

# General purpose transistor (dual transistors)

## EMZ7/UMZ7N

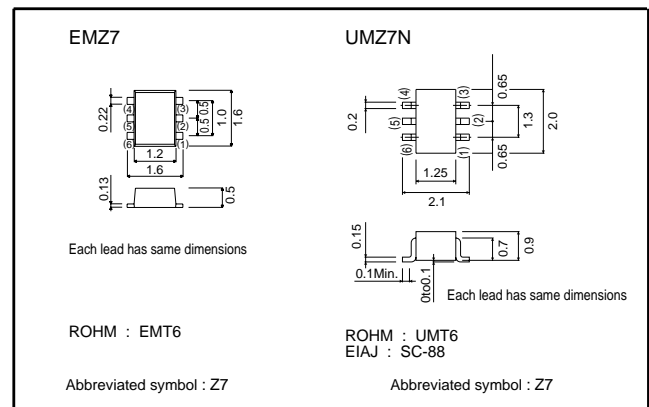
### ●Features

- 1) Both a 2SA2018 chip and 2SC5585 chip in a EMT or UMT 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.
- 5) Low  $V_{CE(sat)}$

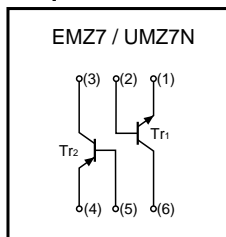
### ●Structure

NPN / PNP epitaxial planar silicon transistor

### ● External dimensions (Unit : mm)



### ● Equivalent Circuit



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

| Parameter                   | Symbol    | Limits          |                 | Unit  |
|-----------------------------|-----------|-----------------|-----------------|-------|
|                             |           | Tr <sub>1</sub> | Tr <sub>2</sub> |       |
| Collector-base voltage      | $V_{CBO}$ | 15              | -15             | V     |
| Collector-emitter voltage   | $V_{CEO}$ | 12              | -12             | V     |
| Emitter-base voltage        | $V_{EBO}$ | 6               | -6              | V     |
| Collector current           | $I_C$     | 500             | -500            | mA    |
|                             | $I_{CP}$  | 1               | -1              | A     |
| Collector power dissipation | $P_C$     | 150(TOTAL)      |                 | mW *1 |
| Junction temperature        | $T_j$     | 150             |                 | °C    |
| Storage temperature         | $T_{stg}$ | -55 to +150     |                 | °C    |

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

## Transistors

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

## Tr1 (NPN)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit | Conditions   |
|--------------------------------------|----------------------|------|------|------|------|--|
| Collector-base breakdown voltage     | BV <sub>CB0</sub>    | 15   | –    | –    | V    | I <sub>C</sub> =10μA                                 |
| Collector-emitter breakdown voltage  | BV <sub>CEO</sub>    | 12   | –    | –    | V    | I <sub>C</sub> =1mA                                  |
| Emitter-base breakdown voltage       | BV <sub>EBO</sub>    | 6    | –    | –    | V    | I <sub>E</sub> =10μA                                 |
| Collector cutoff current             | I <sub>CBO</sub>     | –    | –    | 0.1  | μA   | V <sub>CB</sub> =15V                                 |
| Emitter cutoff current               | I <sub>EBO</sub>     | –    | –    | 0.1  | μA   | V <sub>EB</sub> =6V                                  |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | –    | 90   | 250  | mV   | I <sub>C</sub> /I <sub>B</sub> =200mA/10mA           |
| DC current transfer ratio            | h <sub>FE</sub>      | 270  | –    | 680  | –    | V <sub>CE</sub> /I <sub>C</sub> =2V/10mA             |
| Transition frequency                 | f <sub>r</sub>       | –    | 320  | –    | MHz  | V <sub>CE</sub> =2V, I <sub>C</sub> =–10mA, f=100MHz |
| Output capacitance                   | C <sub>ob</sub>      | –    | 7.5  | –    | pF   | V <sub>CB</sub> =10V, I <sub>E</sub> =0A, f=1MHz     |

## Tr2 (PNP)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit | Conditions   |
|--------------------------------------|----------------------|------|------|------|------|--|
| Collector-base breakdown voltage     | BV <sub>CB0</sub>    | –15  | –    | –    | V    | I <sub>C</sub> =–10μA                                |
| Collector-emitter breakdown voltage  | BV <sub>CEO</sub>    | –12  | –    | –    | V    | I <sub>C</sub> =–1mA                                 |
| Emitter-base breakdown voltage       | BV <sub>EBO</sub>    | –6   | –    | –    | V    | I <sub>E</sub> =–10μA                                |
| Collector cutoff current             | I <sub>CBO</sub>     | –    | –    | –0.1 | μA   | V <sub>CB</sub> =–15V                                |
| Emitter cutoff current               | I <sub>EBO</sub>     | –    | –    | –0.1 | μA   | V <sub>EB</sub> =–6V                                 |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | –    | –100 | –250 | mV   | I <sub>C</sub> /I <sub>B</sub> =–200mA/–10mA         |
| DC current transfer ratio            | h <sub>FE</sub>      | 270  | –    | 680  | –    | V <sub>CE</sub> /I <sub>C</sub> =–2V/–10mA           |
| Transition frequency                 | f <sub>r</sub>       | –    | 260  | –    | MHz  | V <sub>CE</sub> =–2V, I <sub>C</sub> =10mA, f=100MHz |
| Output capacitance                   | C <sub>ob</sub>      | –    | 6.5  | –    | pF   | V <sub>CB</sub> =–10V, I <sub>E</sub> =0A, f=1MHz    |

## ● Packaging specifications

| Part No. | Packaging type               | Taping |      |
|----------|------------------------------|--------|------|
|          | Code                         | TR     | T2R  |
|          | Basic ordering unit (pieces) | 3000   | 8000 |
| UMZ7N    |                              | ○      | –    |
| EMZ7     |                              | –      | ○    |

Transistors

●Electrical characteristic curves

Tr1 (NPN)

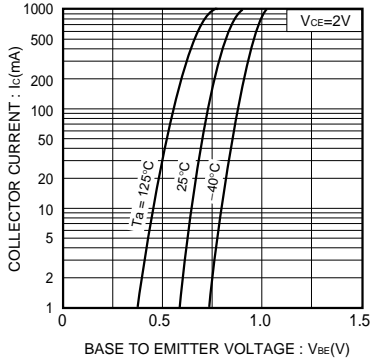


Fig.1 Grounded emitter propagation characteristics

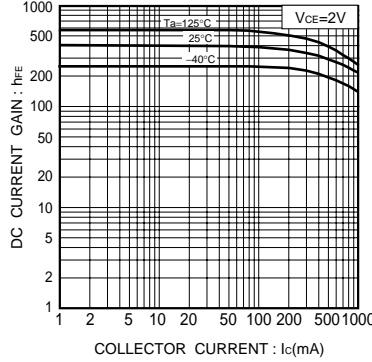


Fig.2 DC current gain vs. collector current

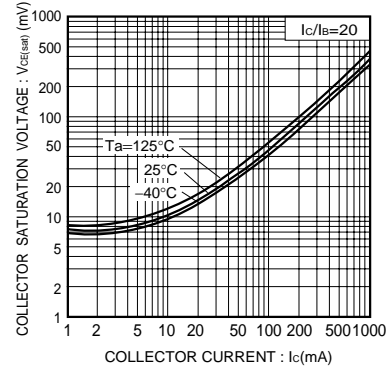


Fig.3 Collector-emitter saturation voltage vs. collector current ( I )

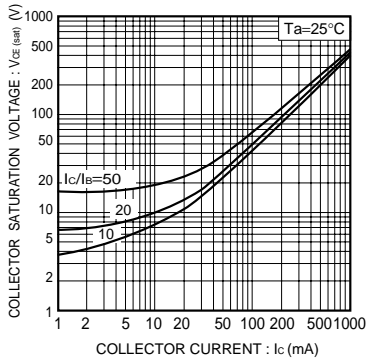


Fig.4 Collector-emitter saturation voltage vs. collector current ( II )

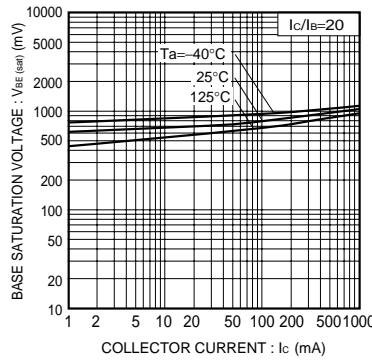


Fig.5 Base-emitter saturation voltage vs. collector current

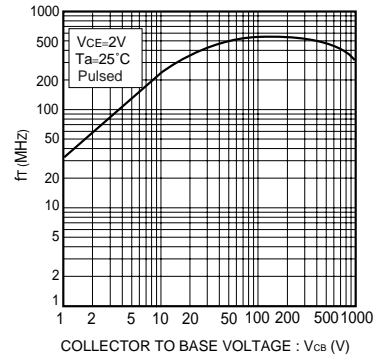


Fig.6 Collector output capacitance  
Emitter input capacitance vs. base voltage

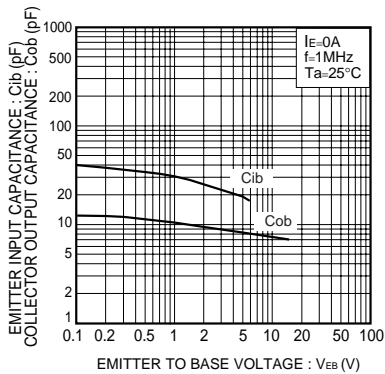


Fig.7 Collector output capacitance vs collector-base voltage  
Emitter input capacitance vs emitter-base voltage

Transistors

T<sub>r2</sub> (PNP)

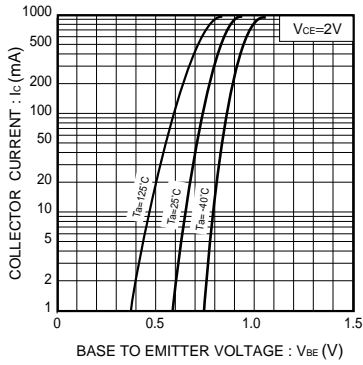


Fig.8 Grounded emitter propagation characteristics

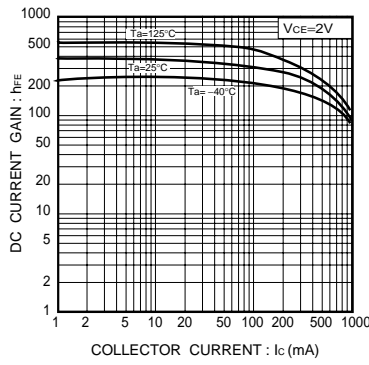


Fig.9 DC current gain vs. collector current

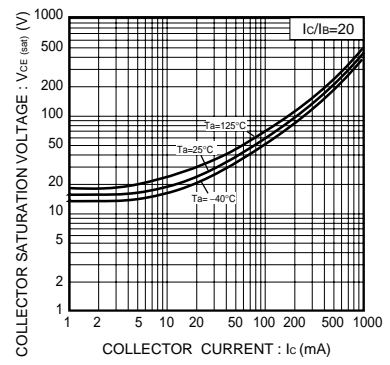


Fig.10 Collector-emitter saturation voltage vs. collector current ( I )

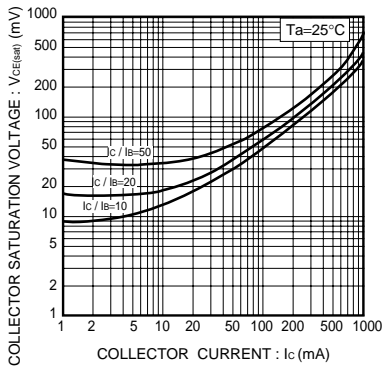


Fig.11 Collector-emitter saturation voltage vs. collector current

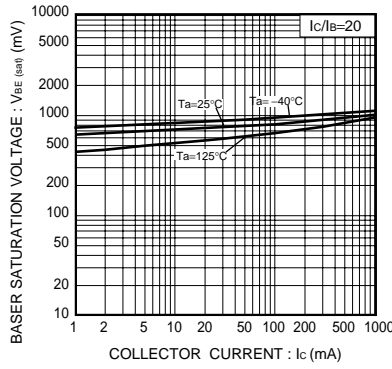


Fig.12 Base-emitter saturation voltage vs. collector current

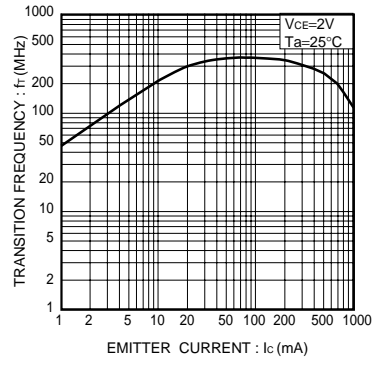


Fig.13 Gain bandwidth product vs. emitter current

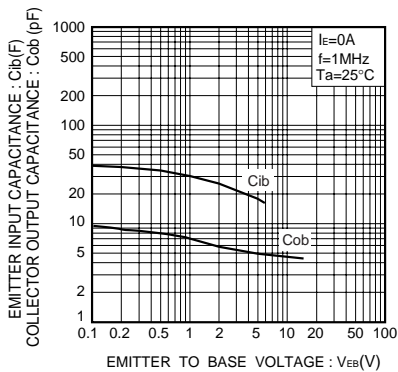


Fig.14 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

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