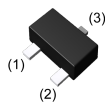
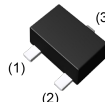


| Parameter | Value |
|-----------|-------|
| $V_{CEO}$ | 30V   |
| $I_C$     | 0.5A  |

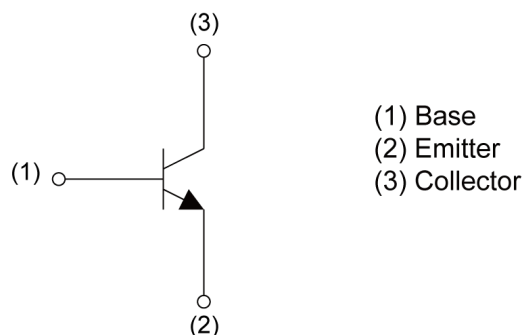
## ●Outline

|                                                                                                                                            |                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EMT3F</b><br><br><b>2SCR502EB</b><br><b>SOT-416FL</b> | <b>UMT3F</b><br><br><b>2SCR502UB</b><br><b>SOT-323FL</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|

## ●Features

- 1)General purpose.
- 2)Complementary PNP types :  
2SAR502EB(EMT3F)/2SAR502UB(UMT3F)
- 3)Collector current is large.
- 4)Low  $V_{CE(sat)}$ .

## ●Inner circuit



## ●Application

LOW FREQUENCY AMPLIFIER

## ●Packaging specifications

| Part No.  | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|-----------|---------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| 2SCR502EB | EMT3F   | 1616         | TL          | 180            | 8               | 3000                      | LW      |
| 2SCR502UB | UMT3F   | 2021         | TL          | 180            | 8               | 3000                      | LW      |

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

| Parameter                    |           | Symbol                        | Values      | Unit |
|------------------------------|-----------|-------------------------------|-------------|------|
| Collector-base voltage       |           | V <sub>CBO</sub>              | 30          | V    |
| Collector-emitter voltage    |           | V <sub>CEO</sub>              | 30          | V    |
| Emitter-base voltage         |           | V <sub>EBO</sub>              | 6           | V    |
| Collector current            |           | I <sub>C</sub> <sup>*1</sup>  | 0.5         | A    |
|                              |           | I <sub>CP</sub> <sup>*2</sup> | 1           | A    |
| Base current                 |           | I <sub>B</sub>                | 0.15        | A    |
| Power dissipation            | 2SCR502EB | P <sub>D</sub> <sup>*3</sup>  | 150         | mW   |
|                              | 2SCR502UB |                               | 200         |      |
| Junction temperature         |           | T <sub>j</sub>                | 150         | °C   |
| Range of storage temperature |           | T <sub>stg</sub>              | -55 to +150 | °C   |

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

| Parameter                            | Symbol             | Conditions                                                    | Values |      |      | Unit |
|--------------------------------------|--------------------|---------------------------------------------------------------|--------|------|------|------|
|                                      |                    |                                                               | Min.   | Typ. | Max. |      |
| Collector-base breakdown voltage     | $BV_{CBO}$         | $I_C = 100\mu\text{A}$                                        | 30     | -    | -    | V    |
| Collector-emitter breakdown voltage  | $BV_{CEO}$         | $I_C = 1\text{mA}$                                            | 30     | -    | -    | V    |
| Emitter-base breakdown voltage       | $BV_{EBO}$         | $I_E = 100\mu\text{A}$                                        | 6      | -    | -    | V    |
| Collector cut-off current            | $I_{CBO}$          | $V_{CB} = 25\text{V}$                                         | -      | -    | 200  | nA   |
| Emitter cut-off current              | $I_{EBO}$          | $V_{EB} = 4\text{V}$                                          | -      | -    | 200  | nA   |
| Collector-emitter saturation voltage | $V_{CE(sat)}^{*4}$ | $I_C = 200\text{mA}, I_B = 10\text{mA}$                       | -      | 100  | 300  | mV   |
| DC current gain                      | $h_{FE}$           | $V_{CE} = 2\text{V}, I_C = 100\text{mA}$                      | 200    | -    | 500  | -    |
| Transition frequency                 | $f_T^{*4}$         | $V_{CE} = 10\text{V}, I_E = -100\text{mA}, f = 100\text{MHz}$ | -      | 360  | -    | MHz  |
| Output capacitance                   | $C_{ob}$           | $V_{CB} = 10\text{V}, I_E = 0\text{A}, f = 1\text{MHz}$       | -      | 3    | -    | pF   |

\*1 Limited by power dissipation.

\*2  $P_w=10\text{ms}$ , Single pulse.

\*3 Each terminal mounted on a reference land.

\*4 Pulsed

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

Fig.1 Grounded Emitter Propagation Characteristics

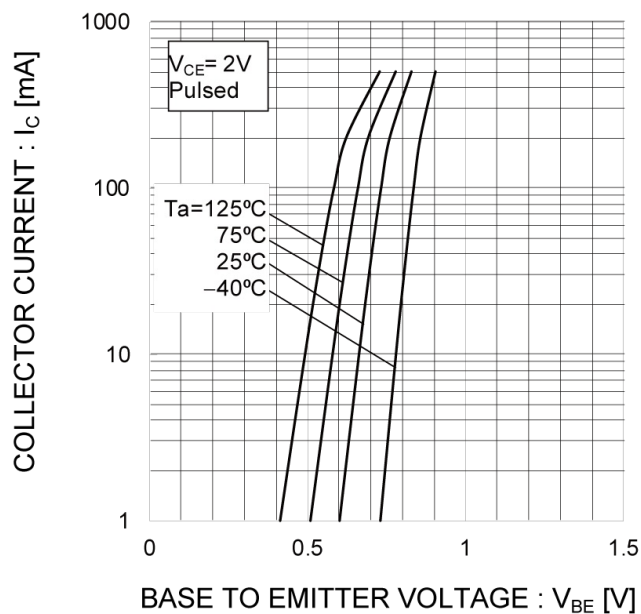


Fig.2 Typical Output Characteristics

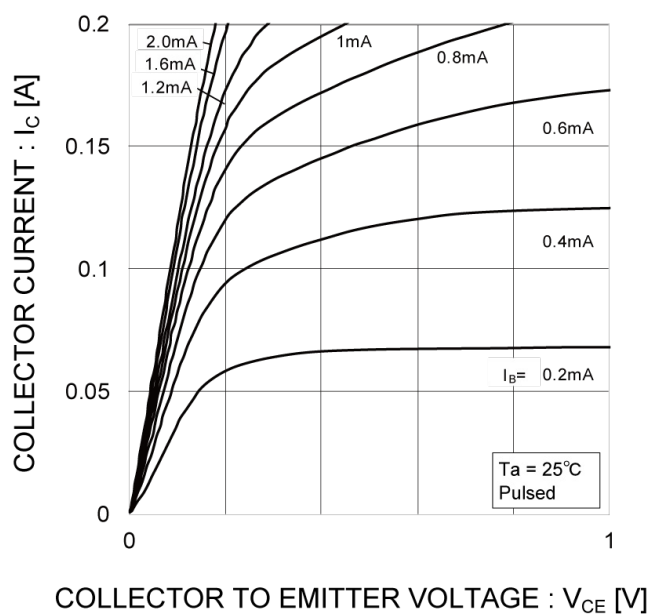


Fig.3 DC Current Gain vs. Collector Current(I)

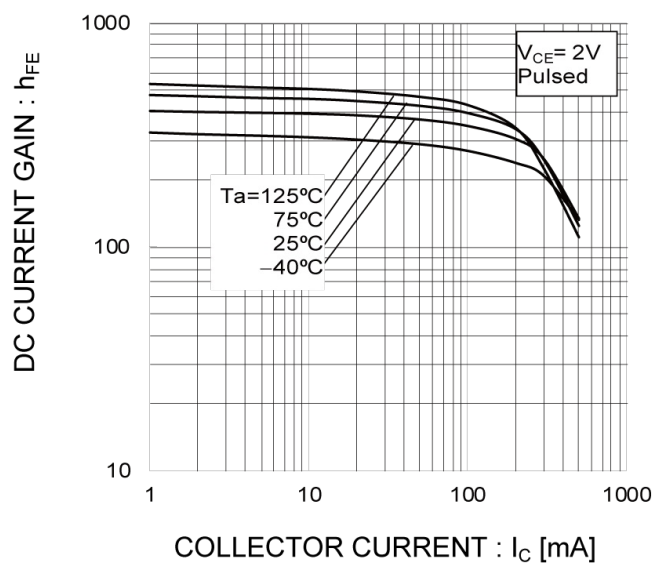
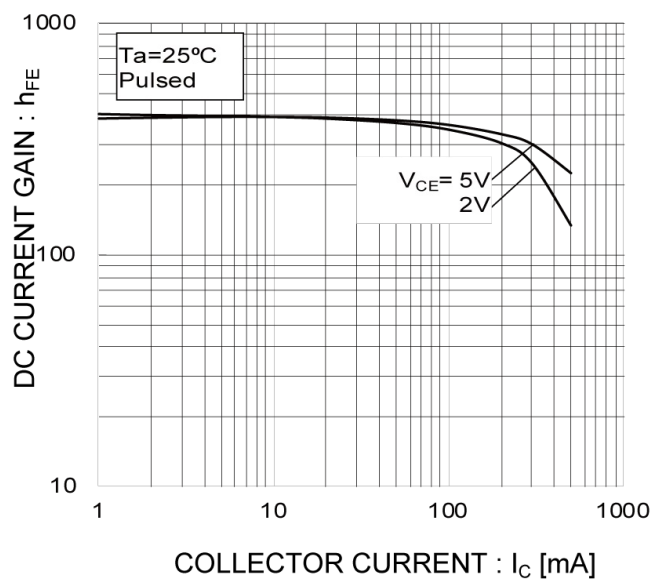


Fig.4 DC Current Gain vs. Collector Current(II)



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

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

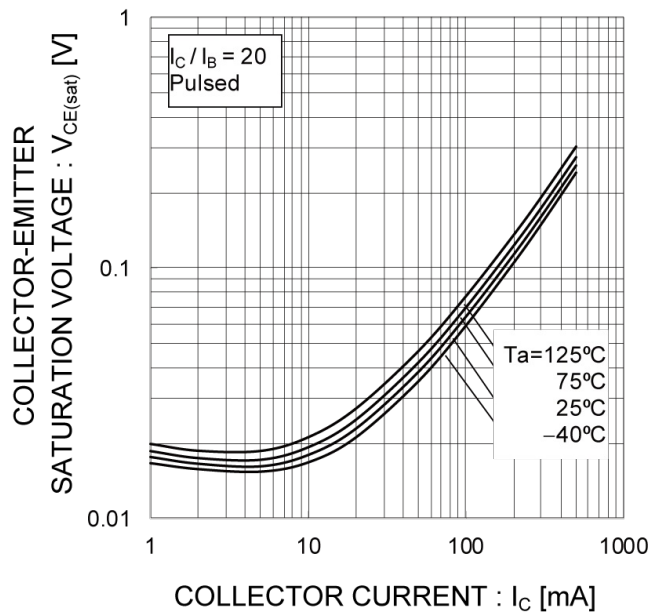


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current(II)

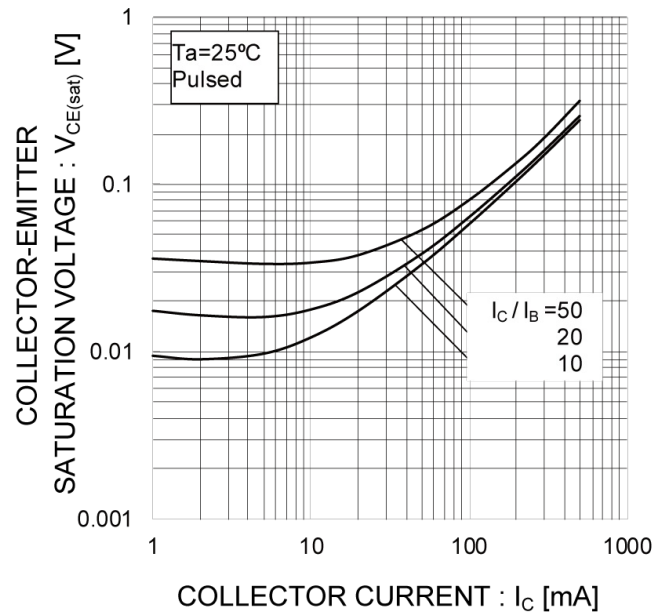


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

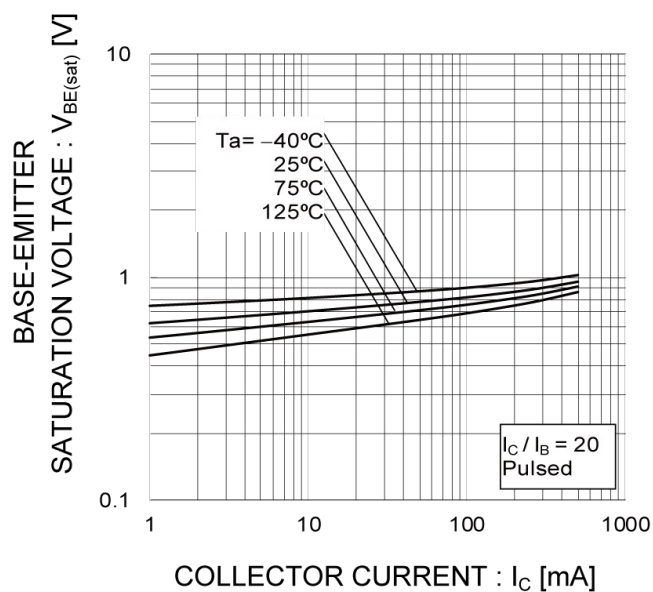
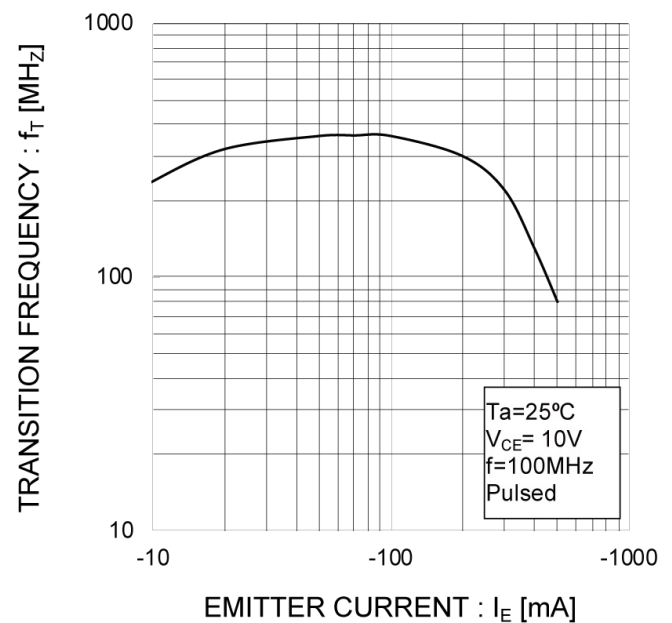


Fig.8 Gain Bandwidth Product vs. Emitter Current



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

Fig.9 Emitter input capacitance vs.  
Emitter-Base Voltage Collector output  
capacitance vs. Collector-Base Voltage

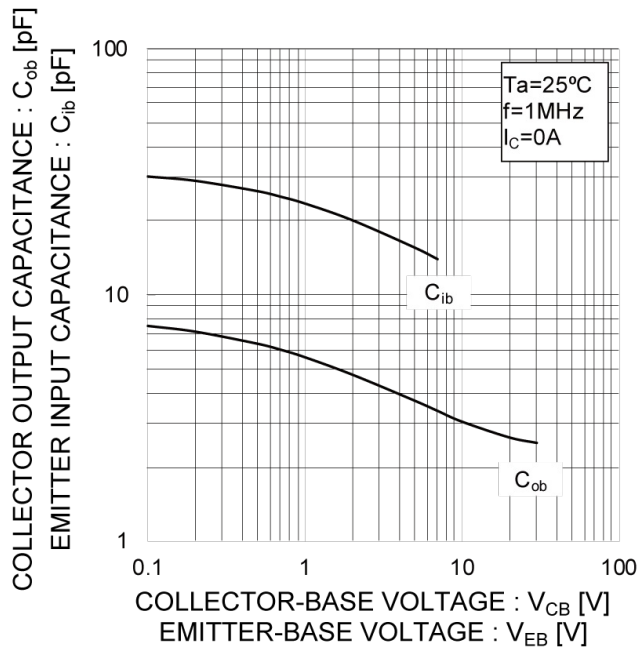


Fig.10 Safe Operating Area

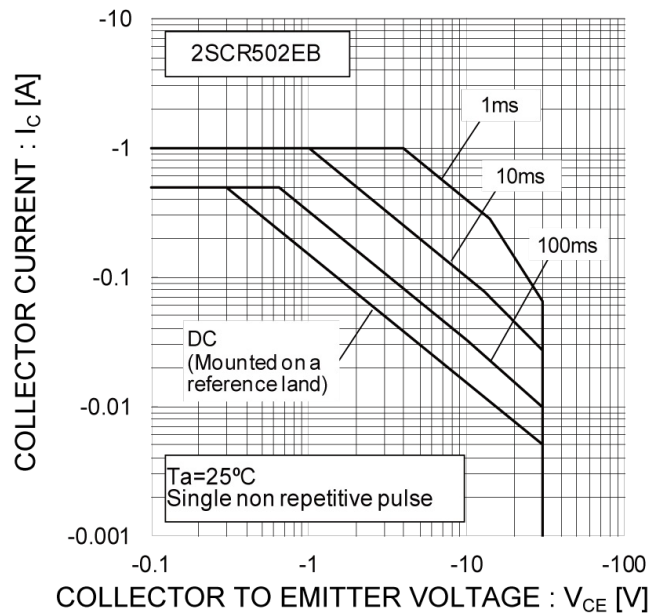
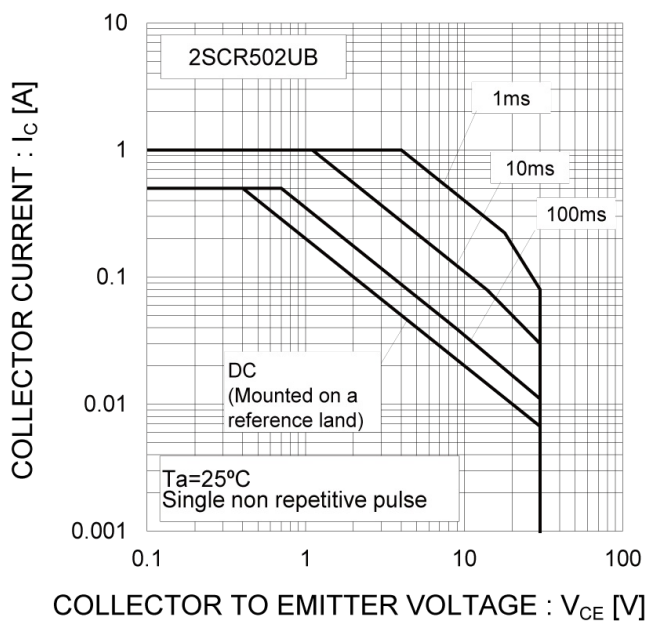
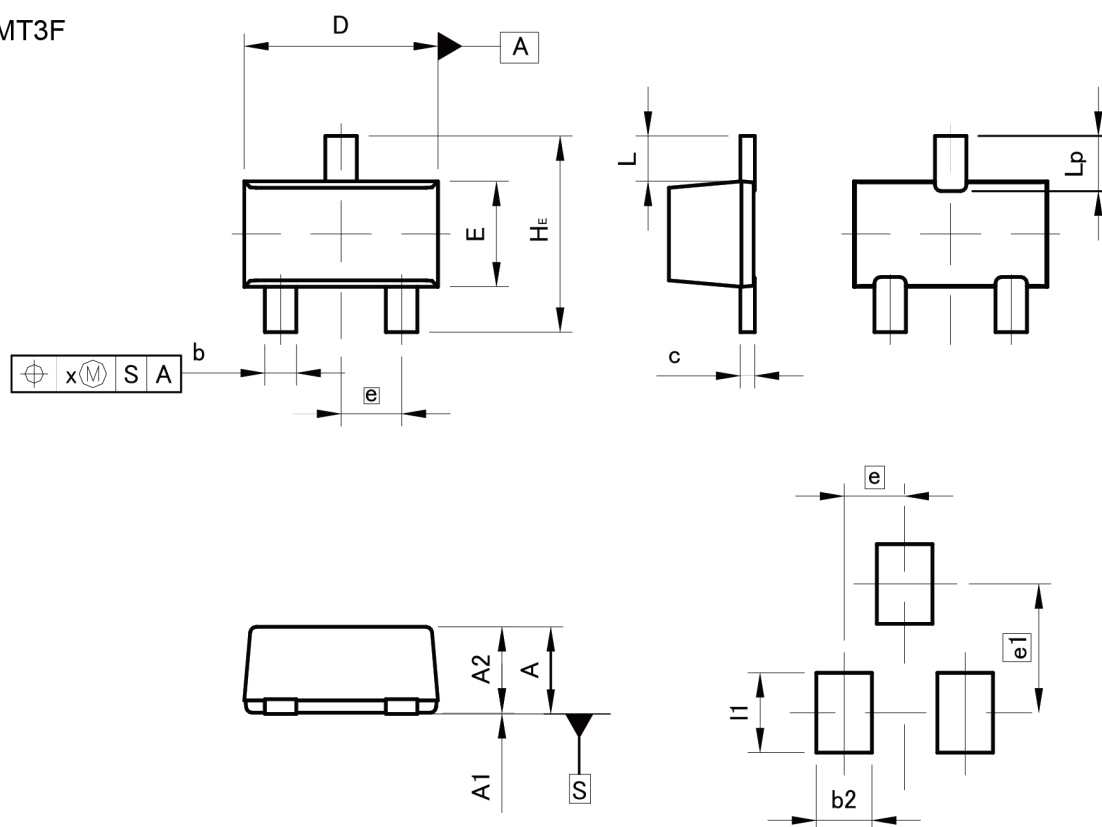


Fig.11 Safe Operating Area



## ●Dimensions

EMT3F



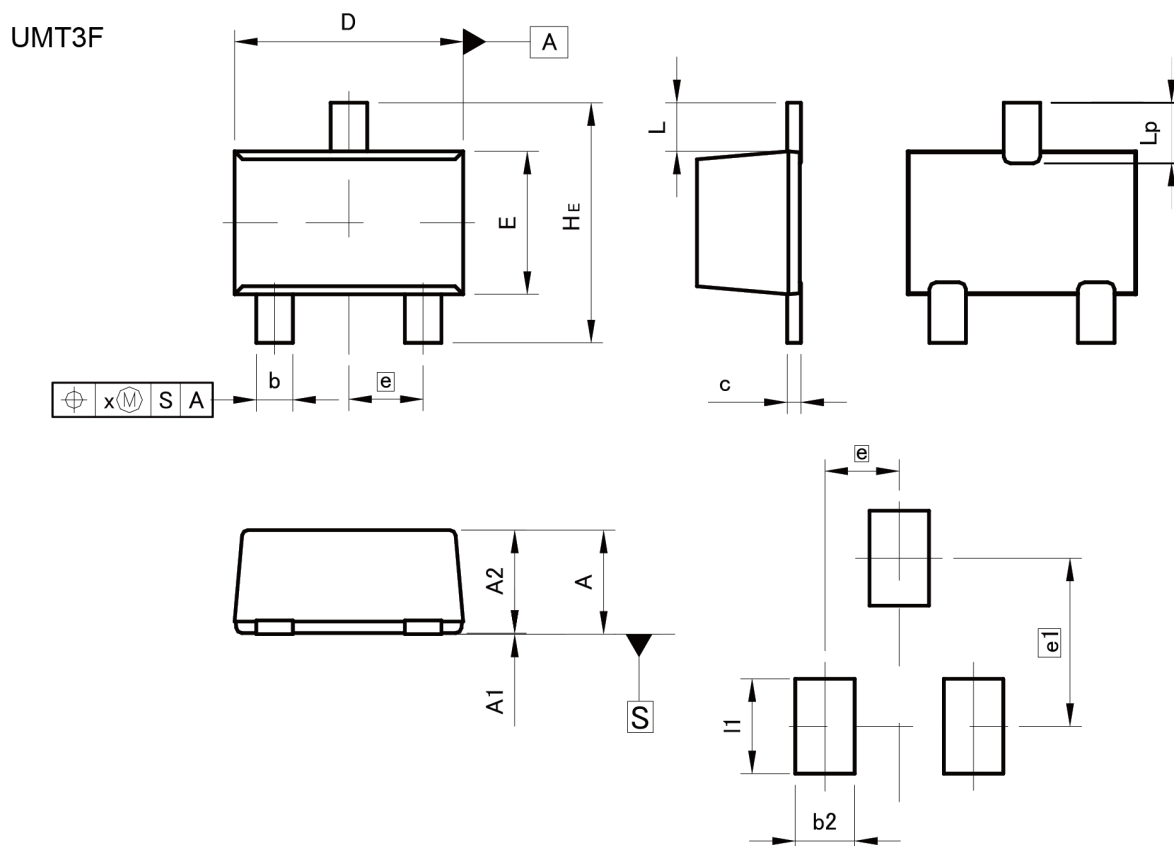
Pattern of terminal position areas  
[Not a recommended pattern of soldering pads]

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.65       | 0.85 | 0.026  | 0.033 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A2  | 0.60       | 0.80 | 0.024  | 0.031 |
| b   | 0.21       | 0.36 | 0.008  | 0.014 |
| c   | 0.08       | 0.18 | 0.003  | 0.007 |
| D   | 1.50       | 1.70 | 0.059  | 0.067 |
| E   | 0.76       | 0.96 | 0.030  | 0.038 |
| e   | 0.50       |      | 0.020  |       |
| HE  | 1.50       | 1.70 | 0.059  | 0.067 |
| L   | 0.37       |      | 0.015  |       |
| Lp  | 0.35       | 0.55 | 0.014  | 0.022 |
| x   | —          | 0.10 | —      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.46 | —      | 0.018 |
| e1  | —          | 1.05 | —      | 0.041 |
| l1  | —          | 0.65 | —      | 0.026 |

Dimension in mm/inches

## ●Dimensions



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

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.85       | 1.05 | 0.033  | 0.041 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A2  | 0.80       | 1.00 | 0.031  | 0.039 |
| b   | 0.27       | 0.42 | 0.011  | 0.017 |
| c   | 0.08       | 0.18 | 0.003  | 0.007 |
| 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 |
| L   | 0.43       |      | 0.017  |       |
| Lp  | 0.43       | 0.63 | 0.017  | 0.025 |
| x   | —          | 0.10 | —      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.52 | —      | 0.020 |
| e1  | 1.47       |      | 0.058  |       |
| l1  | —          | 0.83 | —      | 0.033 |

Dimension in mm/inches

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