

# 2SD2538

## Silicon NPN triple diffusion planer type Darlington

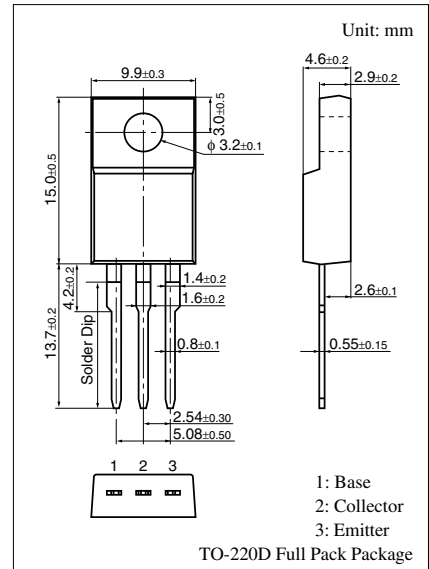
For power amplification

### ■ Features

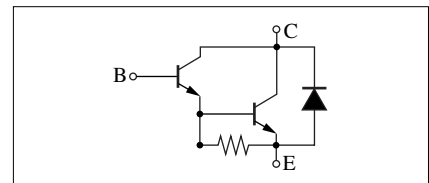
- High forward current transfer ratio  $h_{FE}$
- Full-pack package which can be installed to the heat sink with one screw

### ■ Absolute Maximum Ratings $T_C = 25^\circ\text{C}$

| Parameter                    | Symbol    | Rating                   | Unit             |   |
|------------------------------|-----------|--------------------------|------------------|---|
| Collector to base voltage    | $V_{CBO}$ | 60                       | V                |   |
| Collector to emitter voltage | $V_{CEO}$ | 60                       | V                |   |
| Emitter to base voltage      | $V_{EBO}$ | 5                        | V                |   |
| Peak collector current       | $I_{CP}$  | 4                        | A                |   |
| Collector current            | $I_C$     | 2                        | A                |   |
| Collector power dissipation  | $P_C$     | $T_C = 25^\circ\text{C}$ | 35               | W |
|                              |           | $T_a = 25^\circ\text{C}$ | 2                |   |
| Junction temperature         | $T_j$     | 150                      | $^\circ\text{C}$ |   |
| Storage temperature          | $T_{stg}$ | -55 to +150              | $^\circ\text{C}$ |   |



### Internal Connection



### ■ Electrical Characteristics $T_C = 25^\circ\text{C} \pm 3^\circ\text{C}$

| Parameter                               | Symbol        | Conditions  | Min   | Typ | Max    | Unit          |
|---|---------------|---|-------|-----|--------|---------------|
| Collector cutoff current                | $I_{CBO}$     | $V_{CB} = 60\text{ V}, I_E = 0$                                 |       |     | 1      | mA            |
|   | $I_{CEO}$     | $V_{CE} = 30\text{ V}, I_B = 0$                                 |       |     | 2      | mA            |
| Emitter cutoff current                  | $I_{EBO}$     | $V_{EB} = 5\text{ V}, I_C = 0$                                  |       |     | 2      | mA            |
| Collector to emitter voltage            | $V_{CEO}$     | $I_C = 30\text{ mA}, I_B = 0$                                   | 60    |     |        | V             |
| Forward current transfer ratio          | $h_{FE1}$     | $V_{CE} = 4\text{ V}, I_C = 1\text{ A}$                         | 1 000 |     |        |               |
|   | $h_{FE2}^*$   | $V_{CE} = 4\text{ V}, I_C = 2\text{ A}$                         | 2 000 |     | 10 000 |               |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 2\text{ A}, I_B = 8\text{ mA}$                           |       |     | 2.5    | V             |
| Base to emitter voltage                 | $V_{BE}$      | $V_{CE} = 4\text{ V}, I_C = 2\text{ A}$                         |       |     | 2.8    | V             |
| Transition frequency                    | $f_T$         | $V_{CE} = 10\text{ V}, I_C = 0.5\text{ A}, f = 1\text{ MHz}$    |       | 20  |        | MHz           |
| Turn-on time                            | $t_{on}$      | $I_C = 2\text{ A}, I_{B1} = 8\text{ mA}, I_{B2} = -8\text{ mA}$ |       | 0.5 |        | $\mu\text{s}$ |
| Storage time                            | $t_{stg}$     | $V_{CC} = 50\text{ V}$  |       | 4.0 |        | $\mu\text{s}$ |
| Fall time                               | $t_f$         |   |       | 1.0 |        | $\mu\text{s}$ |

Note) \*: Rank classification

| Rank      | P               | Q              |
|-----------|-----------------|----------------|
| $h_{FE2}$ | 4 000 to 10 000 | 2 000 to 5 000 |



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