TOSHIBA Transistor Silicon NPN Epitaxial Type (Darlington power transistor)

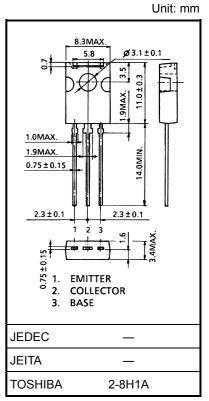
# 2SD2130

Micro Motor Drive, Hammer Drive Applications Switching Applications Power Amplifier Applications

- High DC current gain:  $h_{FE} = 2000$  (min) ( $V_{CE} = 2$  V,  $I_{C} = 1$  A)
- Low saturation voltage: VCE (sat) = 1.5 V (max) (IC = 3 A, IB = 10 mA)
- Zener diode included between collector and base.

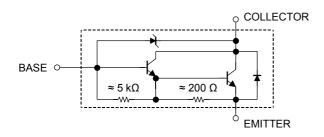
#### Maximum Ratings (Ta = 25°C)

| Characteristics             |           | Symbol           | Rating     | Unit |  |
|-----------------------------|-----------|------------------|------------|------|--|
| Collector-base voltage      |           | V <sub>CBO</sub> | 60 ± 10    | ٧    |  |
| Collector-emitter voltage   |           | V <sub>CEO</sub> | 60 ± 10    | V    |  |
| Emitter-base voltage        |           | V <sub>EBO</sub> | 6          | V    |  |
| Collector current           | DC        | Ic               | ±4         | А    |  |
|                             | Pulse     | I <sub>CP</sub>  | ±6         |      |  |
| Base current                |           | Ι <sub>Β</sub>   | 0.5        | Α    |  |
| Collector power dissipation | Ta = 25°C | PC               | 1.5        | W    |  |
|                             | Tc = 25°C | FC               | 10         |      |  |
| Junction temperature        |           | Tj               | 150        | °C   |  |
| Storage temperature range   |           | T <sub>stg</sub> | −55 to 150 | °C   |  |



Weight: 0.82 g (typ.)

#### **Equivalent Circuit**

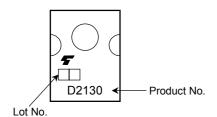


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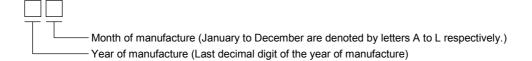
## Electrical Characteristics (Ta = 25°C)

| Characteristics                      |                 | Symbol                | Test Condition   | Min  | Тур. | Max   | Unit |
|--------------------------------------|-----------------|-----------------------|--|------|------|-------|------|
| Collector cut-off of                 | urrent          | I <sub>CBO</sub>      | V <sub>CB</sub> = 45 V, I <sub>E</sub> = 0                       | _    | _    | 10    | μΑ   |
| Emitter cut-off cu                   | rent            | I <sub>EBO</sub>      | V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0                        | 0.6  | _    | 2.0   | mA   |
| Collector-base br                    | eakdown voltage | V (BR) CBO            | I <sub>C</sub> = 10 mA, I <sub>E</sub> = 0                       | 50   | 60   | 70    | V    |
| Collector-emitter breakdown voltage  |                 | V (BR) CEO            | I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0                       | 50   | 60   | 70    | V    |
| Emitter-base brea                    | kdown voltage   | V (BR) EBO            | I <sub>E</sub> = 10 mA, I <sub>C</sub> = 0                       | 6    | _    | _     | V    |
| DC current gain                      |                 | h <sub>FE (1)</sub>   | V <sub>CE</sub> = 2 V, I <sub>C</sub> = 1 A                      | 2000 | _    | 15000 |      |
|                                      |                 | h <sub>FE (2)</sub>   | V <sub>CE</sub> = 2 V, I <sub>C</sub> = 3 A                      | 1000 | _    | _     |      |
| Collector-emitter saturation voltage |                 | V <sub>CE (sat)</sub> | I <sub>C</sub> = 3 A, I <sub>B</sub> = 10 mA                     | _    | _    | 1.5   | V    |
| Base-emitter saturation voltage      |                 | V <sub>BE (sat)</sub> | I <sub>C</sub> = 3 A, I <sub>B</sub> = 10 mA                     | _    | _    | 2.0   | V    |
| Transition frequency                 |                 | f <sub>T</sub>        | V <sub>CE</sub> = 2 V, I <sub>C</sub> = 0.5 A                    | _    | 60   | _     | MHz  |
| Collector output capacitance         |                 | C <sub>ob</sub>       | V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz            | _    | 30   | _     | pF   |
| Switching time                       | Turn-on time    | t <sub>on</sub>       | Output  20 $\mu$ s  Input  N  N  N  N  N  N  N  N  N  N  N  N  N | _    | 0.2  | _     |      |
|                                      | Storage time    | t <sub>stg</sub>      |  | _    | 3.0  | _     | μs   |
|                                      | Fall time       | t <sub>f</sub>        |  | _    | 0.5  | _     |      |

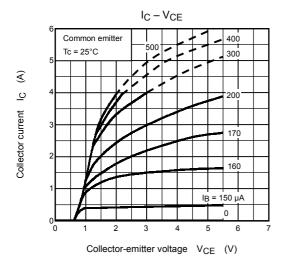
### Marking

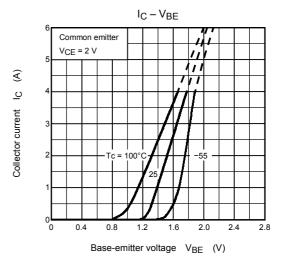


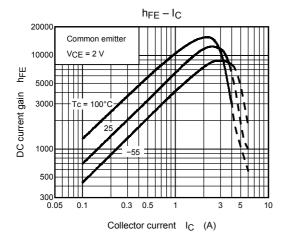
## **Explanation of Lot No.**

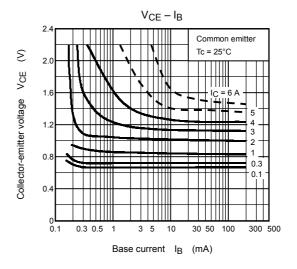


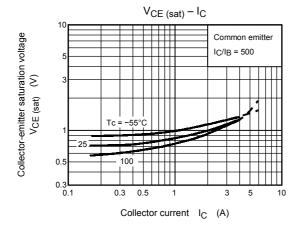
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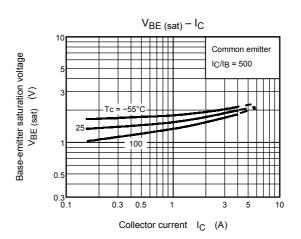


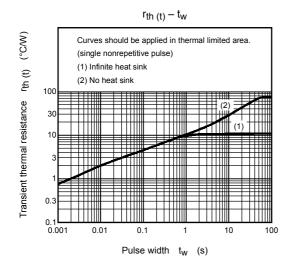


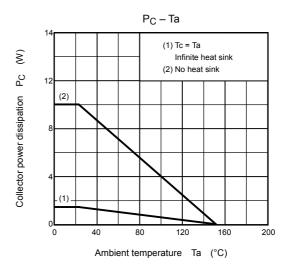


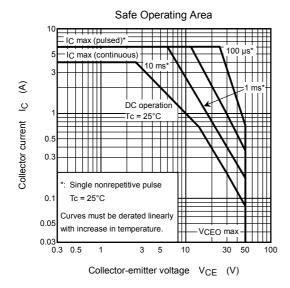












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