

| Parameter     | Value        |
|---------------|--------------|
| $V_{CC}$      | -50V         |
| $I_{C(MAX.)}$ | -100mA       |
| $R_1$         | 47k $\Omega$ |
| $R_2$         | 47k $\Omega$ |

### ●Features

- 1) Built-In Biasing Resistors,  $R_1 = R_2 = 47k\Omega$ .
- 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 :DTC144E series
- 6) Complex transistors :EMB2 /UMB5N /IMB2A /EMA2 /UMA2N /FMA2A (PNP type)
- 7) Lead Free/RoHS Compliant.

### ●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

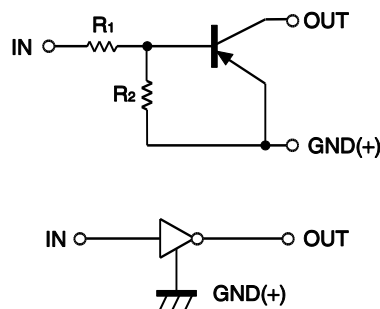
### ●Packaging specifications

| Part No.  | Package | Package size (mm) | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit (pcs) | Marking |
|-----------|---------|-------------------|-------------|----------------|-----------------|---------------------------|---------|
| DTA144EM  | VMT3    | 1212              | T2L         | 180            | 8               | 8,000                     | 16      |
| DTA144EEB | EMT3F   | 1616              | TL          | 180            | 8               | 3,000                     | 16      |
| DTA144EE  | EMT3    | 1616              | TL          | 180            | 8               | 3,000                     | 16      |
| DTA144EUB | UMT3F   | 2021              | TL          | 180            | 8               | 3,000                     | 16      |
| DTA144EUA | UMT3    | 2021              | T106        | 180            | 8               | 3,000                     | 16      |
| DTA144EKA | SMT3    | 2928              | T146        | 180            | 8               | 3,000                     | 16      |

### ●Outline

|  |  |
|--|--|
| <p>VMT3</p> <p>DTA144EM (SC-105AA)</p>       | <p>EMT3F</p> <p>DTA144EEB (SC-89)</p>        |
| <p>EMT3</p> <p>DTA144EE SOT-416 (SC-75A)</p> | <p>UMT3F</p> <p>DTA144EUB (SC-85)</p>        |
| <p>UMT3</p> <p>DTA144EUA SOT-323 (SC-70)</p> | <p>SMT3</p> <p>DTA144EKA SOT-346 (SC-59)</p> |

### ●Inner circuit



●Absolute maximum ratings (Ta = 25°C)

| Parameter                    |                                     | Symbol             | Values      | Unit |
|------------------------------|-------------------------------------|--------------------|-------------|------|
| Supply voltage               |                                     | $V_{CC}$           | -50         | V    |
| Input voltage                |                                     | $V_{IN}$           | -40 to +10  | V    |
| Output current               |                                     | $I_O$              | -30         | mA   |
| Collector current            |                                     | $I_{C(MAX.)}^{*1}$ | -100        | mA   |
| Power dissipation            | DTA144EM<br>DTA144EEB<br>DTA144EE   | $P_D^{*2}$         | 150         | mW   |
|                              | DTA144EUB<br>DTA144EUA<br>DTA144EKA |                    | 200         | mW   |
| Junction temperature         |                                     | $T_j$              | 150         | °C   |
| Range of storage temperature |                                     | $T_{stg}$          | -55 to +150 | °C   |

●Electrical characteristics (Ta = 25°C)

| Parameter            | Symbol       | Conditions                                  | Min. | Typ. | Max.  | Unit       |
|----------------------|--------------|---|------|------|-------|------------|
| Input voltage        | $V_{I(off)}$ | $V_{CC} = -5V, I_O = -100\mu A$             | -    | -    | -0.5  | V          |
|                      | $V_{I(on)}$  | $V_O = -0.3V, I_O = -2mA$                   | -3   | -    | -     |            |
| Output voltage       | $V_{O(on)}$  | $I_O / I_I = -10mA / -0.5mA$                | -    | -0.1 | -0.3  | V          |
| Input current        | $I_I$        | $V_I = -5V$                                 | -    | -    | -0.18 | mA         |
| Output current       | $I_{O(off)}$ | $V_{CC} = -50V, V_I = 0V$                   | -    | -    | -0.5  | $\mu A$    |
| DC current gain      | $G_I$        | $V_O = -5V, I_O = -5mA$                     | 68   | -    | -     | -          |
| Input resistance     | $R_1$        | -   | 32.9 | 47   | 61.1  | k $\Omega$ |
| Resistance ratio     | $R_2/R_1$    | -   | 0.8  | 1    | 1.2   | -          |
| Transition frequency | $f_T^{*1}$   | $V_{CE} = -10V, I_E = 5mA,$<br>$f = 100MHz$ | -    | 250  | -     | MHz        |

\*1 Characteristics of built-in transistor

\*2 Each terminal mounted on a reference footprint

●Electrical characteristic curves(Ta = 25°C)

Fig.1 Input voltage vs. output current (ON characteristics)

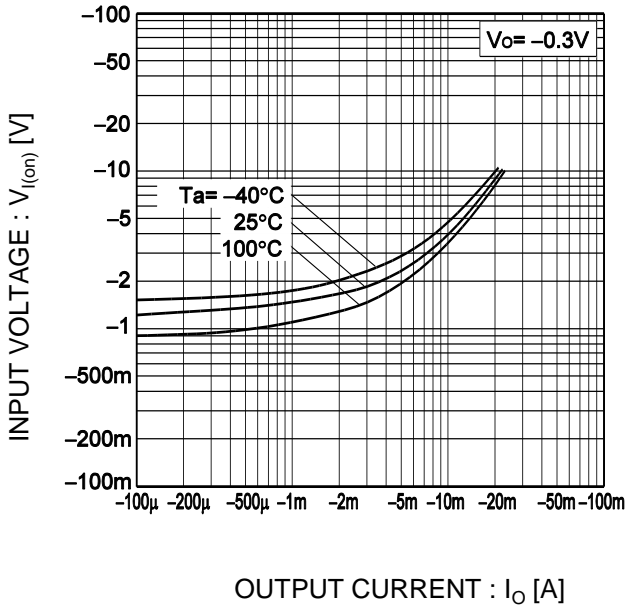


Fig.2 Output current vs. input voltage (OFF characteristics)

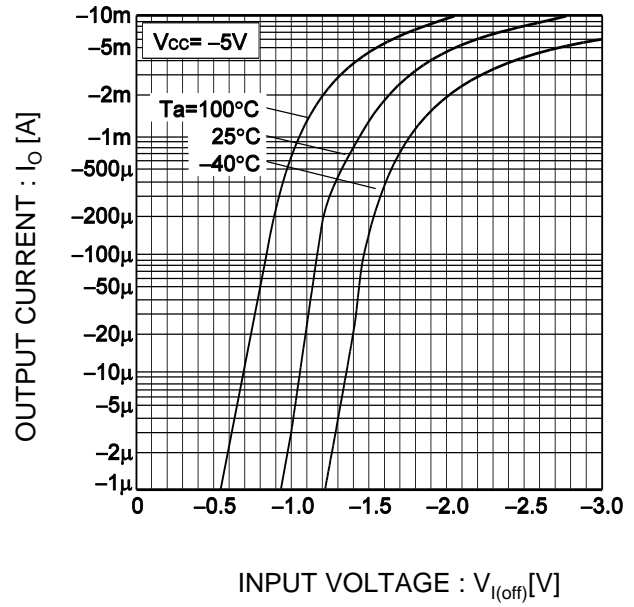


Fig.3 Output current vs. output voltage

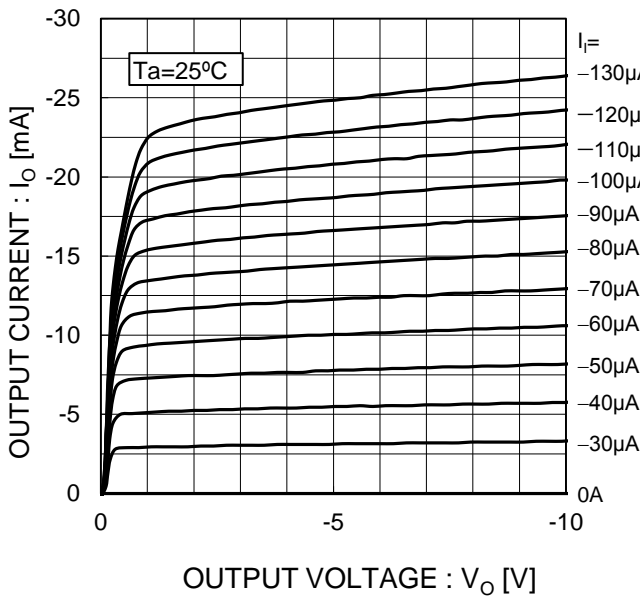
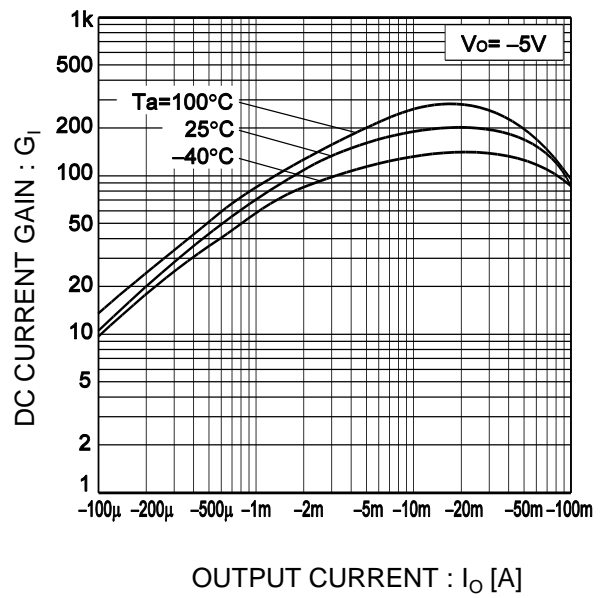
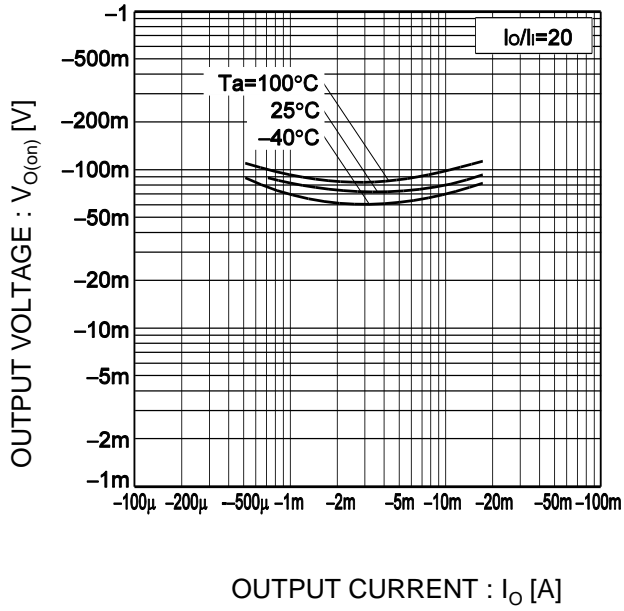


Fig.4 DC current gain vs. output current

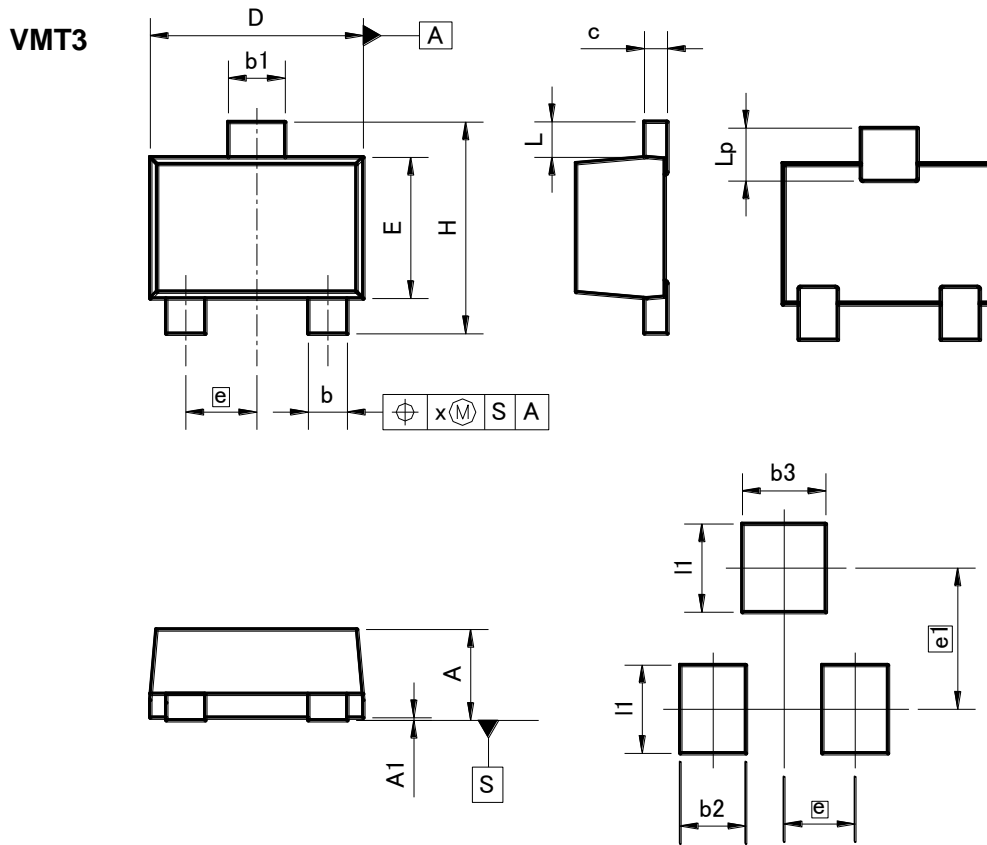


●Electrical characteristic curves(Ta = 25°C)

Fig.5 Output voltage vs. output current



●Dimensions (Unit : mm)



Pattern of terminal position areas

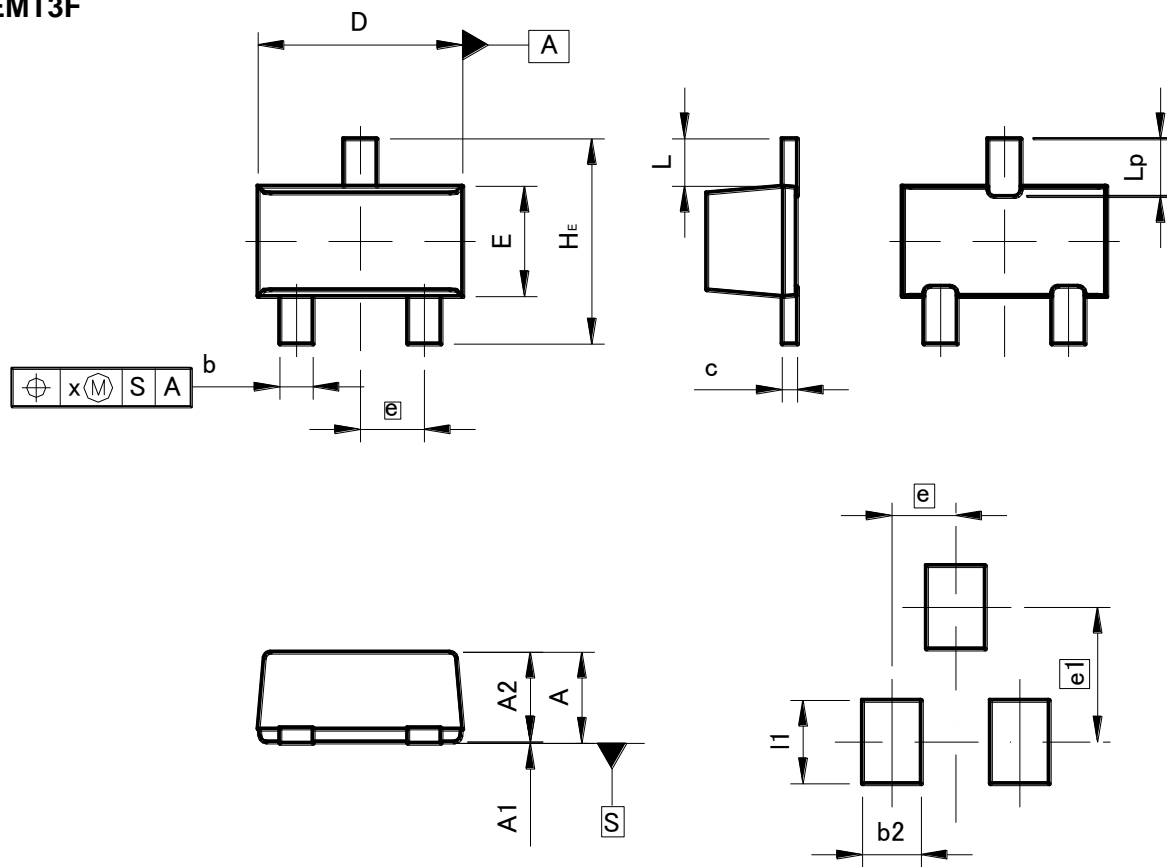
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.45       | 0.55 | 0.018  | 0.022 |
| A1  | 0.00       | 0.10 | 0      | 0.004 |
| b   | 0.17       | 0.27 | 0.007  | 0.011 |
| b1  | 0.27       | 0.37 | 0.011  | 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  | -     |
| Lp  | 0.20       | 0.40 | 0.008  | -     |
| x   | -          | 0.10 | -      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| e1  | 0.80       |      | 0.03   |       |
| b2  | -          | 0.37 | -      | 0.015 |
| b3  | -          | 0.47 | -      | 0.019 |
| l1  | -          | 0.50 | -      | 0.02  |

Dimension in mm/inches

●Dimensions (Unit : mm)

EMT3F



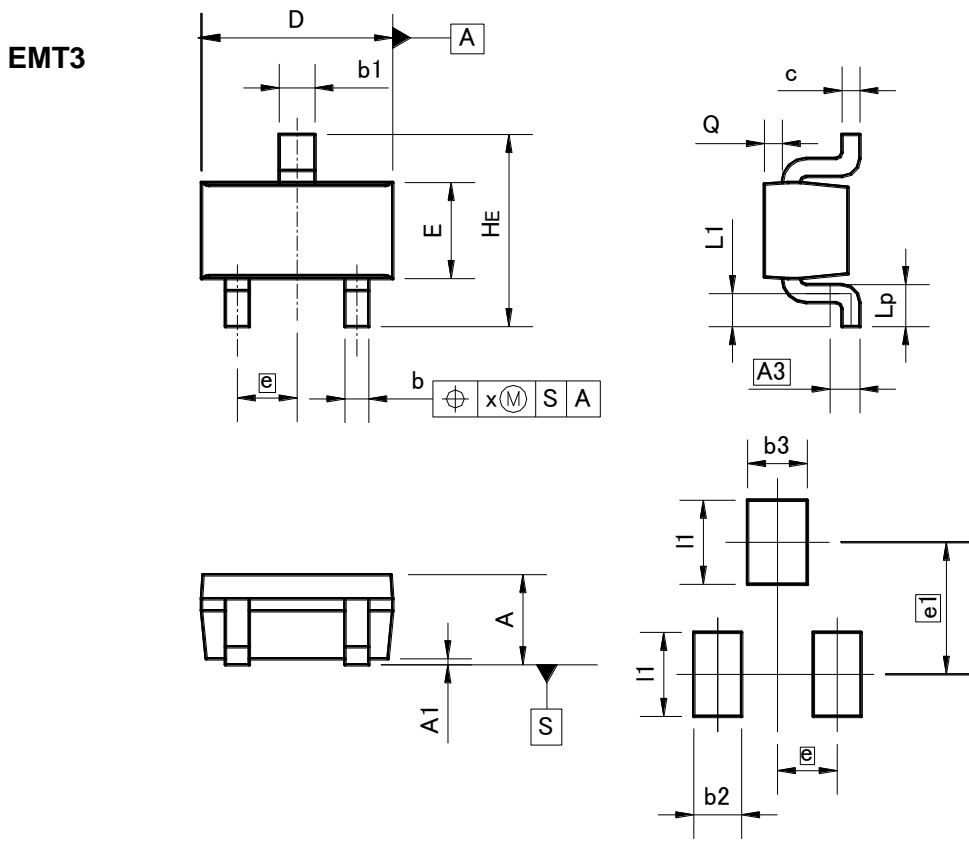
Pattern of terminal position areas

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.65       | 0.85 |        |       |
| A1  | 0.00       | 0.10 | 0      | 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 | 0.03   | 0.038 |
| e   | 0.50       |      | 0.02   |       |
| 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   |
| e1  | -          | 1.05 | -      | 0.041 |
| b2  | -          | 0.46 | -      | 0.018 |
| l1  | -          | 0.65 | -      | 0.026 |

Dimension in mm/inches

●Dimensions (Unit : mm)



Pattern of terminal position areas

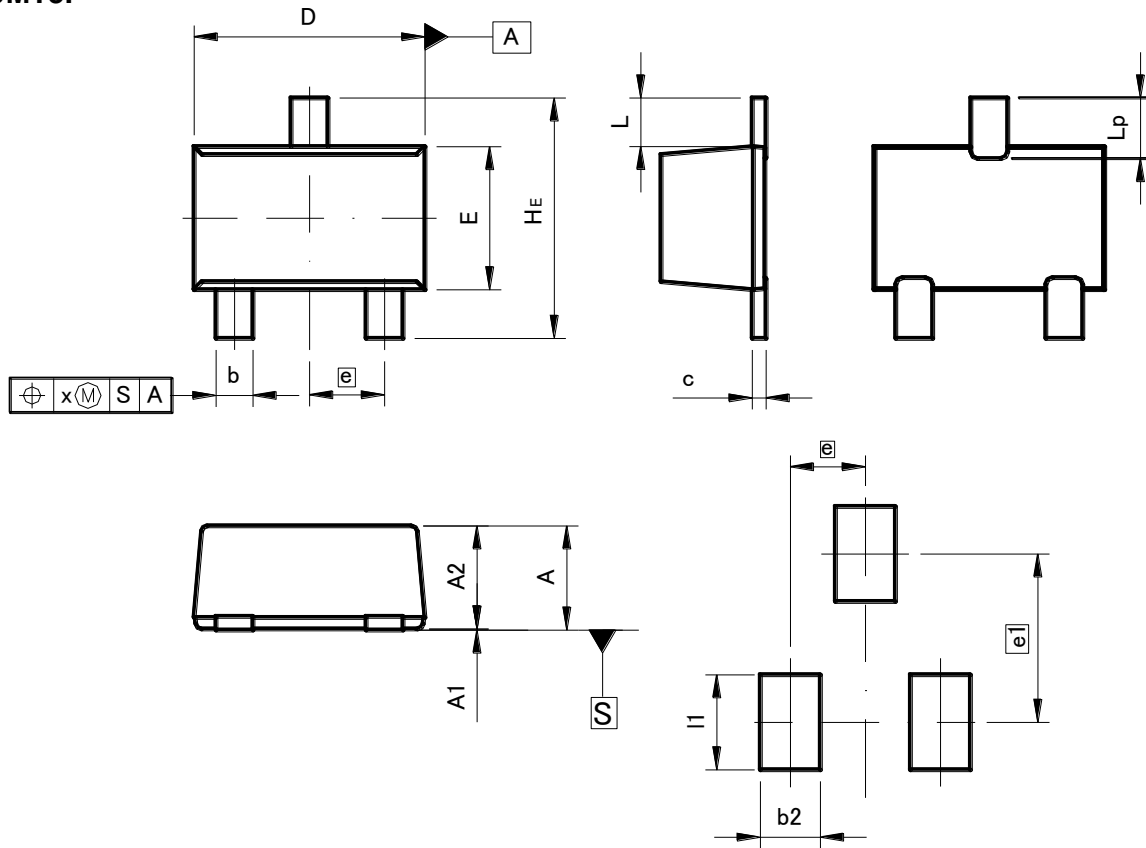
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.60       | 0.80 | 0.024  | 0.031 |
| A1  | 0.00       | 0.10 | 0      | 0.004 |
| A3  | 0.25       |      | 0.01   |       |
| b   | 0.15       | 0.30 | 0.006  | 0.012 |
| b1  | 0.25       | 0.40 | 0.01   | 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       |      | 0.02   |       |
| 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  | 0.01  |
| x   | -          | 0.10 | -      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| e1  | 1.10       |      | 0.04   |       |
| b2  | -          | 0.40 | -      | 0.016 |
| b3  | -          | 0.50 | -      | 0.02  |
| l1  | -          | 0.70 | -      | 0.028 |

Dimension in mm/inches

●Dimensions (Unit : mm)

UMT3F



Pattern of terminal position areas

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.85       | 1.05 | 0.033  | 0.041 |
| A1  | 0.00       | 0.10 | 0      | 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       |      | 0.03   |       |
| HE  | 2.00       | 2.20 | 0.079  | 0.087 |
| L   | 0.425      |      | 0.02   |       |
| Lp  | 0.43       | 0.63 | 0.017  | 0.025 |
| x   | -          | 0.10 | -      | 0.004 |

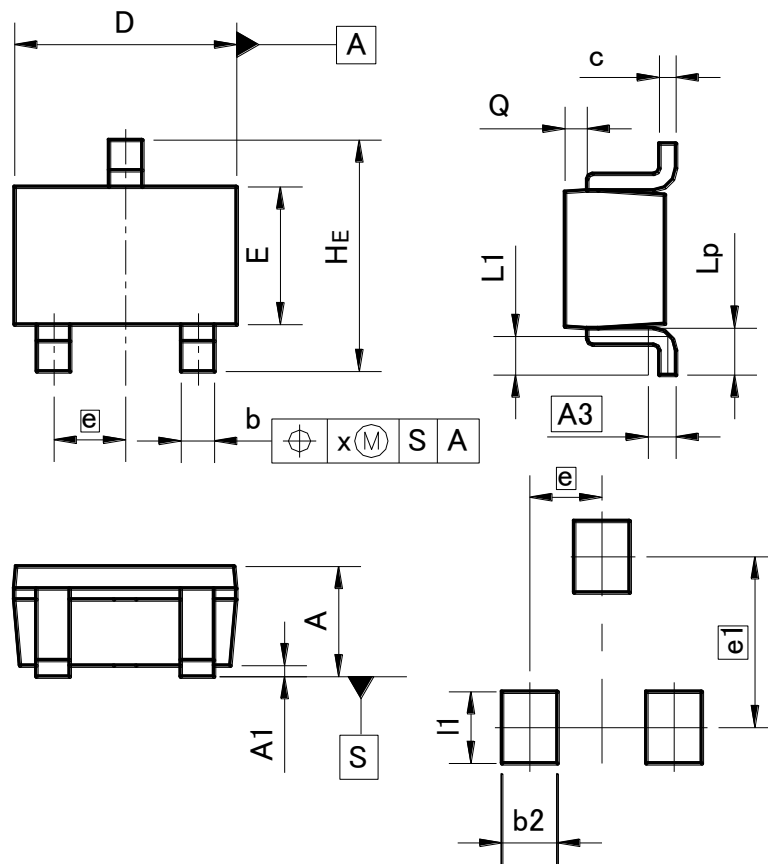
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| e1  | 1.47       |      | 0.058  |       |
| b2  | -          | 0.52 | -      | 0.02  |
| l1  | -          | 0.83 | -      | 0.033 |

Dimension in mm/inches



## ●Dimensions (Unit : mm)

## UMT3



## Pattern of terminal position areas

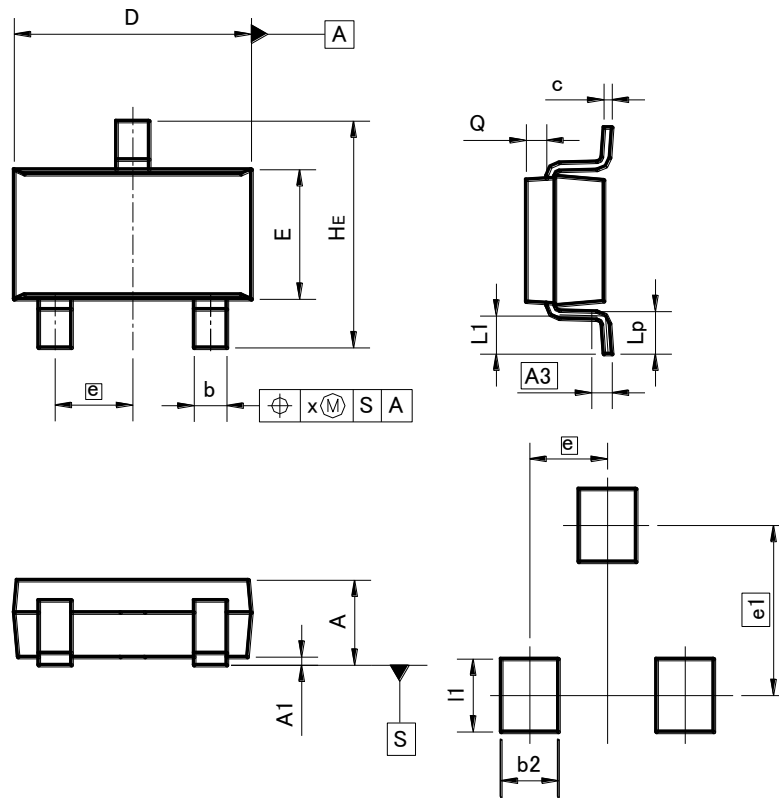
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.80       | 1.00 | 0.031  | 0.039 |
| A1  | 0.00       | 0.10 | 0      | 0.004 |
| A3  | 0.25       |      | 0.01   |       |
| b   | 0.15       | 0.30 | 0.006  | 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       |      | 0.03   |       |
| HE  | 2.00       | 2.20 | 0.079  | 0.087 |
| L1  | 0.20       | 0.50 | 0.008  | 0.02  |
| Lp  | 0.25       | 0.55 | 0.01   | 0.022 |
| Q   | 0.10       | 0.30 | 0.004  | 0.012 |
| x   | -          | 0.10 | -      | 0.004 |

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| e1  | 1.55       |      | 0.06   |       |
| b2  | -          | 0.50 | -      | 0.02  |
| l1  | -          | 0.65 | -      | 0.026 |

Dimension in mm/inches

●Dimensions (Unit : mm)

SMT3



Pattern of terminal position areas

| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 1.00       | 1.30 | -      | 0.051 |
| A1  | 0.00       | 0.10 | 0      | 0.004 |
| A3  | 0.25       |      | 0.01   |       |
| b   | 0.35       | 0.50 | 0.014  | 0.02  |
| c   | 0.09       | 0.25 | 0.004  | 0.01  |
| D   | 2.80       | 3.00 | 0.11   | 0.118 |
| E   | 1.50       | 1.80 | 0.059  | 0.071 |
| e   | 0.95       |      | 0.04   |       |
| 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   |
| e1  | 2.10       |      | 0.08   |       |
| b2  | -          | 0.60 | -      | 0.024 |
| l1  | -          | 0.90 | -      | 0.035 |

Dimension in mm/inches

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