LINEAR SYSTEMS

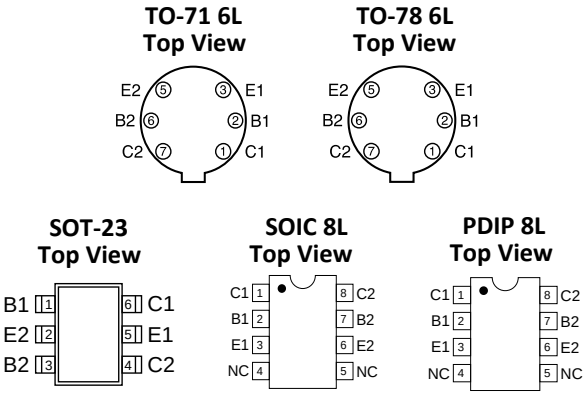
Over 30 Years of Quality Through Innovation

LS3250A/B/C

Monolithic Dual Matched NPN Transistor

LOW NOISE AND THERMALLY MATCHED MONOLITHIC DUAL NPN TRANSISTOR

Absolute Maximum Ratings @ 25 °C (unless otherwise stated)	
Maximum Temperatures	
Storage Temperature	-65 to +150°C
Junction Operating Temperature	-55 to +150°C
Maximum Power Dissipation	
Continuous Power Dissipation	400mW
Maximum Voltages	
Maximum Power Supply	45V
Collector to Collector	50V
Maximum Current	
Collector Current	50mA



Features

- Low Voltage Noise, 2.7nV-typ at f=100Hz
- Low Vbe Matching 2mV-max
- Low Vbe Temperature Drift 3µV/˚C-max
- High Current Gain 150-Min and 650-max
- High VCBO Breakdown Voltage-45V-min
- High VCEO Breakdown Voltage-45V-min
- High VCCO Breakdown Voltage +/-50V-min
- Refer to LS350/1/2 dual PNP for counterpart version

Benefits

- Unique Monolithic Dual Design Construction
- Improved System Noise Performance
- Wide Range of Parameter Operations
- High Frequency Performance
- Excellent Matching and Thermal Tracking
- Operation in High Voltage Applications

Applications

- Differential and Preamplifiers
- Multivibrator Circuits
- Music Synthesizers
- Current Sources
- Clocking Networks
- Voltage Controlled Oscillators
- Frequency Division
- Photon Generators

Description

The LS3250A/B/C monolithic dual matched NPN transistor offers excellent matching characteristics and high frequency performance up to 600MHz gain bandwidth product. Low 2pF-max Cobo output capacitance further improves frequency characteristics and decreases signal distortion at the output.

Tight current gain matching and high current gain, make the LS3250 an ideal choice for accurate current biasing and mirroring circuits and designs. LS3250 output stages do not need considerable error correction, due to their higher transconductance and have a positive temperature coefficient of current (Ib and Ic).

Low noise performance, low offset voltage and high bandwidth, make the LS3250 ideal for differential input stages and pre-amplifier applications.

Due to its high breakdown specifications, the LS3250 is suitable in high voltage applications requiring up to 45VMax. In addition to the very small outline SOT-23 6L package, the LS3250 is available in the TO-78 6L, TO-71 6L, PDIP 8L and SOIC 8L packages.

Furthermore, the LS3250 is offered with custom electrical specifications called SELXXXX. Contact our factory for modified electrical specifications for these special versions of the LS3250 SELXXXX.

Refer to the LS350/1/2 dual PNP for the counterpart version.

Electrical Characteristics @ 25 °C (Unless Otherwise Stated)

SYMBOL	CHARACTERISTIC	LS3250A		LS3250B		LS3250C		UNIT	CONDITIONS
		MIN	MAX	MIN	MAX	MIN	MAX		
$\lvert V_{BE1} - V_{BE2} \rvert$	Base to Emitter Voltage Differential	-	2	-	5	-	10	mV	I_C = 10µA, V_{CE} = 5V
$\frac{\lvert V_{BE1} - V_{BE2} \rvert}{\Delta T}$	Base to Emitter Voltage Differential Change with Temperature	-	3	-	5	-	15	µV/°C	I_C = 10µA, V_{CE} = 5V T_A = -40°C to +85°C
$\lvert I_{B1} - I_{B2} \rvert$	Base Current Differential	-	10	-	10	-	10	nA	I_C = 10µA, V_{CE} = 5V
$\frac{\lvert I_{B1} - I_{B2} \rvert}{\Delta T}$	Base Current Differential Change with Temperature	-	0.5	-	0.5	-	1.0	nA/°C	I_C = 10µA, V_{CE} = 5V T_A = -40°C to +85°C
h_{FE1}/h_{FE2}	Current Gain Differential	-	10	-	10	-	15	%	I_C = 1mA, V_{CE} = 5V
BV_{CBO}	Collector to Base Breakdown Voltage	45	-	40	-	20	-	V	I_C = 10µA, I_E = 0A
BV_{CEO}	Collector to Emitter Breakdown Voltage	45	-	40	-	20	-		I_C = 10mA, I_B = 0
BV_{CCO}	Collector to Collector Breakdown Voltage	±50	-	±50	-	±50	-		I_C = ±1µA, I_E = I_B= 0A
BV_{EBO}	Emitter to Base Breakdown Voltage[3]	6.0	-	6.0	-	6.0	-		I_E = 10µA, I_C = 0A
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	-	0.35	-	0.35	-	1.2		I_C = 10mA, I_B = 1mA
h_{FE}	DC Current Gain	150	-	100	-	50	-	-	I_C = 1mA, V_{CE} = 5V
		150	650	80	-	40	-		I_C = 10mA, V_{CE} = 5V
		125	-	60	-	30	-		I_C = 35mA, V_{CE} = 5V
I_{CBO}	Collector Cutoff Current	-	0.35	-	0.35	-	-	nA	I_E = 0A, V_{CB} = 30V
		-	-	-	-	-	0.2		I_E = 0A, V_{CB} = 20V
I_{EBO}	Emitter Cutoff Current	-	0.35	-	0.35	-	0.35		I_E = 0A, V_{CB} = 3V
I_{C1C2}	Collector to Collector Leakage Current	-	±1	-	±1	-	±1	µA	V_{CC} = ±50V, I_E = I_B= 0A
C_{OBO}	Output Capacitance	-	2	-	2	-	2	pF	I_E = 0A, V_{CB} = 10V
f_T	Gain Bandwidth Product (Current)	-	600	-	600	-	600	MHz	I_C = 1mA, V_{CE} = 5V
en	Noise Voltage	-	2.7typ	-	2.7typ	-	2.7typ	nV/√Hz	V_{CE}==5V, IC=2mA F=100Hz, NBW=1Hz
en	Noise Voltage	-	0.7typ	-	0.7typ	-	0.7typ	nV/√Hz	V_{CE} ==5V, IC=2mA F=1kHz, NBW=1Hz

Notes

1. Absolute maximum ratings are limiting values above which serviceability may be impaired.
2. Pulse Test: PW ≤ 300µs, Duty Cycle ≤ 3%
3. All characteristics MIN/TYP/MAX numbers are absolute values. Negative values indicate electrical polarity only.

Typical Characteristics

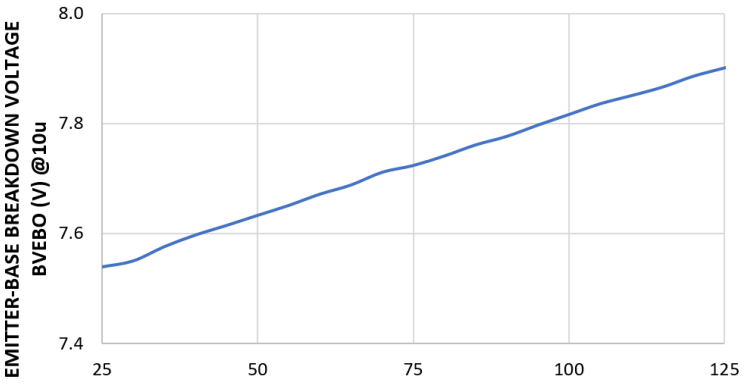


Figure-1 BVEBO(V) vs. Temperature

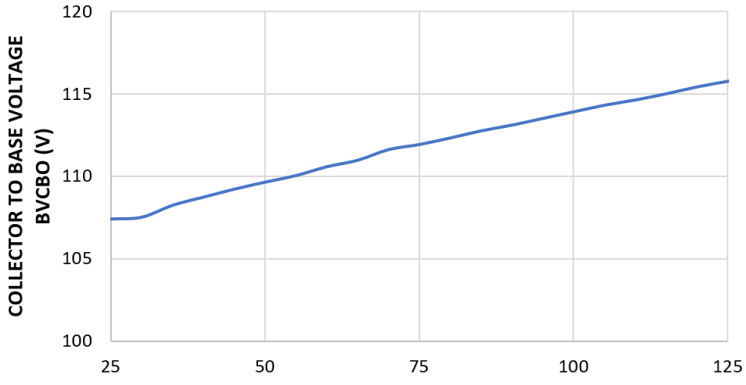


Figure-2 BVCBO(V) vs. Temperature

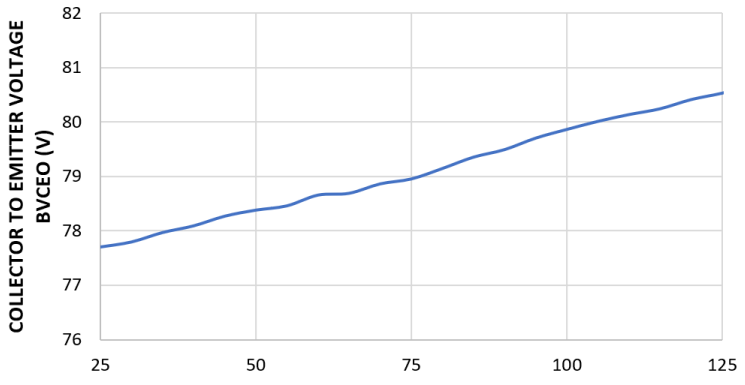


Figure-3 (BVCEO(V) vs. Temperature

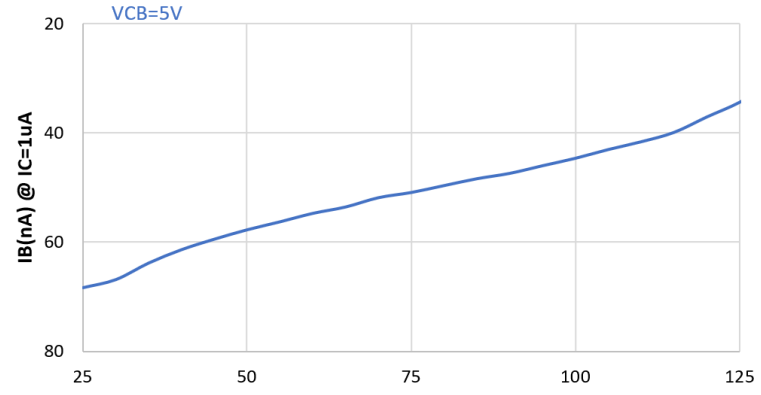


Figure-4 IB(nA) vs. Temperature

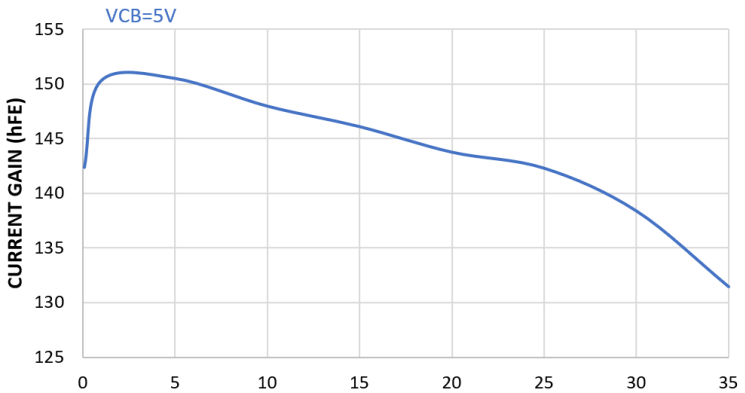


Figure-5 COLLECTOR CURRENT vs. CURRENT GAIN (hFE)

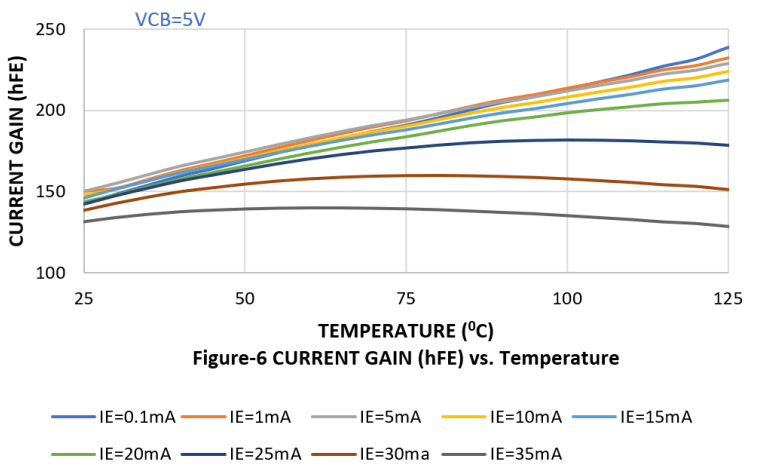
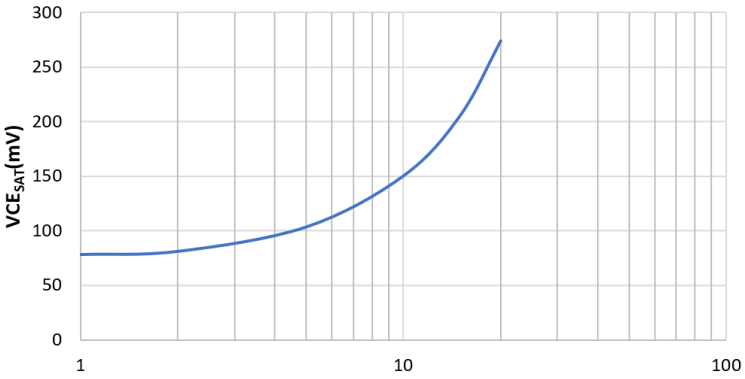


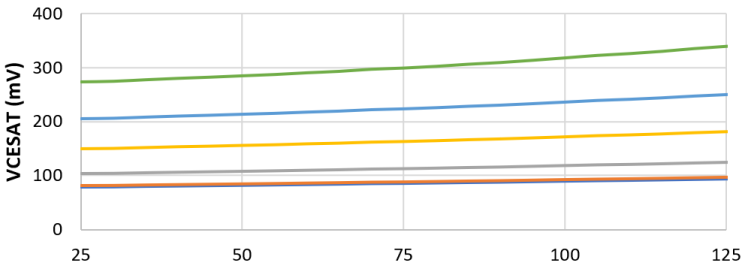
Figure-6 CURRENT GAIN (hFE) vs. Temperature

Typical Characteristics



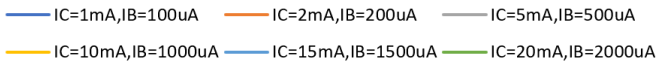
COLLECTOR CURRENT, IC(mA)

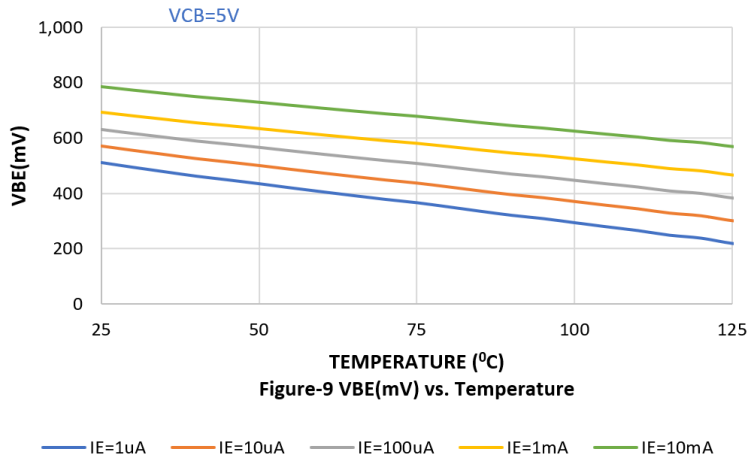
Figure-7 COLLECTOR CURRENT(mA) vs. VCE_{SAT} (mV)



TEMPERATURE (^{0}C)

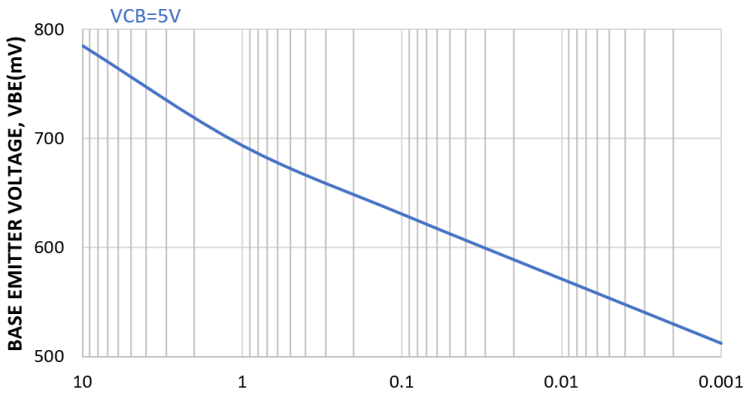
Figure-8 VCE_{SAT} (mV) vs. Temperature





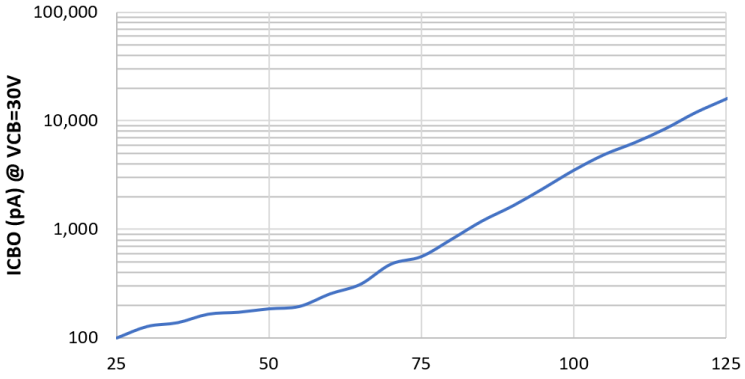
TEMPERATURE (^{0}C)

Figure-9 VBE(mV) vs. Temperature



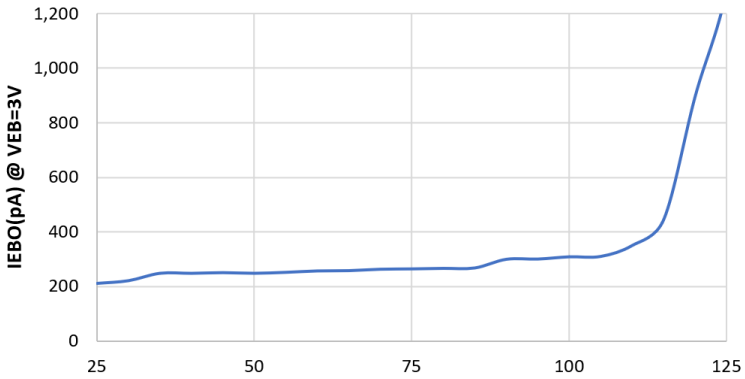
COLLECTOR CURRENT, IC(mA)

Figure-10 VBE(mV) vs. Temperature



TEMPERATURE (^{0}C)

Figure-11 ICBO(pA) vs. Temperature



TEMPERATURE (^{0}C)

Figure-12 IEBO(pA) vs. Temperature

Typical Characteristics

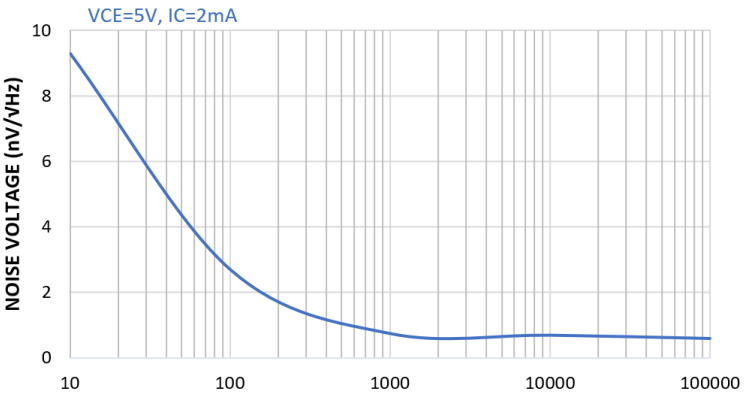


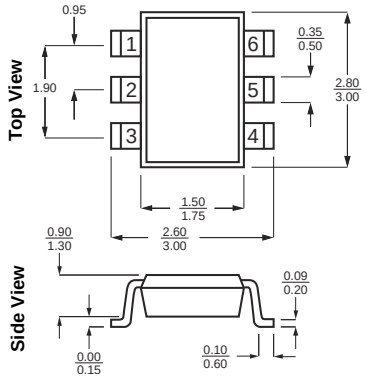
Figure-13 Noise Voltage vs. Frequency

Ordering Information

Standard Part Call-Out
LS3250A/B/C TO-71 6L RoHS
LS3250A/B/C TO-78 6L RoHS
LS3250A/B/C PDIP 8L RoHS
LS3250A/B/C SOIC 8L RoHS
LS3250A/B/C SOT-23 6L RoHS
Custom Part Call-out Custom parts include SEL+4 digit numeric code
LS3250A/B/C TO-71 6L RoHS SELXXXX
LS3250A/B/C TO-78 6L RoHS SELXXXX
LS3250A/B/C PDIP 8L RoHS SELXXXX
LS3250A/B/C SOIC 8L RoHS SELXXXX
LS3250A/B/C SOT-23 6L RoHS SELXXXX

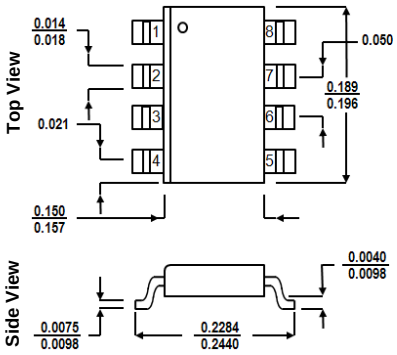
Package Dimensions

SOT-23 6 Lead



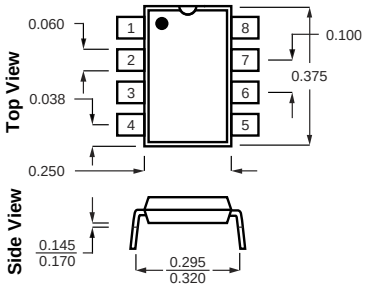
DIMENSIONS IN MILLIMETERS

SOIC-A 8 Lead



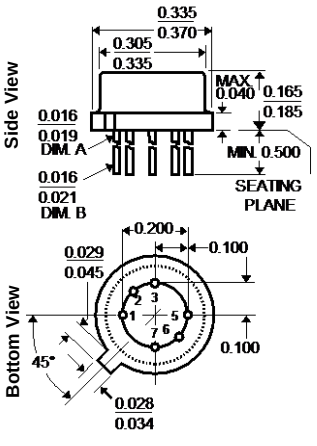
DIMENSIONS IN INCHES

PDIP 8 Lead



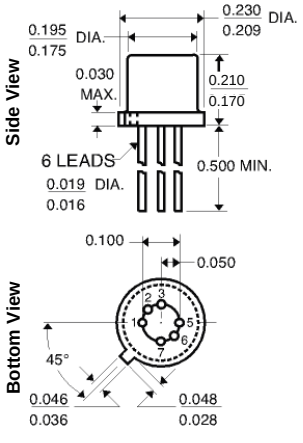
DIMENSIONS IN INCHES

TO-78 6 Lead



DIMENSIONS IN INCHES

TO-71 6 Lead



DIMENSIONS IN INCHES