



## UMH11

Preliminary

NPN SILICON TRANSISTOR

### DUAL NPN DIGITAL TRANSISTOR (BUILT- IN BIAS RESISTORS)

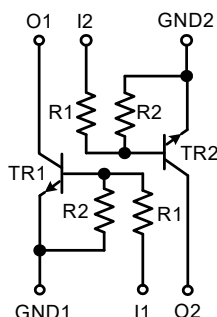
#### DESCRIPTION

The UTC **UMH11** is an dual transistor; it uses UTC's advanced technology to provide the customers with low collector -emitter saturation voltage, etc.

#### FEATURES

- \* NPN silicon transistor (Built-in resistor type)
- \* 100mA output current capability
- \* Built-in bias resistors
- \* Simplifies circuit design
- \* Reduces component count
- \* Reduces pick and place costs

#### EQUIVALENT CIRCUIT

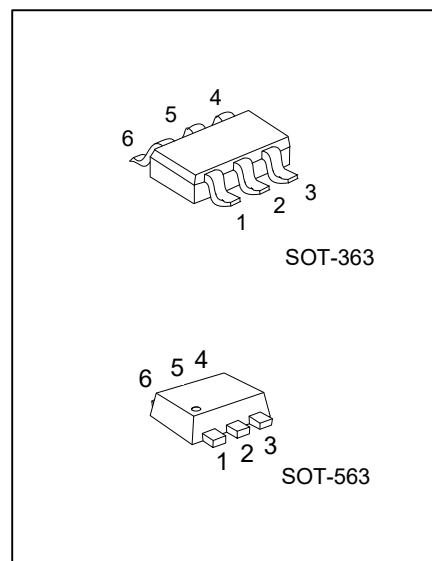


#### ORDERING INFORMATION

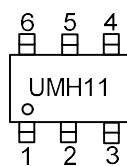
| Ordering Number |              | Package | Pin Assignment |    |    |    |    |    | Packing   |
|-----------------|--------------|---------|----------------|----|----|----|----|----|-----------|
| Lead Free       | Halogen Free |         | 1              | 2  | 3  | 4  | 5  | 6  |           |
| UMH11L-AL6-R    | UMH11G-AL6-R | SOT-363 | G1             | I1 | O2 | G2 | I2 | O1 | Tape Reel |
| UMH11L-AN6-R    | UMH11G-AN6-R | SOT-563 | G1             | I1 | O2 | G2 | I2 | O1 | Tape Reel |

Note: Pin Assignment: G: GND I: IN O: OUT

|              |                  |                                                 |
|--------------|------------------|-------------------------------------------------|
| UMH11G-AL6-R | (1)Packing Type  | (1) R: Tape Reel                                |
|              | (2)Package Type  | (2) AL6: SOT-363, AN6: SOT-563                  |
|              | (3)Green Package | (3) G: Halogen Free and Lead Free, L: Lead Free |



## ■ MARKING



■ **ABSOLUTE MAXIMUM RATING** ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                 |         | SYMBOL    | RATINGS    | UNIT               |
|---------------------------|---------|-----------|------------|--------------------|
| Collector-Base Voltage    |         | $V_{CBO}$ | 50         | V                  |
| Collector-Emitter Voltage |         | $V_{CEO}$ | 50         | V                  |
| Emitter-Base Voltage      |         | $V_{EBO}$ | 10         | V                  |
| Input Voltage             |         | $V_{IN}$  | -10 ~ +40  | V                  |
| Output Current            |         | $I_{OUT}$ | 100        | mA                 |
| Power Dissipation         | SOT-363 | $P_C$     | 300        | mW                 |
|                           | SOT-563 |           | 250        | mW                 |
| Junction Temperature      |         | $T_J$     | +150       | $^{\circ}\text{C}$ |
| Ambient Temperature       |         | $T_A$     | -55 ~ +150 | $^{\circ}\text{C}$ |
| Storage Temperature       |         | $T_{STG}$ | -55 ~ +150 | $^{\circ}\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ **THERMAL DATA**

| PARAMETER           |         | SYMBOL        | RATINGS | UNIT                 |
|---------------------|---------|---------------|---------|----------------------|
| Junction to Ambient | SOT-363 | $\theta_{JA}$ | 417     | $^{\circ}\text{C/W}$ |
|                     | SOT-563 |               | 500     | $^{\circ}\text{C/W}$ |

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ **ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                            | SYMBOL        | TEST CONDITIONS                                                   | MIN | TYP | MAX | UNIT          |
|--------------------------------------|---------------|-------------------------------------------------------------------|-----|-----|-----|---------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=100\mu\text{A}$ , $I_E=0\text{A}$                            | 50  |     |     | V             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=2\text{mA}$ , $I_B=0\text{A}$                                | 50  |     |     | V             |
| Collector-Base Cut-Off Current       | $I_{CBO}$     | $V_{CB}=50\text{V}$ , $I_E=0\text{A}$                             |     |     | 100 | nA            |
| Collector-Emitter Cut-Off Current    | $I_{CEO}$     | $V_{CE}=30\text{V}$ , $I_B=0\text{A}$                             |     |     | 1   | $\mu\text{A}$ |
| Emitter-Base Cut-Off Current         | $I_{EBO}$     | $V_{EB}=5\text{V}$ , $I_C=0\text{A}$                              |     |     | 400 | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$      | $V_{CE}=5\text{V}$ , $I_C=5\text{mA}$                             | 30  |     |     |               |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C=10\text{mA}$ , $I_B=0.5\text{mA}$                            |     |     | 150 | mV            |
| Off-State Input Voltage              | $V_{I(OFF)}$  | $V_{CE}=5\text{V}$ , $I_C=100\mu\text{A}$                         |     |     | 0.8 | V             |
| On-State Input Voltage               | $V_{I(ON)}$   | $V_{CE}=0.3\text{V}$ , $I_C=10\text{mA}$                          | 3   |     |     | V             |
| Bias Resistor 1 (Input)              | R1            |                                                                   | 7   | 10  | 13  | K $\Omega$    |
| Bias Resistor Ratio                  | R2/R1         |                                                                   | 0.8 | 1   | 1.2 |               |
| Collector Capacitance                | $C_C$         | $V_{CB}=10\text{V}$ , $I_E=0\text{A}$ , $f=1\text{MHz}$           |     |     | 2.5 | pF            |
| Transition Frequency                 | $f_T$         | $V_{CE}=10\text{V}$ , $I_E=5\text{mA}$ , $f=100\text{MHz}$ (Note) |     | 250 |     | MHz           |

Note: Transition frequency of the device.

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