

# Transistors

## TO-92L TO-92LS MRT

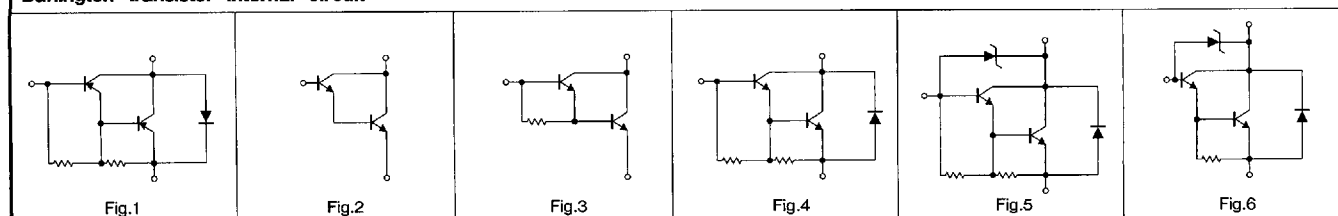
TO-92L is a high power version of TO-92 and TO-92LS is a slimmed TO-92L.

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

| Application                                   | Package  |         |          | V <sub>CEO</sub> (V)<br>*V <sub>CES</sub> | I <sub>C</sub> (A) | I <sub>C</sub> Max. (A) | P <sub>C</sub> (W) (T <sub>a</sub> =25°C) |         |     | h <sub>FE</sub> | h <sub>FE</sub><br>Ranking code | V <sub>CE</sub> (V) | I <sub>C</sub> (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 <sub>CE(sat)</sub>                      | —        | 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                                  | 2SB1306  | —       | 2SB1482  | —20                                       | —5                 | —10                     | 1.2                                       | —       | 1.2 | 82~390          | P Q R                           | —2                  | —500                | —                |
| Low V <sub>CE(sat)</sub>                      | 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 <sub>FE</sub>                          | 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 <sub>FE</sub><br>High V <sub>EBO</sub> | 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 <sup>+20</sup> <sub>—10</sub>          | 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



# 查询"2SB1041P"供应商

- 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<sub>FE</sub> Ranking code

Input h<sub>FE</sub> rank signal display

One rank preferred ☒ P ☐

Multiple rank preferred ☒ P ☒ R

(Min., Max. is displayed)

| Code | h <sub>FE</sub> Range | Code | h <sub>FE</sub> 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<br/>(2) Collector<br/>(3) Base</p> | <p>(1) Emitter<br/>(2) Collector<br/>(3) Base</p> | <p>(1) Emitter<br/>(2) Collector<br/>(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 |
|-------------------------|----------|----------|-----------------|--------------------------------------|--------------------------------------|---------------------------------|
|                         |          |          |                 |                                      |                                      |                                 |
| Symbol                  | TO-92L   | TO-92LS  | Symbol          | TO-92L                               | TO-92LS                              |                                 |
| A                       | 5.8±0.2  | 4.9±0.2  | F <sub>0</sub>  | 5.0 <sup>+0.8</sup> <sub>-0.4</sub>  | 5.0 <sup>+0.8</sup> <sub>-0.4</sub>  |                                 |
| B                       | 4.8±0.2  | 3.9±0.2  | F <sub>1</sub>  | 2.5 <sup>+0.4</sup> <sub>-0.2</sub>  | 2.5 <sup>+0.4</sup> <sub>-0.2</sub>  |                                 |
| C                       | 3.0Min.  | 3.0Min.  | W               | 18.0 <sup>+1.0</sup> <sub>-0.5</sub> | 18.0 <sup>+1.0</sup> <sub>-0.5</sub> |                                 |
| H                       | 8.0±0.2  | 8.0±0.2  | H <sub>0</sub>  | 16.0±0.5                             | 16.0±0.5                             |                                 |
| d                       | 0.55±0.1 | 0.55±0.1 | W <sub>0</sub>  | 6.0±0.5                              | 6.0±0.3                              |                                 |
| P                       | 12.7±1.0 | 12.7±1.0 | W <sub>1</sub>  | 9.0±0.5                              | 9.0±0.4                              |                                 |
| P <sub>0</sub>          | 12.7±0.3 | 12.7±0.3 | Δh              | 0±1.0                                | 0±1.0                                |                                 |
| D <sub>0</sub>          | φ4.0±0.2 | φ4.0±0.2 | Δh <sub>1</sub> | 0±0.5                                | 0±0.5                                |                                 |
| P <sub>1</sub>          | 6.35±0.4 | 6.35±0.4 | t               | 0.7±0.2                              | 0.7±0.2                              |                                 |

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