FAIRCHILD SEMICONDUCTOR®

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LM319

Dual Comparator

Features

- Operates from a single 5V supply
- Typically 80ns response time at ±15V
- Open collector outputs : up to + 35V
- High output drive current : 25mA
- Inputs and outputs can be isolated from system ground
- Minimum fan-out of 2 (each side)
- Two independent comparators

Description

The LM319 is a dual high speed voltage comparator designed to operate from a single + 5V supply up to ±15V dual supplies. Open collector of the output stage makes the LM319 compatible with RTL, DTL and TTL as well as capable of driving lamps and relays at currents up to 25mA. Typical response time of 80ns with ±15V power supplies makes the LM319 ideal for application in fast A/D converts, level shifters, oscillators, and multivibrators.

14-DIP

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14-SOP

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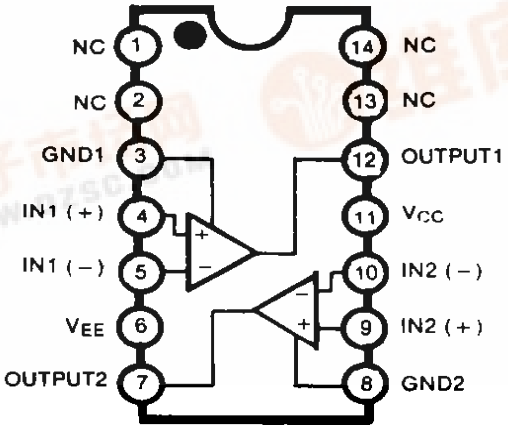
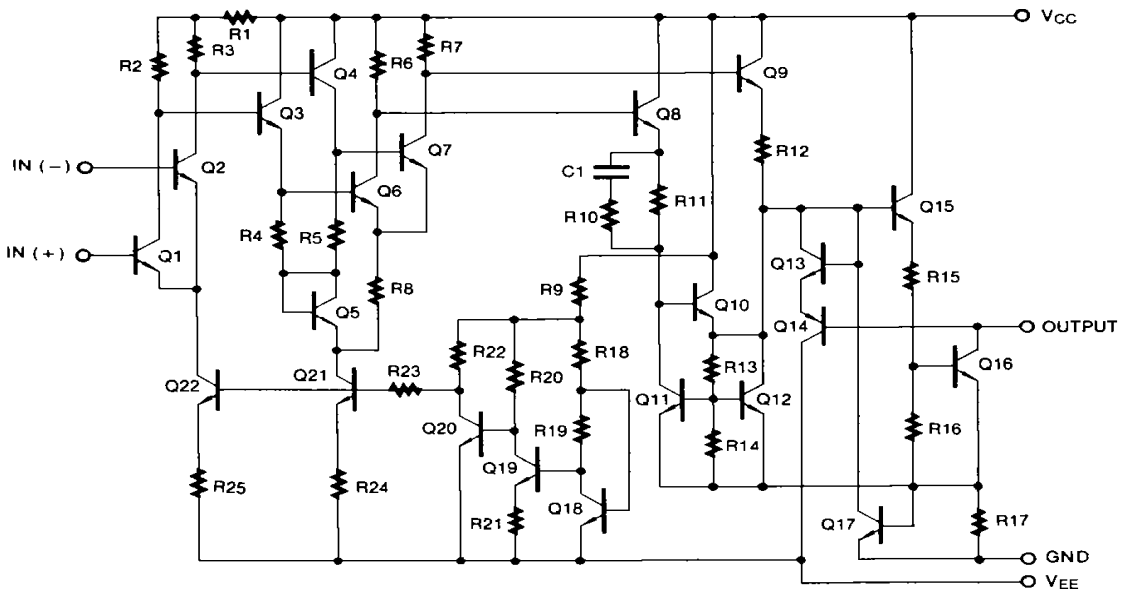
Internal Block Diagram



Schematic Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	36	V
Output to Negative Supply Voltage	V_O - V_{EE}	36	V
Ground to Negative Supply Voltage	V_{EE}	25	V
Ground to Positive Supply Voltage	V_{CC}	18	V
Differential Input Voltage	$V_{I(DIFF)}$	5	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, V_{EE} = - 15V, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions		LM319			Unit
				Min.	Typ.	Max.	
Input Offset Voltage (Note 1)	V_{IO}	$R_S \leq 5K\Omega$		-	2.0	8.0	mV
			Note 3	-	-	10	
Input Offset Current (Note 1)	I_{IO}			-	10	200	nA
			Note 3	-	-	300	
Input Bias Current	I_{BIAS}			-	150	1000	nA
			Note 3	-	-	1200	
Voltage Gain	G_V	-		8	40	-	V/mV
Response Time (Note 2)	T_{RES}	V_{CC} = ±15V		-	80	-	ns
Saturation Voltage	V_{SAT}	V_{CC}=15V, V_{EE} = -15V , $V_I \leq$ -5mV, I_O = 25mA		-	0.6	1.5	V
		V_{CC} = 4.5V,V_{EE} = 0V $V_I \leq$ -10mV, $I_O \leq$ 3.2mA	Note3	-	0.3	0.4	
Output Leakage Current	$I_{O(LKG)}$	$V_I \geq$ 5mV, $V_{O(P)}$ = 35V		-	-	-	µA
			Note 3	-	-	-	
		$V_I \geq$ 10mV, $V_{O(P)}$ = 35V		-	0.2	10	
Input Voltage Range	$V_{I(R)}$	Note 3	V_{CC} = ±15V	-	±13	-	V
			V_{CC} = 5V, V_{EE} = 0V	1	-	3	
Differential Input Voltage	$V_{I(DIFF)}$	-		-	-	±5	V
Positive Supply Current	I_{CC1}	V_{CC} = 5V, V_{EE} = 0V		-	3.6	-	mA
Positive Supply Current	I_{CC2}	V_{CC} = ±15V		-	7.5	12.5	mA
Negative Supply Current	I_{EE}	V_{CC} = ±15V		-	3	5	mA

Notes :

1. The offset voltage and offset currents given are the maximum values required to drive the output within a volt of either supply with a 1mA load. Thus, these parameters define an error band and take into account the worst case effects of voltage gain and input impedance.
2. The response time specified is for a 100mV input step with 5mV overdrive.
3. LM319 : $0 \leq T_A \leq +70°C$

Typical Performance Characteristics

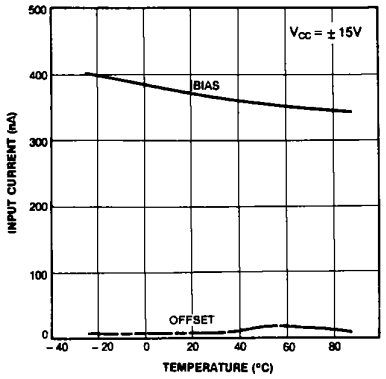


Figure 1. Input Current

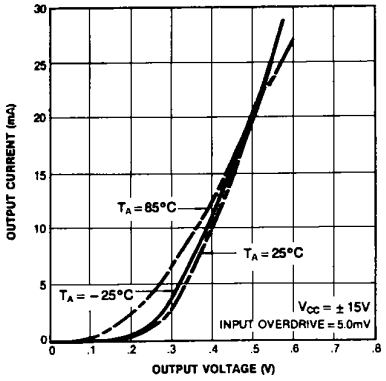


Figure 2. Output Saturation Voltage

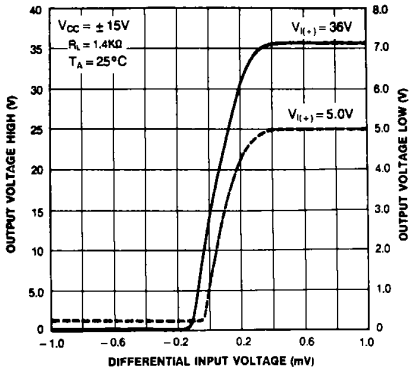


Figure 3. Transfer Function

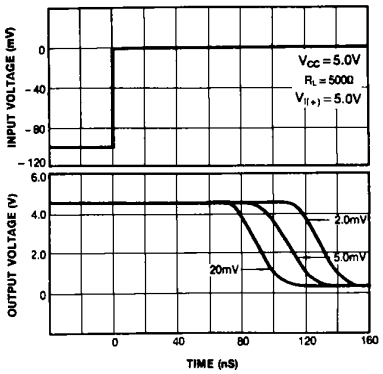


Figure 4. Response Time for Various Input Overdriver

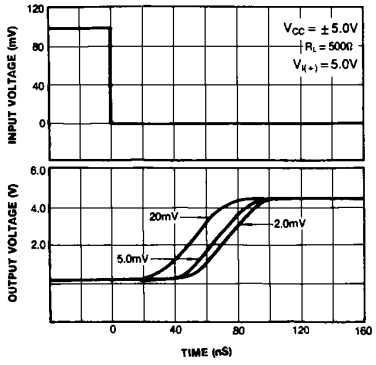


Figure 5. Response Time Various Input Overdriver

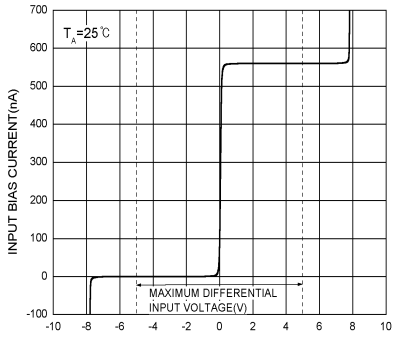


Figure 6. Input Characteristics

Typical Performance Characteristics (continued)

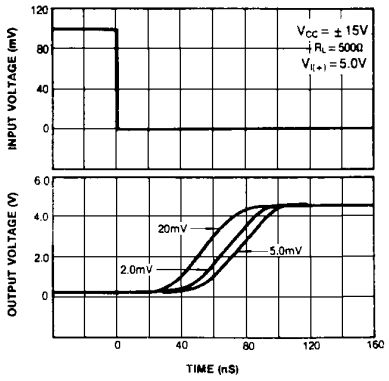


Figure 7. Response Time for Various Input Overdriver

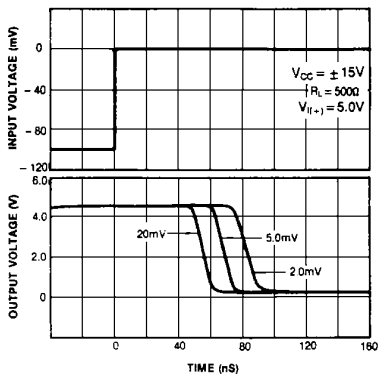


Figure 8. Response Time for Various Input Overdriver

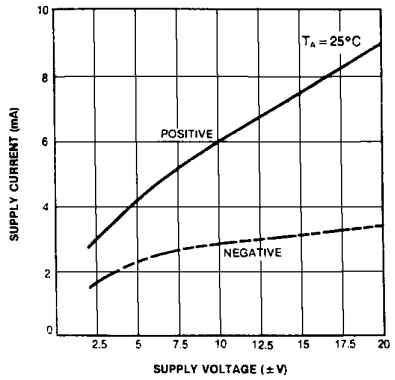


Figure 9. Supply Current

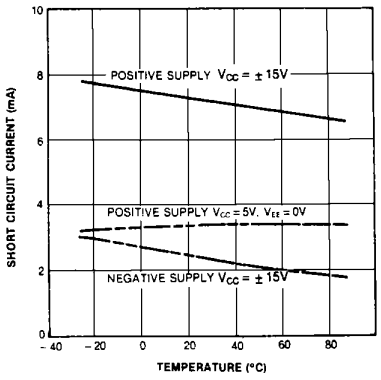


Figure 10. Supply Current

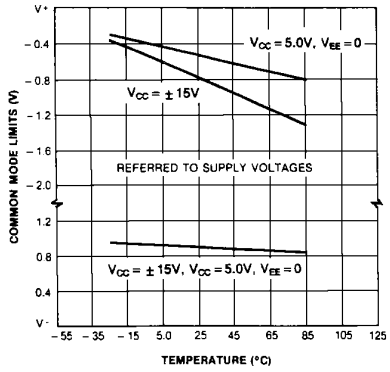


Figure 11. Common Mode Limits

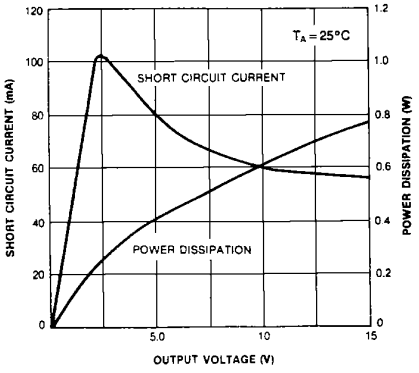


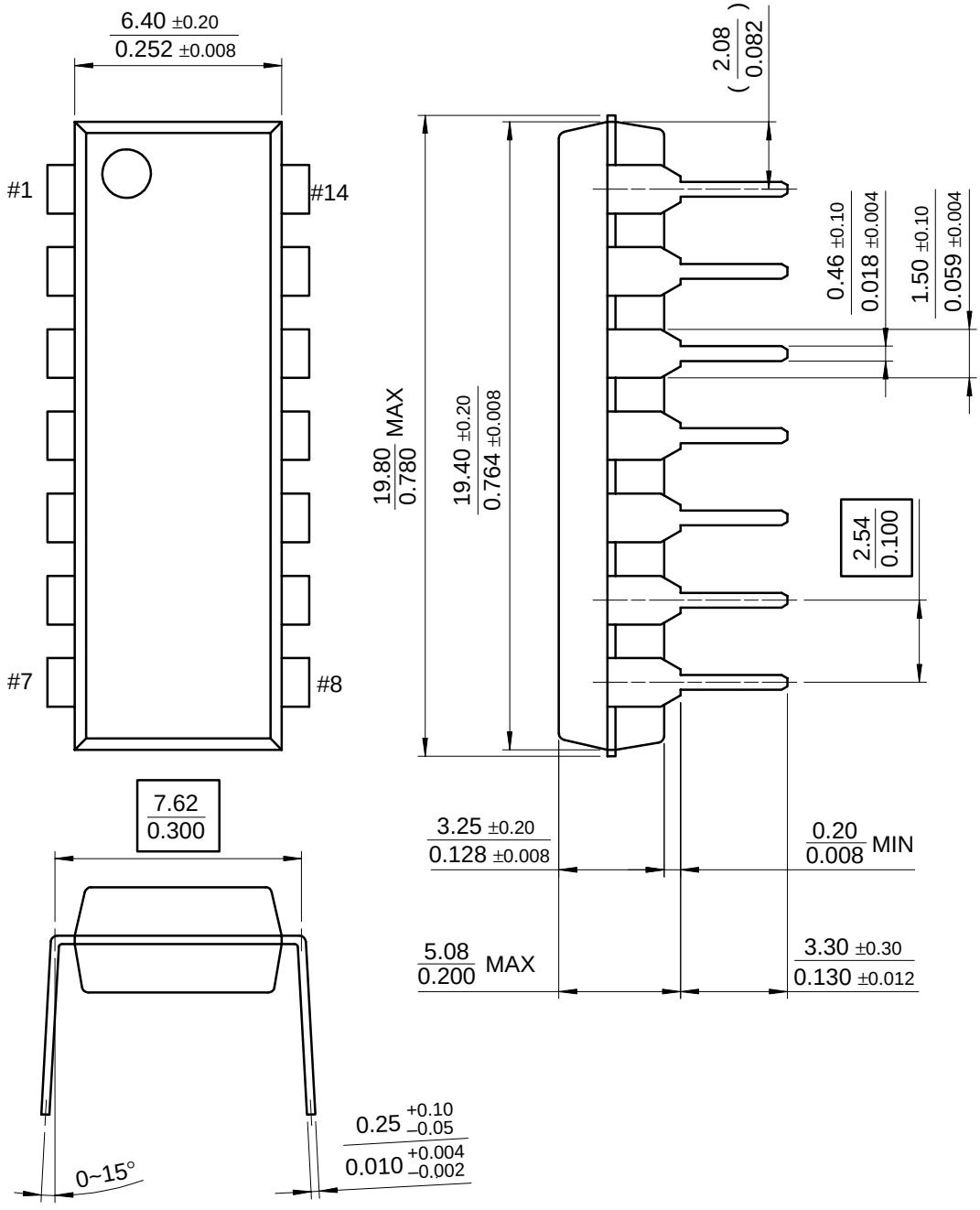
Figure 12. Output Limiting Characteristics

Mechanical Dimensions

Package

Dimensions in millimeters

14-DIP

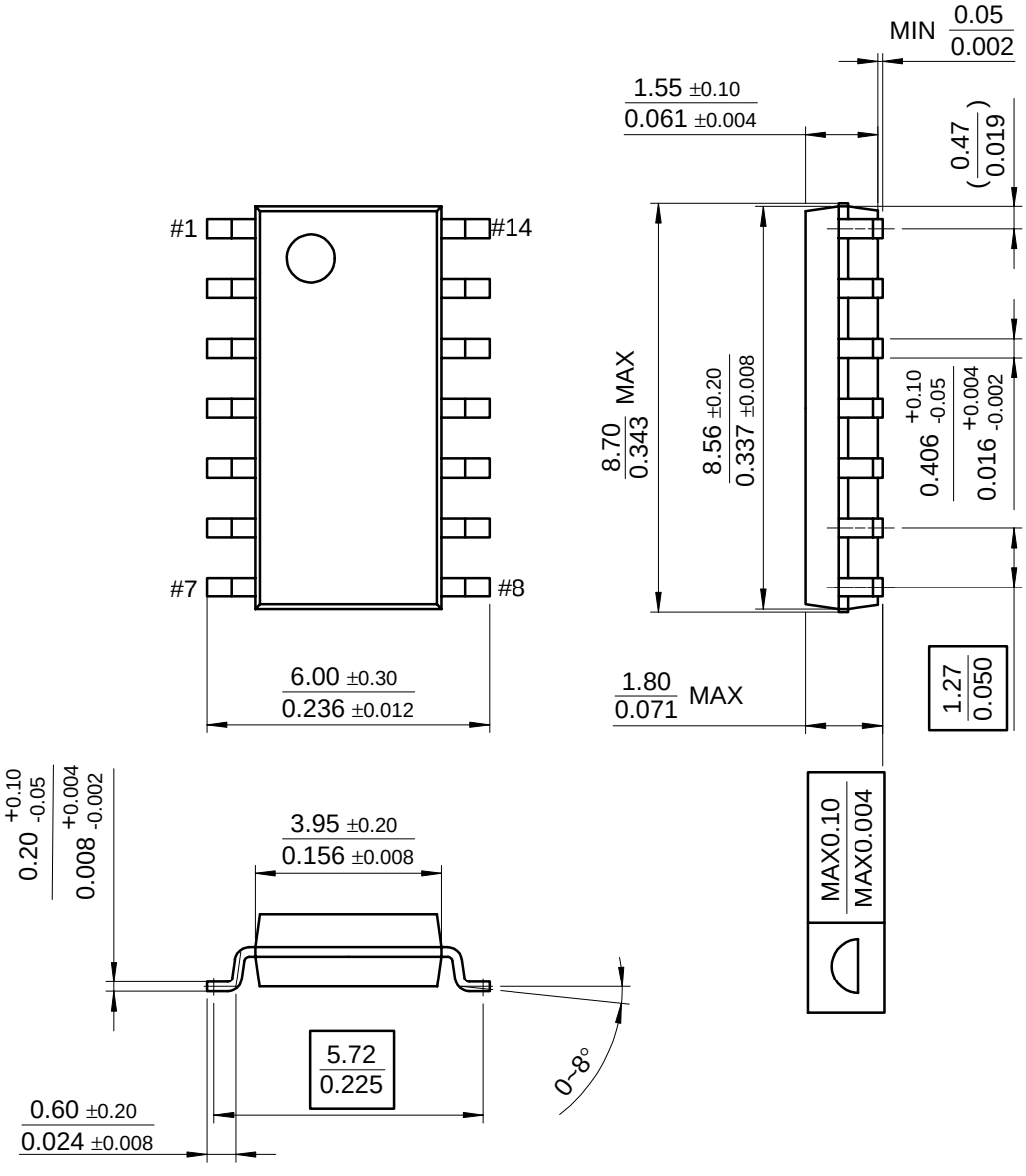


Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

14-SOP



Ordering Information

Product Number	Package	Operating Temperature
LM319N	14-DIP	0 ~ + 70°C
LM319M	14-SOP	

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