# Digital transistors (built-in resistors)

## DTC124EE / DTC124EUA / DTC124EKA
## DTC124ECA / DTC124ESA

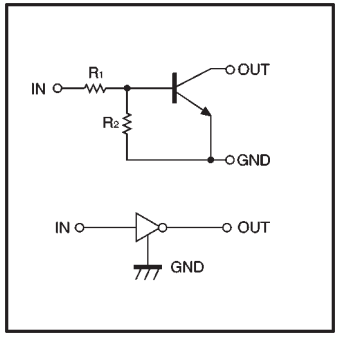
●Features

1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
3) Only the on / off conditions need to be set for operation, making device design easy.

●Structure

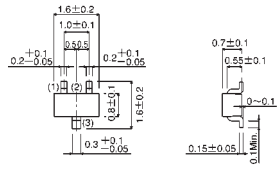
NPN digital transistor
(with built-in resistors)

●Equivalent circuit




●External dimensions (Units: mm)

DTC124EE

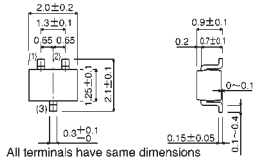


ROHM : EMT3

Addreviated symbol : 25

(1) GND
(2) IN
(3) OUT

DTC124EUA



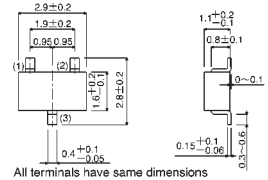
ROHM : UMT3
EIAJ : SC-70

All terminals have same dimensions

Addreviated symbol : 25

(1) GND
(2) IN
(3) OUT

DTC124EKA



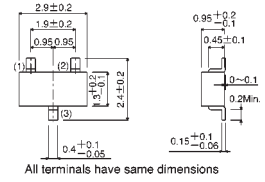
ROHM : SMT3
EIAJ : SC-59

All terminals have same dimensions

Addreviated symbol : 25

(1) GND
(2) IN
(3) OUT

DTC124ECA



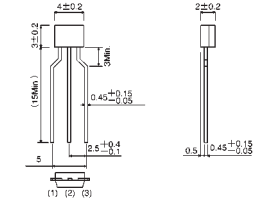
ROHM : SST3

All terminals have same dimensions

Addreviated symbol : 25

(1) GND
(2) IN
(3) OUT

DTC124ESA



ROHM : SPT
EIAJ : SC-72

(1) GND
(2) OUT
(3) IN

(96-323-C124E)

●Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits(DTC124E□) | | | | | Unit |
|---|---|---|---|---|---|---|---|
| | | E | UA | KA | CA | SA | |
| Supply voltage | $V_{CC}$ | 50 | | | | | V |
| Input voltage | $V_{IN}$ | −10～+40 | | | | | V |
| Output current | $I_O$ | 30 | | | | | mA |
| | $I_{C(Max.)}$ | 100 | | | | | |
| Power dissipation | Pd | 150 | 200 | | | 300 | mW |
| Junction temperature | Tj | 150 | | | | | ℃ |
| Storage temperature | Tstg | −55～+150 | | | | | ℃ |

●Electrical characteristics (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Input voltage | $V_{I(off)}$ | — | — | 0.5 | V | $V_{CC}$=5V, $I_O$=100 μA |
| | $V_{I(on)}$ | 3 | — | — | | $V_O$=0.2V, $I_O$=5mA |
| Output voltage | $V_{O(on)}$ | — | 0.1 | 0.3 | V | $I_O/I_I$=10mA/0.5mA |
| Input current | $I_I$ | — | — | 0.36 | mA | $V_I$=5V |
| Output current | $I_{O(off)}$ | — | — | 0.5 | μA | $V_{CC}$=50V, $V_I$=0V |
| DC current gain | $G_I$ | 56 | — | — | — | $V_O$=5V, $I_O$=5mA |
| Input resistance | $R_1$ | 15.4 | 22 | 28.6 | kΩ | — |
| Resistance ratio | $R_2/R_1$ | 0.8 | 1 | 1.2 | — | — |
| Transition frequency | $f_T$ | — | 250 | — | MHz | $V_{CE}$=10V, $I_E$=−5mA, f=100MHz ✻ |

✻ Transition frequency of the device

●Packaging specifications

| Part No. | Package | EMT3 | UMT3 | SMT3 | SST3 | SPT |
|---|---|---|---|---|---|---|
| | Packaging type | Taping | Taping | Taping | Taping | Taping |
| | Code | TL | T106 | T146 | T116 | TP |
| | Basic ordering unit (pieces) | 3000 | 3000 | 3000 | 3000 | 5000 |
| DTC124EE | | ○ | — | — | — | — |
| DTC124EUA | | — | ○ | — | — | — |
| DTC124EKA | | — | — | ○ | — | — |
| DTC124ECA | | — | — | — | ○ | — |
| DTC124ESA | | — | — | — | — | ○ |

●Electrical characteristic curves

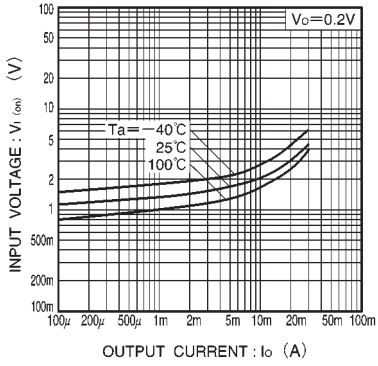



Fig.1 Input voltage vs. output current (ON characteristics)

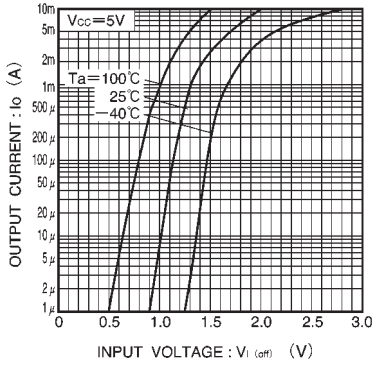



Fig.2 Output current vs. input voltage (OFF characteristics)

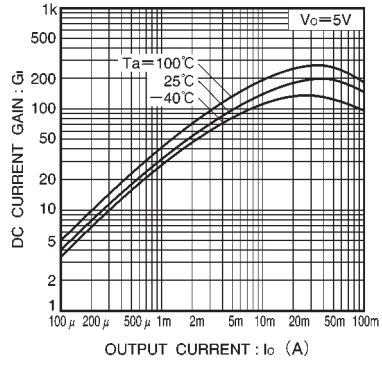



Fig.3 DC current gain vs. output current

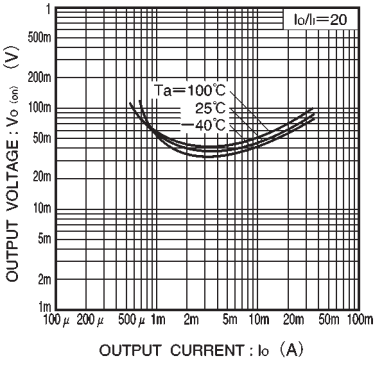



Fig.4 Output voltage vs. output current