

# 2SD2178

## Silicon NPN epitaxial planar type

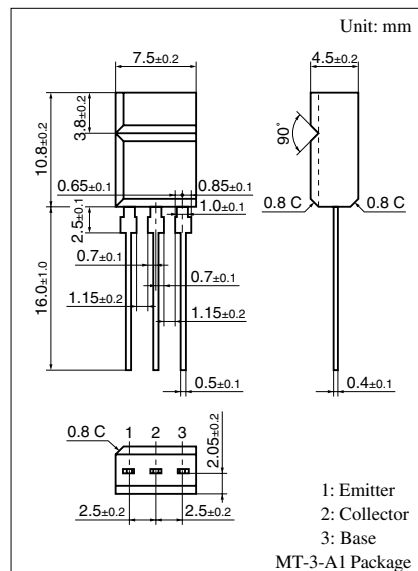
For low-frequency output amplification

### ■ Features

- Low collector to emitter saturation voltage  $V_{CE(sat)}$
- Large collector current  $I_C$

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

| Parameter                    | Symbol    | Rating      | Unit             |
|------------------------------|-----------|-------------|------------------|
| Collector to base voltage    | $V_{CBO}$ | 50          | V                |
| Collector to emitter voltage | $V_{CEO}$ | 50          | V                |
| Emitter to base voltage      | $V_{EBO}$ | 5           | V                |
| Peak collector current       | $I_{CP}$  | 3           | A                |
| Collector current            | $I_C$     | 2           | A                |
| Collector power dissipation  | $P_C$     | 1.5         | W                |
| Junction temperature         | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage temperature          | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

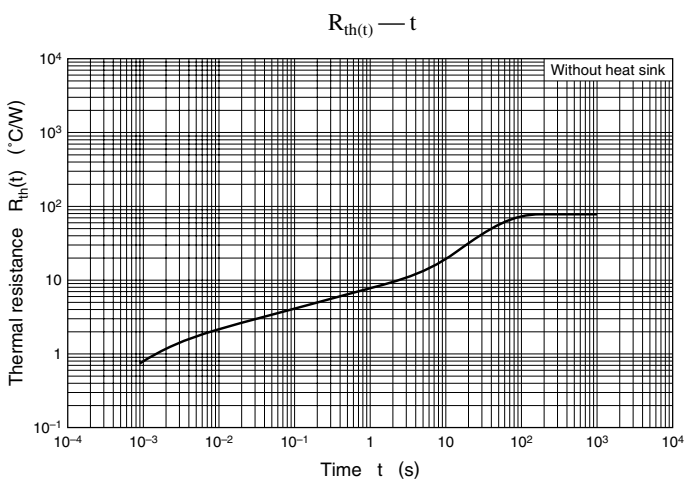
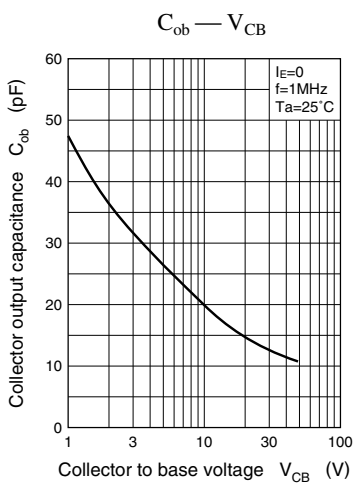
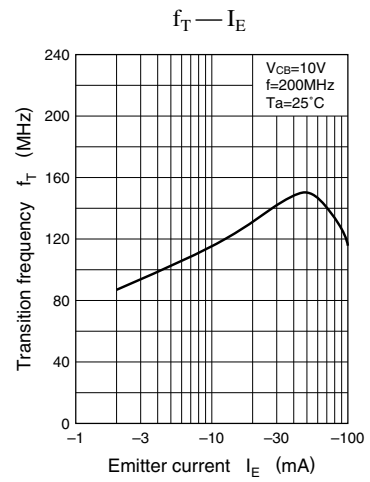
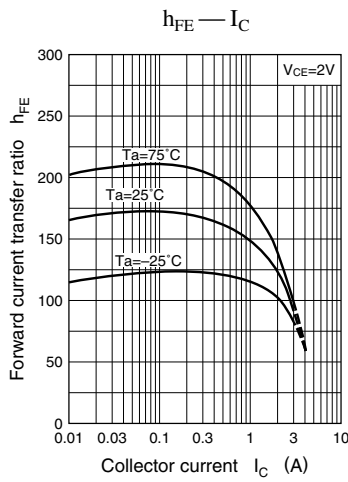
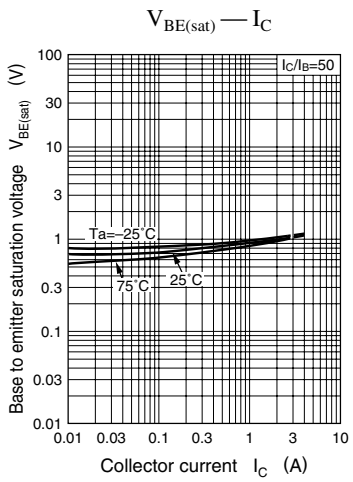
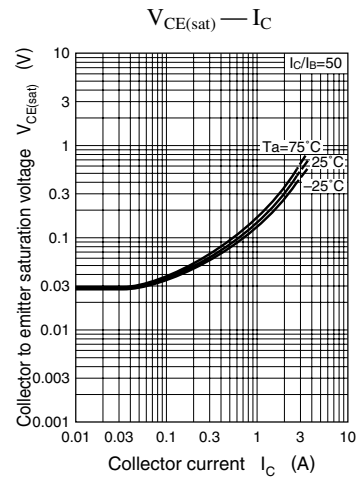
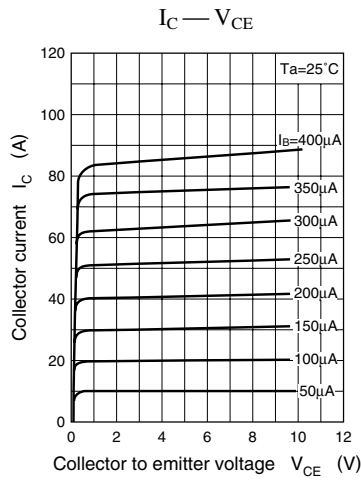
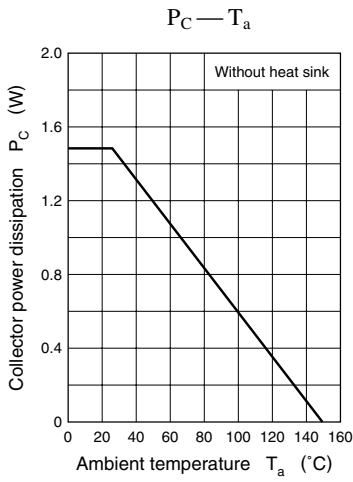


### ■ Electrical Characteristics $T_C = 25^\circ\text{C}$

| Parameter                               | Symbol        | Conditions   | Min | Typ  | Max | Unit          |
|---|---------------|--|-----|------|-----|---------------|
| Collector cutoff current                | $I_{CBO}$     | $V_{CB} = 20\text{ V}, I_E = 0$                                    |     |      | 0.1 | $\mu\text{A}$ |
| Collector to base voltage               | $V_{CBO}$     | $I_C = 10\ \mu\text{A}, I_E = 0$                                   | 50  |      |     | V             |
| Collector to emitter voltage            | $V_{CEO}$     | $I_C = 1\ \text{mA}, I_B = 0$                                      | 50  |      |     | V             |
| Emitter to base voltage                 | $V_{EBO}$     | $I_E = 10\ \mu\text{A}, I_C = 0$                                   | 5   |      |     | V             |
| Forward current transfer ratio          | $h_{FE1}$ *   | $V_{CE} = 2\ \text{V}, I_C = 200\ \text{mA}$                       | 120 |      | 340 |               |
|   | $h_{FE2}$     | $V_{CE} = 2\ \text{V}, I_C = 1.0\ \text{A}$                        | 80  |      |     |               |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 1\ \text{A}, I_B = 50\ \text{mA}$                           |     | 0.15 | 0.3 | V             |
| Base to emitter saturation voltage      | $V_{BE(sat)}$ | $I_C = 1\ \text{A}, I_B = 50\ \text{mA}$                           |     | 0.9  | 1.2 | V             |
| Transition frequency                    | $f_T$         | $V_{CE} = 10\ \text{V}, I_E = -50\ \text{mA}, f = 200\ \text{MHz}$ |     | 150  |     | MHz           |
| Collector output capacitance            | $C_{ob}$      | $V_{CB} = 10\ \text{V}, I_E = 0, f = 1\ \text{MHz}$                |     | 23   | 35  | pF            |

Note) \*: Rank classification

| Rank      | R          | S          |
|-----------|------------|------------|
| $h_{FE1}$ | 120 to 240 | 170 to 340 |



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