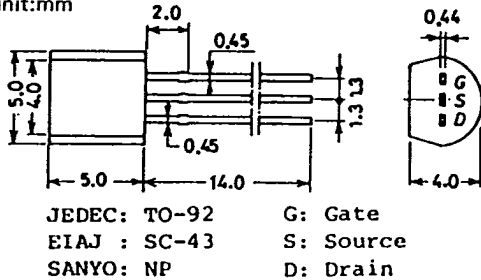
Case Outline—[2010A]

unit:mm



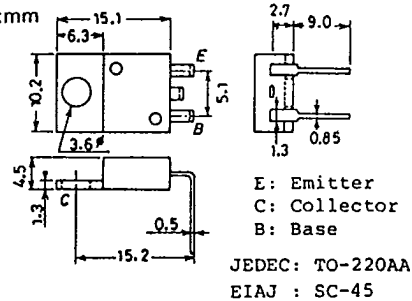
Case Outline—[2005A]

unit:mm



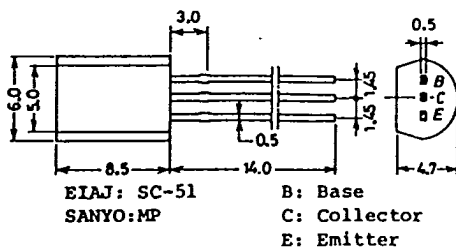
Case Outline—[2012]

unit:mm



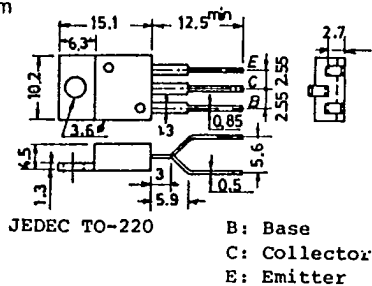
Case Outline—[2006A]

unit:mm



Case Outline—[2013]

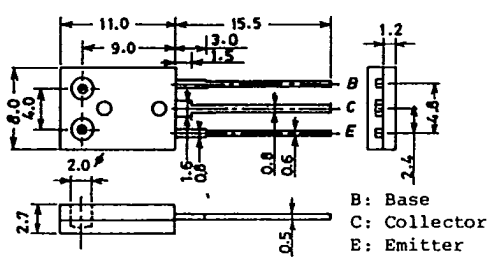
unit:mm



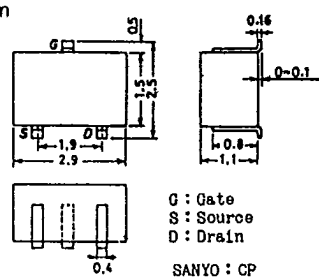
EIAI TC-3, TR-3
JEDEC TO-3

THIS MATERIAL CONTAINED BY IT IS RESTRICTIVE MANUFACTURING

Case Outline—[2043A] unit:mm

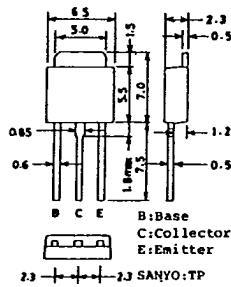


SANYO: TO126LP

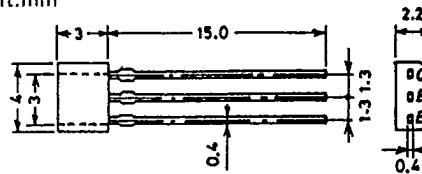
Case Outline—[2050]
unit:mm

SANYO: CP

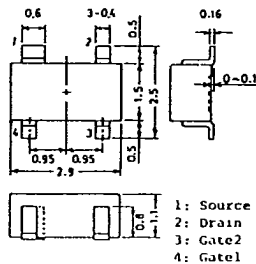
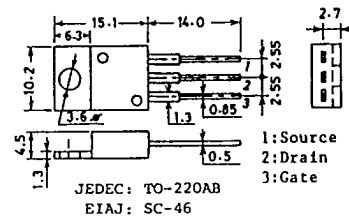
T-91-20

Case Outline—[2045]
unit:mm

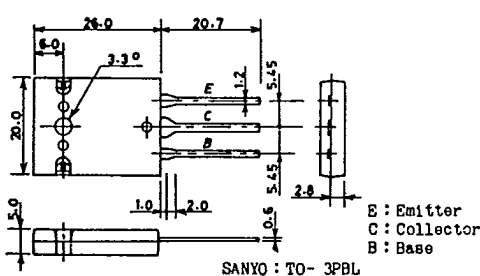
SANYO: TP

Case Outline—[2051]
unit:mm

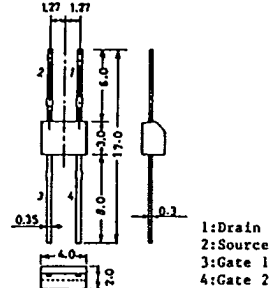
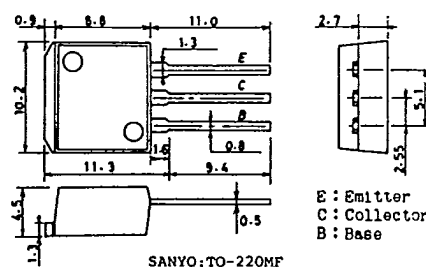
SANYO: SPA

Case Outline—[2046]
unit:mmCase Outline—[2052A]
unit:mmJEDEC: TO-220AB
EIAJ: SC-46

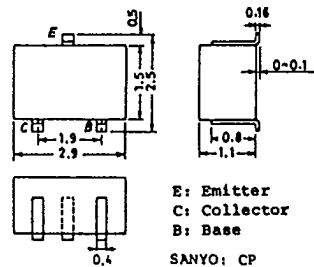
Case Outline—[2048] unit:mm



SANYO: TO-3PBL

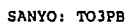
Case Outline—[2053]
unit:mmCase Outline—[2049]
unit:mm

SANYO: TO-220MF

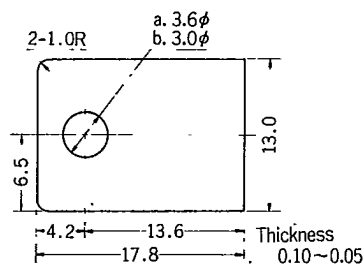
Case Outline—[2054]
unit:mm

SANYO: CP

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



SANYO IS-126

Thickness : 0.075

Technical drawing of a stepped shaft. The left view is a side elevation showing a shaft with a diameter D on the left and a smaller diameter d on the right. The transition between the two diameters is a fillet with radius r . The axial distance from the left face to the start of the fillet is h_1 . The axial distance from the start of the fillet to the end of the fillet is h_2 . The axial distance from the end of the fillet to the right face is h_3 . The right view is a top-down circular cross-section showing the outer diameter D and the inner diameter d .

Bush	D	H	h_1	h_2	h_3
A	8.0 ϕ	4.0	2.8	3.1 ϕ	3.89 ϕ
B	8.0 ϕ	3.0	1.8	3.1 ϕ	3.89 ϕ
C	8.0 ϕ	5.7	4.5	3.1 ϕ	3.89 ϕ
D	8.0 ϕ	2.7	1.5	3.1 ϕ	3.89 ϕ
E	8.0 ϕ	3.4	2.2	3.1 ϕ	3.89 ϕ
F	8.0 ϕ	4.0	2.8	3.0 ϕ	3.59 ϕ
K	16.0 ϕ	3.4	1.4	3.1 ϕ	6.0 ϕ
L	6.0 ϕ	3.1	1.5	2.6 ϕ	3.5 ϕ
M	6.0 ϕ	3.1	1.5	3.0 ϕ	3.5 ϕ
P	6.0 ϕ	2.3	1.1	3.0 ϕ	3.59 ϕ

SANYO Bush

Technical drawing of a square plate with a circular hole. The plate has a width of 8.0 and a height of 10.0. The hole has a diameter of 4.0. The hole is positioned 3.2 from the left edge and 6.0 from the bottom edge. A fillet with a radius of 4.0 is shown at the bottom-left corner.

Thickness : 0.075

SANYO IS-126A Mica

	D	H	h ₁	h ₂	h ₃	h ₄
Bush	3.04	4.0	2.0	0.8	3.04	

Bush	O	H	n ₁	n ₂	n ₃	n ₄	n ₅
H	90¢	40	20	08	30¢	3.59¢	56¢
T	90¢	58	20	26	30¢	3.59¢	56¢
UB	160¢	68	15	33	30¢	3.89¢	80¢

SANYO Bush

Thickness : 0.05~0.1

SANYO IS-20MA Mica

Technical drawing showing a bolt and nut assembly. The left view is a top view of a circular nut with a cross-shaped hole and a center point. The right view is a side view of a bolt passing through the nut. Dimensions include a nut thickness of 5.5ϕ , a bolt head diameter of 3.0ϕ (Pitch=0.5), a bolt head thickness of 2.0, and a bolt length of 8.0.

JIS No.B1111 M3×0.5

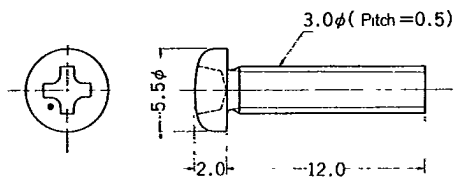
Technical drawing of a rectangular plate with the following dimensions and labels:

- Overall width: 22.0
- Overall height: 13.0
- Left corner radius: 4-1.0R
- Top edge features:
 - Feature 'a': 3.6φ
 - Feature 'b': 2.8φ
- Right edge features:
 - Feature '2-2.2φ' (two holes)
 - Distance from top edge to first hole: 2.55
 - Distance between holes: 5.1
 - Distance from second hole to right edge: 2.8
- Left edge features:
 - Distance from top edge to hole center: 6.5
- Internal horizontal distance from left edge to feature 'b': 15.0
- Thickness: Indicated at the bottom right.

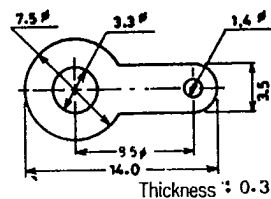
a. IS-313
b. IS-313A

Thickness
0.10~0.05

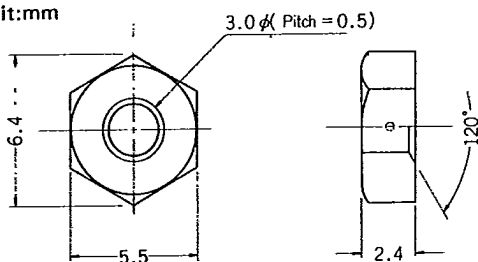
JIS No.B1111 M3×0.5

Case Outline—[0013]
unit:mm

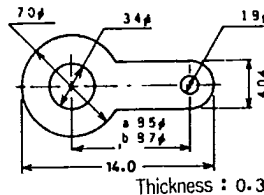
JIS No. B1111 M3×0.5

Case Outline—[0018]
unit:mm

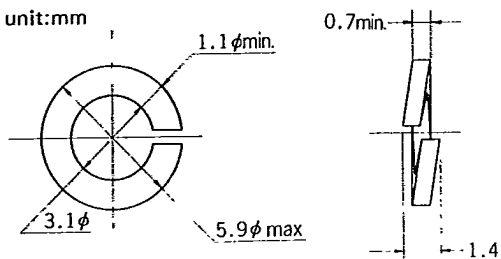
SANYO Lug 1.4

Case Outline—[0014]
unit:mm

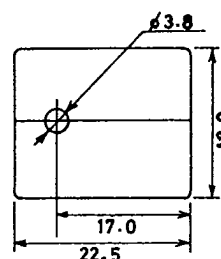
JIS No. B1181 M3×0.5

Case Outline—[0019]
unit:mm

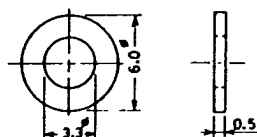
SANYO Lug 1.8φ

Case Outline—[0015]
unit:mm

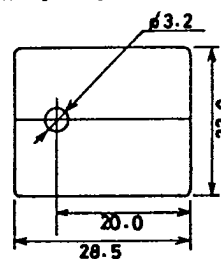
JIS No. B 1251 Spring washer (M3)

Case Outline—[0020]
unit:mm

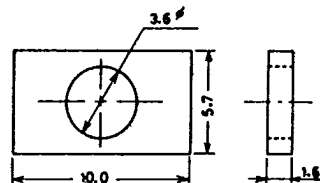
SANYO IS-3MP Mica

Case Outline—[0016]
unit:mm

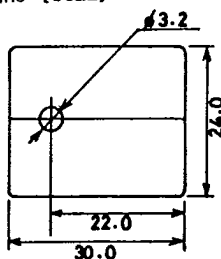
JIS No. B1252 Flat washer

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