

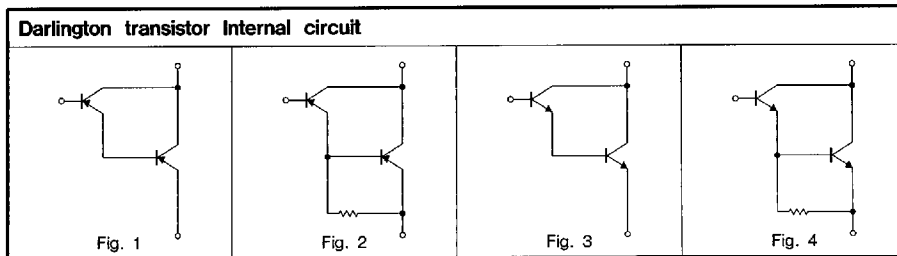
# Transistors

## TO-92 • SPT

TO-92 and its smaller version, the SPT transistors, have conventional leads that fit into PWB mounting holes. Ammo box taped packaging for automated insertion is standard packaging, however, bulk is also available.

Application	Package		$V_{CE0}$ (V) * $V_{CES}$ ** $V_{CER}$	$I_c$ (mA)	$I_c$ Max. (mA)	$P_c$ (mW) ( $T_a=25^\circ C$ )		$h_{FE}$	$h_{FE}$ Ranking code	$V_{CE}(V)$	$I_c(A)$	Internal circuit
	TO-92	SPT				TO-92	SPT					
	Part No.											
Low rbb' Head Amp	2SA1137	2SA1137S	-80	-100	-	300	300	120~560	Q R S	-6	-2	-
	2SB737	-	-40	-300	-	250	-	120~560	Q R S	-6	-10	-
	2SD786	2SD786S	40	300	-	250	250	120~560	Q R S	6	10	-
Low Noise	2SA825	2SA825S	-80**	-50	-	250	250	82~270	P Q	-3	-10	-
	2SA933A	2SA933AS	-50	-150	-	300	300	120~560	Q R S	-6	-1	-
	2SA933ALN	2SA933ASLN	-50	-150	-	300	300	180~560	R S	-6	-1	-
	2SA1038	2SA1038S	-120	-50	-	300	300	180~560	R S	-6	-2	-
	2SA1039	-	-80	-50	-	300	-	180~820	R S E	-6	-2	-
	2SA1198	2SA1198S	-80	-50	-	400	300	180~820	R S E	-6	-2	-
	2SC1740	2SC1740S	40	150	-	300	300	390~820	E	6	1	-
			50	150	-	300	300	120~560	Q R S	6	1	-
	2SC1740LN	2SC1740SLN	40	150	-	300	300	390~820	E	6	1	-
			50	150	-	300	300	180~560	R S	6	1	-
	2SC2389	2SC2389S	120	50	-	300	300	180~820	R S E	6	2	-
	2SC2390	-	80	50	-	300	-	180~820	R S E	6	2	-
2SC2808	2SC2808S	100	50	-	500	300	180~820	R S E	6	2	-	
Pre Amp	-	2SC4779S	25	100	200	-	300	180~560	R S	6	1	-
Driver	2SA854	2SA854S	-32	-500	-	400	300	82~390	P Q R	-3	-100	-
	2SA1199	2SA1199S	-40	-700	-	400	300	120~560	Q R S	-6	-10	-
	2SA1515	2SA1515S	-32	1000	-	500	300	82~390	P Q R	-3	-100	-
	2SC1741	2SC1741S	32	500	-	400	300	82~390	P Q R	3	100	-
	2SC1741A	2SC1741AS	50	500	-	400	300	82~390	P Q R	3	100	-
	2SC2872	2SC2872S	40	700	-	400	300	120~560	Q R S	6	10	-
	2SC3359	2SC3359S	80	300	-	400	300	82~390	P Q R	3	100	-
	2SC3377	-	32	1000	-	500	-	82~390	P Q R	3	100	-
Low $V_{CE(sat)}$	-	2SD1768S	80	1000	2000	-	300	82~390	P Q R	3	500	-
	-	2SA1585S	-20	-2000	-5000	-	400	82~390	P Q R	-2	-100	-
	-	2SC4115S	20	2000	5000	-	400	120~560	Q R S	2	100	-
	2SD2152	-	20	3000	5000	750	-	120~560	Q R S	2	100	-
	2SD1468	2SD1468S	15	1000	-	400	300	120~560	Q R S	3	100	-
	-	2SD2322S	32	800	-	-	300	82~390	P Q R	3	100	-
Strobo Flash	2SD1960	-	15	5000	8000	750	-	250~	-	2	2000	-
	-	2SD2470	10	5000	8000	-	400	270~820	S E	2	2000	-
Indicator Drive	2SA821	2SA821S	-210**	-30	-	250	250	56~270	N P Q	-3	-5	-
High Voltage SW	2SC1651	2SC1651S	210**	30	-	250	250	56~270	N P Q	3	5	-
SW	-	2SA1835S	-40	-200	-	-	250	56~270	N P Q	-1	-10	-
Chroma	2SC3415	2SC3415S	300	100	-	500	300	39~180	M N P	10	10	-
Darlington	2SA830	2SA830S	-32*	-300	-1500	300	300	5k~	-	-5	-100	Fig. 2
	2SA936	2SA936S	-32*	-300	-	300	300	10k~	-	-5	-10	Fig. 1
	2SC1645	2SC1645S	32*	300	1500	300	300	5k~	-	5	100	Fig. 4
	2SC2062	2SC2062S	32	300	-	300	300	5k~	-	3	100	Fig. 3
High $h_{FE}$	2SD2132	2SD2144S	20	500	1000	625	300	560~2700	U V W	3	10	-
High $V_{EBO}$	-	2SD2171S	25	1200	2000	-	300	560~2700	U V W	5	500	-
	-	2SD2227S	50	150	200	-	300	560~2700	U V W	5	1	-

Note: \*Emitter center



## TO-92 • SPT High frequency type

Application	Package		$V_{CE0}$ (V)	$I_c$ (mA)	$f_T$ (MHz)	$C_{ob}$ (pF)	$h_{FE}$	$h_{FE}$ Ranking code	$V_{CE}$ (V)	$I_c$ (mA)
	TO-92	SPT								
	Part No.									
FM IF AM RF	2SC2410	2SC2410S	32	100	230	1.8	56~180	N P	6	2
	2SC2058	2SC2058S	25	50	300	1.6	56~270	N P G	6	1
FM RF Mix. Osc.	2SC1809	2SC1809S	20	20	500	1.4	39~180	M N P	6	1
TV Tuner UHF Mix. Osc.	2SC3801*	-	25	30	1100	0.8	39~270	M N P Q	10	4
	2SC2926	2SC2926S	19	50	1100	1.2	39~270	M N P Q	10	5
	-	2SC4042S	18	50	1500	1.1	27~180	L M N P	10	5
	-	2SC4044S	20	50	2000	1.0	27~270	L M N P Q	10	5
	-	2SC4043S	11	50	3200	1.0	27~270	L M N P Q	10	5

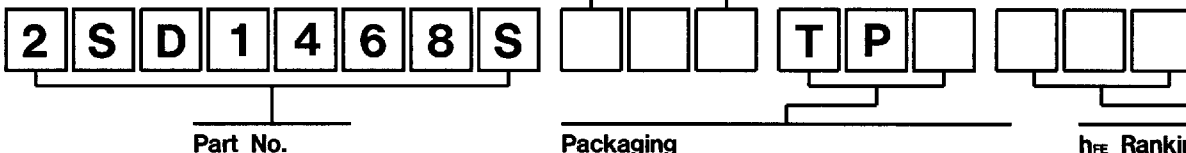
Note: \*Emitter center

●Product Designation

- When ordering, specify the type.
- Check each code against the tables shown below.
- Fill a space with the next character.

Special code

- Omit for standard product.
- Factory assigned for custom product.



Part No.

Packaging

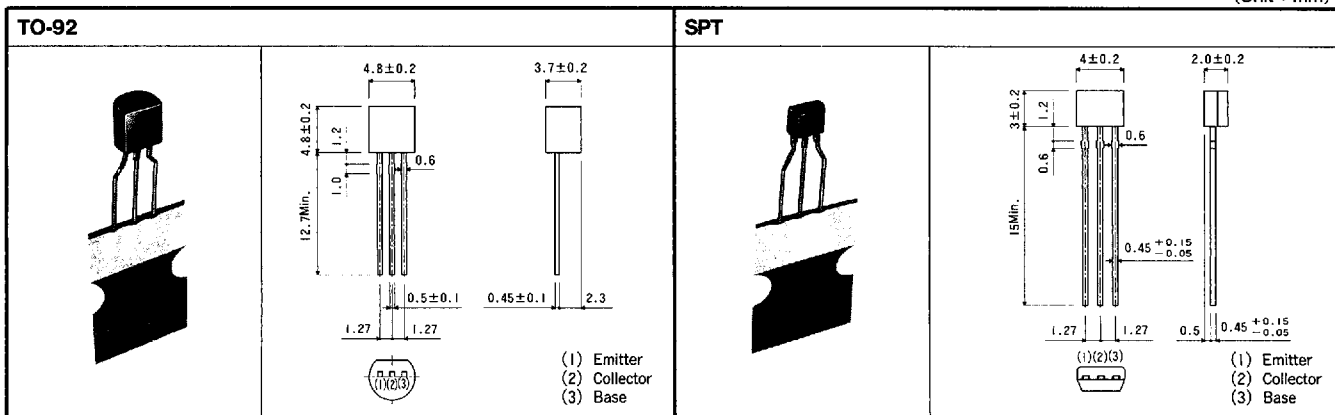
Package	Code	Package specifications	Quantity /Package
TO-92	T93	Ammo box	3,000
	None	Bulk	1,000
SPT	TP	Ammo box	5,000
	None	Bulk	2,000

hFE Ranking code

Input hFE rank signal display  
 One rank preferred  Q   
 Multiple rank preferred  Q  S  
 (Min., Max. is displayed)

Code	hFE Range
L	27~56
M	39~82
N	56~120
P	82~180
Q	120~270
R	180~390
S	270~560
E	390~820
U	560~1200
V	820~1800
W	1200~2700
A	1k~
B	5k~
C	10k~

(Unit : mm)



Magazine taping type : lead formed as shown below.

●Packaging Specifications

(Unit : mm)

TO-92 · SPT Taping

Code	TO-92	SPT
A	4.8±0.2	4.0±0.2
B	3.7±0.2	2.0±0.2
C	2.5Min.	3.0Min.
H	5.2Max.	3.0±0.2
d	0.5±0.1	0.45 <sup>+0.15</sup> <sub>-0.05</sub>
P	12.7±0.5	12.7±1.0
P <sub>0</sub>	12.7±0.3	12.7±0.2
D <sub>0</sub>	φ4.0±0.2	φ4.0±0.2
P <sub>1</sub>	6.35±0.5	6.35±0.5
F <sub>0</sub>	5.0 <sup>+0.6</sup> <sub>-0.2</sub>	5.0 <sup>+0.6</sup> <sub>-0.2</sub>
F <sub>1</sub>	2.5 <sup>+0.3</sup> <sub>-0.1</sub>	2.5 <sup>+0.4</sup> <sub>-0.1</sub>
W	18.0 <sup>+1.0</sup> <sub>-0.5</sub>	18.0 <sup>+1.0</sup> <sub>-0.1</sub>
H <sub>0</sub>	16.0±0.5	16.0±0.5
W <sub>0</sub>	6.0±0.5	6.0±0.5
W <sub>1</sub>	9.0±0.5	9.0±0.5
P <sub>20</sub>	1.0Max.	1.0Max.
Δh	0±1.0	0±1.0
Δh <sub>1</sub>	0±0.5	0±1.0
t	0.7±0.2	0.7±0.2

TO-92 · SPT Ammo box

	W	H	D
TO-92	340	262	40
SPT	330	232	40