

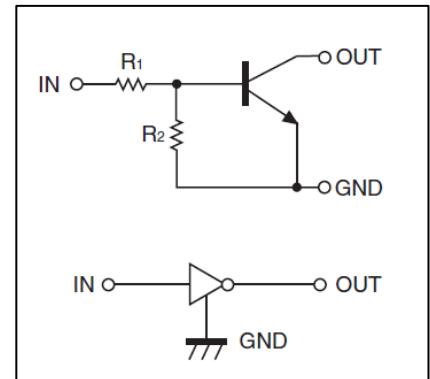
## Digital Transistors (Built-in Resistors)

DIGITAL TRANSISTOR (NPN)

### FEATURES

- ◆ Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors(see equivalent circuit)
- ◆ 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
- ◆ Only the on/off conditions need to be set for operation, making device design easy

### Equivalent Circuit



### ORDERING INFORMATION

| Part Number | Marking | Package  |
|-------------|---------|----------|
| DTC124XE    | 45      | SOT-523  |
| DTC124XUA   | 45      | SOT-323  |
| DTC124XKA   | 45      | SOT23-3L |
| DTC124XCA   | 45      | SOT-23   |

### PIN CONNENCTIONS and MARKING

|                                                                                   |                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <p><b>DTC124XE</b></p> <p><b>SOT-523</b></p> <p>1. IN<br/>2. GND<br/>3. OUT</p>   | <p><b>DTC124XUA</b></p> <p><b>SOT-323</b></p> <p>1. IN<br/>2. GND<br/>3. OUT</p> |
| <p><b>DTC124XKA</b></p> <p><b>SOT23-3L</b></p> <p>1. IN<br/>2. GND<br/>3. OUT</p> | <p><b>DTC124XCA</b></p> <p><b>SOT-23</b></p> <p>1. IN<br/>2. GND<br/>3. OUT</p>  |

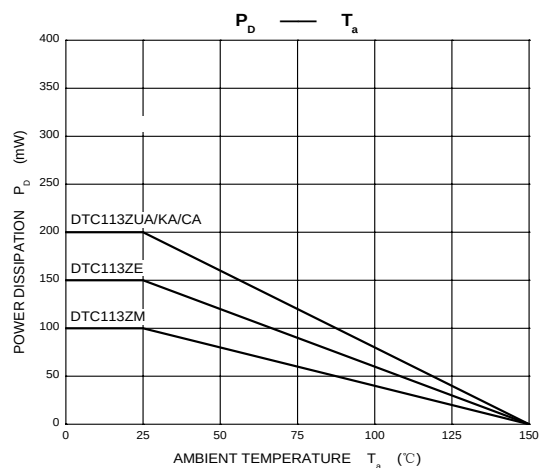
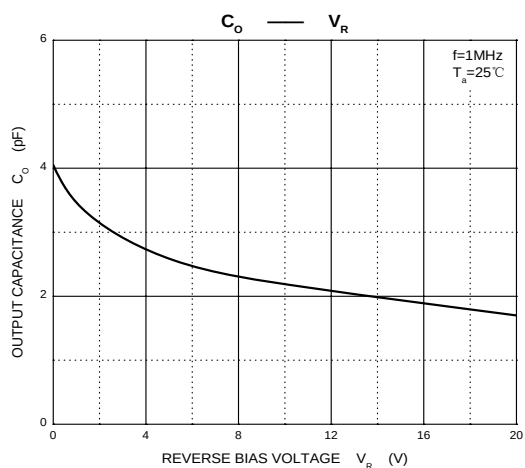
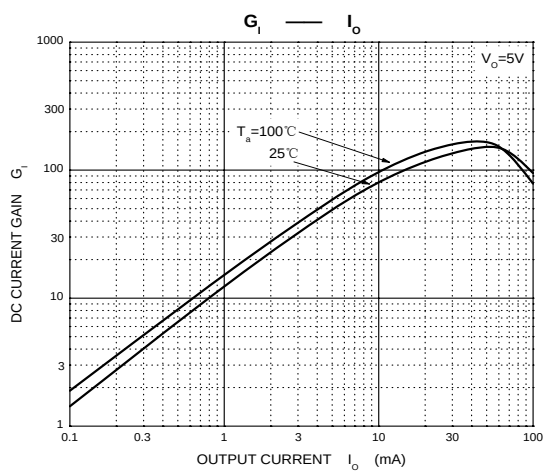
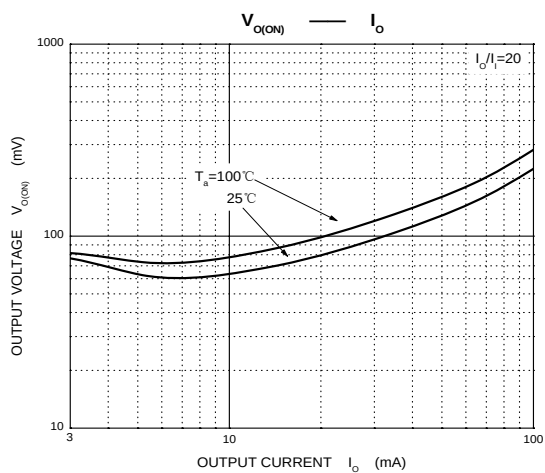
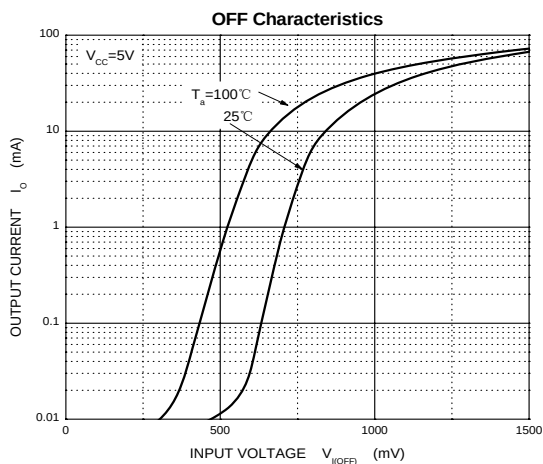
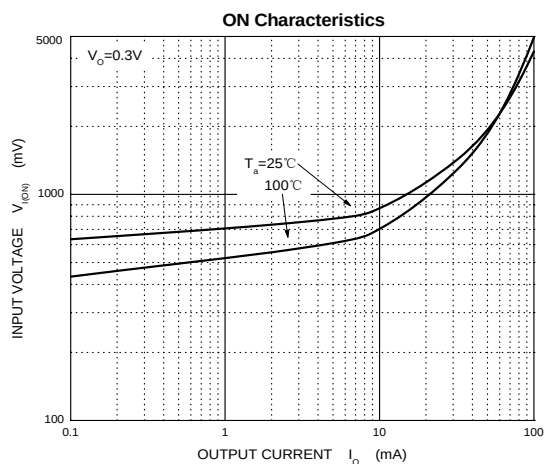
### MAXIMUM RATINGS(Ta=25℃ unless otherwise noted)

| Parameter                                        | Symbol                            | Limits(DTC124X□) |     |     |     | Unit |
|--------------------------------------------------|-----------------------------------|------------------|-----|-----|-----|------|
|                                                  |                                   | E                | UA  | KA  | CA  |      |
| Supply Voltage                                   | V <sub>CC</sub>                   | 50               |     |     |     | V    |
| Input Voltage                                    | V <sub>IN</sub>                   | -10~+40          |     |     |     | V    |
| Output Current                                   | I <sub>O</sub>                    | 100              |     |     |     | mA   |
| Power Dissipation                                | P <sub>D</sub>                    | 150              | 200 | 200 | 200 | mW   |
| Operation Junction and Storage Temperature Range | T <sub>J</sub> , T <sub>stg</sub> | -55~+150         |     |     |     | ℃    |

### ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

| Parameter            | Conditions                                         | Symbol                         | Min  | Typ | Max  | Unit |
|----------------------|----------------------------------------------------|--------------------------------|------|-----|------|------|
| Input voltage        | V <sub>CC</sub> =5V, I <sub>O</sub> =100μA         | V <sub>I(off)</sub>            | 0.4  |     |      | V    |
|                      | V <sub>O</sub> =0.3V, I <sub>O</sub> =2mA          | V <sub>I(on)</sub>             |      |     | 2.5  | V    |
| Output voltage       | I <sub>O</sub> /I <sub>I</sub> =10mA/0.5mA         | V <sub>O(on)</sub>             |      | 0.1 | 0.3  | V    |
| Input current        | V <sub>I</sub> =5V                                 | I <sub>I</sub>                 |      |     | 0.36 | mA   |
| Output current       | V <sub>CC</sub> =50V, V <sub>I</sub> =0            | I <sub>O(off)</sub>            |      |     | 0.5  | μA   |
| DC current gain      | V <sub>O</sub> =5V, I <sub>O</sub> =5mA            | G <sub>I</sub>                 | 68   |     |      |      |
| Input resistance     |                                                    | R <sub>1</sub>                 | 15.4 | 22  | 28.6 | kΩ   |
| Resistance ratio     |                                                    | R <sub>2</sub> /R <sub>1</sub> | 1.7  | 2.1 | 2.6  |      |
| Transition frequency | V <sub>O</sub> =10V, I <sub>O</sub> =5mA, f=100MHz | f <sub>r</sub>                 |      | 250 |      | MHz  |

Typical Characteristics



### Ordering information

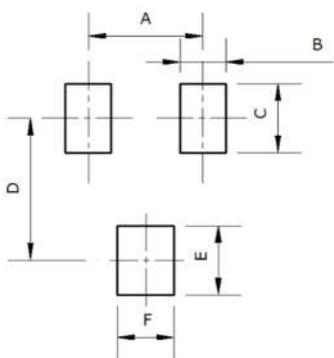
| Package | Packing Description | Base Quantity | Packing Quantity              |
|---------|---------------------|---------------|-------------------------------|
| SOT-523 | Tape/Reel, 7" reel  | 3000pcs/Reel  | 24000PCS/Box 120000PCS/Carton |

### Package Dimensions

#### SOT-523

| Dim. | Millimeter (mm) |      | mil      |      |
|------|-----------------|------|----------|------|
|      | Min.            | Max. | Min.     | Max. |
| A    | 1.50            | 1.70 | 59       | 67   |
| B    | 0.75            | 0.85 | 30       | 33   |
| C    | 1.45            | 1.75 | 57       | 69   |
| D    | 0.50TYP         |      | 0.020TYP |      |
| E    | 0.90            | 1.10 | 35       | 43   |
| G    | 0.00            | 0.10 | 0        | 4    |
| H    | 0.60            | 0.80 | 24       | 31   |
| J    | 0.10            | 0.20 | 4        | 8    |
| K    | 0.15            | 0.35 | 6        | 14   |
| L    | 0.26            | 0.46 | 10       | 18   |

### The recommended mounting pad size



| Millimeter (mm) |      |
|-----------------|------|
| Dim.            | TYP  |
| A               | 1.00 |
| B               | 0.40 |
| C               | 0.60 |
| D               | 1.24 |
| E               | 0.60 |
| F               | 0.50 |

### Ordering information

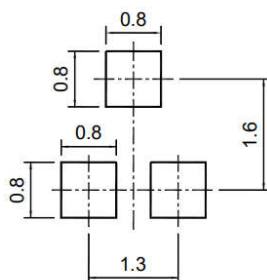
| Package | Packing Description | Base Quantity | Packing Quantity              |
|---------|---------------------|---------------|-------------------------------|
| SOT-323 | Tape/Reel, 7" reel  | 3000pcs/Reel  | 24000PCS/Box 120000PCS/Carton |

### Package Dimensions

#### SOT-323

| Dim. | Millimeter (mm) |      | mil  |      |
|------|-----------------|------|------|------|
|      | Min.            | Max. | Min. | Max. |
| A    | 0.8             | 1.1  | 32   | 43   |
| A1   | 0.1             |      | 4    |      |
| bp   | 0.3             | 0.4  | 12   | 16   |
| C    | 0.10            | 0.25 | 4    | 10   |
| D    | 1.8             | 2.2  | 71   | 87   |
| E    | 1.15            | 1.35 | 45   | 53   |
| e    | 1.3             |      | 51   |      |
| e1   | 0.65            |      | 26   |      |
| HE   | 2.0             | 2.2  | 79   | 87   |
| Lp   | 0.15            | 0.45 | 6    | 18   |
| Q    | 0.13            | 0.23 | 5.1  | 9    |
| v    | 0.2             |      | 8    |      |
| W    | 0.2             |      | 8    |      |

### The recommended mounting pad size



### Ordering information

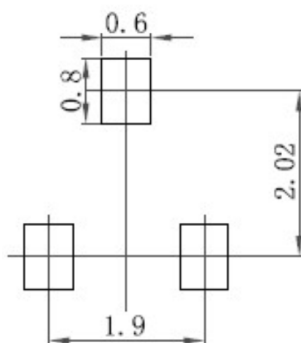
| Package  | Packing Description | Base Quantity | Packing Quantity              |
|----------|---------------------|---------------|-------------------------------|
| SOT23-3L | Tape/Reel, 7" reel  | 3000pcs/Reel  | 24000PCS/Box 120000PCS/Carton |

### Package Dimensions

#### SOT23-3L

| Dim. | Millimeter (mm) |       | mil  |      |
|------|-----------------|-------|------|------|
|      | Min.            | Max.  | Min. | Max. |
| A    | 1.05            | 1.25  | 41   | 49.2 |
| A1   | 0.10            |       | 3.93 |      |
| A2   | 1.05            | 1.15  | 41   | 45   |
| b    | 0.30            | 0.50  | 12   | 20   |
| c    | 0.10            | 0.20  | 3.93 | 7.9  |
| D    | 2.82            | 3.02  | 111  | 119  |
| E    | 1.50            | 1.70  | 59   | 67   |
| E1   | 2.65            | 2.95  | 104  | 116  |
| a    | 0.95            |       | 37.4 |      |
| a1   | 1.80            | 2.00  | 71   | 78   |
| L    | 0.30            | 0.066 | 12   | 26   |
| Θ    | 8°              |       |      |      |

### The recommended mounting pad size



## Ordering information

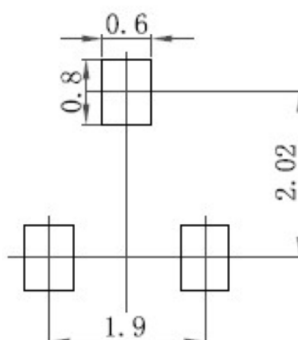
| Package | Packing Description | Base Quantity | Packing Quantity              |
|---------|---------------------|---------------|-------------------------------|
| SOT-23  | Tape/Reel, 7" reel  | 3000pcs/Reel  | 24000PCS/Box 120000PCS/Carton |

## Package Dimensions

### SOT-23

| Dim. | Millimeter (mm) |      | mil  |      |
|------|-----------------|------|------|------|
|      | Min.            | Max. | Min. | Max. |
| A    | 0.9             | 1.15 | 35   | 45   |
| A1   | 0.1             |      | 3.9  |      |
| bp   | 0.38            | 0.48 | 15   | 19   |
| C    | 0.09            | 0.15 | 3.54 | 5.9  |
| D    | 2.8             | 3.0  | 110  | 118  |
| E    | 1.2             | 1.4  | 47   | 55   |
| e    | 1.9             |      | 75   |      |
| e1   | 0.95            |      | 37   |      |
| HE   | 2.1             | 2.55 | 83   | 100  |
| Lp   | 0.15            | 0.45 | 5.9  | 18   |
| Q    | 0.45            | 0.55 | 18   | 22   |
| v    | 0.2             |      | 7.9  |      |
| W    | 0.1             |      | 4    |      |

## The recommended mounting pad size



## Disclaimer

The information presented in this document is for reference only. Guangdong Youfeng Microelectronics Co.,Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise. The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), YFW or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale. This publication supersedes & replaces all information previously supplied. For additional information, please visit our website <https://www.yfwdiode.com>, or consult YFW sales office for further assistance.