

## Low-Saturation Voltage Series(TO-3PB,ML Package)

### Applications

- \* Relay drivers.
- \* High-speed inverters.
- \* Converters.
- \* High-current switching.

### Features

- \* Low  $V_{CE(sat)}$ .
- \* Highly resistant to breakdown because of wide ASO.
- \* Fast switching speed.

### V<sub>CEO</sub> 30V Series (hFE:Q,R,S)

(For PNP, minus sign is omitted.)

Type No.	Package	Absolute Maximum Ratings/Ta=25°C				Electrical Characteristics/Ta=25°C						
		V <sub>CB0</sub> (V)	V <sub>CEO</sub> (V)	I <sub>C</sub> (A)	P <sub>C</sub> T <sub>c</sub> =25°C (W)	V <sub>CE</sub> (V)	I <sub>C</sub> (A)	h <sub>FE</sub>	I <sub>C</sub> (A)	I <sub>B</sub> (A)	V <sub>CE(sat)</sub> max (V)	f <sub>T</sub> typ (MHz)
2SB904 2SD1213	TO-3PB	60	30	20	60	2	1	70~280	8	0.4	0.5 0.4	120
2SB1511 2SD2285	TO-3PML			20	40						0.5 0.4	

### V<sub>CEO</sub> 50V/60V Series (hFE:Q,R,S)

2SB827 2SD1063	TO-3PB	60	50	7	60	2	1	70~280	4	0.4	0.4 0.4	10
2SB828 2SD1064				12	80				6	0.3	0.5 0.4	10
2SB829 2SD1065				15	90				8	0.4	0.5 0.4	20
2SA1292 2SC3256	TO-3PML	80	60	15	80	2	1	70~280	7.5	375m	0.4 0.4	100
2SB1507 2SD2280		60	50	7	40				4	0.4	0.4 0.4	10
2SB1508 2SD2281				12	45				6	0.3	0.5 0.4	10
2SB1509 2SD2282				15	50				8	0.4	0.5 0.4	20

### V<sub>CEO</sub> 80V Series (hFE:Q,R,S)

2SB922 2SD1238	TO-3PB	90	80	12	80	2	1	70~280	6	0.6	0.5 0.4	20
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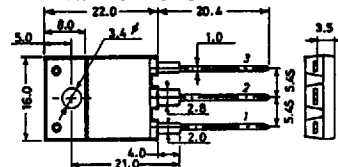
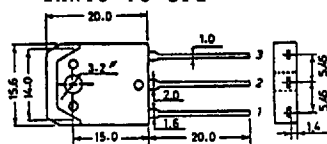
### V<sub>CEO</sub> 100V Series (hFE:P,Q)

2SB1230 2SD1840	TO-3PB	110	100	15	100	2	1.5	50~140	6	0.6	0.8	
2SB1231 2SD1841				25	120		2.5		10	1		
2SB1232 2SD1842				40	150		4		16	1.6		

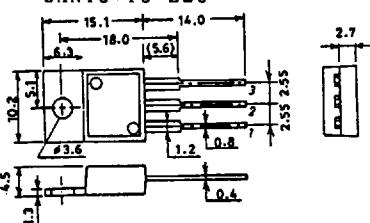
### Classification by hFE.

50	P	100	70	Q	140	100	R	200	140	S	280
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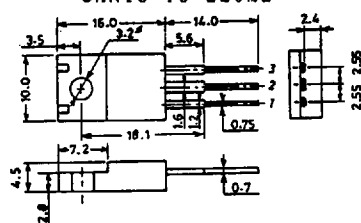
Case Outlines (unit: mm) 1:Base, 2:Collector, 3:Emitter  
SANYO:TO-3PB



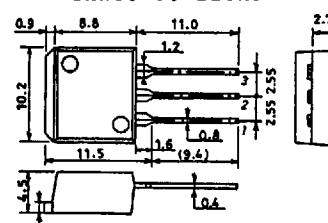
### SANYO:TO-220



### SANYO:TO-220ML



### SANYO:TO-220MF



These specifications are subject to change without notice.

## SANYO Discrete Device Package Outlines(unit:mm)

### Small-Signal Transistors

Outlines name SSFP, SMCP, MCP, MCP4/6, CP, CP4/5/6, CPH3/5/6, PCP, PCP4/5, XP5/6, TP, TP-FA, MFP6, TSSOP8, SOP8, SPA, NP, MP, NMP, FLP, TO-126, TO-126ML, TO-126LP

### Large-Signal Transistors

ZP, SMP, SMP-FD, TO-220, TO-220C1, TO-220ML, TO-220FI (LS), TO-220MF, TO-3PB, TO-3PML, TO-3PBL, TO-3JML

### SANYO Transistor Package Name List.

#### Surface Mount Types

SSFP Super Small Flat Package  
SMCP Super Mini Chip Pack.  
MCP Mini Chip Pack.  
MCP4/6 Mini Chip Pack. (FH type)  
CP Chip Pack.  
CP5/6 Chip Pack. (FC type)  
CPH3/5/6 \* Chip Pack high-power  
PCP Power Chip Pack.  
PCP4/5 Power Chip Pack. (FP type)  
XP (FX type)  
TSSOP8 (FTS, FTD type)  
SOP8 (FW, FSS type)  
TP-FA Tiny Package  
SMP-FD For large signal  
ZP For large signal

#### Lead Types

NMP New MP  
FLP Full Mold Large Package  
TO-126LP Large-Power  
TO-126ML Micaless  
TO-220, 220ML ML:Micaless type  
TO-220C1 CI:Compact Isolation  
TO-220FI (LS) Full Isolation (leade short type)  
TO-220MF Mini Pin Short fin type.  
TO-3PB, 3PML Bushless, ML:Micaless  
TO-3PBL Micaless  
TO-3JML Bushless Large  
Jumbo Micaless

PB, BL:no insulating needed.

### Notes

Nomenclature of house NOS.  
The first several letters of the type Nos. of the FSS, FTD, FW, FTS, FC, FP, FH, series mean:

1'st F : Packages for complex type devices.  
(CP5/6, MCP4/6, PCP4/5, XP5/6, SOP8, TSSOP8)  
2'nd S: SOP8 package  
2'nd W: Double chips  
2'nd T: TSSOP8 package  
2'nd C: CP5/6 package  
2'nd P: PCP4/5 package  
2'nd X: XP5/6 package  
2'nd D: Dual type  
2'nd H: Ultra high freq. type  
3'rd S: Single

Type Nos. of 1XX or 1XXX are p-channel types.

Type Nos. of 2XX or 2XXX are N-channel types.

XP package is excluded.

1P package is excluded.

\*:How to name CPH3/6 devices. Package name followed by 1, 2, 3 or 4 and then tow-digit

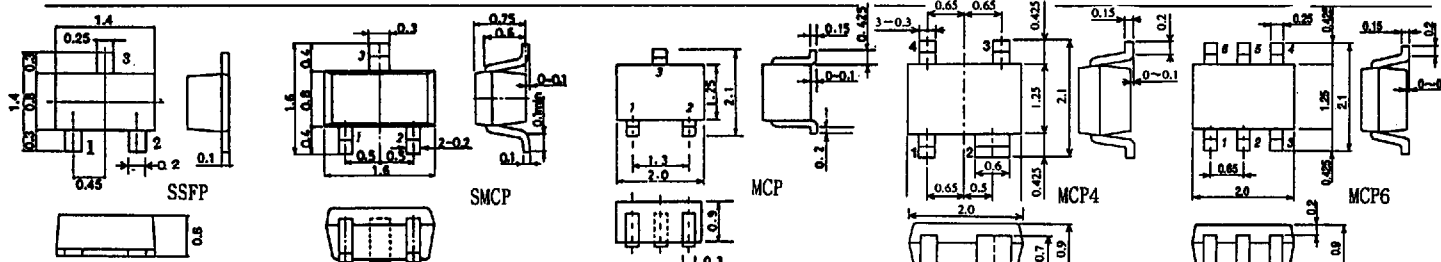
consecutive Nos. Figures following the package names mean: 1:PNP Tr, 2:NPN Tr, 3:P-ch MOSFET, 4:N-ch MOSFET.

### Surface Mount Type Outlines(JEDEC and EIAJ name are in parentheses.)

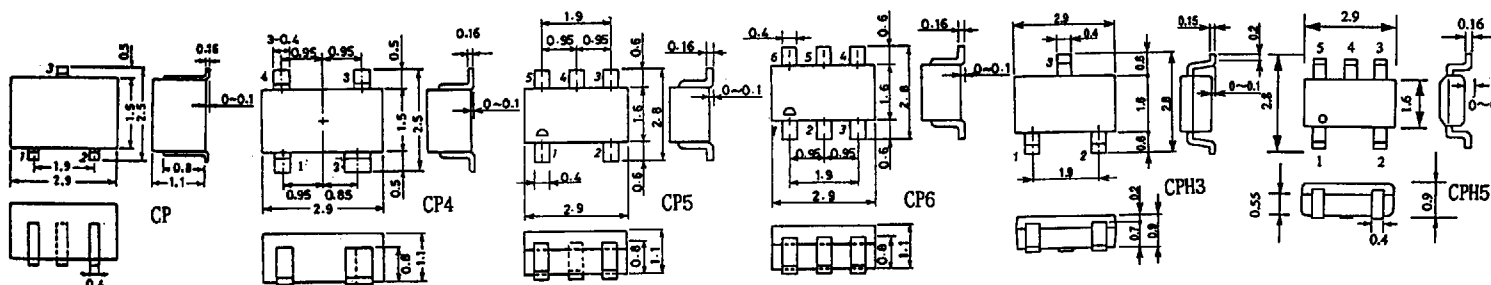
#### Top View

Pin Nos. of top view are CAD register Nos. Bottom side : Heat sink side.

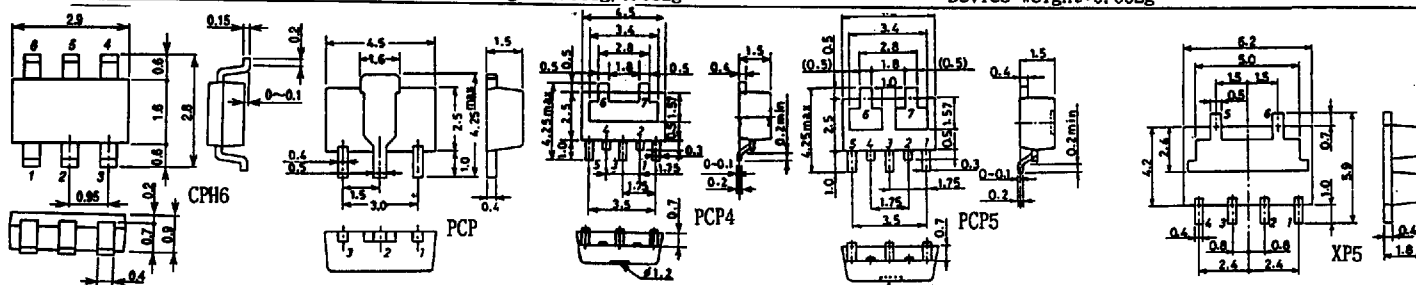
SANYO:SSFP SANYO:SMCP(SC-75A) SANYO:MCP(SC-70), MCP4(SC-82, A), MCP6  
Device weight:0.002g Device weight:0.003g Device weight:0.006g, 0.007g, 0.007g



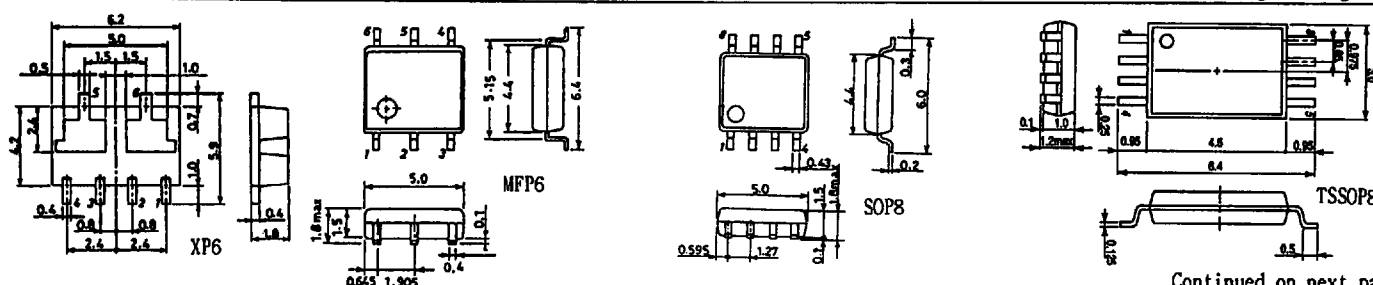
SANYO:CP(SC-59, TO-236) SANYO:CP4, CP5, CP6(SC-61, SC-74A, SC-74, SOT143) SANYO:CPH3, CPH5  
Device weight:0.013g Device weight:0.013g, 0.014g, 0.015g Device weight:0.013g, 0.015g



SANYO:CPH6 SANYO:PCP, PCP4/5(SC-62, SOT89) Bottom View SANYO:XP5 Bottom View  
Device weight:0.015g Device weight:0.058g, 0.052g Device weight:0.062g



SANYO:XP6 Bottom View SANYO:MFP6 SANYO:SOP8 SANYO:TSSOP8  
Device weight:0.062g Device weight:0.089g Device weight:0.093g Device weight:0.04g



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## SANYO Discrete Device Package Outlines(unit:mm)

Surface Mount Type Outlines(JEDEC and EIAJ name are in parentheses.)  
Top View Pin Nos. of top view are CAD register Nos. Bottom side : Heat sink side.

SANYO:TP, TP-FA(SC-64, SC-63, TO-251)

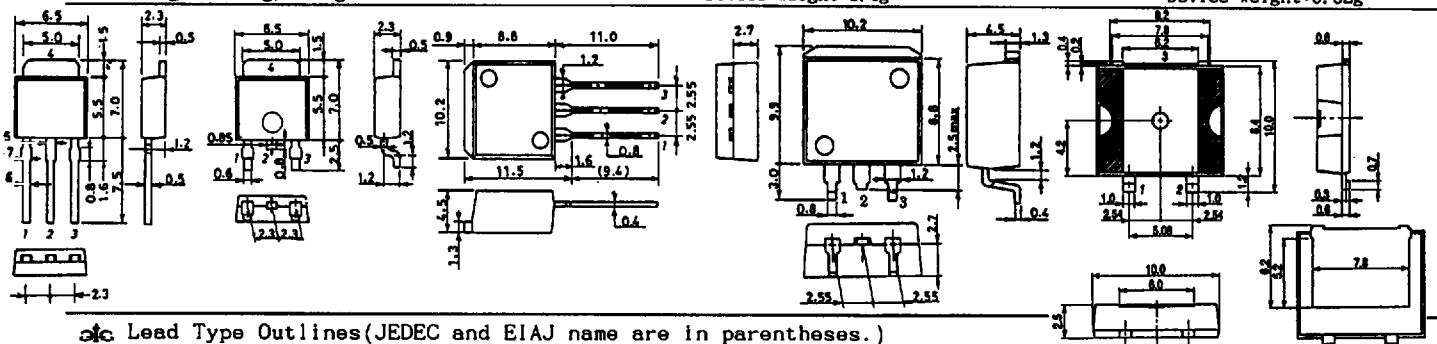
Device weight:0.315g, 0.282g

SANYO:SMP, SMP-FD(forming type)(SC-83)

Device weight:1.4g

SANYO:ZP

Device weight:0.62g



Lead Type Outlines(JEDEC and EIAJ name are in parentheses.)  
Top View (Pin No. : CAD register Nos.)

SANYO:SPA(TO-18, TO-39)

Device weight:0.098g

SANYO:NP(SC-43A, TO-92, SOT-54)

Device weight:0.269g

SANYO:MP(SC-51, TO-226)

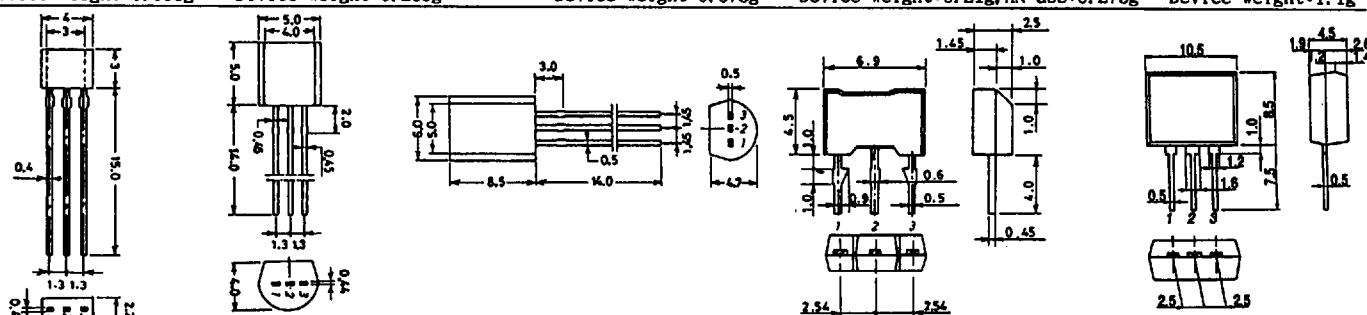
Device weight:0.578g

SANYO:NMP(SC-71)

Device weight:0.21g, AN use:0.275g

SANYO:FLP

Device weight:1.1g

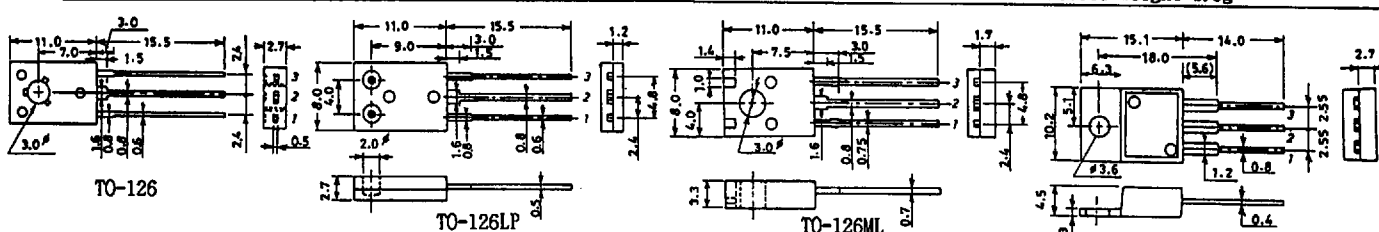


SANYO:TO-126(TO-126, TO-225, SOT-32), TO-126LP, TO-126ML(SOT-82)

Device weight : 0.675g, 0.7g, 0.97g

SANYO:TO-220AB, AB(SC-45, 46, TO-220AA)

Device weight:1.9g



SANYO:TO-220CI

Device weight:1.75g

SANYO:TO-220ML(SC-67, SOT-186)

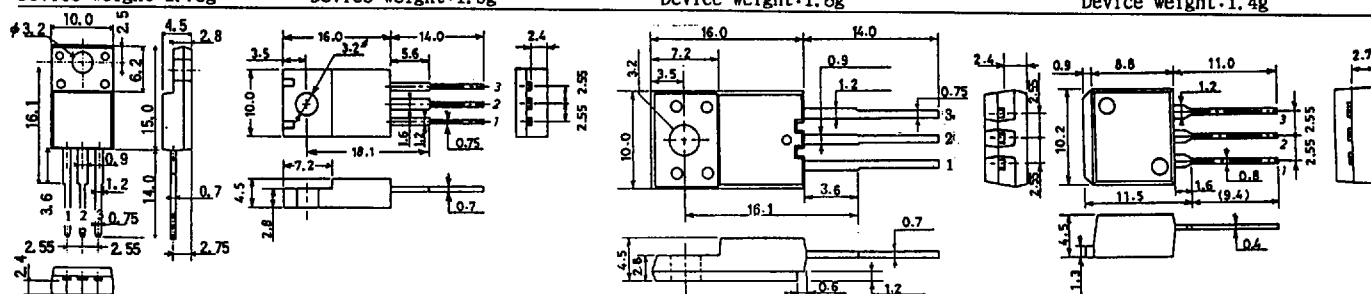
Device weight:1.9g

SANYO:TO-220FI(1S)(SC-67, SOT-189)

Device weight:1.8g

SANYO:TO-220MF

Device weight:1.4g



SANYO:TO-3PB(SC-65, TO-218)

Device weight:5.8g

SANYO:TO-3PML(1SOWATT218)

Device weight:5.3g

SANYO:TO-3PBL(TO-247)

Device weight:9.2g

SANYO:TO-3JML

Device weight:9.2g

