# Bias Resistor Transistor

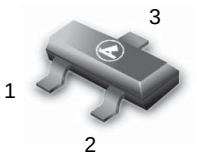
## NPN Silicon Surface Mount Transistor with Monolithic Bias Resistor Network

**LDTC123JLT1G**

- **Applications**
  Inverter, Interface, Driver

- **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 positive 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 the device design easy.

- We declare that the material of product compliance with RoHS requirements.

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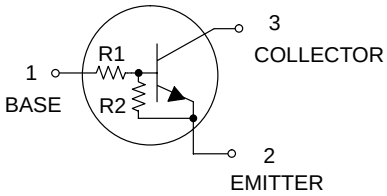



**●Absolute maximum ratings** (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Supply voltage | $V_{CC}$ | 50 | V |
| Input voltage | $V_{IN}$ | −5 to +12 | V |
| Output current | $I_O$ | 100 | mA |
| | $I_{C(Max.)}$ | 100 | |
| Power dissipation | Pd | 200 | mW |
| Junction temperature | Tj | 150 | °C |
| Storage temperature | Tstg | −55 to +150 | °C |

**DEVICE MARKING AND RESISTOR VALUES**

| Device | Marking | R1 (K) | R2 (K) | Shipping |
|---|---|---|---|---|
| LDTC123JLT1G | A8M | 2.2 | 47 | 3000/Tape & Reel |
| LDTC123JLT3G | A8M | 2.2 | 47 | 10000/Tape & Reel |

**●Electrical characteristics** (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Input voltage | $V_{I(off)}$ | – | – | 0.5 | V | $V_{CC}$=5V, $I_O$=100μA |
| | $V_{I(on)}$ | 1.1 | – | – | | $V_O$=0.3V, $I_O$=5mA |
| Output voltage | $V_{O(on)}$ | – | 0.1 | 0.3 | V | $I_O$/$I_I$=5mA/0.25mA |
| Input current | $I_I$ | – | – | 3.6 | mA | $V_I$=5V |
| Output current | $I_{O(off)}$ | – | – | 0.5 | μA | $V_{CC}$=50V, $V_I$=0V |
| DC current gain | $G_I$ | 80 | – | – | – | $V_O$=5V, $I_O$=10mA |
| Input resistance | $R_1$ | 1.54 | 2.2 | 2.86 | kΩ | – |
| Resistance ratio | $R_2/R_1$ | 17 | 21 | 26 | – | – |
| Transition frequency | $f_T$* | – | 250 | – | MHz | $V_{CE}$=10V, $I_E$= −5mA, f=100MHz |

*Characteristics of built-in transistor

**LDTC123JLT1G**

- **Electrical characteristic curves**

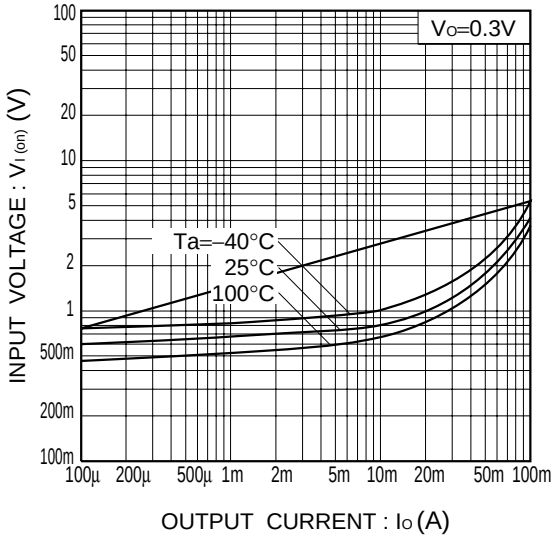



Fig.1 Input voltage vs. output current (ON characteristics)

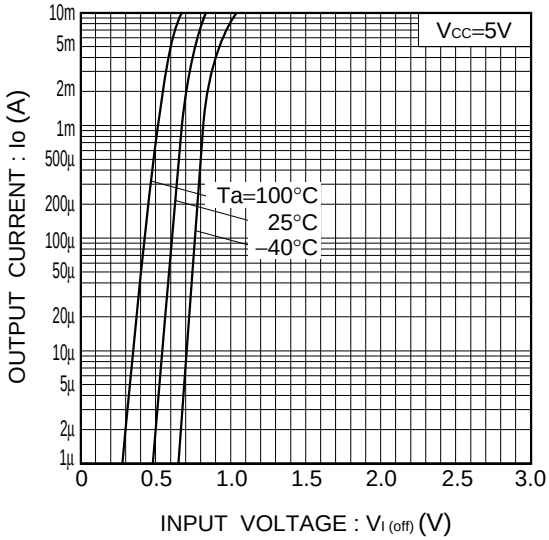



Fig.2 Output current vs. input voltage (OFF characteristics)

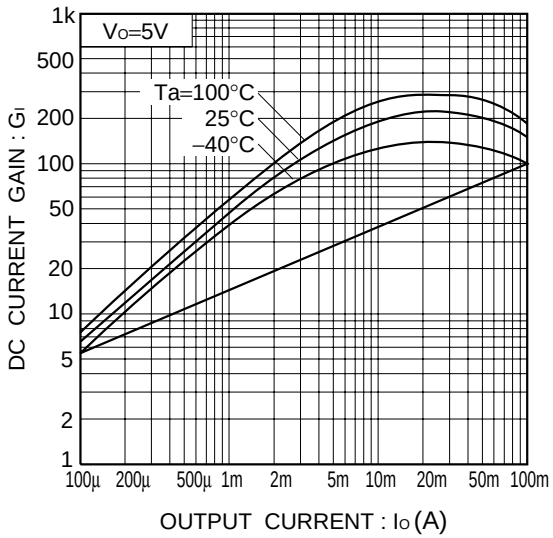



Fig.3 DC current gain vs. output current

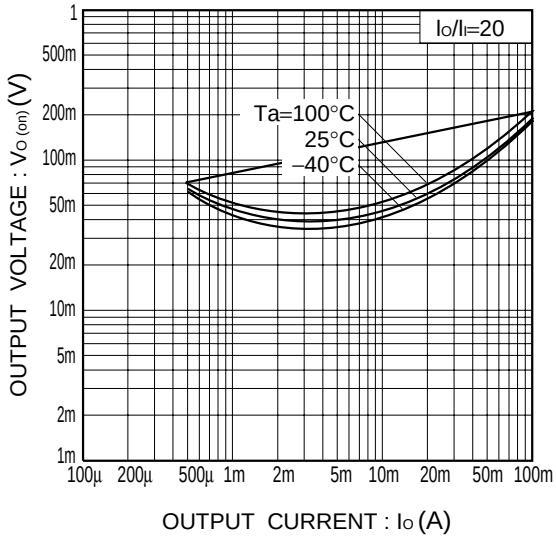
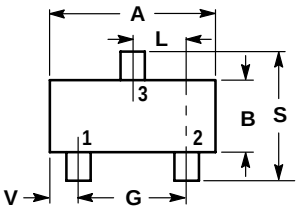
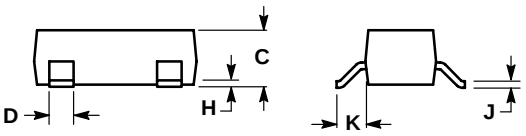



Fig.4 Output voltage vs. output current

**LDTC123JLT1G**

## SOT–23




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M,1982
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 0.1102 | 0.1197 | 2.80 | 3.04 |
| B | 0.0472 | 0.0551 | 1.20 | 1.40 |
| C | 0.0350 | 0.0440 | 0.89 | 1.11 |
| D | 0.0150 | 0.0200 | 0.37 | 0.50 |
| G | 0.0701 | 0.0807 | 1.78 | 2.04 |
| H | 0.0005 | 0.0040 | 0.013 | 0.100 |
| J | 0.0034 | 0.0070 | 0.085 | 0.177 |
| K | 0.0140 | 0.0285 | 0.35 | 0.69 |
| L | 0.0350 | 0.0401 | 0.89 | 1.02 |
| S | 0.0830 | 0.1039 | 2.10 | 2.64 |
| V | 0.0177 | 0.0236 | 0.45 | 0.60 |