FAIRCHILD SEMICONDUCTOR®

August 2000
Revised October 2005

KA311
Single Comparator

General Description

The KA311 series is a monolithic, low input current voltage comparator. The device is also designed to operate from dual or single supply voltage.

Features

- Low Input Bias Current: 250nA (Max)
- Low Input Offset Current: 50nA (Max)
- Differential Input Voltage: ±30V
- Power Supply Voltage:
  Single 5.0V to 30V or 15V Split Supplies (±15V)
- Offset Voltage Null Capability
- Strobe Capability

Ordering Information:

Product Number	Package	Operating Temperature
KA311	8-DIP	0 ~ +70°C
KA311DTF	8-SOP	

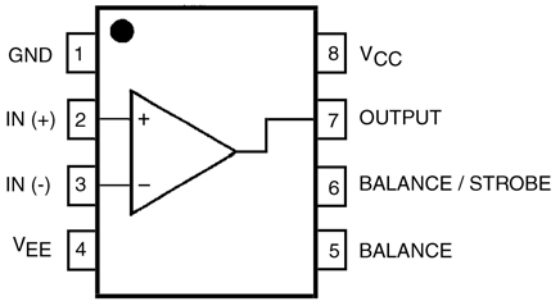
8-DIP



8-SOP

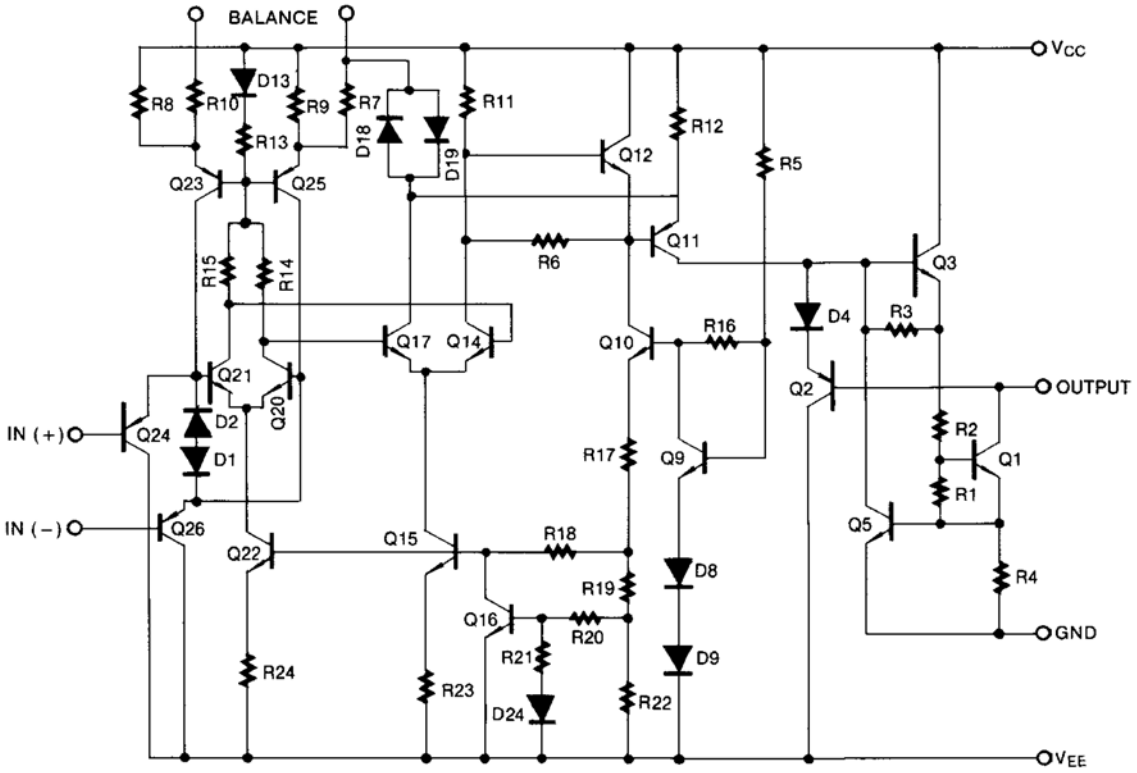


Internal Block Diagram



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Schematic Diagram



Absolute Maximum Ratings(Note 1)

Parameter	Symbol	Value	Unit
Total Supply Voltage	$V_{CC} + \lvert V_{EE} \rvert$	36	V
Output to Negative Supply Voltage KA311	$V_O - V_{EE}$	40	V
Ground to Negative voltage	V_{EE}	−30	V
Differential Input Voltage	$V_{I(DIFF)}$	30	V
Input Voltage	V_I	15	V
Output Short Circuit Duration	–	10	sec.
Power Dissipation	P_D	500	mW
Operating Temperature Range	T_{OPR}	0 ~ +70	°C
Storage Temperature Range	T_{STG}	−65 ~ +150	°C

Note 1: The “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The “Recommended Operating Conditions” table will define the conditions for actual device operation.

Electrical Characteristics (V_{CC} = 15V, V_{EE} = −15V, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	RS ≤ 50kΩ		–	1.0	7.5	mV
			(Note 2)	–	–	10.0	
Input Offset Current	I_{IO}			–	6.0	50.0	nA
			(Note 2)	–	–	70.0	
Input Bias Current	I_{BIAS}			–	100	250	nA
			(Note 2)	–	–	300	
Voltage Gain	G_V			40.0	200	–	V/mV
Response Time	t_{RES}		(Note 3)	–	200	–	ns
Saturation Voltage	V_{SAT}	I_O = 50mA, V_I ≤ −10mV		–	0.75	1.5	V
		V_{CC} ≥ 4.5V, V_{EE} = 0V, I_O = 8mA, V_I ≤ −10mV	(Note 2)	–	0.23	0.4	
Strobe “ON” Current	$I_{STR(ON)}$			–	3.0	–	mA
Output Leakage Current	I_{SINK}	I_{STR} = 3mA, V_I ≥ 10mV, V_O = 15V, V_{CC} = ±15V		–	0.2	50.0	nA
Input Voltage Range	$V_{I(R)}$		(Note 2)	−14.5 to 13.0	−14.7 to 13.8	–	V
Positive Supply Current	I_{CC}			–	3.0	7.5	mA
Negative Supply Current	I_{EE}			–	−2.2	−5.0	mA
Strobe Current	I_{STR}			–	3.0	–	mA

Note 2: 0 ≤ T_A ≤ +70°C.

Note 3: The response time specified is for a 100mV input step with 5mV over drive.

Typical Performance Characteristics

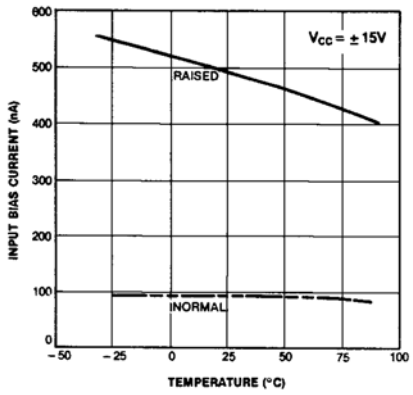


FIGURE 1. Input Bias Current vs. Temperature

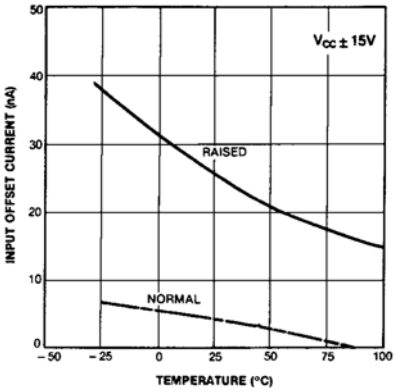


FIGURE 2. Input Offset Current vs. Temperature

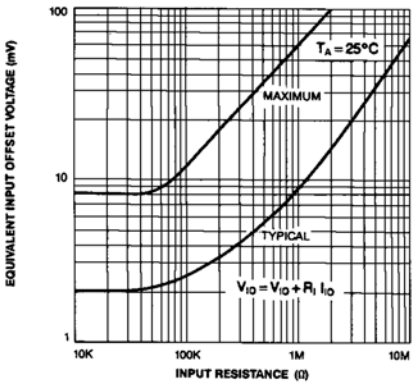


FIGURE 3. Offset Voltage vs. Input Resistance

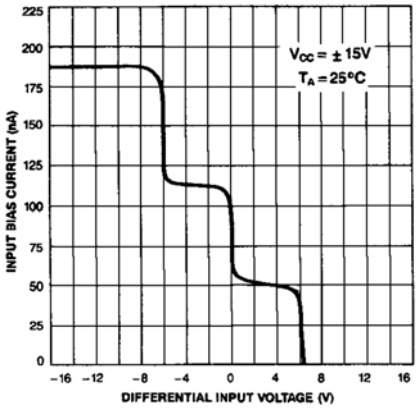


FIGURE 4. Input Bias Current vs. Differential Input Voltage

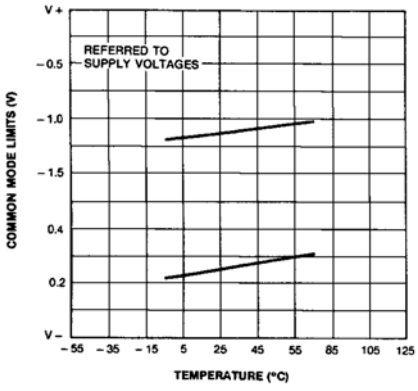


FIGURE 5. Common Mode Limits vs. Temperature

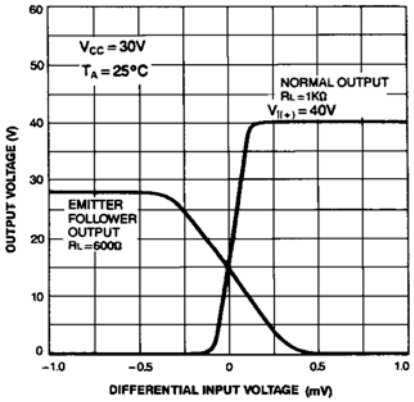


FIGURE 6. Output Voltage vs. Differential Input Voltage

Typical Performance Characteristics (Continued)

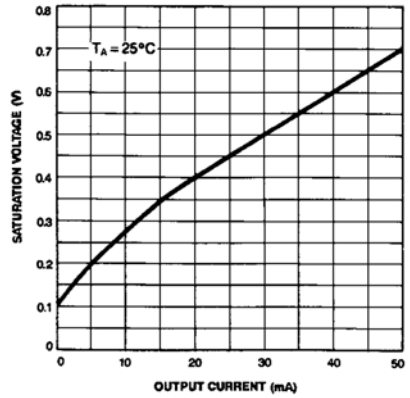


FIGURE 7. Saturation Voltage vs. Current

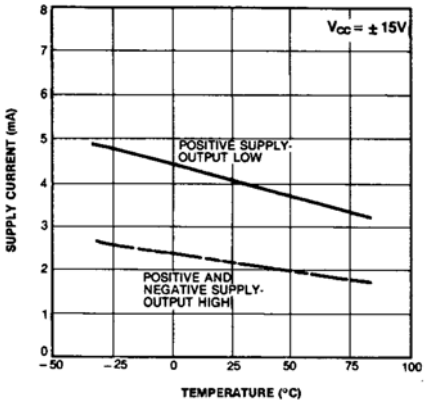


FIGURE 8. Supply Current vs. Temperature

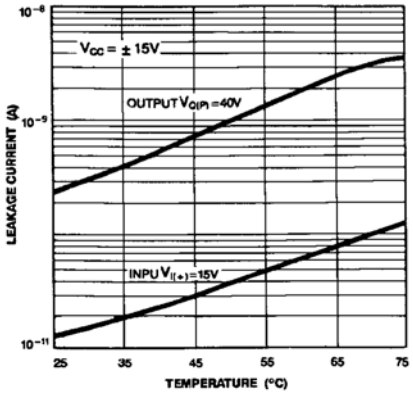


FIGURE 9. Leakage Current vs. Temperature

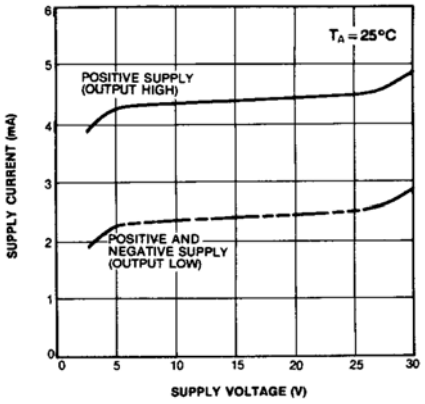


FIGURE 10. Supply Current vs. Supply Voltage

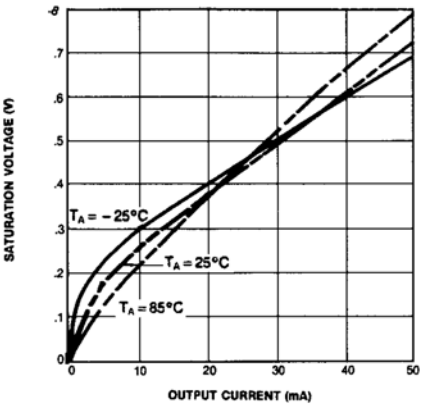


FIGURE 11. Current Saturation Voltage

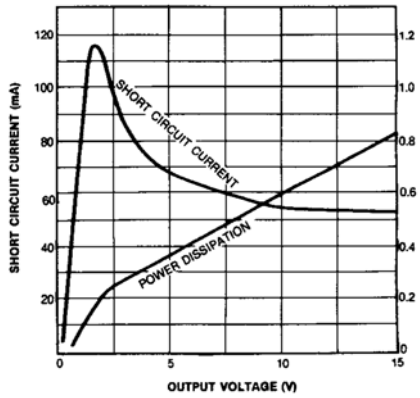
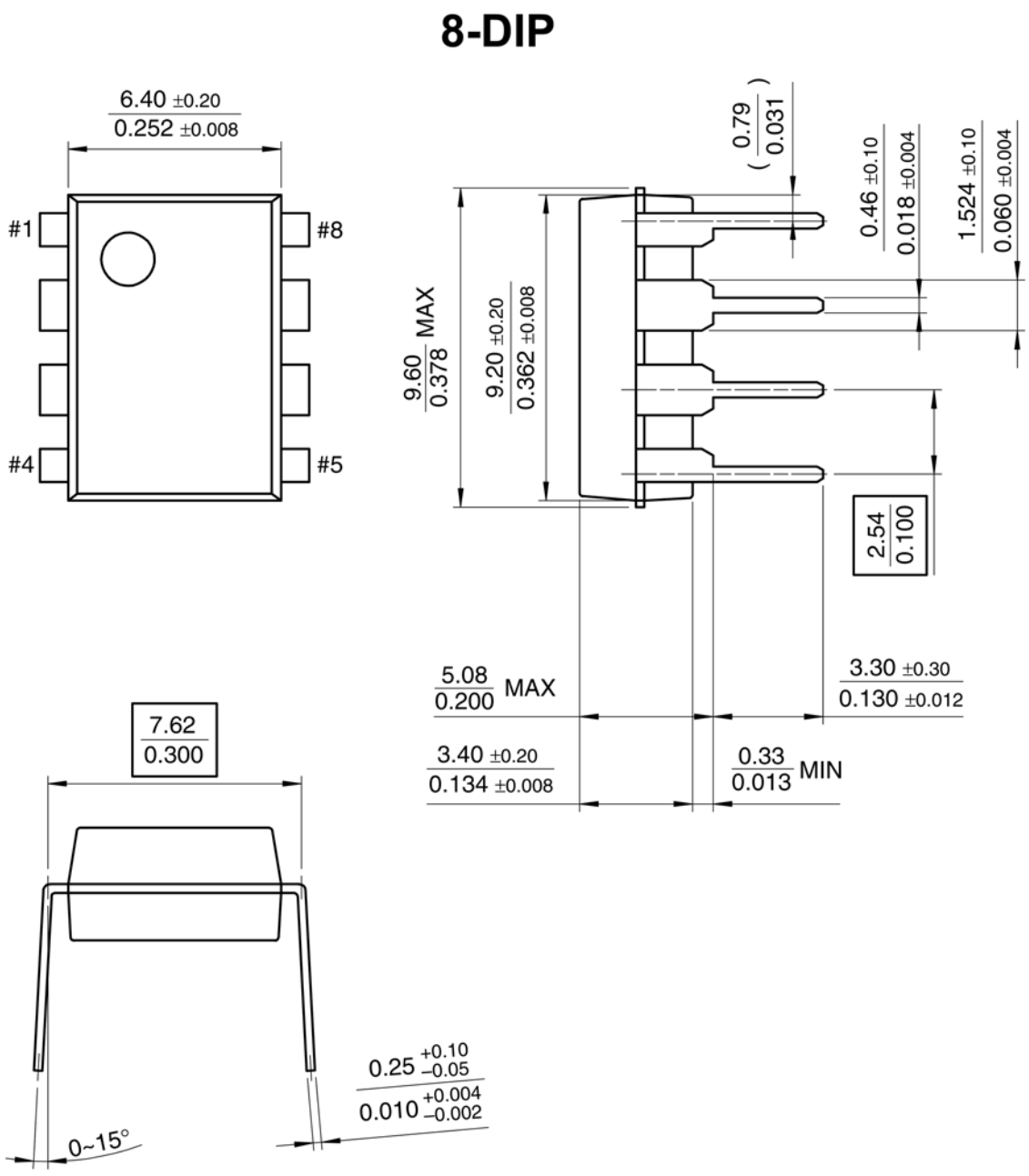


FIGURE 12. Output Limiting Characteristics

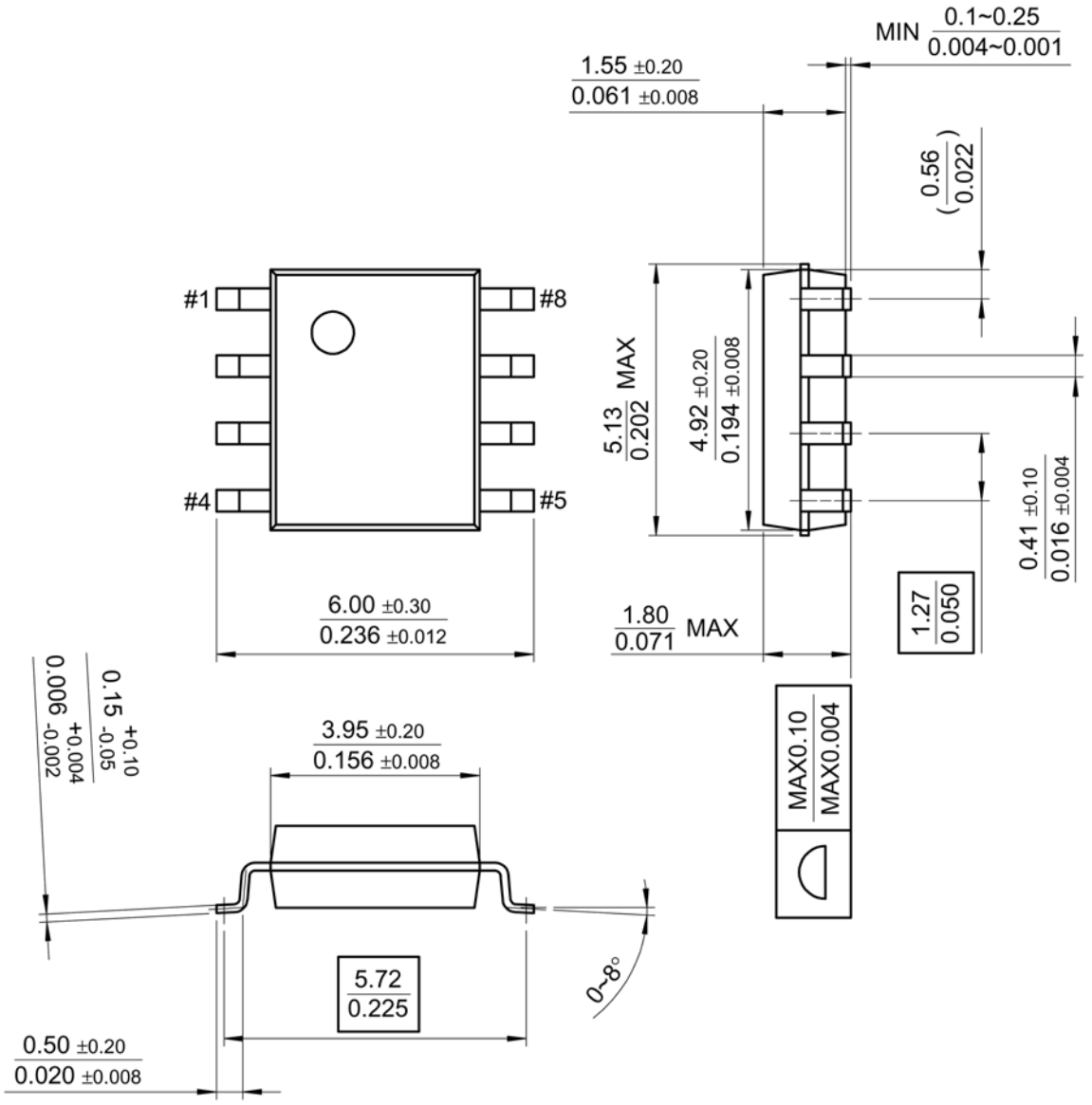
Physical Dimensions inches (millimeters) unless otherwise noted



8-Lead Dual-In-Line Package

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

8-SOP



8-Lead Small Outline Package

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