

**Features**

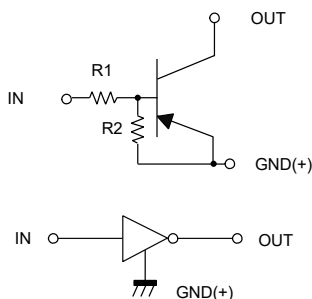
- Built-In Bias Resistors Enable the Configuration of an Inverter Circuit Without Connecting External Input Resistors
- The Bias Resistors Consist of Thin-Film Resistors With Complete Isolation to Allow Negative Biasing of the Input. They Also Have the Advantage of Almost Completely Eliminating Parasitic Effects
- Only the On/Off Conditions Need to Be Set For Operation, Making Device Design Easy
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings @ 25°C Unless Otherwise Specified**

| Parameter            | Symbol       | Min | Typ  | Max | Unit |
|----------------------|--------------|-----|------|-----|------|
| Supply Voltage       | $V_{CC}$     | --- | -50  | --- | V    |
| Input Voltage        | $V_{IN}$     | -30 | ---  | 5   | V    |
| Output Current       | $I_O$        | --- | -100 | --- | mA   |
|                      | $I_{C(Max)}$ | --- | -100 | --- | mA   |
| Power Dissipation    | $P_D$        | --- | 200  | --- | mW   |
| Junction Temperature | $T_J$        | --- | 150  | --- | °C   |
| Storage Temperature  | $T_{stg}$    | -55 | ---  | 150 | °C   |

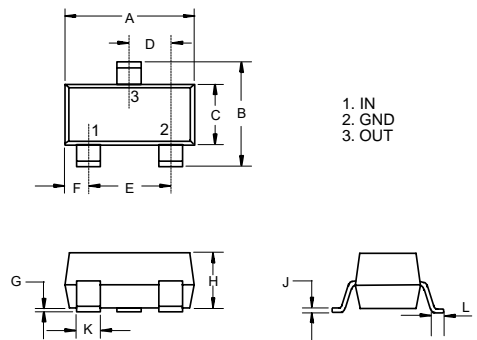
**Device Marking: E13**

**Internal Structure**



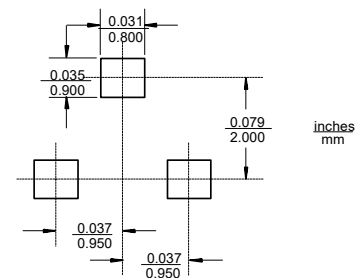
**PNP  
Digital Transistor**

**SOT-23**



| DIM | DIMENSIONS |       |      |      | NOTE |
|-----|------------|-------|------|------|------|
|     | INCHES     |       | MM   |      |      |
|     | MIN        | MAX   | MIN  | MAX  |      |
| A   | 0.110      | 0.120 | 2.80 | 3.04 |      |
| B   | 0.083      | 0.104 | 2.10 | 2.64 |      |
| C   | 0.047      | 0.055 | 1.20 | 1.40 |      |
| D   | 0.034      | 0.041 | 0.85 | 1.05 |      |
| E   | 0.067      | 0.083 | 1.70 | 2.10 |      |
| F   | 0.018      | 0.024 | 0.45 | 0.60 |      |
| G   | 0.0004     | 0.006 | 0.01 | 0.15 |      |
| H   | 0.035      | 0.043 | 0.90 | 1.10 |      |
| J   | 0.003      | 0.007 | 0.08 | 0.18 |      |
| K   | 0.012      | 0.020 | 0.30 | 0.51 |      |
| L   | 0.007      | 0.020 | 0.20 | 0.50 |      |

**Suggested Solder Pad Layout**



**Electrical Characteristics @ 25°C Unless Otherwise Specified**

| Parameter            | Symbol       | Min  | Typ | Max  | Unit       | Conditions                       |
|----------------------|--------------|------|-----|------|------------|----------------------------------|
| Input Voltage        | $V_{I(off)}$ | -0.5 | --- | ---  | V          | $V_{CC}=-5V, I_O=-100\mu A$      |
|                      | $V_{I(on)}$  | ---  | --- | -1.3 | V          | $V_O=-0.3V, I_O=-5mA$            |
| Output Voltage       | $V_{O(on)}$  | ---  | --- | -0.3 | V          | $I_O=-5mA, I_I=-0.25mA$          |
| Input Current        | $I_I$        | ---  | --- | -1.8 | mA         | $V_I=-5V$                        |
| Output Current       | $I_{O(off)}$ | ---  | --- | -0.5 | $\mu A$    | $V_{CC}=-50V, V_I=0$             |
| DC Current Gain      | $G_I$        | 80   | --- | ---  |            | $V_O=-5V, I_O=-5mA$              |
| Input Resistance     | $R_1$        | 3.29 | 4.7 | 6.11 | K $\Omega$ |                                  |
| Resistance Ratio     | $R_2/R_1$    | 8    | 10  | 12   |            |                                  |
| Transition Frequency | $f_T$        | ---  | 250 | ---  | MHz        | $V_{CE}=-10V, I_E=5mA, f=100MHz$ |

Curve Characteristics

Fig. 1 - DC Current Gain Characteristics

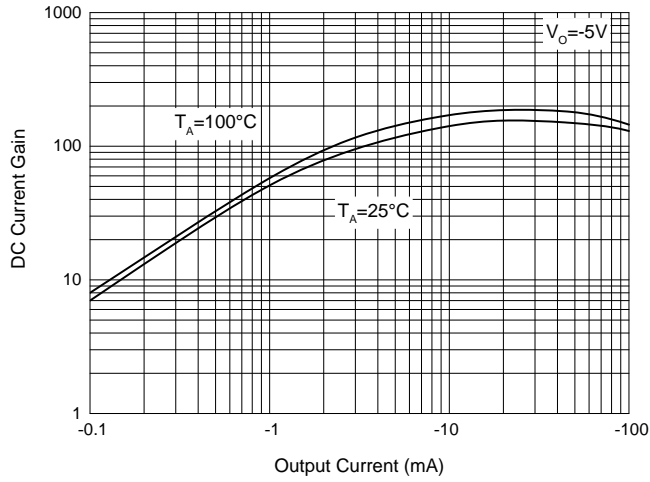


Fig. 2 - Input Voltage (on) Characteristics

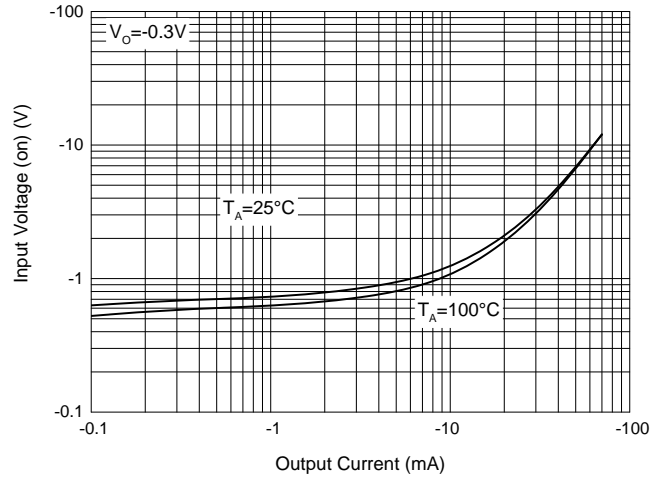


Fig. 3 - Input Voltage (off) Characteristics

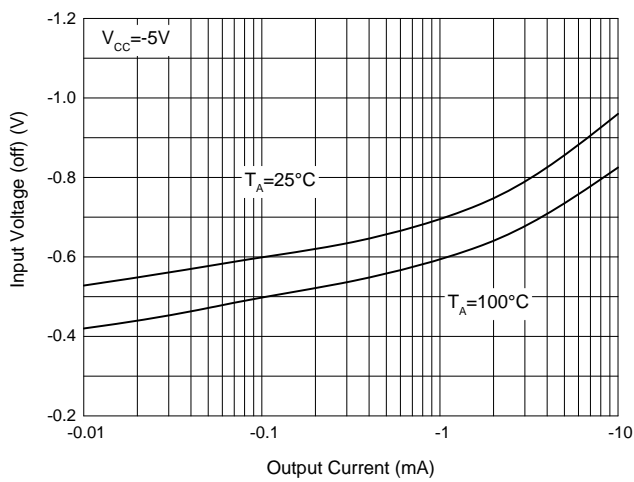


Fig. 4 - Output Voltage Characteristics

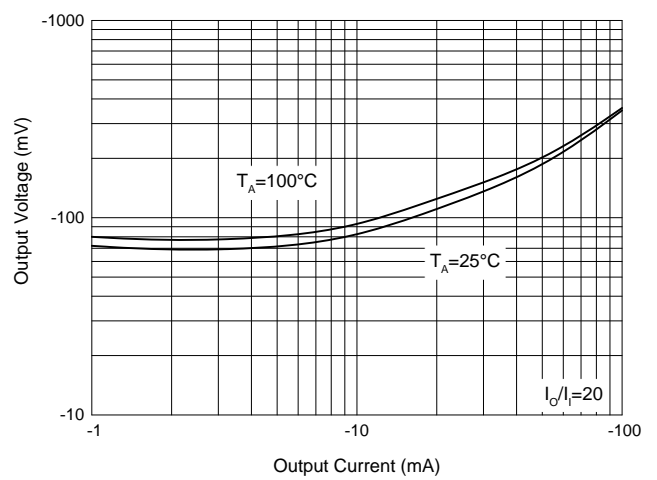
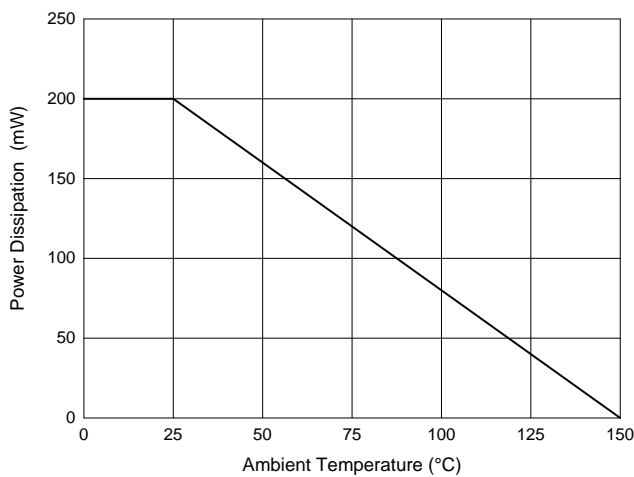


Fig. 5 - Power Derating Curve



## Ordering Information

| Device         | Packing              |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:3Kpcs/Reel |

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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- Техническая поддержка проекта;
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