

# 2SC1881(K)

Silicon NPN Triple Diffused

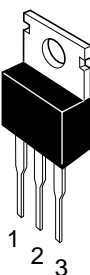
# HITACHI

## Application

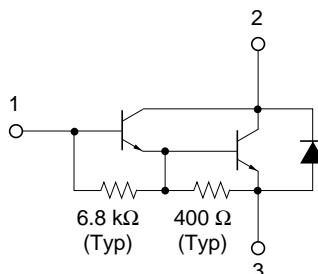
High gain amplifier power switching

## Outline

TO-220AB



1. Base
2. Collector (Flange)
3. Emitter



## Absolute Maximum Ratings (Ta = 25°C)

| Item                         | Symbol        | Ratings     | Unit |
|------------------------------|---------------|-------------|------|
| Collector to base voltage    | $V_{CBO}$     | 60          | V    |
| Collector to emitter voltage | $V_{CEO}$     | 60          | V    |
| Emitter to base voltage      | $V_{EBO}$     | 7           | V    |
| Collector current            | $I_C$         | 3           | A    |
| Collector peak current       | $I_{C(peak)}$ | 6           | A    |
| Collector power dissipation  | $P_C^{*1}$    | 30          | W    |
| Junction temperature         | $T_j$         | 150         | °C   |
| Storage temperature          | $T_{stg}$     | -55 to +150 | °C   |

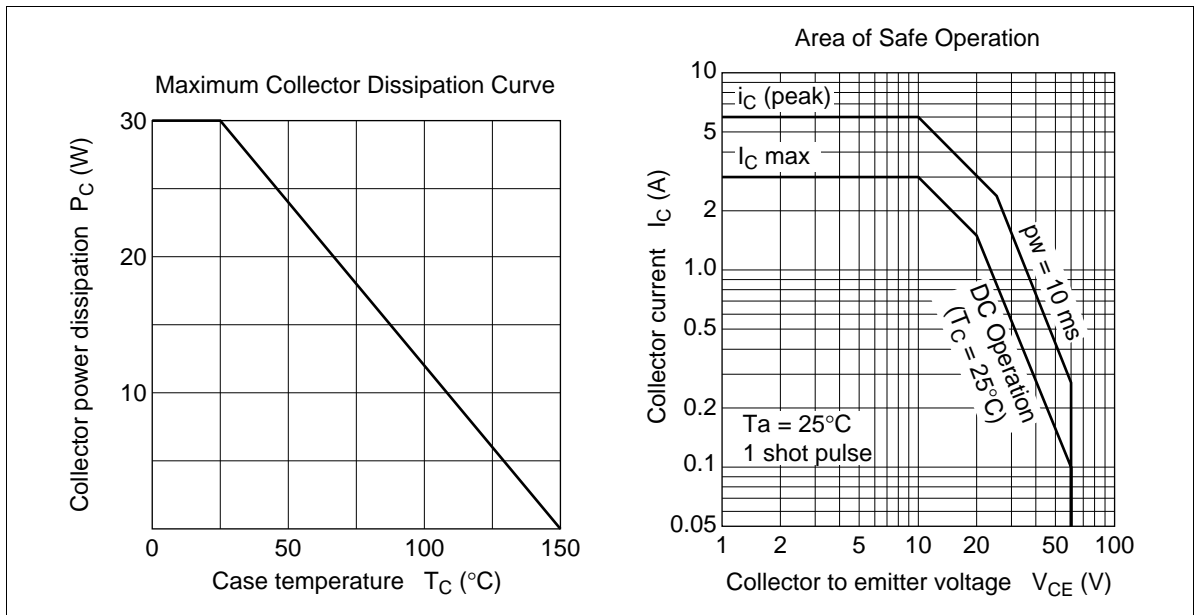
Note: 1. Value at  $T_c = 25^\circ\text{C}$ .

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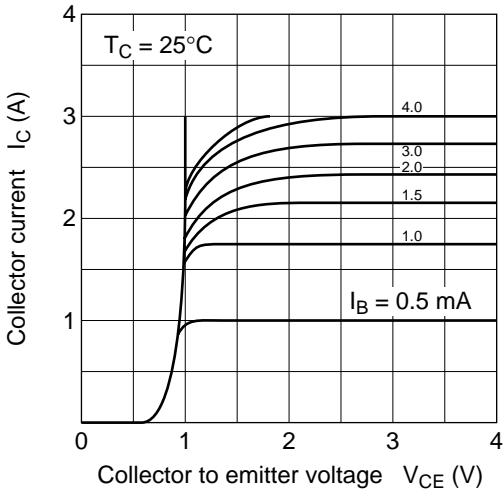
## Electrical Characteristics (Ta = 25°C)

| Item                                    | Symbol        | Min  | Typ | Max | Unit          | Test conditions  |
|---|---------------|------|-----|-----|---------------|--|
| Collector to emitter breakdown voltage  | $V_{(BR)CEO}$ | 60   | —   | —   | V             | $I_C = 50 \text{ mA}$ , $R_{BE} = \infty$                |
| Emitter to base breakdown voltage       | $V_{(BR)EBO}$ | 7    | —   | —   | V             | $I_E = 50 \text{ mA}$ , $I_C = 0$                        |
| Collector cutoff current                | $I_{CBO}$     | —    | —   | 0.2 | mA            | $V_{CB} = 60 \text{ V}$ , $I_E = 0$                      |
|   | $I_{CEO}$     | —    | —   | 0.4 | mA            | $V_{CE} = 30 \text{ V}$ , $R_{BE} = \infty$              |
| DC current transfer ratio               | $h_{FE}$      | 1000 | —   | —   |               | $V_{CE} = 1.5 \text{ V}$                                 |
|   |               | 500  | —   | —   |               | $I_C = 1.5 \text{ A}^{*1}$<br>$I_C = 2.5 \text{ A}^{*1}$ |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | —    | —   | 1.2 | V             | $I_C = 2.5 \text{ A}$ , $I_B = 20 \text{ mA}^{*1}$       |
| Turn on time                            | $t_{on}$      | —    | 1   | —   | $\mu\text{s}$ | $V_{CC} = 11 \text{ V}$ , $I_C = 2 \text{ A}$ ,          |
| Turn off time                           | $t_{off}$     | —    | 5   | —   | $\mu\text{s}$ | $I_{B1} = -I_{B2} = 8 \text{ mA}$                        |

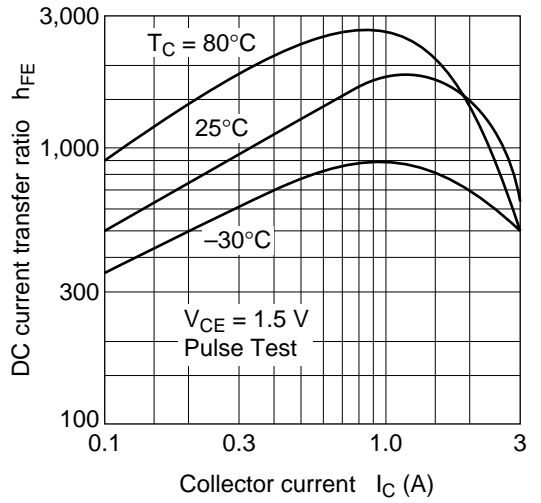
Note: 1. Pulse test.



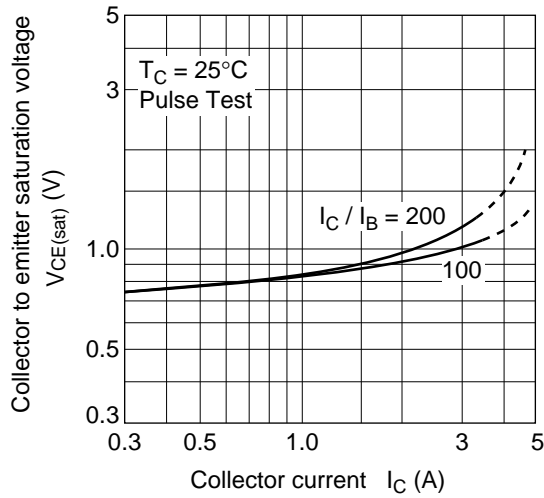
Typical Output Characteristics



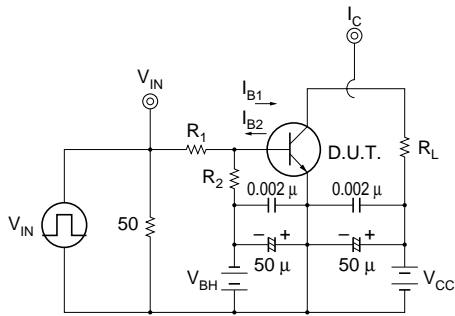
DC Current Transfer Ratio vs. Collector Current



Collector to Emitter Saturation Voltage vs. Collector Current



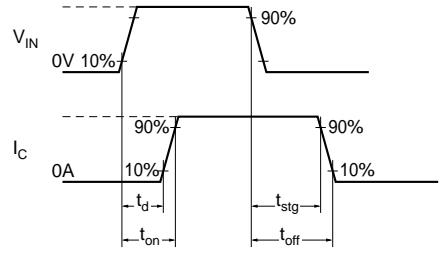
### Switching Time Test Circuit



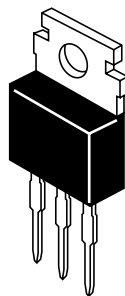
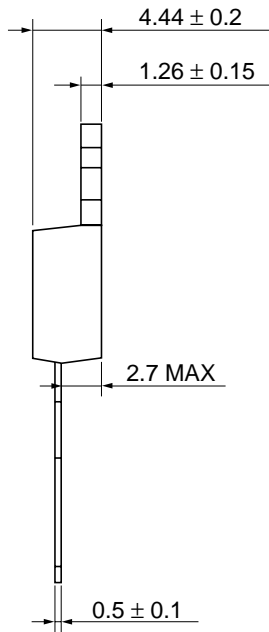
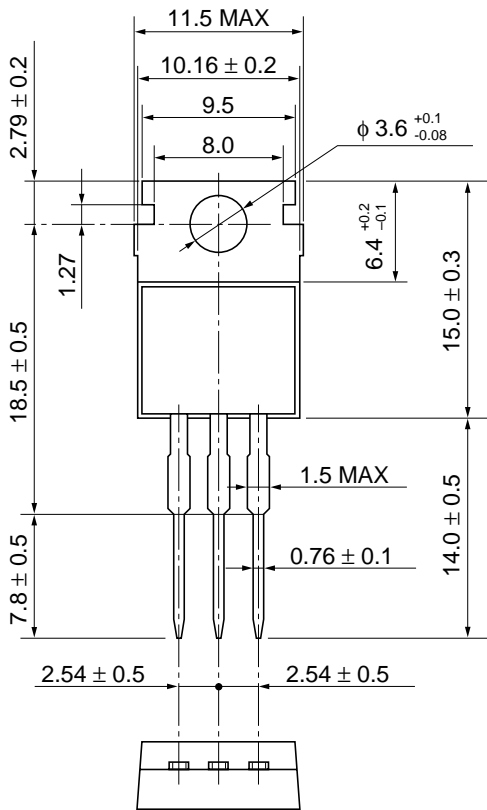
$t_r, t_f \leq 10 \text{ ns}$   
 $\text{pw} \geq 100 \mu\text{s}$   
 $\text{duty ratio} \leq 10\%$

Unit R :  $\Omega$   
 C : F

### Response Waveform



| $I_C$ | $I_{B1}$ | $I_{B2}$ | $V_{CC}$ | $V_{BB}$ | $V_{IN}$ | $R_L$    | $R_1$    | $R_2$    |
|-------|----------|----------|----------|----------|----------|----------|----------|----------|
| A     | mA       | mA       | V        | V        | V        | $\Omega$ | $\Omega$ | $\Omega$ |
| 2     | 8        | -8       | 11       | -4       | 7.2      | 5        | 620      | 910      |



|                          |          |
|--------------------------|----------|
| Hitachi Code             | TO-220AB |
| JEDEC                    | Conforms |
| EIAJ                     | Conforms |
| Weight (reference value) | 1.8 g    |

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