

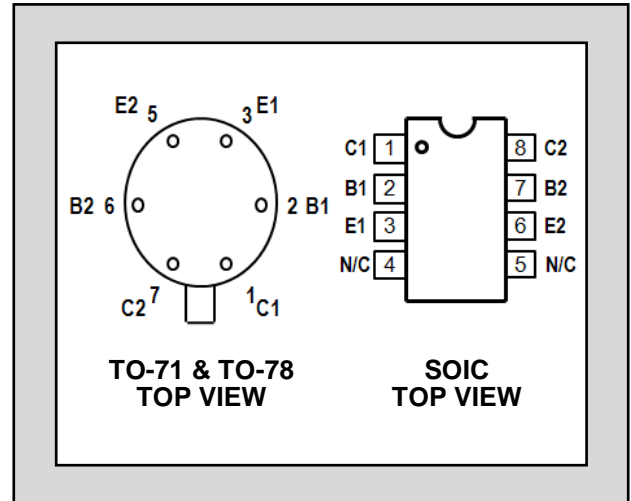
LINEAR SYSTEMS

Improved Standard Products®

LS301 LS302 LS303

HIGH VOLTAGE
SUPER-BETA MONOLITHIC DUAL
NPN TRANSISTORS

FEATURES		
VERY HIGH GAIN	h_{FE} 2000 @ 1.0 μ A TYP.	
LOW OUTPUT CAPACITANCE	C_{OBO} 2.0pF	
TIGHT V_{BE} MATCHING	$ V_{BE1} - V_{BE2} = 0.2\text{mV}$ TYP.	
HIGH f_T	100 MHz	
ABSOLUTE MAXIMUM RATINGS <u>NOTE 1</u>		
@ 25 °C (unless otherwise stated)		
I_C	Collector Current	5mA
Maximum Temperatures		
Storage Temperature		-55 to +150 °C
Operating Junction Temperature		-55 to +150 °C
Maximum Power Dissipation		ONE SIDE BOTH SIDES
Device Dissipation @ Free Air		250mW 500mW
Linear Derating Factor		2.3mW/°C 4.3mW/°C

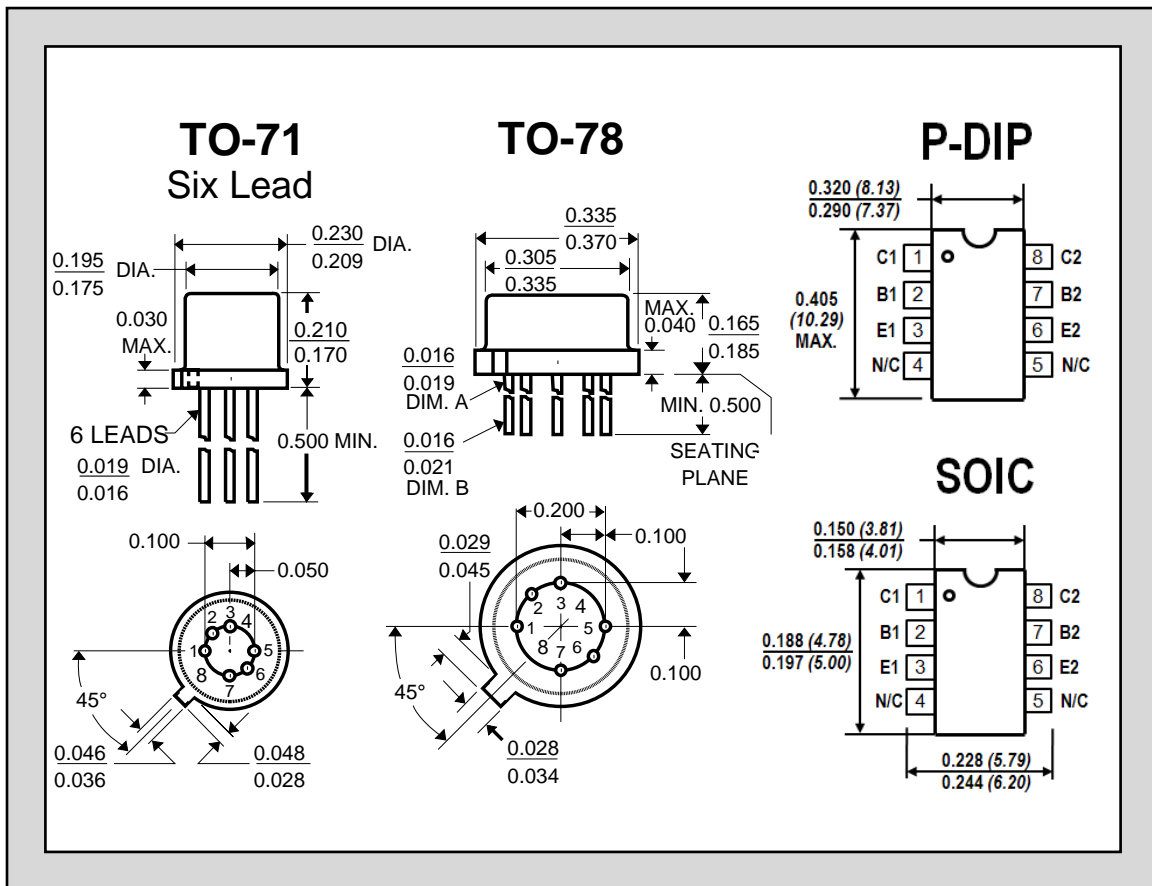


ELECTRICAL CHARACTERISTICS @ 25 °C (unless otherwise stated)

SYMBOL	CHARACTERISTIC	LS301	LS302	LS303		UNITS	CONDITIONS
BV_{CBO}	Collector to Base Voltage	18	35	10	MIN.	V	$I_C = 10\mu\text{A}$ $I_E = 0$
BV_{CEO}	Collector to Emitter Voltage	18	35	10	MIN.	V	$I_C = 1\text{mA}$ $I_B = 0$
BV_{EBO}	Emitter-Base Breakdown Voltage	6.0	6.0	6.0	MIN.	V	$I_E = 10\mu\text{A}$ $I_C = 0$ <u>NOTE 2</u>
BV_{CCO}	Collector To Collector Voltage	80	80	20	MIN.	V	$I_C = 1\mu\text{A}$ $I_E = I_B = 0$
h_{FE}	DC Current Gain	2000	1000	2000	TYP.		$I_C = 1\mu\text{A}$ $V_{CE} = 5\text{V}$
h_{FE}	DC Current Gain	2000	1000	2000	MIN.		$I_C = 10\mu\text{A}$ $V_{CE} = 5\text{V}$
h_{FE}	DC Current Gain	2000	1000	2000	TYP.		$I_C = 500\mu\text{A}$ $V_{CE} = 5\text{V}$
$V_{CE(SAT)}$	Collector Saturation Voltage	0.5	0.5	0.5	MAX.	V	$I_C = 1\text{mA}$ $I_B = 0.1\text{mA}$
I_{CBO}	Collector Cutoff Current	100	100	100	MAX.	pA	$I_E = 0$ $V_{CB} = \text{NOTE 3}$
I_{EBO}	Emitter Cutoff Current	0.2	0.2	0.2	MAX.	pA	$I_E = 0$ $V_{EB} = 3\text{V}$
C_{OBO}	Output Capacitance	2	2	2	MAX.	pF	$I_E = 0$ $V_{CB} = 1\text{V}$
C_{C1C2}	Collector to Collector Capacitance	2	2	2	MAX.	pF	$V_{CC} = 0$
I_{C1C2}	Collector to Collector Leakage Current	1.0	1.0	1.0	MAX.	μA	$V_{CC} = \text{NOTE 4}$, $I_E = I_B = 0$
f_T	Current Gain Bandwidth Product	100	100	100	MIN.	MHz	$I_C = 200\mu\text{A}$ $V_{CE} = 5\text{V}$
NF	Narrow Band Noise Figure	3	3	3	MAX.	dB	$I_C = 10\mu\text{A}$ $V_{CE} = 3\text{V}$ $BW = 200\text{Hz}$ $R_G = 10\text{K}$ $f = 1\text{KHz}$

MATCHING CHARACTERISTICS

SYMBOL	CHARACTERISTIC	LS301	LS302	LS303		UNITS	CONDITIONS
$I_{V_{BE1}-V_{BE2}}$	Base Emitter Voltage Differential	0.2	0.2	0.2	TYP.	mV	$I_C = 10\mu A$ $V_{CE} = 5V$
		1	1	1	MAX.	mV	
$I(V_{BE1}-V_{BE2})/^\circ C$	Base Emitter Voltage Differential Change with Temperature	1	1	1	TYP.	$\mu V/^\circ C$	$I_C = 10\mu A$ $V_{CE} = 5V$ $T = 55^\circ C$ to $+125^\circ C$
		5	5	5	MAX.	$\mu V/^\circ C$	
$I_{B1} - I_{B2}$	Base Current Differential	0.5	1	0.5	TYP.	nA	$I_C = 10\mu A$ $V_{CE} = 1V$
		1	5	1.5	MAX.	nA	
h_{FE1}/h_{FE2}	DC Current Gain Differential	5	5	5	TYP.	%	$I_C = 10\mu A$ $V_{CE} = 5V$



NOTES:

1. These ratings are limiting values above which the serviceability of any semiconductor may be impaired
2. The reverse base-to-emitter voltage must never exceed 6.0 volts; the reverse base-to-emitter current must never exceed 10 μA mps.
3. For LS301 & LS302: $V_{CB}=10V$; for LS303: $V_{CB}=5V$
4. For LS301 & LS302: $V_{CC}=\pm 80V$; for LS303: $V_{CC}=\pm 20V$

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