

AN1311, AN1311S

Single High-Speed Comparators

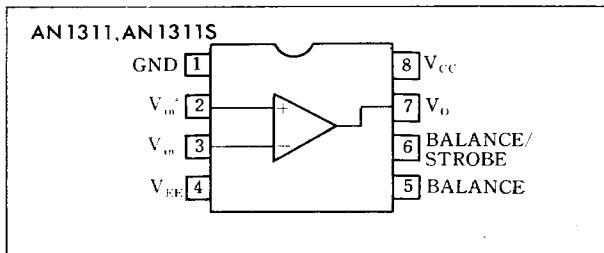
■ Outline

The AN1311 and the AN1311S are single high-speed voltage comparators with large output sink current, wide operating supply voltage range, and excellent characteristics for $\pm 15V$ operation as well as for 5V single power supply operation. They are provided with strobe pins and input balance pins and can be applied widely to drive the standard logic circuit directly.

■ Features

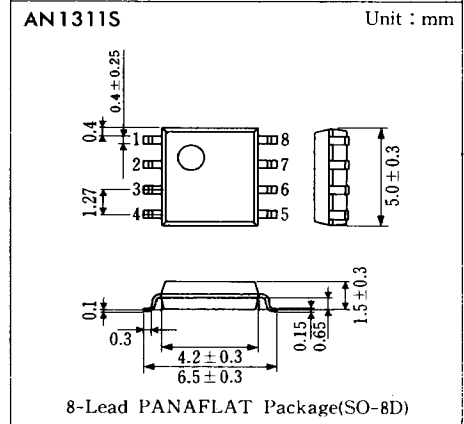
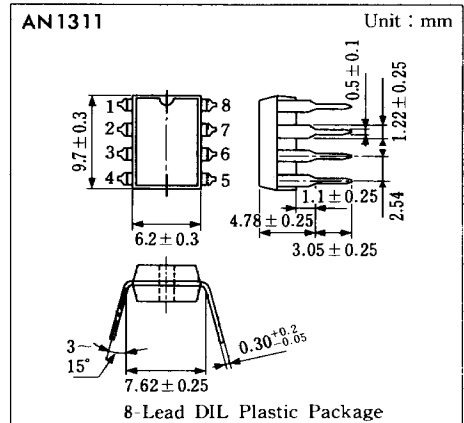
- The output levels are compatible with TTL and MOS logic.
- Offset balancing and strobe capability are available.
- Large output sink current drives LED and lamps.
- Output stage forms open collector and emitter follower.

■ Block Diagram



■ Pin

Pin No.	Pin Name
1	GND
2	Non Invert Input
3	Invert Input
4	V_{EE}
5	Balance
6	Balance/Strobe
7	Output
8	V_{CC}



■ Absolute Maximum Ratings (Ta=25°C)

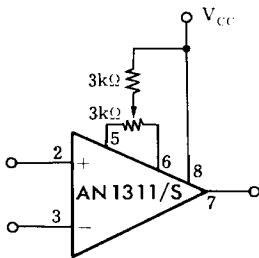
Item		Symbol	Rating	Unit
Voltage	Supply Voltage	V_{CC}	± 18	V
	Differential Input Voltage	V_{ID}	± 30	V
	Common-Mode Input Voltage	V_{ICM}	± 15	V
	Voltage between Output and Negative Power Supply	$V_O - V_{EE}$	36	V
	Voltage between Ground and Negative Power Supply	$V_{GND} - V_{EE}$	30	V
Output Short-Circuit Duration		t_{OS}	10	s
Power Dissipation	AN1311	P_D	500	mW
	AN1311S		360	
Operating Ambient Temperature		T_{opr}	-20 ~ +75	°C
Storage Temperature	AN1311	T_{stg}	-55 ~ +150	°C
	AN1311S		-55 ~ +125	

■ Electrical Characteristics (V_{CC}=15V, V_{EE}=-15V, Ta=25°C)

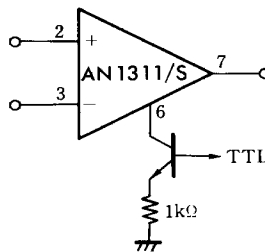
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Input Offset Voltage	$V_{I(offset)}$	1	$R_S \leq 50k\Omega$		2.0	7.5	mV
Input Offset Current	I_{IO}	1	$R_S \leq 50k\Omega$		6.0	50	nA
Input Bias Current	I_{BIAS}	1	$R_L \leq 50k\Omega$		100	250	nA
Voltage Gain	G_V	1	$R_L = 1k\Omega$		106		dB
Response Time	t_r	2	Step Input 100mV, Overdrive 5mV		200		ns
Saturation Voltage	$V_{O(sat)}$	3	$V_{IN} \geq 10mV, I_O = 50mA$		0.75	1.5	V
Strobe on Current	I_{ST}	4			3		mA
Output Leakage Current	$I_{O(LEAK)}$	5	$V_{IN} \geq 10mV, V_O = 35V$		0.2	50	nA
Positive Supply Current	I_{CC}	6			5.1	7.5	mA
Negative Supply Current	I_{EE}	6			4.1	5.0	mA
Input Voltage Range	V_I	7			± 14		V
Saturation Voltage	$V_{O(sat)}$	3	$V_{CC} \geq 4.5V, V_{EE} = 0V, V_{IK} \geq 10mV, I_O = 8mA$		0.23	0.4	V

■ Typical Application (Balance Strobe Pin, Output Pin, GND Pin)

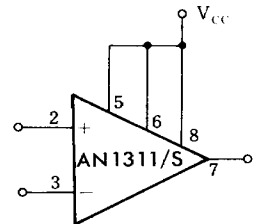
Offset Null Circuit



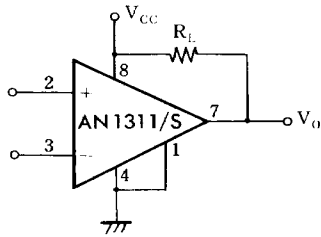
Strobe Circuit



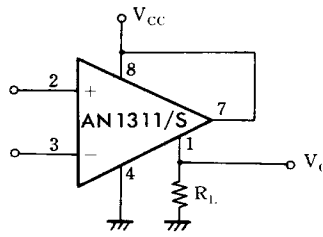
Increasing Input Stage Current



Collector output

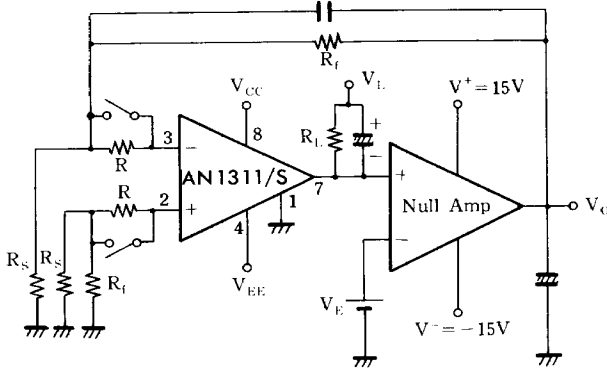


Emitter output



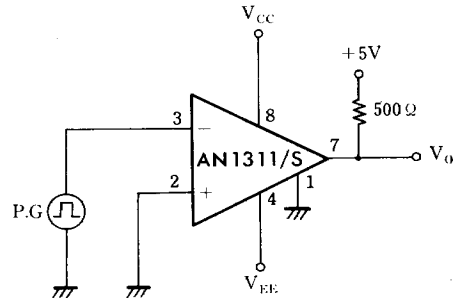
■ Measuring Circuits

Test Circuit 1 ($V_{I(offset)}$, I_{IO} , I_{Bias} , G_V)

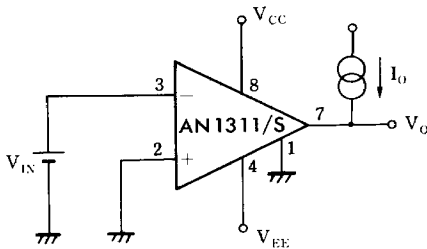


Note: The load current should be 1mA.

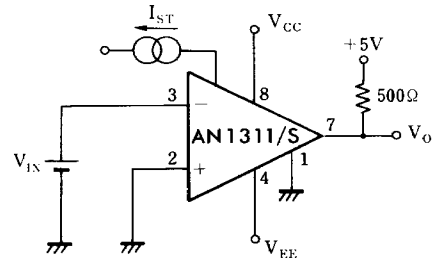
Test Circuit 2 (t_r)



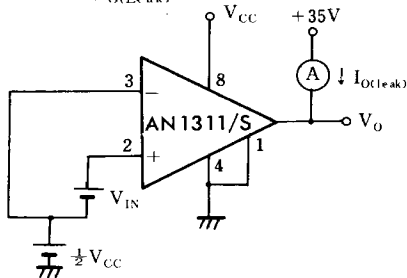
Test Circuit 3 ($V_{O(sat)}$)



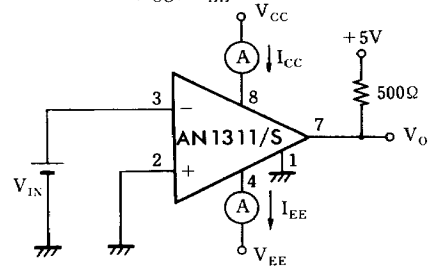
Test Circuit 4 (I_{ST})



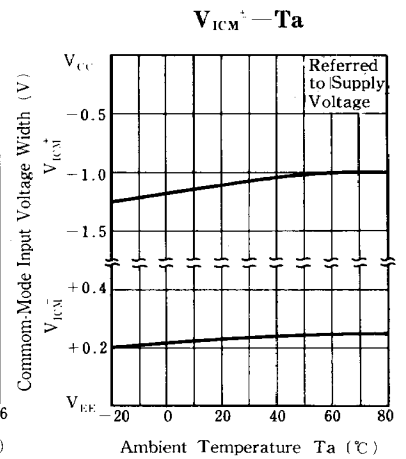
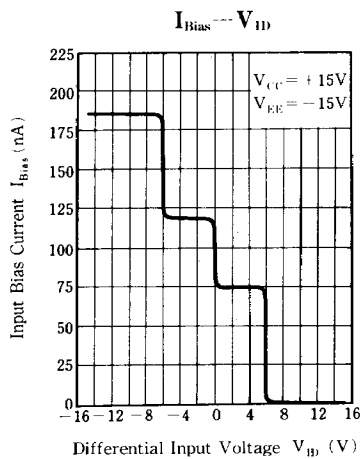
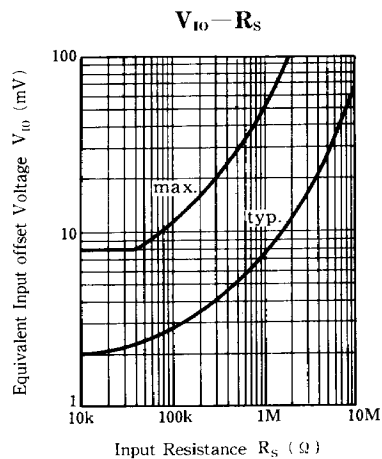
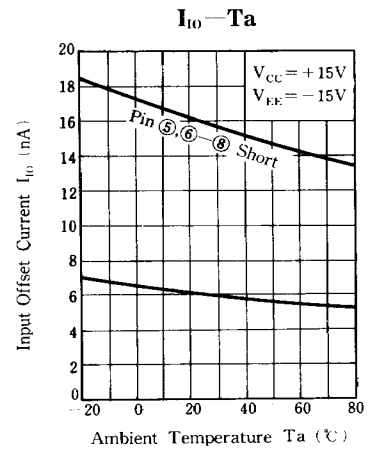
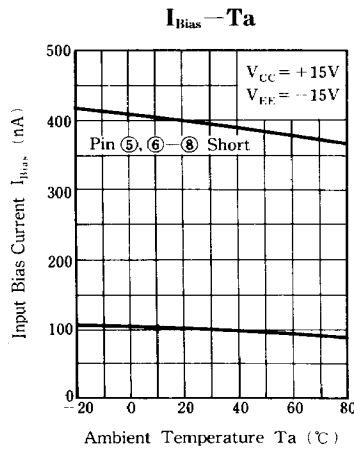
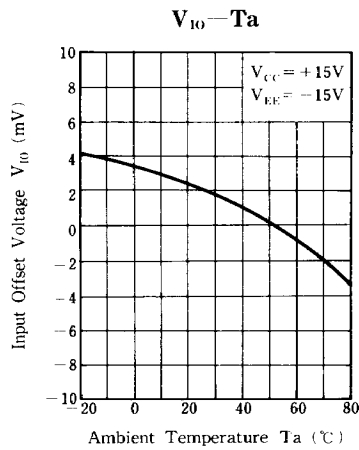
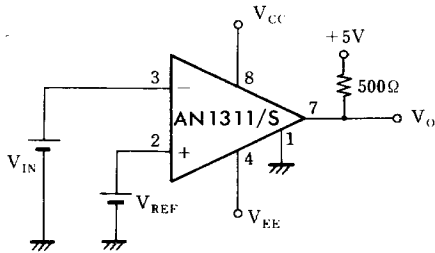
Test Circuit 5 ($I_{O(Leak)}$)



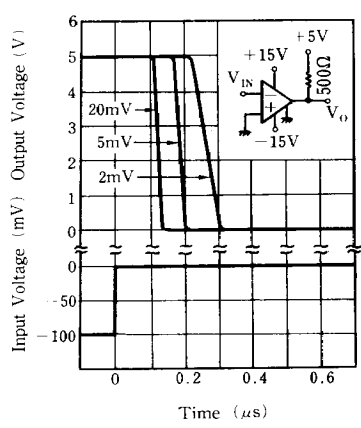
Test Circuit 6 (I_{CC} , I_{EE})



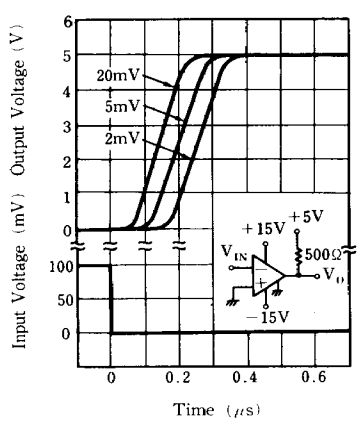
Test Circuit 7 (V_I)



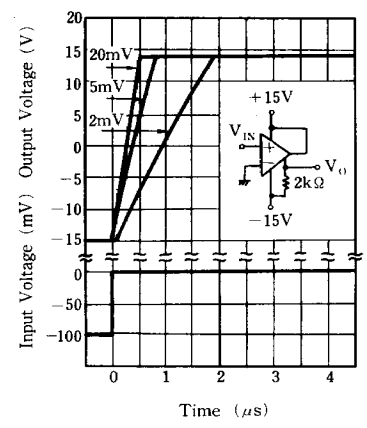
Response Time



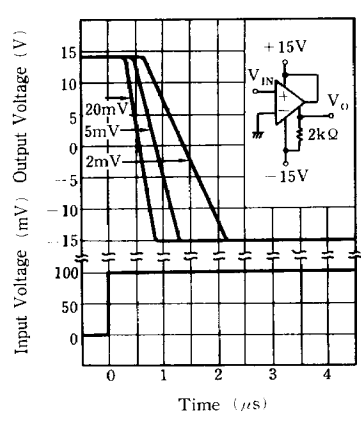
Response Time



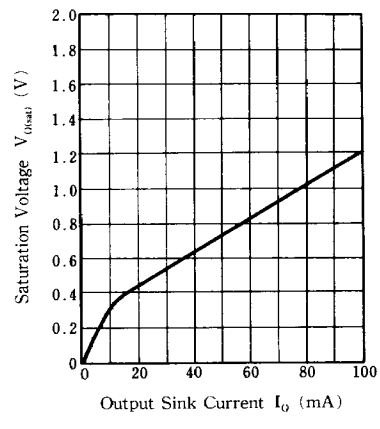
Response Time



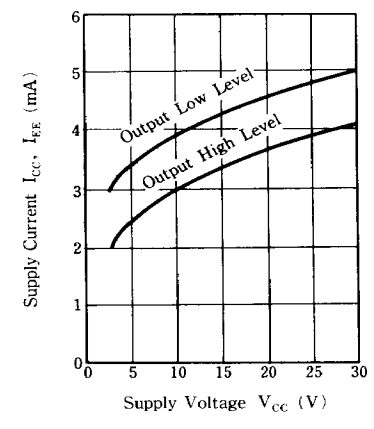
Response Time



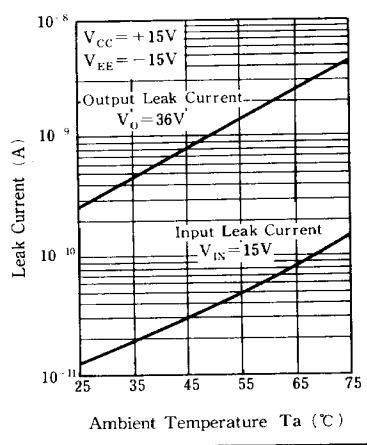
$V_{O(sat)} - I_O$



$I_{CC}, I_{EE} - V_{CC}$



Leak Current - T_a



$V_O - V_{ID}$

