

AEC-Q101 Qualified

| Parameter | Value        |
|-----------|--------------|
| $V_{CEO}$ | -50V         |
| $I_C$     | -100mA       |
| $R_1$     | 22k $\Omega$ |

### ●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: DTC124T series
- 6) Lead Free/RoHS Compliant.

### ●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

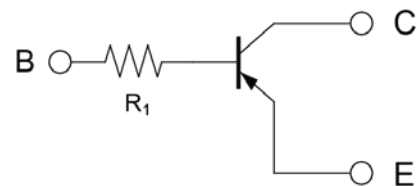
### ●Packaging specifications

| Part No.     | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|--------------|---------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| DTA124TMFHA  | VMT3    | 1212         | T2L         | 180            | 8               | 8000                      | 95      |
| DTA124TEFRA  | EMT3    | 1616         | TL          | 180            | 8               | 3000                      | 95      |
| DTA124TUFRA  | UMT3    | 2021         | T106        | 180            | 8               | 3000                      | 95      |
| DTA124TKAFRA | SMT3    | 2928         | T146        | 180            | 8               | 3000                      | 95      |

### ●Outline

|   |  |
|---|--|
| <p>VMT3</p> <p>DTA124TMFHA<br/>(SC-105AA)</p>     | <p>EMT3</p> <p>DTA124TEFRA<br/>SOT-416(SC-75A)</p> |
| <p>UMT3</p> <p>DTA124TUFRA<br/>SOT-323(SC-70)</p> | <p>SMT3</p> <p>DTA124TKAFRA<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       |              | $V_{\text{CBO}}$    | -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            | DTA124TMFHA  | $P_{\text{D}}^{*1}$ | 150         | mW               |
|                              | DTA124TEFRA  |                     | 150         |                  |
|                              | DTA124TUAFRA |                     | 200         |                  |
|                              | DTA124TKAFRA |                     | 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 | $V_{\text{CE(sat)}}$ | $I_{\text{C}} / I_{\text{B}} = -5\text{mA} / -0.5\text{mA}$                      | -      | -    | -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                     | $R_1$                | -  | 15.4   | 22   | 28.6 | 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

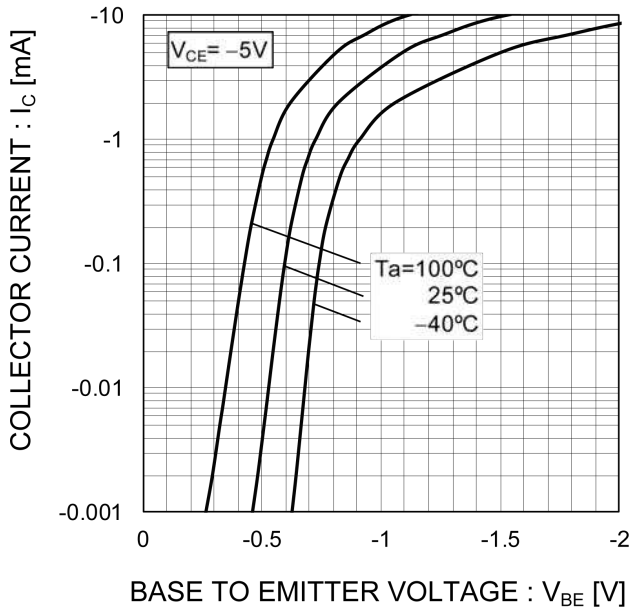


Fig.2 Grounded emitter output characteristics

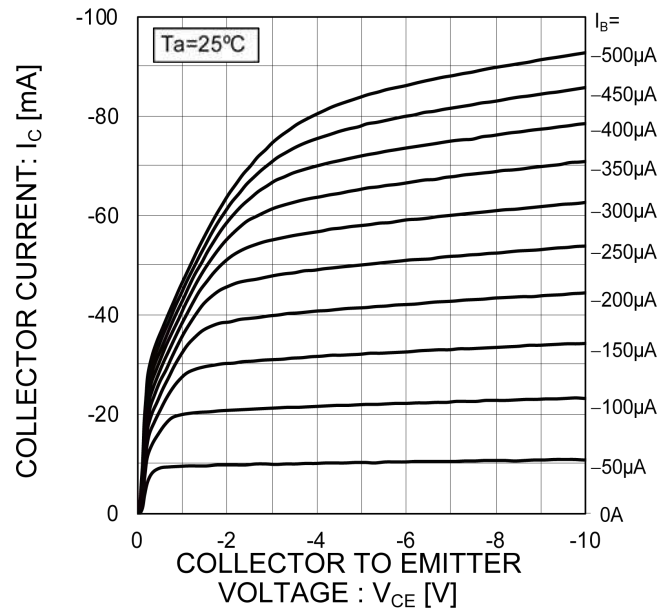


Fig.3 DC Current gain vs. Collector Current

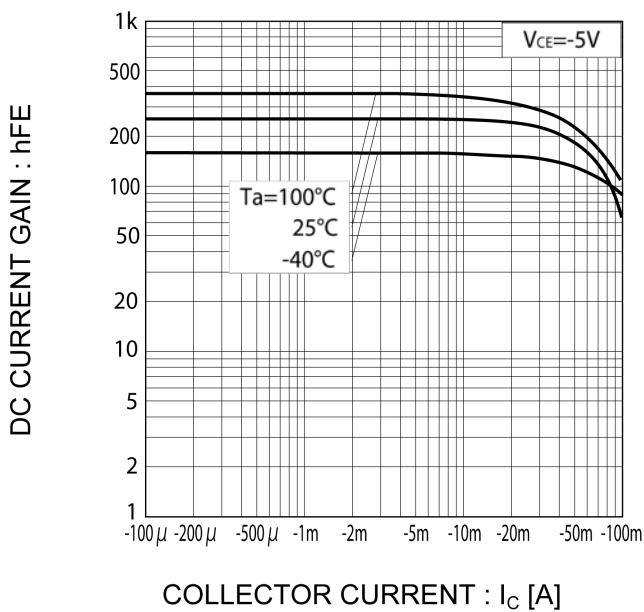
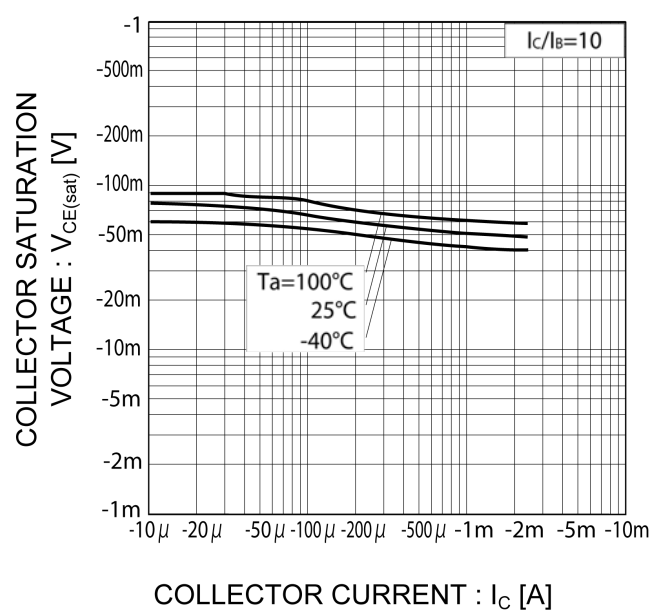
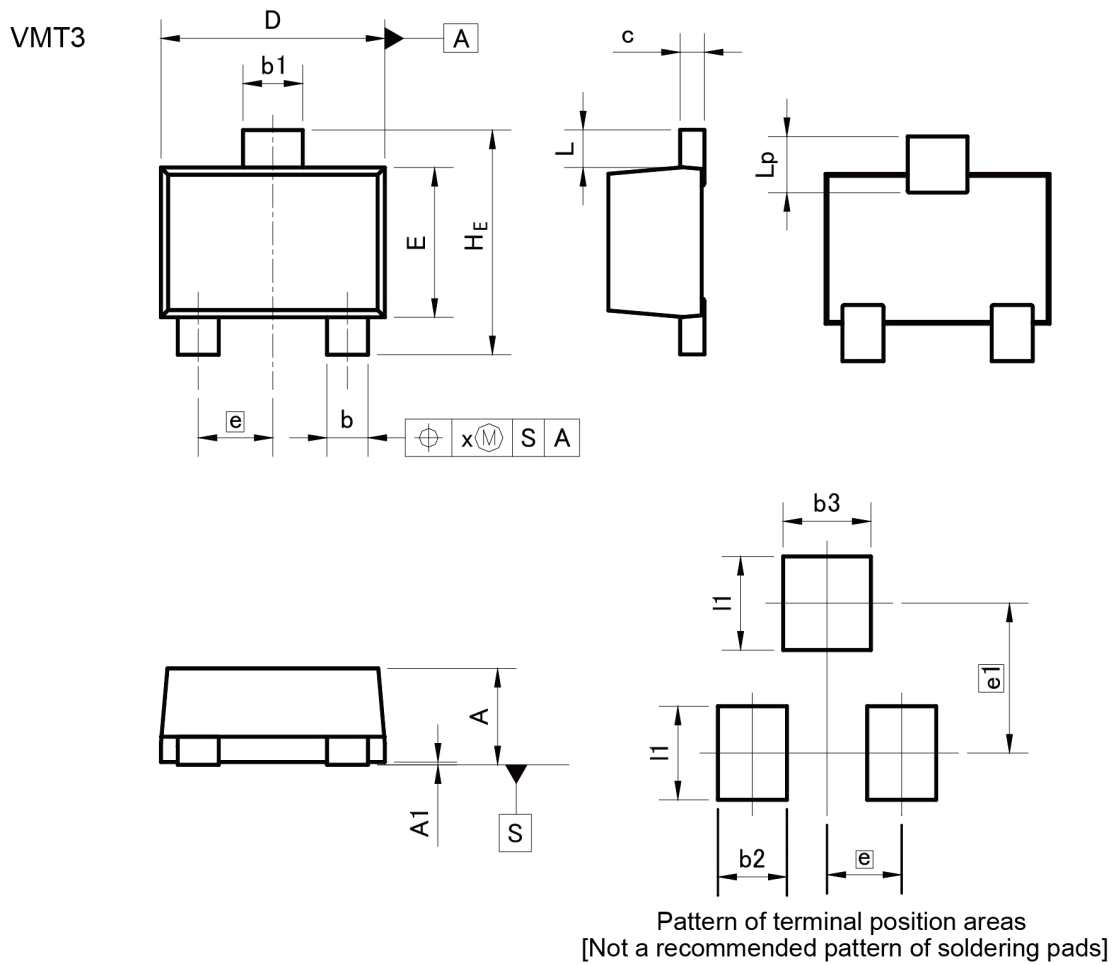


Fig.4 Collector-emitter saturation voltage vs. Collector Current



●Dimensions



| 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 |

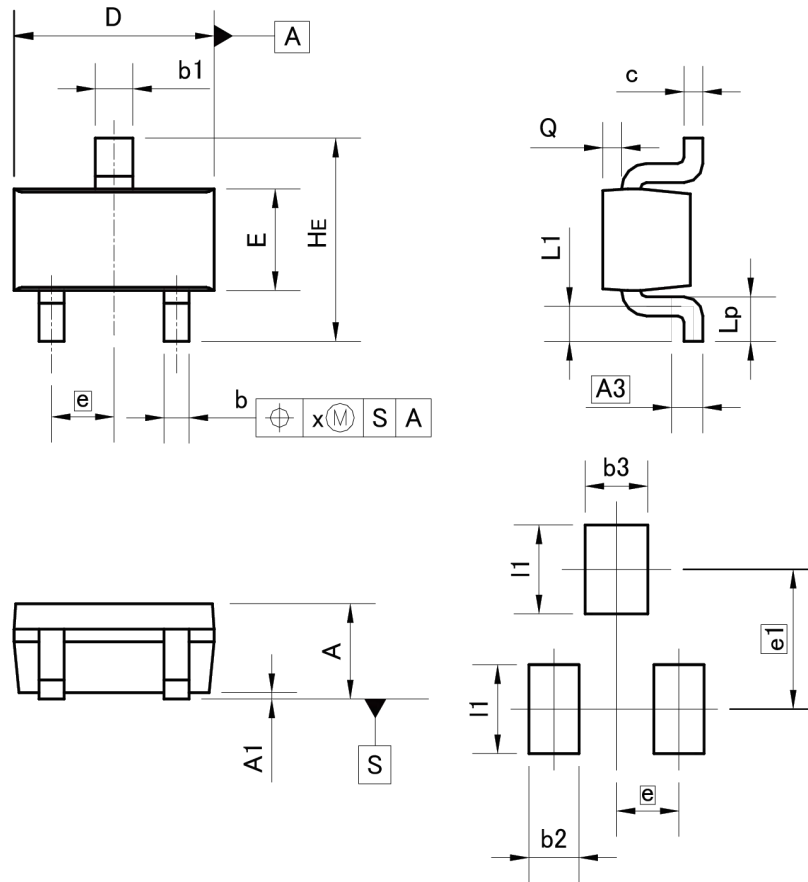
  

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| b2  | -          | 0.37 | -      | 0.015 |
| b3  | -          | 0.47 | -      | 0.019 |
| e1  | 0.80       |      | 0.031  |       |
| l1  | -          | 0.50 | - 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

Dimension in mm/inches

●Dimensions

EMT3



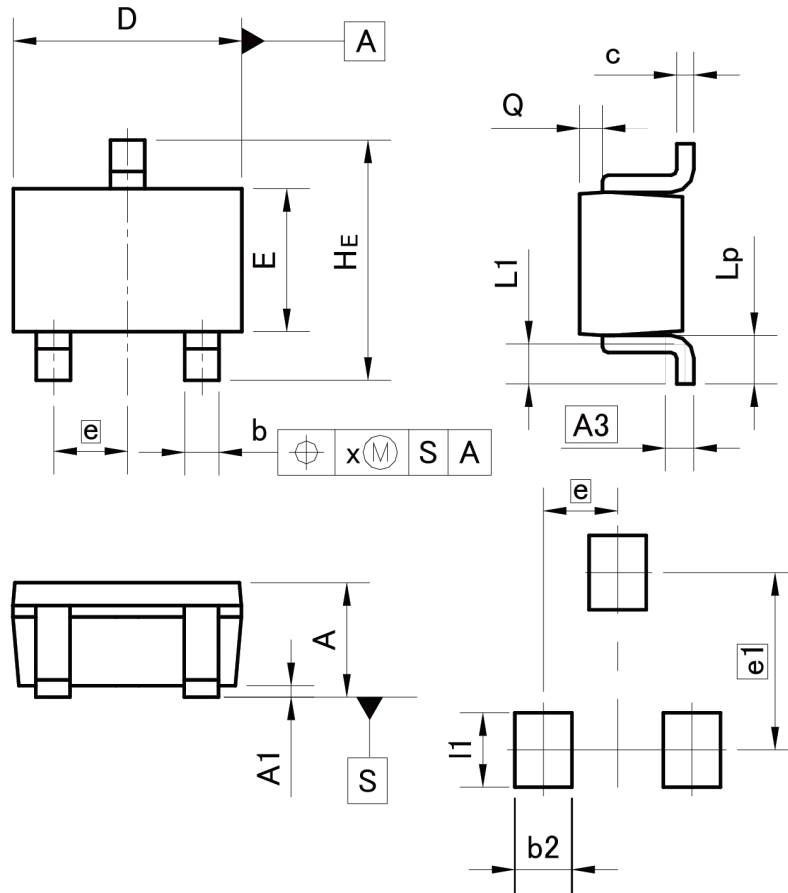
Pattern of terminal position areas  
[Not a recommended pattern of soldering pads]

| 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]

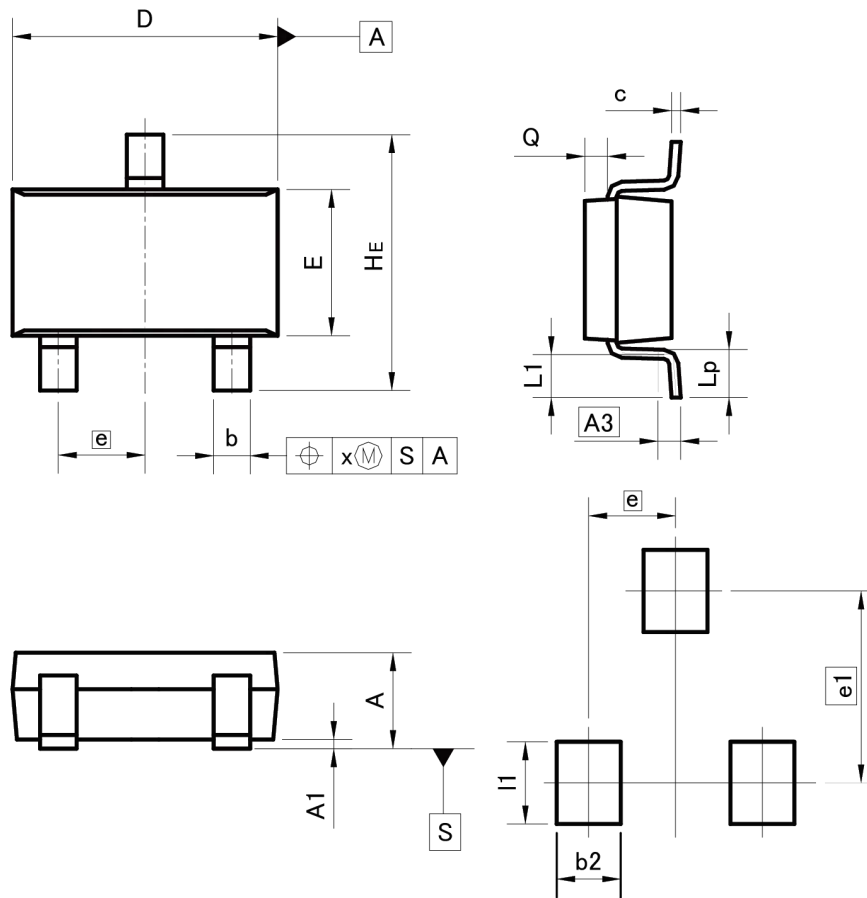
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.80       | 1.00 | 0.031  | 0.039 |
| A1  | 0.00       | 0.10 | 0.000  | 0.004 |
| A3  | 0.25       |      | 0.010  |       |
| b   | 0.15       | 0.30 | 0.006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

# Notice

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| JAPAN     | USA       | EU         | CHINA     |
|-----------|-----------|------------|-----------|
| CLASS III | CLASS III | CLASS II b | CLASS III |
| CLASS IV  |           | CLASS III  |           |

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  - [h] Use of the Products in places subject to dew condensation
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5. Please verify and confirm characteristics of the final or mounted products in using the Products.
6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
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8. Confirm that operation temperature is within the specified range described in the product specification.
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  - [c] the Products are exposed to direct sunshine or condensation
  - [d] the Products are exposed to high Electrostatic
2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.
3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

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