

| Parameter | Value        |
|-----------|--------------|
| $V_{CEO}$ | 50V          |
| $I_C$     | 100mA        |
| $R_1$     | 47k $\Omega$ |

### ●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 PNP Types: DTA144T series
- 6) Complex transistors: UMH14N/ IMH14A/ EMH15/ IMH15A (NPN type)
- 7) Lead Free/RoHS Compliant.

### ●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

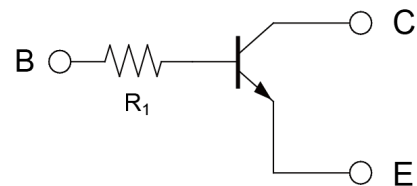
### ●Packaging specifications

| Part No.  | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|-----------|---------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| DTC144TM  | VMT3    | 1212         | T2L         | 180            | 8               | 8000                      | 06      |
| DTC144TE  | EMT3    | 1616         | TL          | 180            | 8               | 3000                      | 06      |
| DTC144TUA | UMT3    | 2021         | T106        | 180            | 8               | 3000                      | 06      |
| DTC144TKA | SMT3    | 2928         | T146        | 180            | 8               | 3000                      | 06      |

### ●Outline

|   |   |
|---|---|
| <p>VMT3</p> <p>DTC144TM<br/>(SC-105AA)</p>      | <p>EMT3</p> <p>DTC144TE<br/>SOT-416(SC-75A)</p> |
| <p>UMT3</p> <p>DTC144TUA<br/>SOT-323(SC-70)</p> | <p>SMT3</p> <p>DTC144TKA<br/>SOT-346(SC-59)</p> |

### ●Inner circuit



B: BASE  
C: COLLECTOR  
E: EMITTER

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

| Parameter                    |           | Symbol     | Values      | Unit             |
|------------------------------|-----------|------------|-------------|------------------|
| Collector-base voltage       |           | $V_{CBO}$  | 50          | V                |
| Collector-emitter voltage    |           | $V_{CEO}$  | 50          | V                |
| Emitter-base voltage         |           | $V_{EBO}$  | 5           | V                |
| Collector current            |           | $I_C$      | 100         | mA               |
| Power dissipation            | DTC144TM  | $P_D^{*1}$ | 150         | mW               |
|                              | DTC144TE  |            | 150         |                  |
|                              | DTC144TUA |            | 200         |                  |
|                              | DTC144TKA |            | 200         |                  |
| Junction temperature         |           | $T_j$      | 150         | $^\circ\text{C}$ |
| Range of storage temperature |           | $T_{stg}$  | -55 to +150 | $^\circ\text{C}$ |

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

| Parameter                            | Symbol        | Conditions  | Values |      |      | Unit          |
|--------------------------------------|---------------|---|--------|------|------|---------------|
|                                      |               |   | Min.   | Typ. | Max. |               |
| Collector-base breakdown voltage     | $BV_{CBO}$    | $I_C = 50\mu\text{A}$                                       | 50     | -    | -    | V             |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | $I_C = 1\text{mA}$  | 50     | -    | -    | V             |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | $I_E = 50\mu\text{A}$                                       | 5      | -    | -    | V             |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 50\text{V}$                                       | -      | -    | 0.5  | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 4\text{V}$  | -      | -    | 0.5  | $\mu\text{A}$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C / I_B = 5\text{mA} / 0.5\text{mA}$                     | -      | -    | 0.3  | V             |
| DC current gain                      | $h_{FE}$      | $V_{CE} = 5\text{V}, I_C = 1\text{mA}$                      | 100    | 250  | 600  | -             |
| Input resistance                     | $R_1$         | -   | 32.9   | 47   | 61.1 | k $\Omega$    |
| Transition frequency                 | $f_T^{*2}$    | $V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$ | -      | 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

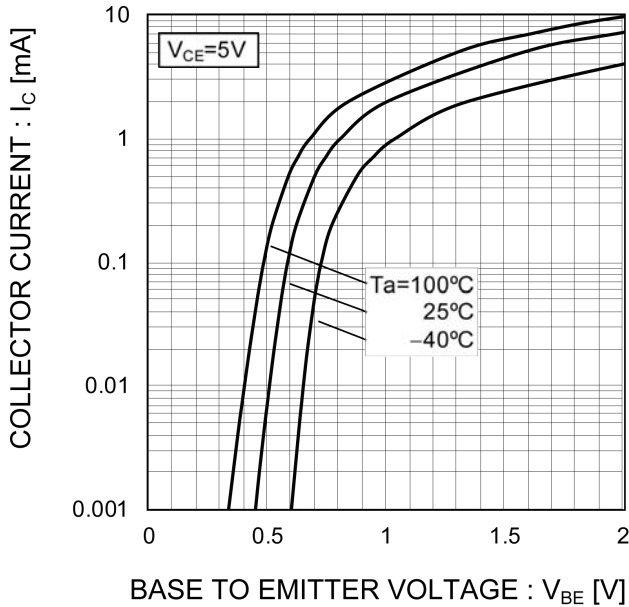


Fig.2 Grounded emitter output characteristics

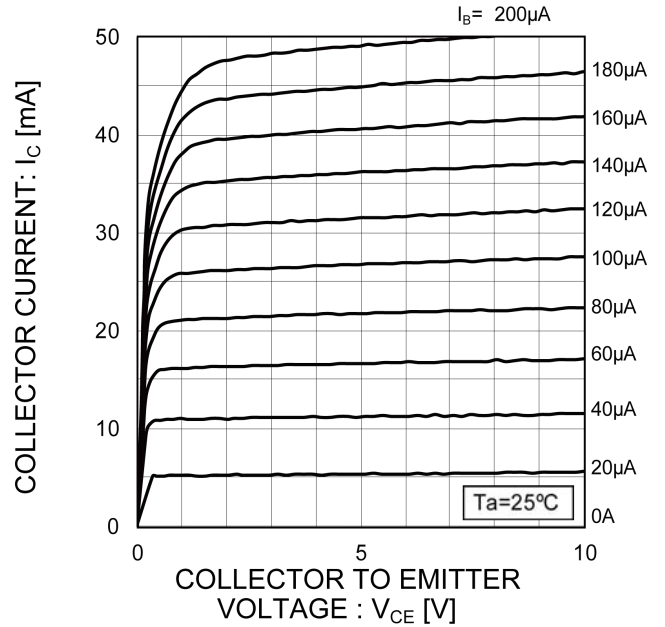


Fig.3 DC Current gain vs. Collector Current

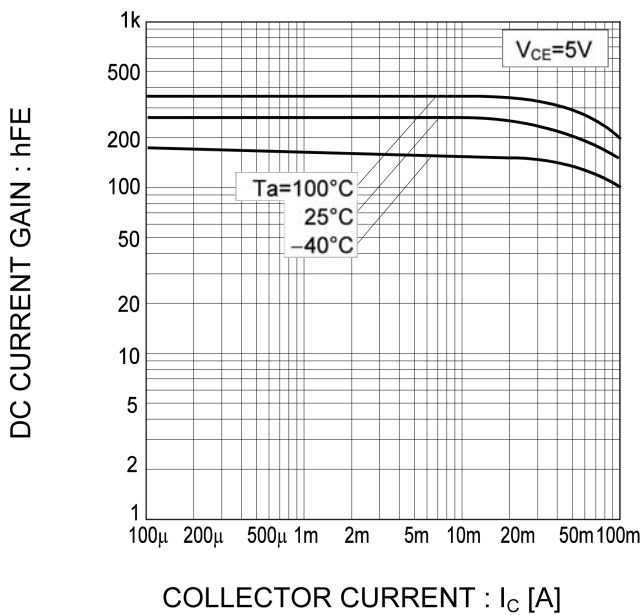
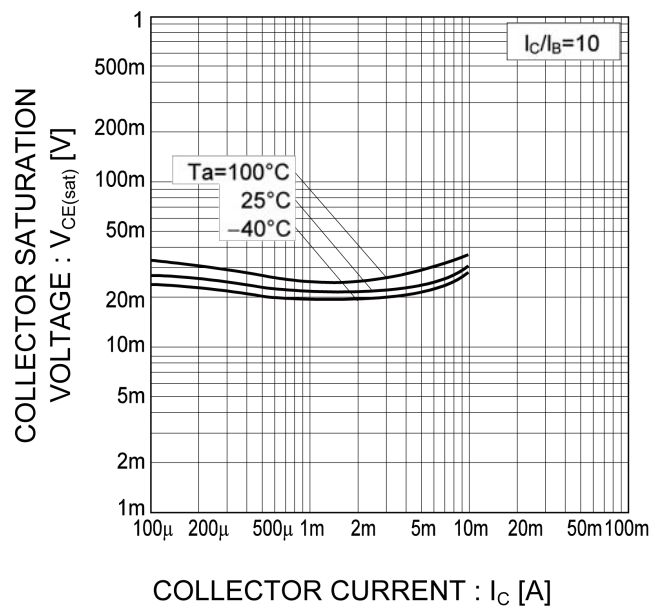
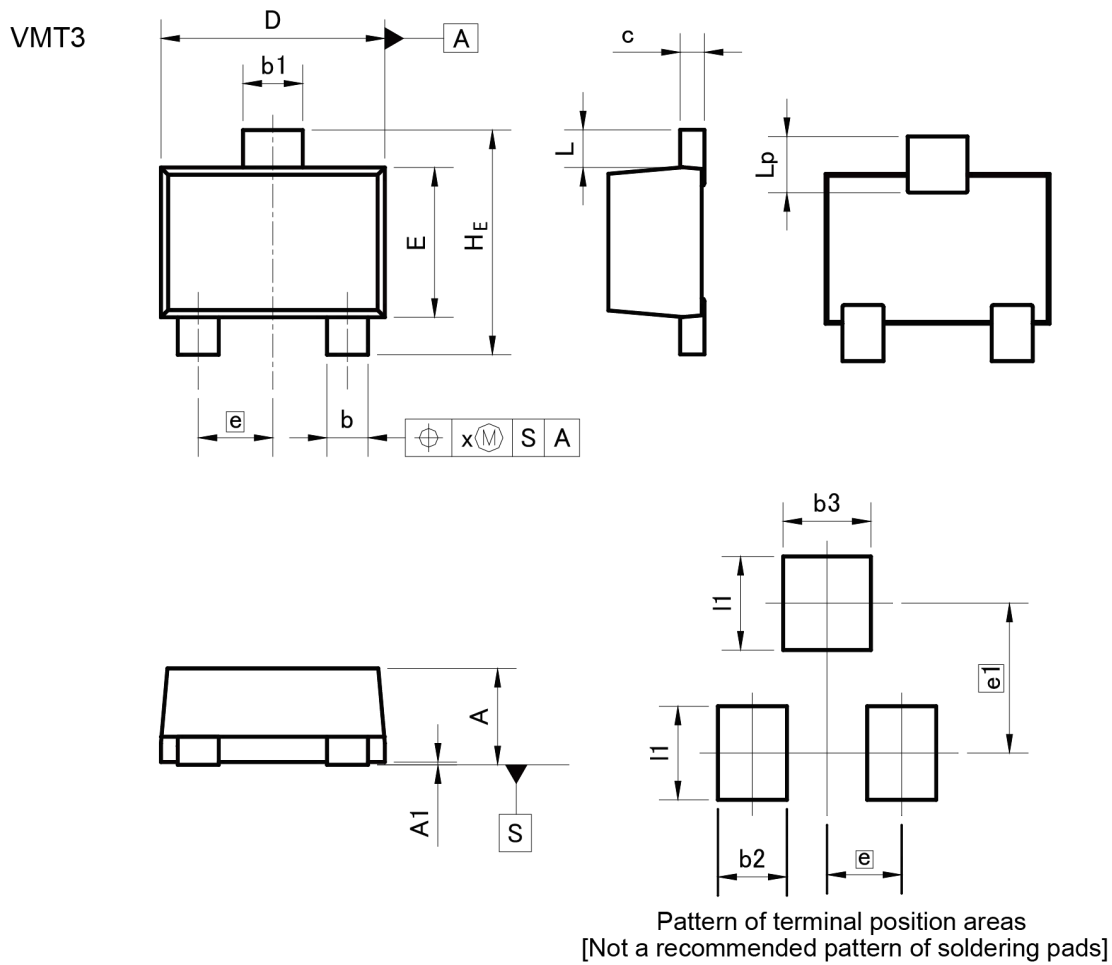


Fig.4 Collector-emitter saturation voltage vs. Collector Current



●Dimensions



| 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 |

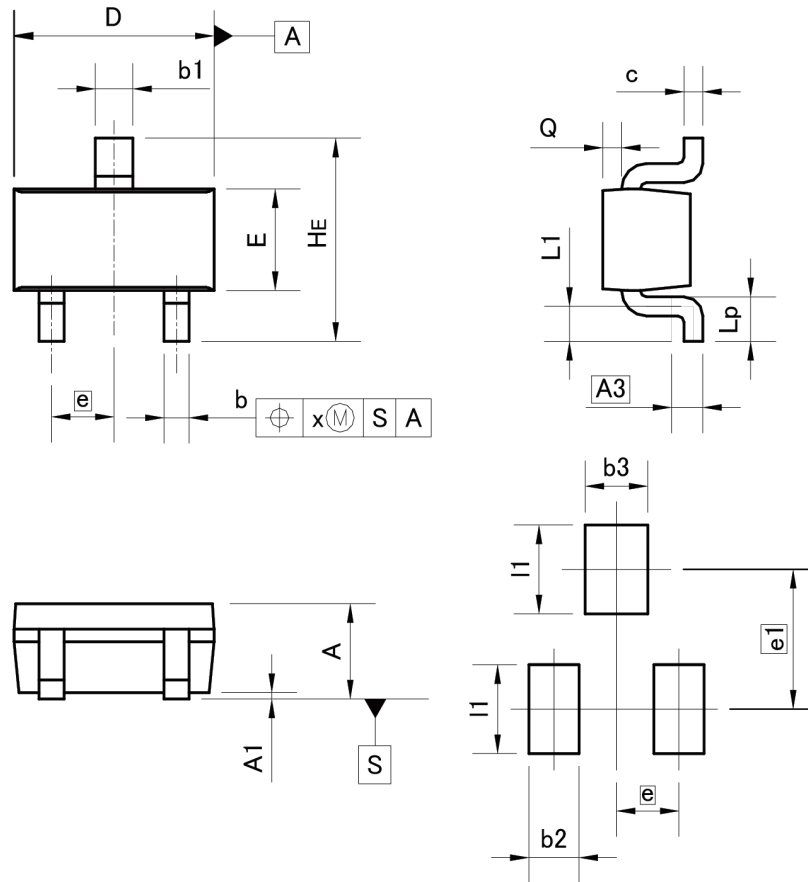
  

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | -          | 0.37 | -      | 0.015 |
| b3  | -          | 0.47 | -      | 0.019 |
| e1  | 0.80       |      | 0.031  |       |
| I1  | -          | 0.50 | -      | 0.020 |

Dimension in mm/inches

●Dimensions

EMT3



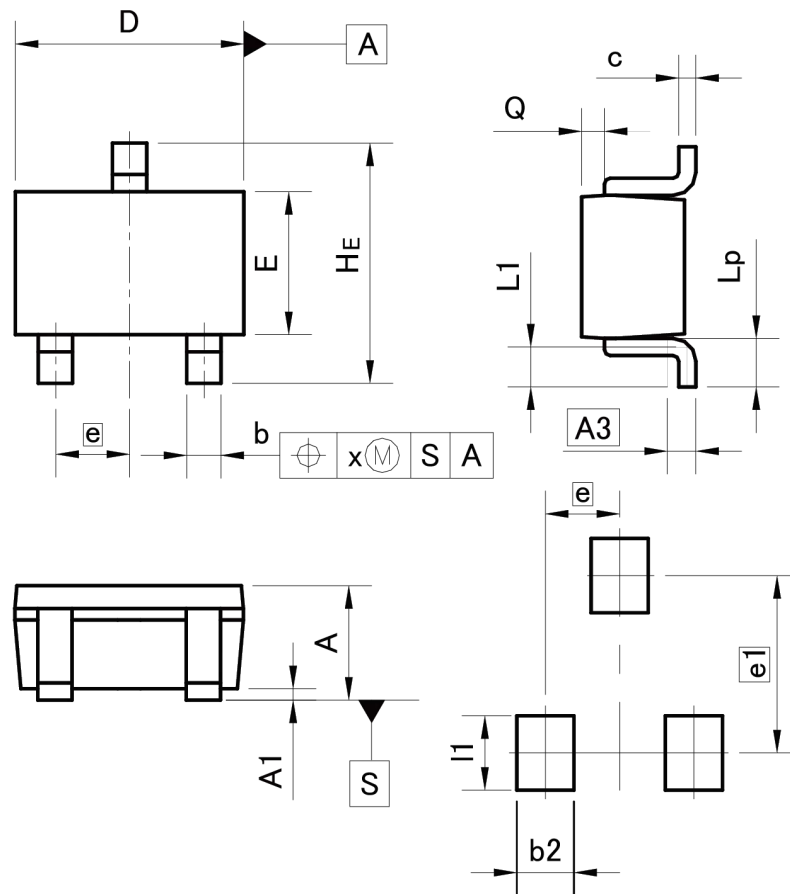
Pattern of terminal position areas  
[Not a recommended pattern of soldering pads]

| 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  |       |
| I1  | -          | 0.70 | -      | 0.028 |

Dimension in mm/inches

●Dimensions

UMT3



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

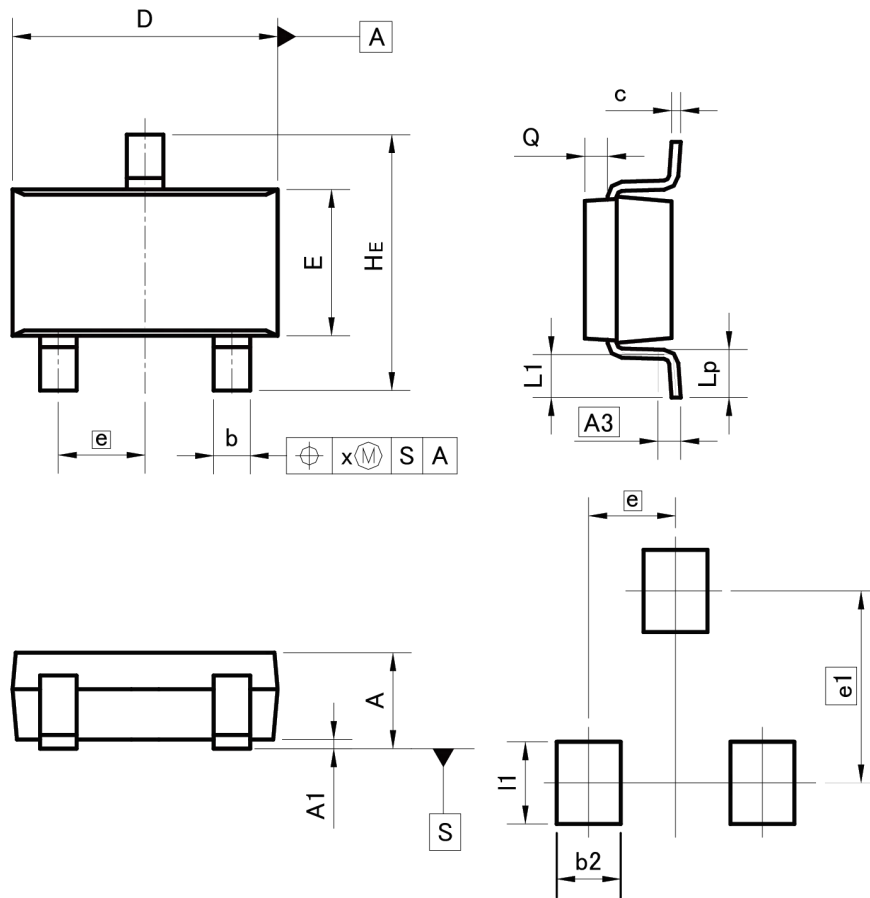
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.80       | 1.00 | 0.031  | 0.039 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A3  | 0.25       |      | 0.010  |       |
| b   | 0.15       | 0.30 | 0.006  | 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  |       |
| l1  | -          | 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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