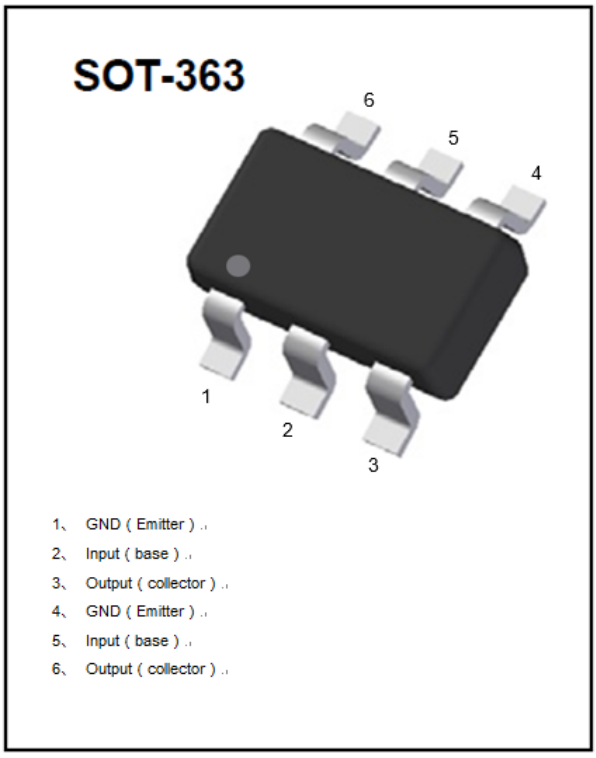
# Digital Transistors (Built-in Resistors)



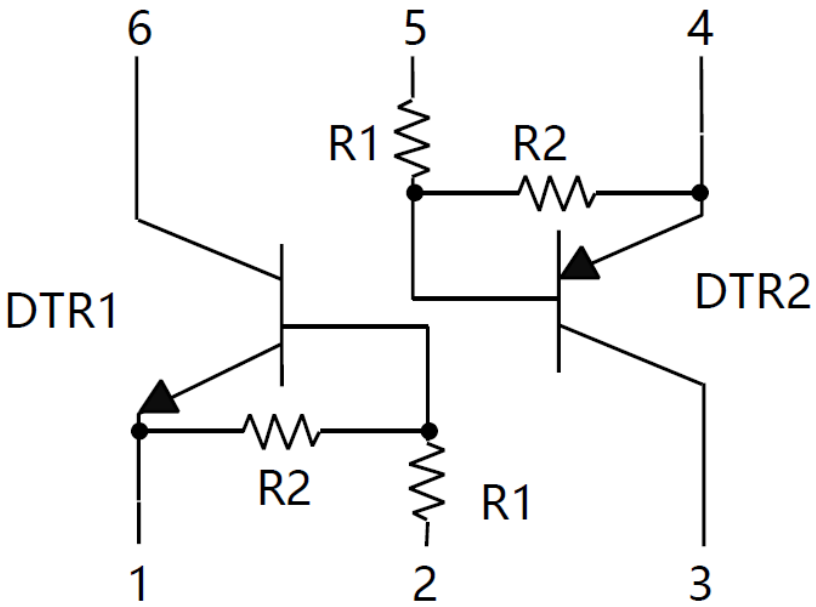

## Features

- Epoxy meets UL-94 V-0 flammability rating
- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors
- Surface mount package ideally Suited for Automatic Insertion

## Mechanical Data

- **Package:** SOT-363
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** D22

## ■Equivalent circuit



## ■Maximum Ratings (Ta=25℃ Unless otherwise specified）

### DTR1-NPN

| ITEM | SYMBOL | UNIT | CONDITIONS | VALUE |
|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | V | | 50 |
| Input Voltage | $V_{IN}$ | V | | -5 to +30 |
| Output Current | $I_O$ | mA | | 100 |
| Power Dissipation | $P_D$ | mW | | 150 |
| Junction Temperature （Single） | Tj | ℃ | | 150 |
| Storage Temperature | $T_{STG}$ | ℃ | | -55 to +150 |

### DTR2-PNP

| ITEM | SYMBOL | UNIT | CONDITIONS | VALUE |
|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | V | | -50 |
| Input Voltage | $V_{IN}$ | V | | -30 to +5 |
| Output Current | $I_O$ | mA | | -100 |
| Power Dissipation | $P_D$ | mW | | 150 |
| Junction Temperature | Tj | ℃ | | 150 |
| Storage Temperature | $T_{STG}$ | ℃ | | -55 to +150 |

## ■Electrical Characteristics (Ta=25℃ unless otherwise specified)

### DTR1-NPN

| ITEM | SYMBOL | UNIT | CONDITIONS | MIN | TYP | MAX |
|---|---|---|---|---|---|---|
| Input voltage | $VI_{(off)}$ | V | $V_{CC}$=5V,Ic=100uA | 0.5 | - | - |
| | $VI_{(on)}$ | V | $V_O$=0.3V,Ic=5mA | - | - | 1.3 |
| Output voltage | $Vo_{(on)}$ | V | Io /Ii =5mA/0.25 mA | - | - | 0.3 |
| Input current | $I_I$ | mA | $V_I$=5V | - | - | 1.8 |
| Output current | $I_{O(off)}$ | uA | $V_{CC}$=50V, Vi=0 | - | - | 0.5 |
| DC current gain | $G_I$ | | Vo=5V, Io =10mA | 80 | - | - |
| Input resistance | $R_1$ | kΩ | | 3.29 | 4.7 | 6.11 |
| Resistance ratio | $R_2/R_1$ | | | 8 | 10 | 12 |
| Transition frequency | $f_T$ | MHz | $V_{CE}$=10V,$I_E$=5mA,f=100MHz | - | 250 | - |

## DTR2-PNP

| ITEM | SYMBOL | UNIT | CONDITIONS | MIN | TYP | MAX |
|---|---|---|---|---|---|---|
| Input voltage | $VI_{(off)}$ | V | $V_{CC}$=-5V,Ic=-100uA | -0.5 | - | - |
| | $VI_{(on)}$ | V | $V_O$=-0.3V,Ic=-5mA | - | - | -1.3 |
| Output voltage | $Vo_{(on)}$ | V | Io /Ii =-5mA/-0.25 mA | - | - | -0.3 |
| Input current | $I_I$ | mA | $V_I$=-5V | - | - | -1.8 |
| Output current | $I_{O(off)}$ | uA | $V_{CC}$=-50V, Vi=0 | - | - | -0.5 |
| DC current gain | $G_I$ | | Vo=-5V, Io =-10mA | 80 | - | - |
| Input resistance | $R_1$ | kΩ | | 3.29 | 4.7 | 6.11 |
| Resistance ratio | $R_2/R_1$ | | | 8 | 10 | 12 |
| Transition frequency | $f_T$ | MHz | $V_{CE}$=-10V,$I_E$=-5mA,f=100MHz | - | 250 | - |

## ■ **Ordering Information** (Example)

| PREFERED P/N | PACKING CODE | UNIT WEIGHT(g) | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| UMD22N | F2 | Approximate 0.009g | 3000 | 30000 | 120000 | 7” reel |

## ■ **Characteristics** (Typical)

Fig. 1 - DTR1 DC Current Gain Characteristics

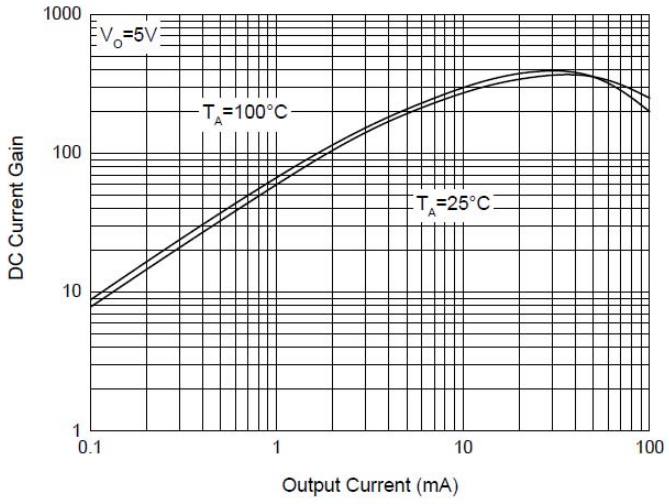



Fig. 2 - DTR1 Input Voltage (on) Characteristics

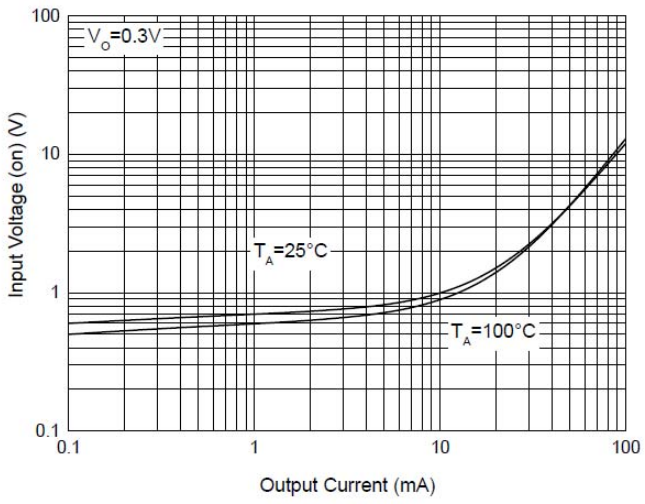


Fig. 3 - DTR1 Input Voltage (off) Characteristics

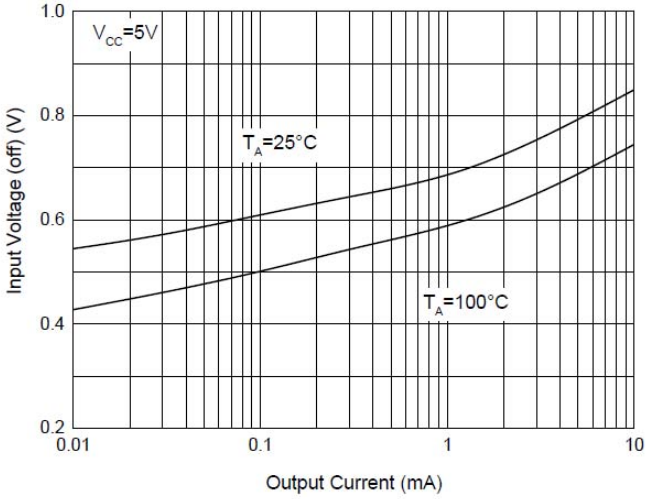



Fig. 4 - DTR1 Output Voltage Characteristics

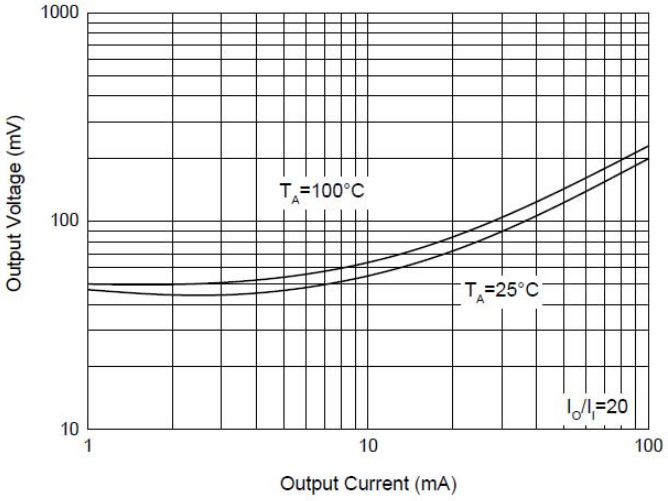



Fig. 5 - DTR2 DC Current Gain Characteristics

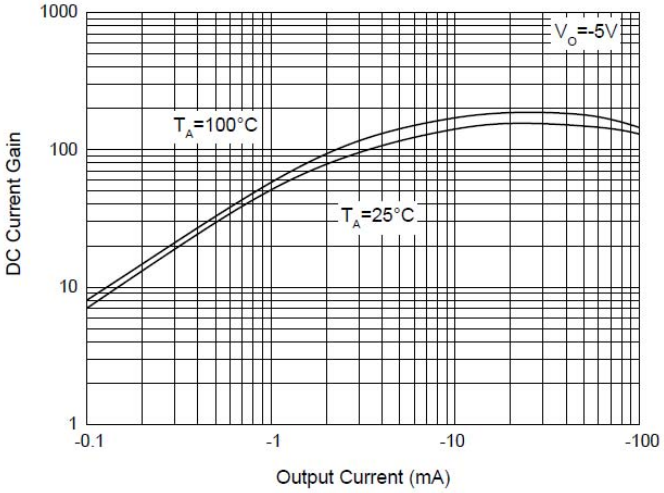



Fig. 6 - DTR2 Input Voltage (on) Characteristics

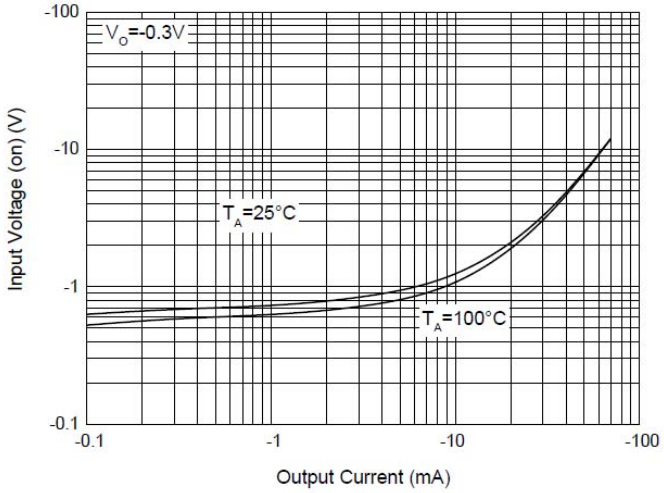



Fig. 7 - DTR2 Input Voltage (off) Characteristics

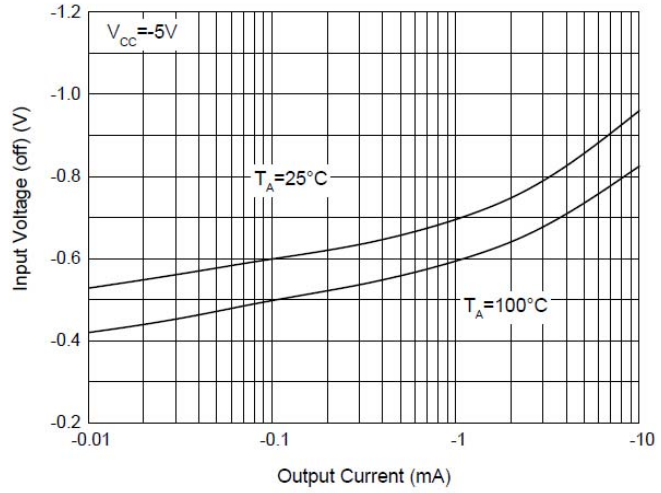
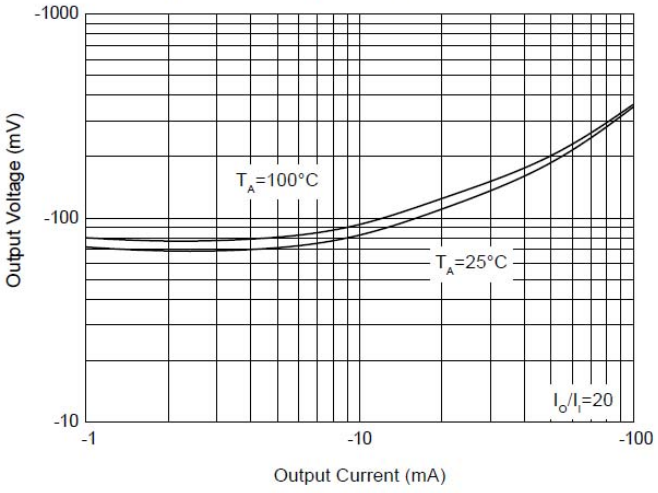
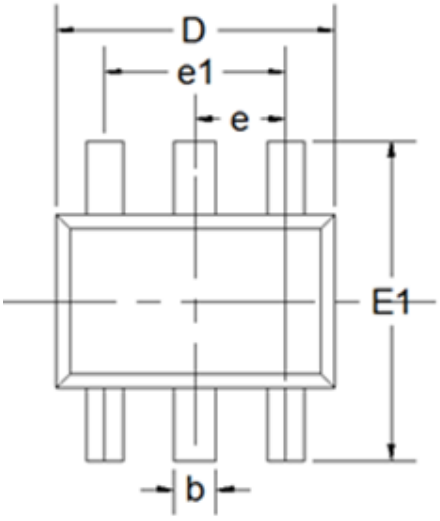


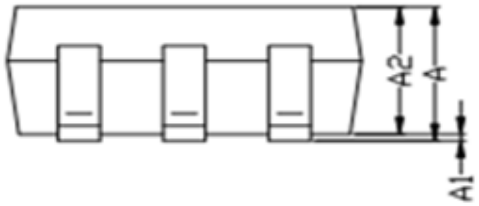

Fig. 8 - DTR2 Output Voltage Characteristics

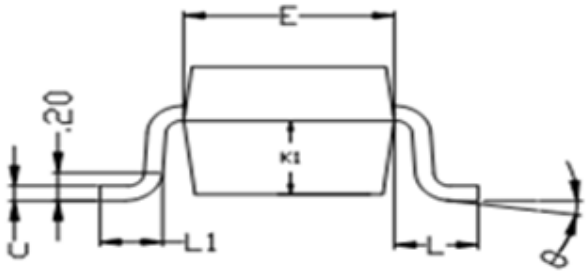


## ■SOT-363 Package Outline Dimensions

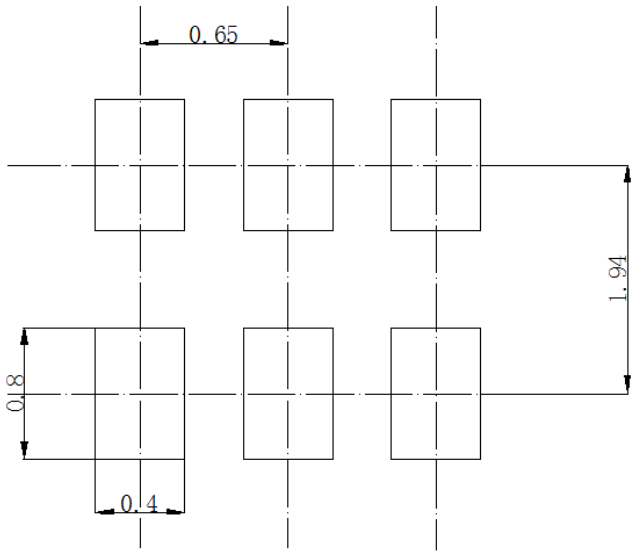



| DIMENSIONS | | | | |
|---|---|---|---|---|
| DIM | INCHES | | MM | |
| | MIN | MAX | MIN | MAX |
| A | 0.035 | 0.043 | 0.9 | 1.1 |
| A1 | 0 | 0.004 | 0 | 0.1 |
| A2 | 0.035 | 0.039 | 0.9 | 1 |
| b | 0.006 | 0.014 | 0.15 | 0.35 |
| c | 0.002 | 0.01 | 0.05 | 0.25 |
| D | 0.071 | 0.087 | 1.8 | 2.2 |
| E | 0.045 | 0.053 | 1.15 | 1.35 |
| E1 | 0.085 | 0.096 | 2.15 | 2.45 |
| e | 0.026Typ | | 0.65Typ | |
| e1 | 0.047 | 0.055 | 1.2 | 1.4 |
| L | 0.021Typ | | 0.525Typ | |
| L1 | 0.01 | 0.018 | 0.26 | 0.46 |
| θ | 0° | 8° | 0° | 8° |




## ■SOT-363 Suggested Pad Layout




Unit：mm

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