µA760

HIGH-SPEED DIFFERENTIAL COMPARATOR

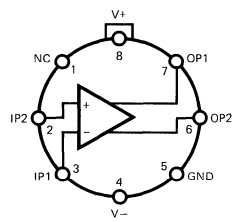
FAIRCHILD LINEAR INTEGRATED CIRCUITS

GENERAL DESCRIPTION – The µA760 is a Differential Voltage Comparator offering considerable speed improvement over the µA710 family and operation from symmetric supplies of from ±4.5 V to ±6.5 V. The µA760 can be used in high speed analog to digital conversion systems and as a zero crossing detector in disc file and tape amplifiers. The µA760 output features balanced rise and fall times for minimum skew and close matching between the complementary outputs. The outputs are TTL compatible with a minimum sink capability of two gate loads.

- **GUARANTEED HIGH SPEED – 25 ns MAX**
- **GUARANTEED DELAY MATCHING ON BOTH OUTPUTS**
- **COMPLEMENTARY TTL COMPATIBLE OUTPUTS**
- **HIGH SENSITIVITY**
- **USES STANDARD SUPPLY VOLTAGES**

CONNECTION DIAGRAMS

8-PIN METAL CAN
(TOP VIEW)
PACKAGE OUTLINE 5S
PACKAGE CODE H

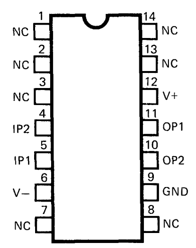


NOTE: Pin 4 connected to case.

ORDER INFORMATION

TYPE	PART NO.
µA760	µA760HM
µA760C	µA760HC

14-PIN DIP
(TOP VIEW)
PACKAGE OUTLINE 6A
PACKAGE CODE D



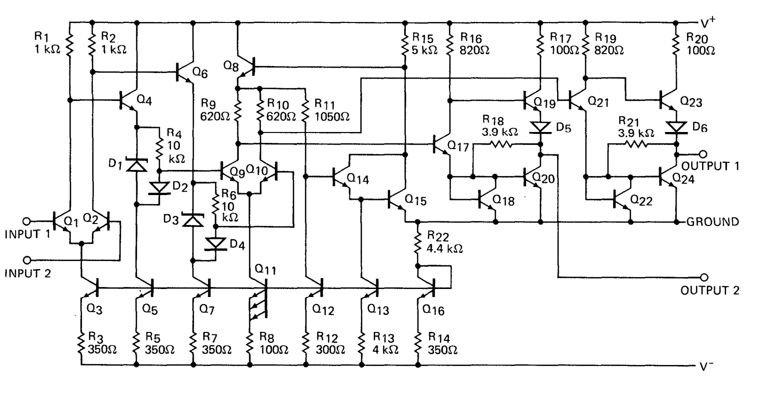
ORDER INFORMATION

TYPE	PART NO.
µA760	µA760DM
µA760C	µA760DC

ABSOLUTE MAXIMUM RATINGS

Positive Supply Voltage	+8 V
Negative Supply Voltage	-8 V
Peak Output Current	10 mA
Differential Input Voltage	±5 V
Input Voltage	$V+ \geq V_{IN} \geq V-$
Internal Power Dissipation (Note 1)	
Metal Can	500 mW
DIP	670 mW
Operating Temperature Range	
Military (µA760)	-55°C to 125°C
Commercial (µA760C)	0°C to 70°C
Storage Temperature Range	
Metal Can and DIP	-65°C to 150°C

EQUIVALENT CIRCUIT



Notes on following page.

μA760

ELECTRICAL CHARACTERISTICS: V_S = ±4.5 V to ±6.5 V, T_A = -55°C to +125°C, T_A = 25°C for typical figures unless otherwise specified.

CHARACTERISTICS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S \leq 200\Omega$		1.0	6.0	mV
Input Offset Current			0.5	7.5	μA
Input Bias Current			8.0	60	μA
Output Resistance (either output)	$V_{OUT} = V_{OH}$		100		Ω
Response Time	Note 2, T_A = 25°C		18	30	ns
	Note 3, T_A = 25°C			25	ns
	Note 4		16		ns
Response Time Difference between Outputs					
(t_{pd} of $+V_{IN1}$) − (t_{pd} of $-V_{IN2}$)	Note 2, T_A = 25°C			5.0	ns
(t_{pd} of $+V_{IN2}$) − (t_{pd} of $-V_{IN1}$)	Note 2, T_A = 25°C			5.0	ns
(t_{pd} of $+V_{IN1}$) − (t_{pd} of $+V_{IN2}$)	Note 2, T_A = 25°C			7.5	ns
(t_{pd} of $-V_{IN1}$) − (t_{pd} of $-V_{IN2}$)	Note 2, T_A = 25°C			7.5	ns
Input Resistance	f = 1 MHz		12		kΩ
Input Capacitance	f = 1 MHz		8.0		pF
Average Temperature Coefficient of Input Offset Voltage	R_S = 50Ω, T_A = −55°C to T_A = +125°C		3.0		μV/°C
Average Temperature Coefficient of Input Offset Current	T_A = 25°C to T_A = +125°C		2.0		nA/°C
	T_A = 25°C to T_A = −55°C		7.0		nA/°C
Input Voltage Range	V_S = ±6.5V	±4.0	±4.5		V
Differential Input Voltage Range			±5.0		V
Output HIGH Voltage (either output)	$0 \leq I_{OUT} \leq 5.0$ mA				
	V_S = ±5.0V	2.4	3.2		V
	I_{OUT} = 80 μA, V_S = ±4.5V	2.4	3.0		V
Output LOW Voltage (either output)	I_{SINK} = 3.2 mA		0.25	0.4	V
Positive Supply Current	V_S = ±6.5V		18	32	mA
Negative Supply Current	V_S = ±6.5V		9.0	16	mA

6

μA760C

ELECTRICAL CHARACTERISTICS: V_S = ±4.5 V to ±6.5 V, T_A = -55°C to +125°C, T_A = 25°C for typical figures unless otherwise specified.

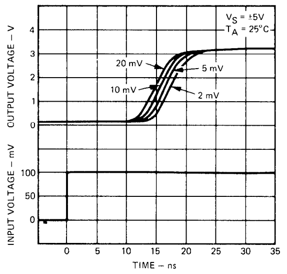
CHARACTERISTICS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S \leq 200\Omega$		1.0	6.0	mV
Input Offset Current			0.5	7.5	μA
Input Bias Current			8.0	60	μA
Output Resistance (either output)	$V_{OUT} = V_{OH}$		100		Ω
Response Time	Note 2, T_A = 25°C		18	30	ns
	Note 3, T_A = 25°C			25	ns
	Note 4		16		ns
Response Time Difference between Outputs					
(t_{pd} of $+V_{IN1}$) − (t_{pd} of $-V_{IN2}$)	Note 2, T_A = 25°C			5.0	ns
(t_{pd} of $+V_{IN2}$) − (t_{pd} of $-V_{IN1}$)	Note 2, T_A = 25°C			5.0	ns
(t_{pd} of $+V_{IN1}$) − (t_{pd} of $+V_{IN2}$)	Note 2, T_A = 25°C			10	ns
(t_{pd} of $-V_{IN1}$) − (t_{pd} of $-V_{IN2}$)	Note 2, T_A = 25°C			10	ns
Input Resistance	f = 1 MHz		12		kΩ
Input Capacitance	f = 1 MHz		8.0		pF
Average Temperature Coefficient of Input Offset Voltage	R_S = 50Ω, T_A = 0°C to T_A = +70°C		3.0		μV/°C
Average Temperature Coefficient of Input Offset Current	T_A = 25°C to T_A = +70°C		5.0		nA/°C
	T_A = 25°C to T_A = 0°C		10		nA/°C
Input Voltage Range	V_S = ±6.5V	±4.0	±4.5		V
Differential Input Voltage Range			±5.0		
Output HIGH Voltage (either output)	$0 \leq I_{OUT} \leq 5.0$ mA				
	V_S = ±5.0V	2.4	3.2		V
	I_{OUT} = 80 μA, V_S = ±4.5V	2.5	3.0		V
Output LOW Voltage (either output)	I_{SINK} = 3.2 mA		0.25	0.4	V
Positive Supply Current	V_S = ±6.5V		18	34	mA
Negative Supply Current	V_S = ±6.5V		9.0	16	mA

NOTES

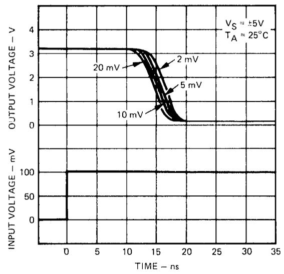
1. Rating applies to ambient temperatures up to 70°C. Above 70°C ambient derate linearly at 6.3 mW/°C for metal can and 8.3 mW/°C for the DIP.
2. Response time measured from the 50% point of a 30 mVp-p 10 MHz sinusoidal input to the 50% point of the output.
3. Response time measured from the 50% point of a 2 Vp-p 10 MHz sinusoidal input to the 50% point of the output.
4. Response time measured from the start of a 100 mV input step with 5 mV overdrive to the time when the output crosses the logic threshold.

TYPICAL PERFORMANCE CURVES FOR μA760 AND μA760C

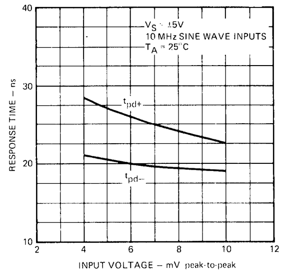
RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



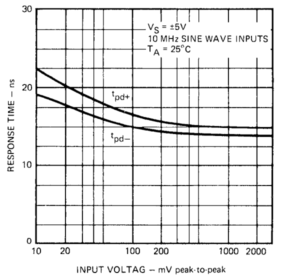
RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



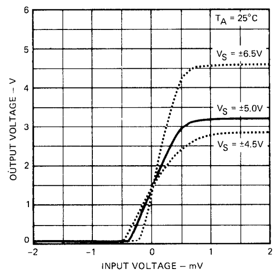
RESPONSE TIME AS A FUNCTION OF INPUT VOLTAGE



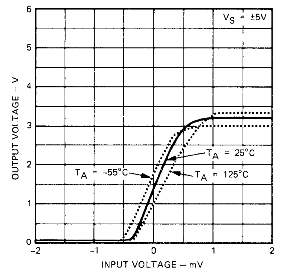
RESPONSE TIME AS A FUNCTION OF INPUT VOLTAGE



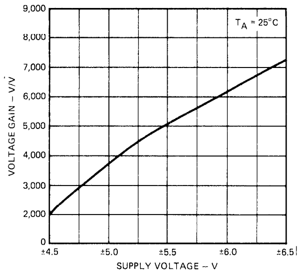
VOLTAGE TRANSFER CHARACTERISTIC



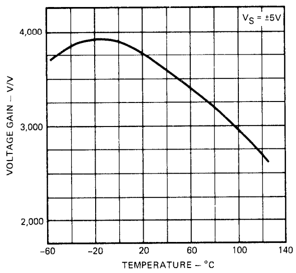
VOLTAGE TRANSFER CHARACTERISTIC



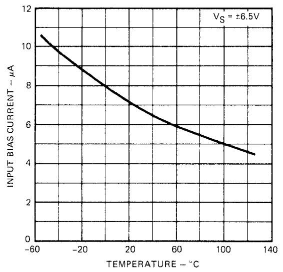
VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



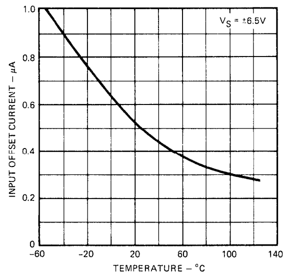
VOLTAGE GAIN AS A FUNCTION OF AMBIENT TEMPERATURE



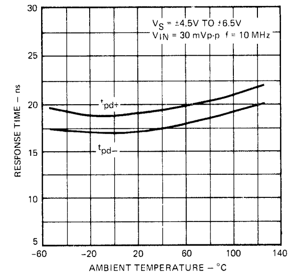
INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



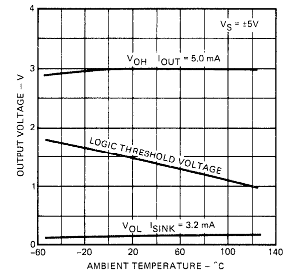
INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



RESPONSE TIME AS A FUNCTION OF AMBIENT TEMPERATURE

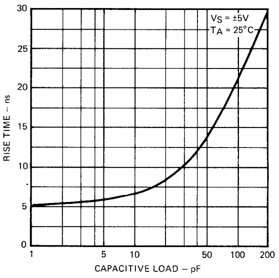


OUTPUT VOLTAGE LEVELS AS A FUNCTION OF AMBIENT TEMPERATURE

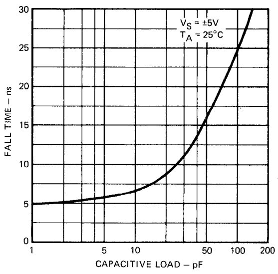


TYPICAL PERFORMANCE CURVES FOR μA760 AND μA760C (Cont'd)

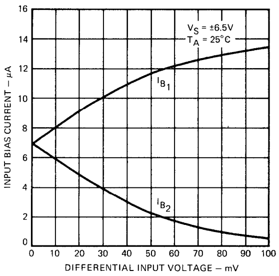
RISE TIME AS A FUNCTION OF CAPACITIVE LOAD



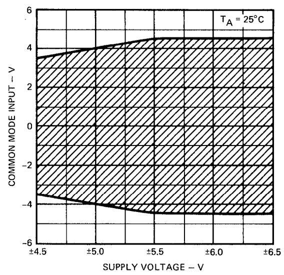
FALL TIME AS A FUNCTION OF CAPACITIVE LOAD



INPUT BIAS CURRENT AS A FUNCTION OF DIFFERENTIAL INPUT VOLTAGE



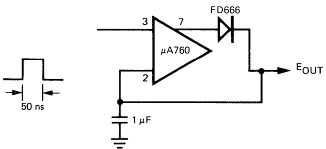
COMMON MODE RANGE AS A FUNCTION OF SUPPLY VOLTAGE



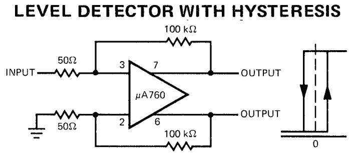
APPLICATIONS

Pin numbers shown are only for Metal Can

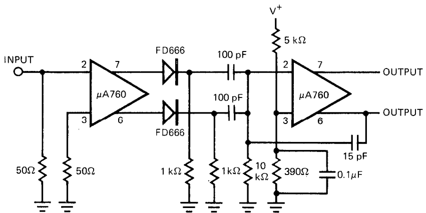
FAST POSITIVE PEAK DETECTOR



LEVEL DETECTOR WITH HYSTERESIS

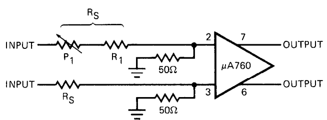


ZERO CROSSING DETECTOR



Total Delay = 30 ns
Input frequency = 300 Hz to 3 MHz
Minimum input voltage = 20 mVpk-pk

LINE RECEIVER WITH HIGH COMMON MODE RANGE



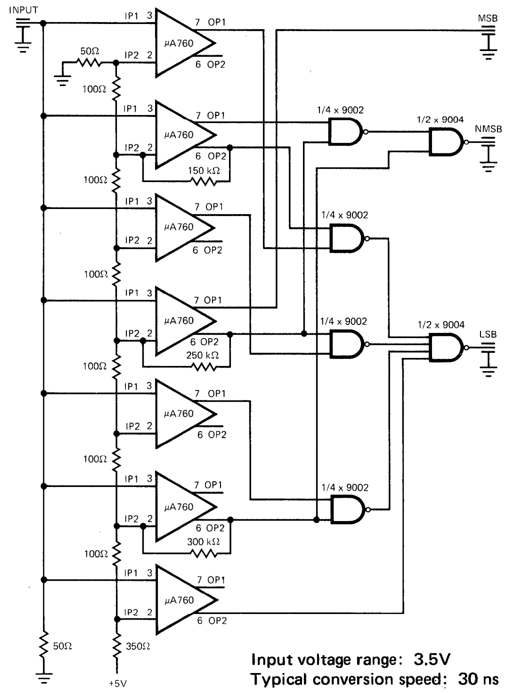
$$\text{Common mode range} = \pm 4 \times \frac{RS}{50}\ \text{V}$$

$$\text{Differential Input sensitivity} = 5 \times \frac{RS}{50}\ \text{mV}$$

P_1 must be adjusted for optimum common mode rejection.

For $R_S = 200\Omega$
Common mode range = ±16V
Sensitivity = 20 mV

HIGH SPEED 3-BIT A/D CONVERTER



Input voltage range: 3.5V
Typical conversion speed: 30 ns