

## Transistors for Very High-Definition CRT Display Video Output Use

Our transistors for CRT display use are fabricated using our original process technology. They are designed to meet the characteristic requirements for CRT use.

### \*Features \*Adoption of FBET process

\*Less parasitic capacitance ⇒ Reduction (1/2 reduction compared with predecessors) in  $C_{ob}$  (output capacitance),  $C_{re}$  (reverse transfer capacitance)

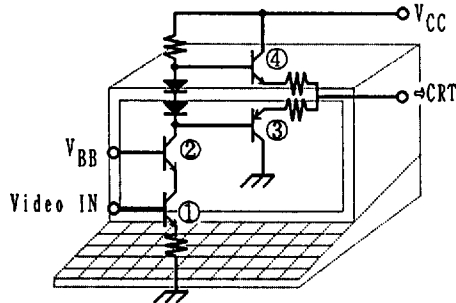
\*Increase in effective area of chip ⇒ Increase (30% increase) in  $I_c$  (current capacity)

\*Ideal pattern formation, fast switching time, high energy handling capability, excellent HF characteristic

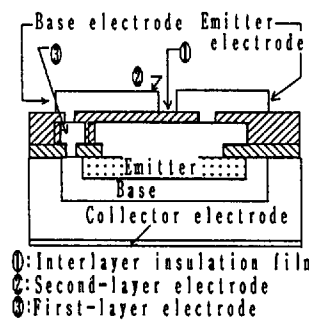
\*Complementary PNP and NPN types (Case outline: FLP, TO-126, TO-126ML, TP, TO-220, TO220ML)

\*Use \*Wide-band amp (Video band up to 100MHz)

### BLOCK DIAGRAM

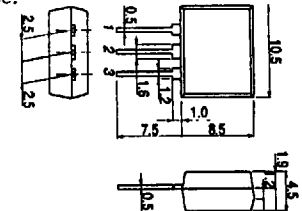


### FBET STRUCTURE

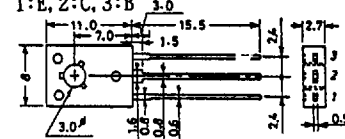


### Case Outlines (unit:mm)

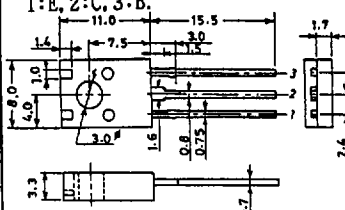
SANYO:FLP  
1: Emitter, 2: Collector,  
3: Base.



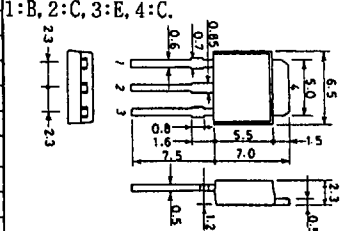
### SANYO:TO-126



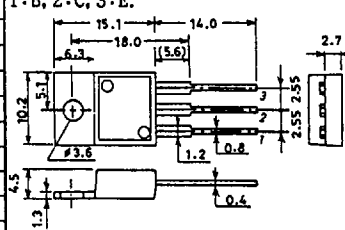
### SANYO:TO-126ML



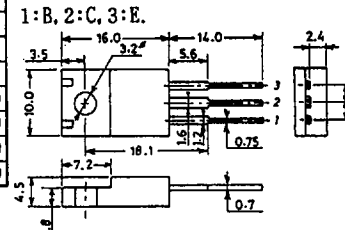
### SANYO:TP



### SANYO:TO-220



### SANYO:TO-220ML



\*:  $T_c=25^\circ\text{C}$ . ◆:  $T_c=50^\circ\text{C}$ . For PNP, (-) sign is omitted.

Type No. PNP/NPN	Package	Absolute Maximum Ratings/ $T_a=25^\circ\text{C}$				Electrical Characteristics/ $T_a=25^\circ\text{C}$							
		$V_{CBO}$ (V)	$V_{CEO}$ (V)	$I_C$ (A)	$P_C$ (W)	$f_T$ typ (MHz)	$V_{CE} \cdot I_C$ (V) (mA)	$C_{ob}$ typ (PF)	$C_{re}$ typ (PF)	$V_{CB}$ (V)	$h_{FE}$		
2SA1402/2SC3596	TO-126	80	60	0.3	*8	700	10 100	3.0/2.3	2.3/1.8	30	40~320		
2SA1403/2SC3597		80	60	0.5	*10	800	10 100	5.2/3.4	4.6/2.9	30	40~320		
2SA1404/2SC3598		120	120	0.2	*8	500	10 50	2.7/2.0	2.1/1.6	30	40~320		
2SA1405/2SC3599		120	120	0.3	*8	500	10 50	4.3/2.9	3.8/2.5	30	40~320		
2SA1406/2SC3600		200	200	0.1	*7	400	30 30	2.3/1.8	1.7/1.4	30	40~320		
2SA1407/2SC3601		200	200	0.15	*7	400	30 50	3.0/2.5	2.5/2.0	30	40~320		
2SA1723		30	20	0.3	*5	1500	5 100	5.8	5.0	10	15~100		
2SC4271		30	20	0.3	*5	2200	5 50	3.9	3.2	10	40~200		
2SC3595		30	20	0.5	*5	2000	5 100	6.0	4.6	10	40~200		
2SC4821		30	20	0.5	1.3	2000	5 100	6.0	4.6	10	40~200		
2SA1848/2SC4822	FLP	80	70	0.3	1.3	600	10 100	3.1/2.4	2.4/1.9	30	60~320		
2SA1849/2SC4823		80	70	0.5	1.3	700	10 100	5.4/3.6	4.8/3.1	30	60~320		
2SA1850/2SC4824		120	120	0.2	1.3	400	10 50	2.8/2.1	2.2/1.7	30	60~320		
2SA1851/2SC4825		120	120	0.3	1.3	400	10 50	4.4/3.1	4.0/2.7	30	60~320		
2SA1852/2SC4826		200	200	0.1	1.3	300	30 30	2.4/1.9	2.0/1.5	30	60~320		
2SA1853/2SC4827		200	200	0.2	1.3	300	30 50	3.2/2.6	2.7/2.2	30	60~320		
2SA1536/2SC3951		TO-126 ML	80	70	0.3	*8	600	10 100	3.1/2.4	2.4/1.9	30	40~320	
2SA1537/2SC3952			80	70	0.5	*10	700	10 100	5.4/3.6	4.8/3.1	30	40~320	
2SA1538/2SC3953			120	120	0.2	*8	400	10 50	2.8/2.1	2.2/1.7	30	40~320	
2SA1539/2SC3954			120	120	0.3	*8	400	10 50	4.4/3.1	4.0/2.7	30	40~320	
2SA1540/2SC3955	200		200	0.1	*7	300	30 30	2.4/1.9	1.8/1.5	30	40~320		
2SA1541/2SC3956	200		200	0.2	*7	300	30 50	3.2/2.7	2.7/2.2	30	40~320		
2SA1749/2SC4564	200		200	0.3	*10	400	30 100	5.0/4.2	4.2/3.4	30	40~320		
2SA1777/2SC4623	250		250	0.3	*10	400	30 100	5.0/4.2	4.2/3.4	30	40~200		
2SC3950	30		20	0.5	*5	2000	5 100	6.0	4.6	10	40~200		
2SC4563	100		80	0.5	*10	1200	10 100	4.4	3.8	30	30~200		
2SC4660	30	20	0.3	*8	2200	5 50	3.9	3.2	10	40~200			
2SA1875/2SC4976	TP	200	200	0.3	*12	400	10 100	5.0/4.2	4.2/3.4	30	60~320		
2SA1474/2SC3780		80	60	0.8	◆15	800	10 100	5.3/3.5	4.7/3.0	30	40~320		
2SA1475/2SC3781	TO-220	120	120	0.4	◆15	500	10 50	4.4/3.0	3.9/2.6	30	40~320		
2SA1476/2SC3782		200	200	0.2	◆15	400	30 50	3.1/2.6	2.6/2.1	30	40~320		
2SC4411		100	80	0.5	*15	1200	10 100	4.4	3.8	30	30~200		
2SA1696/2SC4473	TO-220 ML	120	120	0.4	◆10	400	10 50	4.4/3.1	4.0/2.7	30	40~320		
2SA1697/2SC4474		200	200	0.2	◆10	300	30 50	3.2/2.7	2.7/2.2	30	40~320		

Underlined type Nos. are before mass production.  
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 Fin Short fin type.  
 TO-3PB, 3PML Bushless, ML:Micaless  
 TO-3PBL Micaless  
 TO-3PBL Bushless Large  
 TO-3JML 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

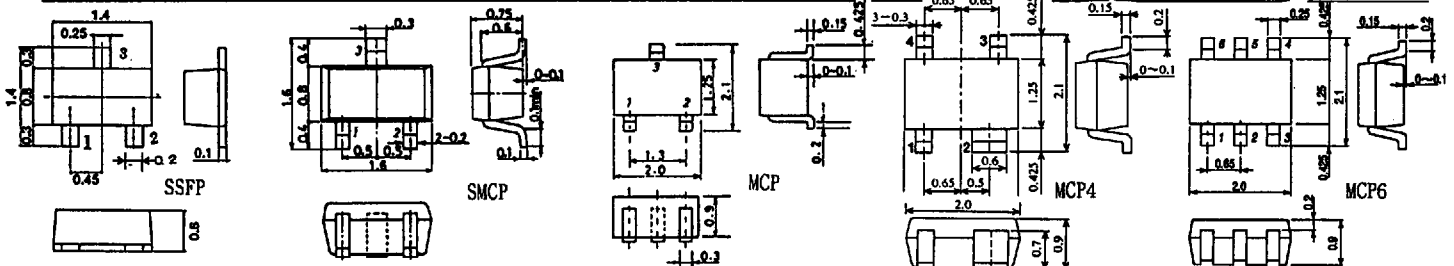
Type Nos. of 1XX or 1XXX are p-channel types.  
 Type Nos. of 2XX or 2XXX are N-channel types.  
 XP package is excluded.

\*: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.

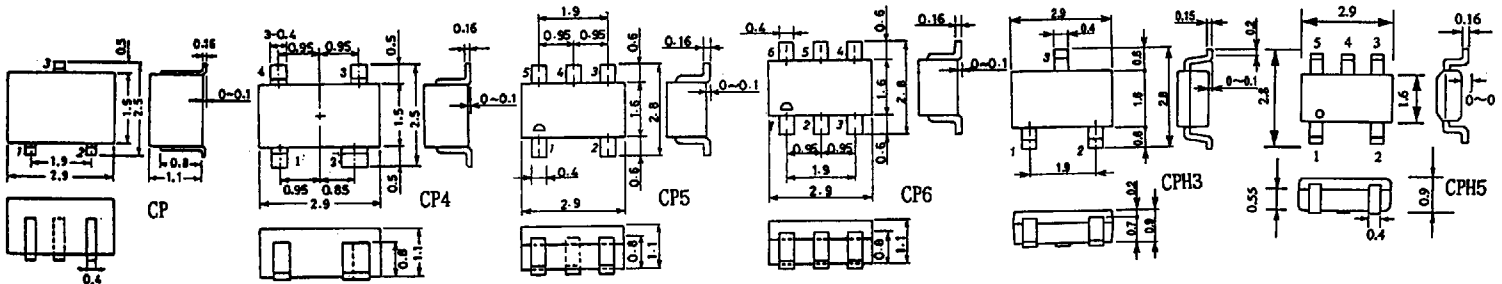
### Surface Mount Type Outlines (JEDEC and EIAJ name are in parentheses.)

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

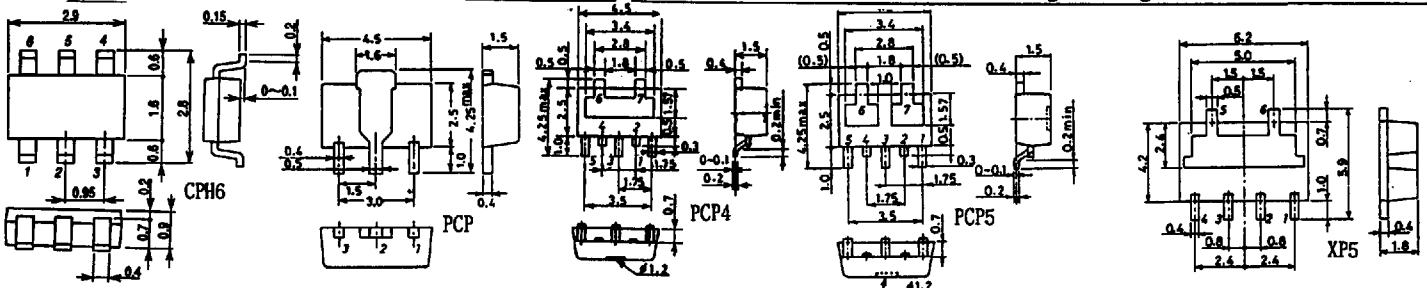
SANYO:SSFP SANYO:SMCP(SC-75A) SANYO:MCP(SC-70), MCP4(SC-82, A), MCP6  
 Device weight:0.002g Device weight:0.003g Device weight:0.006g, 0.007g, 0.007g



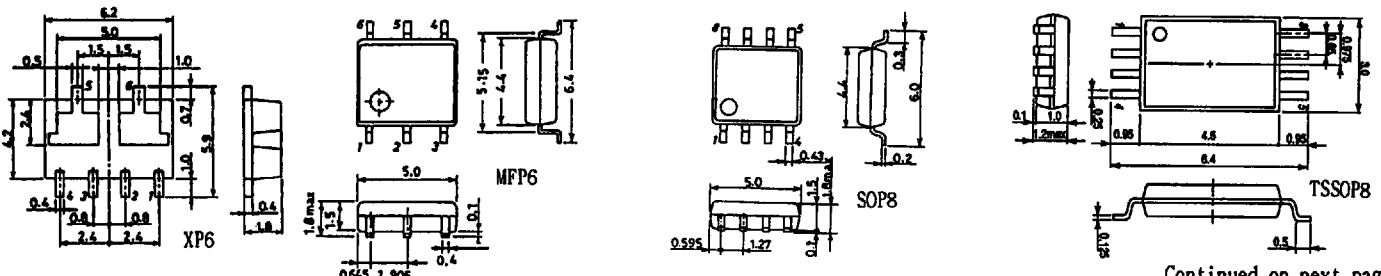
SANYO:CP(SC-59, TO-236) SANYO:CP4, CP5, CP6(SC-61, SC-74A, SC-74, SOT143) SANYO:CPH3, CPH5  
 Device weight:0.013g Device weight:0.013g, 0.014g, 0.015g Device weight:0.013g, 0.015g



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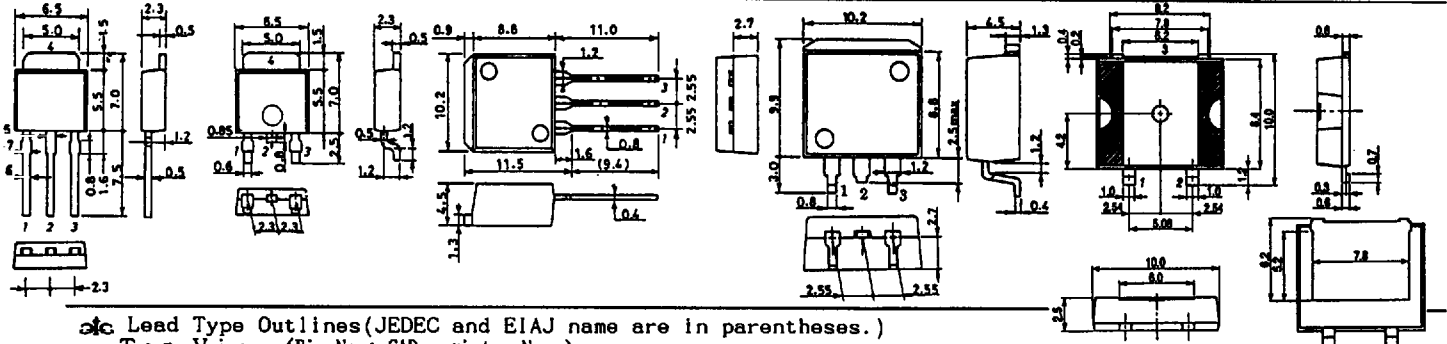
## SANYO Discrete Device Package Outlines (unit:mm)

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.)

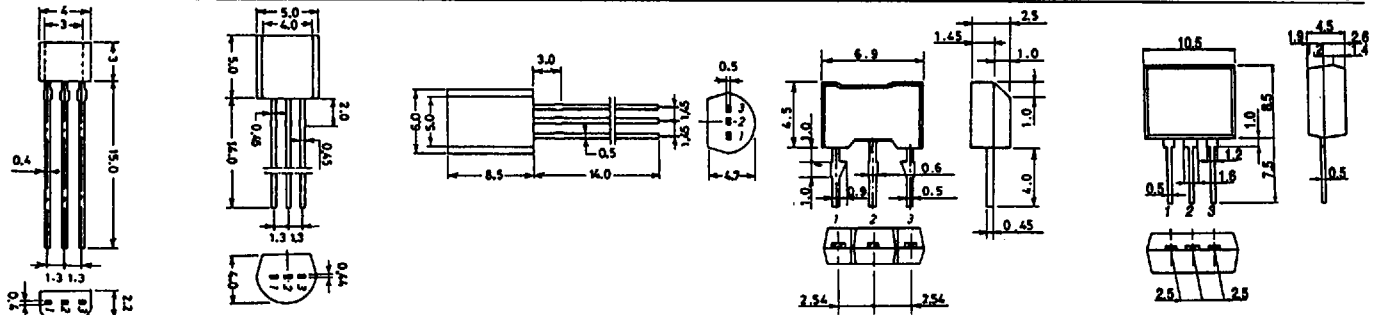
SANYO:SPA(TO-18, TO-39)  
 Device weight:0.098g

SANYO:NP(SC-43A, TO-92, SOT-54)  
 Device weight:0.269g

SANYO:MP(SC-51, TO-226)  
 Device weight:0.578g

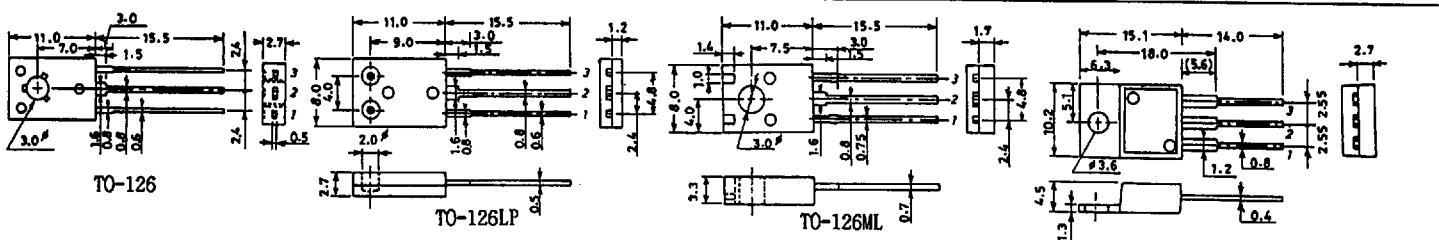
SANYO:NMP(SC-71)  
 Device weight:0.21g, AN use:0.275g

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

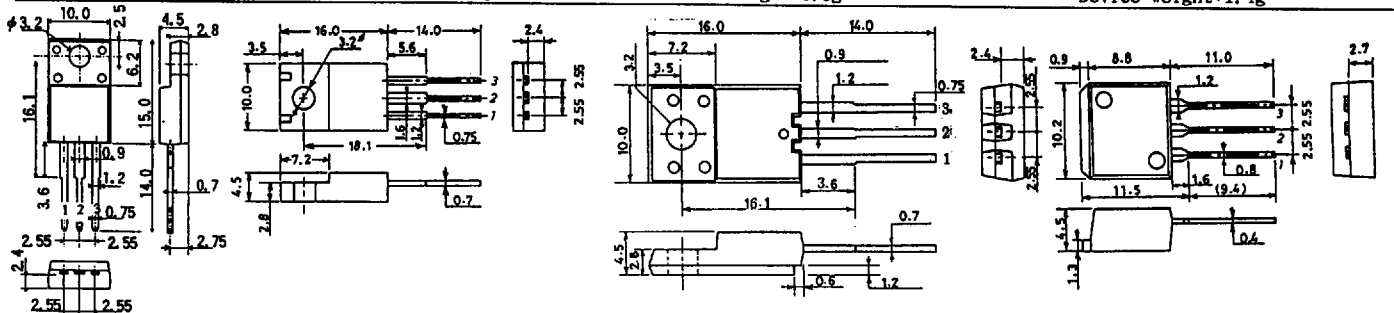


SANYO:TO-220CI  
 Device weight:1.75g

SANYO:TO-220ML(SC-67, SOT-186)  
 Device weight:1.9g

SANYO:TO-220FI(LS)(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

