

# General purpose transistor (isolated transistors)

## EMD30

DTB713Z □ and DTC114E □ A are housed independently in a EMT6 package.

### ●Applications

DC / DC converter  
Motor driver

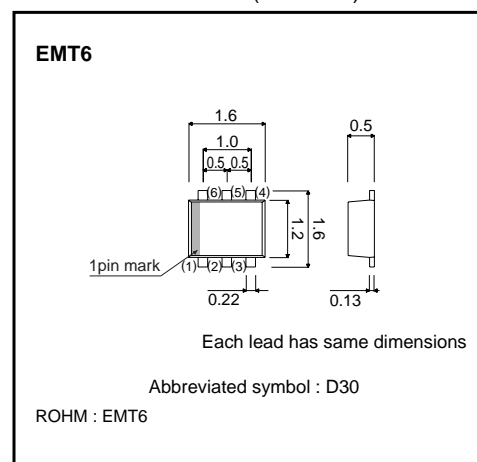
### ●Features

- 1) DT<sub>r1</sub> : PNP digital transistor  
DT<sub>r2</sub> : NPN digital transistor
- 2) Mounting possible with EMT3 automatic mounting machines.

### ●Structure

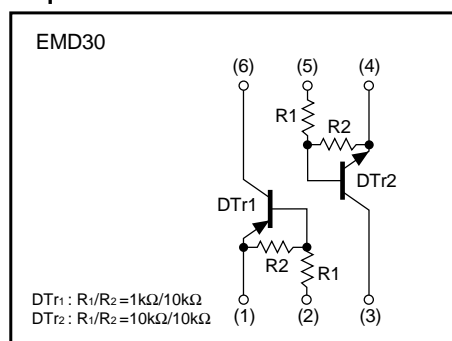
PNP / NPN Silicon epitaxial planar digital transistor

### ●External dimensions (Unit : mm)



The following characteristics apply to both DT<sub>r1</sub> and DT<sub>r2</sub>.

### ●Equivalent circuit



### ●Packaging specifications

|                              |       |
|------------------------------|-------|
| Type                         | EMD30 |
| Package                      | EMT6  |
| Marking                      | D30   |
| Code                         | T2R   |
| Basic ordering unit (pieces) | 8000  |

## Transistors

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### ●Absolute maximum ratings (Ta=25°C)

#### DTr1

| Parameter            | Symbol                | DTr1        | Unit |
|----------------------|-----------------------|-------------|------|
| Supply voltage       | V <sub>CC</sub>       | -30         | V    |
| Input voltage        | V <sub>IN</sub>       | -30 to +5   | V    |
| Output current       | I <sub>C (MAX.)</sub> | -200        | mA   |
| Power dissipation    | P <sub>d</sub>        | 120         | mW * |
| Junction temperature | T <sub>j</sub>        | 150         | °C   |
| Storage temperature  | T <sub>stg</sub>      | -55 to +150 | °C   |

\* Each terminal mounted on a recommended.

#### DTr2

| Parameter            | Symbol                | DTr2        | Unit |
|----------------------|-----------------------|-------------|------|
| Supply voltage       | V <sub>CC</sub>       | 50          | V    |
| Input voltage        | V <sub>IN</sub>       | -10 to +40  | V    |
| Output current       | I <sub>o</sub>        | 50          | mA   |
|                      | I <sub>C (MAX.)</sub> | 100         |      |
| Power dissipation    | P <sub>d</sub>        | 120         | mW * |
| Junction temperature | T <sub>j</sub>        | 150         | °C   |
| Storage temperature  | T <sub>stg</sub>      | -55 to +150 | °C   |

\* Each terminal mounted on a recommended.

#### DTr1/DTr2

| Parameter           | Symbol           | Limits      | Unit |
|---------------------|------------------|-------------|------|
| Power dissipation   | P <sub>d</sub>   | 150(TOTAL)  | mW * |
| Storage temperature | T <sub>stg</sub> | -55 to +125 | °C   |

\* Each terminal mounted on a recommended.

## Transistors

## ●Electrical characteristics (Ta=25°C)

## DTr1

| Parameter              | Symbol       | Min. | Typ. | Max. | Unit      | Conditions                              |
|------------------------|--------------|------|------|------|-----------|---|
| Input voltage          | $V_{I(off)}$ | –    | –    | –0.3 | V         | $V_{CC} = -5V / I_o = -100\mu A$        |
|                        | $V_{I(on)}$  | –2.5 | –    | –    | V         | $V_o = -0.3V / I_o = -20mA$             |
| Output voltage         | $V_{O(on)}$  | –    | –70  | –300 | mV        | $I_o = -50mA, I_i = -2.5mA$             |
| Input current          | $I_i$        | –    | –    | –6.4 | mA        | $V_i = -5V$                             |
| Output current         | $I_{O(off)}$ | –    | –    | –0.5 | $\mu A$   | $V_{CC} = -30V / V_i = 0V$              |
| DC current gain        | $G_i$        | 140  | –    | –    | –         | $V_o = -2V / I_o = -100mA$              |
| Transition frequency * | $f_T$        | –    | 260  | –    | MHz       | $V_{CE} = -10V / I_E = 5mA, f = 100MHz$ |
| Input resistance       | $R_1$        | 0.7  | 1.0  | 1.3  | $k\Omega$ | –                                       |
| Resistance ratio       | $R_2/R_1$    | 8    | 10   | 12   | –         | –                                       |

\* Characteristics of built-in transistor.

## DTr2

| Parameter              | Symbol       | Min. | Typ. | Max. | Unit      | Conditions                              |
|------------------------|--------------|------|------|------|-----------|---|
| Input voltage          | $V_{I(off)}$ | –    | –    | 0.5  | V         | $V_{CC} = 5V / I_o = 100\mu A$          |
|                        | $V_{I(on)}$  | 3    | –    | –    | V         | $V_o = 0.3V / I_o = 2mA$                |
| Output voltage         | $V_{O(on)}$  | –    | 100  | 300  | mV        | $I_o = 10mA, I_i = 0.5mA$               |
| Input current          | $I_i$        | –    | –    | 880  | $\mu A$   | $V_i = 5V$                              |
| Output current         | $I_{O(off)}$ | –    | –    | 0.5  | $\mu A$   | $V_{CC} = 50V / V_i = 0V$               |
| DC current gain        | $G_i$        | 30   | –    | –    | –         | $V_o = 5V / I_o = 5mA$                  |
| Transition frequency * | $f_T$        | –    | 250  | –    | MHz       | $V_{CE} = 10V / I_E = -5mA, f = 100MHz$ |
| Input resistance       | $R_1$        | 7    | 10   | 13   | $k\Omega$ | –                                       |
| Resistance ratio       | $R_2/R_1$    | 0.8  | 1    | 1.2  | –         | –                                       |

\* Characteristics of built-in transistor.

Transistors

●Electrical characteristic curves

DTr1

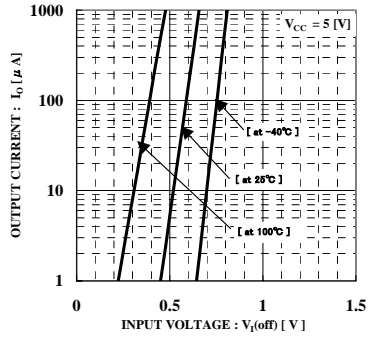


Fig.1 Output current vs. input voltage (OFF characteristics)

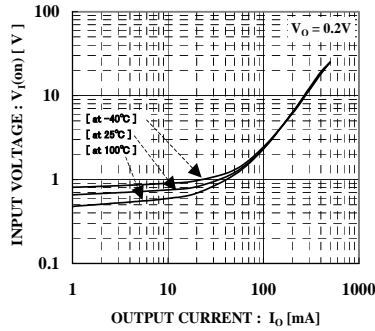


Fig.2 Input voltage vs. output current (ON characteristics) I

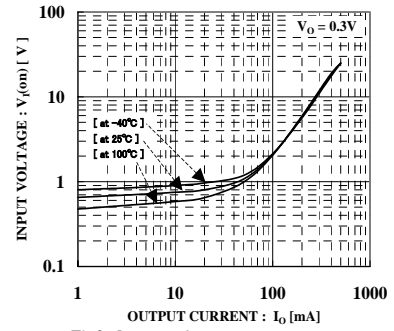


Fig.3 Input voltage vs. output current (ON characteristics) II

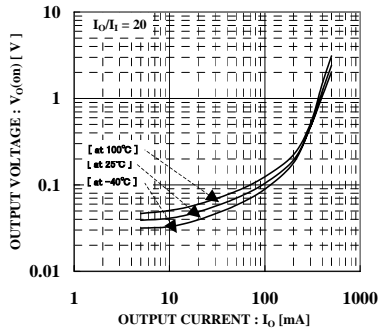


Fig.4 Output voltage vs. output current I

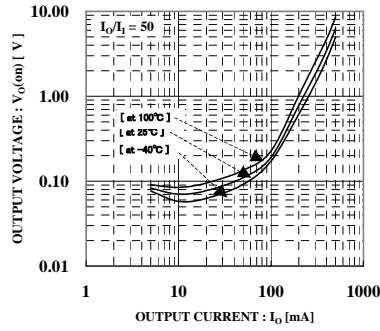


Fig.5 Output voltage vs. output current II

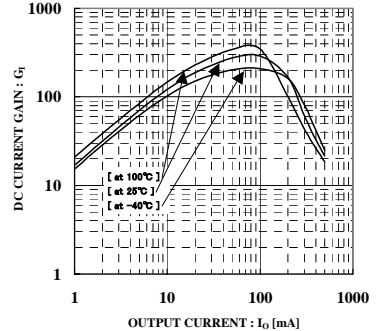


Fig.6 DC current gain vs. output current

Transistors

DTr2

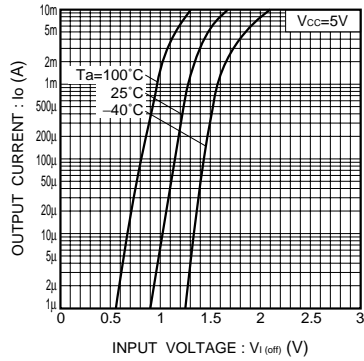


Fig.7 Output current vs. input voltage (OFF characteristics)

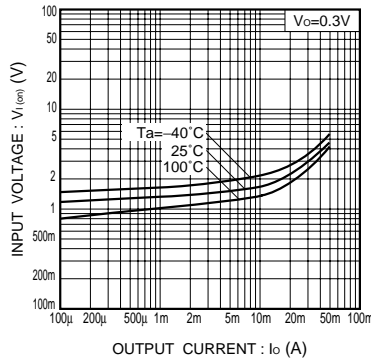


Fig.8 Input voltage vs. output current (ON characteristics)

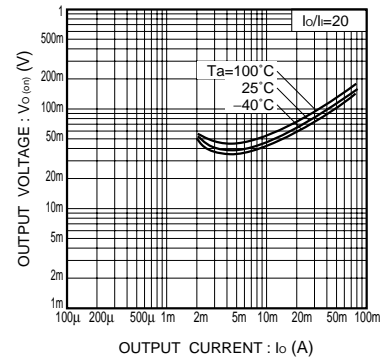


Fig.9 Output voltage vs. output current

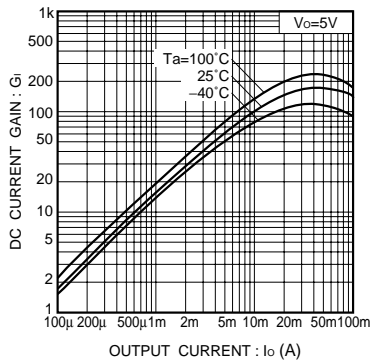


Fig.10 DC current gain vs. output current

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