

| Parameter | Tr1 and Tr2 |
|-----------|-------------|
| $V_{CE0}$ | 50V         |
| $I_C$     | 150mA       |

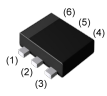
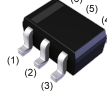
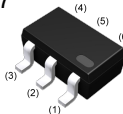
### ●Features

- 1) Two 2SC2412K chips in a EMT, UMT or SMT package.
- 2) Mounting possible with EMT3, UMT3 or SMT3 automatic mounting machines.
- 3) Transistor elements are independent, eliminating interference.
- 4) Mounting cost and area can be cut in half.

### ●Application

GENERAL PURPOSE SMALL SIGNAL AMPLIFIER

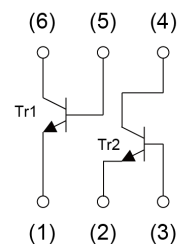
### ●Outline

|  |  |
|--|--|
| <p>SOT-563</p>  <p>EMX2<br/>(EMT6)</p> | <p>SOT-363</p>  <p>UMX2N<br/>(UMT6)</p> |
| <p>SOT-457</p>  <p>IMX2<br/>(SMT6)</p> |  |

### ●Inner circuit

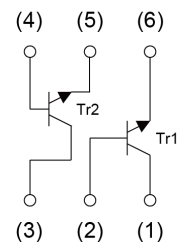
#### EMX2 / UMX2N

- (1) Tr1 Emitter
- (2) Tr2 Emitter
- (3) Tr2 Base
- (4) Tr2 Collector
- (5) Tr1 Base
- (6) Tr1 Collector



#### IMX2

- (1) Tr1 Collector
- (2) Tr1 Base
- (3) Tr2 Collector
- (4) Tr2 Base
- (5) Tr2 Emitter
- (6) Tr1 Emitter



### ●Packaging specifications

| Part No. | Package           | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|----------|-------------------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| EMX2     | SOT-563<br>(EMT6) | 1616         | T2R         | 180            | 8               | 8000                      | X2      |
| UMX2N    | SOT-363<br>(UMT6) | 2021         | TR          | 180            | 8               | 3000                      | X2      |
| IMX2     | SOT-457<br>(SMT6) | 2928         | T108        | 180            | 8               | 3000                      | X2      |

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

<For Tr1 and Tr2 in common>

| Parameter                    |             | Symbol       | Values      | Unit             |
|------------------------------|-------------|--------------|-------------|------------------|
| Collector-base voltage       |             | $V_{CBO}$    | 60          | V                |
| Collector-emitter voltage    |             | $V_{CEO}$    | 50          | V                |
| Emitter-base voltage         |             | $V_{EBO}$    | 7           | V                |
| Collector current            |             | $I_C$        | 150         | mA               |
| Power dissipation            | EMX2/ UMX2N | $P_D^{*1*2}$ | 150         | mW/Total         |
|                              | IMX2        | $P_D^{*1*3}$ | 300         | mW/Total         |
| Junction temperature         |             | $T_j$        | 150         | $^\circ\text{C}$ |
| Range of storage temperature |             | $T_{stg}$    | -55 to +150 | $^\circ\text{C}$ |

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

<For Tr1 and Tr2 in common>

| Parameter                            | Symbol        | Conditions  | Values |      |      | Unit |
|--------------------------------------|---------------|---|--------|------|------|------|
|                                      |               |   | Min.   | Typ. | Max. |      |
| Collector-base breakdown voltage     | $BV_{CBO}$    | $I_C = 50\mu\text{A}$                                       | 60     | -    | -    | V    |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | $I_C = 1\text{mA}$  | 50     | -    | -    | V    |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | $I_E = 50\mu\text{A}$                                       | 7      | -    | -    | V    |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 60\text{V}$                                       | -      | -    | 100  | nA   |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 7\text{V}$  | -      | -    | 100  | nA   |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 50\text{mA}, I_B = 5\text{mA}$                       | -      | -    | 400  | mV   |
| DC current gain                      | $h_{FE}$      | $V_{CE} = 6\text{V}, I_C = 1\text{mA}$                      | 120    | -    | 560  | -    |
| Transition frequency                 | $f_T$         | $V_{CE} = 12\text{V}, I_E = -2\text{mA}, f = 100\text{MHz}$ | -      | 180  | -    | MHz  |
| Output capacitance                   | $C_{ob}$      | $V_{CB} = 12\text{V}, I_E = 0\text{A}, f = 1\text{MHz}$     | -      | 2.0  | 3.5  | pF   |

\*1 Each terminal mounted on a reference land.

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

\*3 200mW per element must not be exceeded.

● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ )

<For Tr1 and Tr2 in common>

Fig.1 Ground Emitter Propagation Characteristics

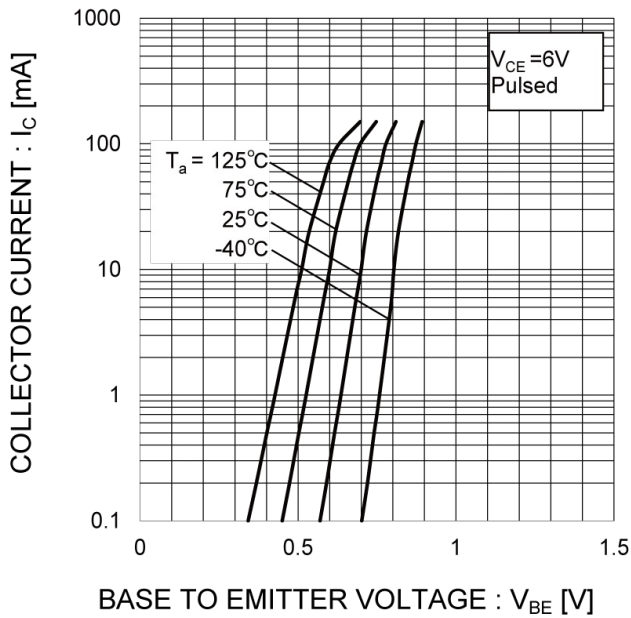


Fig.2 Grounded Emitter Output Characteristics

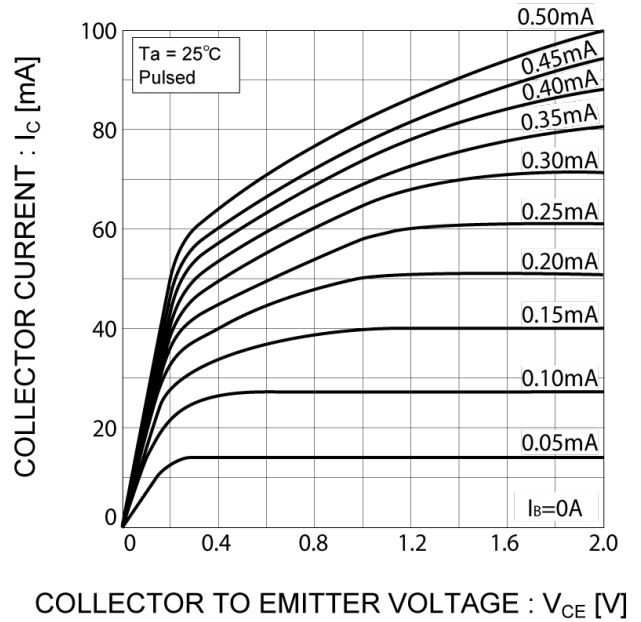


Fig.3 DC Current Gain vs. Collector Current (I)

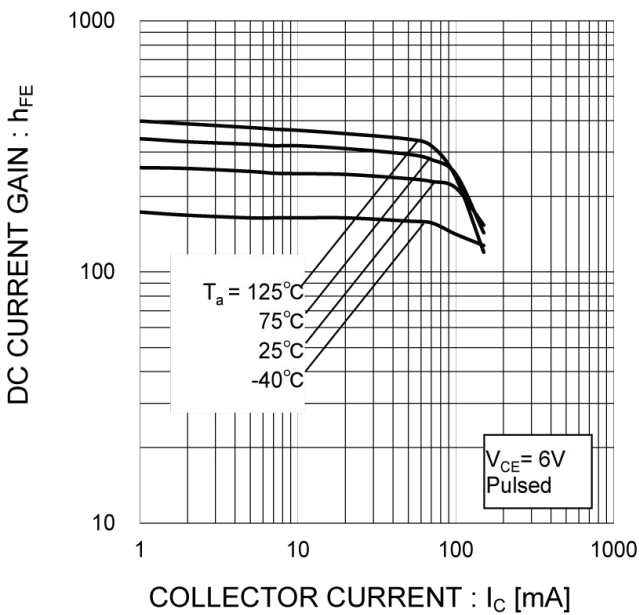
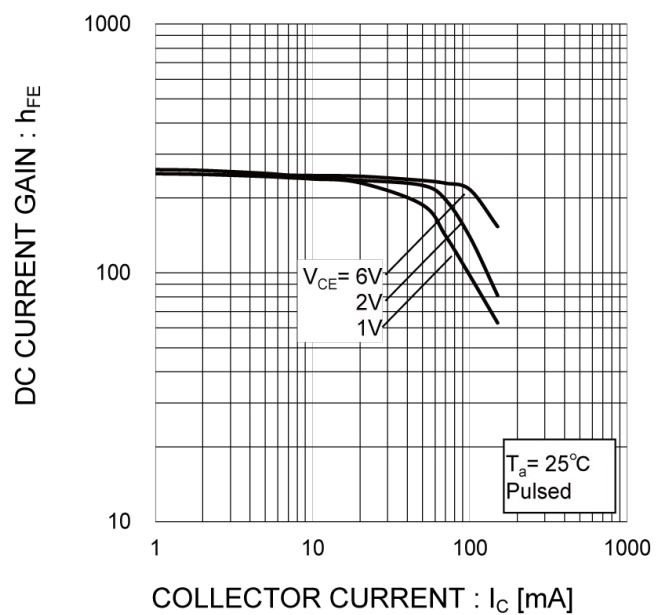


Fig.4 DC Current Gain vs. Collector Current (II)



● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ )

<For Tr1 and Tr2 in common>

Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current(I)

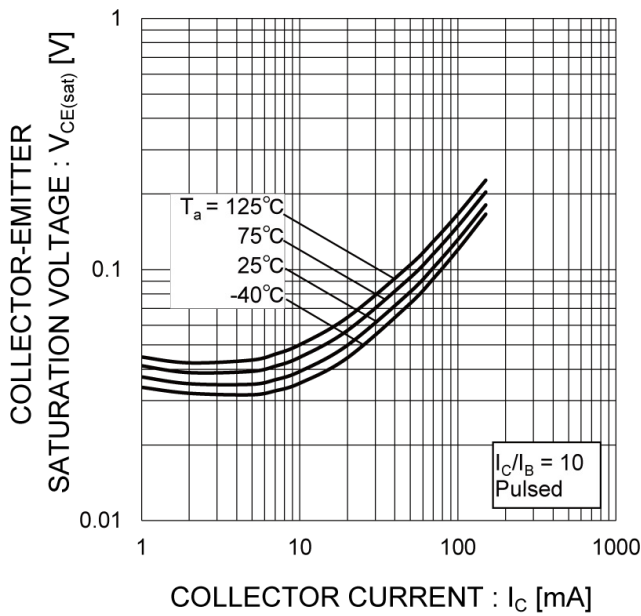


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

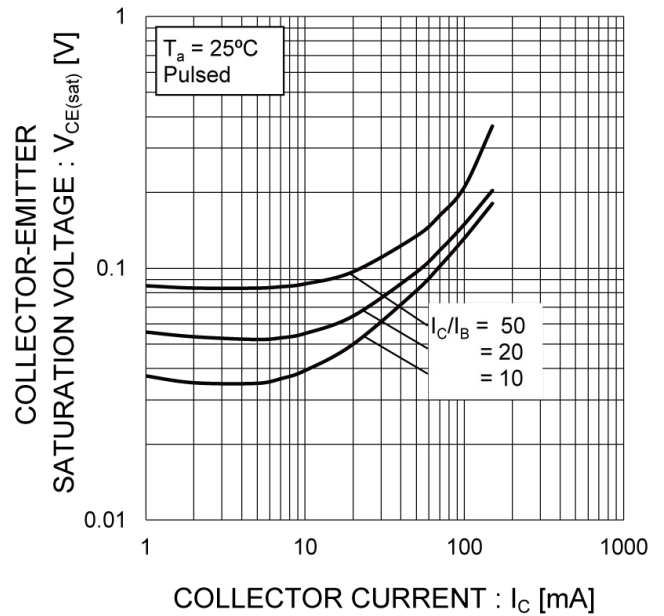


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current (I)

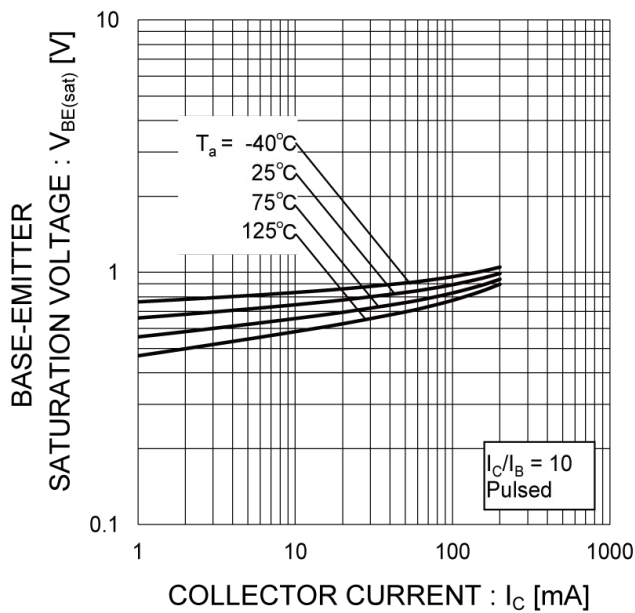
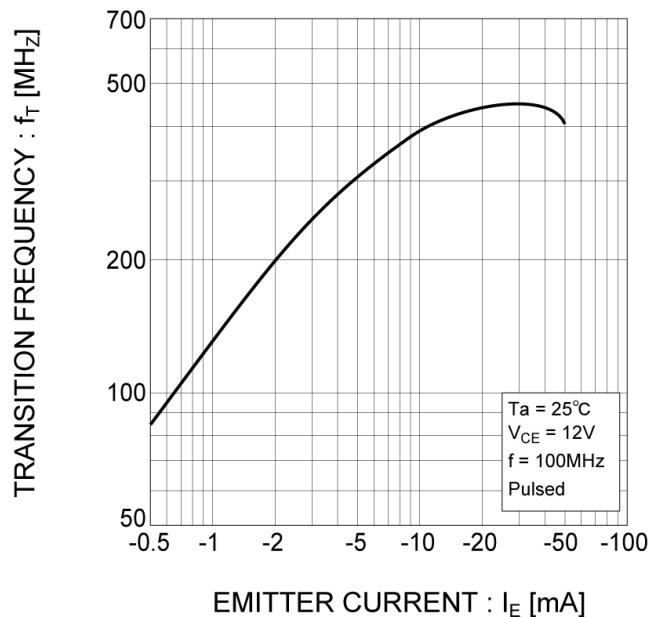


Fig.8 Gain Bandwidth Product vs. Emitter Current



● Electrical characteristic curves ( $T_a = 25^\circ\text{C}$ )

<For Tr1 and Tr2 in common>

Fig.9 Collector Output Capacitance vs. collector-Base Voltage  
Emitter Input Capacitance vs. Emitter-Base Voltage

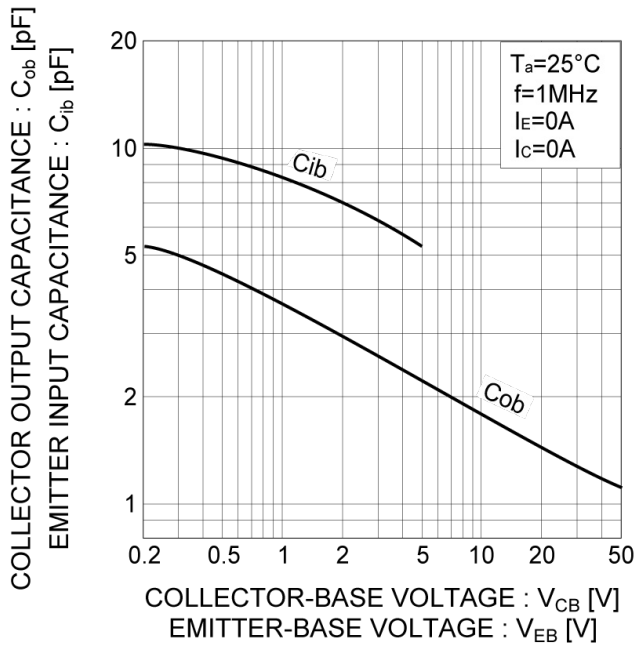


Fig.10 Safe Operating Area

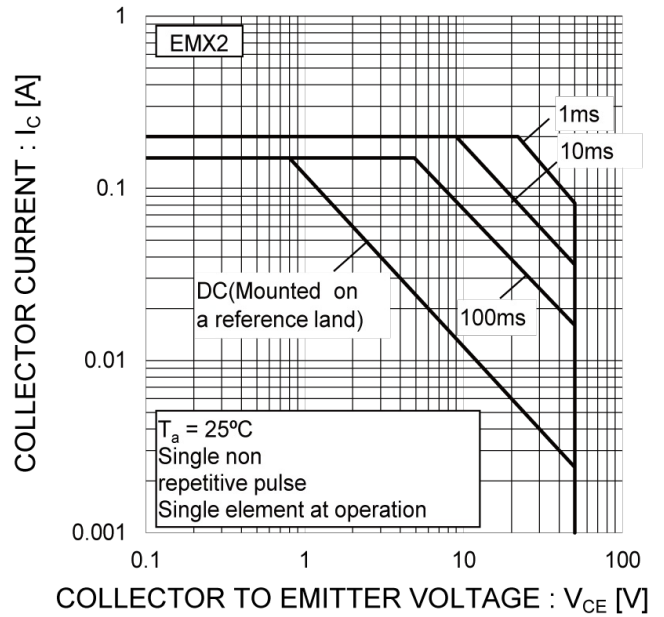


Fig.11 Safe Operating Area

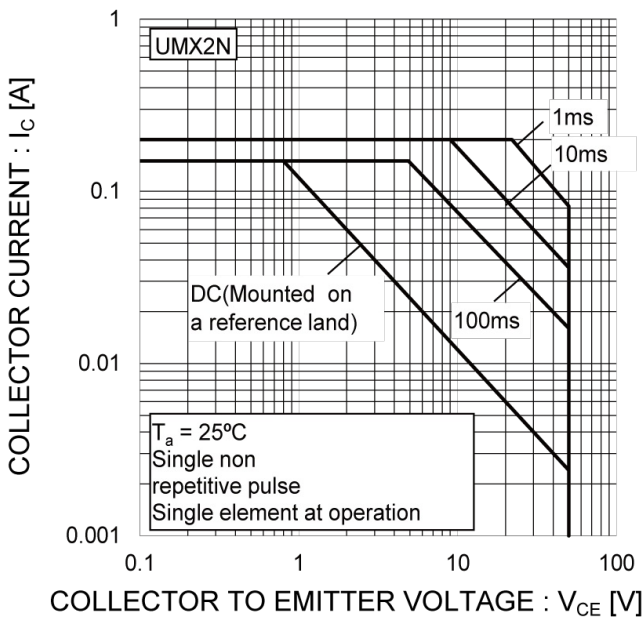
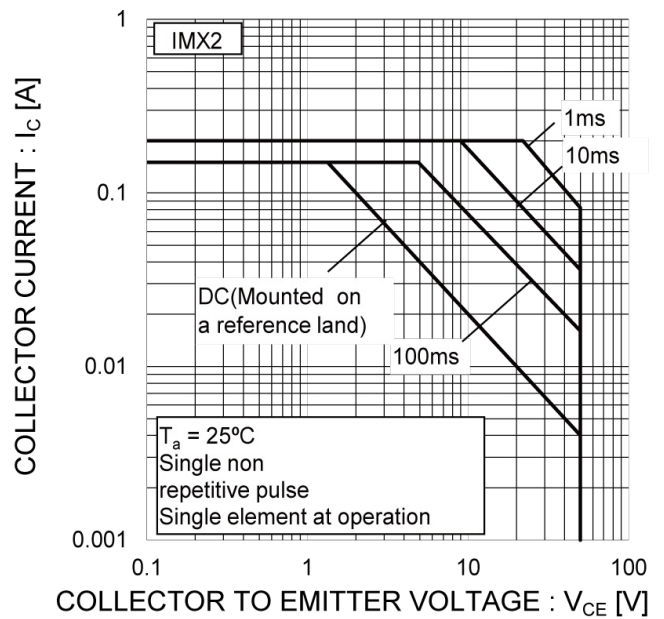
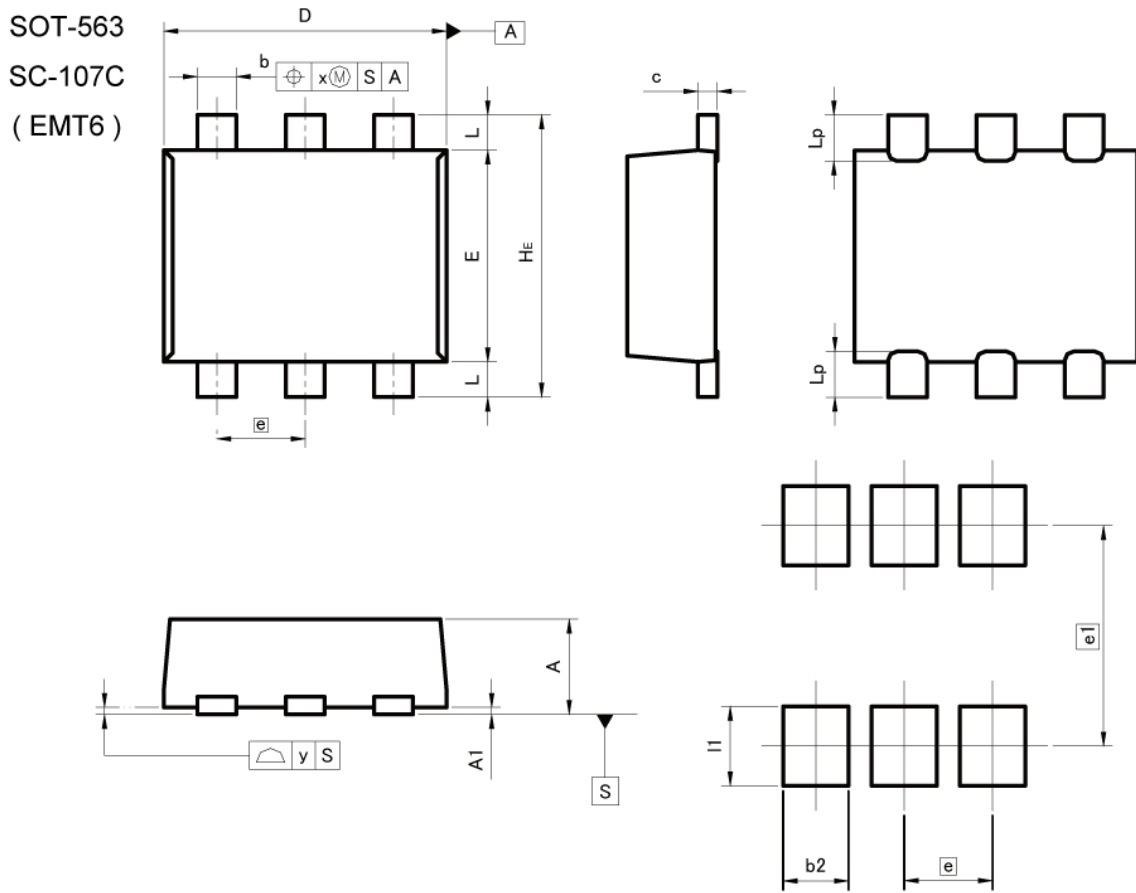


Fig.12 Safe Operating Area



●Dimensions



Pattern of terminal position areas  
[Not a pattern of soldering pads]

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.45       | 0.55 | 0.018  | 0.022 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| b   | 0.17       | 0.27 | 0.007  | 0.011 |
| c   | 0.08       | 0.18 | 0.003  | 0.007 |
| D   | 1.50       | 1.70 | 0.059  | 0.067 |
| E   | 1.10       | 1.30 | 0.043  | 0.051 |
| e   | 0.50       |      | 0.020  |       |
| HE  | 1.50       | 1.70 | 0.059  | 0.067 |
| L   | 0.10       | 0.30 | 0.004  | 0.012 |
| Lp  | -          | 0.35 | -      | 0.014 |
| x   | -          | 0.10 | -      | 0.004 |
| y   | -          | 0.10 | -      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | -          | 0.37 | -      | 0.015 |
| e1  | 1.25       |      | 0.049  |       |
| I1  | -          | 0.45 | -      | 0.018 |

Dimension in mm/inches

●Dimensions



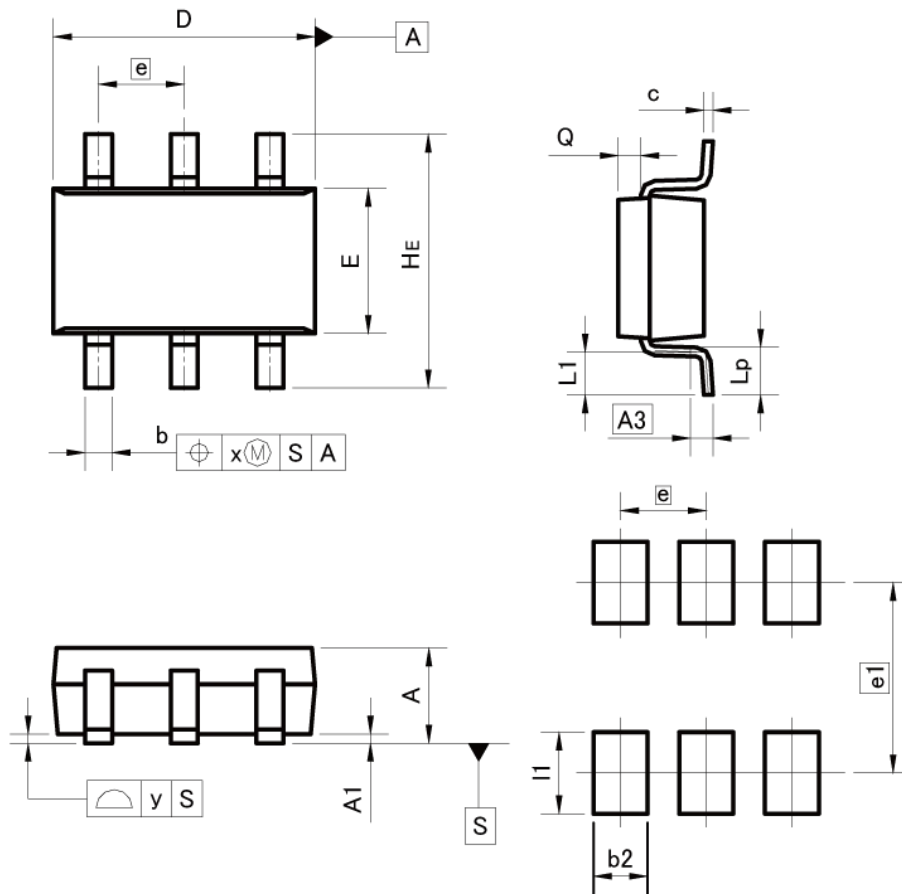
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.80       | 1.00 | 0.031  | 0.039 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A3  | 0.25       |      | 0.010  |       |
| b   | 0.15       | 0.30 | 0.006  | 0.012 |
| c   | 0.10       | 0.20 | 0.004  | 0.008 |
| D   | 1.90       | 2.10 | 0.075  | 0.083 |
| E   | 1.15       | 1.35 | 0.045  | 0.053 |
| e   | 0.65       |      | 0.026  |       |
| HE  | 2.00       | 2.20 | 0.079  | 0.087 |
| L1  | 0.20       | 0.50 | 0.008  | 0.020 |
| Lp  | 0.25       | 0.55 | 0.010  | 0.022 |
| Q   | 0.10       | 0.30 | 0.004  | 0.012 |
| x   | -          | 0.10 | -      | 0.004 |
| y   | -          | 0.10 | -      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | -          | 0.40 | -      | 0.016 |
| e1  | 1.55       |      | 0.061  |       |
| l1  | -          | 0.65 | -      | 0.026 |

Dimension in mm/inches

●Dimensions

SOT-457  
 SC-74  
 (SMT6)



Pattern of terminal position areas  
 [Not a pattern of soldering pads]

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 1.00       | 1.30 | 0.039  | 0.051 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A3  | 0.25       |      | 0.010  |       |
| b   | 0.25       | 0.40 | 0.010  | 0.016 |
| c   | 0.09       | 0.25 | 0.004  | 0.010 |
| D   | 2.80       | 3.00 | 0.110  | 0.118 |
| E   | 1.50       | 1.80 | 0.059  | 0.071 |
| e   | 0.95       |      | 0.037  |       |
| HE  | 2.60       | 3.00 | 0.102  | 0.118 |
| L1  | 0.30       | 0.60 | 0.012  | 0.024 |
| Lp  | 0.40       | 0.70 | 0.016  | 0.028 |
| Q   | 0.20       | 0.30 | 0.008  | 0.012 |
| x   | -          | 0.20 | -      | 0.008 |
| y   | -          | 0.10 | -      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | -          | 0.60 | -      | 0.024 |
| e1  | 2.10       |      | 0.083  |       |
| I1  | -          | 0.90 | -      | 0.035 |

Dimension in mm/inches



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