PJ76393

Dual Differential Comparator In a SOP-8P Package

GENERAL DESCRIPTION

The LM393 consists of two independent voltage comparators. They were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent from the magnitude of the power supply voltage. The outputs can be connected to other open-collector outputs to achieve wired-AND relationships.

Available Package : SOP-8P

FEATURES

- Wide Supply Voltage Range : 2 V to 36 V or ±1V to ±18V
- Low Supply Current Drain independent from the Supply Voltage
- Low Input Biasing Current
- Low Input Offset Current
- Low Input Offset Voltage
- Input Common-mode Voltage Range includes GND
- Differential Input Voltage Range Equal to the Power Supply Voltage
- Low Output Saturation Voltage
- Output Voltage Compatible with TTL, MOS and CMOS Logic.
- Temperature Range: -40°C to 125°C

APPLICATIONS

- A/D converters
- Wide range VCO
- Clock generator
- High voltage logic gate
- Multi vibrators

ORDERING INFORMATION

ORDER NUMBER	Marking ID	Package	Description
PJ76393P_R2	PJ76393 PYMDNN	SOP-8P	Halogen free RoHS compliant in T/R, 3,000 pcs/Reel

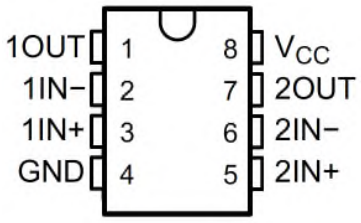
Note 1

1. Panjit can meet RoHS 2.0/REACH requirement. So most package types Panjit offers only states halogen free, instead of lead free.

MARKING INFORMATION

Marking ID	Package	Definition
PJ76393 PYMDNN	SOP-8P	PJ76393: Product code P: Package code Y: Year code M: Month code D: Day code NN: Serial No.

PIN CONFIGURATION



SOP-8P (TOP VIEW)

FUNCTIONAL PIN DESCRIPTION

TERMINAL		DESCRIPTION
NUMBER	NAME	
1	1OUT	Output pin of comparator 1
2	1IN-	Inverting Input Pin of comparator 1
3	1IN+	Non-Inverting Input Pin of comparator 1
4	GND	Ground Pin
5	2IN+	Non-Inverting Input Pin of comparator 2
6	2 N-	Inverting Input Pin of comparator 2
7	2OUT	Output Pin of comparator 2
8	VCC	IC Power Supply

ABSOLUTE MAXIMUM RATINGS

Over operating free-air temperature range (unless otherwise noted) (1)

PARAMETER		MIN	MAX	Unit
Supply Voltage	V_{CC}	-0.3	36	V
		-18	18	V
Differential Input Voltage	V_{IND}	-36	36	V
Input Voltage	V_{IN}	-0.3	36	V
		-18	18	V
Input Current (V_{IN} < -0.3 V)	I_{IO}		50	mA
Operating junction temperature range	T_J	-40	125	°C
Maximum Junction Temperature	$T_{J(MAX)}$		150	°C
Storage temperature range	T_{STG}	-65	150	°C

(1) Stresses beyond those listed under ***absolute maximum ratings*** may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under ***recommended operating conditions*** is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

PARAMETER		MIN	TYP	MAX	UNIT
V_{CC}	Supply Voltage	2		32	V
T_A	Operating Ambient temperature	-40		85	°C

ELECTRICAL CHARACTERISTICS

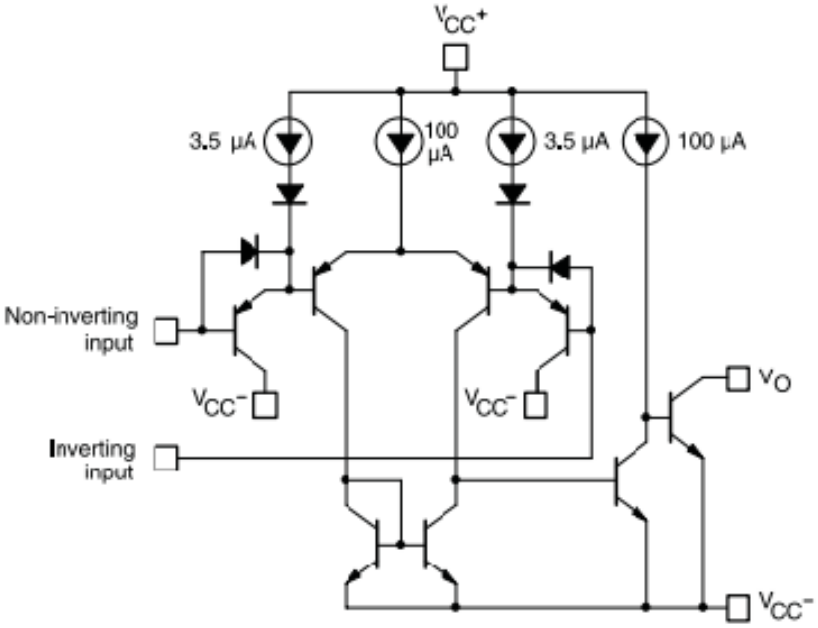
Test Condition : V_{CC} = 5.0V, unless otherwise specified, all limits are 100% test at T_A=25°C. (1)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IO}	Input Offset Voltage	V_{CC} = 5 V to 30 V, V_{IC} = V_{ICRMIN}, V_O = 1.4 V, T_A = 25°C		2	5	mV
		V_{CC} = 5 V to 30 V, V_{IC} = V_{ICRMIN}, V_O = 1.4 V, T_A = -40 to 125°C			9	mV
I_{IO}	Input Offset Current	V_O = 1.4 V, T_A = 25°C		5	50	nA
		V_O = 1.4 V, T_A = -40 to 125°C			150	nA
I_{IB}	Input Bias Current	V_O = 1.4 V, T_A = 25°C		-25	-250	nA
		V_O = 1.4 V, T_A = -40 to 125°C			-400	nA
V_{ICR}	Common-mode Input Voltage Range(1)	T_A = 25°C	0		V_{CC}-1.5	V
		T_A = -40 to 125°C	0		V_{CC}-2.0	V
A_{VD}	Large-signal Differential Voltage Amplification	V_{CC} = 15 V, V_O = 1.4 V to 11.4 V, R_L = 15 kΩ to V_{CC}	50	200		V/mV
V_{OL}	Low-Level Output Voltage	I_{OL} = 4 mA, V_{ID} = -1 V, T_A = 25°C		150	400	mV
		I_{OL} = 4 mA, V_{ID} = -1 V, T_A = -40 to 125°C			700	mV
I_{OH}	High-Level Output Current	V_{OH} = 5 V, V_{ID} = 1 V, T_A = 25°C		0.1	50	nA
		V_{OH} = 30 V, V_{ID} = 1 V, T_A = -40 to 125°C			1	uA
I_{OL}	Low-Level Output Current	V_{OL} = 1.5 V, V_{ID} = -1 V	6			mA
I_{CC}	Supply Current	R_L = ∞, V_{CC} = 5 V, T_A = 25°C		0.8	1	mA
		R_L = ∞, V_{CC} = 30 V, T_A = -40 to 125°C			2.5	mA
t_{RES}	Response Time	R_L connected to 5 V through 5.1 kΩ, C_L = 15 pF(2), 100 mV input step with 5 mV over-drive		1.3		uS
		R_L connected to 5 V through 5.1 kΩ, C_L = 15 pF(2), TTL-level input step		0.3		uS

(1) ***The voltage at either input or common-mode should not be allowed to go negative by more than 0.3V. The upper end of the common- mode voltage range is V_{CC}-1.5V, but either or both inputs can go to 30V without damage.***

(2) ***The response time specified is the interval between the input step function and the instant, when the output crosses 1.4 V. C_L includes probe and jig capacitance.***

SCHEMATIC DIAGRAM



TYPICAL PERFORMANCE CHARACTERISTICS

Figure 3: Supply current vs. supply voltage

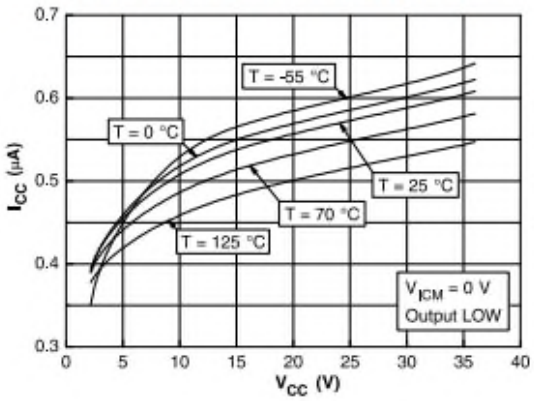


Figure 4: Input current vs. supply voltage

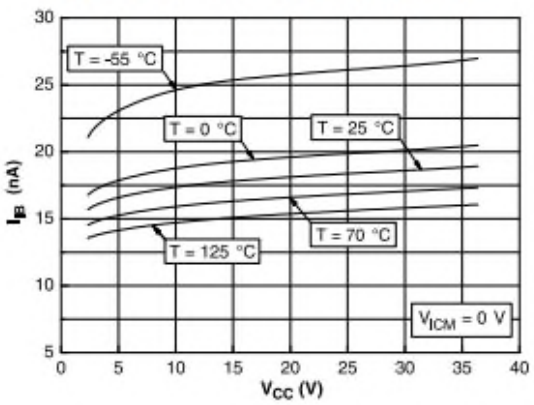


Figure 5: Output saturation voltage vs. output current

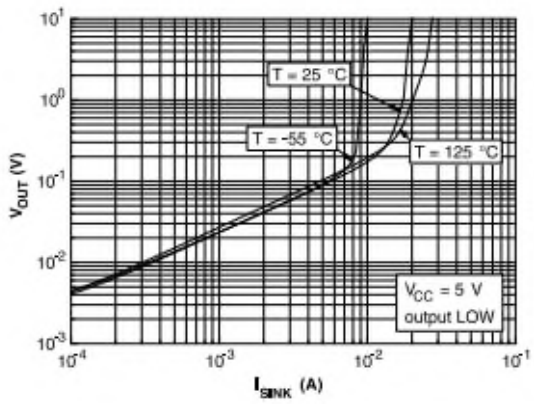


Figure 6: Response time for various input overdrives - negative transition

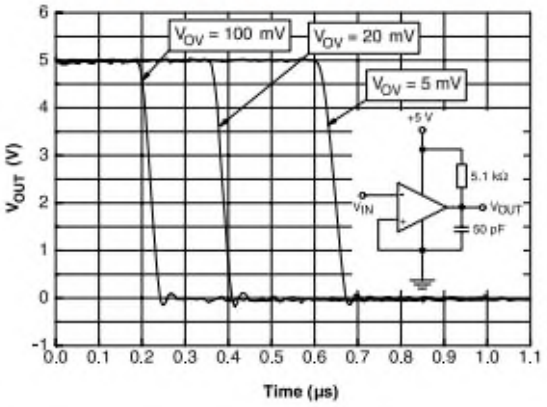
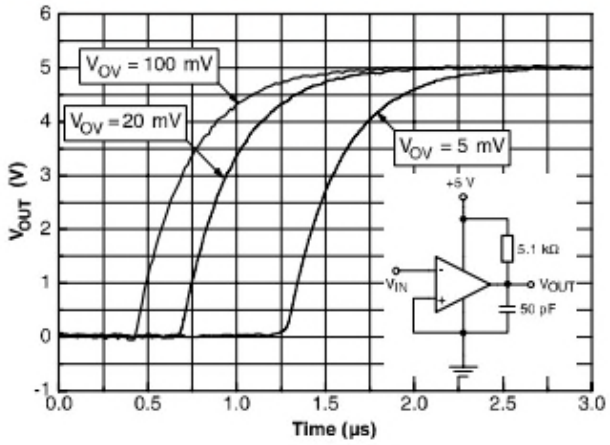


Figure 7: Response time for various input overdrives - positive transition



TYPICAL PERFORMANCE CHARACTERISTICS

Figure 8: Basic comparator

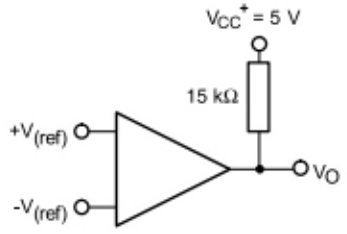


Figure 9: Driving TTL

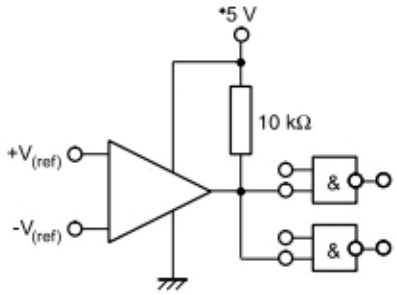


Figure 10: Low-frequency op amp (1)

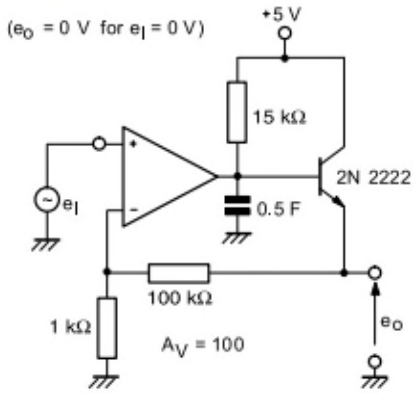


Figure 11: Driving CMOS

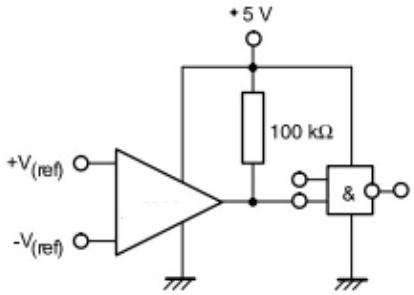


Figure 12: Low-frequency op amp (2)

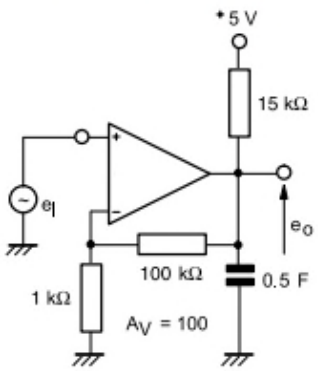


Figure 13: Transducer amplifier

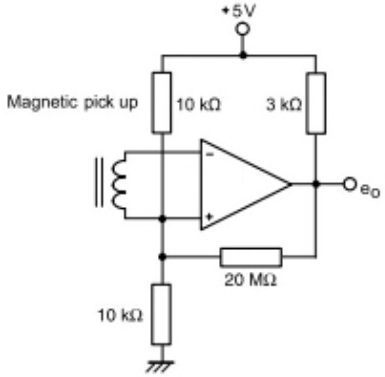


Figure 14: Low-frequency op amp with offset adjust

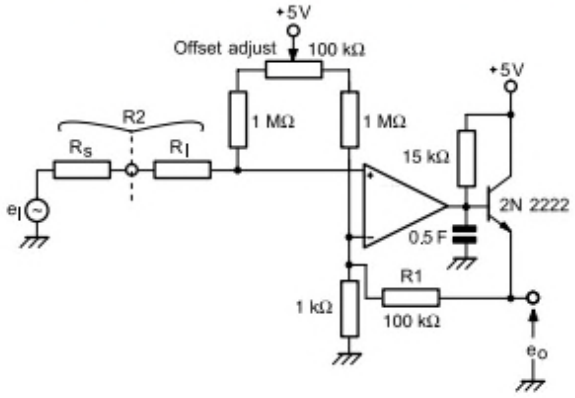


Figure 15: Zero crossing detector (single power supply)

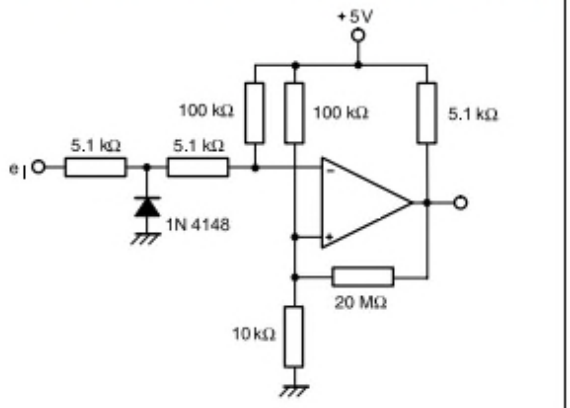


Figure 16: Limit comparator

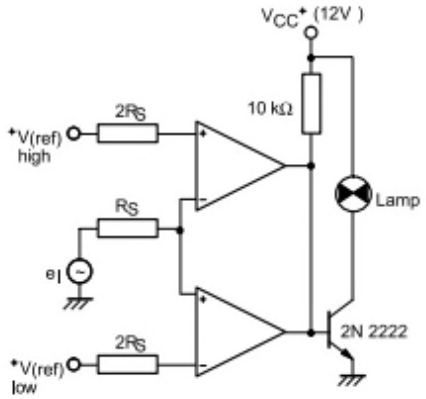


Figure 17: Crystal controlled comparator

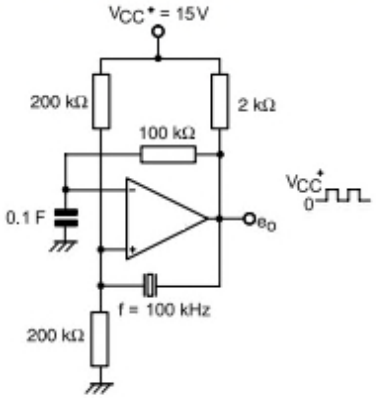


Figure 18: Split supply applications (zero crossing detector)

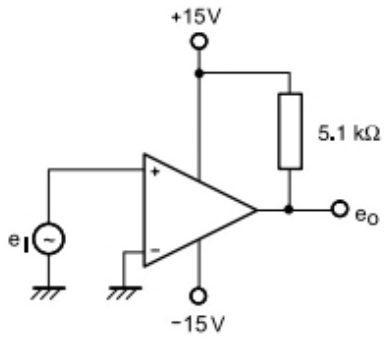
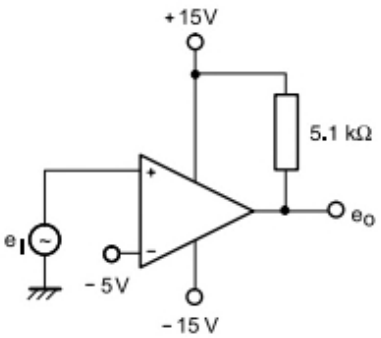
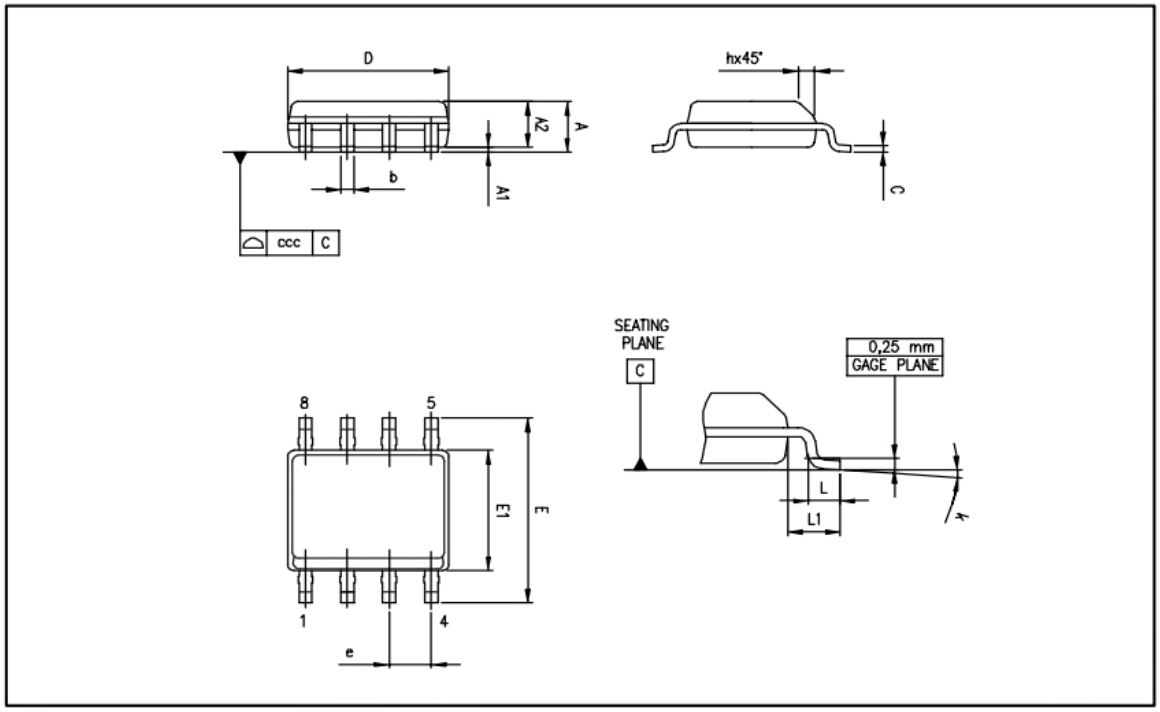


Figure 19: Comparator with a negative reference



PACKAGE OUTLINE DIMENSION (SOP-8P)

SOP-8P Unit (mm)



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max
A			1.75			0.069
A1	0.10		0.25	0.004		0.010
A2	1.25			0.049		
b	0.28		0.48	0.011		0.019
c	0.17		0.23	0.007		0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e		1.27			0.050	
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
L1		1.04			0.040	
k	0°		8°	0°		8°
ccc			0.10			0.004

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