

EMD5 / UMD5N

Transistors

# General purpose (dual digital transistors)

## EMD5 / UMD5N

●Features

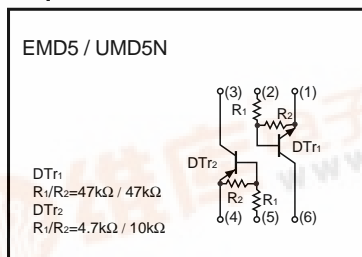
- 1) Both the DTA143X chip and DTC144E chip in an EMT6 or UMT6 package.
- 2) Mounting possible with EMT3 or UMT3 automatic mounting machines.
- 3) Transistor elements are independent, eliminating interference.
- 4) Mounting cost and area can be cut in half.

●Structure

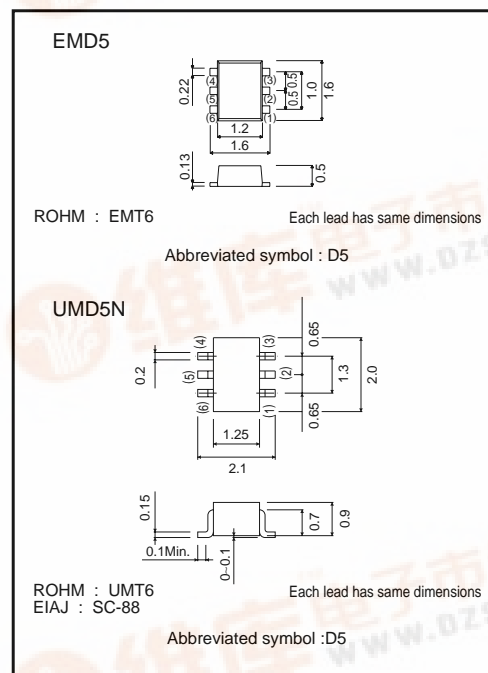
A PNP and NPN digital transistor  
(each with a single built in resistor)

The following characteristics apply to both the DTr1 and DTr2, however, the “-” sign on DTr2 values for the PNP type have been omitted.

●Equivalent circuit



●External dimensions (Unit : mm)



●Packaging specifications

| Type  | Package                      | Taping |      |
|-------|------------------------------|--------|------|
|       | Code                         | T2R    | TR   |
|       | Basic ordering unit (pieces) | 8000   | 3000 |
| EMD5  | ○                            | —      | —    |
| UMD5N | —                            | —      | ○    |

## Transistors

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

| Parameter            | Symbol               | Limits        |               | Unit |
|----------------------|----------------------|---------------|---------------|------|
|                      |                      | DTr1(DTC144E) | DTr2(DTC143X) |      |
| Supply voltage       | V <sub>CC</sub>      | 50            | -50           | V    |
| Input voltage        | V <sub>IN</sub>      | -10 to +40    | -20 to +7     | V    |
| Output current       | I <sub>O</sub>       | 30            | -100          | mA   |
|                      | I <sub>C(Max.)</sub> | 100           | -100          |      |
| Power dissipation    | P <sub>d</sub>       | 150(TOTAL)    | 120(1ELEMENT) | mW   |
| Junction temperature | T <sub>j</sub>       | 150           |               | °C   |
| Storage temperature  | T <sub>stg</sub>     | -55 to +150   |               | °C   |

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

| Parameter            | Symbol                         | Min. | Typ. | Max. | Unit | Conditions   |
|----------------------|--------------------------------|------|------|------|------|--|
| Input voltage        | V <sub>I(off)</sub>            | -    | -    | 0.5  | V    | V <sub>CC</sub> =5V, I <sub>O</sub> =100μA             |
|                      | V <sub>I(on)</sub>             | 3    | -    | -    |      | V <sub>O</sub> =0.3V, I <sub>O</sub> =2mA              |
| Output voltage       | V <sub>O(on)</sub>             | -    | 0.1  | 0.3  | V    | I <sub>O</sub> /I <sub>I</sub> =10mA/0.5mA             |
| Input current        | I <sub>I</sub>                 | -    | -    | 0.18 | mA   | V <sub>I</sub> =5V                                     |
| Output current       | I <sub>O(off)</sub>            | -    | -    | 0.5  | μA   | V <sub>CC</sub> =50V, V <sub>I</sub> =0V               |
| DC current gain      | G <sub>I</sub>                 | 68   | -    | -    | -    | V <sub>O</sub> =5V, I <sub>O</sub> =5mA                |
| Input resistance     | R <sub>1</sub>                 | 32.9 | 47   | 61.1 | kΩ   | -  |
| Resistance ratio     | R <sub>2</sub> /R <sub>1</sub> | 0.8  | 1    | 1.2  | -    | -  |
| Transition frequency | f <sub>T</sub>                 | -    | 250  | -    | MHz  | V <sub>CE</sub> =10V, I <sub>E</sub> =-5mA, f=100MHz * |

\* Transition frequency of the device

| Parameter            | Symbol                         | Min. | Typ. | Max. | Unit | Conditions   |
|----------------------|--------------------------------|------|------|------|------|--|
| Input voltage        | V <sub>I(off)</sub>            | -    | -    | -0.3 | V    | V <sub>CC</sub> =-5V, I <sub>O</sub> =-100μA           |
|                      | V <sub>I(on)</sub>             | -2.5 | -    | -    |      | V <sub>O</sub> =-0.3V, I <sub>O</sub> =-20mA           |
| Output voltage       | V <sub>O(on)</sub>             | -    | -0.1 | -0.3 | V    | I <sub>O</sub> /I <sub>I</sub> =-10mA/-0.5mA           |
| Input current        | I <sub>I</sub>                 | -    | -    | -1.8 | mA   | V <sub>I</sub> =-5V                                    |
| Output current       | I <sub>O(off)</sub>            | -    | -    | -0.5 | μA   | V <sub>CC</sub> =-50V, V <sub>I</sub> =0V              |
| DC current gain      | G <sub>I</sub>                 | 30   | -    | -    | -    | V <sub>O</sub> =-5V, I <sub>O</sub> =-10mA             |
| Input resistance     | R <sub>1</sub>                 | 3.29 | 4.7  | 6.11 | kΩ   | -  |
| Resistance ratio     | R <sub>2</sub> /R <sub>1</sub> | 1.7  | 2.1  | 2.6  | -    | -  |
| Transition frequency | f <sub>T</sub>                 | -    | 250  | -    | MHz  | V <sub>CE</sub> =-10V, I <sub>E</sub> =5mA, f=100MHz * |

\* Transition frequency of the device

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●Electrical characteristic curves

DTr1 (NPN)

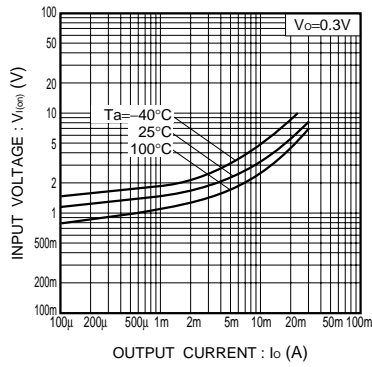


Fig.1 Input voltage vs. output current (ON characteristics)

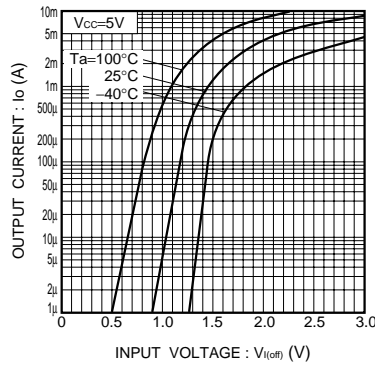


Fig.2 Output current vs. input voltage (OFF characteristics)

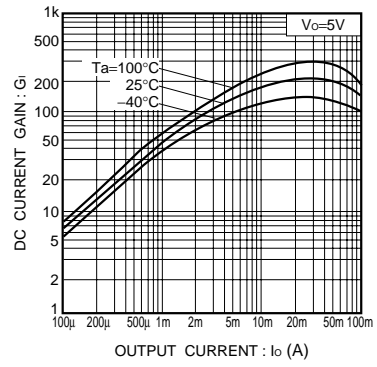


Fig.3 DC current gain vs. output current

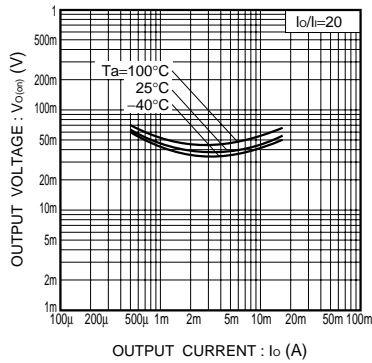


Fig.4 Output voltage vs. output current

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DTr2 (PNP)

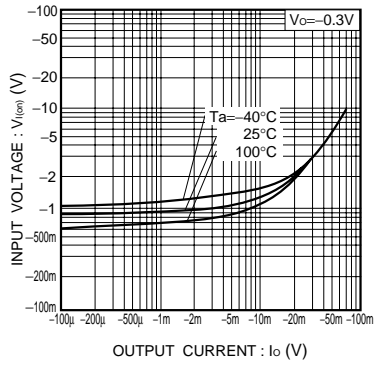


Fig.1 Input voltage vs. output current (ON characteristics)

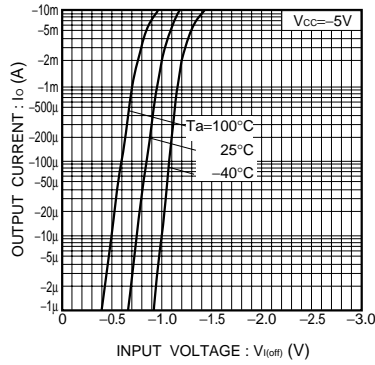


Fig.2 Output current vs. input voltage (OFF characteristics)

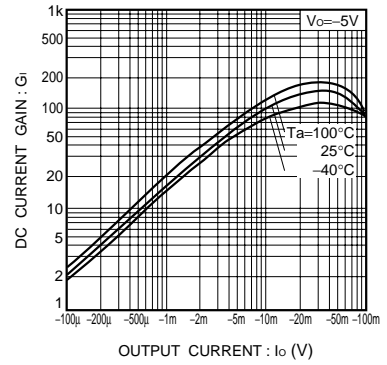


Fig.3 DC current gain vs. output current

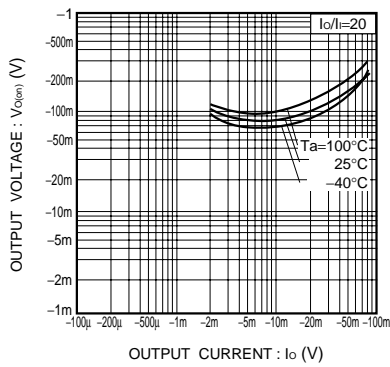


Fig.4 Output voltage vs. output current

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