

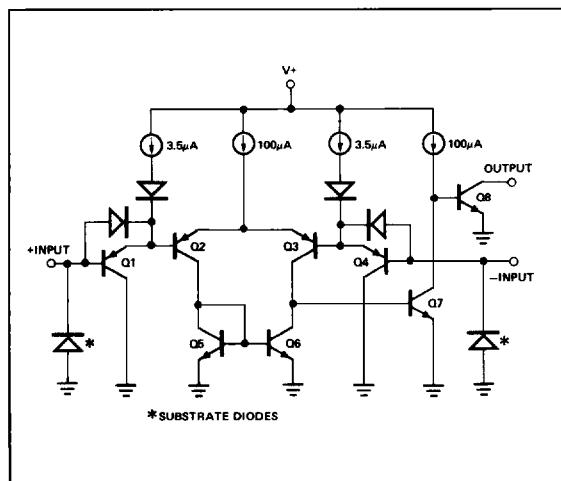
FEATURES

- High Gain 200V/mV Typ
- Single or Dual Supply Operation
- Input Voltage Range Includes Ground
- Low Power Consumption (1.5mW/Comparator)
- Low Input Bias Current 100nA Max
- Low Input Offset Current 10nA Max
- Low Offset Voltage 1mV Max
- Low Output Saturation Voltage 250mV @ 4mA
- Logic Output Compatible with TTL, DTL, ECL, MOS and CMOS
- Directly Replaces LM139/239/339 Comparators
- Available In Die Form

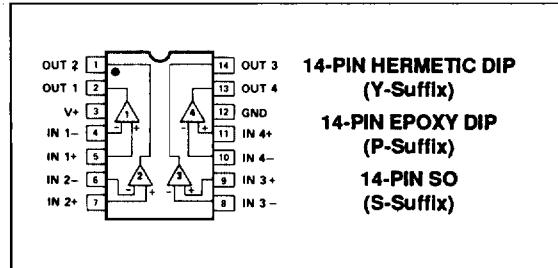
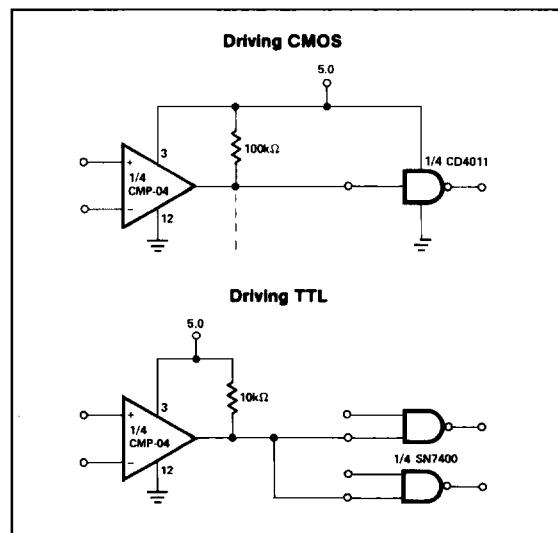
ORDERING INFORMATION¹

T _A = +25°C	PACKAGE			OPERATING TEMPERATURE RANGE
	V _{os} (mV)	CERDIP	PLASTIC	
1	CMP04BY*	—	—	MIL
1	CMP04FY	CMP04FP	CMP04FS	XIND

- * For devices processed in total compliance to MIL-STD-883, add /883 after part number. Consult factory for 883 data sheet.
- † Burn-in is available on commercial and industrial temperature range parts in CerDIP, plastic DIP, and TO-can packages.

SIMPLIFIED SCHEMATIC (1/4 CMP-04)

GENERAL DESCRIPTION

Four precision independent comparators comprise the CMP-04. Performance highlights include a very low offset voltage, low output saturation voltage and high gain in a single supply design. The input voltage range includes ground for single supply operation and V₊ for split supplies. A low power supply current of 2mA, which is independent of supply voltage, makes this the preferred comparator for precision applications requiring minimal power consumption. Maximum logic interface flexibility is offered by the open-collector TTL output.

PIN CONNECTIONS

TYPICAL INTERFACE


This is an abridged data sheet. To obtain the most recent version or complete data sheet, call our fax retrieval system at 1-800-446-6212.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage	36V or $\pm 18V$
Differential Input Voltage	36V _{DC}
Input Voltage	-0.3V to +36V
Operating Temperature Range	-40°C to +85°C
CMP-04FY	-55°C to +125°C
CMP-04BY	-40°C to +85°C
CMP-04FP, FS	-65°C to +150°C
Junction Temperature (T_j)	-65°C to +150°C
Storage Temperature Range	-65°C to +125°C
P-Suffix)	-65°C to +125°C
Input Current ($V_{IN} < -3.0V$)	50mA

Output Short-Circuit to GND Continuous
Lead Temperature (Soldering, 60 sec) 300°C

PACKAGE TYPE	θ_{JA} (Note 2)	θ_{JC}	UNITS
14-Pin Hermetic DIP (Z)	110	26	°C/W
14-Pin Plastic DIP (P)	83	39	°C/W
14-Pin SO (S)	120	36	°C/W

NOTES:

- Absolute maximum ratings apply to both DICE and packaged parts, unless otherwise noted.
- θ_{JA} is specified for worst case mounting conditions, i.e., θ_{JA} is specified for device in socket for CerDIP and P-DIP packages; θ_{JA} is specified for device soldered to printed circuit board for SO package.

ELECTRICAL CHARACTERISTICS at $V+ = +5V$, $T_A = 25^\circ C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	CMP-04B/F			
			MIN	TYP	MAX	UNITS
Input Offset Voltage	V_{OS}	$R_S = 0\Omega$, $R_L = 5.1k\Omega$ $V_O = 1.4V$, (Note 1)	—	0.4	1	mV
Input Offset Current	I_{OS}	$I_{IN(+)} - I_{IN(-)}$ $R_L = 5.1k\Omega$ $V_O = 1.4V$	—	2	10	nA
Input Bias Current	I_B	$I_{IN(+)} \text{ or } I_{IN(-)}$	—	25	100	nA
Voltage Gain	A_V	$R_L \geq 15k\Omega$, $V+ = 15V$, (Note 5)	80	200	—	V/mV
Large-Signal Response Time	t_r	$V_{IN} = \text{TTL Logic Swing}$ $V_{REF} = 1.4V$, (Note 4) $V_{RL} = 5V$, $R_L = 5.1k\Omega$	—	300	—	ns
Small-Signal Response Time	t_r	$V_{IN} = 100mV \text{ Step}$, (Note 4) 5mV Overdrive $V_{RL} = 5V$, $R_L = 5.1k\Omega$	—	1.3	—	μs
Input Voltage Range	CMVR	(Note 2)	0	—	$V+ - 1.5V$	V
Common-Mode Rejection Ratio	CMRR	(Notes 3, 5)	80	100	—	dB
Power Supply Rejection Ratio	PSRR	$V+ = +5V$ to $18V$, (Note 5)	80	100	—	dB
Saturation Voltage	V_{OL}	$V_{IN(-)} \geq 1V$, $V_{IN(+)} = 0$, $I_{SINK} \leq 4mA$	—	250	400	mV
Output Sink Current	I_{SINK}	$V_{IN(-)} \geq 1V$, $V_{IN(+)} = 0$, $V_O \leq 1.5V$	6	16	—	mA
Output Leakage Current	I_{LEAK}	$V_{IN(+)} \geq 1V$, $V_{IN(-)} = 0$, $V_O = 30V$	—	0.1	100	nA
Supply Current	$I+$	$R_L = \infty$, All Comps $V+ = 30V$	—	0.8	2.0	mA

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NOTES:

- At output switch point, $V_O = 1.4V$, $R_S = 0\Omega$ with $V+$ from $5V$; and over the full input common-mode range ($0V$ to $V+ - 1.5V$).
- The input common-mode voltage or either input signal voltage should not be allowed to go negative by more than $0.3V$. The upper end of the common-mode voltage range is $V+ - 1.5V$, but either or both inputs can go to $+30V$ without damage.
- $R_L \geq 15k\Omega$, $V+ = 15V$, $V_{CM} = 1.5V$ to $13.5V$.
- Sample tested.
- Guaranteed by design.

CMP04

ELECTRICAL CHARACTERISTICS at $V+ = +5V$, $-55^\circ C \leq T_A \leq +125^\circ C$ for CMP-04BY, $-40^\circ C \leq T_A \leq +85^\circ C$ for CMP-04FY/FP/FS, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	CMP-04B/F (Note 3)			UNITS
			MIN	TYP	MAX	
Input Offset Voltage	V_{OS}	$R_S = 0\Omega$, $R_L = 5.1k\Omega$ $V_O = 1.4V$, (Note 1)	—	1	2	mV
Input Offset Current	I_{OS}	$I_{IN(+)} - I_{IN(-)}$ $R_L = 5.1k\Omega$ $V_O = 1.4V$	—	4	20	nA
Input Bias Current	I_B	$I_{IN(+)} + I_{IN(-)}$	—	40	200	nA
Voltage Gain	A_V	$R_L \geq 15k\Omega$, $V+ = 15V$, (Note 5)	70	125	—	V/mV
Large-Signal Response Time	t_r	$V_{IN} = TTL$ Logic Swing $V_{REF} = 1.4V$, (Note 4) $V_{RL} = 5V$, $R_L = 5.1k\Omega$	—	300	—	ns
Small-Signal Response Time	t_r	$V_{IN} = 100mV$ Step, (Note 4) 5mV Overdrive $V_{RL} = 5V$, $R_L = 5.1k\Omega$	—	1.3	—	μs
Input Voltage Range	CMVR	(Note 2)	0	—	$V+ - 1.5$	V
Common-Mode Rejection Ratio	CMRR	(Notes 3, 5)	60	100	—	dB
Power Supply Rejection Ratio	PSRR	$V+ = +5V$ to $18V$	80	100	—	dB
Saturation Voltage	V_{OL}	$V_{IN(-)} \geq 1V$, $V_{IN(+)} = 0$, $I_{SINK} \leq 4mA$	—	250	700	mV
Output Sink Current	I_{SINK}	$V_{IN(-)} \geq 1V$, $V_{IN(+)} = 0$, $V_O \leq 1.5V$	5	16	—	mA
Output Leakage Current	I_{LEAK}	$V_{IN(+)} \geq 1V$, $V_{IN(-)} = 0$, $V_O = 30V$	—	0.1	200	nA
Supply Current	I_+	$R_L = \infty$, All Comps $V+ = 30V$	—	1.2	3.0	mA

NOTES:

- At output switch point, $V_O = 1.4V$, $R_S = 0\Omega$ with $V+$ from $5V$; and over the full input common-mode range ($0V$ to $V+ - 1.5V$).
- The input common-mode voltage or either input signal voltage should not be allowed to go negative by more than $0.3V$. The upper end of the common-mode voltage range is $V+ - 1.5V$, but either or both inputs can go to $+30V$ without damage.
- $R_L \geq 15k\Omega$, $V+ = 15V$, $V_{CM} = 1.5V$ to $13.5V$.
- Sample tested.
- Guaranteed by design.

BURN-IN CIRCUIT

