

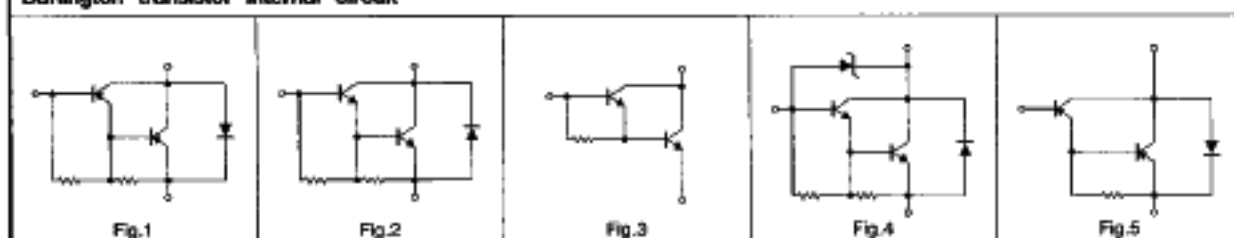
# TO-220 • TO-220FP • TO-220FN • HRT

TO-220FP is a TO-220 with mold coated fin for easier mounting and higher PC, 2W. TO-220FN is a low profile (by 2mm) version of TO-220FP without fin support pin, for higher mounting density. HRT is a taped power transistor package for use with an automatic placement machine.

| Application              | Part No. |          |          |          | V <sub>CEO</sub> (V)             | I <sub>C</sub> (A) | P <sub>C</sub> (W)   |          |                      |         | h <sub>FE</sub> | h <sub>FE</sub> (Sinking only) | V <sub>CE</sub> (V) | I <sub>C</sub> (A) | Internal circuit |
|--------------------------|----------|----------|----------|----------|----------------------------------|--------------------|----------------------|----------|----------------------|---------|-----------------|--------------------------------|---------------------|--------------------|------------------|
|                          | TO-220   | TO-220FP | TO-220FN | HRT      |                                  |                    | T <sub>C</sub> =25°C |          | T <sub>A</sub> =25°C |         |                 |                                |                     |                    |                  |
|                          |          |          |          |          |                                  |                    | TO-220               | TO-220FP | TO-220FN             | HRT     |                 |                                |                     |                    |                  |
| Driver                   | 2SA1634  | 2SA1635  | -        | -        | -60                              | -4                 | 40                   | 30       | -                    | -       | 80~320          | D E F                          | -4                  | -1                 | -                |
|                          | 2SB1369  | 2SB1370  | 2SB1565  | 2SB1496  | -60                              | -3                 | 40                   | 30       | 25                   | 1.8     | 80~320          | D E F                          | -5                  | -0.5               | -                |
|                          | 2SB1064  | 2SB1185  | 2SB1566  | 2SB1357  | -50                              | -3                 | 30                   | 25       | 25                   | 1.8     | 80~320          | D E F                          | -3                  | -0.5               | -                |
|                          | 2SB1085  | 2SB1186  | 2SB1569  | 2SB1353  | -120                             | -1.5               | 20                   | 20       | 20                   | 1.8     | 60~320          | D E F                          | -5                  | -0.1               | -                |
|                          | 2SB1085A | 2SB1186A | 2SB1569A | 2SB1353A | -150                             | -1.5               | 20                   | 20       | 20                   | 1.8     | 60~200          | D E                            | -5                  | -0.1               | -                |
|                          | 2SB1289  | 2SB1290  | -        | 2SB1356  | -80                              | -7                 | 40                   | 30       | -                    | 1.6     | 60~320          | D E F                          | -5                  | -1                 | -                |
|                          | 2SB1291  | 2SB1292  | -        | 2SB1358  | -80                              | -5                 | 40                   | 30       | -                    | 1.8     | 60~320          | D E F                          | -5                  | -1                 | -                |
|                          | 2SB1293  | 2SB1294  | -        | 2SB1360  | -100                             | -5                 | 40                   | 30       | -                    | 1.8     | 60~320          | D E F                          | -5                  | -1                 | -                |
|                          | 2SB1334  | 2SB1335  | -        | 2SB1355  | -80                              | -4                 | 40                   | 30       | -                    | 1.8     | 60~320          | D E F                          | -5                  | -1                 | -                |
|                          | 2SB1334A | 2SB1335A | -        | -        | -80                              | -4                 | 40                   | 30       | -                    | -       | 60~320          | D E F                          | -5                  | -1                 | -                |
|                          | 2SC4007  | 2SC4008  | -        | 2SC4355  | 80                               | 4                  | 40                   | 30       | -                    | 1.8     | 60~600          | D E F G                        | 4                   | 1                  | -                |
|                          | 2SD2023  | 2SD2061  | 2SD2394  | 2SD2096  | 60                               | 3                  | 40                   | 30       | 25                   | 1.8     | 60~320          | D E F                          | 5                   | 0.5                | -                |
|                          | 2SD1505  | 2SD1762  | 2SD2395  | 2SD2037  | 50                               | 3                  | 30                   | 25       | 25                   | 1.8     | 60~320          | D E F                          | 3                   | 0.5                | -                |
|                          | 2SD1562  | 2SD1763  | 2SD2400  | 2SD2033  | 120                              | 1.5                | 20                   | 20       | 20                   | 1.8     | 60~320          | D E F                          | 5                   | 0.1                | -                |
|                          | 2SD1562A | 2SD1763A | 2SD2400A | 2SD2033A | 160                              | 1.5                | 20                   | 20       | 20                   | 1.8     | 60~200          | D E                            | 5                   | 0.1                | -                |
|                          | 2SD1680  | 2SD1833  | -        | 2SD2036  | 80                               | 7                  | 40                   | 30       | -                    | 1.8     | 60~320          | D E F                          | 5                   | 1                  | -                |
|                          | 2SD1720  | 2SD1832  | -        | 2SD2038  | 60                               | 5                  | 40                   | 30       | -                    | 1.8     | 60~320          | D E F                          | 5                   | 1                  | -                |
|                          | 2SD1778  | 2SD1855  | -        | 2SD2035  | 60                               | 4                  | 40                   | 30       | -                    | 1.8     | 60~320          | D E F                          | 5                   | 1                  | -                |
|                          | 2SD1778A | 2SD1855A | -        | -        | 80                               | 4                  | 40                   | 30       | -                    | -       | 60~320          | D E F                          | 5                   | 1                  | -                |
|                          | 2SD1896  | 2SD1897  | -        | 2SD2040  | 100                              | 6                  | 40                   | 30       | -                    | 1.8     | 60~320          | D E F                          | 5                   | 1                  | -                |
| 2SD1966                  | 2SD1967  | -        | -        | 120      | 7                                | 40                 | 30                   | -        | -                    | 100~500 | E F G           | 5                              | 1                   | -                  |                  |
| Low V <sub>CE(sat)</sub> | -        | 2SA1757  | -        | -        | -60                              | -5                 | -                    | 25       | -                    | -       | 60~320          | D E F                          | -2                  | -1                 | -                |
|                          | -        | 2SA1758  | -        | -        | -60                              | -12                | -                    | 30       | -                    | -       | 60~320          | D E F                          | -2                  | -2                 | -                |
|                          | -        | 2SC4595  | -        | -        | 60                               | 12                 | -                    | 30       | -                    | -       | 60~320          | D E F                          | 2                   | 2                  | -                |
|                          | -        | 2SC4596  | -        | -        | 60                               | 5                  | -                    | 25       | -                    | -       | 60~320          | D E F                          | 2                   | 1                  | -                |
|                          | 2SC4845  | 2SC4846  | -        | -        | 120                              | 5                  | 40                   | 30       | -                    | -       | 60~200          | D E                            | 5                   | 3                  | -                |
|                          | 2SC4848  | 2SC4849  | -        | -        | 120                              | 7                  | 40                   | 30       | -                    | -       | 60~200          | D E                            | 5                   | 3                  | -                |
| Chroma                   | -        | -        | 2SC5147  | 2SC4506  | 300                              | 0.1                | -                    | -        | 10                   | 1.5     | 40~200          | C D E                          | 10                  | 0.01               | -                |
| High h <sub>FE</sub>     | 2SD1943  | 2SD1944  | 2SD2396  | 2SD2044  | 60                               | 3                  | 40                   | 30       | 30                   | 1.8     | 400~2k          | H J K                          | 4                   | 0.5                | -                |
| High Voltage SW          | 2SC3968  | 2SC3969  | -        | 2SC4354  | 400                              | 2                  | 20                   | 20       | -                    | 1.8     | 16~50           | A B                            | 5                   | 0.1                | -                |
|                          | 2SC4205  | 2SC4129  | -        | -        | 400                              | 5                  | 40                   | 30       | -                    | -       | 16~32           | A                              | 6                   | 3                  | -                |
|                          | ☆2SC5112 | ☆2SC5113 | -        | -        | 500                              | 5                  | 40                   | 35       | -                    | -       | 10~60           | -                              | 5                   | 2.5                | -                |
|                          | ☆2SC5116 | ☆2SC5117 | -        | -        | 550                              | 4                  | 40                   | 35       | -                    | -       | 10~50           | -                              | 5                   | 2                  | -                |
| Darlington               | 2SB1286  | 2SB1287  | 2SB1567  | 2SB1359  | -100                             | -2                 | 25                   | 20       | 20                   | 1.8     | 1k~10k          | -                              | -2                  | -1                 | Fig.1            |
|                          | 2SB1339  | 2SB1340  | -        | 2SB1513  | -120                             | -6                 | 40                   | 30       | -                    | 1.8     | 2k~20k          | -                              | -3                  | -2                 | Fig.1            |
|                          | 2SB1341  | 2SB1342  | 2SB1568  | 2SB1512  | -80                              | -4                 | 35                   | 30       | 30                   | 1.8     | 1k~10k          | -                              | -3                  | -2                 | Fig.1            |
|                          | 2SB1343  | 2SB1344  | -        | 2SB1514  | -100                             | -6                 | 40                   | 30       | -                    | 1.8     | 1k~20k          | -                              | -3                  | -2                 | Fig.1            |
|                          | 2SB1550  | 2SB1551  | -        | 2SB1549  | -80                              | -10                | 40                   | 30       | -                    | 1.8     | 1k~20k          | -                              | -3                  | -5                 | Fig.1            |
|                          | -        | 2SB1616  | -        | -        | -80                              | -4                 | -                    | 30       | -                    | -       | 1K~10K          | -                              | -3                  | -2                 | Fig.5            |
|                          | 2SC4573  | 2SC4574  | -        | 2SC4575  | 80±10                            | 4                  | 35                   | 30       | -                    | 1.8     | 2k~10k          | -                              | 5                   | 1.5                | Fig.4            |
|                          | -        | 2SC4895  | -        | -        | 100                              | 3                  | -                    | 30       | -                    | -       | 2k~10k          | -                              | 2                   | 1.5                | Fig.2            |
|                          | 2SD1646  | 2SD1765  | 2SD2398  | 2SD2039  | 100                              | 2                  | 25                   | 20       | 20                   | 1.8     | 1k~10k          | -                              | 2                   | 1                  | Fig.2            |
|                          | 2SD1647  | 2SD1764  | 2SD2397  | 2SD2041  | 80±10                            | 2                  | 25                   | 20       | 20                   | 1.8     | 1k~10k          | -                              | 2                   | 1                  | Fig.4            |
|                          | -        | 2SD2091  | -        | 2SD2263  | 90 <sup>+20</sup> <sub>-10</sub> | 2                  | -                    | 20       | -                    | 1.8     | 1k~10k          | -                              | 2                   | 1                  | Fig.4            |
|                          | 2SD1783  | 2SD1856  | -        | 2SD2042  | 60±10                            | 5                  | 30                   | 25       | -                    | 1.8     | 2k~30k          | -                              | 3                   | 2                  | Fig.4            |
|                          | 2SD1888  | 2SD1889  | -        | 2SD2043  | 120                              | 6                  | 40                   | 30       | -                    | 1.8     | 2k~20k          | -                              | 3                   | 2                  | Fig.2            |
|                          | 2SD1932  | 2SD1933  | 2SD2399  | 2SD2032  | 80                               | 4                  | 35                   | 30       | 30                   | 1.8     | 1k~10k          | -                              | 3                   | 2                  | Fig.2            |
|                          | 2SD1986  | 2SD1987  | -        | 2SD2306  | 60                               | 4                  | 35                   | 30       | -                    | 1.8     | 1k~10k          | -                              | 3                   | 2                  | Fig.3            |
|                          | 2SD2024  | 2SD2025  | -        | 2SD2307  | 100                              | 8                  | 40                   | 30       | -                    | 1.8     | 1k~20k          | -                              | 3                   | 2                  | Fig.2            |

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.



Part No.

Special code

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

Packaging

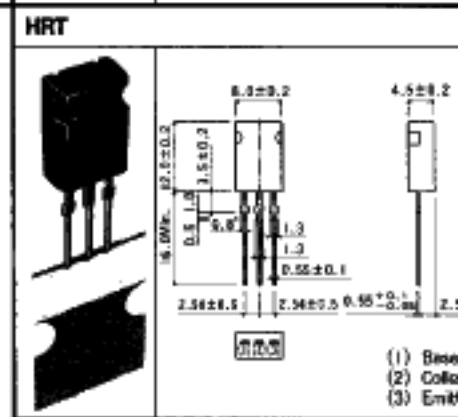
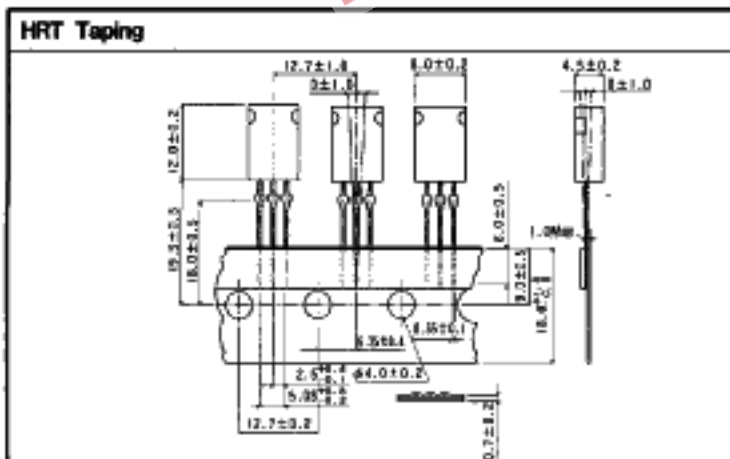
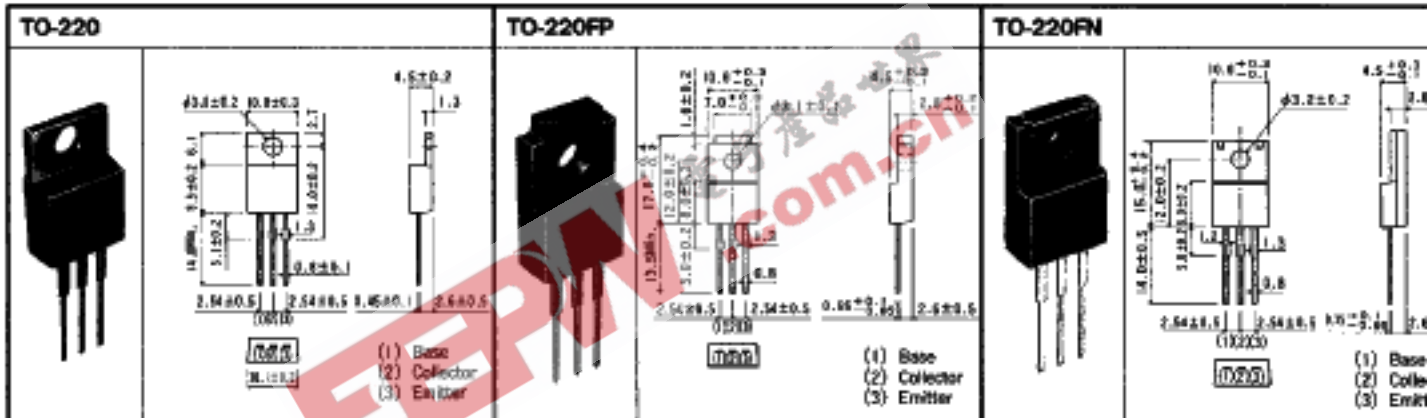
| Package   | Code | Package specification | Quantity/Package (pcs) |
|-----------|------|-----------------------|------------------------|
| TO-220*   | None | Bulk                  | 500                    |
|           | C7   | Tube                  | 1,000<br>(500pcs × 20) |
| TO-220FP* | None | Bulk                  | 500                    |
|           | C7   | Tube                  | 1,000<br>(500pcs × 20) |
| TO-220FN  | None | Bulk                  | 500                    |
|           | C7   | Tube                  | 1,000<br>(500pcs × 20) |
| HRT       | T114 | Ammo box              | 1,000                  |

Note: Available in various lead configurations (forming, cut leads).  
For further information, contact our sales representatives.

hvc Ranking code

- Input hvc rank signal code  
One rank preferred   
Multiple rank preferred   
(Min., Max. is displayed)

| Code | hvc Rank  |
|------|-----------|
| A    | 16~32     |
| B    | 25~50     |
| C    | 40~80     |
| D    | 60~120    |
| E    | 100~200   |
| F    | 160~320   |
| G    | 250~500   |
| H    | 400~800   |
| J    | 800~1200  |
| K    | 1000~2000 |



(Unit: mm)

