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# 2SD1504

Silicon NPN Epitaxial

# HITACHI

ADE-208-1158A (Z)  
2nd. Edition  
Mar. 2001

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## Application

Low frequency amplifier, Muting

## Outline

SPAK



- 1. Emitter
- 2. Collector
- 3. Base

2SD1504

Absolute Maximum Ratings (Ta = 25°C)

| Item                         | Symbol                | Ratings     | Unit |
|------------------------------|-----------------------|-------------|------|
| Collector to base voltage    | $V_{CBO}$             | 30          | V    |
| Collector to emitter voltage | $V_{CEO}$             | 15          | V    |
| Emitter to base voltage      | $V_{EBO}$             | 5           | V    |
| Collector current            | $I_C$                 | 0.5         | A    |
| Collector peak current       | $i_{c\text{ (peak)}}$ | 1.0         | A    |
| Collector power dissipation  | $P_C$                 | 300         | mW   |
| Junction temperature         | $T_j$                 | 150         | °C   |
| Storage temperature          | $T_{stg}$             | -55 to +150 | °C   |

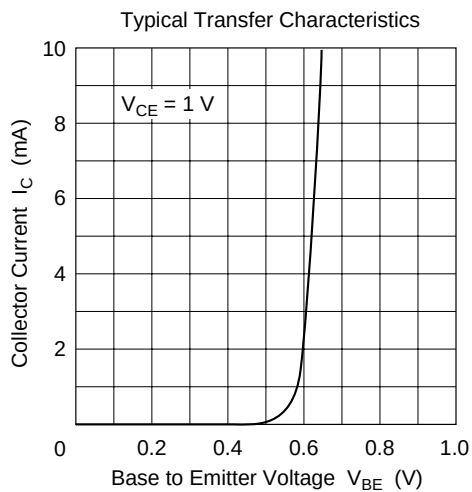
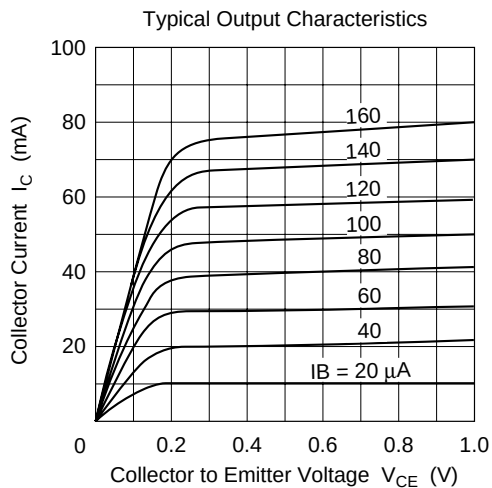
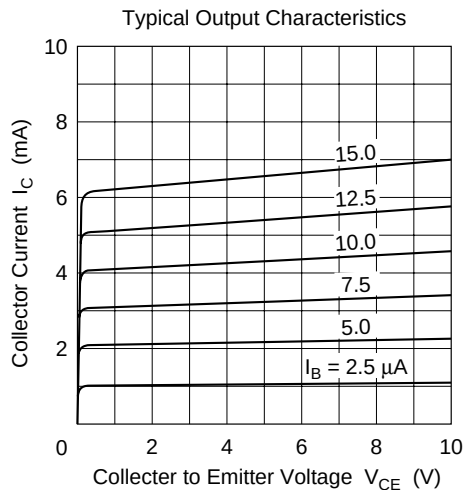
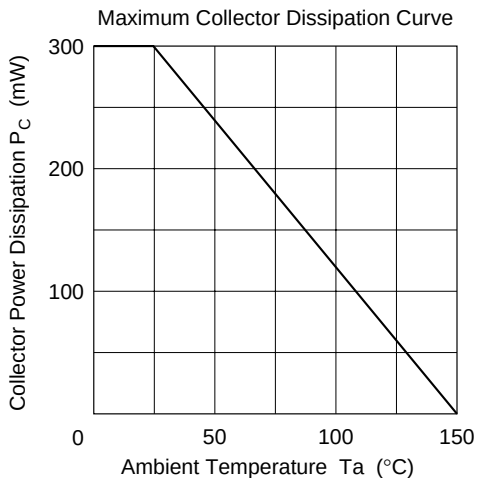
Electrical Characteristics (Ta = 25°C)

| Item                                    | Symbol        | Min | Typ   | Max  | Unit          | Test conditions                                    |
|-----------------------------------------|---------------|-----|-------|------|---------------|----------------------------------------------------|
| Collector to base breakdown voltage     | $V_{(BR)CBO}$ | 30  | —     | —    | V             | $I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$          |
| Collector to emitter breakdown voltage  | $V_{(BR)CEO}$ | 15  | —     | —    | V             | $I_C = 1\text{ mA}$ , $R_{BE} = \infty$            |
| Emitter to base breakdown voltage       | $V_{(BR)EBO}$ | 5   | —     | —    | V             | $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$          |
| Collector cutoff current                | $I_{CBO}$     | —   | —     | 10   | $\mu\text{A}$ | $V_{CB} = 20\text{ V}$ , $I_E = 0$                 |
| DC current transfer ratio               | $h_{FE}^{*1}$ | 250 | —     | 1200 |               | $V_{CE} = 1\text{ V}$ , $I_C = 150\text{ mA}^{*2}$ |
| Base to emitter voltage                 | $V_{BE}$      | —   | 0.65  | —    | V             | $V_{CE} = 1\text{ V}$ , $I_C = 150\text{ mA}$      |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | —   | 0.15  | 0.5  | V             | $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}^{*2}$  |
|                                         | $V_{CE(sat)}$ | —   | 0.018 | —    | V             | $I_C = 30\text{ mA}$ , $I_B = 3\text{ mA}$         |
| Gain bandwidth product                  | $f_T$         | —   | 300   | —    | MHz           | $V_{CE} = 1\text{ V}$ , $I_C = 50\text{ mA}$       |
| On resistance                           | $r_{on}$      | —   | 0.5   | —    | $\Omega$      | $I_B = 2\text{ mA}$                                |

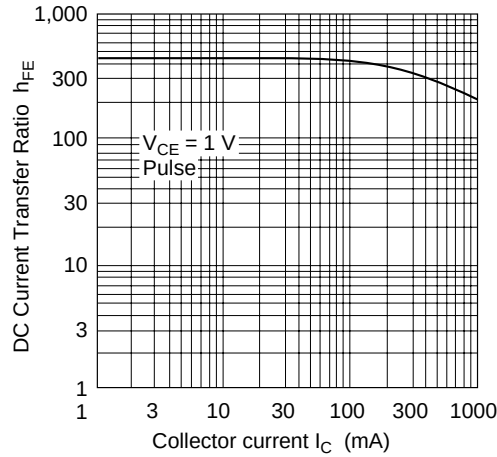
Notes: 1. The 2SD1504 is grouped by  $h_{FE}$  as follows.

2. Pulse test

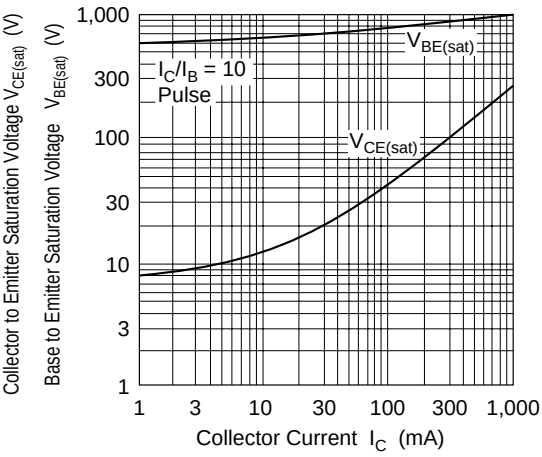
| D          | E          | F           |
|------------|------------|-------------|
| 250 to 500 | 400 to 800 | 600 to 1200 |



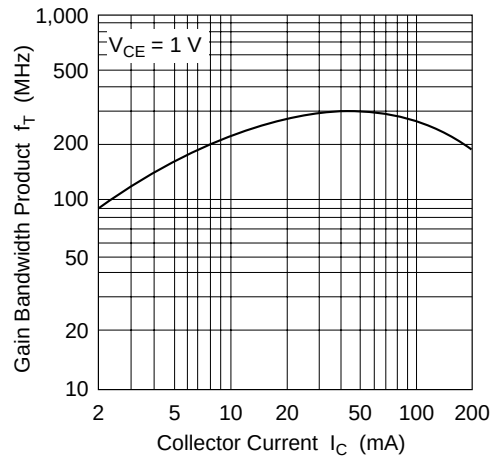
DC Current Transfer Ratio vs.  
Collector Current



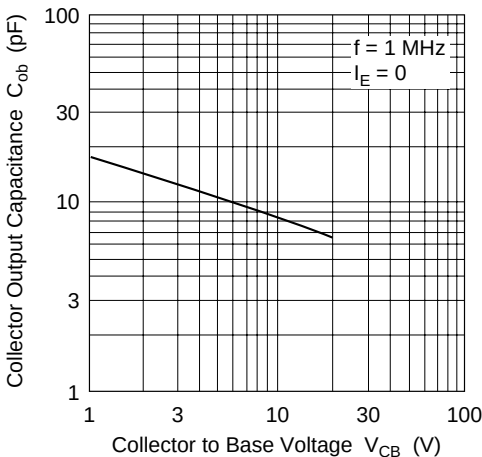
Saturation Voltage vs. Collector Current

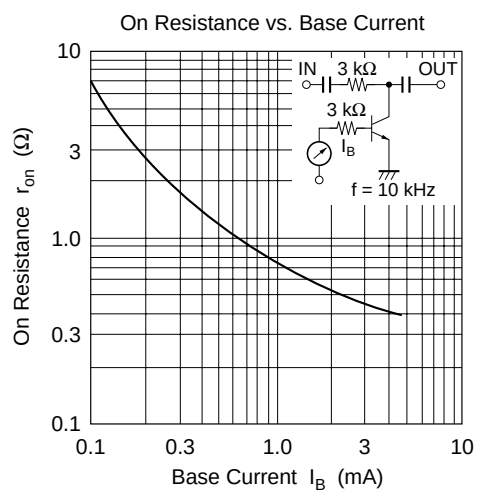


Gain Bandwidth Product vs.  
Collector Current

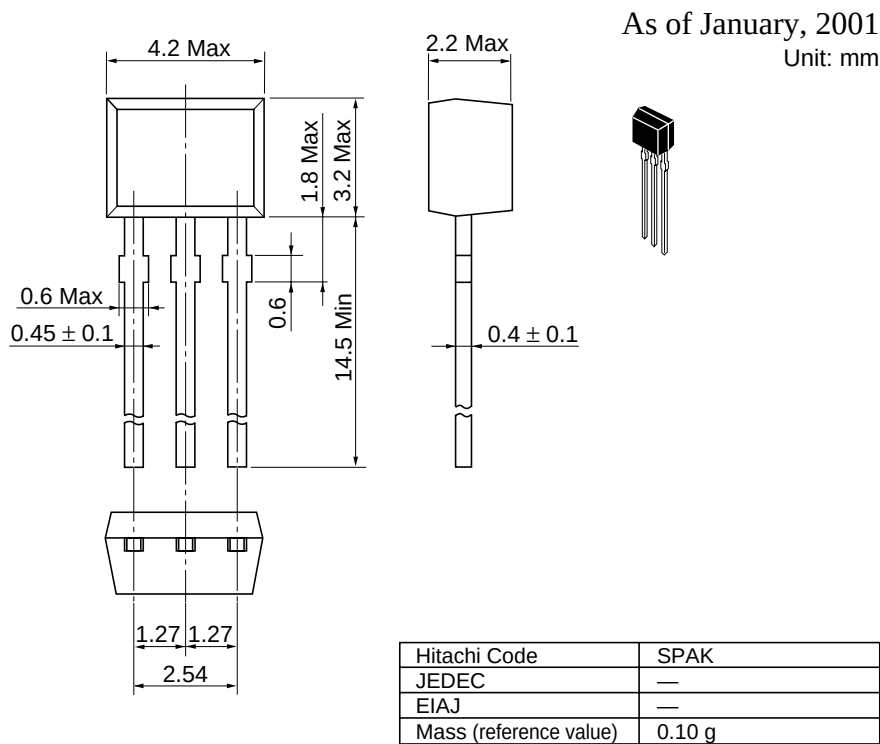


Collector Output Capacitance vs.  
Collector to Base Voltage





Package Dimensions



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