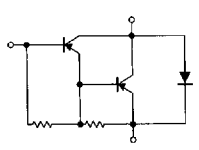
TO-92L • TO-92LS • MRT

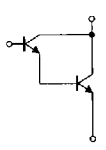
TO-92L is a high power version of TO-92 and TO-92LS is a slimmed TO-92L.
MRT is a 1.2W package power taped transistor designed for use with an automatic placement machine.

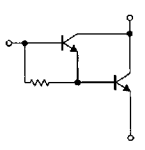
Application	Package Part No. TO-92L	TO-92LS	MRT	V_{CEO} (V) *V_{CES}	Ic (A)	Ic Max. (A)	Pc (W) (Ta=25°C) TO-92L	TO-92LS	MRT	h_{FE}	h_{FE} Ranking code	V_{CE} (V)	Ic (mA)	Internal circuit
Low Noise	–	2SA1819	–	−150	−0.05	–	–	0.8	–	120~390	Q R	−6	−2	–
	–	2SC4720	–	−150	0.05	–	–	0.8	–	120~390	Q R	6	2	–
Driver	2SA934	2SA1818	2SB1329	−32	−1	−2	0.75	0.9	1.2	82~390	P Q R	−3	−100	–
	2SA935	2SA1902	2SB1330	−80	−0.7	–	0.75	0.9	1.2	82~390	P Q R	−3	−100	–
	2SB1010	2SB1595	2SB1331	−32	−2	−3	0.75	0.9	1.2	82~390	P Q R	−3	−500	–
	2SB1041	–	2SB1332	−80	−1	–	0.9	–	1.2	82~390	P Q R	−3	−100	–
	2SB1043	–	–	−50	−1	–	0.9	–	–	82~390	P Q R	−3	−100	–
	2SB1212	2SB1596	2SB1328	−160	−1.5	–	0.9	0.9	1.2	56~270	N P Q	−5	−100	–
	2SB1425	–	–	−20	−2	−3	1.0	–	–	270~1200	S E U	−6	−500	–
	–	–	2SB1517	−50	−3	–	–	–	1.2	56~390	N P Q R	−3	−500	–
	2SC2060	2SC4719	2SD2005	32	1	2	0.75	0.9	1.2	82~390	P Q R	3	100	–
	2SC2061	2SC5061	2SD2006	80	0.7	1	0.75	0.9	1.2	82~390	P Q R	3	100	–
	2SD1292	–	2SD2008	80	1	2	0.9	–	1.2	82~390	P Q R	3	500	–
	2SD1384	2SD2450	2SD2007	32	2	2.5	0.75	0.9	1.2	82~390	P Q R	3	500	–
	2SD1812	2SD2451	2SD2004	160	1.5	–	0.9	0.9	1.2	56~270	N P Q	5	100	–
	–	–	2SD2146	50	3	–	–	–	1.2	56~390	N P Q R	3	500	–
Low V_{CE}(sat)	–	2SA1903	–	−20	−3	–	–	0.9	–	82~390	P Q R	−2	−100	–
	2SB1374	2SA1820	–	−50	−2	−5	1.0	0.9	–	82~270	P Q	−2	−500	–
	–	2SC5062	–	20	3	–	–	0.9	–	120~560	Q R S	2	100	–
	2SD2069	2SC4721	–	50	2	5	1.0	0.9	–	82~270	P Q	2	500	–
Strobo Flash Low V_{CE}(sat)	2SB1306	–	2SB1482	−20	−5	−10	1.2	–	1.2	82~390	P Q R	−2	−500	–
	2SD1961	–	–	20	5	10	1.2	–	–	120~560	Q R S	2	500	–
Chroma	2SC3269	2SC4722	2SC4243	300	0.1	–	0.75	0.9	1.0	39~180	M N P	10	10	–
High h_{FE}	2SB1425	–	2SB1461	−20	−2	−3	1.0	–	1.2	270~820	S E	−6	−500	–
	2SD2159	–	–	25	2	3	1.0	–	–	390~2700	E U V W	6	500	–
High h_{FE} High V_{EBO}	2SD2172	–	–	25	1.2	2	1	–	–	560~2700	U V W	5	500	–
Darlington	2SB1256	–	2SB1333	−100	−2	–	1.2	–	1.2	1k~10k	–	−2	−1000	Fig.1
	–	–	2SB1515	−80	−4	–	–	–	1.2	1k~10k	–	−3	−2000	Fig.1
	–	–	2SD2452	31±4	2	3	–	–	1.2	1k~10k	–	2	1000	Fig.5
	2SD1809	–	2SD2009	60*	1	–	0.9	–	1.2	2k~	–	3	500	Fig.2
	2SD1929	–	2SD2010	60±10	2	–	1.2	–	1.2	1k~10k	–	2	1000	Fig.5
	2SD1930	–	2SD2011	100	2	–	1.2	–	1.2	1k~10k	–	2	1000	Fig.4
	–	–	☆2SC4724	100	3	5	–	–	1.2	2k~10k	–	2	1500	Fig.4
	2SD1931	–	–	60±10	1.5	–	0.9	–	–	1k~30k	–	2	1000	Fig.6
	–	–	2SD2308	80	4	–	–	–	1.2	1k~10k	–	3	2000	Fig.4
	–	–	2SD2309	60	4	–	–	–	1.2	1k~10k	–	3	2000	Fig.3
Darlington Driver	–	–	2SD2388	90^{+20}_{-10}	2	3	–	–	1.2	1k~10k	–	2	1000	Fig.5
High Voltage SW	2SA1584	–	–	−400	−0.1	−0.2	0.9	–	–	56~270	N P Q	−10	−10	–
	2SA1780	2SA1884	2SA1809	−400	−0.5	−1	0.9	0.9	1.2	56~270	N P Q	−5	−50	–
	2SA1760	–	–	−400	−0.1	−0.2	0.9	–	–	56~270	N P Q	−10	−10	–
	–	–	2SA1861	−400	−2	−4	–	–	1.2	56~180	N P	−5	−100	–
	2SC4166	–	–	400	0.1	–	0.9	–	–	56~270	N P Q	10	10	–

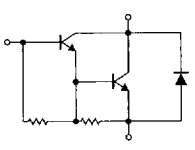
Note : ☆Under development

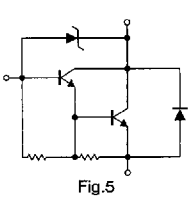
Darlington transistor Internal circuit

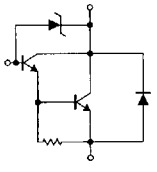

Fig.1


Fig.2


Fig.3


Fig.4


Fig.5


Fig.6

●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.

2	S	A	9	3	4				T	1	0	3			

Part No.

Packaging

Package	Code	Package specifications	Quantity/Package (pcs)
TO-92L	T103	Ammo box	2,500
	None	Bulk	500
TO-92LS	TE4	Ammo box	3,000
	None	Bulk	1,000
MRT	T105	Ammo box	2,000

h_{FE} Ranking code

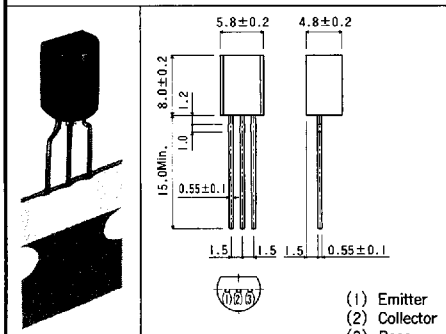
Input h_{FE} rank signal display
One rank prefered ☐P☐
Multiple rank prefered ☐P☐

(Min., Max. is displayed)

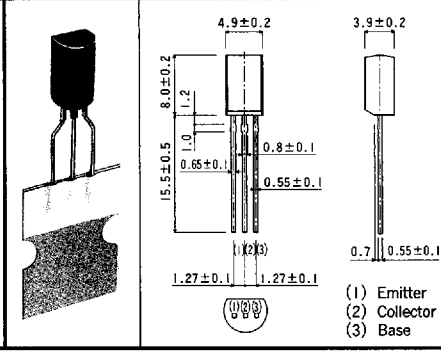
Code	h_{FE} Range	Code	h_{FE} Range
L	27~56	E	390~820
M	39~82	U	560~1200
N	56~120	V	820~1800
P	82~180	W	1200~2700
Q	120~270	A	1k~
R	180~390	B	5k~
S	270~560	C	10k~

(Unit : mm)

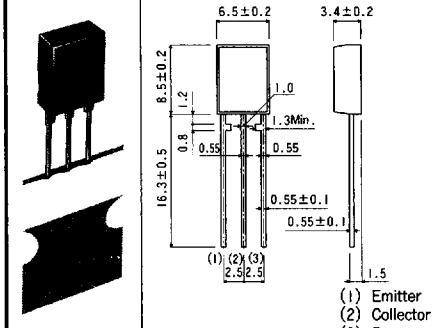
TO-92L



TO-92LS



MRT

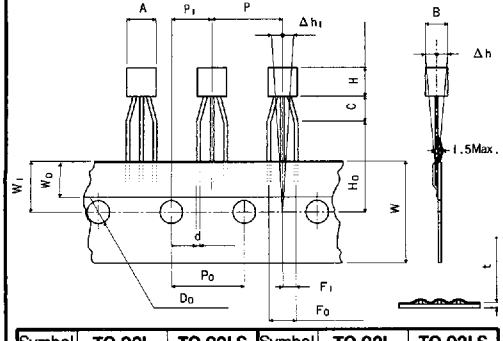


Magazine taping of TO-92L and TO-92LS : lead formed as shown below.

●Packaging Specifications

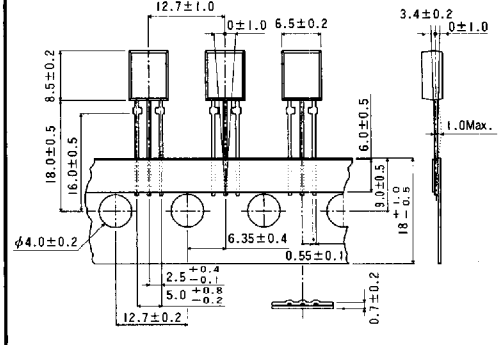
(Unit : mm)

TO-92L • TO-92LS Taping

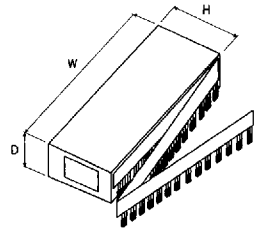


Symbol	TO-92L	TO-92LS	Symbol	TO-92L	TO-92LS
A	5.8±0.2	4.9±0.2	F_0	$5.0^{+0.8}_{-0.4}$	$5.0^{+0.8}_{-0.4}$
B	4.8±0.2	3.9±0.2	F_1	$2.5^{+0.4}_{-0.2}$	$2.5^{+0.4}_{-0.2}$
C	3.0Min.	3.0Min.	W	$18.0^{+1.0}_{-0.5}$	$18.0^{+1.0}_{-0.5}$
H	8.0±0.2	8.0±0.2	H_0	16.0±0.5	16.0±0.5
d	0.55±0.1	0.55±0.1	W_0	6.0±0.5	6.0±0.3
P	12.7±1.0	12.7±1.0	W_1	9.0±0.5	9.0±0.4
P_0	12.7±0.3	12.7±0.3	Δh	0±1.0	0±1.0
D_0	φ4.0±0.2	φ4.0±0.2	Δh_1	0±0.5	0±0.5
P_1	6.35±0.4	6.35±0.4	t	0.7±0.2	0.7±0.2

MRT Taping



TO-92L • TO-92LS • MRT Ammo box



	W	H	D
TO-92L	340	317	48
TO-92LS	340	270	48
MRT	340	317	48