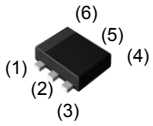
# EMB10 / UMB10N / IMB10A

**PNP -100mA -50V Complex Digital Transistors (Bias Resistor Built-in Transistors)** Datasheet

| Parameter | Tr1 and Tr2 |
|---|---|
| $V_{CC}$ | −50V |
| $I_{C(MAX.)}$ | −100mA |
| $R_1$ | 2.2kΩ |
| $R_2$ | 47kΩ |

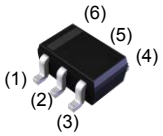
## ●Outline

EMT6



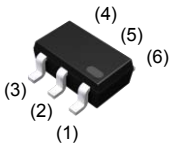

EMB10
(SC-107C)

UMT6




UMB10N
SOT-353 (SC-88)

SMT6



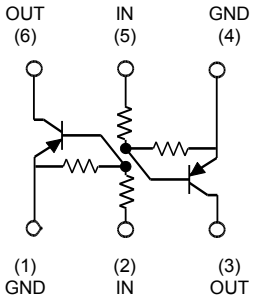

IMB10A
SOT-457 (SC-74)

## ●Features

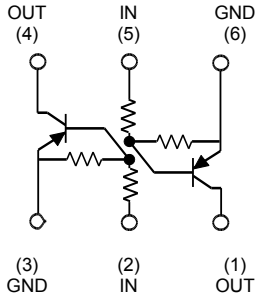
1) Built-In Biasing Resistors.
2) Two DTA123J chips in one package.
3) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
4) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of completely eliminating parasitic effects.
5) Only the on/off conditions need to be set for operation, making the circuit design easy.
6) Lead Free/RoHS Compliant.

## ●Inner circuit

EMB10 / UMB10N




IMB10A




## ●Application

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 |
|---|---|---|---|---|---|---|---|
| EMB10 | EMT6 | 1616 | T2R | 180 | 8 | 8,000 | B10 |
| UMB10N | UMT6 | 2021 | TR | 180 | 8 | 3,000 | B10 |
| IMB10A | SMT6 | 2928 | T108 | 180 | 8 | 3,000 | B10 |


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## ●Absolute maximum ratings (Ta = 25°C)

<For Tr1 and Tr2 in common>

| Parameter | | Symbol | Values | Unit |
|---|---|---|---|---|
| Supply voltage | | $V_{CC}$ | −50 | V |
| Input voltage | | $V_{IN}$ | −12 to +5 | V |
| Output current | | $I_O$ | −100 | mA |
| Collector current | | $I_{C(MAX.)}$ *1 | −100 | mA |
| Power dissipation | EMB10 / UMB10N | $P_D$ *2 | 150 (Total) *3 | mW |
| | IMB10A | | 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 Tr1 and Tr2 in common>

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Input voltage | $V_{I(off)}$ | $V_{CC}$ = −5V, $I_O$ = −100μA | - | - | −0.5 | V |
| | $V_{I(on)}$ | $V_O$ = −0.3V, $I_O$ = −5mA | −1.1 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O$ / $I_I$ = −5mA / −0.25mA | - | −0.1 | −0.3 | V |
| Input current | $I_I$ | $V_I$ = −5V | - | - | −3.6 | mA |
| Output current | $I_{O(off)}$ | $V_{CC}$ = −50V, $V_I$ = 0V | - | - | −0.5 | μA |
| DC current gain | $G_I$ | $V_O$ = −5V, $I_O$ = −10mA | 80 | - | - | - |
| Input resistance | $R_1$ | - | 1.54 | 2.2 | 2.86 | kΩ |
| Resistance ratio | $R_2/R_1$ | - | 17 | 21 | 26 | - |
| 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.


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## ●Electrical characteristic curves(Ta = 25°C)

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

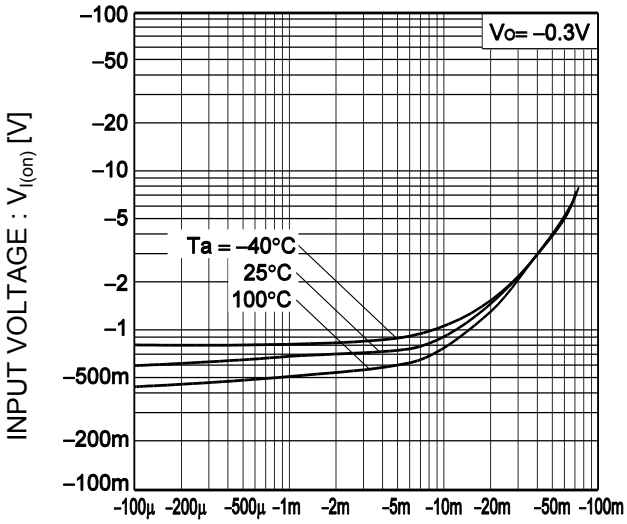



Fig.2 Output current vs. input voltage (OFF characteristics)

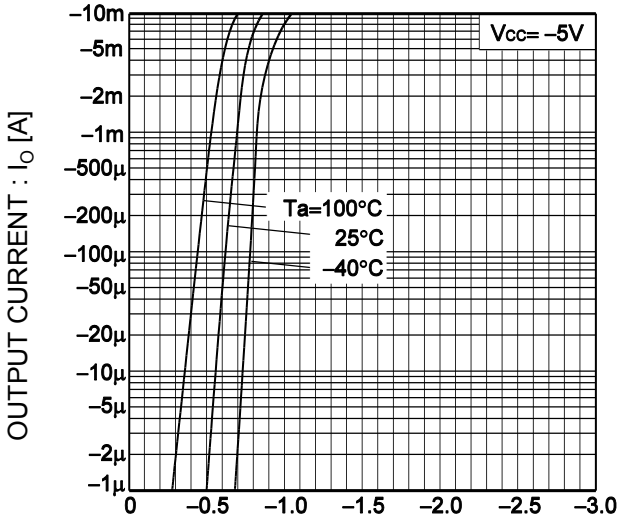



Fig.3 Output current vs. output voltage

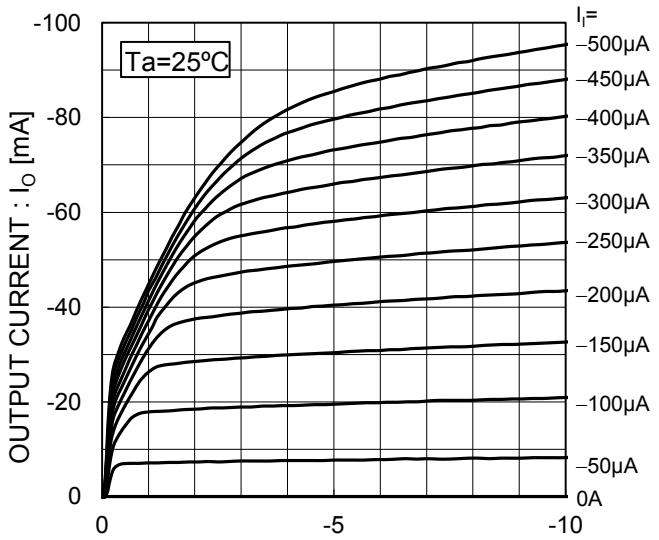
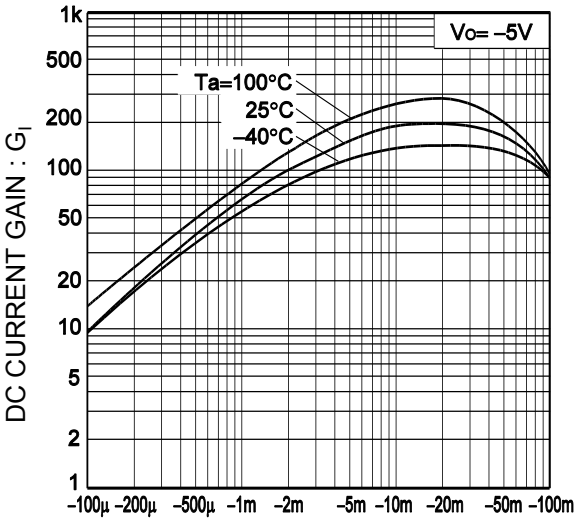



Fig.4 DC current gain vs. output current

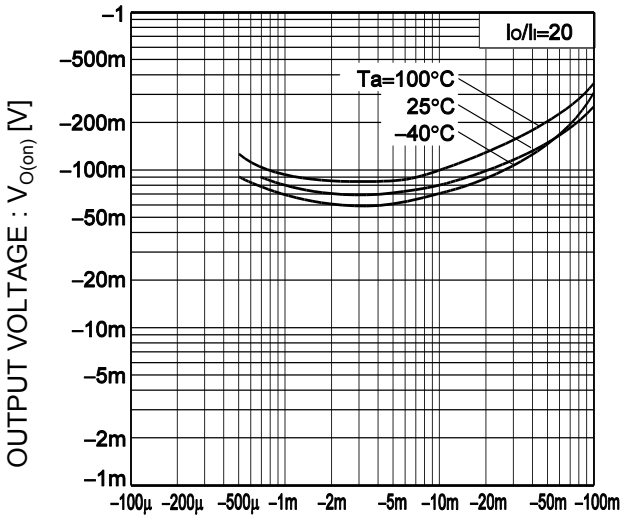




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●**Electrical characteristic curves**(Ta = 25°C)

Fig.5 Output voltage vs. output current

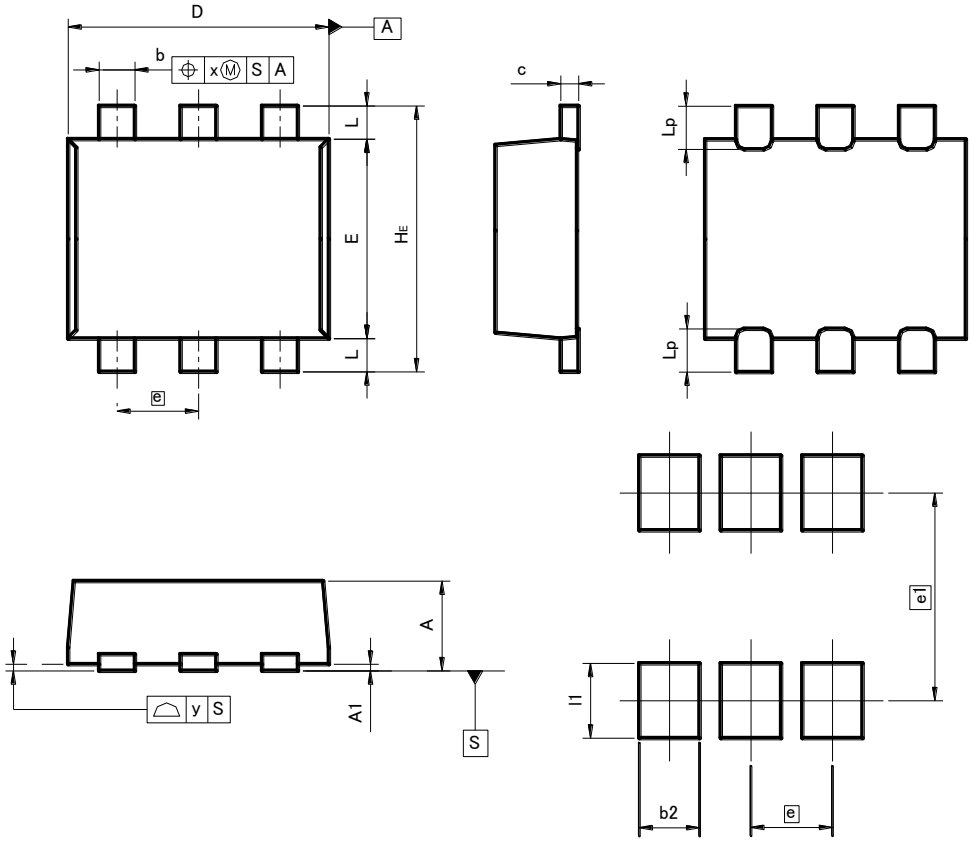




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●**Dimensions** (Unit : mm)

**EMT6**




**Patterm of terminal position areas**

| DIM | MILIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A1 | 0.00 | 0.10 | 0 | 0.004 |
| A | 0.45 | 0.55 | 0.018 | 0.022 |
| 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 | | 0.02 | |
| 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 |

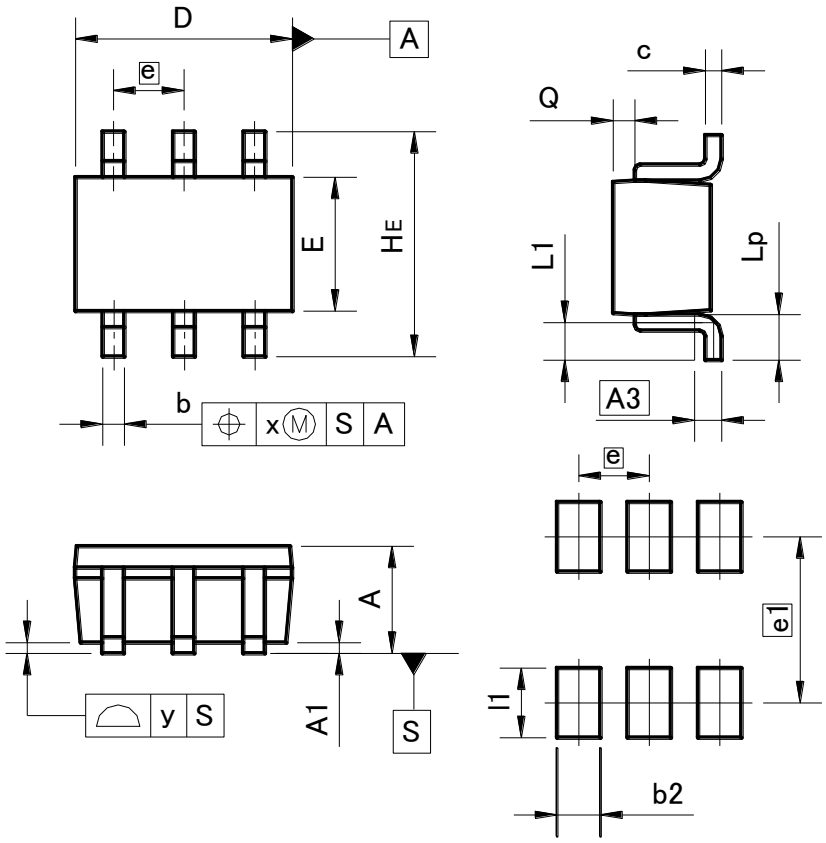
| DIM | MILIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| e1 | 1.25 | | 0.049 | |
| b2 | – | 0.37 | – | 0.015 |
| l1 | – | 0.45 | – | 0.018 |

Dimension in mm/inches


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●**Dimensions** (Unit : mm)

**UMT6**




**Patterm of terminal position areas**

| DIM | MILIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 0.80 | 1.00 | − | 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 |
| y | − | 0.10 | − | 0.004 |

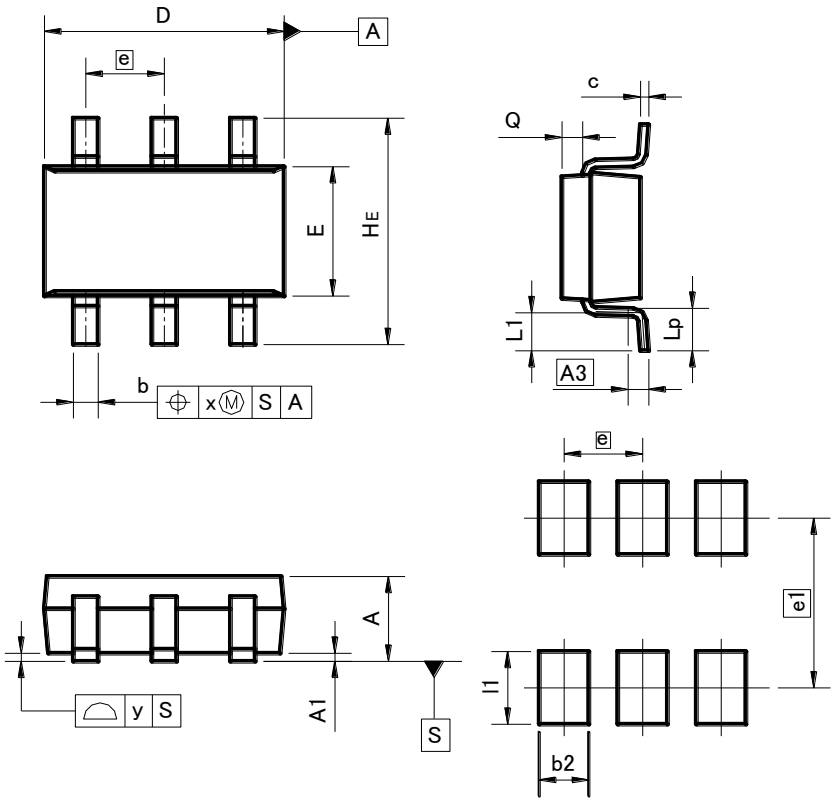
| DIM | MILIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| e1 | 1.55 | | 0.06 | |
| b2 | − | 0.40 | − | 0.016 |
| l1 | − | 0.65 | − | 0.026 |

Dimension in mm/inches


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●**Dimensions** (Unit : mm)

**SMT6**




**Patterm of terminal position areas**

| DIM | MILIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 1.00 | 1.30 | 0.039 | 0.051 |
| A1 | 0.00 | 0.10 | 0 | 0.004 |
| A3 | 0.25 | | 0.01 | |
| b | 0.25 | 0.40 | 0.01 | 0.016 |
| 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 | − | 0.20 | − | 0.008 |
| 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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