

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

The LS301 is a monolithic pair of high voltage Super-Beta NPN transistors mounted in a single TO-78 package. The monolithic dual chip design reduces parasitics and gives better performance while ensuring extremely tight matching.

The hermetically sealed TO-78 is well suited for hi-rel and harsh environment applications.

(See Packaging Information).

### LS301 Features:

- Very high gain
- Tight matching
- Low Output Capacitance

### FEATURES

HIGH GAIN	$h_{FE} \geq 2000$ @ $1\mu A$ TYP.
LOW OUTPUT CAPACITANCE	$C_{OBO} \leq 2.0pF$
TIGHT $V_{BE}$ MATCHING	$ V_{BE1} - V_{BE2}  = 0.2mV$ 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
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### 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	$I_C = 10\mu A, V_{CE} = 5V$
$\Delta  V_{BE1} - V_{BE2}  / \Delta T$	Base Emitter Voltage Differential Change with Temperature	--	1	5	$\mu V/^\circ C$	$I_C = 10\mu A, V_{CE} = 5V$ $T_A = -55^\circ C$ to $+125^\circ C$
$ I_{B1} - I_{B2} $	Base Current Differential	--	0.5	1	nA	$I_C = 10\mu A, V_{CE} = 5V$
$h_{FE1} / h_{FE2}$	DC Current Gain Differential	--	5	--	%	$I_C = 10\mu A, V_{CE} = 5V$

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

SYMBOL	CHARACTERISTICS	MIN.	TYP.	MAX.	UNITS	CONDITIONS
$BV_{CBO}$	Collector to Base Voltage	18	--	--	V	$I_C = 10\mu A, I_E = 0$
$BV_{CEO}$	Collector to Emitter Voltage	18	--	--	V	$I_C = 10\mu A, I_B = 0$
$BV_{EBO}$	Emitter-Base Breakdown Voltage	6.2	--	--	V	$I_E = 10\mu A, I_C = 0^2$
$BV_{CCO}$	Collector to Collector Voltage	100	--	--	V	$I_C = 10\mu A, I_E = 0$
$h_{FE}$	DC Current Gain	--	2000	--		$I_C = 1\mu A, V_{CE} = 5V$
		2000	--	--		$I_C = 10\mu A, V_{CE} = 5V$
		--	2000	--		$I_C = 500\mu A, V_{CE} = 5V$
$V_{CE(SAT)}$	Collector Saturation Voltage	--	--	0.5	V	$I_C = 1mA, I_B = 0.1mA$
$I_{EBO}$	Emitter Cutoff Current	--	--	0.2	pA	$I_C = 0, V_{EB} = 3V$
$I_{CBO}$	Collector Cutoff Current	--	--	100	pA	$I_E = 0, V_{CB} = 10V$
$C_{OBO}$	Output Capacitance	--	--	2	pF	$I_E = 0, V_{EB} = 1V$
$C_{C1C2}$	Collector to Collector Capacitance	--	--	2	pF	$V_{CC} = 0V$
$I_{C1C2}$	Collector to Collector Leakage Current	--	--	0.5	nA	$V_{CC} = \pm 80V$
$f_T$	Current Gain Bandwidth Product	100	--	--	MHZ	$I_C = 200\mu A, V_{CE} = 5V$
NF	Narrow Band Noise Figure	--	--	3	dB	$I_C = 10\mu A, V_{CE} = 3V, BW=200Hz, R_G= 10K\Omega, f = 1KHz$

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:

LS301 in TO-78  
LS301 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)

TO-78 (Bottom View)

