

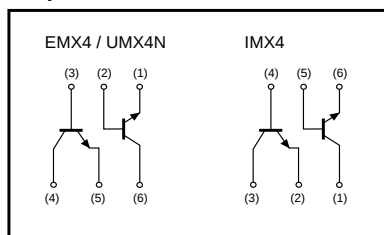
# High transition frequency (dual transistors)

## EMX4 / UMX4N / IMX4

### ●Features

- 1) Two 2SC3837K chips in a EMT or UMT or SMT package.
- 2) High transition frequency. ( $f_T=1.5\text{GHz}$ )
- 3) Low output capacitance. ( $C_{ob}=0.9\text{pF}$ )

### ●Equivalent circuits



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

| Parameter                   | Symbol       | Limits           | Unit             |
|-----------------------------|--------------|------------------|------------------|
| Collector-base voltage      | $V_{CBO}$    | 30               | V                |
| Collector-emitter voltage   | $V_{CEO}$    | 20               | V                |
| Emitter-base voltage        | $V_{EBO}$    | 3                | V                |
| Collector current           | $I_C$        | 50               | mA               |
| Collector power dissipation | EMX4 / UMX4N | $P_C$ 150(TOTAL) | mW *1            |
|                             | IMX4         | 300(TOTAL)       |                  |
| Junction temperature        | $T_J$        | 150              | $^\circ\text{C}$ |
| Storage temperature         | $T_{stg}$    | -55 to +150      | $^\circ\text{C}$ |

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

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

### ●Package, marking, and packaging specifications

| Type                         | EMX4 | UMX4N | IMX4 |
|------------------------------|------|-------|------|
| Package                      | EMT6 | UMT6  | SMT6 |
| Marking                      | X4   | X4    | X4   |
| Code                         | T2R  | TR    | T108 |
| Basic ordering unit (pieces) | 8000 | 3000  | 3000 |

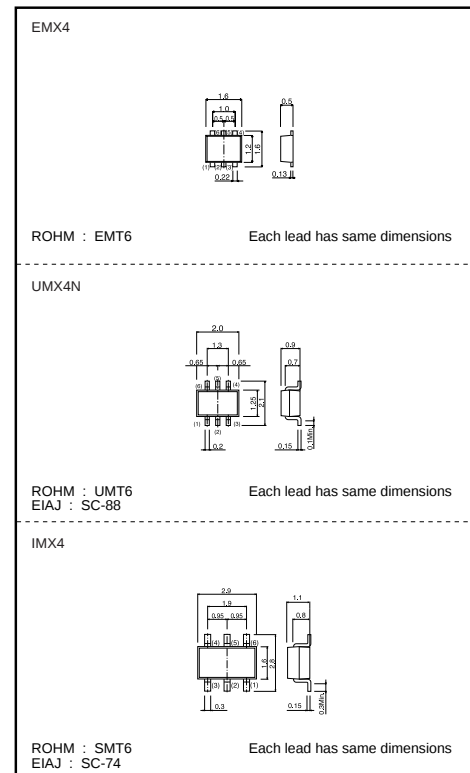
### ●Electrical characteristics ( $T_a=25^\circ\text{C}$ )

| Parameter                            | Symbol                | Min. | Typ. | Max. | Unit          | Conditions                                                                  |
|--------------------------------------|-----------------------|------|------|------|---------------|-----------------------------------------------------------------------------|
| Collector-base breakdown voltage     | $BV_{CBO}$            | 30   | —    | —    | V             | $I_C=10\mu\text{A}$                                                         |
| Collector-emitter breakdown voltage  | $BV_{CEO}$            | 20   | —    | —    | V             | $I_C=1\text{mA}$                                                            |
| Emitter-base breakdown voltage       | $BV_{EBO}$            | 3    | —    | —    | V             | $I_E=10\mu\text{A}$                                                         |
| Collector cutoff current             | $I_{CBO}$             | —    | —    | 0.5  | $\mu\text{A}$ | $V_{CB}=15\text{V}$                                                         |
| Emitter cutoff current               | $I_{EBO}$             | —    | —    | 0.5  | $\mu\text{A}$ | $V_{EB}=2\text{V}$                                                          |
| DC current transfer ratio            | $h_{FE}$              | 56   | —    | 180  | —             | $V_{CE}/I_C=10\text{V}/10\text{mA}$                                         |
| Collector-emitter saturation voltage | $V_{CE(sat)}$         | —    | —    | 0.5  | V             | $I_C/I_E=20\text{mA}/4\text{mA}$                                            |
| Transition frequency                 | $f_T$                 | 600  | 1500 | —    | MHz           | $V_{CE}/I_E=10\text{V}/-10\text{mA}$ , $f=200\text{MHz}$ *                  |
| Output capacitance                   | $C_{ob}$              | —    | 0.95 | 1.6  | pF            | $V_{CB}/f=10\text{V}/1\text{MHz}$ , $I_E=0\text{A}$                         |
| Collector-base time constant         | $\tau_{bb} \cdot C_C$ | —    | 6    | 13   | ps            | $V_{CB}=10\text{V}$ , $I_C=10\text{mA}$ , $f=31.8\text{MHz}$                |
| Noise factor                         | NF                    | —    | 4.5  | —    | dB            | $V_{CE}=12\text{V}$ , $I_C=2\text{mA}$ , $f=200\text{MHz}$ , $R_g=50\Omega$ |

\*Transition frequency of the device.

This product might cause chip aging and breakdown under the large electrified environment.  
Please consider to design ESD protection circuit.

### ●Dimensions (Unit : mm)



# Transistors

## Electrical characteristic curves

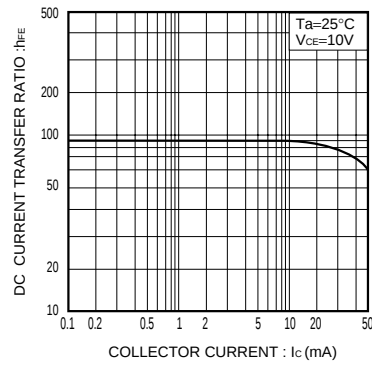


Fig.1 DC current gain vs. collector current

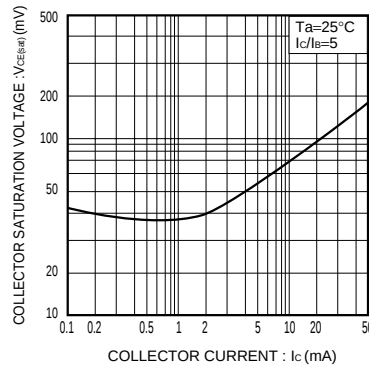


Fig.2 Collector-emitter saturation voltage vs. collector current

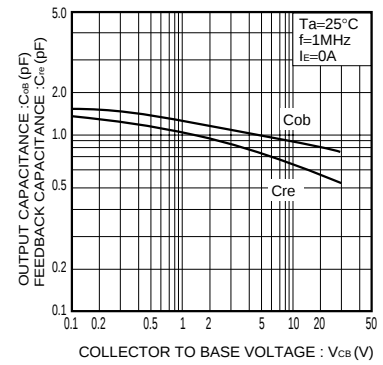


Fig.3 Capacitance vs. reverse bias voltage

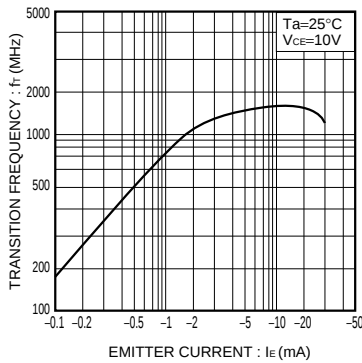


Fig.4 Gain bandwidth product vs. emitter current

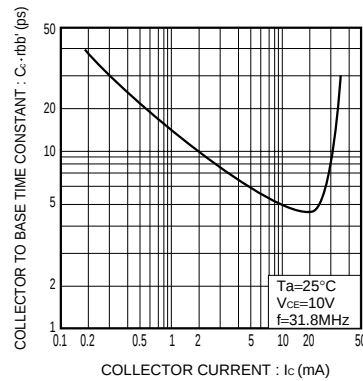


Fig.5 Collector to base time constant vs. collector current

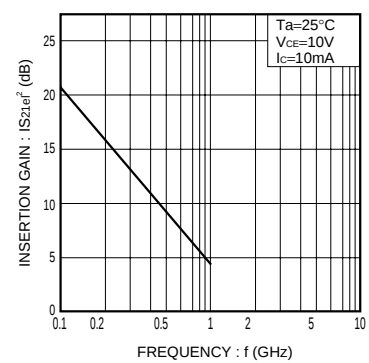


Fig.6 Insertion gain vs. frequency

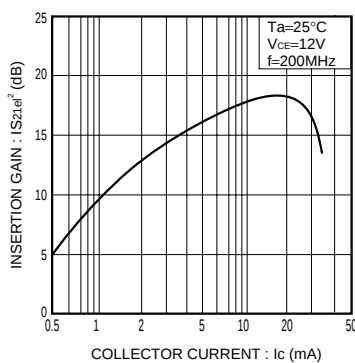


Fig.7 Insertion gain vs. collector current

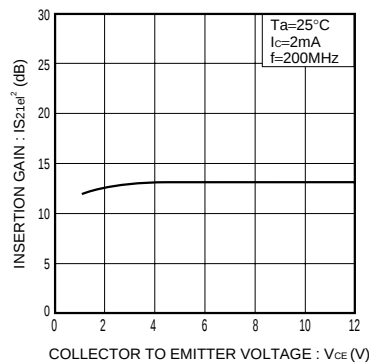


Fig.8 Insertion gain vs. collector voltage

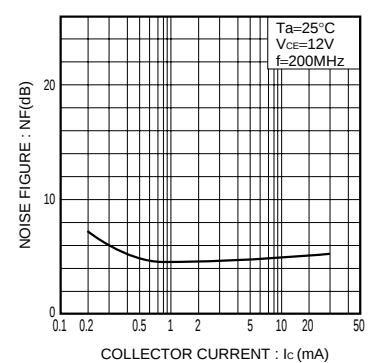


Fig.9 Noise factor vs. collector current

Transistors

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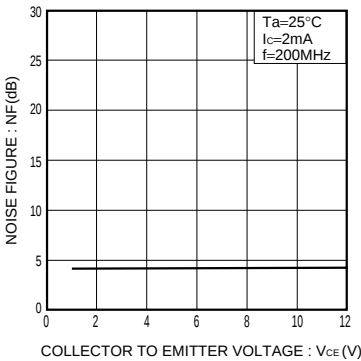


Fig.10 Noise factor vs. collector voltage

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