

Transistors

TO-92L • TO-92LS • MRT

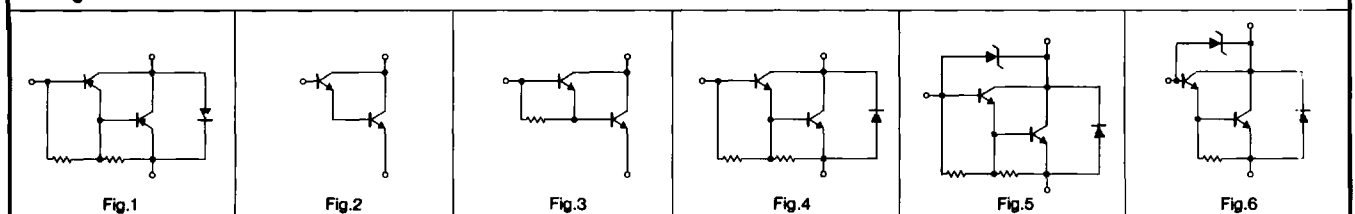
TO-92L is a high power version of TO-92 and TO-92LS is a slimmed TO-92L.

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

Application	Package			V _{CE0} (V) *V _{CEs}	I _c (A)	I _c Max. (A)	P _c (W) (T _a =25°C)			h _{FE}	h _{FE} Rating 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	
—	—	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



●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.

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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>(1) Emitter (2) Collector (3) Base</p>	<p>(1) Emitter (2) Collector (3) Base</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)

TO-92L · TO-92LS Taping					MRT Taping		TO-92L · TO-92LS · MRT Ammo box																																																																							
<table border="1"> <thead> <tr> <th>Symbol</th> <th>TO-92L</th> <th>TO-92LS</th> <th>Symbol</th> <th>TO-92L</th> <th>TO-92LS</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>5.8±0.2</td> <td>4.9±0.2</td> <td>F₀</td> <td>5.0^{+0.8}_{-0.4}</td> <td>5.0^{+0.8}_{-0.4}</td> </tr> <tr> <td>B</td> <td>4.8±0.2</td> <td>3.9±0.2</td> <td>F₁</td> <td>2.5^{+0.4}_{-0.2}</td> <td>2.5^{+0.4}_{-0.2}</td> </tr> <tr> <td>C</td> <td>3.0Min.</td> <td>3.0Min.</td> <td>W</td> <td>18.0^{+1.0}_{-0.6}</td> <td>18.0^{+1.0}_{-0.6}</td> </tr> <tr> <td>H</td> <td>8.0±0.2</td> <td>8.0±0.2</td> <td>H₀</td> <td>16.0±0.5</td> <td>16.0±0.5</td> </tr> <tr> <td>d</td> <td>0.55±0.1</td> <td>0.55±0.1</td> <td>W₀</td> <td>6.0±0.5</td> <td>6.0±0.3</td> </tr> <tr> <td>P</td> <td>12.7±1.0</td> <td>12.7±1.0</td> <td>W₁</td> <td>9.0±0.5</td> <td>9.0±0.4</td> </tr> <tr> <td>P₀</td> <td>12.7±0.3</td> <td>12.7±0.3</td> <td>Δh</td> <td>0±1.0</td> <td>0±1.0</td> </tr> <tr> <td>D₀</td> <td>φ4.0±0.2</td> <td>φ4.0±0.2</td> <td>Δh₁</td> <td>0±0.5</td> <td>0±0.5</td> </tr> <tr> <td>P₁</td> <td>6.35±0.4</td> <td>6.35±0.4</td> <td>t</td> <td>0.7±0.2</td> <td>0.7±0.2</td> </tr> </tbody> </table>	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} _{-0.6}	18.0 ^{+1.0} _{-0.6}	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	<table border="1"> <thead> <tr> <th></th> <th>W</th> <th>H</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>TO-92L</td> <td>340</td> <td>317</td> <td>48</td> </tr> <tr> <td>TO-92LS</td> <td>340</td> <td>270</td> <td>48</td> </tr> <tr> <td>MRT</td> <td>340</td> <td>317</td> <td>48</td> </tr> </tbody> </table>			W	H	D	TO-92L	340	317	48	TO-92LS	340	270	48	MRT	340	317	48
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