

# Power management (dual digital transistors)

## EMC4 / UMC4N / FMC4A

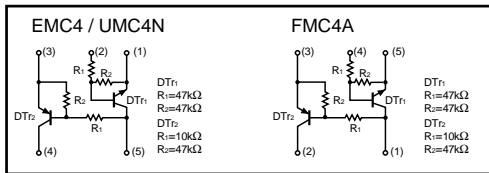
**●Features**

- 1) Both the DTA114Y chip and DTC114E chip in a EMT or UMT or SMT package.
- 2) Ideal for power switch circuits.
- 3) Mounting cost and area can be cut in half.

**●Structure**

Epitaxial planar type  
NPN / PNP silicon transistor (Built-in resistor type.)

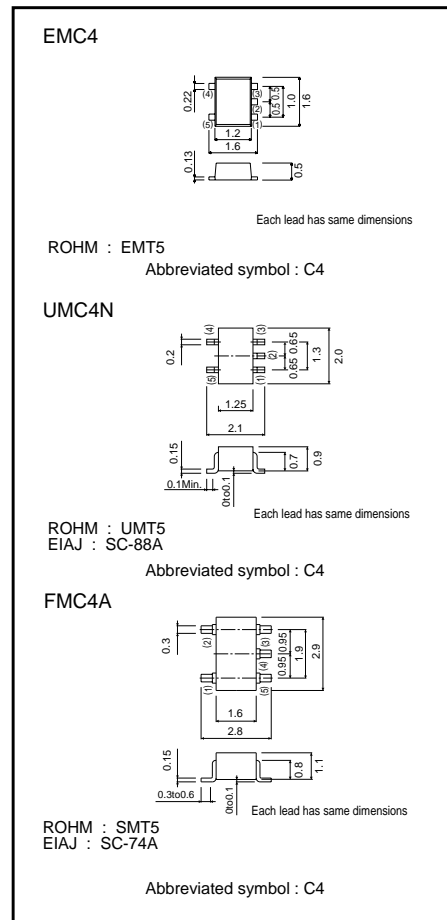
**●Equivalent circuit**



**●Packaging specifications**

| Type  | Package                      | Taping |      |      |
|-------|------------------------------|--------|------|------|
|       | Code                         | T2R    | TR   | T148 |
|       | Basic ordering unit (pieces) | 8000   | 3000 | 3000 |
| EMC4  | ○                            | —      | —    | —    |
| UMC4N | —                            | ○      | —    | —    |
| FMC4A | —                            | —      | —    | ○    |

**●External dimensions (Units : mm)**



## Transistors

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

| Parameter            | Symbol                | Limits   |      | Unit        |    |
|----------------------|-----------------------|----------|------|-------------|----|
|                      |                       | DTr1     | DTr2 |             |    |
| Supply voltage       | V <sub>CC</sub>       | 50       | -50  | V           |    |
| Input voltage        | V <sub>IN</sub>       | 40       | -40  | V           |    |
|                      |                       | -10      | 6    |             |    |
| Output current       | I <sub>o</sub>        | 30       | -100 | mA          |    |
|                      | I <sub>C (Max.)</sub> | 100      | -100 |             |    |
| Power dissipation    | EMC4, UMC4N           | Pd       |      | 150 (TOTAL) | mW |
|                      | FM4A                  | Pd       |      | 300 (TOTAL) |    |
| Junction temperature | T <sub>j</sub>        | 150      |      | °C          |    |
| Storage temperature  | T <sub>stg</sub>      | -55→+150 |      | °C          |    |

\*1 120mW per element must not be exceeded.

\*2 200mW per element must not be exceeded.

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

## DTr1

| 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> =10mA, I <sub>i</sub> =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                 |
| Transition frequency | f <sub>T</sub>                 | -    | 250  | -    | MHz  | V <sub>CE</sub> =10mA, I <sub>E</sub> =-5mA, f=100MHz * |
| 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 of the device

## DTr2

| 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>            | -1.4 | -    | -     |      | V <sub>o</sub> =-0.3V, I <sub>o</sub> =-1mA             |
| Output voltage       | V <sub>O (on)</sub>            | -    | -0.1 | -0.3  | V    | I <sub>o</sub> =-5mA, I <sub>i</sub> =-0.25mA           |
| Input current        | I <sub>i</sub>                 | -    | -    | -0.88 | 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               |
| Transition frequency | f <sub>T</sub>                 | -    | 250  | -     | MHz  | V <sub>CE</sub> =10mA, I <sub>E</sub> =-5mA, f=100MHz * |
| Input resistance     | R <sub>1</sub>                 | 7    | 10   | 13    | kΩ   | -   |
| Resistance ratio     | R <sub>2</sub> /R <sub>1</sub> | 3.7  | 4.7  | 5.7   | -    | -   |

\* Transition frequency of the device

Transistors

●Electrical characteristic curves

DTr1 (NPN)

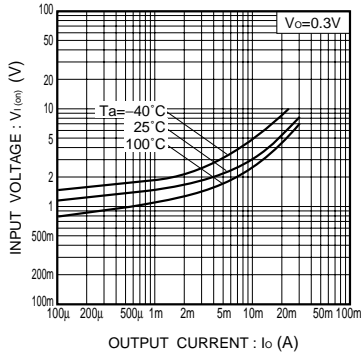


Fig.1 Input voltage vs. output current (ON characteristics)

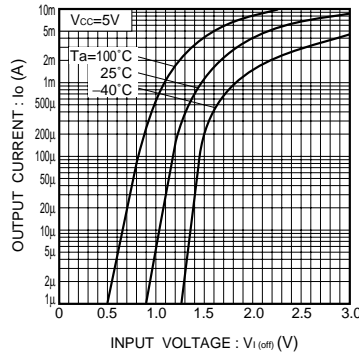


Fig.2 Output current vs. input voltage (OFF characteristics)

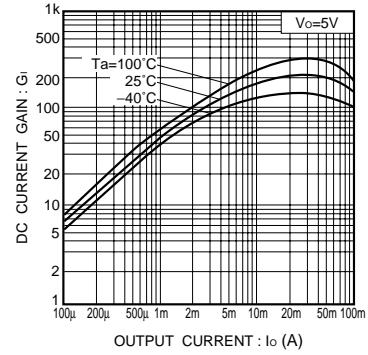


Fig.3 DC current gain vs. output current

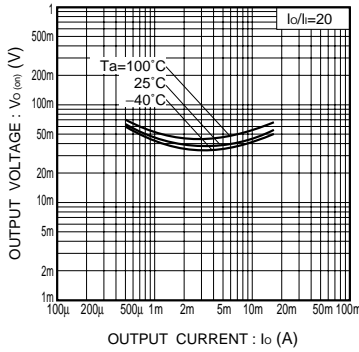


Fig.4 Output voltage vs. output current

DTr2 (PNP)

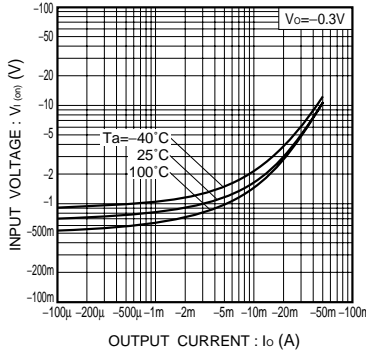


Fig.5 Input voltage vs. output current (ON characteristics)

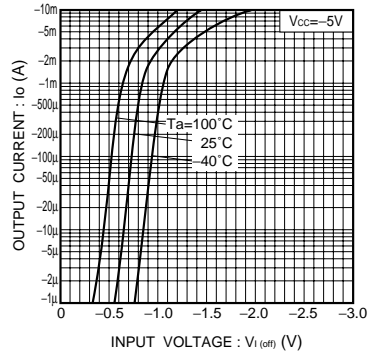


Fig.6 Output current vs. input voltage (OFF characteristics)

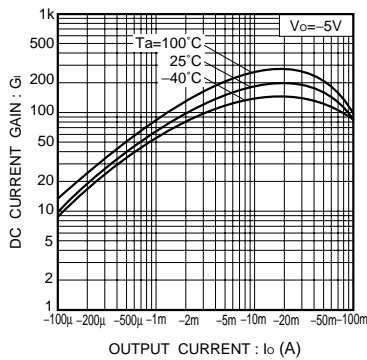


Fig.7 DC current gain vs. output current

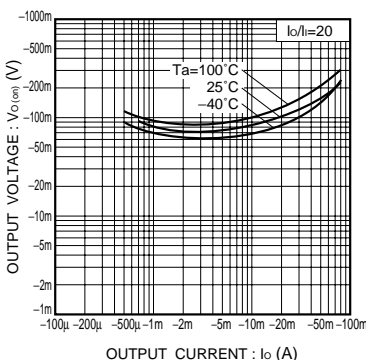


Fig.8 Output voltage vs. output current