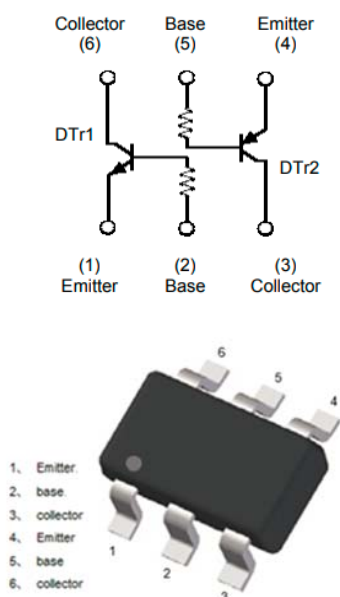


## Dual NPN+PNP Digital Transistors (Built-in Resistors)



### Features

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

### Mechanical data

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

### Application

- Signal amplification
- Switching circuit
- Marking code : D19

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

#### DTr1:NPN

| Item                           | Symbol    | Unit             | Conditions | Value       |
|--------------------------------|-----------|------------------|------------|-------------|
| 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 |

#### DTr1:PNP

| Item                           | Symbol    | Unit             | Conditions | Value       |
|--------------------------------|-----------|------------------|------------|-------------|
| 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 |



## UMD19NS

### ■ Electrical Characteristics (T<sub>a</sub>=25°C Unless otherwise specified)

#### DTTr1:NPN

| Item                                 | Symbol               | Unit | Conditions                                          | Min  | Typ | Max  |
|--------------------------------------|----------------------|------|-----------------------------------------------------|------|-----|------|
| Collector-base voltage               | V <sub>CBO</sub>     | V    | I <sub>C</sub> =1mA                                 | -50  |     |      |
| Collector-emitter voltage            | V <sub>CEO</sub>     | V    | I <sub>C</sub> =1mA                                 | -50  |     |      |
| Emitter-base voltage                 | V <sub>EBO</sub>     | V    | I <sub>E</sub> =50μA                                | -5   |     |      |
| Collector-base cut-off current       | I <sub>CBO</sub>     | μA   | V <sub>CB</sub> =50V                                |      |     | 0.5  |
| Emitter-base cut-off current         | I <sub>EBO</sub>     | μA   | V <sub>EB</sub> =5V                                 |      |     | 0.5  |
| DC current gain                      | h <sub>FE</sub>      |      | V <sub>CE</sub> =5V, I <sub>C</sub> =1mA            | 100  |     | 600  |
| Input resistance                     | R <sub>i</sub>       | kΩ   |                                                     | 15.4 | 22  | 28.6 |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | V    | I <sub>C</sub> =10mA, I <sub>B</sub> =0.5mA         |      |     | 0.3  |
| Transition frequency                 | f <sub>T</sub>       | MHz  | V <sub>CE</sub> =10V, I <sub>E</sub> =5mA, f=100MHz |      | 250 |      |

#### DTTr2:PNP

| Item                                 | Symbol               | Unit | Conditions                                           | Min  | Typ | Max  |
|--------------------------------------|----------------------|------|------------------------------------------------------|------|-----|------|
| Collector-base voltage               | V <sub>CBO</sub>     | V    | I <sub>C</sub> =-50μA                                | -50  |     |      |
| Collector-emitter voltage            | V <sub>CEO</sub>     | V    | I <sub>C</sub> =-1mA                                 | -50  |     |      |
| Emitter-base voltage                 | V <sub>EBO</sub>     | V    | I <sub>E</sub> =-50μA                                | -5   |     |      |
| Collector-base cut-off current       | I <sub>CBO</sub>     | μA   | V <sub>CB</sub> =-50V                                |      |     | -0.5 |
| Emitter-base cut-off current         | I <sub>EBO</sub>     | μA   | V <sub>EB</sub> =-4V                                 |      |     | -0.5 |
| DC current gain                      | h <sub>FE</sub>      |      | V <sub>CE</sub> =-5V, I <sub>C</sub> =-1mA           | 100  |     | 600  |
| Input resistance                     | R <sub>i</sub>       | kΩ   |                                                      | 15.4 | 22  | 28.6 |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | V    | I <sub>C</sub> =-5mA, I <sub>B</sub> =-0.5mA         |      |     | -0.3 |
| Transition frequency                 | f <sub>T</sub>       | MHz  | V <sub>CE</sub> =-10V, I <sub>E</sub> =5mA, f=100MHz |      | 250 |      |

### ■ Thermal Characteristics

| Parameter                               | Symbol                          | Unit | Value |
|-----------------------------------------|---------------------------------|------|-------|
| Thermal resistance, junction-to-ambient | R <sub>θJA</sub> <sup>(1)</sup> | °C/W | 834   |
| Thermal resistance, junction-to-case    | R <sub>θJC</sub> <sup>(1)</sup> | °C/W | 667   |

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

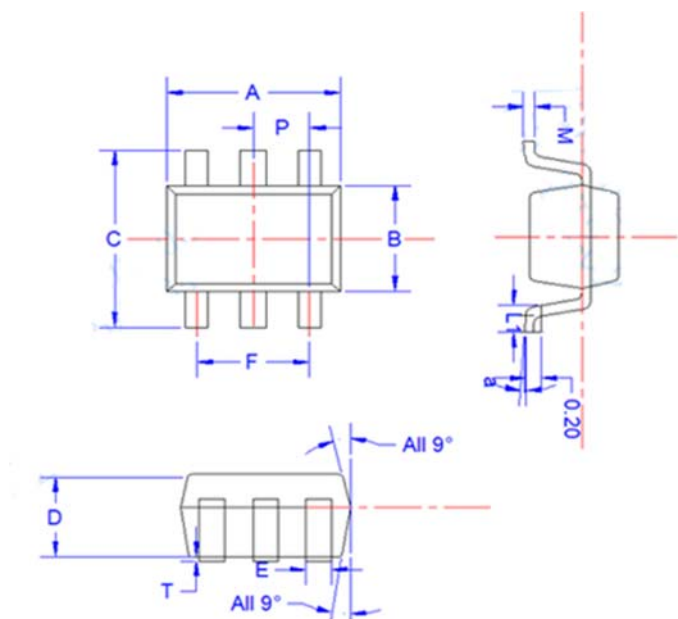
### ■ Ordering Information

| Preferred P/N | Packing code | Unit weight(g)    | Minimum package(pcs) | Inner box quantity(pcs) | Outer carton quantity(pcs) | Delivery mode |
|---------------|--------------|-------------------|----------------------|-------------------------|----------------------------|---------------|
| UMD19NS       | F2           | Approximate 0.009 | 3000                 | 30000                   | 120000                     | 7" reel       |
| UMD19NS       | F3           | Approximate 0.009 | 10000                | /                       | 210000                     | 7" reel       |



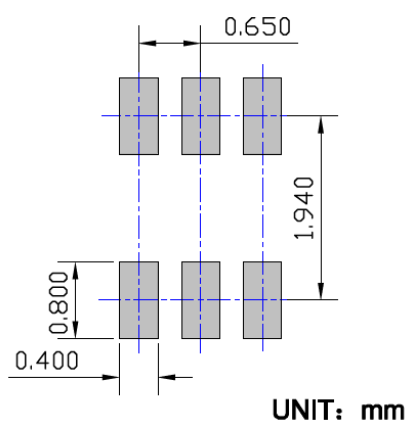
## UMD19NS

### ■ 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





## UMD19NS

### Disclaimer

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