

| Parameter     | Tr1 and Tr2  |
|---------------|--------------|
| $V_{CC}$      | 50V          |
| $I_{C(MAX.)}$ | 100mA        |
| $R_1$         | 22k $\Omega$ |
| $R_2$         | 22k $\Omega$ |

### ●Features

- 1) Built-In Biasing Resistors,  $R_1 = R_2 = 22k\Omega$ .
- 2) Two DTC124E chips in one package.
- 3) Emitter(GND)-common type.
- 4) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- 5) 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.
- 6) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 7) Lead Free/RoHS Compliant.

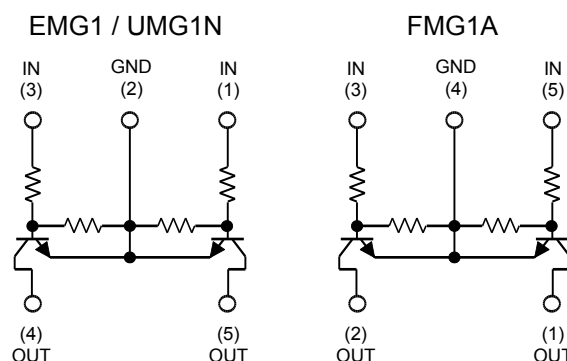
### ●Application

Inverter circuit, Interface circuit, Driver circuit

### ●Outline

|                                        |                                               |
|----------------------------------------|-----------------------------------------------|
| <p>EMT5</p> <p>EMG1<br/>(SC-107BB)</p> | <p>UMT5</p> <p>UMG1N<br/>SOT-353 (SC-88A)</p> |
| <p>SMT5</p> <p>FMG1A<br/>(SC-74A)</p>  |                                               |

### ●Inner circuit



### ●Packaging specifications

| Part No. | Package | Package size (mm) | Taping code | Reel size (mm) | Tape width (mm) | Basic ordering unit (pcs) | Marking |
|----------|---------|-------------------|-------------|----------------|-----------------|---------------------------|---------|
| EMG1     | EMT5    | 1616              | T2R         | 180            | 8               | 8,000                     | G1      |
| UMG1N    | UMT5    | 2021              | TR          | 180            | 8               | 3,000                     | G1      |
| FMG1A    | SMT5    | 2928              | T148        | 180            | 8               | 3,000                     | G1      |

●Absolute maximum ratings (Ta = 25°C)

<For Tr1 and Tr2 in common>

| Parameter                    |               | Symbol             | Values                    | Unit |
|------------------------------|---------------|--------------------|---------------------------|------|
| Supply voltage               |               | $V_{CC}$           | 50                        | V    |
| Input voltage                |               | $V_{IN}$           | -10 to +40                | V    |
| Output current               |               | $I_O$              | 30                        | mA   |
| Collector current            |               | $I_{C(MAX.)}^{*1}$ | 100                       | mA   |
| Power dissipation            | EMG1          | $P_D^{*2}$         | 150 (Total) <sup>*3</sup> | mW   |
|                              | UMG1N / FMG1A |                    | 300 (Total) <sup>*4</sup> | 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        | $V_{I(off)}$ | $V_{CC} = 5V, I_O = 100\mu A$               | -    | -    | 0.5  | V          |
|                      | $V_{I(on)}$  | $V_O = 0.2V, I_O = 5mA$                     | 3    | -    | -    |            |
| Output voltage       | $V_{O(on)}$  | $I_O / I_I = 10mA / 0.5mA$                  | -    | 0.1  | 0.3  | V          |
| Input current        | $I_I$        | $V_I = 5V$                                  | -    | -    | 0.36 | mA         |
| Output current       | $I_{O(off)}$ | $V_{CC} = 50V, V_I = 0V$                    | -    | -    | 0.5  | $\mu A$    |
| DC current gain      | $G_I$        | $V_O = 5V, I_O = 5mA$                       | 56   | -    | -    | -          |
| Input resistance     | $R_1$        | -                                           | 15.4 | 22   | 28.6 | 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

\*3 120mW per element must not be exceeded.

\*4 200mW per element must not be exceeded.

●Electrical characteristic curves(Ta = 25°C)

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

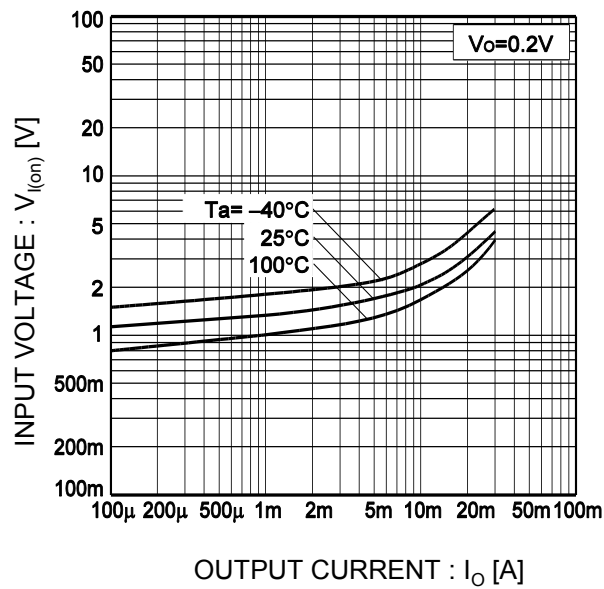


Fig.2 Output current vs. input voltage (OFF characteristics)

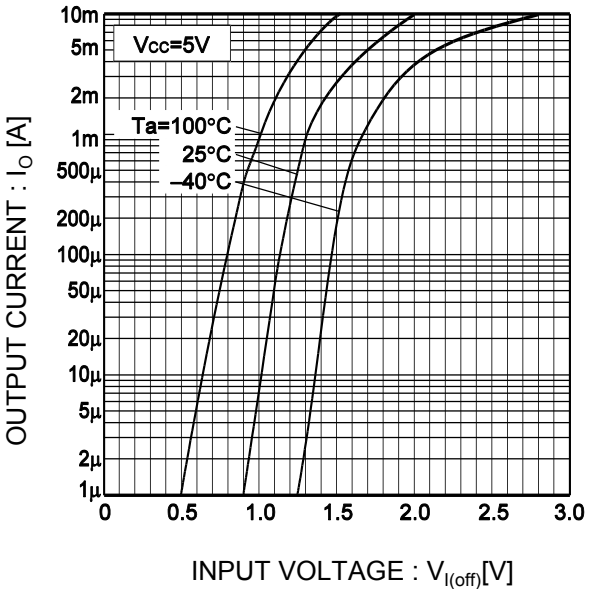


Fig.3 Output current vs. output voltage

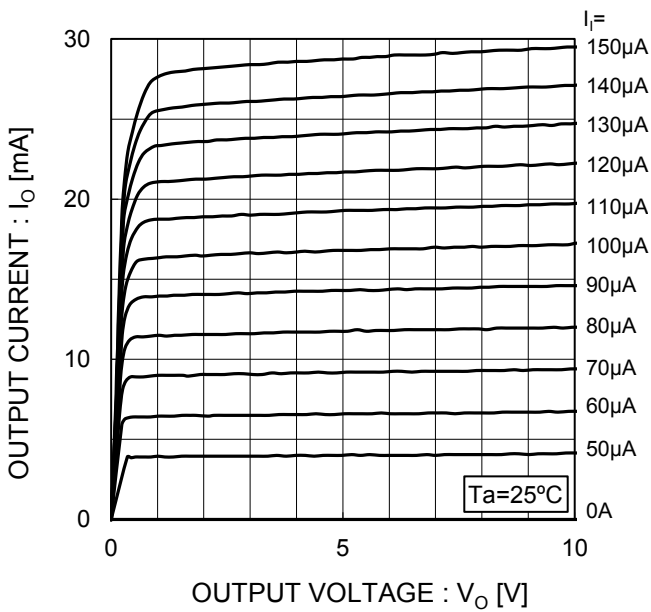
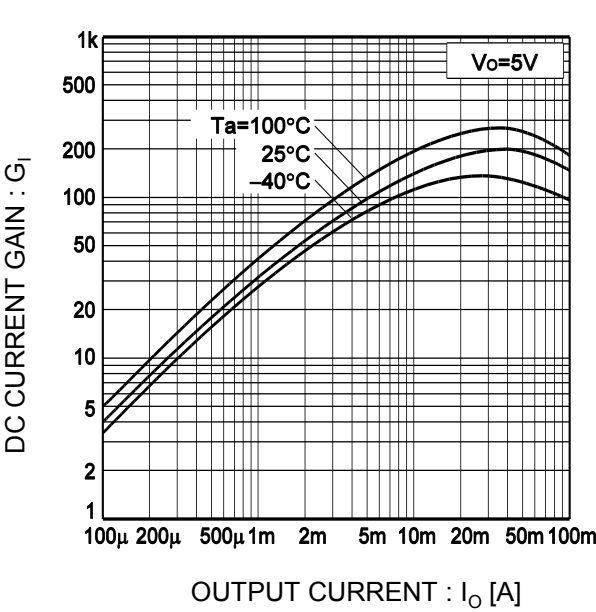
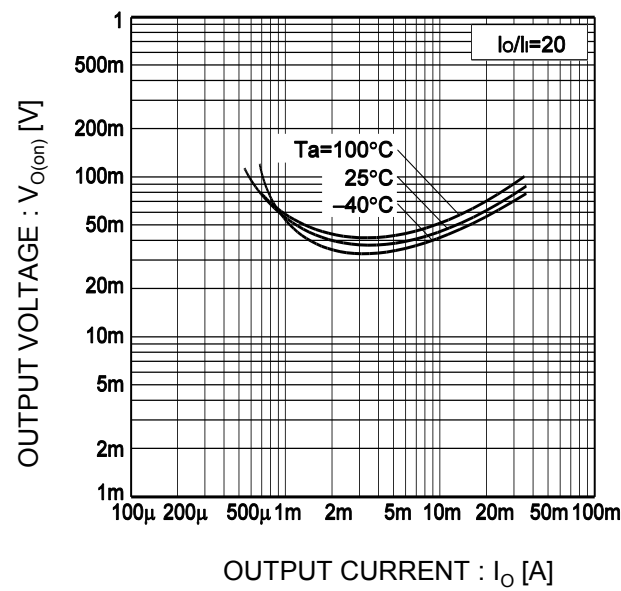


Fig.4 DC current gain vs. output current



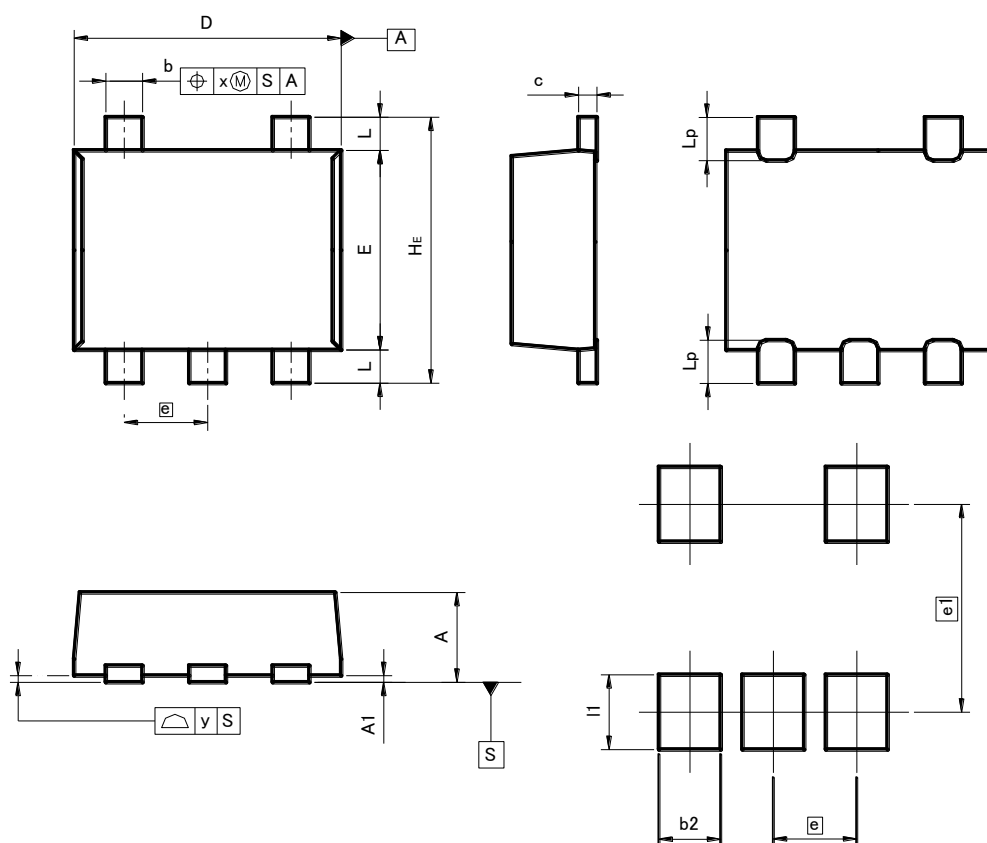
●Electrical characteristic curves(Ta = 25°C)

Fig.5 Output voltage vs. output current



## ●Dimensions (Unit : mm)

## EMT5

Pattern of terminal position areas

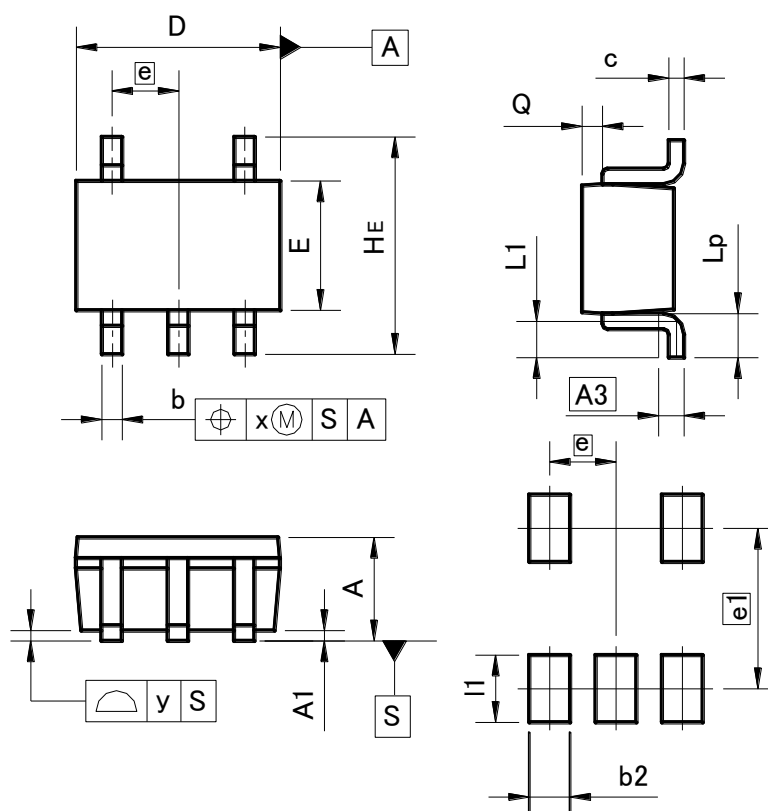
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A1  | 0.00       | 0.10 | 0      | 0.004 |
| A   | 0.45       | 0.55 | 0.018  | 0.022 |
| b   | 0.17       | 0.27 | 0.007  | 0.011 |
| c   | 0.08       | 0.18 | 0.003  | 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

## ●Dimensions (Unit : mm)

## UMT5



Pattern of terminal position areas

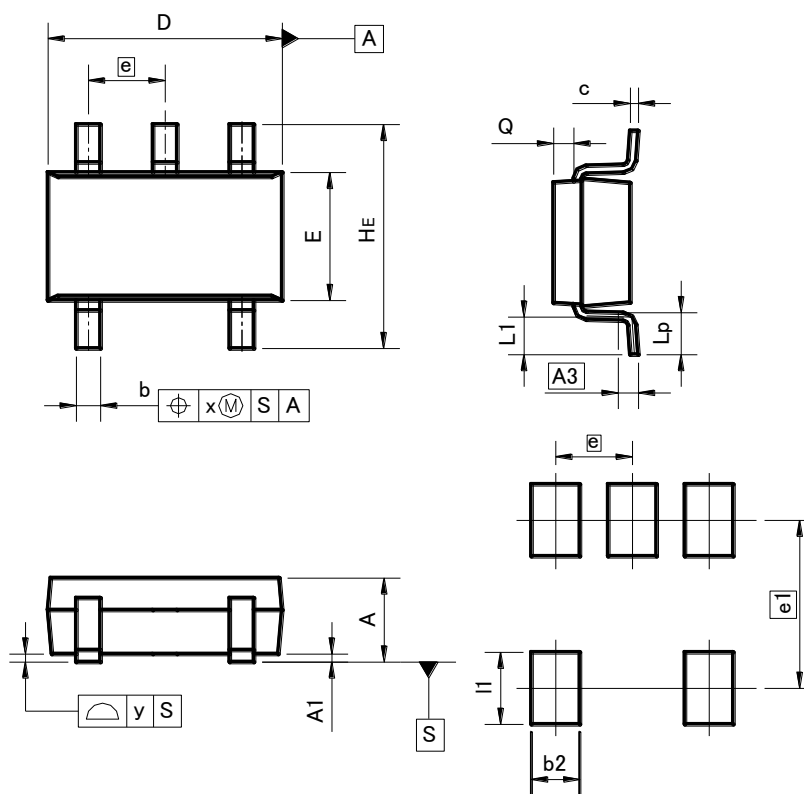
| DIM | MILIMETERS |      | INCHES |       |
|-----|------------|------|--------|-------|
|     | MIN        | MAX  | MIN    | MAX   |
| A   | 0.80       | 1.00 | 0.031  | 0.039 |
| A1  | 0.00       | 0.10 | 0      | 0.004 |
| A3  | 0.25       |      | 0.01   |       |
| b   | 0.15       | 0.30 | 0.006  | 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 |
| 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

## ●Dimensions (Unit : mm)

## SMT5



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   | 0.25       | 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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