

| Parameter | Value        |
|-----------|--------------|
| $V_{CEO}$ | -50V         |
| $I_C$     | -100mA       |
| $R_1$     | 10k $\Omega$ |

## ●Features

- 1) Built-In Biasing Resistor
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit) .
- 3) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of completely eliminating parasitic effects.
- 4) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 5) Complementary NPN Types: DTC114T series
- 6) Complex transistors: EMB4/ UMB4N/ EMA4/ UMA4N/ FMA4A (PNP type)
- 7) Lead Free/RoHS Compliant.

## ●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

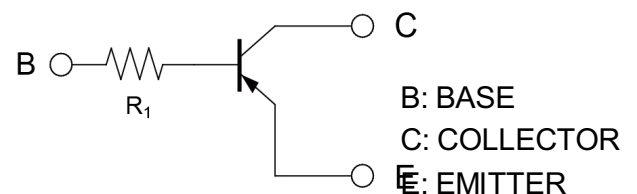
## ●Packaging specifications

| Part No.  | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|-----------|---------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| DTA114TM  | VMT3    | 1212         | T2L         | 180            | 8               | 8000                      | 94      |
| DTA114TEB | EMT3F   | 1616         | TL          | 180            | 8               | 3000                      | 94      |
| DTA114TE  | EMT3    | 1616         | TL          | 180            | 8               | 3000                      | 94      |
| DTA114TUB | UMT3F   | 2021         | TL          | 180            | 8               | 3000                      | 94      |
| DTA114TUA | UMT3    | 2021         | T106        | 180            | 8               | 3000                      | 94      |
| DTA114TKA | SMT3    | 2928         | T146        | 180            | 8               | 3000                      | 94      |

## ●Outline

|                                                 |                                                 |
|-------------------------------------------------|-------------------------------------------------|
| <p>VMT3</p> <p>DTA114TM<br/>(SC-105AA)</p>      | <p>EMT3F</p> <p>DTA114TEB<br/>(SC-89)</p>       |
| <p>EMT3</p> <p>DTA114TE<br/>SOT-416(SC-75A)</p> | <p>UMT3F</p> <p>DTA114TUB<br/>(SC-85)</p>       |
| <p>UMT3</p> <p>DTA114TUA<br/>SOT-323(SC-70)</p> | <p>SMT3</p> <p>DTA114TKA<br/>SOT-346(SC-59)</p> |

## ●Inner circuit



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

| Parameter                    |           | Symbol              | Values      | Unit             |
|------------------------------|-----------|---------------------|-------------|------------------|
| Collector-base voltage       |           | $V_{\text{CBO}}$    | -50         | V                |
| Collector-emitter voltage    |           | $V_{\text{CEO}}$    | -50         | V                |
| Emitter-base voltage         |           | $V_{\text{EBO}}$    | -5          | V                |
| Collector current            |           | $I_{\text{C}}$      | -100        | mA               |
| Power dissipation            | DTA114TM  | $P_{\text{D}}^{*1}$ | 150         | mW               |
|                              | DTA114TEB |                     | 150         |                  |
|                              | DTA114TE  |                     | 150         |                  |
|                              | DTA114TUB |                     | 200         |                  |
|                              | DTA114TUA |                     | 200         |                  |
|                              | DTA114TKA |                     | 200         |                  |
| Junction temperature         |           | $T_{\text{j}}$      | 150         | $^\circ\text{C}$ |
| Range of storage temperature |           | $T_{\text{stg}}$    | -55 to +150 | $^\circ\text{C}$ |

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

| Parameter                            | Symbol               | Conditions                                                                       | Values |      |      | Unit          |
|--------------------------------------|----------------------|----------------------------------------------------------------------------------|--------|------|------|---------------|
|                                      |                      |                                                                                  | Min.   | Typ. | Max. |               |
| Collector-base breakdown voltage     | $BV_{\text{CBO}}$    | $I_{\text{C}} = -50\mu\text{A}$                                                  | -50    | -    | -    | V             |
| Collector-emitter breakdown voltage  | $BV_{\text{CEO}}$    | $I_{\text{C}} = -1\text{mA}$                                                     | -50    | -    | -    | V             |
| Emitter-base breakdown voltage       | $BV_{\text{EBO}}$    | $I_{\text{E}} = -50\mu\text{A}$                                                  | -5     | -    | -    | V             |
| Collector cut-off current            | $I_{\text{CBO}}$     | $V_{\text{CB}} = -50\text{V}$                                                    | -      | -    | -0.5 | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{\text{EBO}}$     | $V_{\text{EB}} = -4\text{V}$                                                     | -      | -    | -0.5 | $\mu\text{A}$ |
| Collector-emitter saturation voltage | $V_{\text{CE(sat)}}$ | $I_{\text{C}} / I_{\text{B}} = -10\text{mA} / -1\text{mA}$                       | -      | -    | -0.3 | V             |
| DC current gain                      | $h_{\text{FE}}$      | $V_{\text{CE}} = -5\text{V}, I_{\text{C}} = -1\text{mA}$                         | 100    | 250  | 600  | -             |
| Input resistance                     | $R_{\text{i}}$       | -                                                                                | 7      | 10   | 13   | k $\Omega$    |
| Transition frequency                 | $f_{\text{T}}^{*2}$  | $V_{\text{CE}} = -10\text{V}, I_{\text{E}} = 5\text{mA},$<br>$f = 100\text{MHz}$ | -      | 250  | -    | MHz           |

\*1 Each terminal mounted on a reference footprint

\*2 Characteristics of built-in transistor

●Electrical characteristic curves(Ta=25°C)

Fig.1 Grounded emitter propagation characteristics

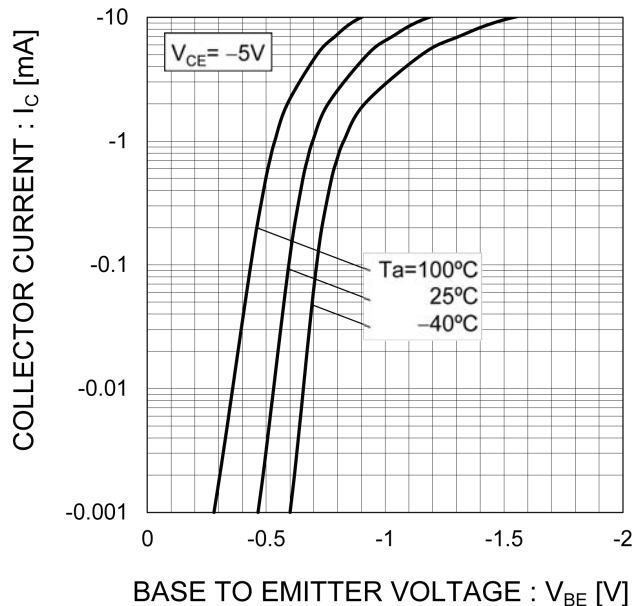


Fig.2 Grounded emitter output characteristics

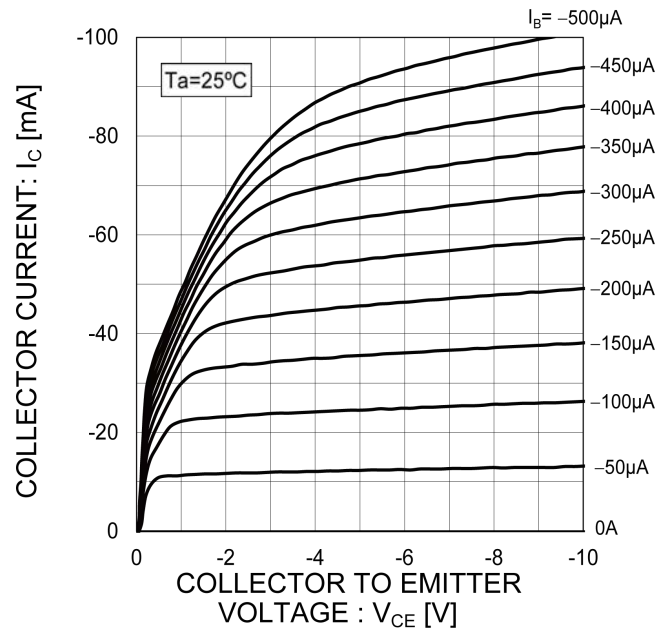


Fig.3 DC Current gain vs. Collector Current

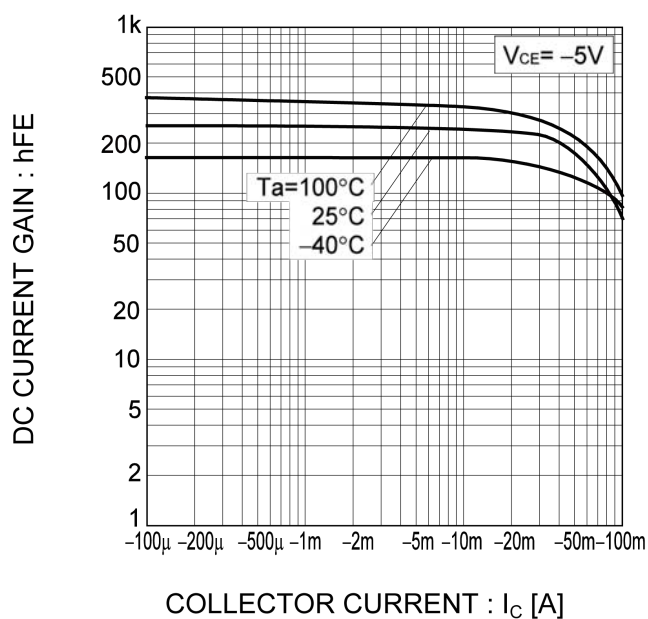
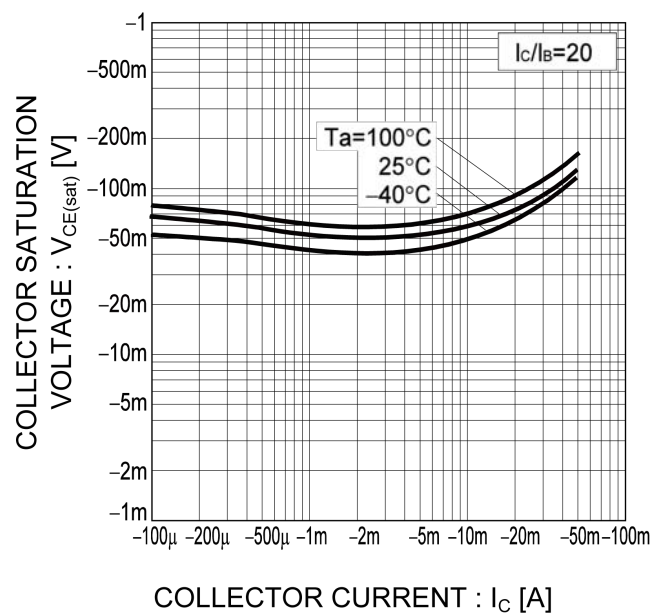
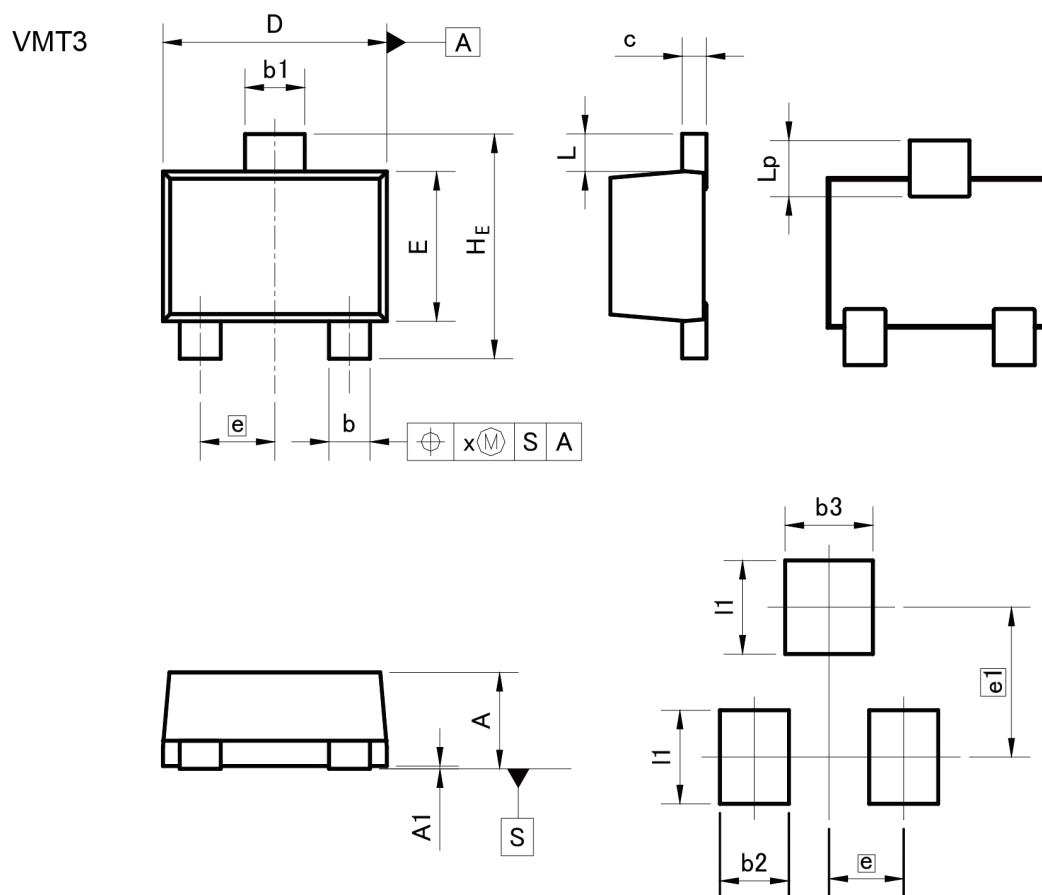


Fig.4 Collector-emitter saturation voltage vs. Collector Current



## ●Dimensions



Pattern of terminal position areas  
[Not a recommended 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 |
| b1  | 0.27       | 0.37 | 0.011  | 0.015 |
| c   | 0.08       | 0.18 | 0.003  | 0.007 |
| D   | 1.10       | 1.30 | 0.043  | 0.051 |
| E   | 0.70       | 0.90 | 0.028  | 0.035 |
| e   | 0.40       |      | 0.02   |       |
| HE  | 1.10       | 1.30 | 0.043  | 0.051 |
| L   | 0.10       | 0.30 | 0.004  | 0.012 |
| Lp  | 0.20       | 0.40 | 0.008  | 0.016 |
| x   | —          | 0.10 | —      | 0.004 |

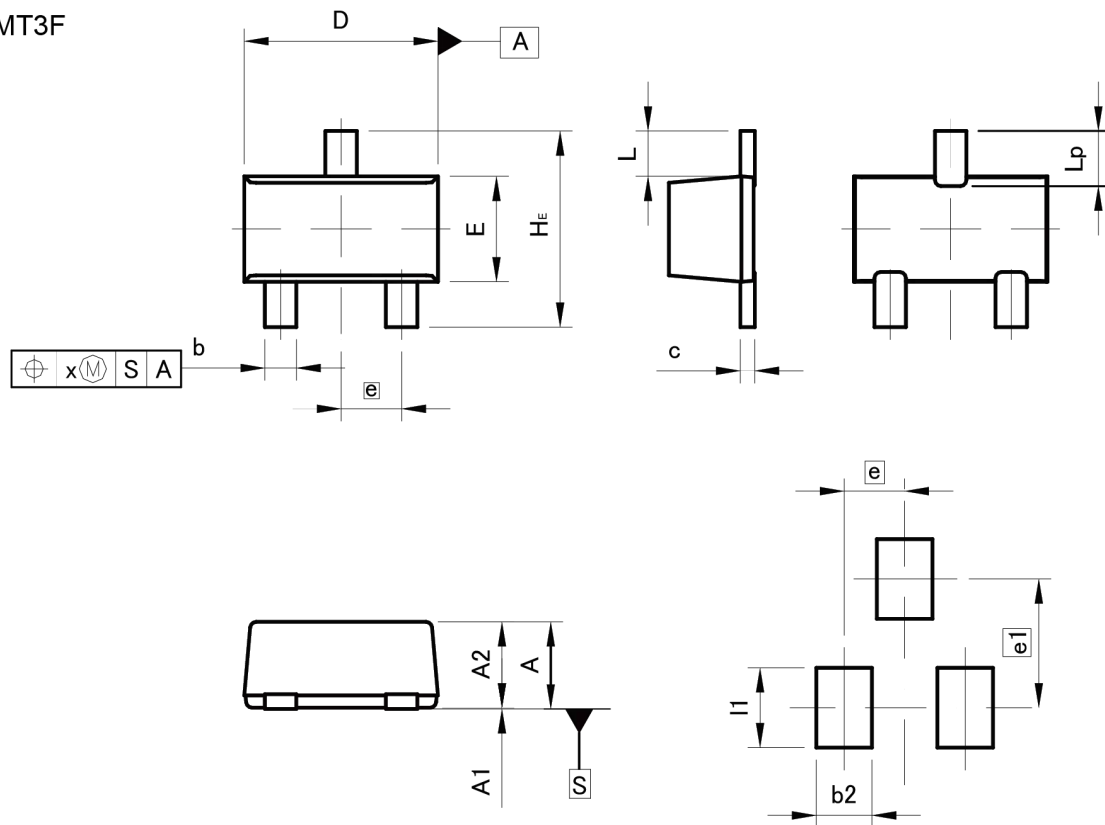
  

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.37 | —      | 0.015 |
| b3  | —          | 0.47 | —      | 0.019 |
| e1  | 0.80       |      | 0.031  |       |
| l1  | —          | 0.50 | —      | 0.020 |

Dimension in mm/inches

## ●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 |

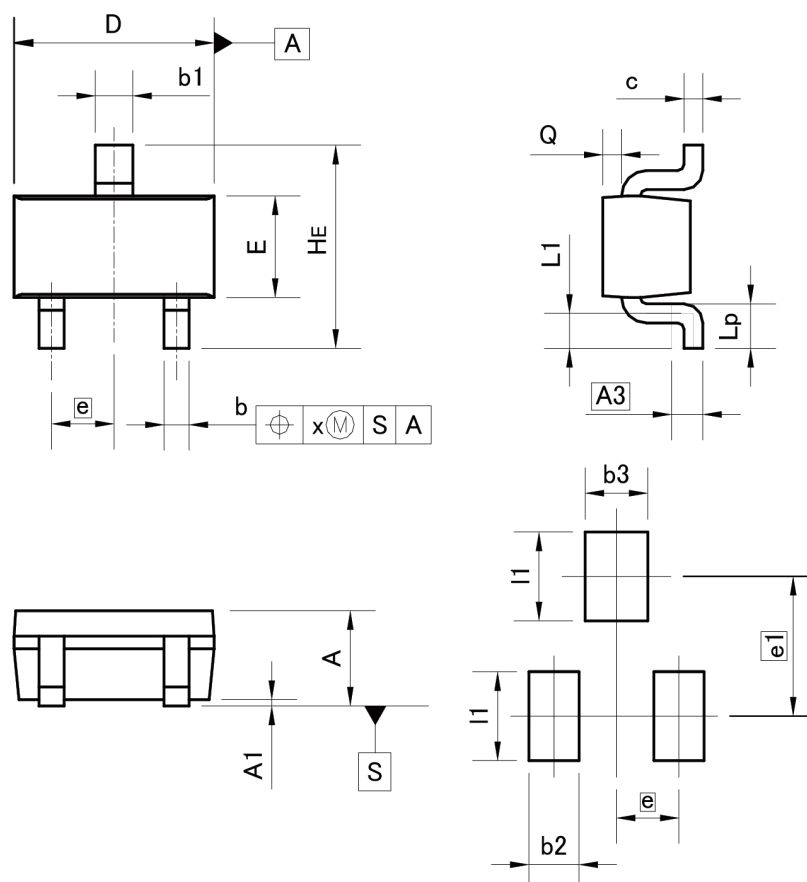
  

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.46 | —      | 0.018 |
| e1  | —          | 1.05 | —      | 0.041 |
| l1  | —          | 0.65 | —      | 0.026 |

Dimension in mm/inches

## ●Dimensions

EMT3



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

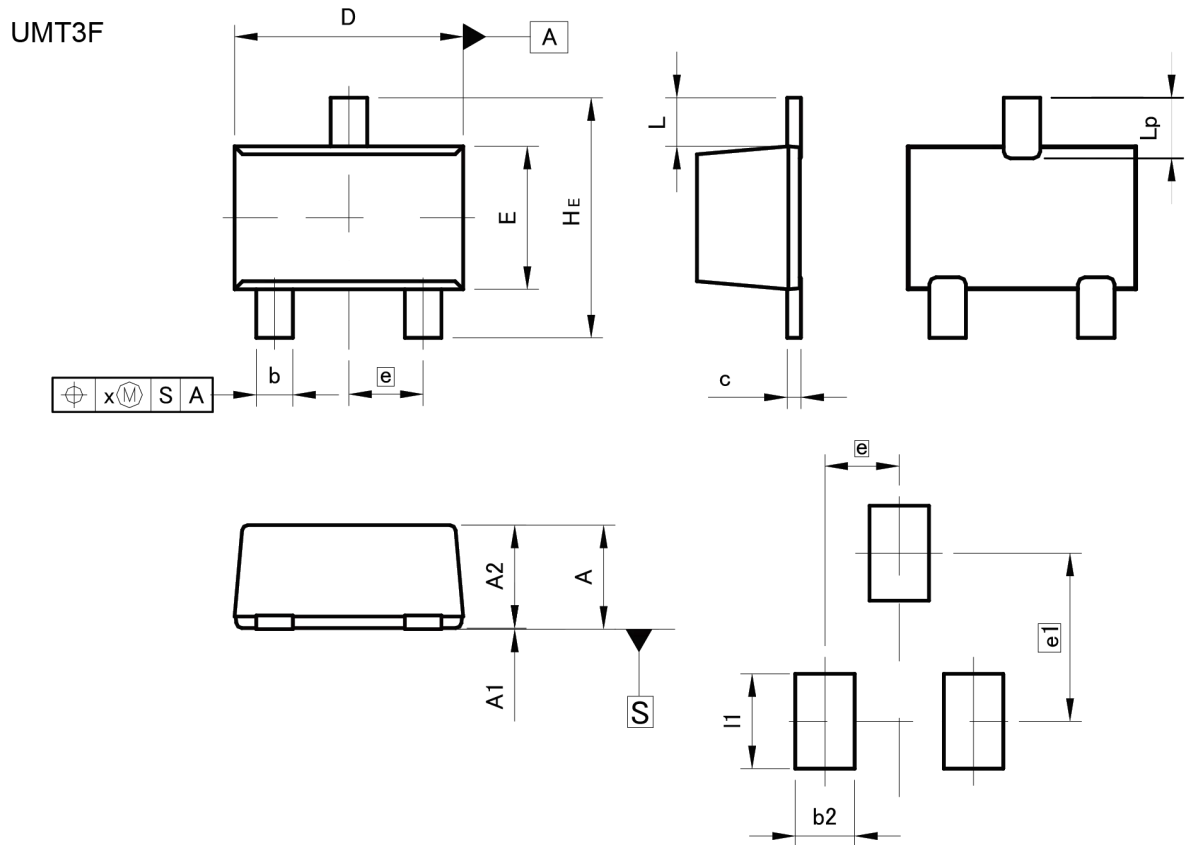
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.60       | 0.80 | 0.024  | 0.031 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A3  | 0.25       |      | 0.010  |       |
| b   | 0.15       | 0.30 | 0.006  | 0.012 |
| b1  | 0.25       | 0.40 | 0.010  | 0.016 |
| c   | 0.10       | 0.20 | 0.004  | 0.008 |
| D   | 1.50       | 1.70 | 0.059  | 0.067 |
| E   | 0.70       | 0.90 | 0.028  | 0.035 |
| e   | 0.50       |      | 0.020  |       |
| HE  | 1.40       | 1.80 | 0.055  | 0.071 |
| L1  | 0.10       | —    | 0.004  | —     |
| Lp  | 0.15       | —    | 0.006  | —     |
| Q   | 0.05       | 0.25 | 0.002  | 0.010 |
| x   | —          | 0.10 | —      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.40 | —      | 0.016 |
| b3  | —          | 0.50 | —      | 0.020 |
| e1  | 1.10       |      | 0.043  |       |
| l1  | —          | 0.70 | —      | 0.028 |

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 |

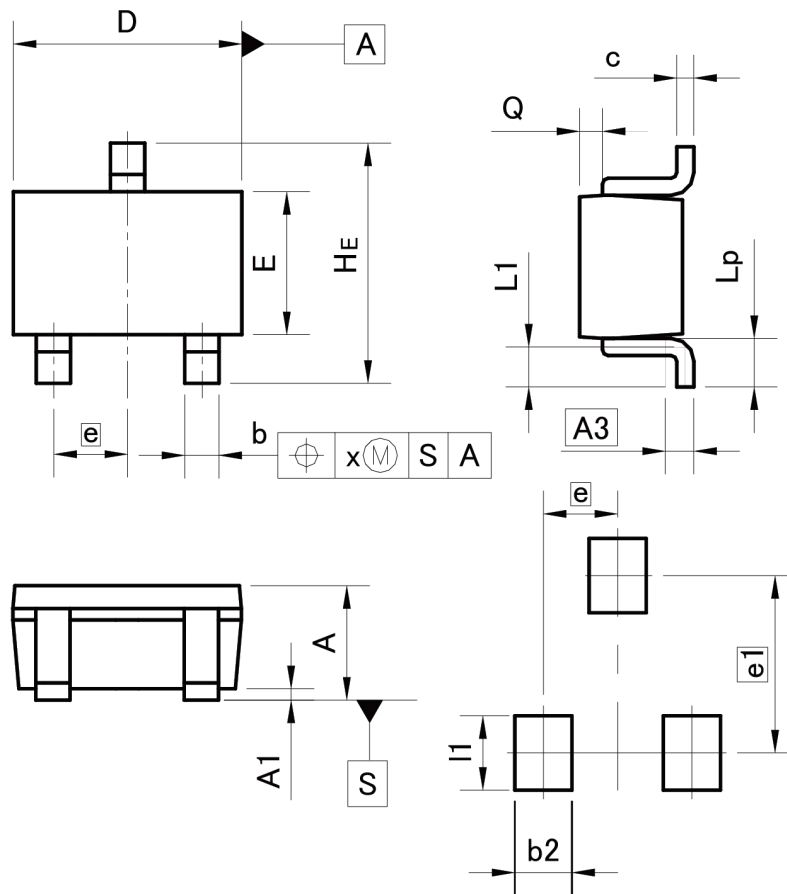
  

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.52 | —      | 0.020 |
| e1  | 1.47       |      | 0.058  |       |
| l1  | —          | 0.83 | —      | 0.033 |

Dimension in mm/inches

## ●Dimensions

UMT3



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

| 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 |

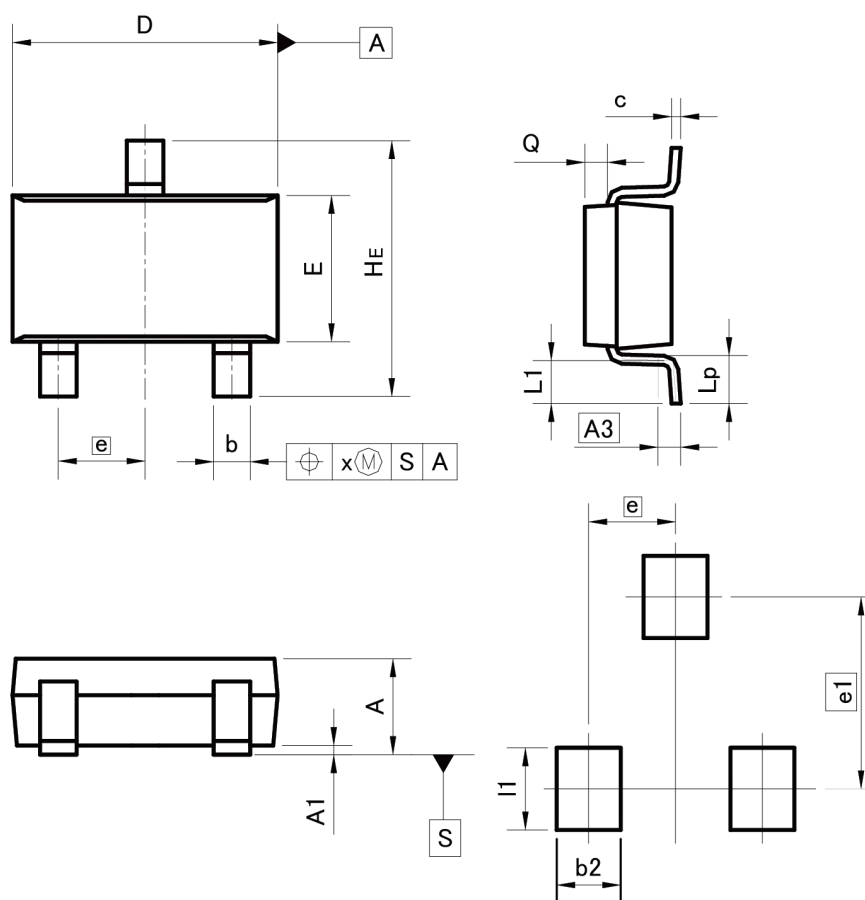
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.50 | —      | 0.020 |
| e1  | 1.55       |      | 0.061  |       |
| I1  | —          | 0.65 | —      | 0.026 |

Dimension in mm/inches



## ●Dimensions

SMT3



Pattern of terminal position areas  
[Not a recommended 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   | 0.35       | 0.50 | 0.014  | 0.020 |
| 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   | —          | 0.10 | —      | 0.004 |
| y   | —          | 0.10 | —      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | —          | 0.60 | —      | 0.024 |
| e1  | 2.10       |      | 0.083  |       |
| l1  | —          | 0.90 | —      | 0.035 |

Dimension in mm/inches

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