

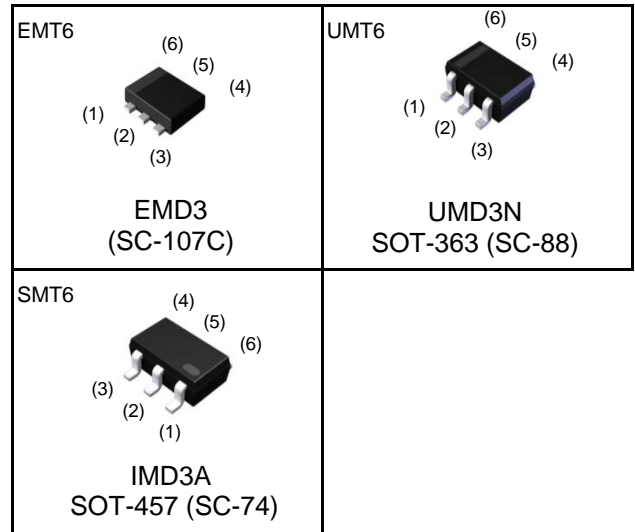
<For DTr1(NPN)>

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

<For DTr2(PNP)>

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

●Outline



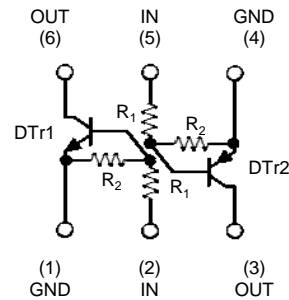
●Features

- 1) Both the DTC114E chip and DTA114E chip in one package.
- 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) Lead Free/RoHS Compliant.

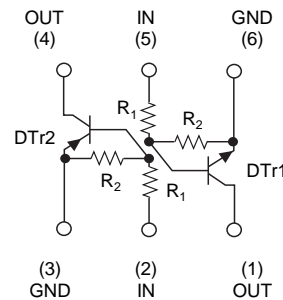
●Application

Inverter circuit, Interface circuit, Driver circuit

●Inner circuit



EMD3 / UMD3N



IMD3A

●Packaging specifications

| Part No. | Package | Package size (mm) | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit (pcs) | Marking |
|----------|---------|-------------------|-------------|----------------|-----------------|---------------------------|---------|
| EMD3 | EMT6 | 1616 | T2R | 180 | 8 | 8,000 | D3 |
| UMD3N | UMT6 | 2021 | TN | 180 | 8 | 3,000 | D3 |
| IMD3A | SMT6 | 2928 | T108 | 180 | 8 | 3,000 | D3 |

●Absolute maximum ratings (Ta = 25°C)

| Parameter | | Symbol | DTr1(NPN) | DTr2(PNP) | Unit |
|------------------------------|--------------|--------------------|---------------------------|------------|------|
| Supply voltage | | V_{CC} | 50 | -50 | V |
| Input voltage | | V_{IN} | -10 to +40 | -40 to +10 | V |
| Output current | | I_O | 50 | -50 | mA |
| Collector current | | $I_{C(MAX.)}^{*1}$ | 100 | -100 | mA |
| Power dissipation | EMD3 / UMD3N | P_D^{*2} | 150 (Total) ^{*3} | | mW |
| | IMD3A | | 300 (Total) ^{*4} | | mW |
| Junction temperature | | T_j | 150 | | °C |
| Range of storage temperature | | T_{stg} | -55 to +150 | | °C |

●Electrical characteristics (Ta = 25°C) <For DTr1(NPN)>

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|----------------------|--------------|--|------|------|------|------------|
| Input voltage | $V_{I(off)}$ | $V_{CC} = 5V, I_O = 100\mu A$ | - | - | 0.5 | V |
| | $V_{I(on)}$ | $V_O = 0.3V, I_O = 10mA$ | 3.0 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O / I_I = 10mA / 0.5mA$ | - | 0.1 | 0.3 | V |
| Input current | I_I | $V_I = 5V$ | - | - | 0.88 | mA |
| Output current | $I_{O(off)}$ | $V_{CC} = 50V, V_I = 0V$ | - | - | 0.5 | μA |
| DC current gain | G_I | $V_O = 5V, I_O = 5mA$ | 30 | - | - | - |
| Input resistance | R_1 | - | 7 | 10 | 13 | k Ω |
| Resistance ratio | R_2/R_1 | - | 0.8 | 1 | 1.2 | - |
| Transition frequency | f_T^{*1} | $V_{CE} = 10V, I_E = -5mA$ $f = 100MHz$ | - | 250 | - | MHz |

●Electrical characteristics (Ta = 25°C) <For DTr2(PNP)>

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|----------------------|--------------|--|------|------|-------|------------|
| Input voltage | $V_{I(off)}$ | $V_{CC} = -5V, I_O = -100\mu A$ | - | - | -0.5 | V |
| | $V_{I(on)}$ | $V_O = -0.3V, I_O = -10mA$ | -3.0 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O / I_I = -10mA / -0.5mA$ | - | -0.1 | -0.3 | V |
| Input current | I_I | $V_I = -5V$ | - | - | -0.88 | mA |
| Output current | $I_{O(off)}$ | $V_{CC} = -50V, V_I = 0V$ | - | - | -0.5 | μA |
| DC current gain | G_I | $V_O = -5V, I_O = -5mA$ | 30 | - | - | - |
| Input resistance | R_1 | - | 7 | 10 | 13 | k Ω |
| Resistance ratio | R_2/R_1 | - | 0.8 | 1 | 1.2 | - |
| Transition frequency | f_T^{*1} | $V_{CE} = -10V, I_E = 5mA$ $f = 100MHz$ | - | 250 | - | MHz |

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference footprint

*3 120mW per element must not be exceeded.

*4 200mW per element must not be exceeded.

●Electrical characteristic curves (Ta = 25°C) <For DTr1(NPN)>

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

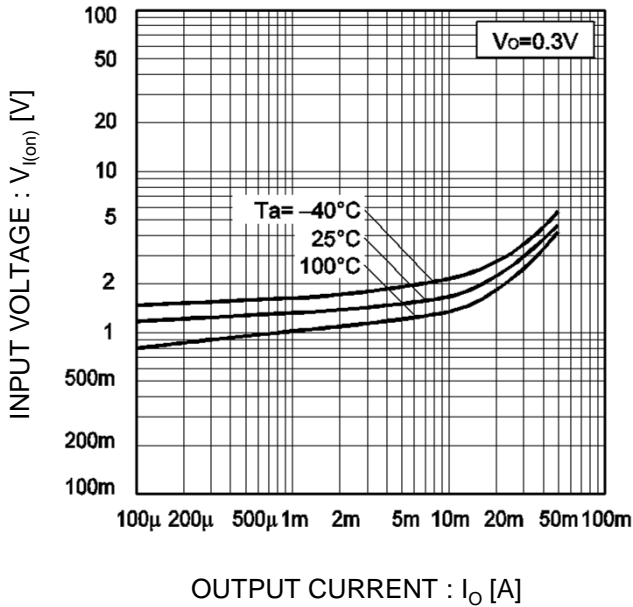


Fig.2 Output current vs. input voltage (OFF characteristics)

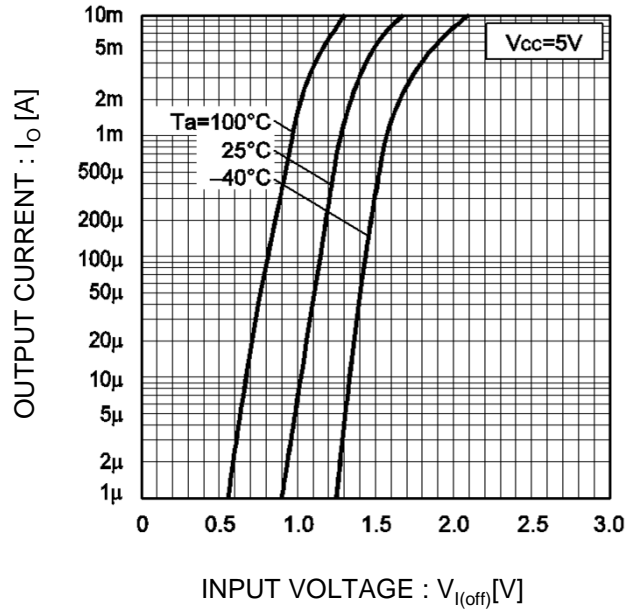


Fig.3 Output current vs. output voltage

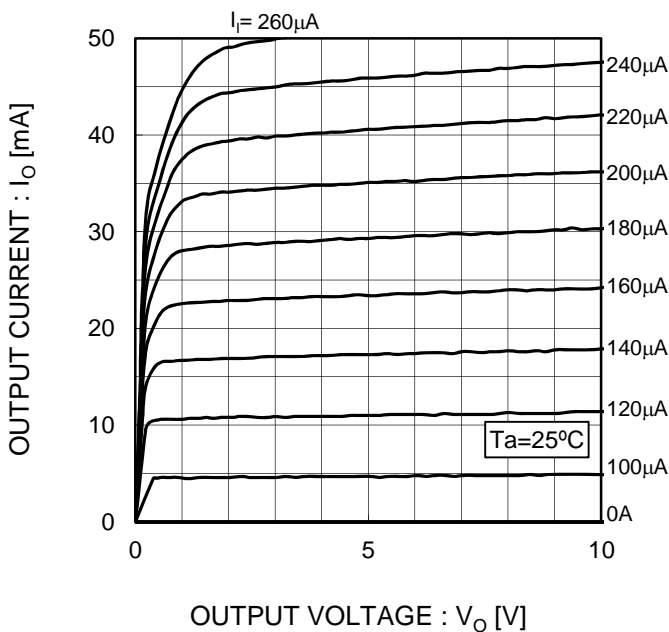
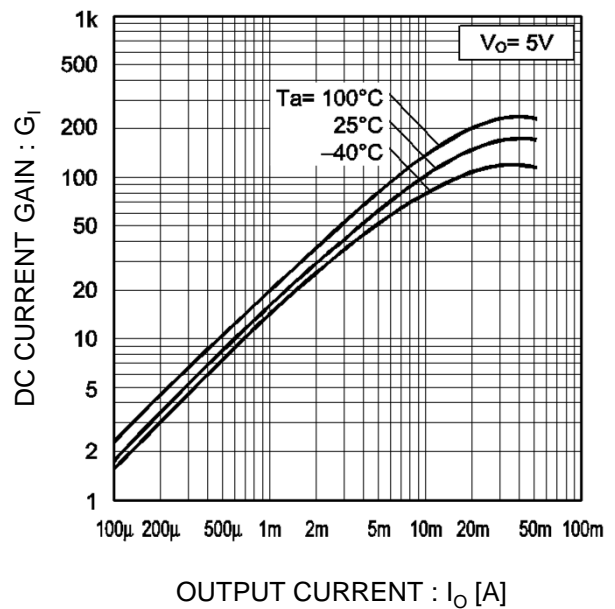
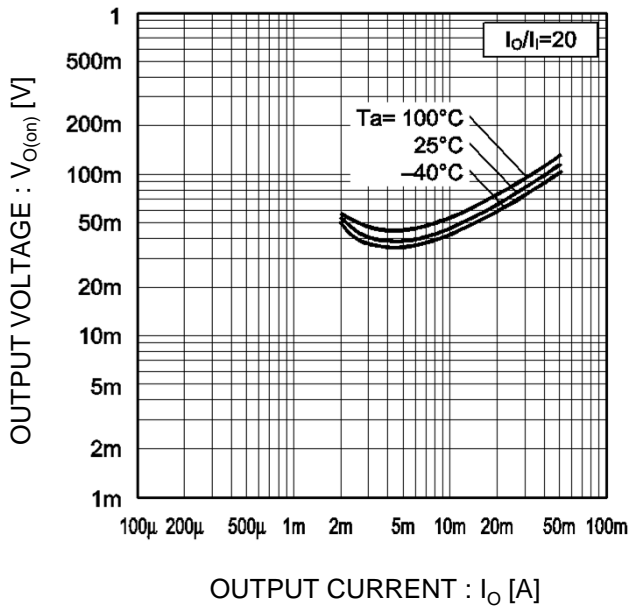


Fig.4 DC current gain vs. output current



●Electrical characteristic curves (Ta = 25°C) <For DTr1(NPN)>

Fig.5 Output voltage vs. output current



●Electrical characteristic curves (Ta = 25°C) <For DTr2(PNP)>

Fig.6 Input voltage vs. output current (ON characteristics)

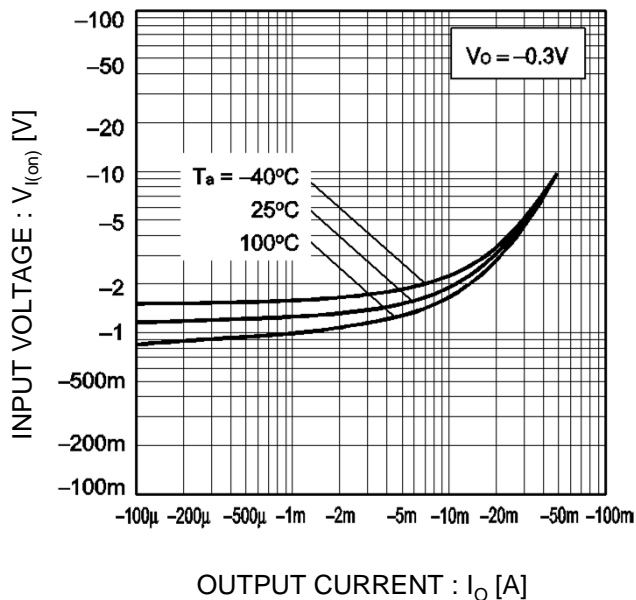
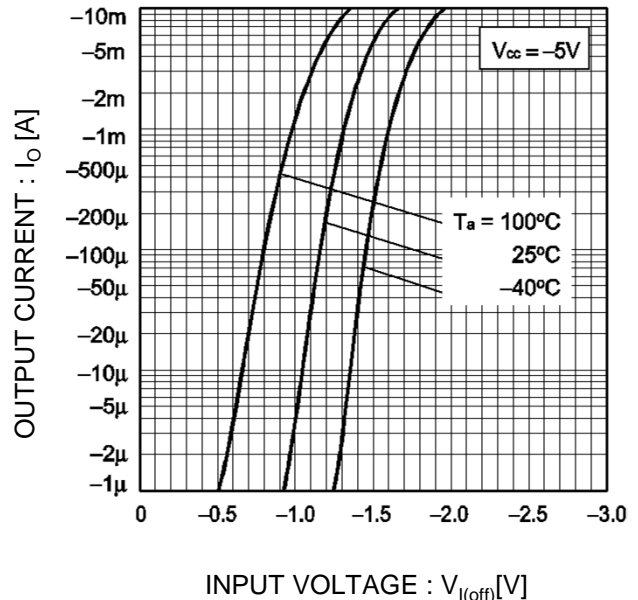


Fig.7 Output current vs. input voltage (OFF characteristics)



●Electrical characteristic curves (Ta = 25°C) <For DTr2(PNP)>

Fig.8 Output current vs. output voltage

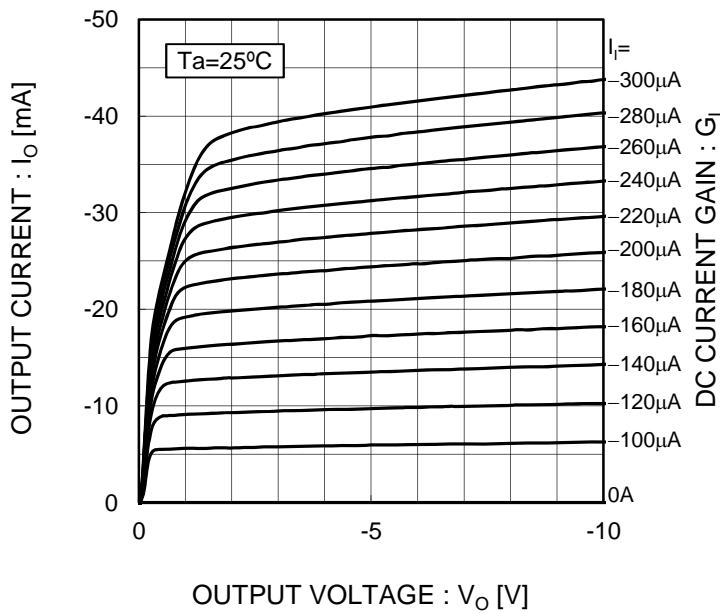


Fig.9 DC current gain vs. output current

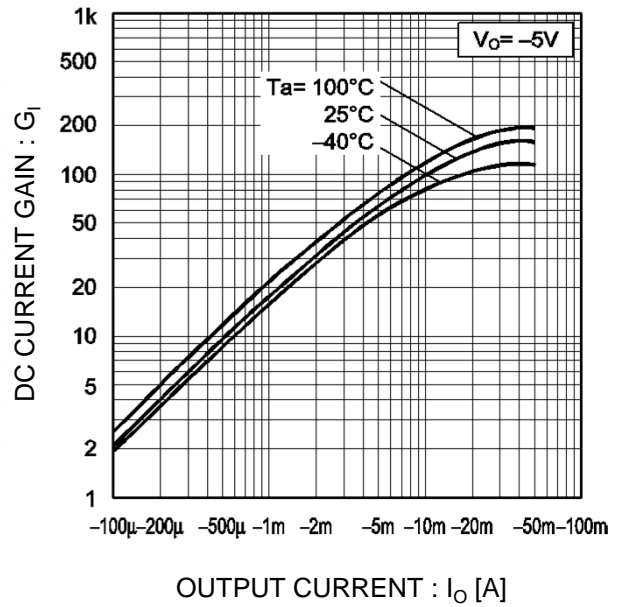
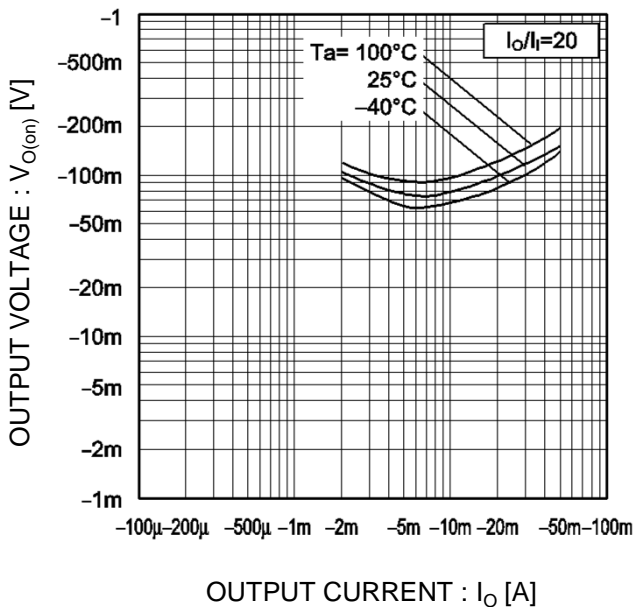
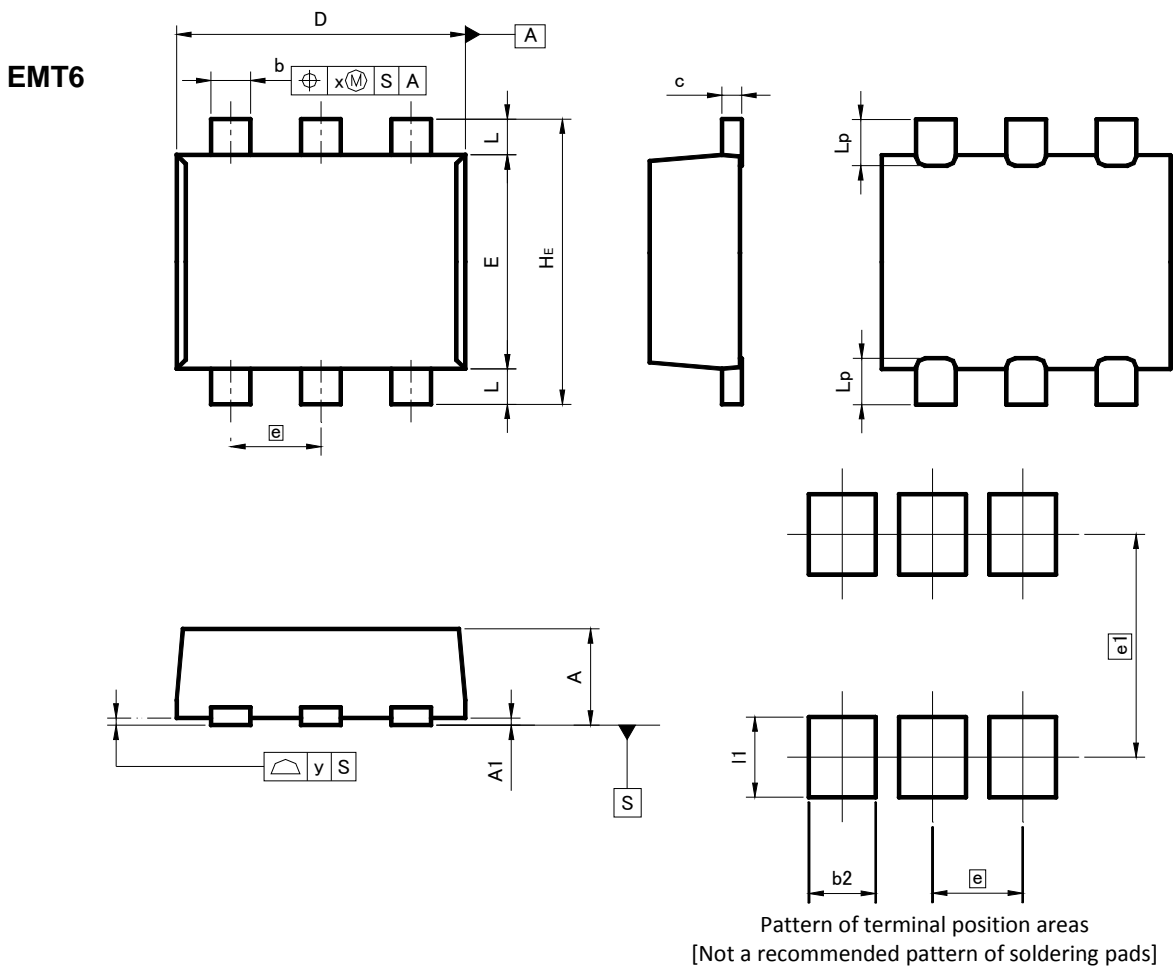


Fig.10 Output voltage vs. output current



●Dimensions (Unit : mm)



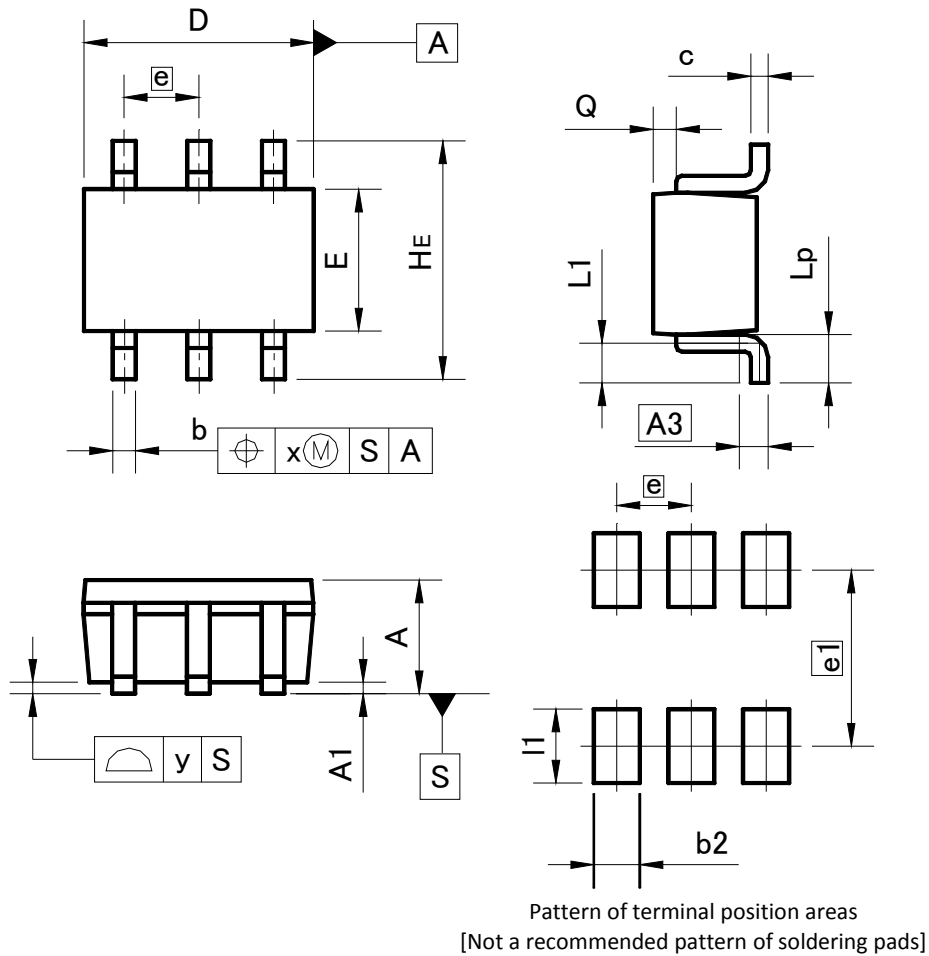
| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.45 | 0.55 | 0.018 | 0.022 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.17 | 0.27 | 0.007 | 0.011 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.50 | 1.70 | 0.059 | 0.067 |
| E | 1.10 | 1.30 | 0.043 | 0.051 |
| e | 0.50 | | 0.020 | |
| HE | 1.50 | 1.70 | 0.059 | 0.067 |
| L | 0.10 | 0.30 | 0.004 | 0.012 |
| Lp | - | 0.35 | - | 0.014 |
| x | - | 0.10 | - | 0.004 |
| y | - | 0.10 | - | 0.004 |

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| b2 | - | 0.37 | - | 0.015 |
| e1 | 1.25 | | 0.049 | |
| l1 | - | 0.45 | - | 0.018 |

Dimension in mm / inches

●Dimensions (Unit : mm)

UMT6



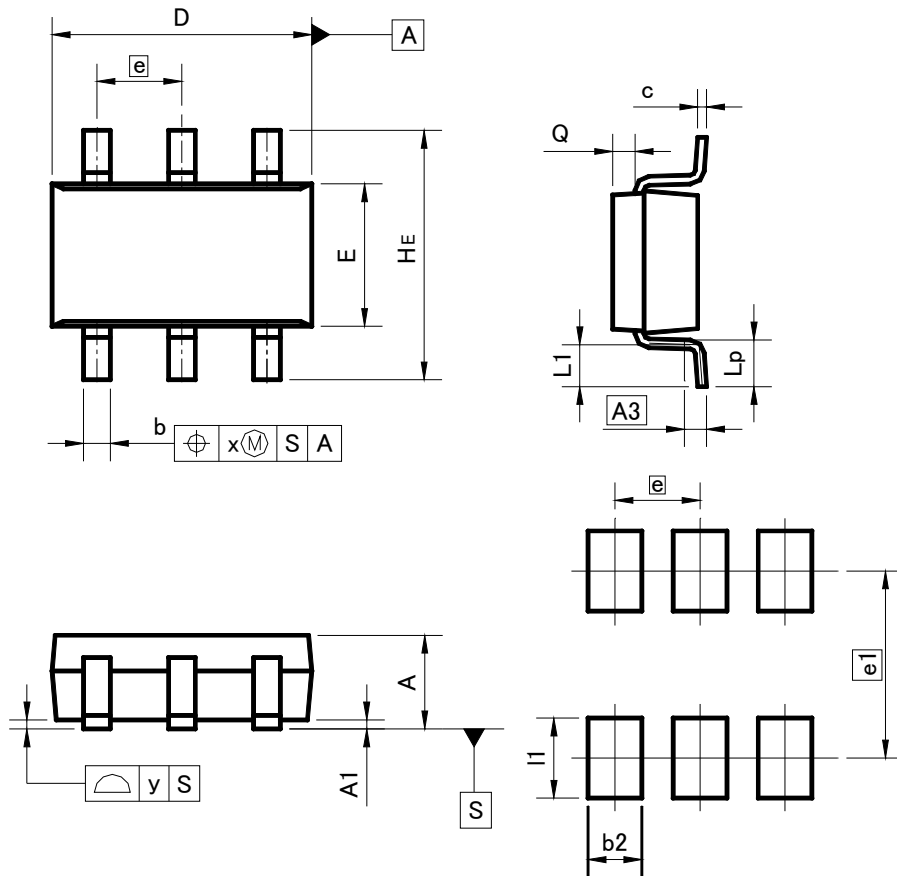
| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.80 | 1.00 | 0.031 | 0.039 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A3 | 0.25 | | 0.010 | |
| b | 0.15 | 0.30 | 0.006 | 0.012 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 1.90 | 2.10 | 0.075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

| DIM | MILIMETERS | | INCHES | |
|-----|------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| b2 | - | 0.40 | - | 0.016 |
| e1 | 1.55 | | 0.061 | |
| l1 | - | 0.65 | - | 0.026 |

Dimension in mm / inches

●Dimensions (Unit : mm)

SMT6



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 | 0.25 | 0.40 | 0.010 | 0.016 |
| 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 | - | 0.20 | - | 0.008 |
| 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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