

## Linear Systems High Voltage Super-Beta Monolithic Dual NPN

The LS302 is a monolithic pair of high voltage Super-Beta NPN transistors mounted in a single SOT-23 package. The monolithic dual chip design reduces parasitics and gives better performance while ensuring extremely tight matching.

The 6 Pin SOT-23 provides ease of manufacturing, and a lower cost assembly option.

(See Packaging Information).

### LS302 Features:

- Very high gain
- Tight matching
- Low Output Capacitance

### FEATURES

|                         |                                     |
|-------------------------|-------------------------------------|
| HIGH GAIN               | $h_{FE} \geq 1000$ @ 1 $\mu$ A TYP. |
| LOW OUTPUT CAPACITANCE  | $C_{OBO} \leq 2.0$ pF               |
| TIGHT $V_{BE}$ MATCHING | $ V_{BE1} - V_{BE2}  = 0.2$ mV TYP. |
| HIGH $f_t$              | 100MHZ                              |

### ABSOLUTE MAXIMUM RATINGS <sup>1</sup> @ 25°C (unless otherwise noted)

#### Maximum Temperatures

|                                |                 |
|--------------------------------|-----------------|
| Storage Temperature            | -65°C to +200°C |
| Operating Junction Temperature | -55°C to +150°C |

#### Maximum Power Dissipation

|   |          |
|---|----------|
| Continuous Power Dissipation (One side)   | 250mW    |
| Continuous Power Dissipation (Both sides) | 500mW    |
| Linear Derating factor (One side)         | 2.3mW/°C |
| Linear Derating factor (Both sides)       | 4.3mW/°C |

#### Maximum Currents

|                   |     |
|-------------------|-----|
| Collector Current | 5mA |
|-------------------|-----|

### MATCHING CHARACTERISTICS @ 25°C (unless otherwise stated)

| SYMBOL                                   | CHARACTERISTIC  | MIN | TYP | MAX | UNITS      | CONDITIONS   |
|--|---|-----|-----|-----|------------|--|
| $ V_{BE1} - V_{BE2} $                    | Base Emitter Voltage Differential                         | --  | 0.2 | 1   | mV         | $I_C = 10\mu$ A, $V_{CE} = 5$ V                                  |
| $\Delta (V_{BE1} - V_{BE2})  / \Delta T$ | Base Emitter Voltage Differential Change with Temperature | --  | 1   | 5   | $\mu$ V/°C | $I_C = 10\mu$ A, $V_{CE} = 5$ V<br>$T_A = -55^\circ$ C to +125°C |
| $ I_{B1} - I_{B2} $                      | Base Current Differential                                 | --  | 1   | 5   | nA         | $I_C = 10\mu$ A, $V_{CE} = 5$ V                                  |
| $h_{FE1} / h_{FE2}$                      | DC Current Gain Differential                              | --  | 5   | --  | %          | $I_C = 10\mu$ A, $V_{CE} = 5$ V                                  |

### ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise noted)

| SYMBOL        | CHARACTERISTICS                        | MIN. | TYP. | MAX. | UNITS | CONDITIONS  |
|---------------|--|------|------|------|-------|---|
| $BV_{CBO}$    | Collector to Base Voltage              | 35   | --   | --   | V     | $I_C = 10\mu$ A, $I_E = 0$  |
| $BV_{CEO}$    | Collector to Emitter Voltage           | 35   | --   | --   | V     | $I_C = 10\mu$ A, $I_B = 0$  |
| $BV_{EBO}$    | Emitter-Base Breakdown Voltage         | 6.2  | --   | --   | V     | $I_E = 10\mu$ A, $I_C = 0$ <sup>2</sup>   |
| $BV_{CCO}$    | Collector to Collector Voltage         | 100  | --   | --   | V     | $I_C = 10\mu$ A, $I_E = 0$  |
| $h_{FE}$      | DC Current Gain                        | --   | 1000 | --   |       | $I_C = 1\mu$ A, $V_{CE} = 5$ V  |
|               |  | 1000 | --   | --   |       | $I_C = 10\mu$ A, $V_{CE} = 5$ V   |
|               |  | --   | 1000 | --   |       | $I_C = 500\mu$ A, $V_{CE} = 5$ V  |
| $V_{CE(SAT)}$ | Collector Saturation Voltage           | --   | --   | 0.5  | V     | $I_C = 1$ mA, $I_B = 0.1$ mA  |
| $I_{EBO}$     | Emitter Cutoff Current                 | --   | --   | 0.2  | pA    | $I_C = 0$ , $V_{EB} = 3$ V  |
| $I_{CBO}$     | Collector Cutoff Current               | --   | --   | 100  | pA    | $I_E = 0$ , $V_{CB} = 10$ V   |
| $C_{OBO}$     | Output Capacitance                     | --   | --   | 2    | pF    | $I_E = 0$ , $V_{EB} = 1$ V  |
| $C_{C1C2}$    | Collector to Collector Capacitance     | --   | --   | 2    | pF    | $V_{CC} = 0$ V  |
| $I_{C1C2}$    | Collector to Collector Leakage Current | --   | --   | 0.5  | nA    | $V_{CC} = \pm 80$ V   |
| $f_T$         | Current Gain Bandwidth Product         | 100  | --   | --   | MHZ   | $I_C = 200\mu$ A, $V_{CE} = 5$ V  |
| NF            | Narrow Band Noise Figure               | --   | --   | 3    | dB    | $I_C = 10\mu$ A, $V_{CE} = 3$ V, $BW = 200$ Hz, $R_G = 10$ K $\Omega$ , $f = 1$ KHz |

Notes:

- Absolute Maximum ratings are limiting values above which serviceability may be impaired
- The reverse base-to-emitter voltage must never exceed 6.2 volts; the reverse base-to-emitter current must never exceed 10 $\mu$ A.

Available Packages:

LS302 in SOT-23  
LS302 available as bare die

Please contact Micross for full package and die dimensions:

Email: [chipcomponents@micross.com](mailto:chipcomponents@micross.com)  
Web: [www.micross.com/distribution.aspx](http://www.micross.com/distribution.aspx)

