

# 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:  $\pm 30V$
- Power Supply Voltage:
  - Single 5.0V to 30V or 15V Split Supplies ( $\pm 15V$ )
- Offset Voltage Null Capability
- Strobe Capability

### Ordering Information:

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

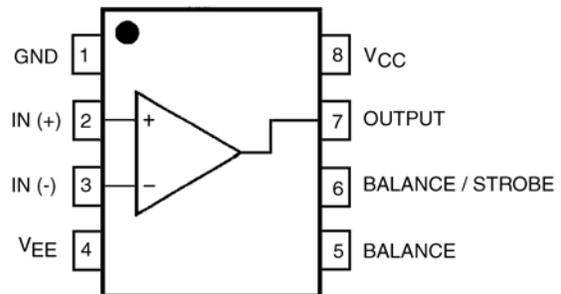
8-DIP



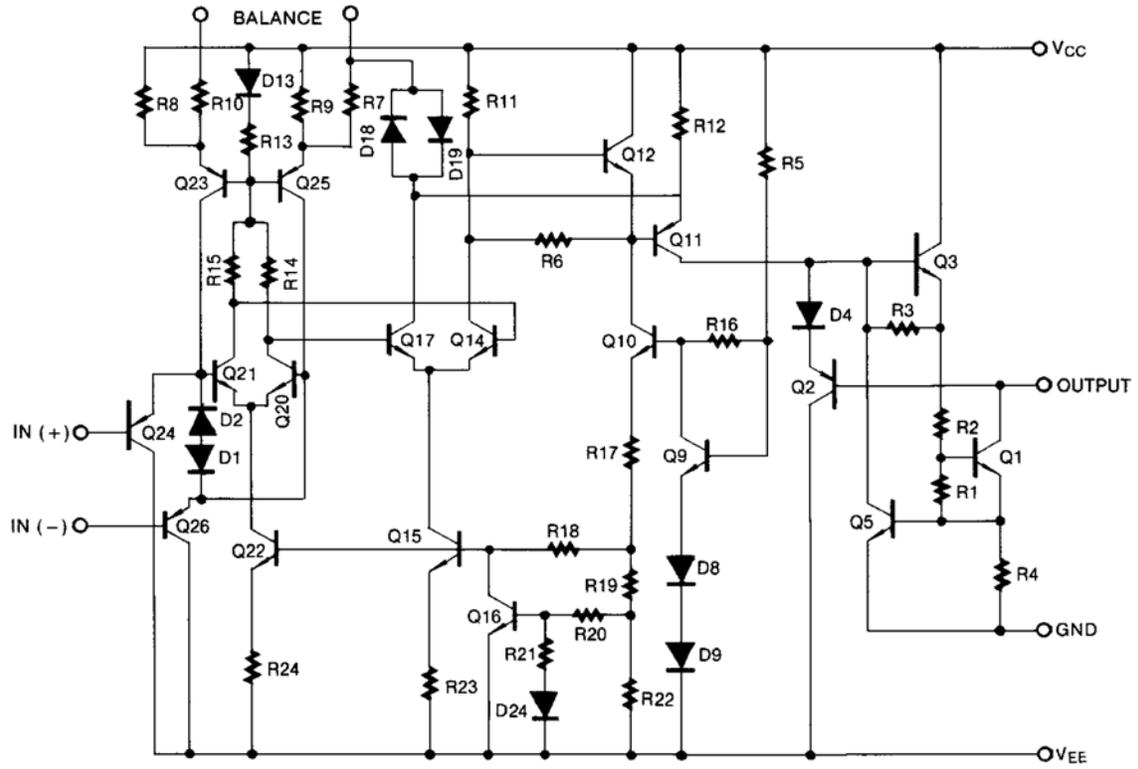
8-SOP



### Internal Block Diagram



### Schematic Diagram



## Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Total Supply Voltage	$V_{CC} +  V_{EE} $	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 ( $V_{CC} = 15V$ , $V_{EE} = -15V$ , $T_A = 25^\circ C$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	$V_{IO}$	$RS \leq 50k\Omega$	–	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	$V_{SAT}$	$I_O = 50mA$ , $V_I \leq -10mV$	–	0.75	1.5	V
		$V_{CC} \geq 4.5V$ , $V_{EE} = 0V$ , $I_O = 8mA$ , $V_I \leq -10mV$ (Note 2)	–	0.23	0.4	
Strobe "ON" Current	$I_{STR(ON)}$		–	3.0	–	mA
Output Leakage Current	$I_{SINK}$	$I_{STR} = 3mA$ , $V_I \geq 10mV$ , $V_O = 15V$ , $V_{CC} = \pm 15V$	–	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:**  $0 \leq T_A \leq +70^\circ C$ .

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

## Typical Performance Characteristics

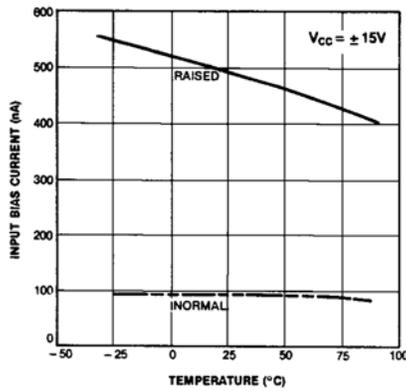


FIGURE 1. Input Bias Current vs. Temperature

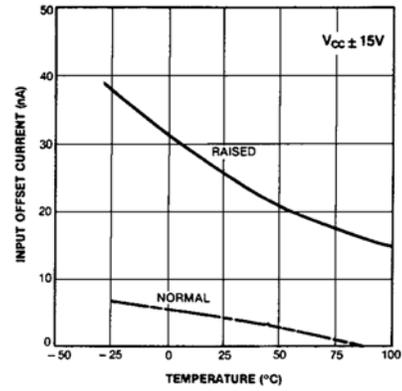


FIGURE 2. Input Offset Current vs. Temperature

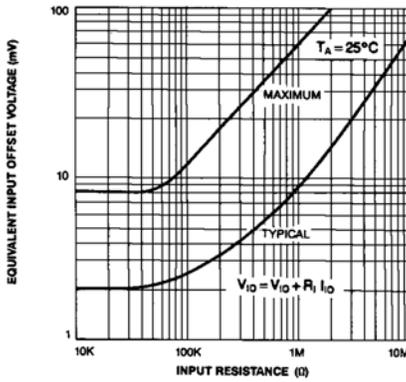


FIGURE 3. Offset Voltage vs. Input Resistance

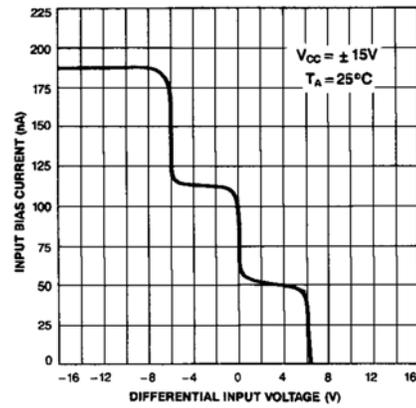


FIGURE 4. Input Bias Current vs. Differential Input Voltage

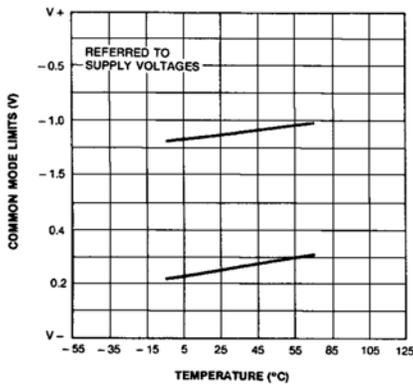


FIGURE 5. Common Mode Limits vs. Temperature

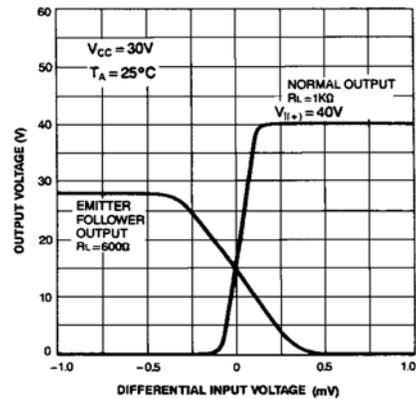


FIGURE 6. Output Voltage vs. Differential Input Voltage

Typical Performance Characteristics (Continued)

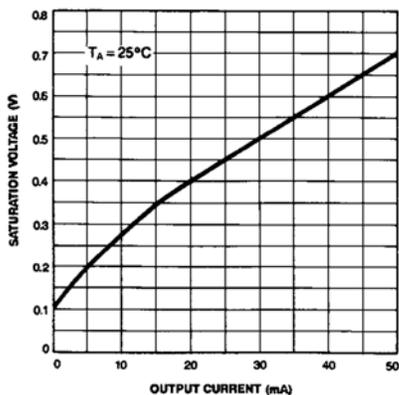


FIGURE 7. Saturation Voltage vs. Current

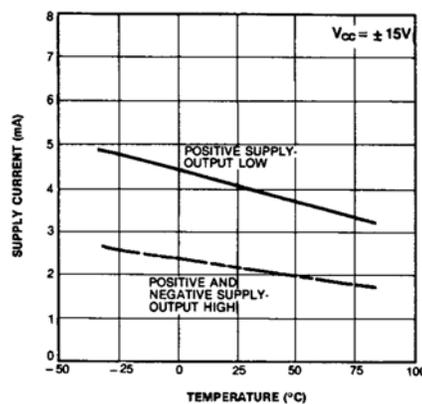


FIGURE 8. Supply Current vs. Temperature

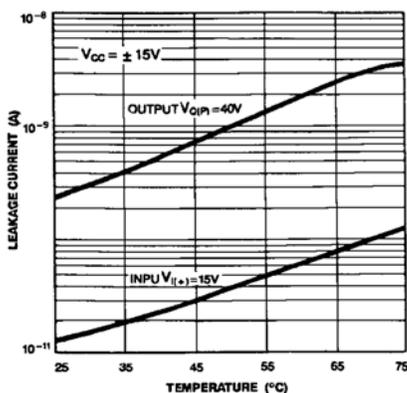


FIGURE 9. Leakage Current vs. Temperature

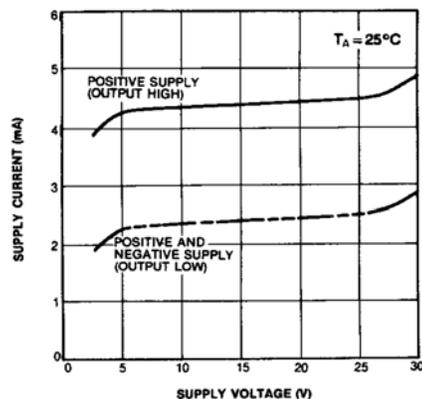


FIGURE 10. Supply Current vs. Supply Voltage

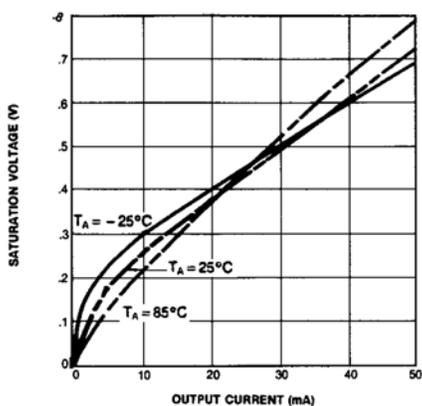


FIGURE 11. Current Saturation Voltage

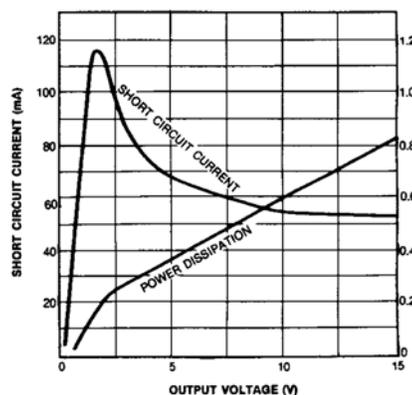
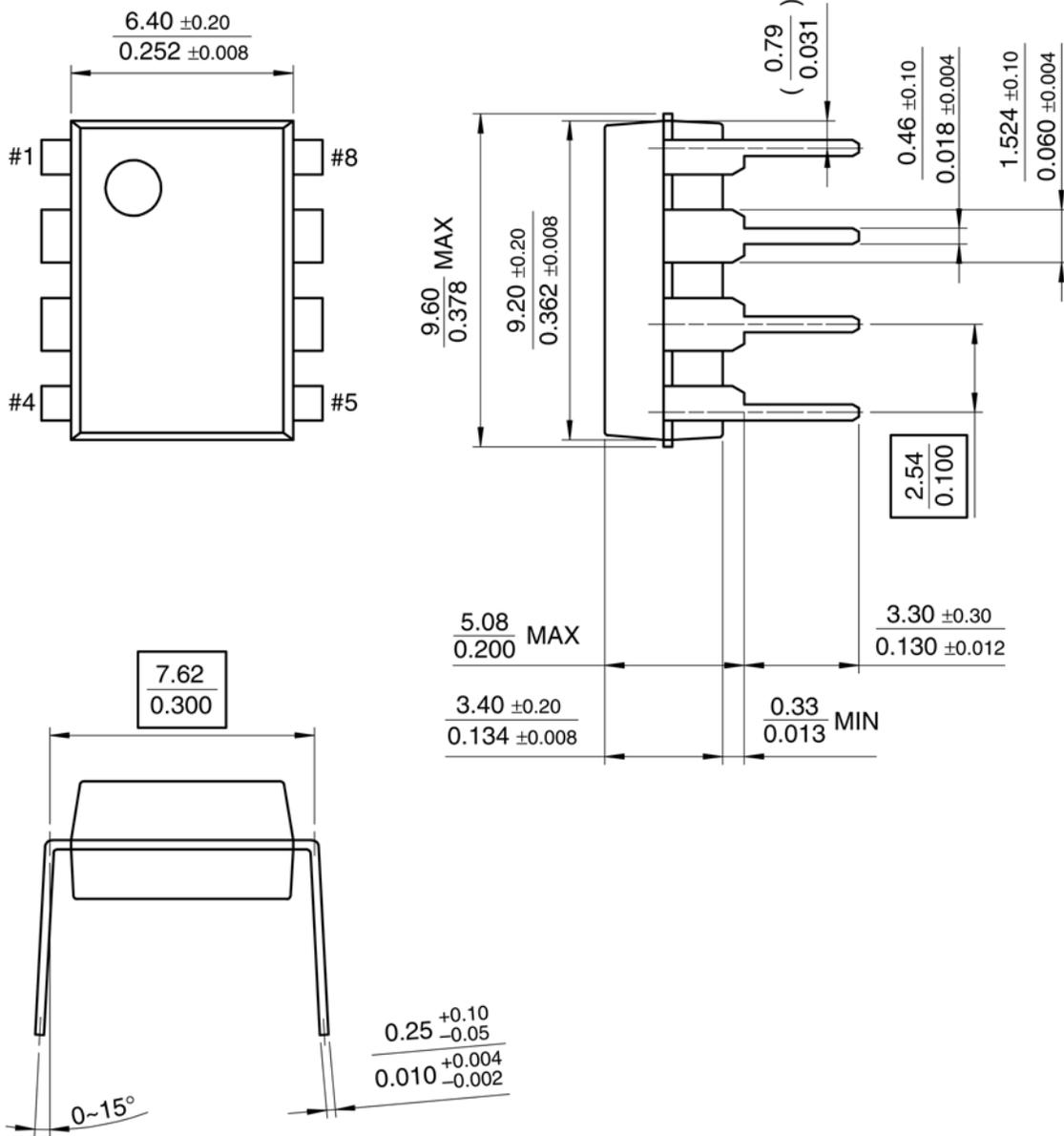


FIGURE 12. Output Limiting Characteristics

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

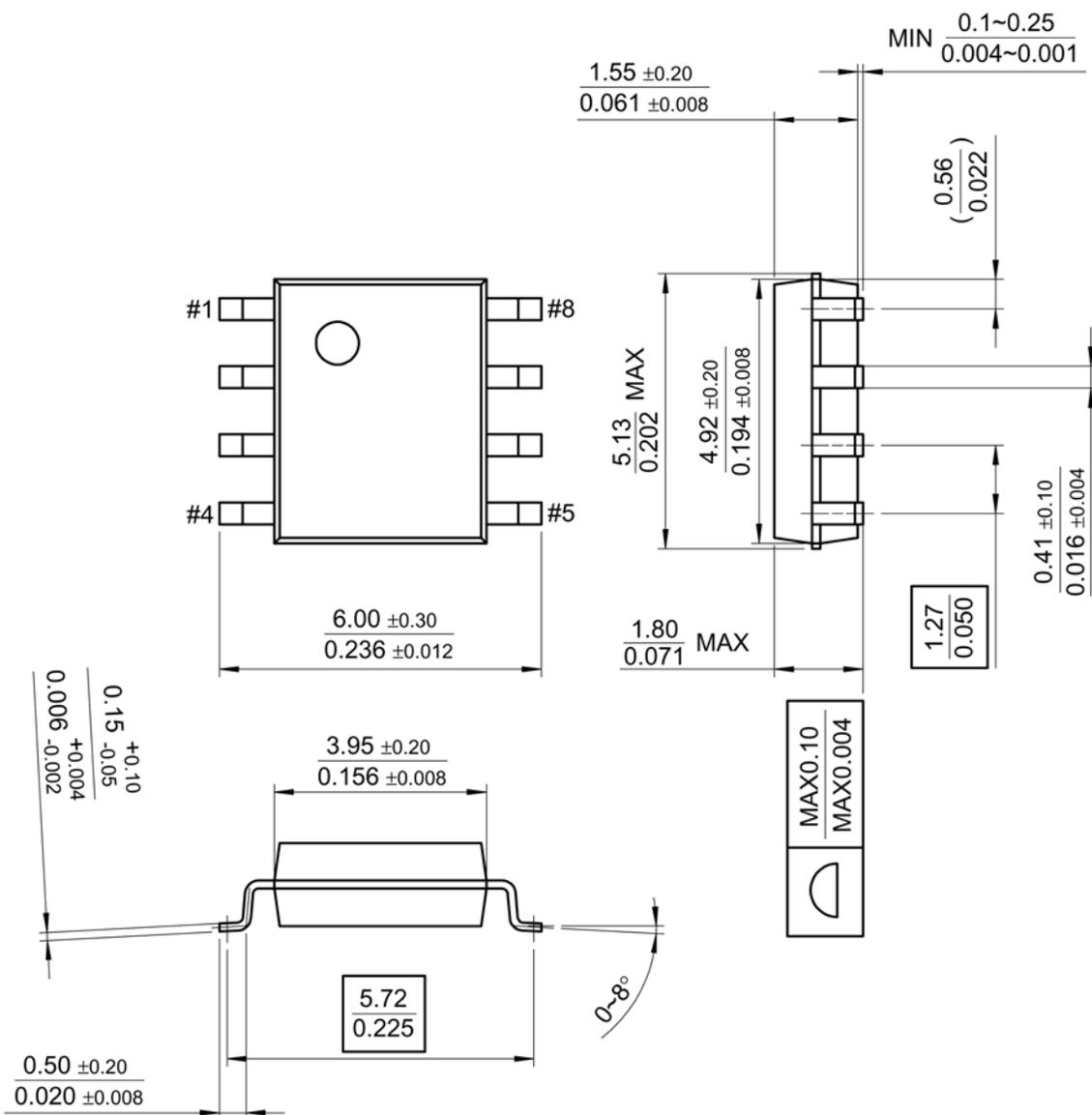
**8-DIP**



**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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Definition of terms

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