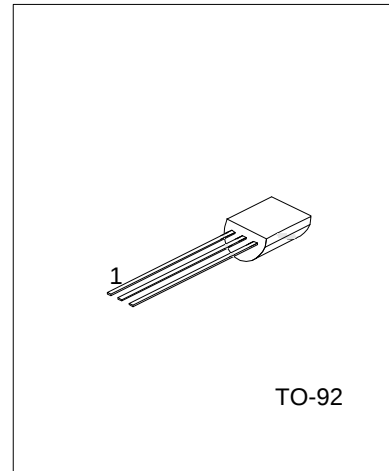


**2N5088/2N5089****NPN EPITAXIAL SILICON TRANSISTOR****NPN GENERAL PURPOSE  
AMPLIFIER**■ **DESCRIPTION**

The devices are designed for low noise, high gain, general purpose amplifier applications at collector currents from 1 $\mu$ A ~ 50mA.

■ **ORDERING INFORMATION**

| Order Number  |               | Package | Pin Assignment |   |   | Packing   |
|---------------|---------------|---------|----------------|---|---|-----------|
| Lead Free     | Halogen Free  |         | 1              | 2 | 3 |           |
| 2N5088L-T92-B | 2N5088G-T92-B | TO-92   | E              | B | C | Tape Box  |
| 2N5088L-T92-K | 2N5088G-T92-K | TO-92   | E              | B | C | Bulk      |
| 2N5088L-T92-R | 2N5088G-T92-R | TO-92   | E              | B | C | Tape Reel |
| 2N5089L-T92-B | 2N5089G-T92-B | TO-92   | E              | B | C | Tape Box  |
| 2N5089L-T92-K | 2N5089G-T92-K | TO-92   | E              | B | C | Bulk      |
| 2N5089L-T92-R | 2N5089G-T92-R | TO-92   | E              | B | C | Tape Reel |

Note: Pin Assignment: E: Emitter B: Base C: Collector

|                                                                                           |                                                                                                              |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <p>2N5088L-T92-B</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p> | <p>(1) B: Tape Box, K: Bulk, R: Tape Reel</p> <p>(2) T92: TO-92</p> <p>(3) G: Halogen Free, L: Lead Free</p> |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|

# 2N5088/2N5089

## NPN EPITAXIAL SILICON TRANSISTOR

### ■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise noted)

| PARAMETER                    | SYMBOL           | RATINGS    | UNIT  |
|------------------------------|------------------|------------|-------|
| Collector-Emitter voltage    | V <sub>CEO</sub> | 30         | V     |
| Collector-Base voltage       | V <sub>CBO</sub> | 35         | V     |
| Emitter-Base Voltage         | V <sub>EBO</sub> | 4.5        | V     |
| Collector Current-Continuous | I <sub>C</sub>   | 100        | mA    |
| Power Dissipation            | P <sub>D</sub>   | 625        | mW    |
| Derate Above 25°C            |                  | 5          | mW/°C |
| Junction Temperature         | T <sub>J</sub>   | 150        | °C    |
| Storage Temperature          | T <sub>STG</sub> | -55 ~ +150 | °C    |

Note 1. These ratings are based on a maximum junction temperature of 150 degrees C.

2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

3. 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 (T<sub>A</sub>=25°C, unless otherwise noted)

| PARAMETER           | SYMBOL          | RATINGS | UNIT |
|---------------------|-----------------|---------|------|
| Junction to Ambient | θ <sub>JA</sub> | 200     | °C/W |
| Junction to Case    | θ <sub>JC</sub> | 83.3    | °C/W |

### ■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise noted)

| PARAMETER                            | SYMBOL               | TEST CONDITIONS                                                                       | MIN | TYP | MAX  | UNIT |
|--------------------------------------|----------------------|---------------------------------------------------------------------------------------|-----|-----|------|------|
| <b>OFF CHARACTERISTICS</b>           |                      |                                                                                       |     |     |      |      |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub> | I <sub>C</sub> =1.0mA, I <sub>B</sub> =0 (Note)                                       | 30  |     |      | V    |
| Collector-Base Breakdown Voltage     | V <sub>(BR)CBO</sub> | I <sub>C</sub> =100μA, I <sub>E</sub> =0                                              | 35  |     |      | V    |
| Collector Cut-Off Current            | I <sub>CBO</sub>     | V <sub>CB</sub> =20V, I <sub>E</sub> =0                                               |     |     | 50   | nA   |
| Emitter Cutoff Current               | I <sub>EBO</sub>     | V <sub>CB</sub> =15V, I <sub>E</sub> =0                                               |     |     | 50   | nA   |
| DC Current Gain                      | h <sub>FE</sub>      | V <sub>CE</sub> =5.0V, I <sub>C</sub> =100μA                                          | 300 |     | 900  |      |
|                                      |                      | V <sub>CE</sub> =5.0V, I <sub>C</sub> =1.0mA                                          | 350 |     |      |      |
|                                      |                      | V <sub>CE</sub> =5.0V, I <sub>C</sub> =10mA (Note)                                    | 300 |     |      |      |
| Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub> | I <sub>C</sub> =10mA, I <sub>B</sub> =1.0mA                                           |     |     | 0.5  | V    |
| Base-Emitter On Voltage              | V <sub>BE(ON)</sub>  | I <sub>C</sub> =10mA, V <sub>CE</sub> =5.0V                                           |     |     | 0.8  | V    |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |                      |                                                                                       |     |     |      |      |
| Current Gain-Bandwidth Product       | f <sub>T</sub>       | V <sub>CE</sub> =5.0mA, I <sub>C</sub> =500μA, f=20MHz                                | 50  |     |      | MHz  |
| Collector-Base Capacitance           | C <sub>CB</sub>      | V <sub>CB</sub> =5.0V, I <sub>E</sub> =0, f=100kHz                                    |     |     | 4    | pF   |
| Emitter-Base Capacitance             | C <sub>EB</sub>      | V <sub>EB</sub> =0.5V, I <sub>C</sub> =0, f=100kHz                                    |     |     | 10   | pF   |
| Small-Signal Current Gain            | h <sub>FE</sub>      | V <sub>CE</sub> =5.0V, I <sub>C</sub> =1.0mA, f=1.0kHz                                | 350 |     | 1400 |      |
| Noise Figure                         | NF                   | V <sub>CE</sub> =5.0V, I <sub>C</sub> =100μA, R <sub>S</sub> =10kΩ, f=10KHz ~ 15.7kHz |     |     | 3.0  | dB   |

Note Pulse Test: Pulse Width≤300μs, Duty Cycle≤2.0%

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