Ordering number : ENN*6636A

Monolithic Linear IC

LA6311M

Precision Voltage Comparator

Preliminary

Overview

The LA6311M is a voltage comparator that has low input currents. It is also designed to operate over a wide range of supply voltages ; from ±15 V op amp supplies down to the single 5 V supply used for IC logic. Its output is compatible with TTL as well as MOS circuits. Offset balancing is provided, and the outputs can be OR wired.

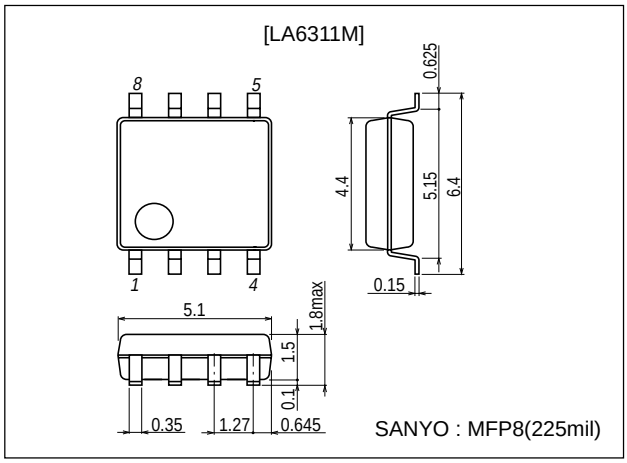
Features

- Response time (100 ns typ).
- Operating voltage (+6 V to +36 V).
- Single supply operation.
- Single circuit.
- With input offset trim terminal.
- Bipolar technology.
- Package outline (MFP8).

Package Dimensions

unit : mm

3032B-MFP8



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V^+ / V^-		±18 (36)	V
Output-to-negative supply voltage	V_{7-4}		40	V
Ground-to-negative supply voltage	V_{1-4}		30	V
Differential input voltage	V_{ID}		±30	V
Input voltage	V_{IN}		±15 (note*)	V
Allowable power dissipation	P_D		300	mW
Operating temperature	Topr		-40 to +85	°C
Storage temperature	Tstg		-40 to +150	°C

Note : *For supply voltage less than ±15 V, the absolute input voltage is equal to the supply voltage.

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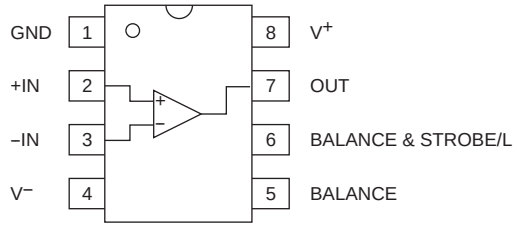
Electrical Characteristics at Ta = 25°C, V^+ / V^- = ± 15 V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input offset voltage	V_{IO}	Rs ≤ 50 kΩ		1.0	7.5	mV
Input offset current	I_{IO}			2.0	50	nA
Input bias current	I_B			70	220	nA
Voltage gain	A_V			110		dB
Response time	t_R			100		ns
Saturation voltage	V_{SAT}	V_{IN} ≥ 10 mV, I_O = 50 mA		0.65	1.0	V
Strobe ON current	I_{STR}			2.4		mA
Output leakage current	I_{LEAK}	V_{IN} ≤ -10 mV, [V_O-V^-] = 35 V		1	50	nA
Input common mode voltage	V_{ICM}			±14		V
Positive quiescent current	I^+	I_O = 0		3.0	5.0	mA
Negative quiescent current	I^-	I_O = 0		1.5	2.5	mA

Pin Assignment



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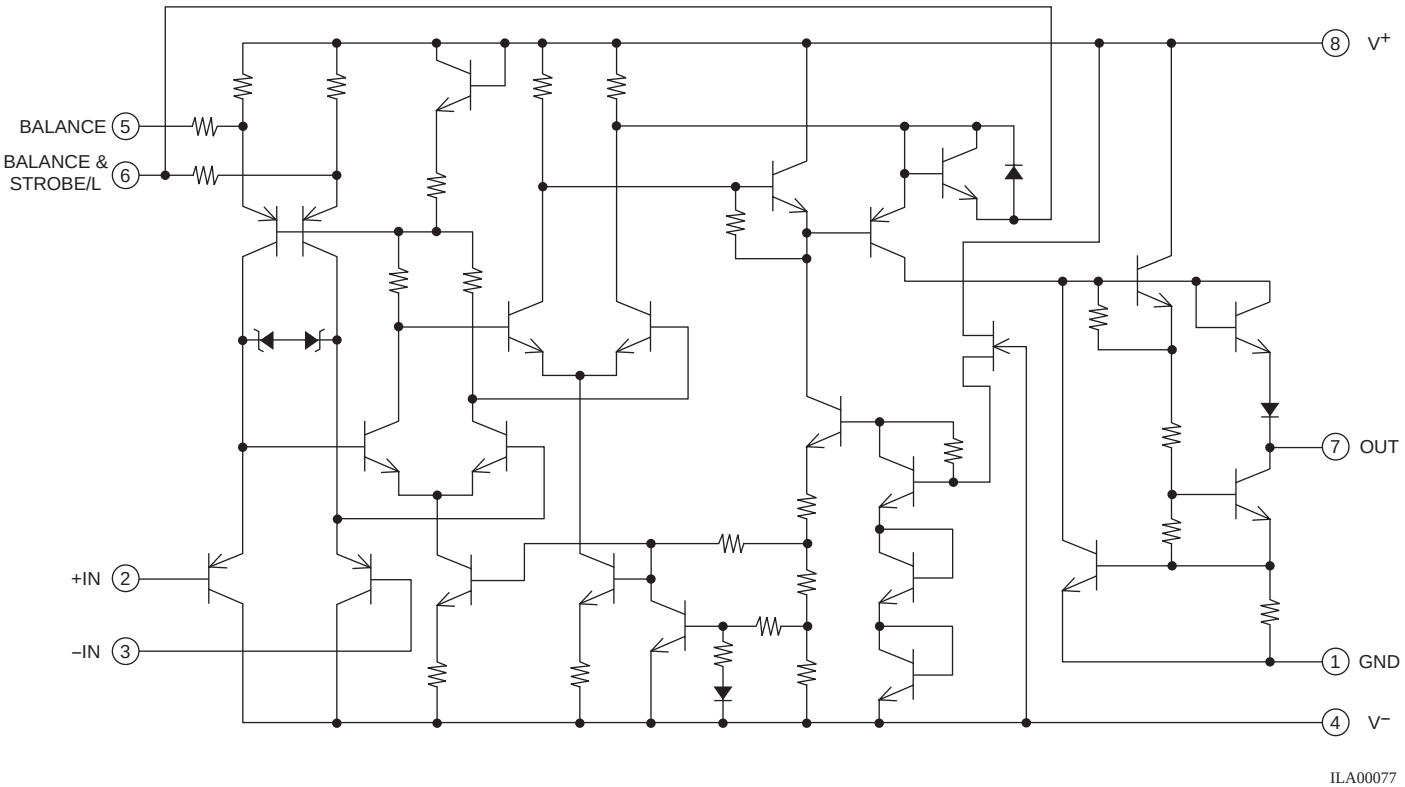
Equivalent Circuit



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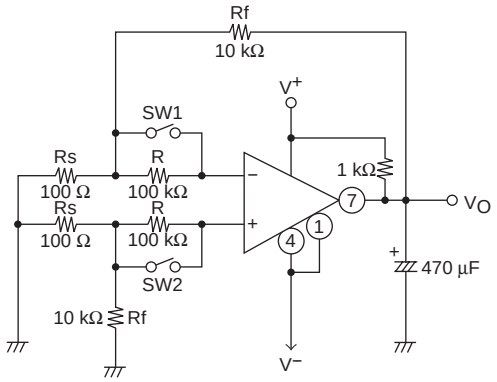
Test Circuit at $V^{\pm}$ = ±15 V, Ta = 25°C, TYP

1.Input Offset Voltage (V_{IO}), Input Offset Current (I_{IO}), Input Base Current (I_B)



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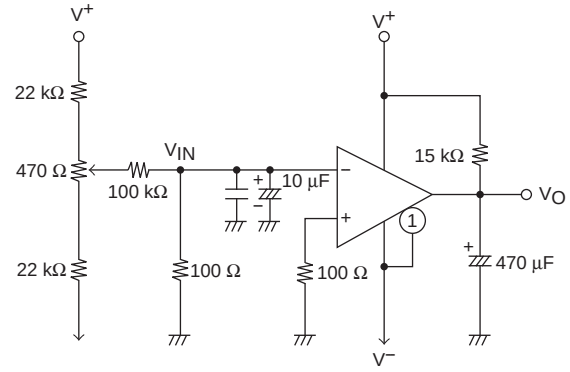
SW1	SW2	V_O
ON	ON	V_O1
OFF	OFF	V_O2
ON	OFF	V_O3
OFF	ON	V_O4

$$V_{IO} = \frac{|V_O1|}{1 + \frac{Rf}{Rs}} \quad [V]$$

$$I_{IO} = \frac{|V_O2 - V_O1|}{R\left[1 + \frac{Rf}{Rs}\right]} \quad [A]$$

$$I_B = \frac{|V_O4 - V_O3|}{2R\left[1 + \frac{Rf}{Rs}\right]} \quad [A]$$

2.Voltage Gain (A_V)



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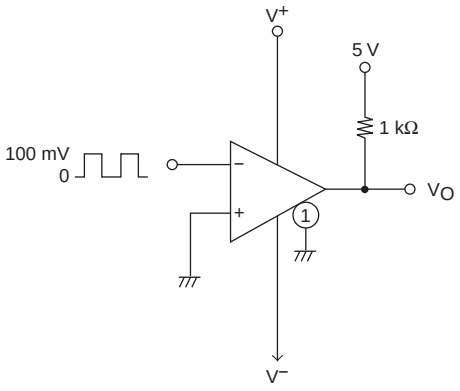
$$A_V = 20 \log \left[\frac{V_O1 - V_O2}{V_{IN}1 - V_{IN}2}\right] \text{ (dB)}$$

3.Response Time (t_R)



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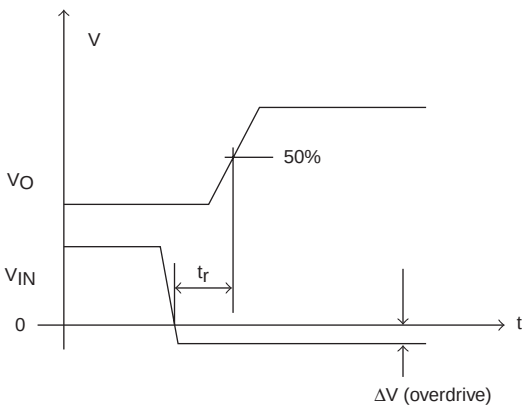

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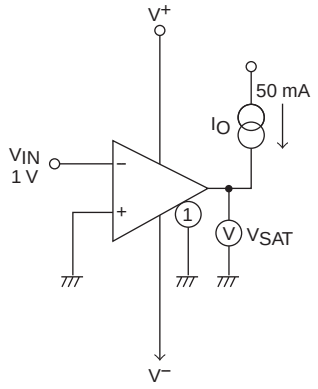
4.Saturation Voltage (V_{SAT})



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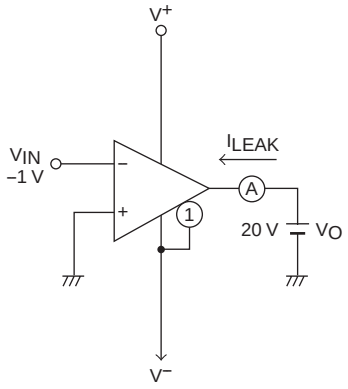
5.Output Leakage Current (I_{LEAK})



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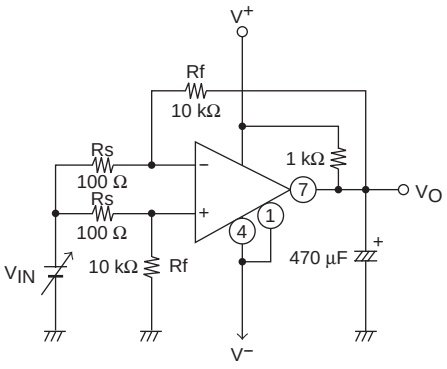
6.Input Common Mode Voltage (V_{ICM})



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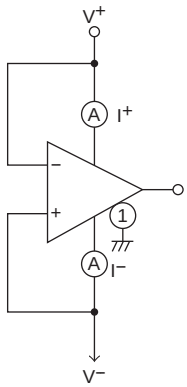
7.Supply Current (I_{CC})



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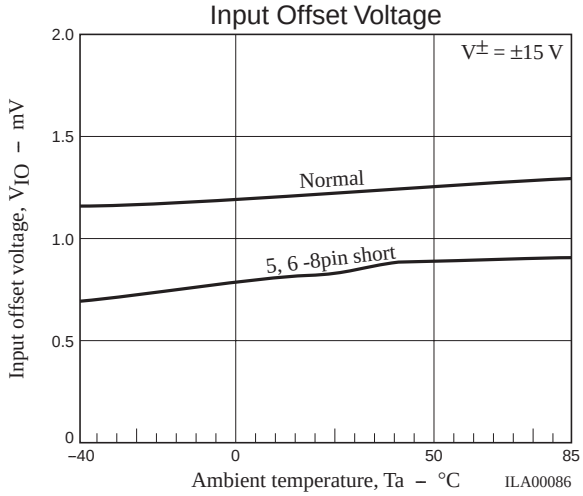
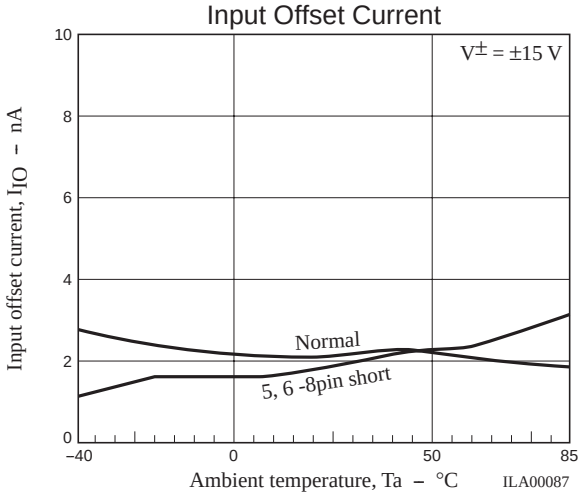
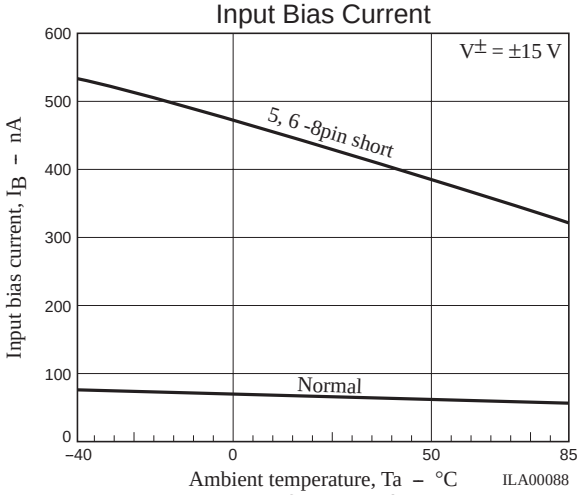
Typical Characteristics at Ta = 25°C, TYP

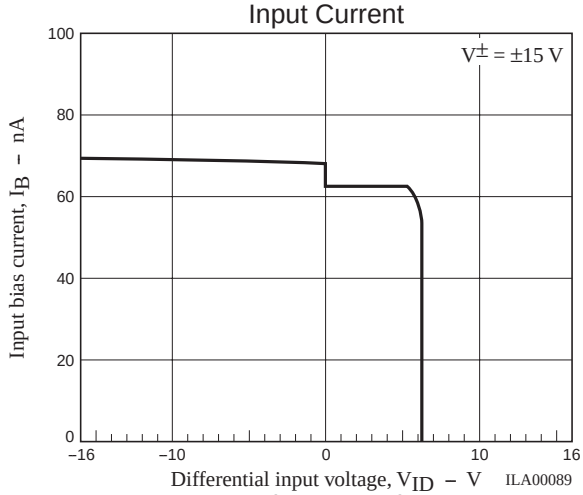




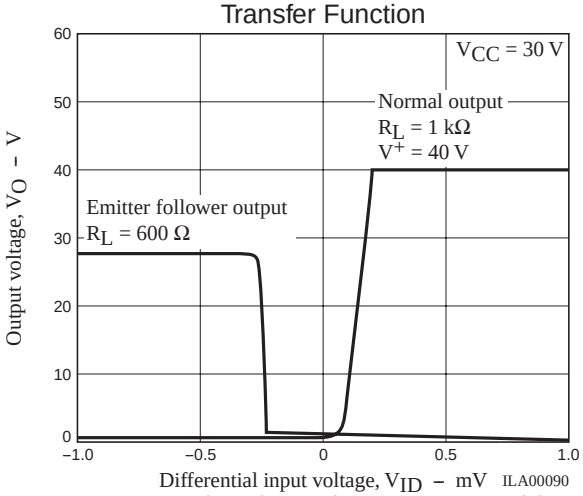
Input Bias Current



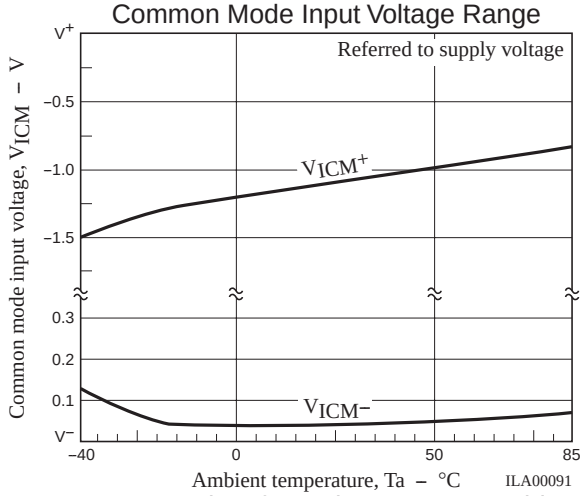
Input Current



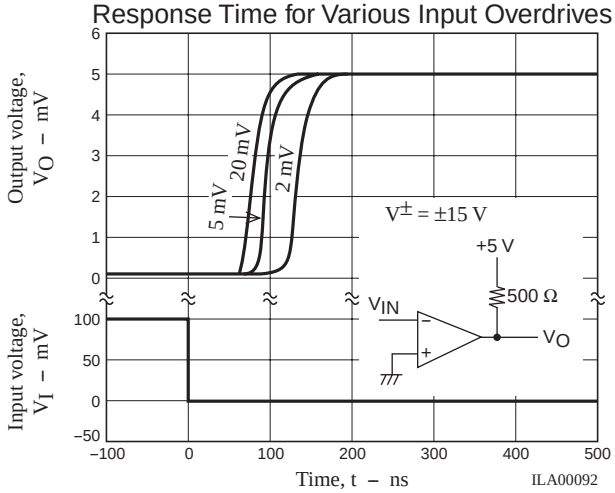
Transfer Function



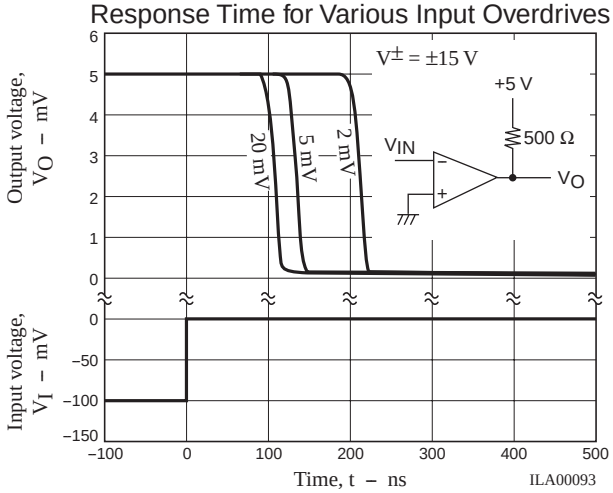
Common Mode Input Voltage Range



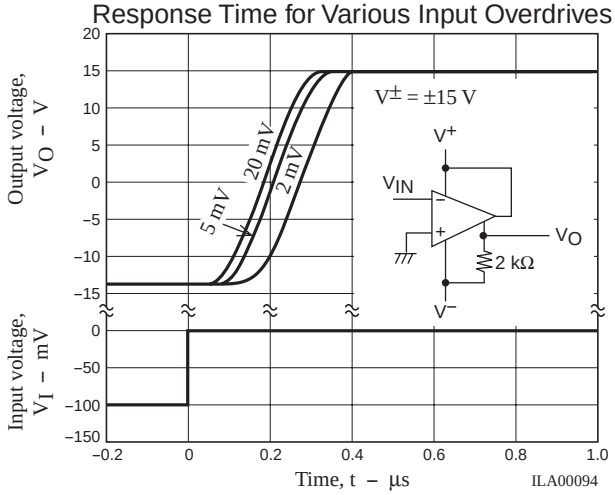
Response Time for Various Input Overdrives



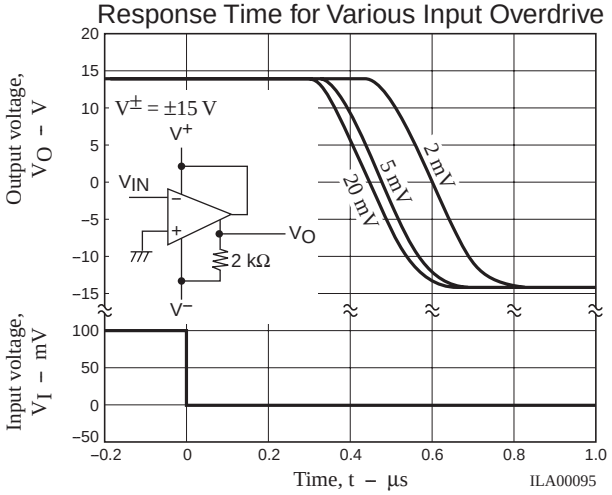
Response Time for Various Input Overdrives

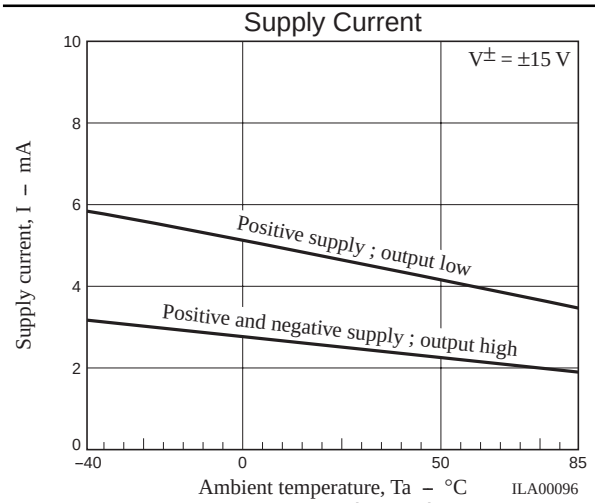


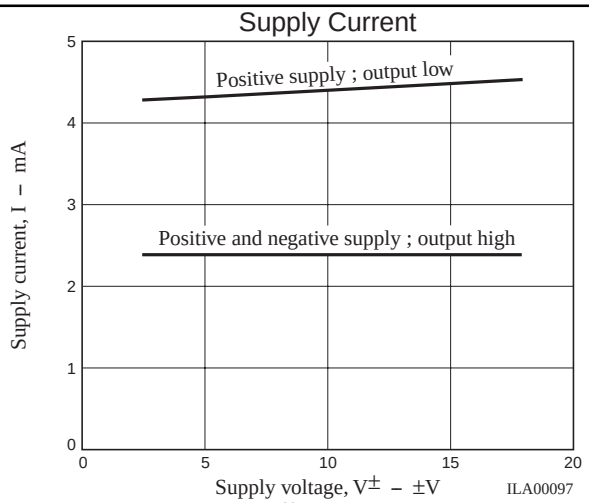
Response Time for Various Input Overdrives

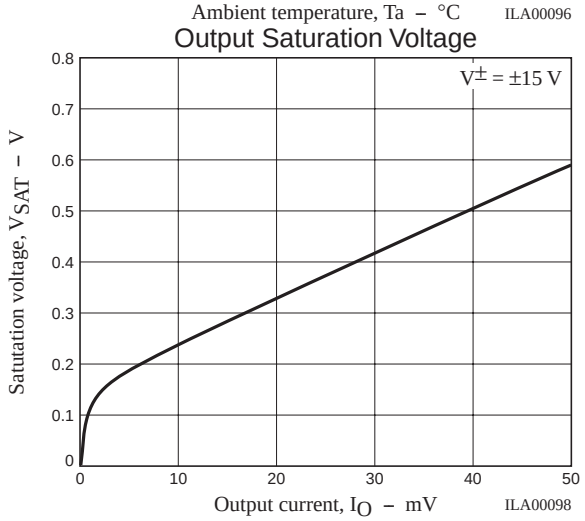


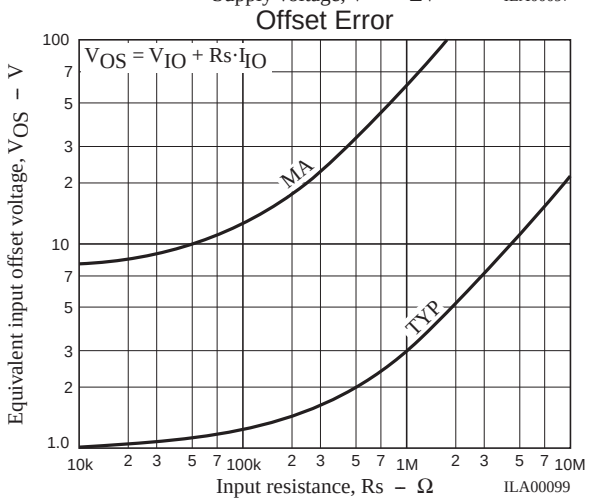
Response Time for Various Input Overdrive





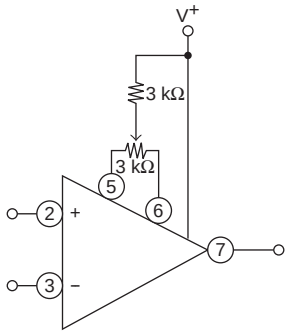




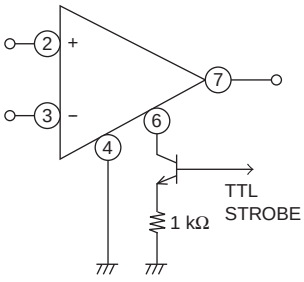


Typical Connection and Applications

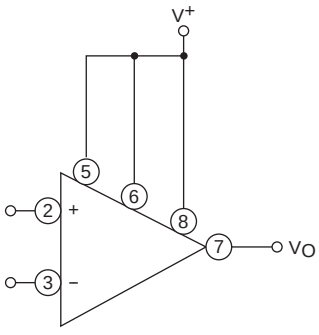
OFFSET VOLTAGE NULL CIRCUIT



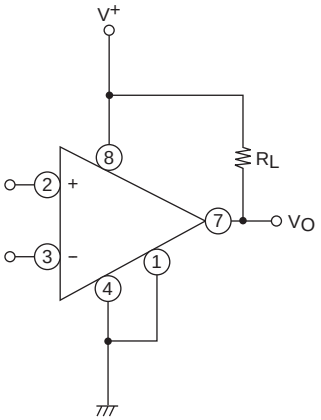
STROBING CIRCUIT



FAST RESPONSE CIRCUIT
(INCREASING INPUT STAGE CURRENT)



OPEN COLLECTOR OUTPUT



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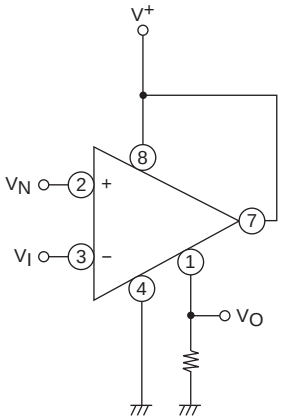
EMITTER FOLLOWER OUTPUT



Input polarity is reversed when 1pin (GND) is used as an output.
$V_N > V_I \rightarrow V_O$: Low

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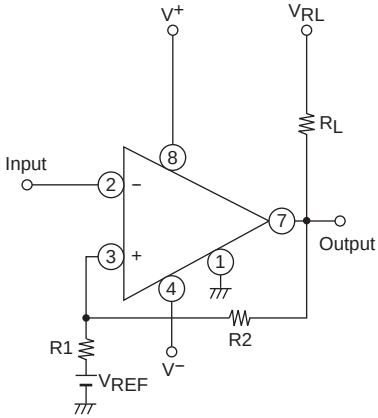
COMPARATOR with HYSTERESIS CIRCUIT



Treshold voltage (V_{TH})

$$V_{TH}\,(high) = V_{REF} + (V_{RL} - V_{REF})\,\frac{R1}{RL + R2 + R1}$$

$$V_{TH}\,(low) = V_{REF} + (V_{RL} - V_{OL})\,\frac{R1}{R1 + R2}$$

$(V_{RL} > V_{REF}\,;\, V_{RL} > V_{OL})$

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