Low Power Operational Amplifier and Comparator

The LM392 contains two functions: an op amp and a comparator. Both devices can operate on single-supply power and both have a common-mode range down to ground. Operation from split power supplies is also possible. Low power-supply current is independent of the supply voltage level. The output of the comparator interfaces directly with either TTL or CMOS logic. Low quiescent current makes the LM392 ideal for portable equipment.

Features

- Wide Power–Supply Range: 3 V to 32 V
- Low Input Offset Voltage: 2 mV
- Low Quiescent Current: 600 µA
- Input CMV Range includes GND
- Op Amp is Unity Gain Stable
- These Devices are Pb-Free and are RoHS Compliant

1

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З

4

GND

Typical Applications

- Level Detectors
- Voltage Controlled Oscillators
- Transducer Amplifiers

OUTPUT A (Comparator)

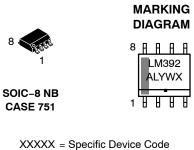
INVERTING INPUT A

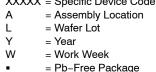
NONINVERTING INPUT A



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ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

OUTPUT B (Operational Amplifier)

INVERTING INPUT B

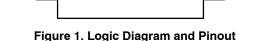
8 V

7

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NONINVERTING INPUT B



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	V _S	32 or ±16	V
Differential Input Voltage	V _{IDR}	32	V
Input Voltage	VI	0.3 to 32	V
Output Short – Circuit to Ground	tso	Continuous	
Thermal Impedance	θ_{JA}	160	°C/W
Storage Temperature Range	T _{stg}	-65 to 150	°C
Lead Temperature (Soldering, 10 Seconds)		260	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

LM392

ELECTRICAL CHARACTERISTICS (Both Amplifiers) (V⁺ = 5 V, T_A= 25°C unless otherwise stated)

				LM392			Unit
Parameter	Conditions		TA	Min	Тур	Max	
Input Offset Voltage	At output switch	At output switch point, $V_0 = 1.4 V$,			±2	±5	mV
	$R_s = 0 \ \Omega, V^+ = 5 \ V \text{ to } 30 \ V, V_{CM} = 0 \text{ to}$ (V ⁺ - 1.5 V)		0°C to 70°C			±7	
Input Bias Current	IN(+) or IN(–), V _{CM} = 0 V	25°C		50	205	nA
	IN(+) or IN(-)		0°C to 70°C			400	
Input Offset Current	IN(+) or IN(-)		25°C		±5	±50	nA
			0°C to 70°C			±150	
Input Common-Mode Voltage Range	V ⁺ = 30 V	25°C	0		V+-1.5	V	
	(NC	ote 1)	0°C to 70°C	0		V+-2	2
Supply Current	No Load	V+ = 30 V	0°C to 70°C		1	2	mA
		V+ = 5 V			0.5	1	
Amplifier-to-Amplifier Coupling	f = 1 kHz to 20 kHz, Input Referred		25°C		-78		dB
Differential Input Voltage	All $V_{IN} \ge V$ (or V ⁻ , If Used)		0°C to 70°C			32	V

(v I A= a) 1000 01101 WIDE 010

				LM392		
Parameter	Conditions	T _A	Min Typ Max		Unit	
OP AMP ONLY						
Large Signal Voltage Gain	V ⁺ = 15 V, V _o Swing = 1 V to 11 V, R _L = 2 k Ω	25°C	25	100		V/mV
Output Voltage Swing, High (V _{OH})	$R_L = 2 k\Omega$	25°C	V ⁺ -1.7			V
Output Voltage Swing, Low (V _{OL})	$R_L = 2 k\Omega$	25°C			20	mV
Common-Mode Rejection Ratio	V_{CM} = 0 to V ⁺ – 1.5 V	25°C	65	70		dB
Power Supply Rejection Ratio		25°C	65	100		dB
Output Current Source	$V_{IN(+)} = 1 V, V_{IN(-)} = 0 V,$ V ⁺ = 15 V, V _O = 2 V	25°C	20	40		mA
Output Current Sink	$V_{IN(-)} = 1 V, V_{IN(+)} = 0 V,$ V ⁺ = 15 V, V _O = 2 V	25°C	10	20		mA
	$V_{IN(-)} = 1 V, V_{IN(+)} = 0 V, V^+ = 15 V, V^O = 200 mV$	25°C	12	50		μΑ
Input Offset Voltage Drift	$R_S = 0 \Omega$ (0°C to 70°C)	0°C to 70°C		7		μV/°C
Input Offset Current Drift	$R_S = 0 \Omega$ (0°C to 70°C)	0°C to 70°C		10		pA/°C

COMPARATOR ONLY

Voltage Gain	$R_L \ge 15 \text{ k}\Omega, V^+ = 15 \text{ V}$	25°C	50	200		V/mV
Large Signal Response Time	$V_{IN} = TTL \text{ Logic Swing, } V_{REF} = 1.4 \text{ V,} \\ V_{RL} = 5 \text{ V, } R_L = 5.1 \text{ k}\Omega$	25°C		200		ns
Response Time	V_{RL} = 5 V, R_L = 5.1 k Ω	25°C		600		ns
Output Sink Current	$V_{IN(-)}$ = 1 V, $V_{IN(+)}$ = 0 V, V_O ≥ 1.5 V	25°C	6	16		mA
Saturation Voltage	$V_{IN(-)} \ge 1 \text{ V}, V_{IN(+)} = 0, I_{SINK} \le 4 \text{ mA}$	25°C		250	400	mV
	$V_{IN(-)} \ge 1 \text{ V}, V_{IN(+)} = 0, I_{SINK} \le 4 \text{ mA}$	0°C to 70°C			700	mV
Output Leakage Current	$V_{IN(-)} = 0, V_{IN(+)} \ge 1 \text{ V}, V_{O} = 5 \text{ V}$	25°C		0.1		nA
	$V_{IN(-)} = 0, V_{IN(+)} \ge 1 \text{ V}, V_O = 30 \text{ V}$	25°C			1.0	μA

The input common-mode voltage or either input signal voltage should not be allowed to go negative by more than 0.3 V. The upper end of the common-mode voltage range is V⁺ – 1.5 V, but either or both inputs can go to 32 V without damage.

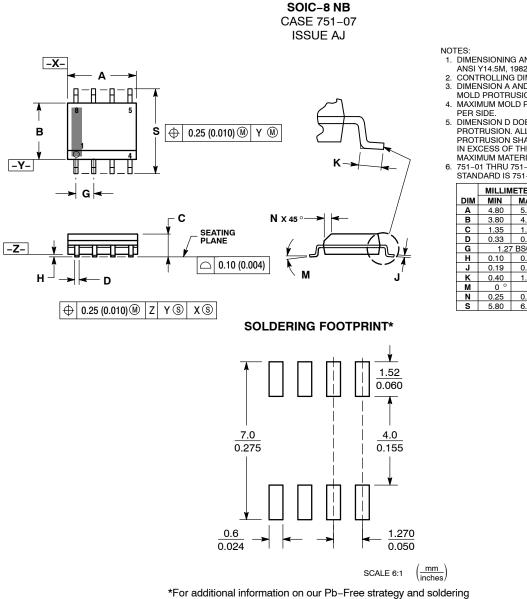
ORDERING INFORMATION

Device	Operating Temperature Range	Package	Shipping [†]
LM392DR2G	0°C to +70°C	SOIC-8 (Pb-Free)	2500 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

LM392

PACKAGE DIMENSIONS



details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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For additional information, please contact your local Sales Representative

- DIMENSIONING AND TOLERANCING PER
- ANSI Y14.5M, 1982. CONTROLLING DIMENSION: MILLIMETER.
- DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
- MAXIMUM MOLD PROTRUSION 0.15 (0.006)
- DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT
- MAXIMUM MATERIAL CONDITION
- 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

	MILLIN	IETERS	INC	HES
DIM	MIN	MAX	MIN	MAX
Α	4.80	5.00	0.189	0.197
в	3.80	4.00	0.150	0.157
С	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27	1.27 BSC 0.050 BS0		0 BSC
н	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
ĸ	0.40	1.27	0.016	0.050
м	0 °	8 °	0 °	8 °
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244