

# UN228

Transistor array to drive the small motor

## Features

- Small and lightweight
- Low power consumption
- Low-voltage drive
- With 4 elements incorporated

## Applications

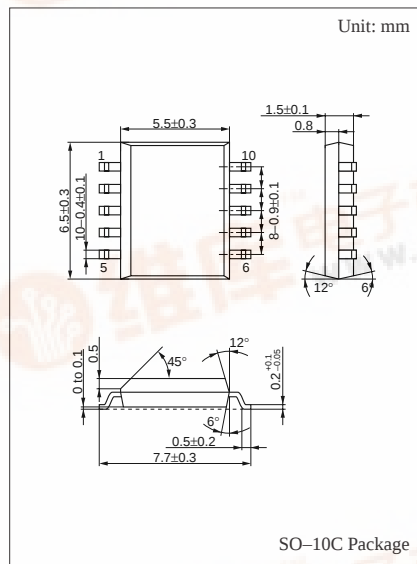
- For motor drives
- Small motor drive circuits in general

## Absolute Maximum Ratings (Ta=25±3°C)

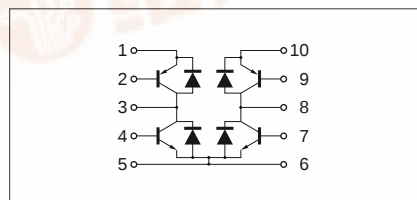
| Parameter                    | Symbol    | Ratings     | Unit |
|------------------------------|-----------|-------------|------|
| Collector to base voltage    | $V_{CBO}$ | $\pm 12$    | V    |
| Collector to emitter voltage | $V_{CEO}$ | $\pm 10$    | V    |
| Emitter to base voltage      | $V_{EBO}$ | $\pm 7$     | V    |
| Collector current            | $I_C$     | $\pm 1$     | A    |
| Peak collector current       | $I_{CP}$  | $\pm 2.5$   | A    |
| Total power dissipation      | $P_T^*$   | 0.5         | W    |
| Junction temperature         | $T_j$     | 150         | °C   |
| Storage temperature          | $T_{stg}$ | -55 to +150 | °C   |

Note:  $\pm$  marks used above: +: NPN part, -: PNP part

\*  $T_C = 25^\circ\text{C}$  only when the elements are active



## Internal Connection



■ Electrical Characteristics (Ta=25°C)

| Parameter                               | Symbol        | Conditions                                   | min | typ  | max  | Unit    |
|-----------------------------------------|---------------|----------------------------------------------|-----|------|------|---------|
| Collector to base voltage               | $V_{CBO}$     | (NPN) $I_C = 10\mu A, I_E = 0$               | 12  |      |      | V       |
|                                         |               | (PNP) $I_C = -10\mu A, I_E = 0$              | -12 |      |      |         |
| Collector to emitter voltage            | $V_{CEO}$     | (NPN) $I_C = 1mA, I_B = 0$                   | 10  |      |      | V       |
|                                         |               | (PNP) $I_C = -1mA, I_B = 0$                  | -10 |      |      |         |
| Emitter to base voltage                 | $V_{EBO}$     | (NPN) $I_E = 10\mu A, I_C = 0$               | 7   |      |      | V       |
|                                         |               | (PNP) $I_E = -10\mu A, I_C = 0$              | -7  |      |      |         |
| Collector cutoff current                | $I_{CBO}$     | (NPN) $V_{CB} = 10V, I_E = 0$                |     |      | 1    | $\mu A$ |
|                                         |               | (PNP) $V_{CB} = -10V, I_E = 0$               |     |      | -1   |         |
| Forward current transfer ratio          | $h_{FE}$      | (NPN) $V_{CE} = 1V, I_C = 0.5A^*$            | 200 |      | 800  |         |
|                                         |               | (PNP) $V_{CE} = -1V, I_C = 0.5A^*$           | 200 |      | 800  |         |
| Collector to emitter saturation voltage | $V_{CE(sat)}$ | (NPN) $I_C = 1A, I_B = 30mA^*$               |     | 0.2  | 0.3  | V       |
|                                         |               | (PNP) $I_C = -1A, I_B = -30mA^*$             |     | -0.2 | -0.3 |         |
| Transition frequency                    | $f_T$         | (NPN) $V_{CB} = 6V, I_E = -50mA, f = 200MHz$ |     | 150  |      | MHz     |
|                                         |               | (PNP) $V_{CB} = -6V, I_E = 50mA, f = 200MHz$ |     | 150  |      |         |
| Collector output capacitance            | $C_{ob}$      | (NPN) $V_{CB} = 10V, I_E = 0, f = 1MHz$      |     | 50   |      | pF      |
|                                         |               | (NPN) $V_{CB} = -10V, I_E = 0, f = 1MHz$     |     | 65   |      |         |
| Forward voltage                         | $V_F$         | (NPN) $I_F = 1A$                             |     |      | 1.5  | V       |
|                                         |               | (PNP) $I_F = -1A$                            |     |      | -1.5 |         |

\*Pulse measurement

Characteristics charts of PNP transistor block

