

# General purpose transistor (dual transistors)

## UMZ1N / IMZ1A

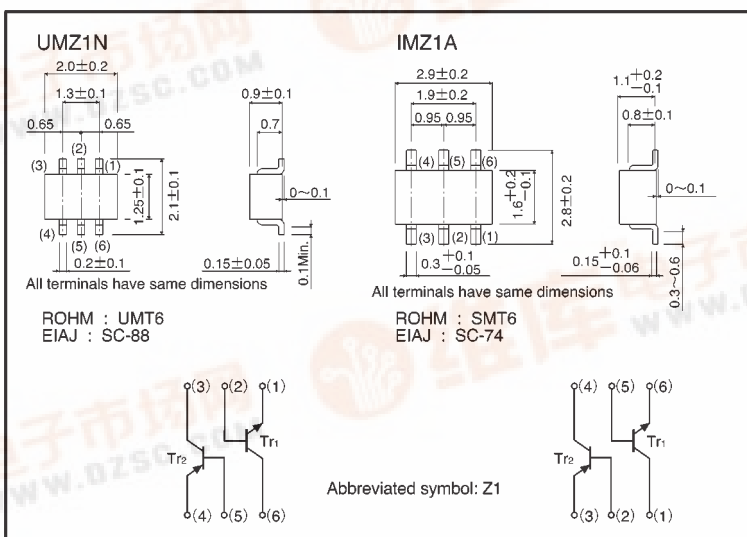
### ●Features

- 1) Both a 2SA1037AK chip and 2SC241ZK chip in a UMT or SMT package.
- 2) Mounting possible with UMT3 or SMT3 automatic mounting machines.
- 3) Transistor elements are independent, eliminating interference.
- 4) Mounting cost and area can be cut in half.

### ●Structure

NPN/PNP epitaxial planar silicon transistor

### ●External dimensions (Units: mm)



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

| Parameter                   |       | Symbol           | Limits          |                 | Unit |
|-----------------------------|-------|------------------|-----------------|-----------------|------|
|                             |       |                  | Tr <sub>1</sub> | Tr <sub>2</sub> |      |
| Collector-base voltage      |       | V <sub>CBO</sub> | 60              | −60             | V    |
| Collector-emitter voltage   |       | V <sub>CEO</sub> | 50              | −50             | V    |
| Emitter-base voltage        |       | V <sub>EBO</sub> | 7               | −6              | V    |
| Collector current           |       | I <sub>c</sub>   | 150             | −150            | mA   |
| Collector power dissipation | UMZ1N | P <sub>c</sub>   | 150 (TOTAL)     |                 | mW   |
|                             | IMZ1A |                  | 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.



## Transistors

## UMZ1N / IMZ1A

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

#### Tr<sub>1</sub> (NPN)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit    | Conditions                                           |
|--------------------------------------|----------------------|------|------|------|---------|------------------------------------------------------|
| Collector-base breakdown voltage     | BV <sub>CBO</sub>    | 60   | —    | —    | V       | I <sub>C</sub> =50 $\mu$ A                           |
| 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> =50 $\mu$ A                           |
| Collector cutoff current             | I <sub>CBO</sub>     | —    | —    | 0.1  | $\mu$ A | V <sub>CB</sub> =60V                                 |
| Emitter cutoff current               | I <sub>EBO</sub>     | —    | —    | 0.1  | $\mu$ A | 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> /I <sub>C</sub> =6V/1mA              |
| Transition frequency                 | f <sub>T</sub>       | —    | 180  | —    | MHz     | V <sub>CE</sub> =12V, I <sub>C</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     |

#### Tr<sub>2</sub> (PNP)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit    | Conditions                                           |
|--------------------------------------|----------------------|------|------|------|---------|------------------------------------------------------|
| Collector-base breakdown voltage     | BV <sub>CBO</sub>    | -60  | —    | —    | V       | I <sub>C</sub> =-50 $\mu$ A                          |
| 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> =-50 $\mu$ A                          |
| Collector cutoff current             | I <sub>CBO</sub>     | —    | —    | -0.1 | $\mu$ A | V <sub>CB</sub> =-60V                                |
| Emitter cutoff current               | I <sub>EBO</sub>     | —    | —    | -0.1 | $\mu$ A | 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> /I <sub>C</sub> =-6V/-1mA            |
| Transition frequency                 | f <sub>T</sub>       | —    | 140  | —    | MHz     | V <sub>CE</sub> =-12V, I <sub>C</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    |

### ●Packaging specifications

| Part No. | Packaging type               | Taping |      |
|----------|------------------------------|--------|------|
|          | Code                         | TR     | T108 |
|          | Basic ordering unit (pieces) | 3000   | 3000 |
| UMZ1N    |                              | ○      | —    |
| IMZ1A    |                              | —      | ○    |

# Transistors

# UMZ1N / IMZ1A

## ●Electrical characteristic curves

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

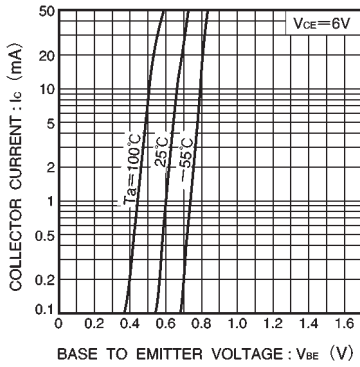


Fig.1 Grounded emitter propagation characteristics

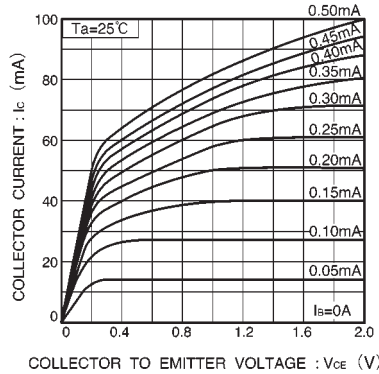


Fig.2 Grounded emitter output characteristics (I)

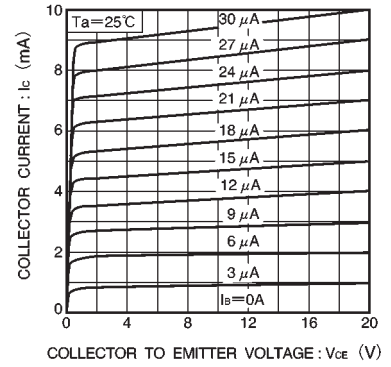


Fig.3 Grounded emitter output characteristics (II)

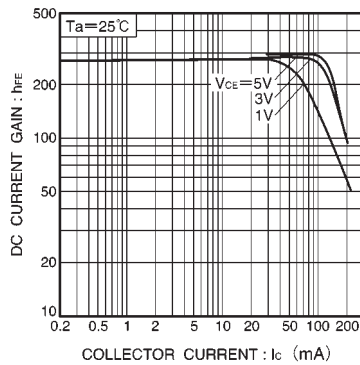


Fig.4 DC current gain vs. collector current (I)

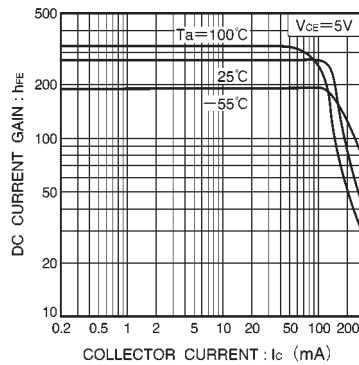


Fig.5 DC current gain vs. collector current (II)

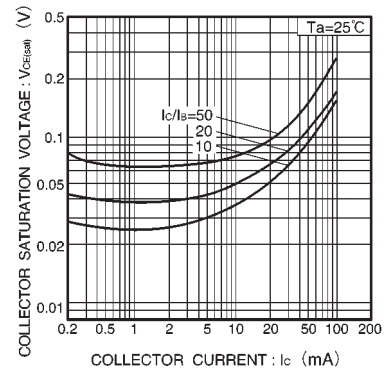


Fig.6 Collector-emitter saturation voltage vs. collector current (I)

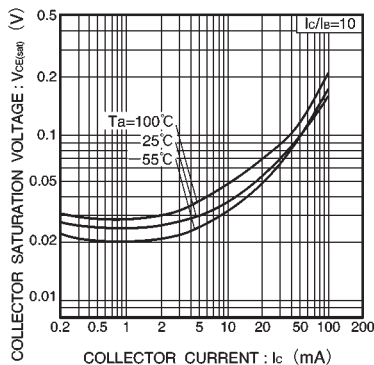


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

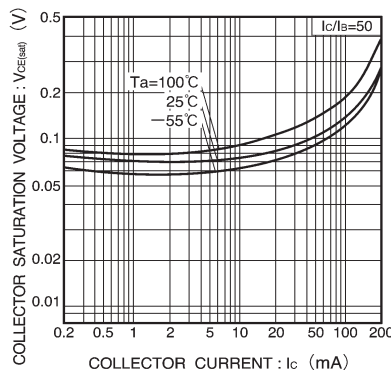


Fig.8 Collector-emitter saturation voltage vs. collector current (III)

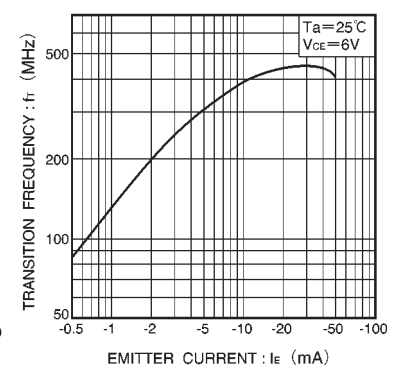


Fig.9 Gain bandwidth product vs. emitter current

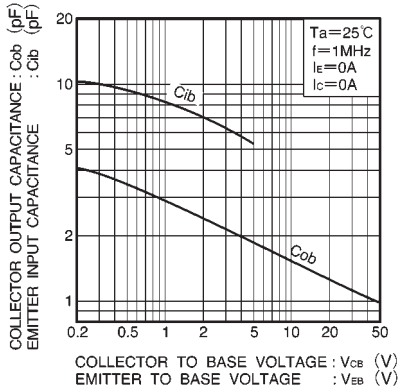


Fig.10 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

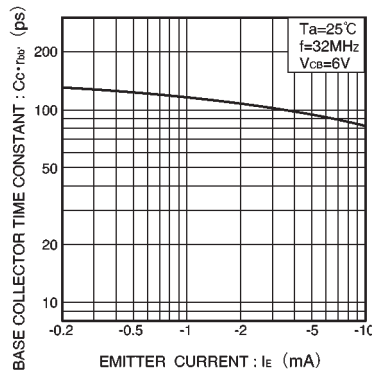


Fig.11 Base-collector time constant vs. emitter current

## Electrical characteristic curves

### $\text{Tr}_2$ (PNP)

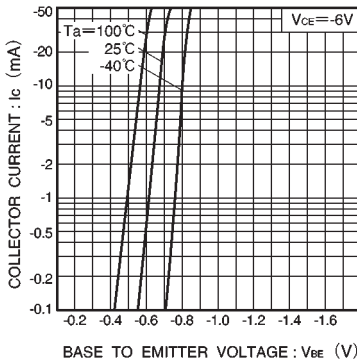


Fig.12 Grounded emitter propagation characteristics

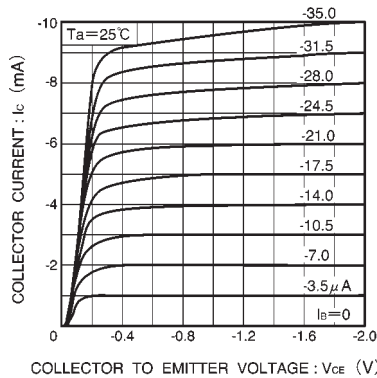


Fig.13 Grounded emitter output characteristics (I)

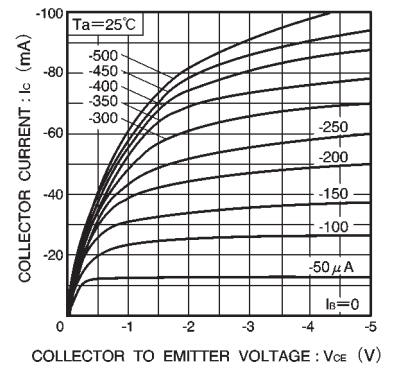


Fig.14 Grounded emitter output characteristics (II)

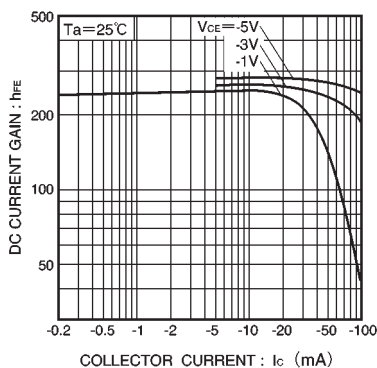


Fig.15 DC current gain vs. collector current (I)

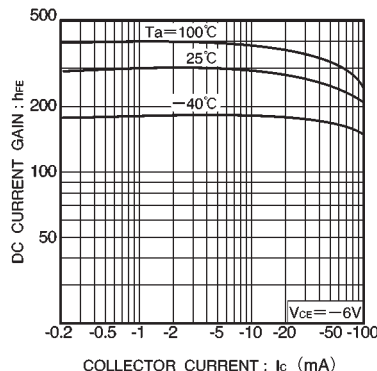


Fig.16 DC current gain vs. collector current (II)

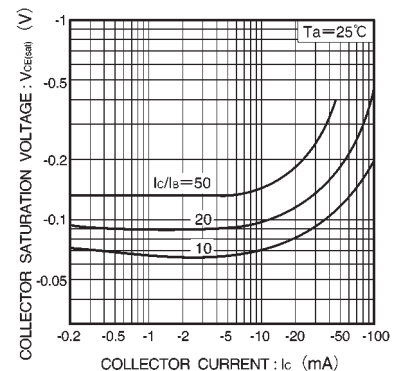


Fig.17 Collector-emitter saturation voltage vs. collector current (I)

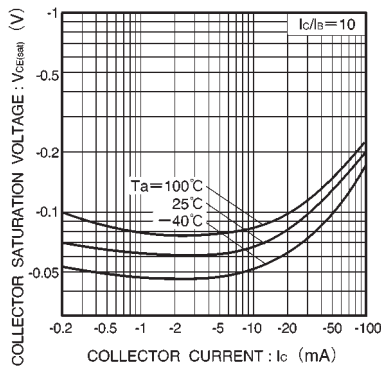


Fig.18 Collector-emitter saturation voltage vs. collector current ( II )

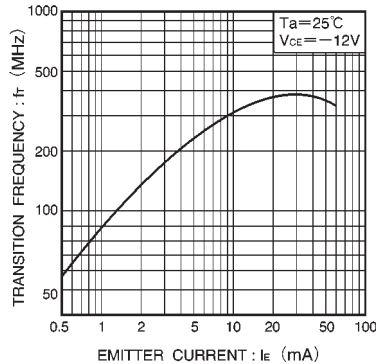


Fig.19 Gain bandwidth product vs. emitter current

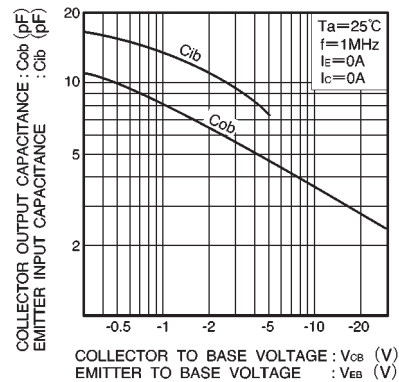


Fig.20 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage