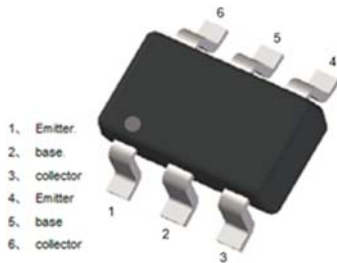
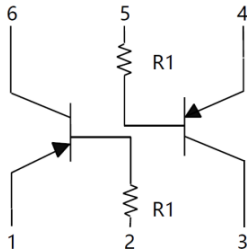


## Digital Transistors (Built-in Resistors)



### Features

- Moisture sensitivity level 1
- General switching and amplification
- Surface mount package ideally suited for automatic insertion

### Application

- Signal amplification
- Switching circuit

### Mechanical data

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

### ■ Maximum Ratings ( $T_a=25^\circ\text{C}$ Unless otherwise specified)

| Item                           | Symbol    | Unit             | Conditions | Value       |
|--------------------------------|-----------|------------------|------------|-------------|
| Device marking code            |           |                  |            | B4          |
| Collector-base voltage         | $V_{CBO}$ | V                |            | -50         |
| Collector-emitter voltage      | $V_{CEO}$ | V                |            | -50         |
| Emitter-base voltage           | $V_{EBO}$ | V                |            | -5          |
| Collector current              | $I_C$     | mA               |            | -100        |
| Power dissipation              | $P_D$     | mW               |            | 150         |
| Operation junction temperature | $T_J$     | $^\circ\text{C}$ |            | -55 to +150 |
| Storage temperature            | $T_{STG}$ | $^\circ\text{C}$ |            | -55 to +150 |

**■ Electrical Characteristics** ( $T_a=25^{\circ}\text{C}$  Unless otherwise specified)

| Item                                 | Symbol        | Unit             | Conditions                                            | Min | Typ | Max  |
|--------------------------------------|---------------|------------------|-------------------------------------------------------|-----|-----|------|
| Collector-base voltage               | $V_{CBO}$     | V                | $I_C=-50\mu\text{A}$                                  | -50 |     |      |
| Collector-emitter voltage            | $V_{CEO}$     | V                | $I_C=-1\text{mA}$                                     | -50 |     |      |
| Emitter-base voltage                 | $V_{EBO}$     | V                | $I_E=-50\mu\text{A}$                                  | -5  |     |      |
| Collector-base cut-off current       | $I_{CBO}$     | $\mu\text{A}$    | $V_{CB}=-50\text{V}$                                  |     |     | -0.5 |
| Emitter-base cut-off current         | $I_{EBO}$     | $\mu\text{A}$    | $V_{EB}=-4\text{V}$                                   |     |     | -0.5 |
| DC current gain                      | $h_{FE}$      |                  | $V_{CE}=-5\text{V}, I_C=-1\text{mA}$                  | 100 |     | 600  |
| Input resistance                     | $R_1$         | $\text{k}\Omega$ |                                                       | 7   | 10  | 13   |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | V                | $I_C=-10\text{mA}, I_B=-1\text{mA}$                   |     |     | -0.3 |
| Transition frequency                 | $f_T$         | MHz              | $V_{CE}=-10\text{V}, I_E=5\text{mA}, f=100\text{MHz}$ |     | 250 |      |

**■ Thermal Characteristics**

| Parameter                               | Symbol                 | Unit                        | Value |
|-----------------------------------------|------------------------|-----------------------------|-------|
| Thermal resistance, junction-to-ambient | $R_{\theta J-A}^{(1)}$ | $^{\circ}\text{C}/\text{W}$ | 834   |
| Thermal resistance, junction-to-case    | $R_{\theta J-C}^{(1)}$ | $^{\circ}\text{C}/\text{W}$ | 667   |

**Note:**

(1) Device mounted on PCB, single-sided copper, with standard footprint

■ Characteristics

Fig 1: Static Characteristics

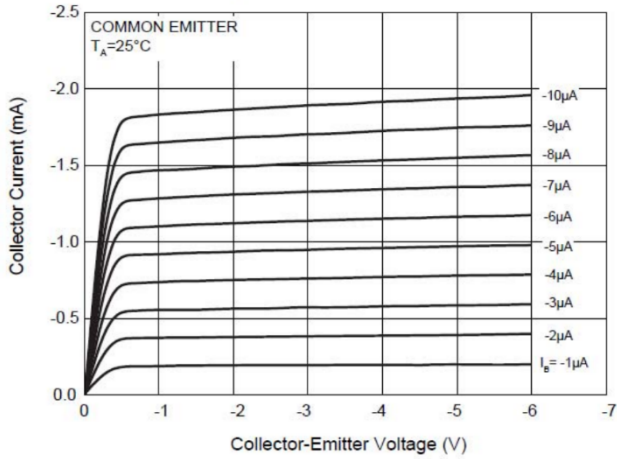


Fig 2: DC Current Gain Characteristics

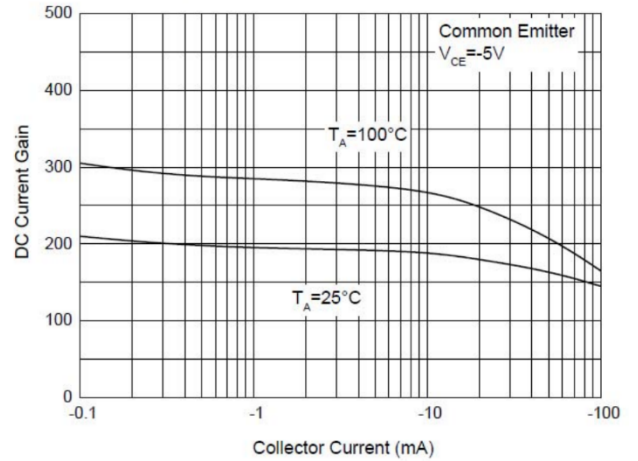


Fig 3: Output Voltage Characteristics

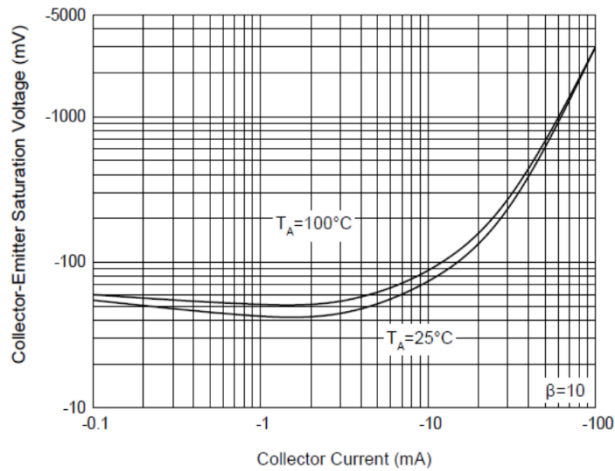
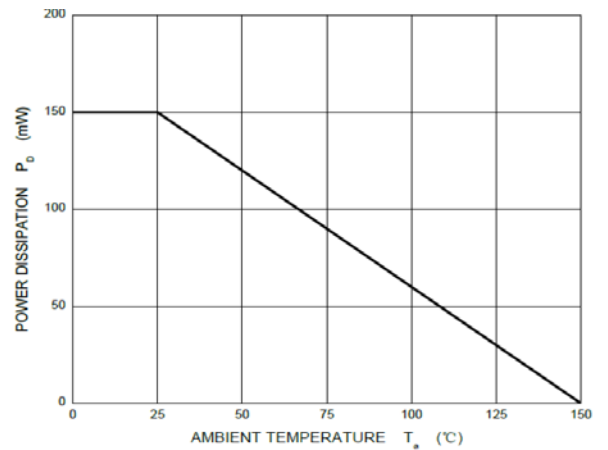


Fig 4:  $P_D$ - $T_a$  Curve

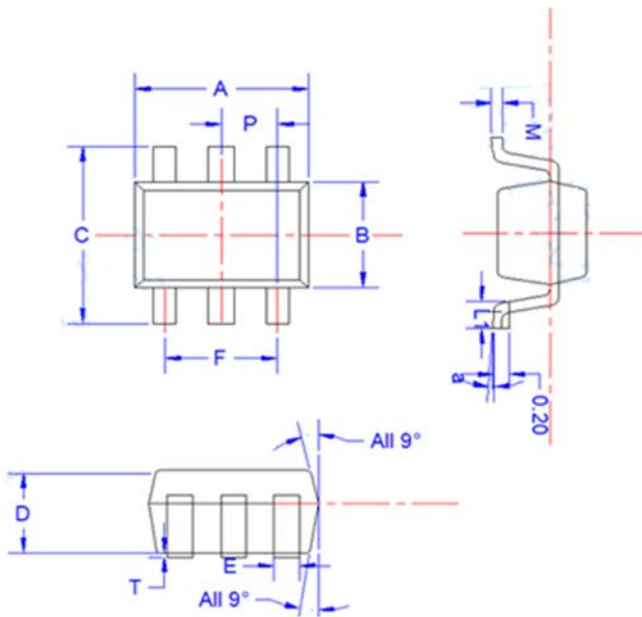




## ■ Ordering Information

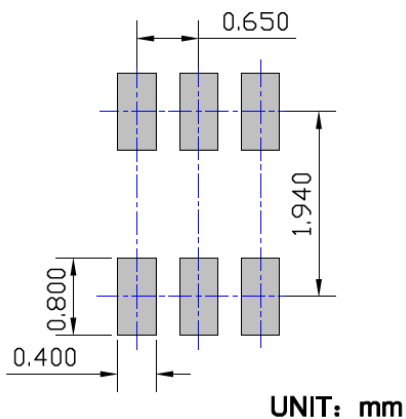
| Preferred P/N | Packing code | Unit weight(g)    | Minimum package(pcs) | Inner box quantity(pcs) | Outer carton quantity(pcs) | Delivery mode |
|---------------|--------------|-------------------|----------------------|-------------------------|----------------------------|---------------|
| UMB4NS        | F2           | Approximate 0.009 | 3000                 | 30000                   | 120000                     | 7" reel       |
| UMB4NS        | F3           | Approximate 0.009 | 10000                | /                       | 210000                     | 7" reel       |

## ■ Outline Dimensions



| SYMBOL | MILLIMETER |      |       |
|--------|------------|------|-------|
|        | MIN        | NOM  | MAX   |
| E      | 0.15       | 0.25 | 0.35  |
| B      | 1.15       | 1.25 | 1.35  |
| C      | 2.00       | 2.10 | 2.20  |
| P      | 0.650BSC   |      |       |
| A      | 1.80       | 2.00 | 2.20  |
| T      | 0.00       | 0.05 | 0.100 |
| D      | 0.90       | 0.95 | 1.00  |
| L1     | 0.20       | 0.30 | 0.40  |
| a      | 4°±4°      |      |       |
| M      | 0.10       | 0.15 | 0.25  |

## ■ Suggested Pad Layout





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