Rochester Electronics®

Datasheet

LM311

Single Comparator

The LM311 series is a monolithic, low input current voltage comparator. The device is also designed to operate from dual or single supply voltage.

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer (OCM).

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
    - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

FOR REFERENCE ONLY

LM311

Single Comparator

Features

- Low input bias current : 250nA (Max)
- Low input offset current : 50nA (Max)
- Differential Input Voltage : ±30V
- Power supply voltage : single 5.0V supply to ±15V.
- Offset voltage null capability.
- Strobe capability.

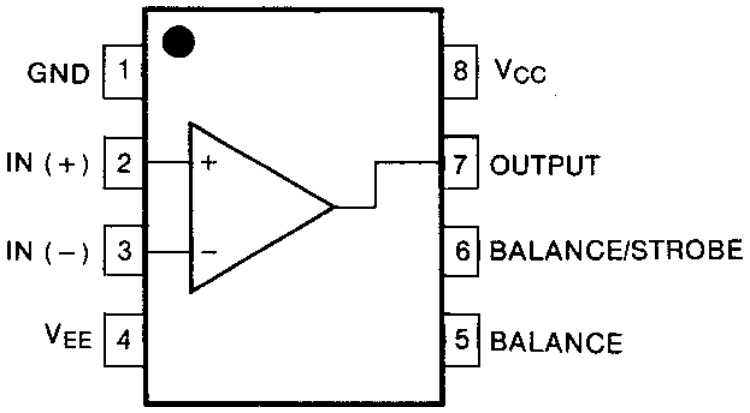
Description

The LM311 series is a monolithic, low input current voltage comparator. The device is also designed to operate from dual or single supply voltage.

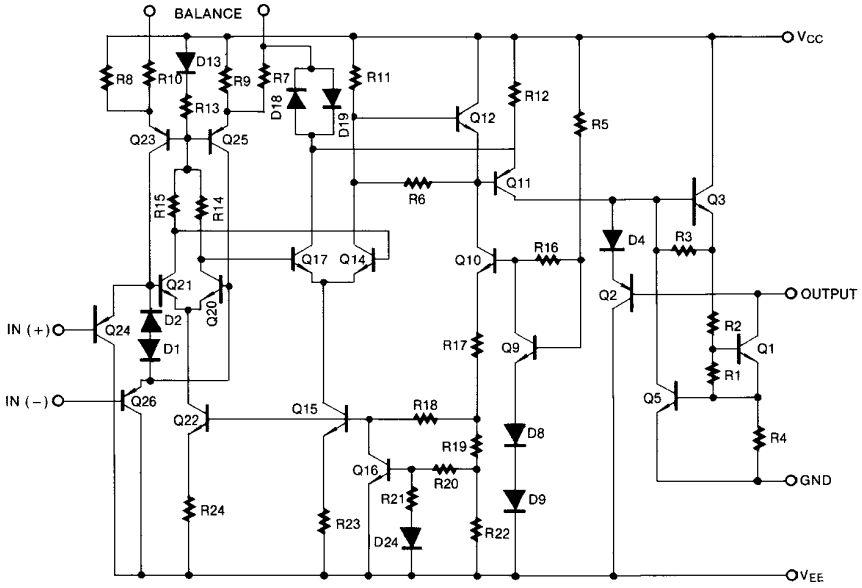
8-DIP

8-SOP

Internal Block Diagram



Schematic Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Total Supply Voltage	V_{CC}	36	V
Output to Negative Supply Voltage LM311	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

Electrical Characteristics

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Input Offset Voltage	V_{IO}	$R_S \leq 50K\Omega$		-	1.0	7.5	mV
			Note 1	-	-	10	
Input Offset Current	I_{IO}			-	6	50	nA
			Note 1	-	-	70	
Input Bias Current	I_{BIAS}			-	100	250	nA
			Note 1	-	-	300	
Voltage Gain	G_V	-		40	200	-	V/mV
Response Time	T_{RES}		Note 2	-	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 1	-	0.23	0.4	
Strobe “ON” Current	$I_{STR(ON)}$	-		-	3	-	mA
Output Leakage Current	I_{SINK}	I_{STR} =3mA, $V_I \geq$ 10mV V_O =15V, V_{CC}=±15V		-	0.2	50	nA
Input Voltage Range	$V_{I(R)}$	Note 1		-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	-	mA

Notes :

1. $0 \leq T_A \leq +70°C$
2. The response time specified is for a 100mV input step with 5mV over drive.

Typical Performance Characteristics

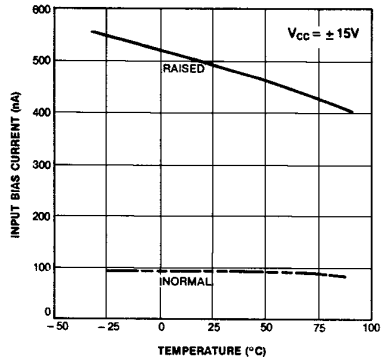


Figure 1. Input Bias Current vs Temperature

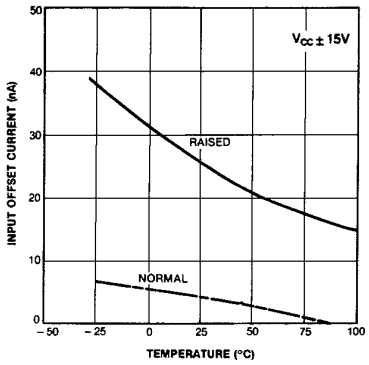


Figure 2. Input Offset Current vs Temperature

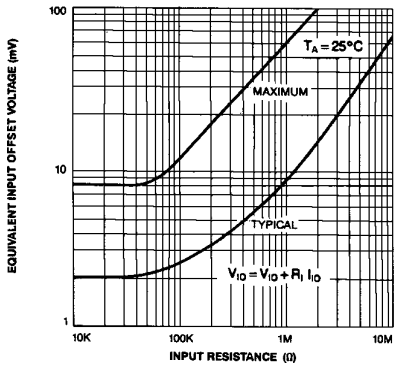


Figure 3. Offset Voltage vs Input Resistance

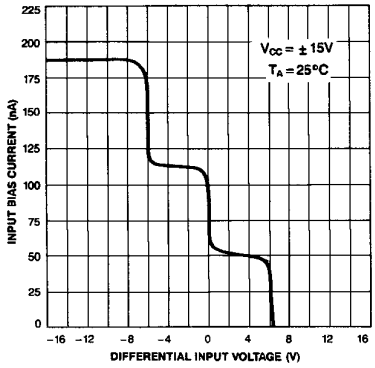


Figure 4. Input Bias Current vs Differential input voltage

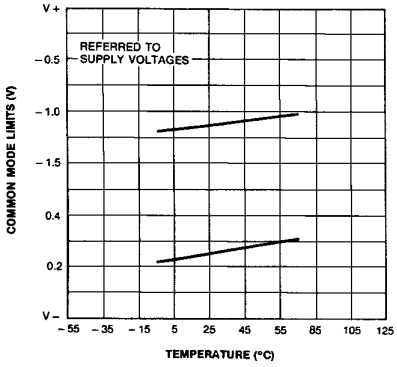


Figure 5. Common Mode Limits vs Temperature

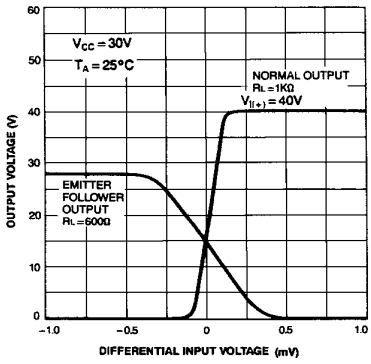


Figure 6. Output Voltage vs Differential input voltage

Typical Performance Characteristics (continued)

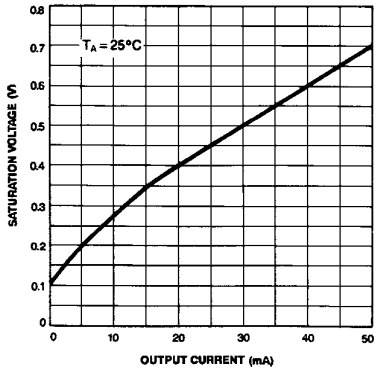


Figure 7. Saturation voltage vs Current

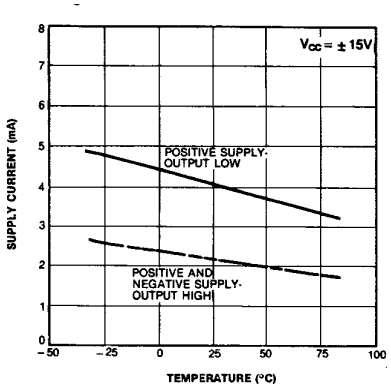


Figure 8. Supply Current vs Temperature

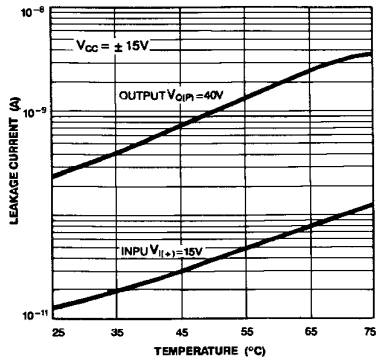


Figure 9. Leakage Current vs Temperature

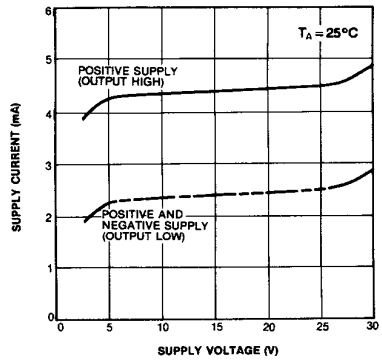


Figure 10. Supply Current vs Supply Voltage

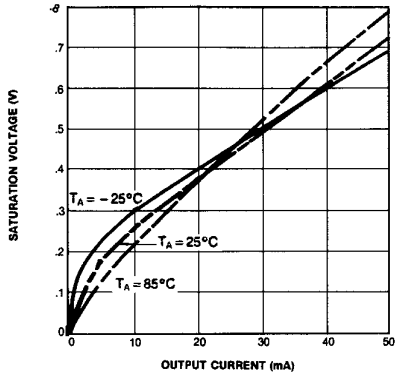


Figure 11. Current Saturation Voltage

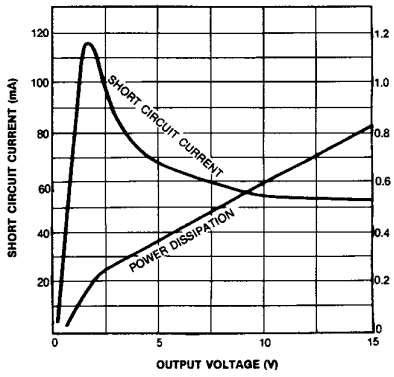
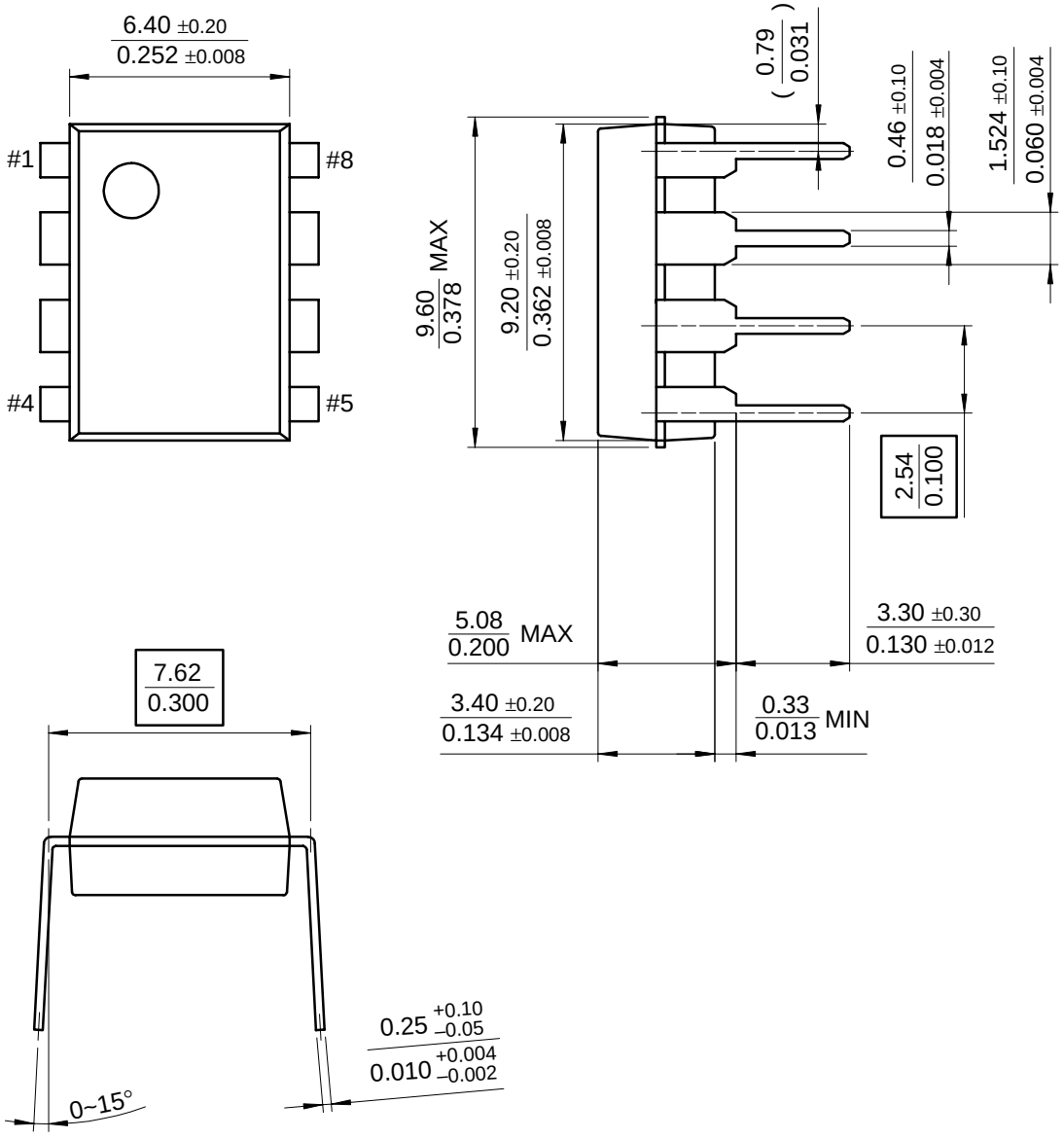


Figure 12. Output Limiting Characterstics

Mechanical Dimensions

Package

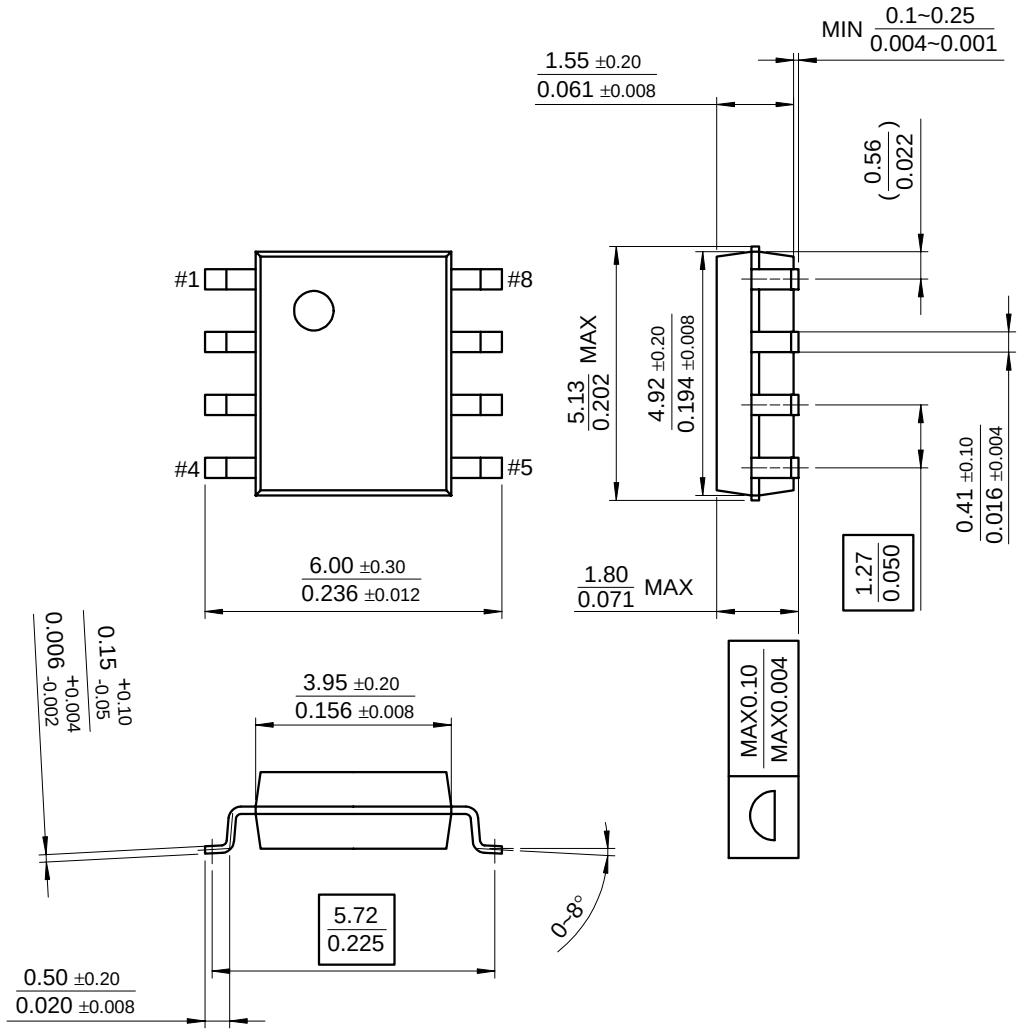
8-DIP



Mechanical Dimensions (Continued)

Package

8-SOP



Ordering Information

Product Number	Package	Operating Temperature
LM311N	8-DIP	0 ~ +70°C
LM311M	8-SOP	

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