# Bias Resistor Transistor

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

**LDTC123YET1G**

- **Applications**

  Inverter, Interface, Driver

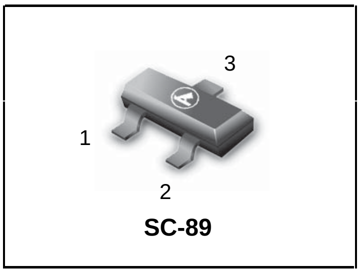
- **Features**

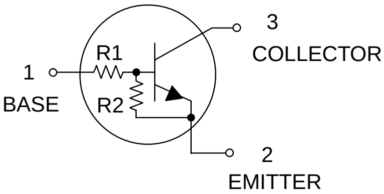
  1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).

  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.





**●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 |
|---|---|---|---|---|
| LDTC123YET1G | N8 | 2.2 | 10 | 3000/Tape & Reel |
| LDTC123YET3G | N8 | 2.2 | 10 | 10000/Tape & Reel |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Input voltage | $V_{I(off)}$ | – | – | 0.3 | V | $V_{CC}$=5V, $I_O$=100μA |
| | $V_{I(on)}$ | 3 | – | – | | $V_O$=0.3V, $I_O$=20mA |
| Output voltage | $V_{O(on)}$ | – | 0.1 | 0.3 | V | $I_O/I_I$=10mA/0.5mA |
| Input current | $I_I$ | – | – | 3.8 | mA | $V_I$=5V |
| Output current | $I_{O(off)}$ | – | – | 0.5 | μA | $V_{CC}$=50V, $V_I$=0V |
| DC current gain | $G_I$ | 33 | – | – | – | $V_O$=5V, $I_O$=10mA |
| Input resistance | $R_1$ | 1.54 | 2.2 | 2.86 | kΩ | – |
| Resistance ratio | $R_2/R_1$ | 3.6 | 4.5 | 5.5 | – | – |
| Transition frequency | $f_T$ * | – | 250 | – | MHz | $V_{CE}$=10V, $I_E$= –5mA, f=100MHz |

* Characteristics of built-in transistor

**LDTC123YET1G**

- **Electrical characteristic curves**

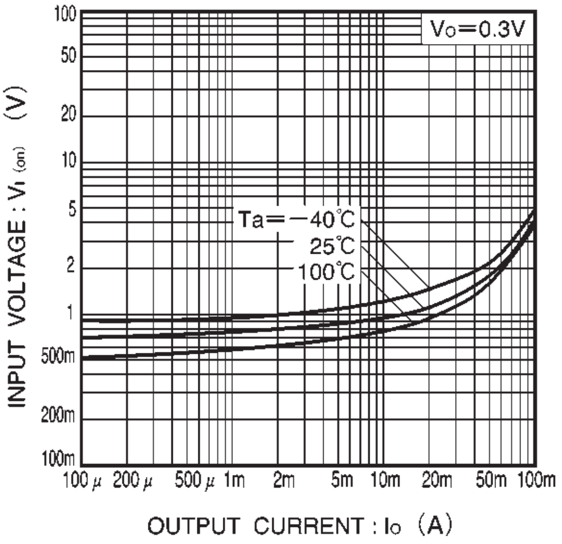


Fig.1 Input voltage vs. output current (ON characteristics)

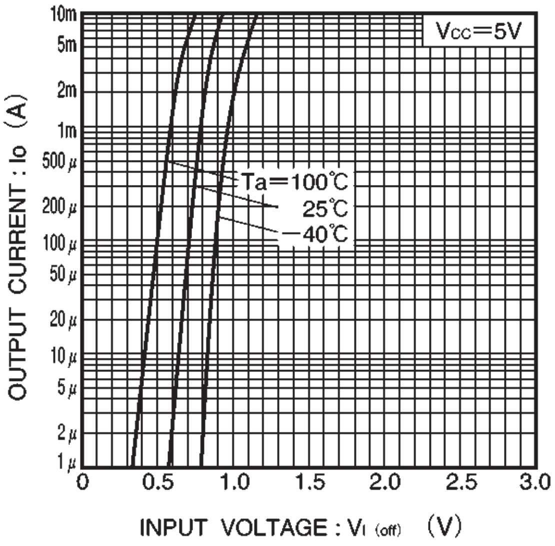


Fig.2 Output current vs. input voltage (OFF characteristics)

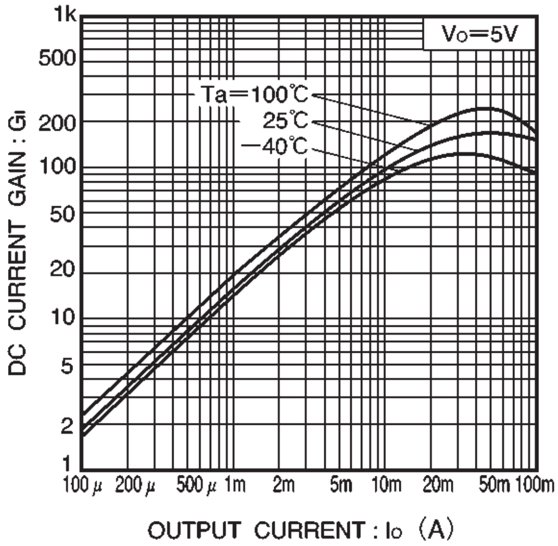


Fig.3 DC current gain vs. output current

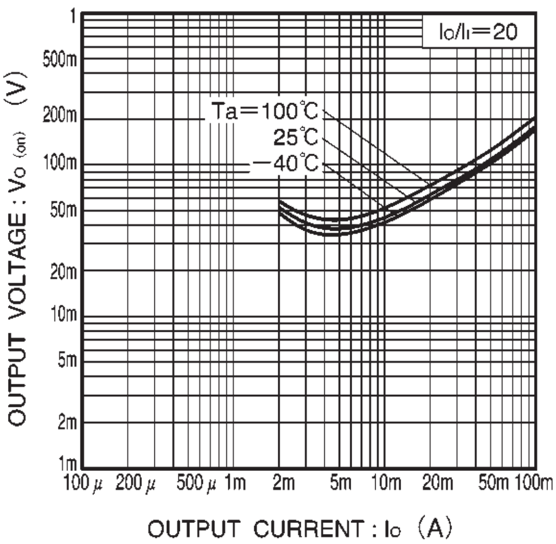
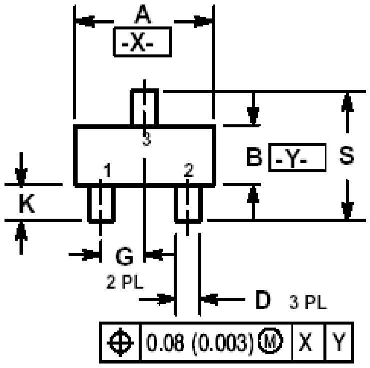


Fig.4 Output voltage vs. output current

## SC-89



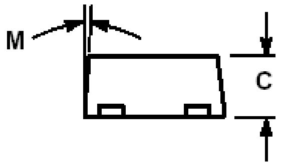
NOTES:

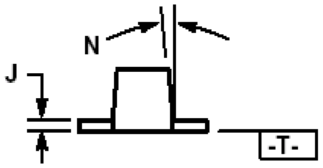
1.DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

2.CONTROLLING DIMENSION: MILLIMETERS

3.MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

4.463C-01 OBSOLETE, NEW STANDARD 463C-02.





| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |
| B | 0.75 | 0.85 | 0.95 | 0.030 | 0.034 | 0.040 |
| C | 0.60 | 0.70 | 0.80 | 0.024 | 0.028 | 0.031 |
| D | 0.23 | 0.28 | 0.33 | 0.009 | 0.011 | 0.013 |
| G | 0.50 BSC | | | 0.020 BSC | | |
| H | 0.53 REF | | | 0.021 REF | | |
| J | 0.10 | 0.15 | 0.20 | 0.004 | 0.006 | 0.008 |
| K | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| L | 1.10 REF | | | 0.043 REF | | |
| M | --- | --- | 10 ° | --- | --- | 10 ° |
| N | --- | --- | 10 ° | --- | --- | 10 ° |
| S | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |