

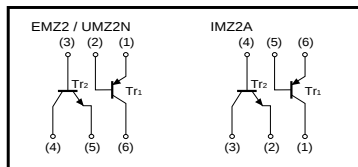
# Power management (dual transistors)

## EMZ2 / UMZ2N / IMZ2A

### ●Feature

- 1) Both a 2SA1037AK chip and 2SC2412K chip in a EMT or UMT or SMT package.

### ●Equivalent circuits



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

| Parameter                   |             | Symbol           | Limits      |     | Unit |
|-----------------------------|-------------|------------------|-------------|-----|------|
|                             |             |                  | Tr1         | Tr2 |      |
| Collector-base voltage      |             | V <sub>CB0</sub> | -60         | 60  | V    |
| Collector-emitter voltage   |             | V <sub>CE0</sub> | -50         | 50  | V    |
| Emitter-base voltage        |             | V <sub>EB0</sub> | -6          | 7   | V    |
| Collector current           |             | I <sub>C</sub>   | -150        | 150 | mA   |
| Collector power dissipation | EM22, UM22N | P <sub>C</sub>   | 150 (TOTAL) |     | mW   |
|                             | IM22A       |                  | 300 (TOTAL) |     | mW   |
| Junction temperature        |             | T <sub>J</sub>   | 150         |     | °C   |
| Storage temperature         |             | T <sub>stg</sub> | -55 to +150 |     | °C   |

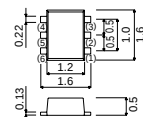
\*1 120mW per element must not be exceeded.  
\*2 200mW per element must not be exceeded.

### ●Package, marking, and packaging specifications

| Part No.                     | EMZ2 | UMZ2N | IMZ2A |
|------------------------------|------|-------|-------|
| Package                      | EMT6 | UMT6  | SMT6  |
| Marking                      | Z2   | Z2    | Z2    |
| Code                         | T2R  | TR    | T108  |
| Basic ordering unit (pieces) | 8000 | 3000  | 3000  |

### ●External dimensions (Unit : mm)

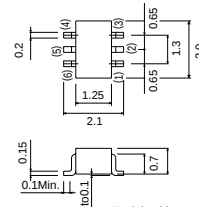
#### EMZ2



ROHM : EMT6

Each lead has same dimensions

#### UMZ2N

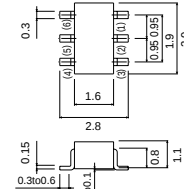


ROHM : UMT6

EIAJ : SC-88

Each lead has same dimensions

#### IMZ2A



ROHM : SMT6

EIAJ : SC-74

Each lead has same dimensions

## Transistors

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

Tr1 (PNP)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit | Conditions                                                 |
|--------------------------------------|----------------------|------|------|------|------|------------------------------------------------------------|
| Collector-base breakdown voltage     | BV <sub>CBO</sub>    | -60  | -    | -    | V    | I <sub>C</sub> = -50μA                                     |
| Collector-emitter breakdown voltage  | BV <sub>CEO</sub>    | -50  | -    | -    | V    | I <sub>C</sub> = -1mA                                      |
| Emitter-base breakdown voltage       | BV <sub>EBO</sub>    | -6   | -    | -    | V    | I <sub>E</sub> = -50μA                                     |
| Collector cutoff current             | I <sub>CBO</sub>     | -    | -    | -0.1 | μA   | V <sub>CB</sub> = -60V                                     |
| Emitter cutoff current               | I <sub>EBO</sub>     | -    | -    | -0.1 | μA   | V <sub>EB</sub> = -6V                                      |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | -    | -    | -0.5 | V    | I <sub>C</sub> /I <sub>B</sub> = -50mA/-5mA                |
| DC current transfer ratio            | h <sub>FE</sub>      | 120  | -    | 560  | -    | V <sub>CE</sub> = -6V, I <sub>C</sub> = -1mA               |
| Transition frequency                 | f <sub>T</sub>       | -    | 140  | -    | MHz  | V <sub>CE</sub> = -12V, I <sub>E</sub> = 2mA, f = 100MHz * |
| Output capacitance                   | C <sub>ob</sub>      | -    | 4    | 5    | pF   | V <sub>CB</sub> = -12V, I <sub>E</sub> = 0A, f = 1MHz      |

\* Transition frequency of the device.

Tr2 (NPN)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit | Conditions                                                 |
|--------------------------------------|----------------------|------|------|------|------|------------------------------------------------------------|
| Collector-base breakdown voltage     | BV <sub>CBO</sub>    | 60   | -    | -    | V    | I <sub>C</sub> = 50μA                                      |
| Collector-emitter breakdown voltage  | BV <sub>CEO</sub>    | 50   | -    | -    | V    | I <sub>C</sub> = 1mA                                       |
| Emitter-base breakdown voltage       | BV <sub>EBO</sub>    | 7    | -    | -    | V    | I <sub>E</sub> = 50μA                                      |
| Collector cutoff current             | I <sub>CBO</sub>     | -    | -    | 0.1  | μA   | V <sub>CB</sub> = 60V                                      |
| Emitter cutoff current               | I <sub>EBO</sub>     | -    | -    | 0.1  | μA   | V <sub>EB</sub> = 7V                                       |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | -    | -    | 0.4  | V    | I <sub>C</sub> /I <sub>B</sub> = 50mA/5mA                  |
| DC current transfer ratio            | h <sub>FE</sub>      | 120  | -    | 560  | -    | V <sub>CE</sub> = 6V, I <sub>C</sub> = 1mA                 |
| Transition frequency                 | f <sub>T</sub>       | -    | 180  | -    | MHz  | V <sub>CE</sub> = 12V, I <sub>E</sub> = -2mA, f = 100MHz * |
| Output capacitance                   | C <sub>ob</sub>      | -    | 2    | 3.5  | pF   | V <sub>CB</sub> = 12V, I <sub>E</sub> = 0A, f = 1MHz       |

\* Transition frequency of the device.

## ●Electrical characteristics curves

PNP Tr

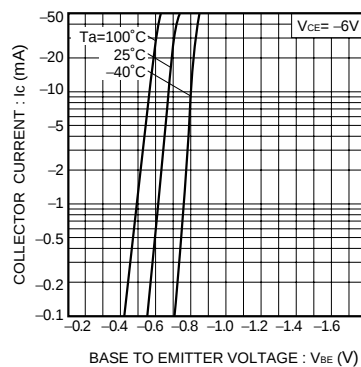


Fig.1 Grounded emitter propagation characteristics

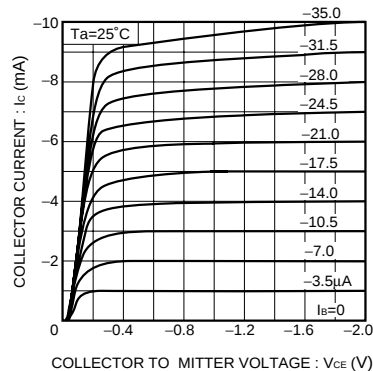


Fig.2 Grounded emitter output characteristics (I)

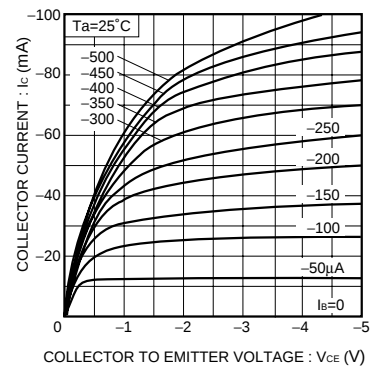


Fig.3 Grounded emitter output characteristics (II)

## Transistors

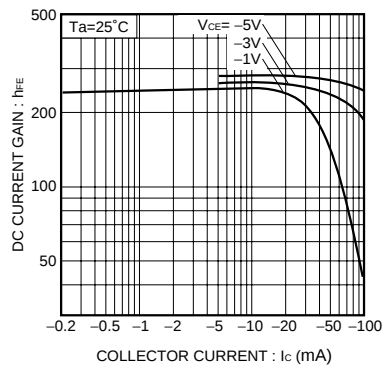


Fig.4 DC current gain vs. collector current (I)

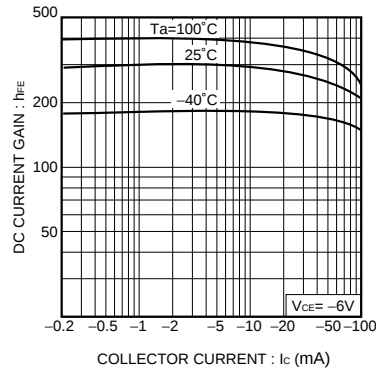


Fig.5 DC current gain vs. collector current (II)

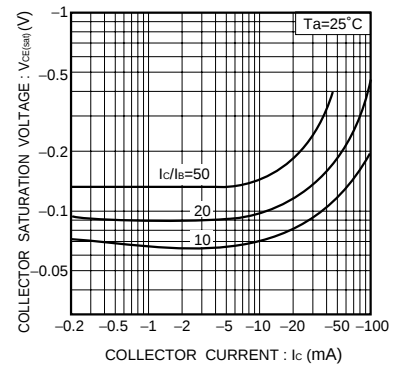


Fig.6 Collector-emitter saturation voltage vs. collector current (I)

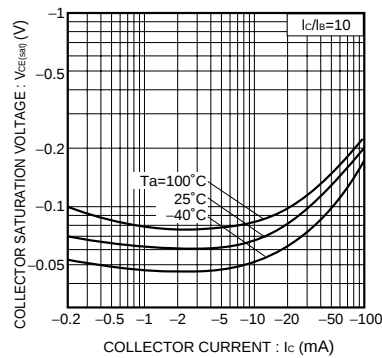


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

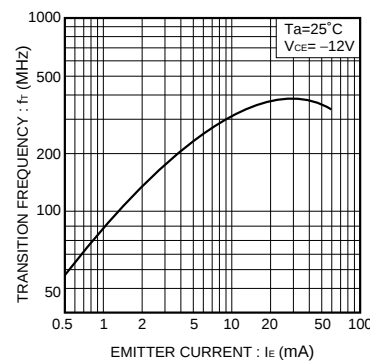
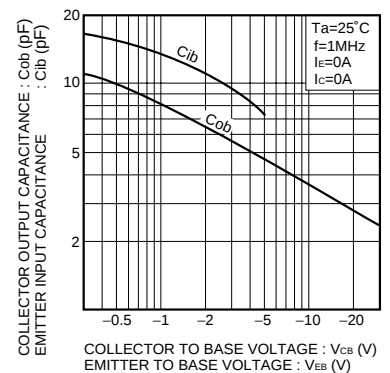


Fig.8 Gain bandwidth product vs. emitter current

Fig.9 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

## NPN Tr

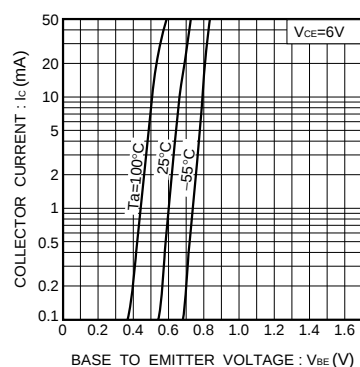


Fig.10 Grounded emitter propagation characteristics

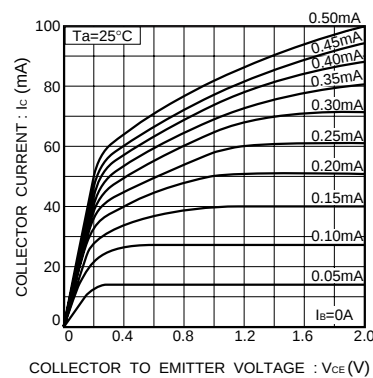


Fig.11 Grounded emitter output characteristics (I)

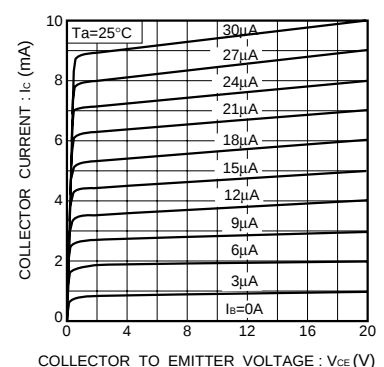


Fig.12 Grounded emitter output characteristics (II)

## Transistors

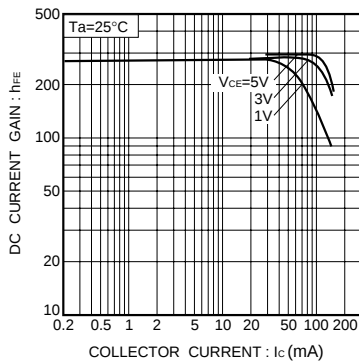


Fig.13 DC current gain vs. collector current ( I )

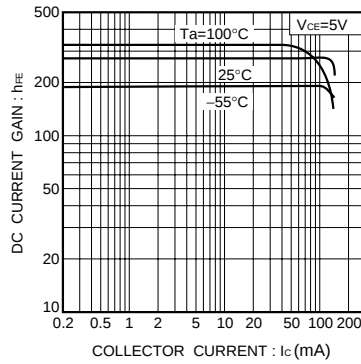


Fig.14 DC current gain vs. collector current ( II )

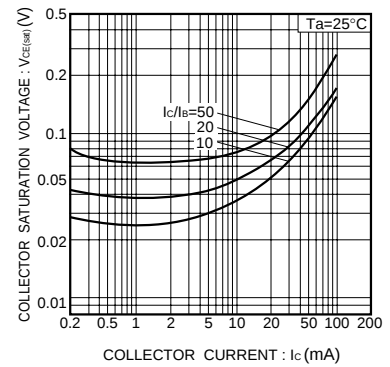


Fig.15 Collector-emitter saturation voltage vs. collector current

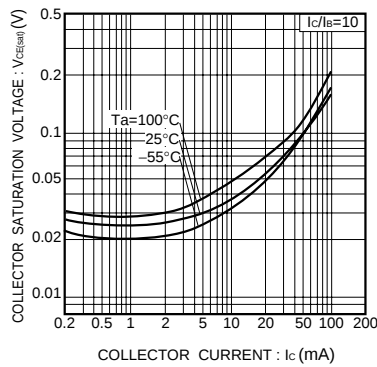


Fig.16 Collector-emitter saturation voltage vs. collector current ( I )

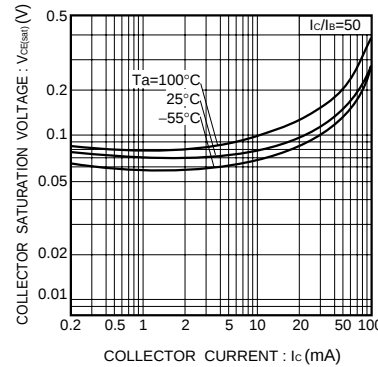


Fig.17 Collector-emitter saturation voltage vs. collector current (II)

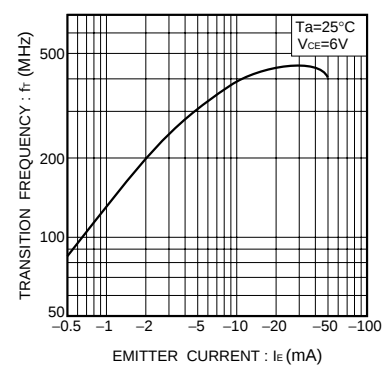


Fig.18 Gain bandwidth product vs. emitter current

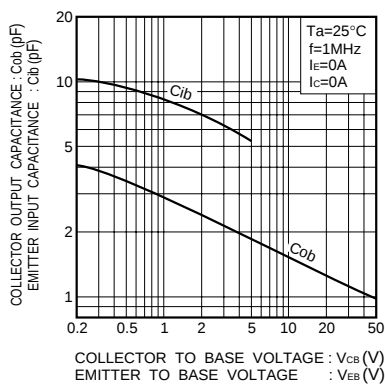
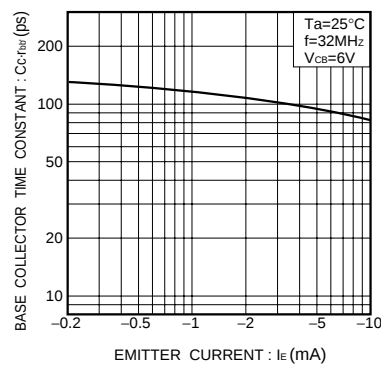
Fig.19 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

Fig.20 Base-collector time constant vs. emitter current

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