

# Power management (dual digital transistors)

## UMC5N / FMC5A

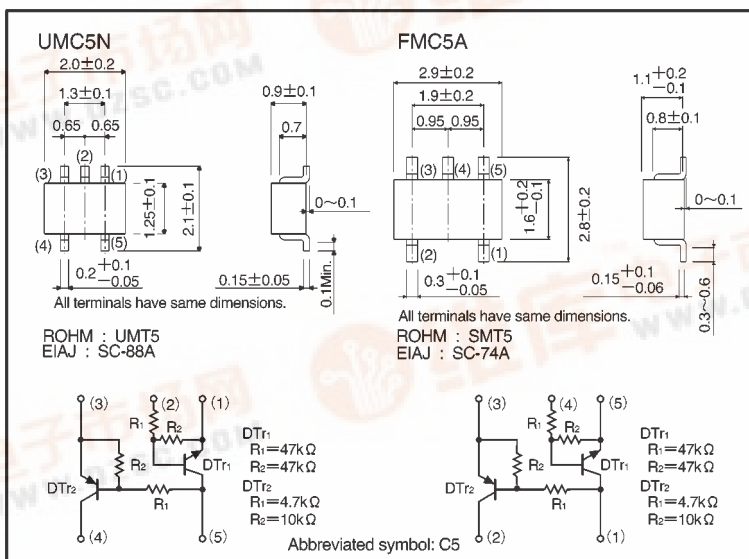
### ●Features

- 1) Both the DTA143X chip and DTZ144E chip in a 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)

### ●External dimensions (Units: mm)



### ●Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

| Parameter            |       | Symbol                | Limits                 |                        | Unit |    |
|----------------------|-------|-----------------------|------------------------|------------------------|------|----|
|                      |       |                       | DT <sub>r1</sub> (NPN) | DT <sub>r2</sub> (PNP) |      |    |
| Supply voltage       |       | V <sub>CC</sub>       | 50                     | —50                    | V    |    |
| Input voltage        |       | V <sub>IN</sub>       | 40                     | —20                    | V    |    |
|                      |       |                       | —10                    | 7                      |      |    |
| Output current       |       | I <sub>O</sub> (Max.) | 30                     | —100                   | mA   |    |
|                      |       | I <sub>C</sub> (Max.) | 100                    | —100                   |      |    |
| Power dissipation    | UMC5N | P <sub>d</sub>        | 150(TOTAL)             |                        | mW   | *1 |
|                      | FMC5A |                       | 300(TOTAL)             |                        |      | *2 |
| 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, DTr<sub>1</sub> (Ta = 25°C)

| 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    | —    | —    |            | $V_o=0.3V, I_o=2mA$                 |
| Output voltage       | $V_{O(on)}$  | —    | 0.1  | 0.3  | V          | $I_o=10mA, I_i=0.5mA$               |
| Input current        | $I_i$        | —    | —    | 0.18 | mA         | $V_i=5V$                            |
| Output current       | $I_{O(off)}$ | —    | —    | 0.5  | $\mu A$    | $V_{CC}=50V, V_i=0V$                |
| DC current gain      | $G_i$        | 68   | —    | —    | —          | $V_o=5V, I_o=5mA$                   |
| Transition frequency | $f_T$        | —    | 250  | —    | MHz        | $V_{CE}=10mA, I_E=-5mA, f=100MHz *$ |
| Input resistance     | $R_i$        | 32.9 | 47   | 61.1 | k $\Omega$ | —                                   |
| Resistance ratio     | $R_2/R_1$    | 0.8  | 1    | 1.2  | —          | —                                   |

\* Transition frequency of the device

●Electrical characteristics, DTr<sub>2</sub> (Ta = 25°C)

| 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 | —    | —    |            | $V_o=-0.3V, I_o=-20mA$              |
| Output voltage       | $V_{O(on)}$  | —    | -0.1 | -0.3 | V          | $I_o=-10mA, I_i=-0.5mA$             |
| Input current        | $I_i$        | —    | —    | -1.8 | mA         | $V_i=-5V$                           |
| Output current       | $I_{O(off)}$ | —    | —    | -0.5 | $\mu A$    | $V_{CC}=-50V, V_i=0V$               |
| DC current gain      | $G_i$        | 30   | —    | —    | —          | $V_o=-5V, I_o=-10mA$                |
| Transition frequency | $f_T$        | —    | 250  | —    | MHz        | $V_{CE}=-10mA, I_E=5mA, f=100MHz *$ |
| Input resistance     | $R_i$        | 3.29 | 4.7  | 6.11 | k $\Omega$ | —                                   |
| Resistance ratio     | $R_2/R_1$    | 1.7  | 2.1  | 2.6  | —          | —                                   |

\* Transition frequency of the device

●Packaging specifications

| Part No. | Packaging type               | Taping |      |
|----------|------------------------------|--------|------|
|          | Code                         | TR     | T148 |
|          | Basic ordering unit (pieces) | 3000   | 3000 |
| UMC5N    |                              | ○      | —    |
| FMC5A    |                              | —      | ○    |

● Electrical characteristic curves

DTr<sub>1</sub> (NPN)

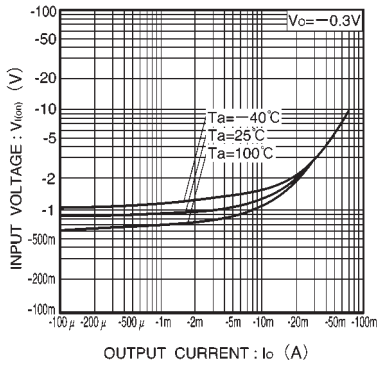


Fig.5 Input voltage vs. output current (ON characteristics)

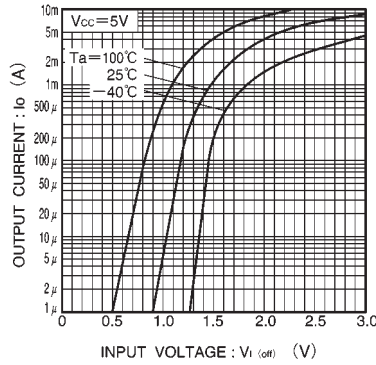


Fig.2 Output current vs. input voltage (OFF characteristics)

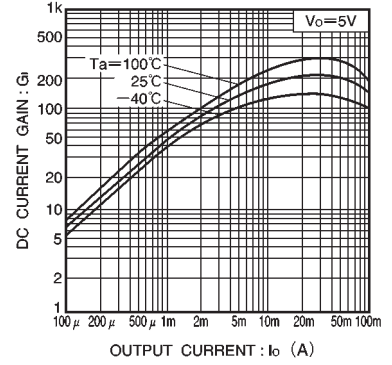


Fig.3 DC current gain vs. output current

DTr<sub>2</sub> (PNP)

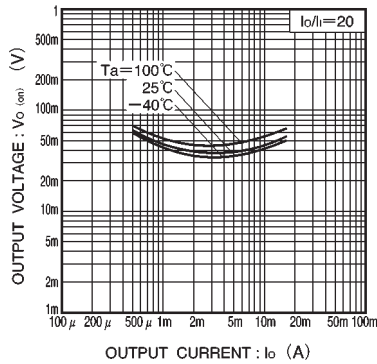


Fig.4 Output voltage vs. output current

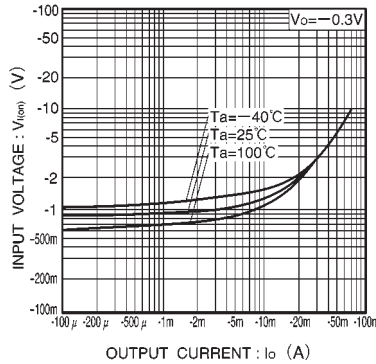


Fig.5 Input voltage vs. output current (ON characteristics)

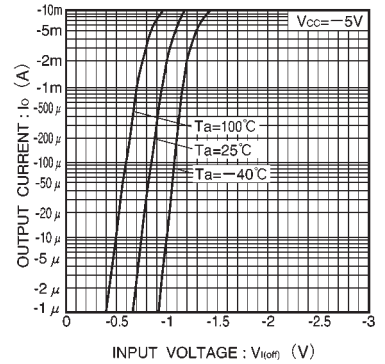


Fig.6 Output current vs. input voltage (OFF characteristics)

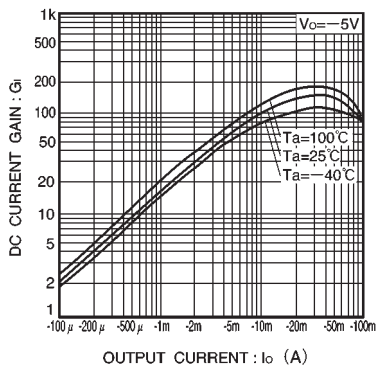


Fig.7 DC current gain vs. output current

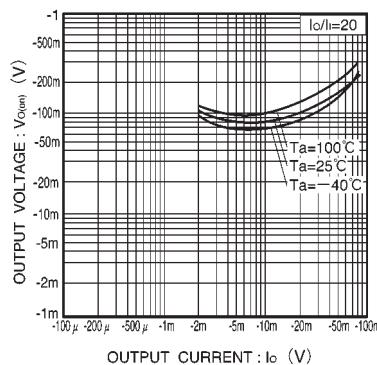


Fig.8 Output voltage vs. output current