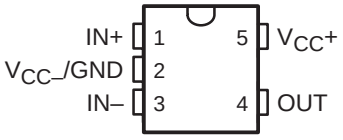
SLOS250D – JUNE 1999 – REVISED NOVEMBER 1999

- **Wide Range of Supply Voltages, Single Supply 5 V to 30 V, or Dual Supplies**
- **Class AB Output Stage**
- **True Differential-Input Stage**
- **Low Input Bias Current**
- **Internal Frequency Compensation**
- **Short-Circuit Protection**
- **Packaged in SOT-23 Package**

DBV PACKAGE
(TOP VIEW)

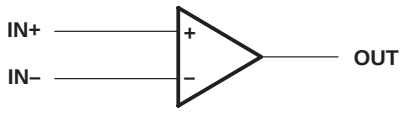


description

The TL343 is a single operational amplifier similar in performance to the μA741, but with several distinct advantages. It is designed to operate from a single supply over a range of voltages from 3 V to 36 V. Operation from split supplies also is possible, provided the difference between the two supplies is 3 V to 36 V. The common-mode input range includes the negative supply. Output range is from the negative supply to V_{CC} – 1.5 V.

The TL343 is characterized for operation from –40°C to 125°C.

symbol



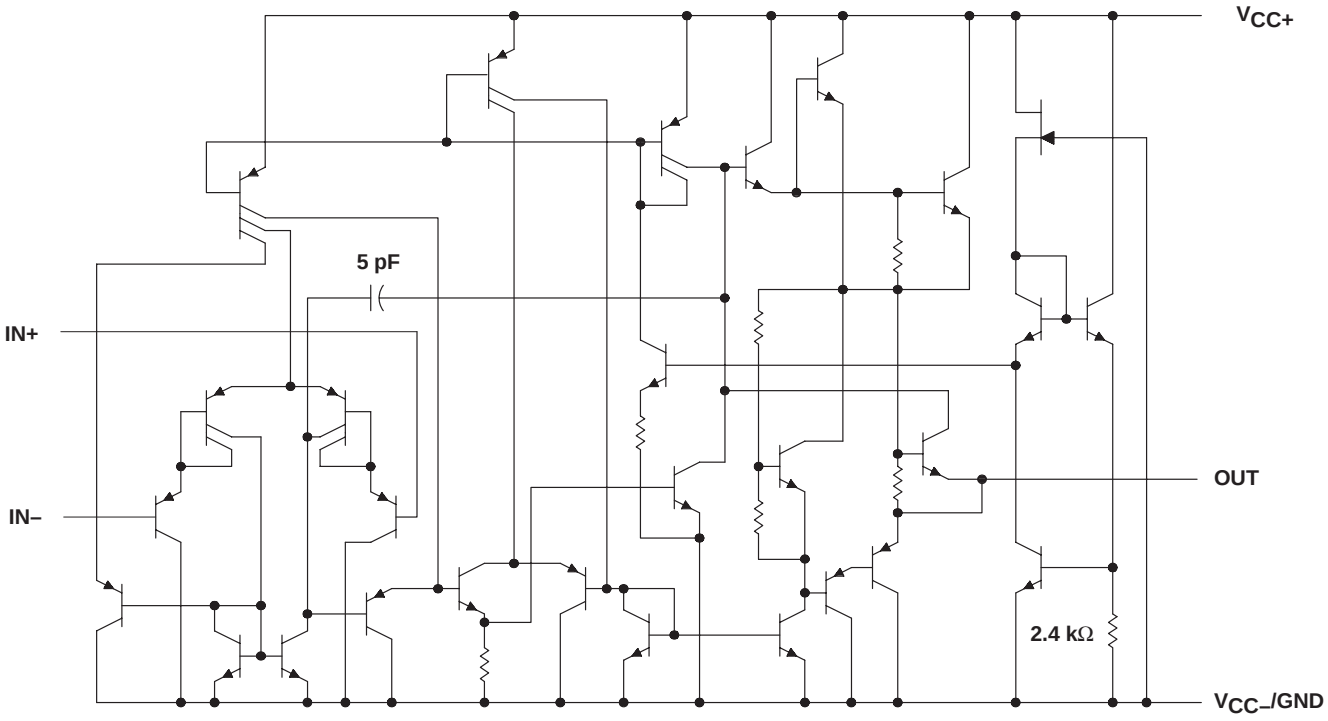
AVAILABLE OPTIONS

T_A	V_{IO}MAX AT 25°C	SOT-23 PACKAGE (DBV)
–40°C to 125°C	10 mV	TL343IDBV

The DBV package is only available taped and reeled. Add the suffix R to device type for ordering (e.g., TL343IDBVR).

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

schematic



NOTE A: Component values shown are nominal.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

		MAX	UNIT
Supply voltage (see Note 1)	V_{CC+}	18	V
	$V_{CC–}$	–18	
Supply voltage, V_{CC+} with respect to $V_{CC–}$		36	V
Differential input voltage (see Note 2)		±36	V
Input voltage (see Notes 1 and 3)		±18	V
Package thermal impedance, θ_{JA} (see Note 4)		347	°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds		260	°C
Storage temperature range, T_{stg}		–65 to 150	°C

NOTES: 1. These voltage values are with respect to the midpoint between V_{CC+} and $V_{CC–}$.
2. Differential voltages are at IN+ with respect to IN–.
3. Neither input must ever be more positive than V_{CC+} or more negative than $V_{CC–}$.
4. The package thermal impedance is calculated in accordance with JESD 51.

recommended operating conditions

		MIN	MAX	UNIT
Single-supply voltage	V_{CC}	5	30	V
Dual-supply voltage	V_{CC+}	2.5	15	V
	V_{CC-}	–2.5	–15	
Operating free-air temperature, T_A		–40	125	°C

electrical characteristics at specified free-air temperature, $V_{CC\pm}$ = ±15 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS†			MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	See Note 5		25°C		2	10	mV
				Full range			12	
$\alpha_{V_{IO}}$	Temperature coefficient of input offset voltage	See Note 5		Full range		10		µV/°C
I_{IO}	Input offset current	See Note 5		25°C		30	50	nA
				Full range			200	
$\alpha_{I_{IO}}$	Temperature coefficient of input offset current	See Note 5		Full range		50		pA/C
I_{IB}	Input bias current	See Note 5		25°C		–20	–50	nA
				Full range			–80	
V_{ICR}	Common-mode input voltage range‡			25°C	V_{CC-} to 13	V_{CC-} to 13.5		V
V_{OM}	Peak output-voltage swing	R_L = 10 kΩ		25°C	±12	±13.5		V
		R_L = 2 kΩ		25°C	±10	±13		
				Full range	±10			
A_{VD}	Large-signal differential voltage amplification	V_O = ±10 V,	R_L = 2 kΩ	25°C	20	200		V/mV
				Full range	15			
B_{OM}	Maximum-output-swing bandwidth	V_{OPP} = 20 V, THD ≤ 5%,	A_{VD} = 1, R_L = 2 kΩ	25°C		9		kHz
B_1	Unity-gain bandwidth	V_O = 50 mV,	R_L = 10 kΩ	25°C		1		MHz
ϕ_m	Phase margin	C_L = 200 pF,	R_L = 2 kΩ	25°C		44°		
r_i	Input resistance	f = 20 Hz		25°C	0.3	1		MΩ
r_o	Output resistance	f = 20 Hz		25°C		75		Ω
CMRR	Common-mode rejection ratio	V_{IC} = V_{ICR}(min)		25°C	70	90		dB
k_{SVS}	Supply-voltage sensitivity ($\Delta V_{IO}/\Delta V_{CC}$)	$V_{CC\pm}$ = ±2.5 to ±15 V		25°C		30	150	µV/V
I_{OS}	Short-circuit output current§			25°C	±10	±30	±55	mA
I_{CC}	Total supply current	No load,	See Note 5	25°C		0.7	2.8	mA

† All characteristics are measured under open-loop conditions with zero common-mode voltage unless otherwise specified. Full range for T_A is –40°C to 125°C.

‡ The V_{ICR} limits are linked directly, volt-for-volt, to supply voltage; the positive limit is 2 V less than V_{CC+}.

§ Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.

NOTE 5: V_{IO}, I_{IO}, I_{IB}, and I_{CC} are defined at V_O = 0.

electrical characteristics, V_{CC+} = 5 V, V_{CC-} = 0 V, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS†		MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	V_O = 2.5 V			2	10	mV
I_{IO}	Input offset current	V_O = 2.5 V			30	50	nA
I_{IB}	Input bias current	V_O = 2.5 V			–20	–50	nA
V_{OM}	Peak output voltage swing‡	R_L = 10 kΩ		3.3	3.5		V
A_{VD}	Large-signal differential voltage amplification	V_O = 1.7 V to 3.3 V,	R_L = 2 kΩ	20	200		V/mV
k_{SVS}	Supply-voltage sensitivity ($\Delta V_{IO}/\Delta V_{CC\pm}$)	$V_{CC\pm}$ = ±2.5 V to ±15 V				150	µV/V
I_{CC}	Supply current	V_O = 2.5 V,	No load		0.7	1.75	mA

† All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified.
‡ Output swings essentially to ground.

operating characteristics, $V_{CC\pm}$ = ±15 V, T_A = 25°C, A_{VD} = 1 (unless otherwise noted)

PARAMETER		TEST CONDITIONS				MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain	V_I = ±10 V,	C_L = 100 pF,	R_L = 2 kΩ,	See Figure 1		1		V/µs
t_r	Rise time	ΔV_O = 50 mV,	C_L = 100 pF,	R_L = 10 kΩ,	See Figure 1		0.35		µs
t_f	Fall time	ΔV_O = 50 mV,	C_L = 100 pF,	R_L = 10 kΩ,	See Figure 1		0.35		µs
	Overshoot factor	ΔV_O = 50 mV,	C_L = 100 pF,	R_L = 10 kΩ,	See Figure 1		20%		
	Crossover distortion	$V_{I(PP)}$ = 30 mV,	V_{OPP} = 2 V,	f = 10 kHz			1%		

PARAMETER MEASUREMENT INFORMATION

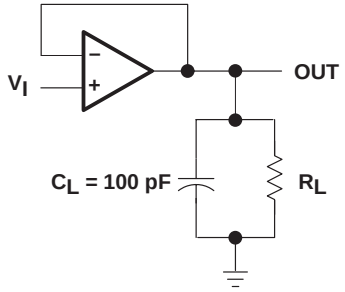


Figure 1. Unity-Gain Amplifier

TYPICAL CHARACTERISTICS†

INPUT BIAS CURRENT vs FREE-AIR TEMPERATURE

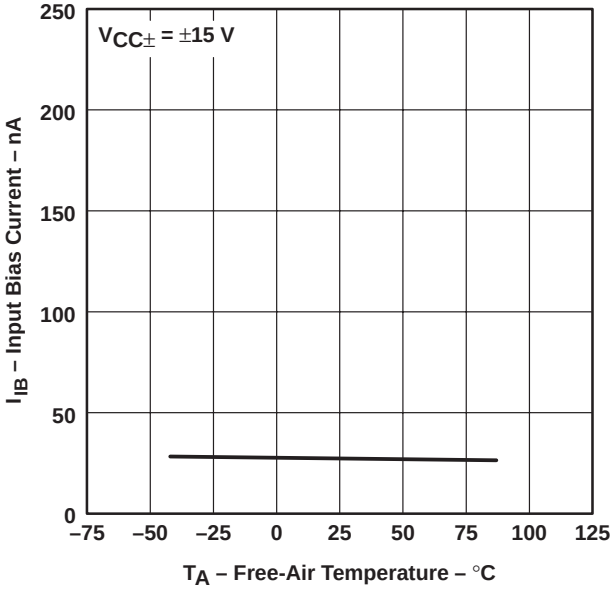


Figure 2

INPUT BIAS CURRENT vs SUPPLY VOLTAGE

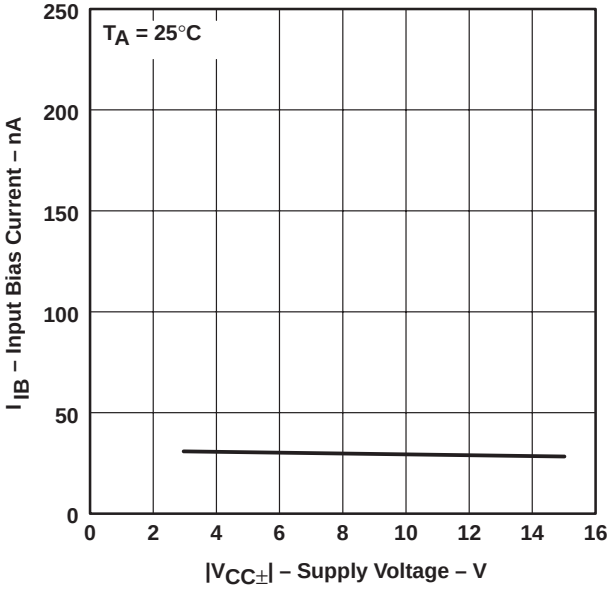


Figure 3

MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE vs SUPPLY VOLTAGE

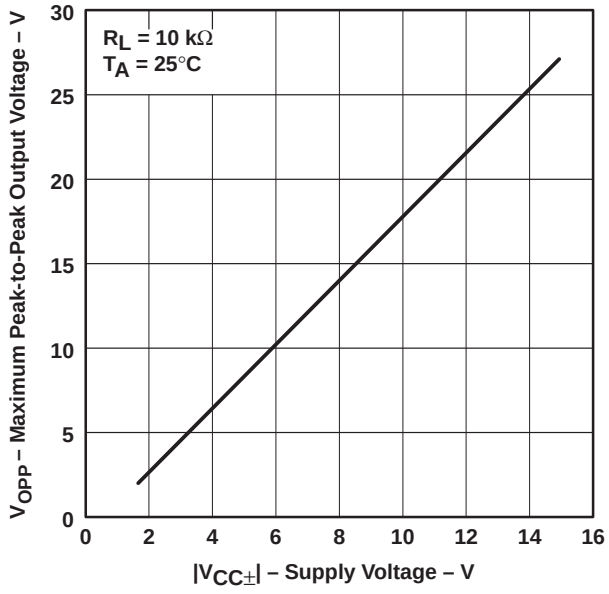


Figure 4

MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE vs FREQUENCY

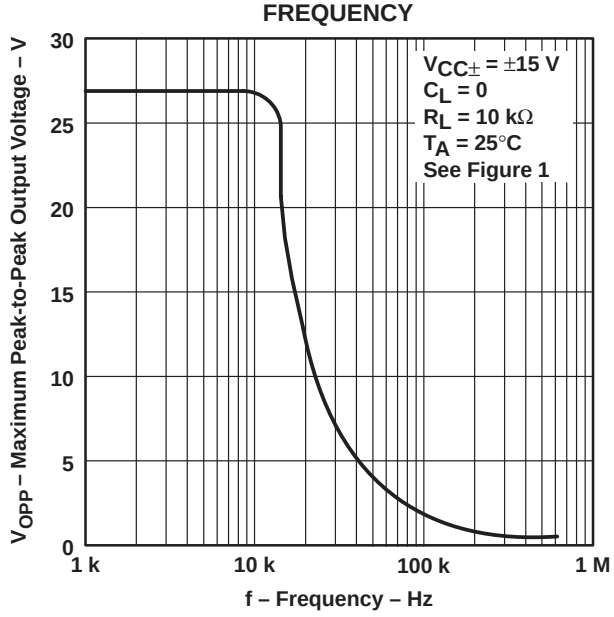


Figure 5

† Operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied.

TYPICAL CHARACTERISTICS†

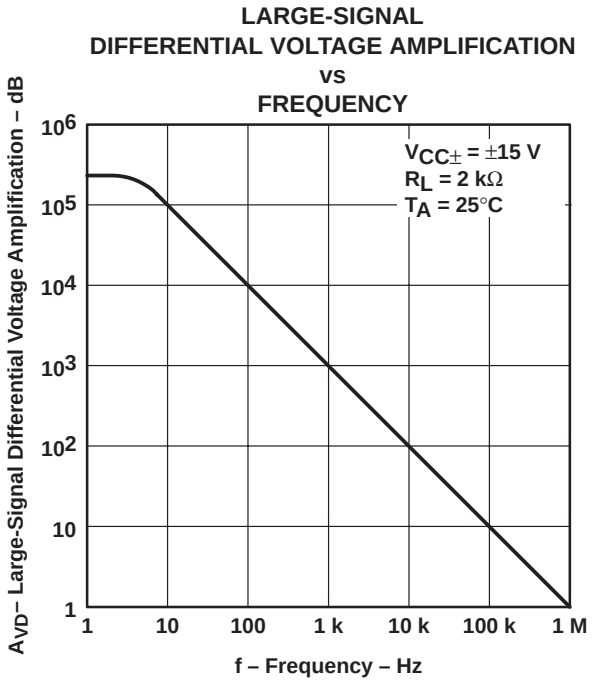


Figure 6

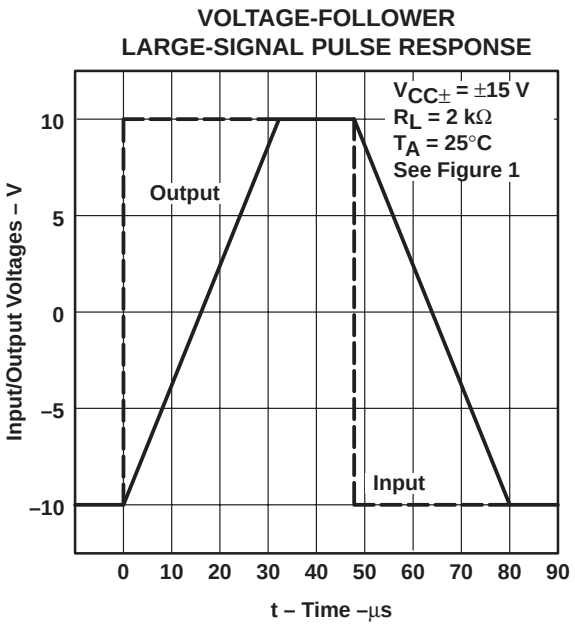


Figure 7

† Operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied.

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