

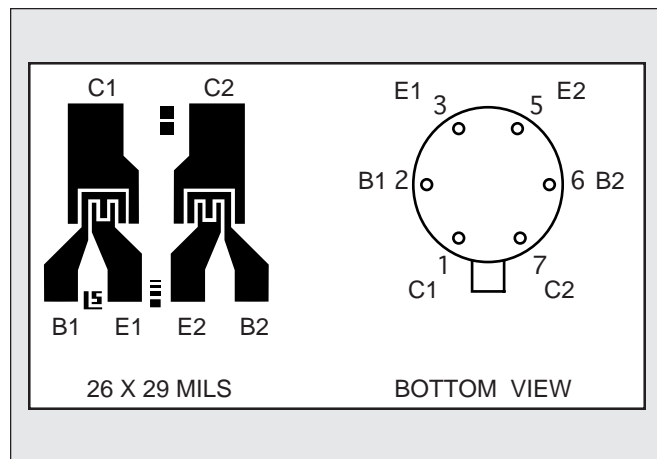
# LINEAR SYSTEMS

*Linear Integrated Systems*

## LS350 LS351 LS352

### MONOLITHIC DUAL PNP TRANSISTORS

FEATURES		
<b>HIGH GAIN</b>		$h_{FE} \geq 200$ @ 10 $\mu$ A - 1mA
<b>TIGHT <math>V_{BE}</math> MATCHING</b>		$ V_{BE1} - V_{BE2}  = 0.2\text{mV TYP.}$
<b>HIGH <math>f_T</math></b>		275MHz TYP. @ 1mA
ABSOLUTE MAXIMUM RATINGS NOTE 1		
@ 25°C (unless otherwise noted)		
$I_C$	Collector Current	10mA
Maximum Temperatures		
Storage Temperature		-65° to +200°C
Operating Junction Temperature		+150°C
Maximum Power Dissipation		
	<b>ONE SIDE</b>	<b>BOTH SIDES</b>
Device Dissipation @ Free Air		250mW      500mW
Linear Derating Factor		2.3mW/°C      4.3mW/°C



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

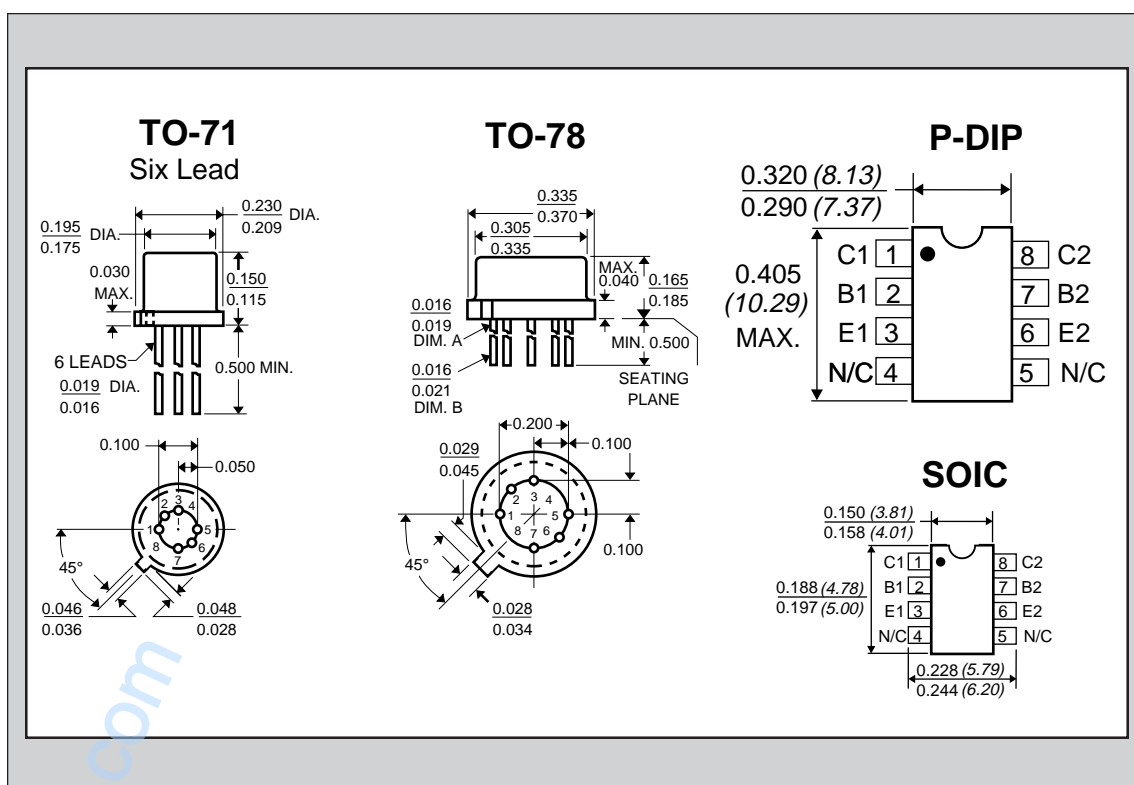
SYMBOL	CHARACTERISTICS	LS350	LS351	LS352		UNITS	CONDITIONS
$V_{CBO}$	Collector to Base Voltage	25	45	60	MIN.	V	$I_C = 10\mu\text{A}$ $I_E = 0$
$V_{CEO}$	Collector to Emitter Voltage	25	45	60	MIN.	V	$I_C = 10\mu\text{A}$ $I_B = 0$
$V_{EBO}$	Emitter to Base Voltage	6.2	6.2	6.2	MIN.	V	$I_E = 10\mu\text{A}$ $I_C = 0$ NOTE 2
$V_{CCO}$	Collector to Collector Voltage	30	60	100	MIN.	V	$I_C = 10\mu\text{A}$ $I_E = 0$
$h_{FE}$	DC Current Gain	100	150	200	MIN.		$I_C = 10\mu\text{A}$ $V_{CE} = 5\text{V}$
			600	600	MAX.		
$h_{FE}$	DC Current Gain	100	150	200	MIN.		$I_C = 100\mu\text{A}$ $V_{CE} = 5\text{V}$
			600	600	MAX.		
$h_{FE}$	DC Current Gain	100	150	200	MIN.		$I_C = 1\text{mA}$ , $V_{CE} = 5\text{V}$
$V_{CE(SAT)}$	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	0.2	0.2	0.2	MAX.	nA	$I_E = 0$ $V_{CB} = \text{NOTE 3}$
$I_{EBO}$	Emitter Cutoff Current	0.2	0.2	0.2	MAX.	nA	$I_C = 0$ $V_{EB} = 3\text{V}$
$C_{OBO}$	Output Capacitance	2	2	2	MAX.	pF	$I_E = 0$ $V_{CB} = 5\text{V}$
$C_{C1C2}$	Collector to Collector Capacitance	2	2	2	MAX.	pF	$V_{CC} = 0$
$I_{C1C2}$	Collector to Collector Leakage Current	0.5	0.5	0.5	MAX.	nA	$V_{CC} = \text{NOTE 4}$
$f_T$	Current Gain Bandwidth Product	200	200	200	MIN.	MHz	$I_C = 1\text{mA}$ $V_{CE} = 5\text{V}$
NF	Narrow Band Noise Figure	3	3	3	MAX.	dB	$I_C = 100\mu\text{A}$ $V_{CE} = 5\text{V}$ BW = 200Hz $R_G = 10\text{K}\Omega$ f = 1KHz

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## MATCHING CHARACTERISTICS

SYMBOL	CHARACTERISTICS	LS350	LS351	LS352		UNITS	CONDITIONS
$ V_{BE1} - V_{BE2} $	Base Emitter Voltage Differential	1	0.4	0.2	TYP.	mV	$I_C = 10 \mu A$ $V_{CE} = 5V$
		5	1.0	0.5	MAX.	mV	
$\Delta (V_{BE1} - V_{BE2}) /^\circ C$	Base Emitter Voltage Differential Change with Temperature	2	1	0.5	TYP.	$\mu V/^\circ C$	$I_C = 10 \mu A$ $V_{CE} = 5V$
		20	10	2	MAX.	$\mu V/^\circ C$	$T_A = -55^\circ C$ to $+125^\circ C$
$ I_{B1} - I_{B2} $	Base Current Differential		5	5	MAX.	nA	$I_C = 10 \mu A$ $V_{CE} = 5V$
$ \Delta(I_{B1} - I_{B2}) /^\circ C$	Base Current Differential Change with Temperature		0.5	0.3	MAX.	nA/°C	$I_C = 10 \mu A$ , $V_{CE} = 5V$ $T_A = -55^\circ C$ to $+125^\circ C$
$h_{FE1}/h_{FE2}$	DC Current Gain Differential	10	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 6.2 volts; the reverse base-to-emitter current must never exceed 10  $\mu A$ .
3. For LS350:  $V_{CB} = 20V$ ; for LS351 & LS352:  $V_{CB} = 30V$ .
4. For LS351:  $V_{CC} = \pm 45V$ ; for LS352:  $V_{CC} = \pm 80V$ ; for LS350:  $V_{CC} = \pm 25V$ .