

Transistors

TO-92L • TO-92LS • MRT

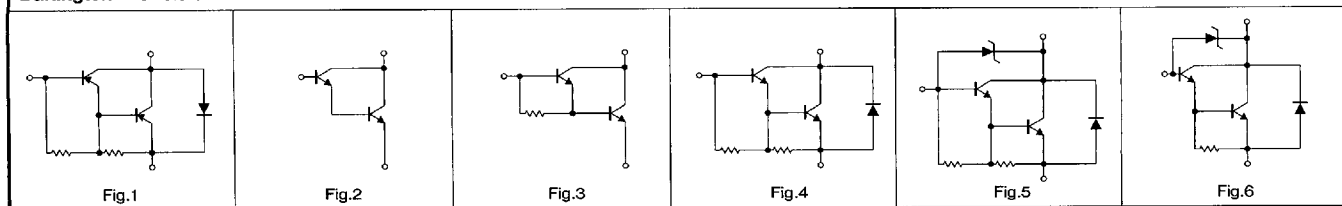
TO-92L is a high power version of TO-92 and TO-92LS is a slimmed TO-92L.

MRT is a 1.2W package power tapered transistor designed for use with an automatic placement machine.

Application	Package			V _{CEO} (V) *V _{CES}	I _C (A)	I _C Max. (A)	P _C (W) (Ta = 25°C)			h _{FE}	h _{FE} Ranking code	V _{CE} (V)	I _C (mA)	Internal circuit
	TO-92L	TO-92LS	MRT				TO-92L	TO-92LS	MRT					
	Part No.													
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 _{EB0}	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
Darlington Driver	—	—	2SD2309	60	4	—	—	—	1.2	1k~10k	—	3	2000	Fig.3
	—	—	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



●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

Part No.

T 1 0 3

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


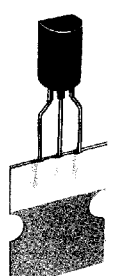

One rank preferred ☒ P ☐

Multiple rank preferred ☒ P ☒ R

(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
 <p> 5.8 ± 0.2 4.8 ± 0.2 8.0 ± 0.2 1.0 15.0 Min. 0.55 ± 0.1 1.5 1.5 0.55 ± 0.1 </p> <p>(1) Emitter (2) Collector (3) Base</p>	 <p> 4.9 ± 0.2 3.9 ± 0.2 8.0 ± 0.2 1.0 15.5 ± 0.5 0.65 ± 0.1 0.8 ± 0.1 0.55 ± 0.1 1.27 ± 0.1 1.27 ± 0.1 </p> <p>(1) Emitter (2) Collector (3) Base</p>	 <p> 6.5 ± 0.2 3.4 ± 0.2 8.5 ± 0.2 1.2 16.3 ± 0.5 0.8 0.55 1.3 Min. 0.55 0.55 ± 0.1 0.55 ± 0.1 1.5 </p> <p>(1) Emitter (2) Collector (3) Base</p>

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

●Packaging Specifications

(Unit : mm)

(Unit : mm)

TO-92L • TO-92LS Taping

MRT Taping

TO-92L • TO-92LS • MRT Ammo box

Technical drawing of TO-92L and TO-92LS components showing dimensions A, B, C, H, d, P, P₀, P₁, W, W₀, W₁, Δh, Δh₁, F₀, F₁, D₀, and t.

Technical drawing of MRT component showing dimensions 12.7±1.0, 0±1.0, 6.5±0.2, 3.4±0.2, 0±1.0, 1.0Max., 18.0±0.5, 16.0±0.5, 18.0±0.5, 6.0±0.5, 9.0±0.5, 12.7±0.2, 2.5±0.4, 5.0±0.8, 0.55±0.1, and 0.7±0.2.

Technical drawing of Ammo box showing dimensions W, H, and D.

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

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

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