



**THE DATASHEET OF
DTC143XUBTL**



| Parameter | Value |
|---------------|---------------|
| V_{CC} | 50V |
| $I_{C(MAX.)}$ | 100mA |
| R_1 | 4.7k Ω |
| R_2 | 10k Ω |

●Features

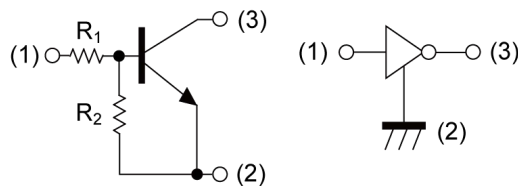
- 1) Built-In Biasing Resistors
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit) .
- 3) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 4) Complementary PNP Types: DTA143X series

●Application

INVERTER, INTERFACE, DRIVER

●Inner circuit

DTC143XM/ DTC143XEB/ DTC143XUB

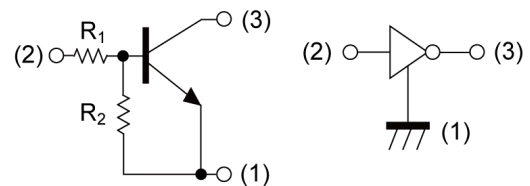


(1) IN (BASE)
 (2) GND (EMITTER)
 (3) OUT (COLLECTOR)

●Outline

| | |
|---|---|
| <p>VMT3</p> <p>DTC143XM (SC-105AA)</p> | <p>EMT3F</p> <p>DTC143XEB (SC-89)</p> |
| <p>EMT3</p> <p>DTC143XE SOT-416(SC-75A)</p> | <p>UMT3F</p> <p>DTC143XUB (SC-85)</p> |
| <p>UMT3</p> <p>DTC143XUA SOT-323(SC-70)</p> | <p>SMT3</p> <p>DTC143XKA SOT-346(SC-59)</p> |

DTC143XE/ DTC143XUA/ DTC143XKA



(1) GND (EMITTER)
 (2) IN (BASE)
 (3) OUT (COLLECTOR)

●Packaging specifications

| Part No. | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit.(pcs) | Marking |
|-----------|---------|--------------|-------------|----------------|-----------------|---------------------------|---------|
| DTC143XM | VMT3 | 1212 | T2L | 180 | 8 | 8000 | 43 |
| DTC143XEB | EMT3F | 1616 | TL | 180 | 8 | 3000 | 43 |
| DTC143XE | EMT3 | 1616 | TL | 180 | 8 | 3000 | 43 |
| DTC143XUB | UMT3F | 2021 | TL | 180 | 8 | 3000 | 43 |
| DTC143XUA | UMT3 | 2021 | T106 | 180 | 8 | 3000 | 43 |
| DTC143XKA | SMT3 | 2928 | T146 | 180 | 8 | 3000 | 43 |

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

| Parameter | | Symbol | Values | Unit |
|------------------------------|-----------|-------------------|-------------|------------------|
| Supply voltage | | V_{CC} | 50 | V |
| Input voltage | | V_{IN} | -7 to 20 | V |
| Output current | | I_O | 100 | mA |
| Collector current | | $I_{C(MAX)}^{*1}$ | 100 | mA |
| Power dissipation | DTC143XM | P_D^{*2} | 150 | mW |
| | DTC143XEB | | 150 | |
| | DTC143XE | | 150 | |
| | DTC143XUB | | 200 | |
| | DTC143XUA | | 200 | |
| | DTC143XKA | | 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. | |
| Input voltage | $V_{I(off)}$ | $V_{CC} = 5V, I_O = 100\mu\text{A}$ | - | - | 0.3 | V |
| | $V_{I(on)}$ | $V_O = 0.3V, I_O = 20\text{mA}$ | 2.5 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O / I_I = 10\text{mA} / 0.5\text{mA}$ | - | 100 | 300 | mV |
| Input current | I_I | $V_I = 5V$ | - | - | 1.8 | mA |
| Output current | $I_{O(off)}$ | $V_{CC} = 50V, V_I = 0V$ | - | - | 500 | nA |
| DC current gain | G_I | $V_O = 5V, I_O = 10\text{mA}$ | 30 | - | - | - |
| Input resistance | R_I | - | 3.29 | 4.7 | 6.11 | k Ω |
| Resistance ratio | R_2/R_1 | - | 1.7 | 2.1 | 2.6 | - |
| Transition frequency | f_T^{*1} | $V_{CE} = 10V, I_E = -5\text{mA},$ $f = 100\text{MHz}$ | - | 250 | - | MHz |

*1 Characteristics of built-in transistor.

*2 Each terminal mounted on a reference land.

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

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

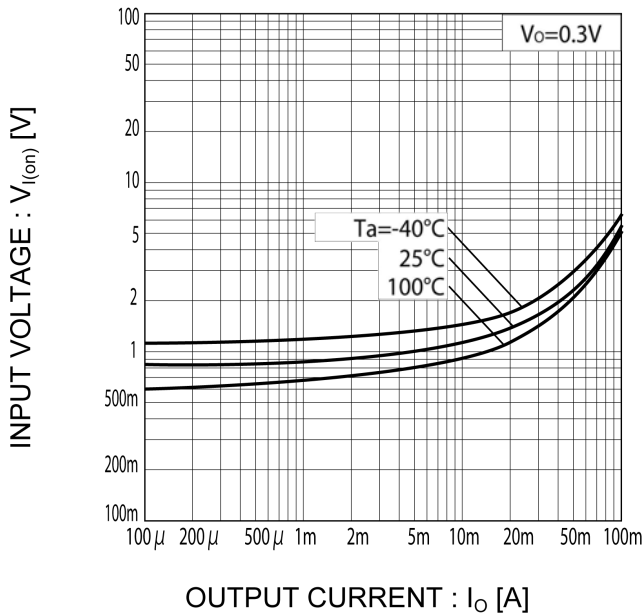


Fig.2 Output current vs. input voltage (OFF characteristics)

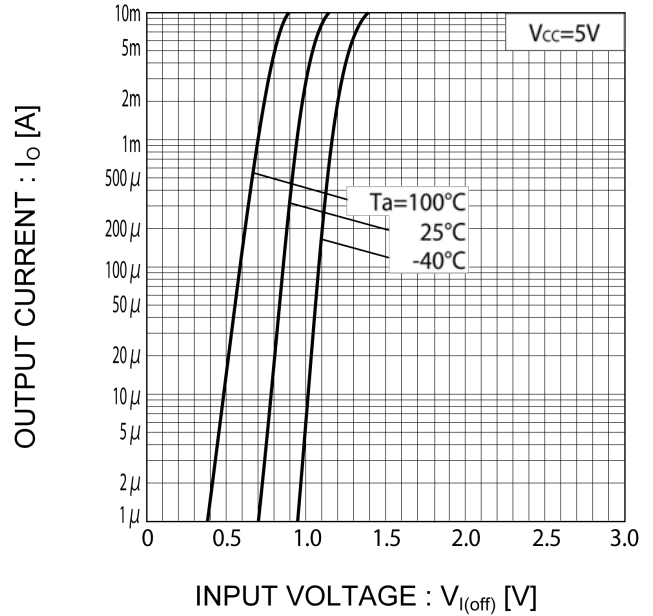


Fig.3 Output current vs. output voltage

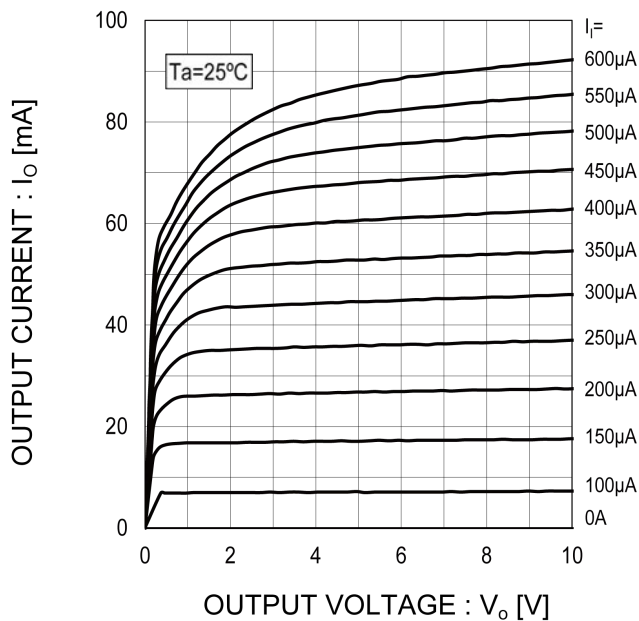
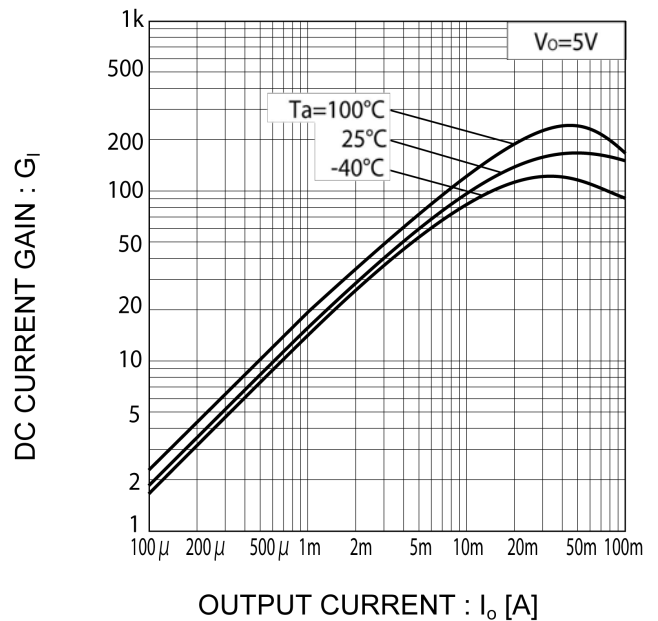
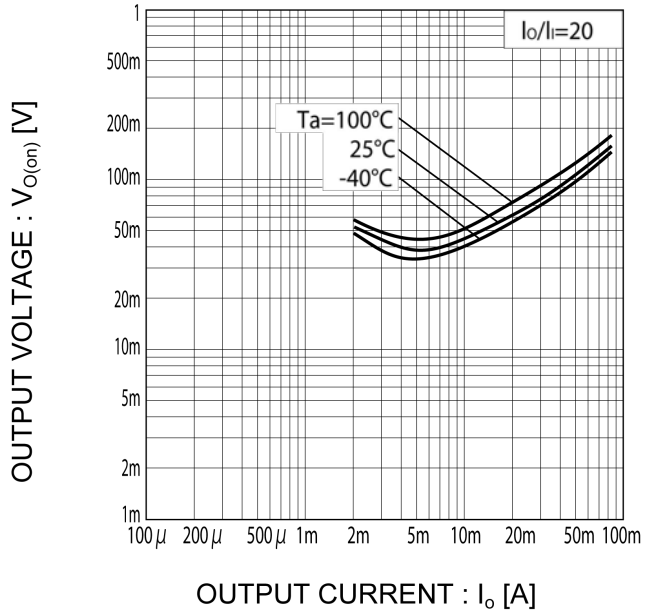


Fig.4 DC current gain vs. output current

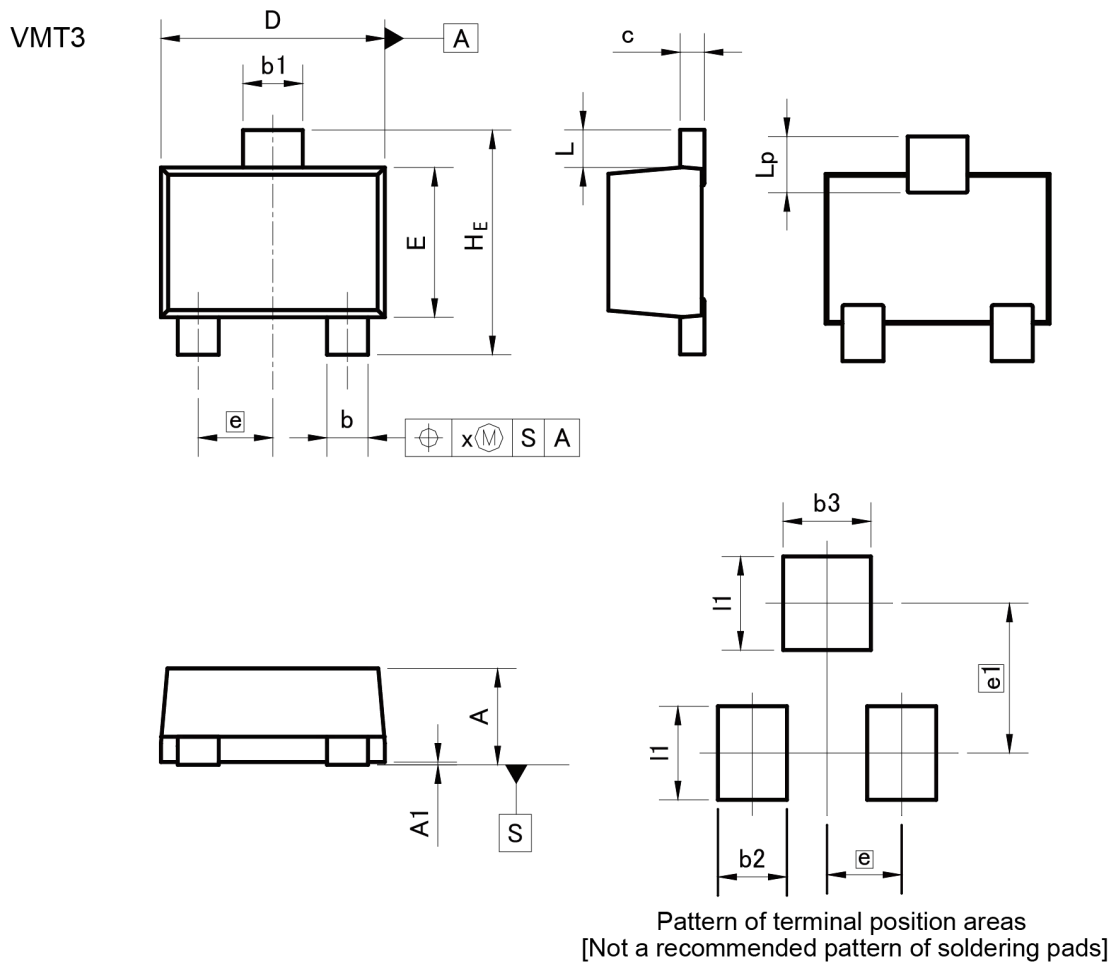


● Electrical characteristic curves ($T_a = 25^\circ\text{C}$)

Fig.5 Output voltage vs. output current



●Dimensions



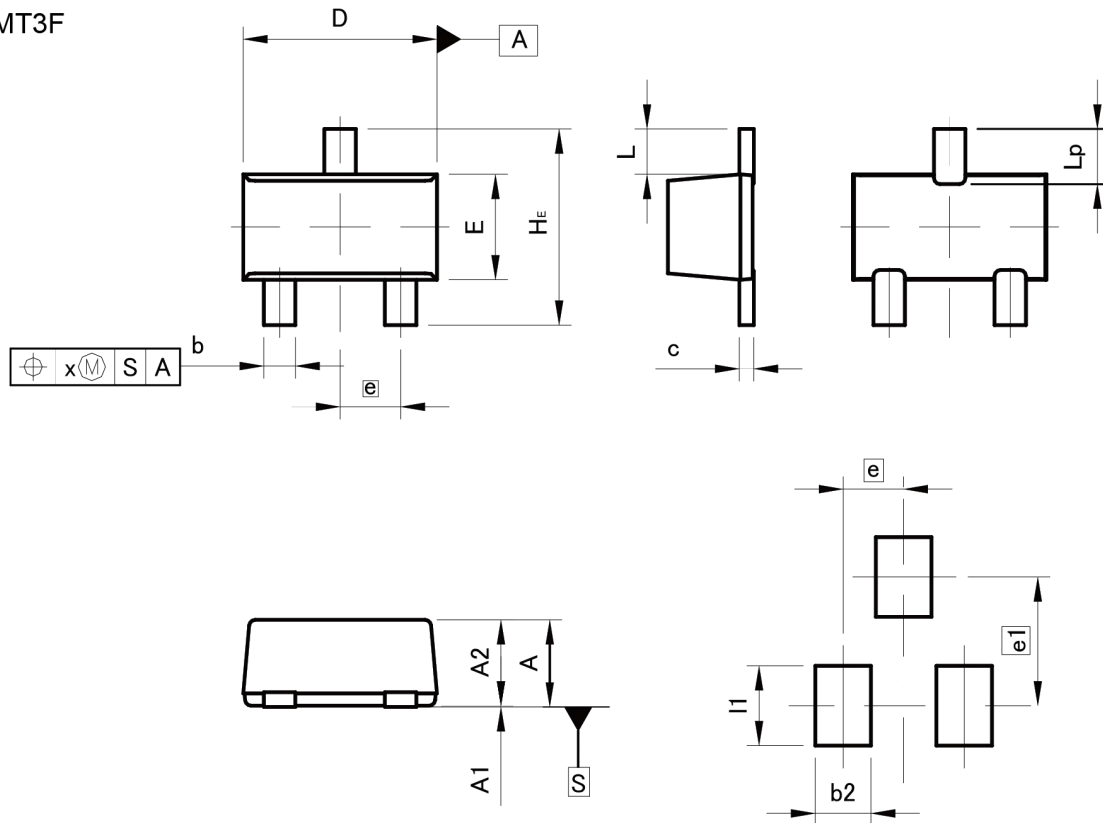
| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.45 | 0.55 | 0.018 | 0.022 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.17 | 0.27 | 0.007 | 0.011 |
| b1 | 0.27 | 0.37 | 0.011 | 0.015 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.10 | 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

EMT3F



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

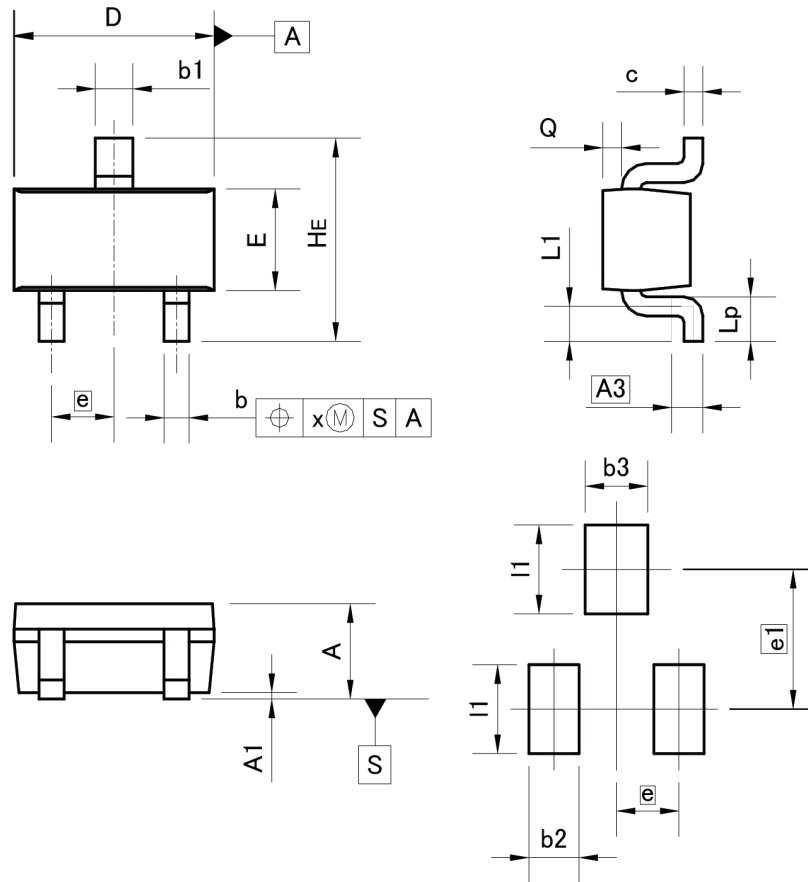
| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.65 | 0.85 | 0.026 | 0.033 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.60 | 0.80 | 0.024 | 0.031 |
| b | 0.21 | 0.36 | 0.008 | 0.014 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.50 | 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



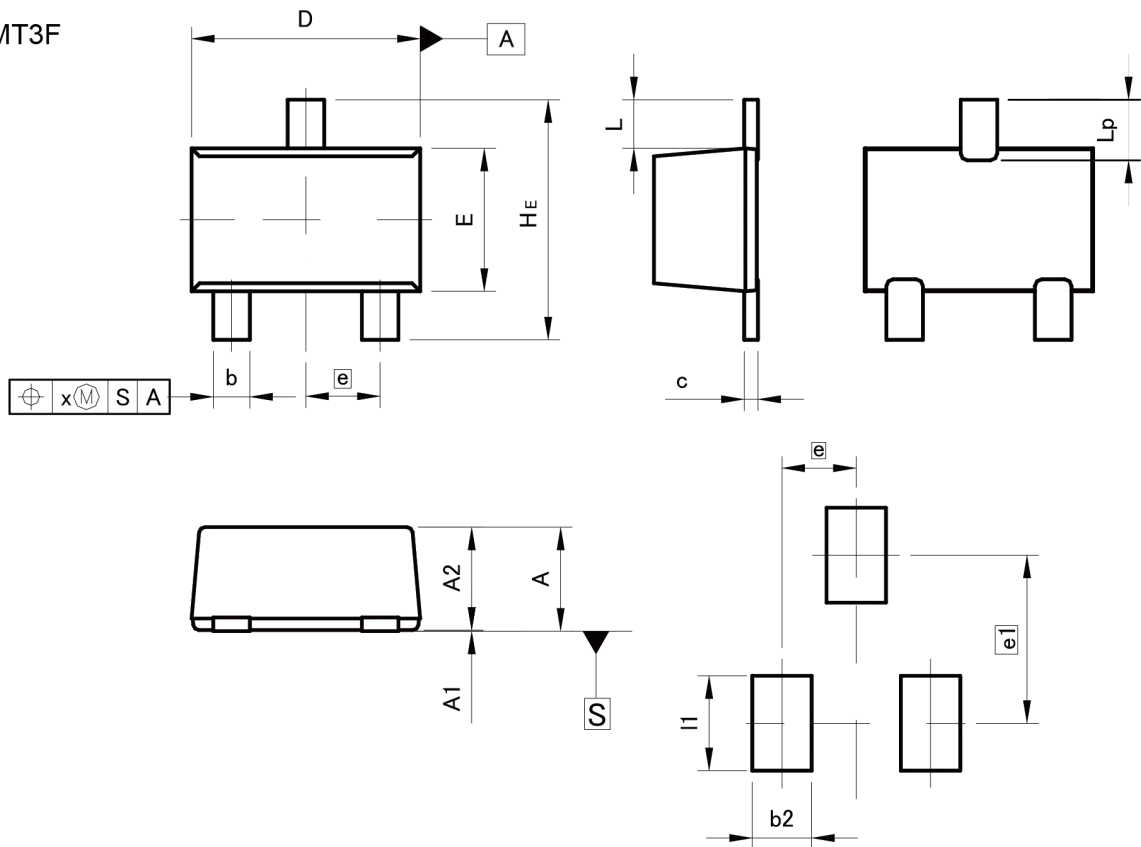
Pattern of terminal position areas
[Not a recommended pattern of soldering pads]

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

Dimension in mm/inches

●Dimensions

UMT3F



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

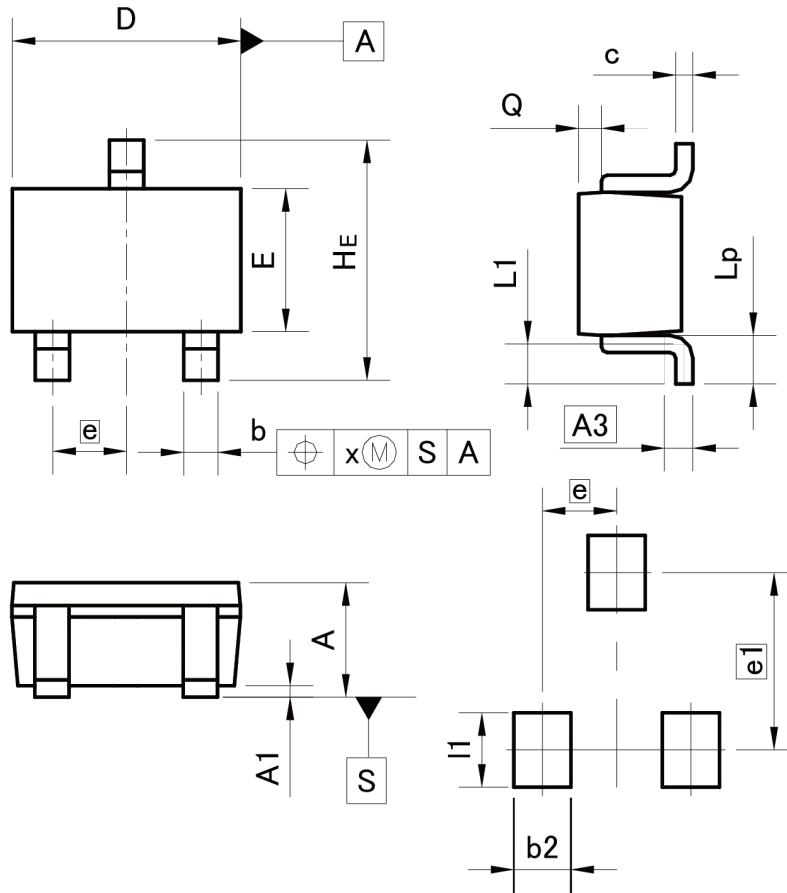
| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.85 | 1.05 | 0.033 | 0.041 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.80 | 1.00 | 0.031 | 0.039 |
| b | 0.27 | 0.42 | 0.011 | 0.017 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.90 | 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]

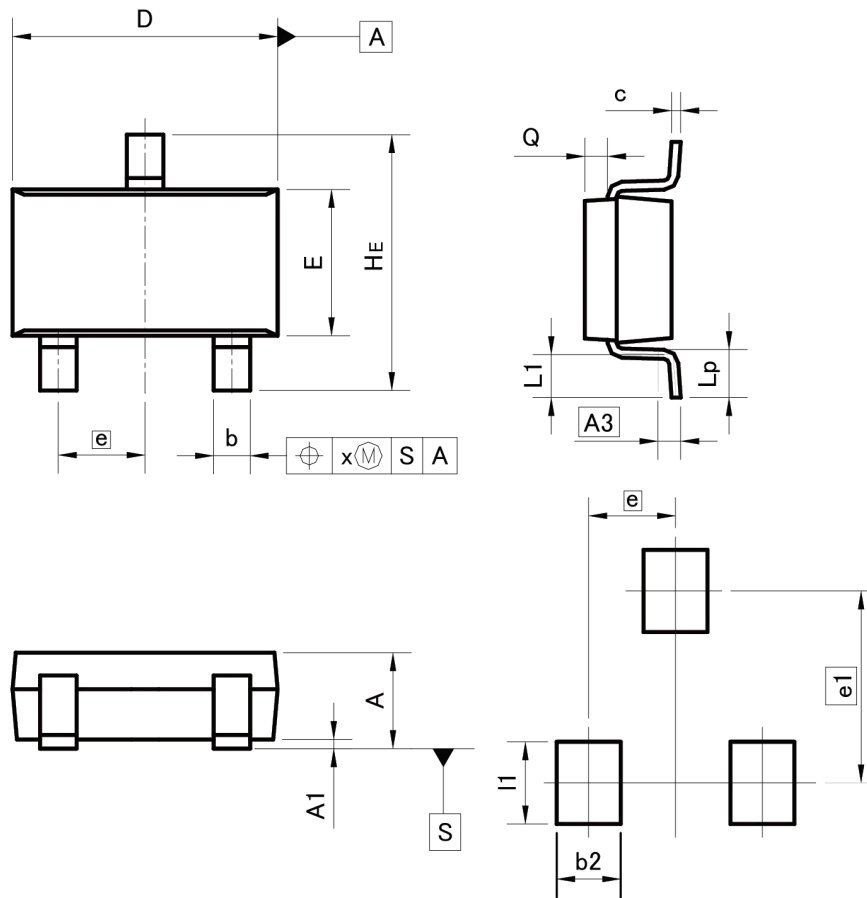
| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.80 | 1.00 | 0.031 | 0.039 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A3 | 0.25 | | 0.010 | |
| b | 0.15 | 0.30 | 0.006 | 0.012 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 1.90 | 2.10 | 0.075 | 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 | |
| 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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