

## Features

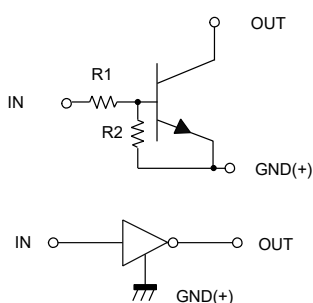
- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings @ 25°C Unless Otherwise Specified

| Parameter                              | Symbol     | Min | Typ | Max | Unit |
|----------------------------------------|------------|-----|-----|-----|------|
| Supply Voltage                         | $V_{CC}$   | --- | --- | 50  | V    |
| Input Voltage                          | $V_{IN}$   | -5  | --- | +10 | V    |
| Collector Current                      | $I_c$      | --- | --- | 100 | mA   |
| Power Dissipation                      | $P_D$      | --- | --- | 200 | mW   |
| Thermal Resistance Junction to Ambient | $R_{thja}$ | --- | --- | 625 | °C/W |
| Junction Temperature                   | $T_J$      | -55 | --- | 150 | °C   |
| Storage Temperature                    | $T_{stg}$  | -55 | --- | 150 | °C   |

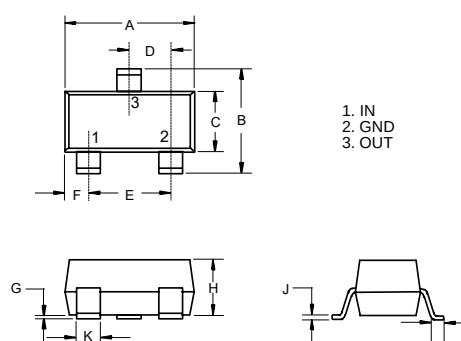
## Device Marking: E21

### Internal Structure



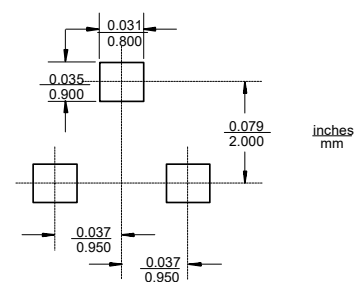
## NPN Digital Transistor

### SOT-23



| DIM | INCHES |       | MM   |      | NOTE |
|-----|--------|-------|------|------|------|
|     | 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        | $V_{I(off)}$ | 0.3 | --- | --- | V          | $V_{CC}=5V, I_O=100\mu A$        |
|                      | $V_{I(on)}$  | --- | --- | 3.0 | V          | $V_O=0.3V, I_O=20mA$             |
| Output Voltage       | $V_{O(on)}$  | --- | --- | 0.3 | V          | $I_O=10mA, I_I=0.5mA$            |
| Input Current        | $I_I$        | --- | --- | 7.2 | mA         | $V_I=5V$                         |
| Output Current       | $I_{O(off)}$ | --- | --- | 0.5 | $\mu A$    | $V_{CC}=50V, V_I=0$              |
| DC Current Gain      | $G_I$        | 33  | --- | --- |            | $V_O=5V, I_O=5mA$                |
| Input Resistance     | $R_1$        | 0.7 | 1.0 | 1.3 | 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

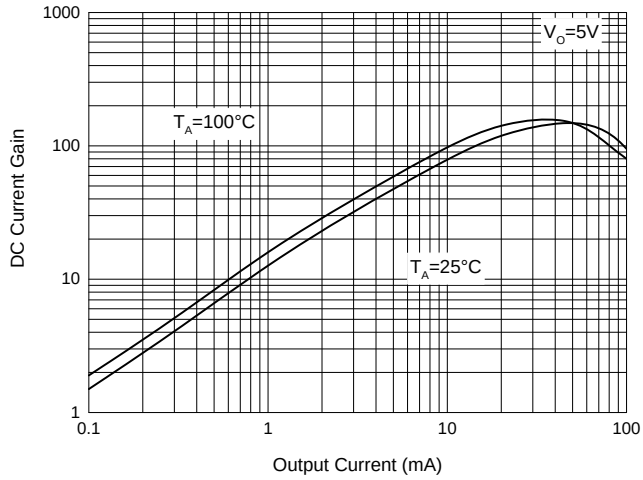


Fig. 2 - Input Voltage (on) Characteristics

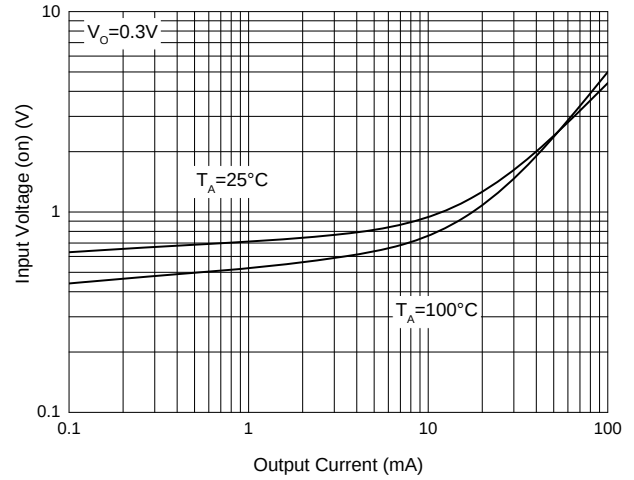


Fig. 3 - Input Voltage (off) Characteristics

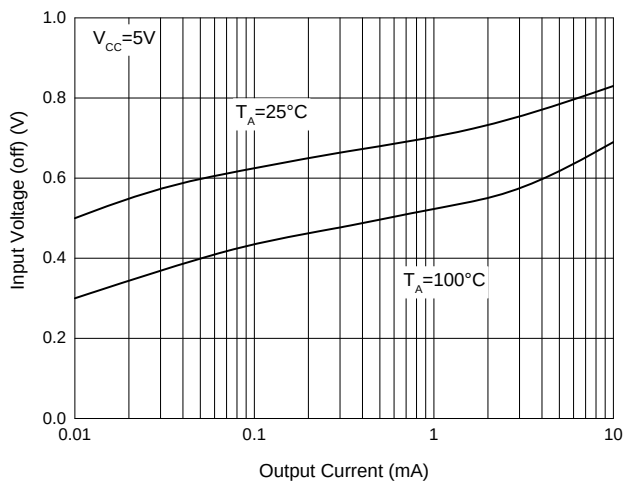


Fig. 4 - Output Voltage Characteristics

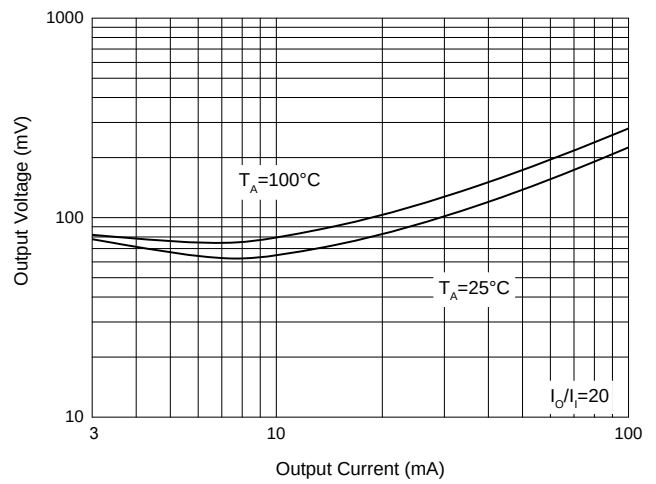
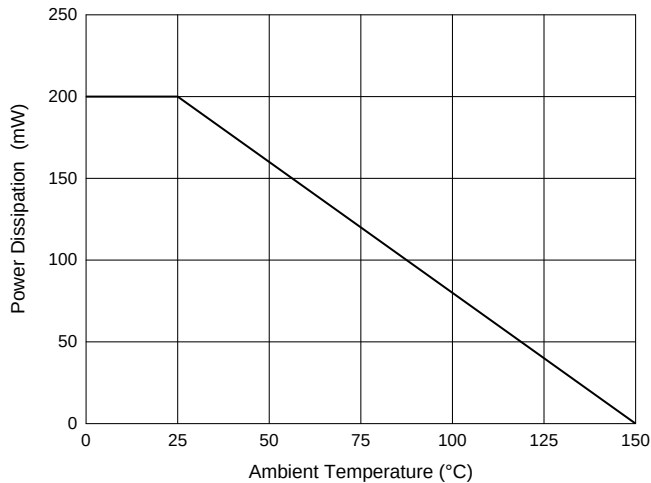


Fig. 5 - Power Derating Curve



## 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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