FAIRCHILD

A Schlumberger Company

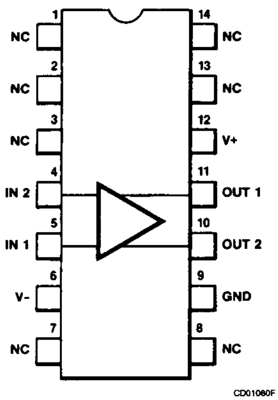
μA760 High Speed Differential Comparator

Description

The μA760 is a differential voltage comparator offering considerable speed improvement over the μA710 family and operates from symmetric supplies of ±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**
- **Standard Supply Voltages**

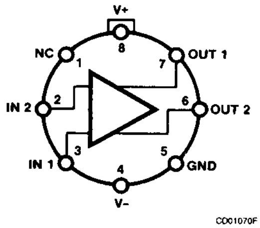
Connection Diagram 14-Lead DIP (Top View)



Order Information

Device Code	Package Code	Package Description
μA760DM	6A	Ceramic DIP
μA760DC	6A	Ceramic DIP

Connection Diagram 8-Lead Metal Package (Top View)

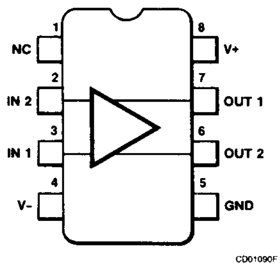


Lead 4 connected to case

Order Information

Device Code	Package Code	Package Description
μA760HM	5W	Metal
μA760HC	5W	Metal

Connection Diagram 8-Lead DIP (Top View)



Order Information

Device Code	Package Code	Package Description
μA760RM	6T	Ceramic DIP
μA760RC	6T	Ceramic DIP

Absolute Maximum Ratings

Storage Temperature Range	
Metal Can and Ceramic DIP	−65°C to +175°C
Molded DIP	−65°C to +150°C
Operating Temperature Range	
Extended (μA760M)	−55°C to +125°C
Commercial (μA760C)	0°C to 70°C
Lead Temperature	
Metal Can and Ceramic DIP (soldering, 60 s)	300°C
Molded DIP (soldering, 10 s)	265°C

Internal Power Dissipation[1, 2]	
8L-Metal Can	1.00 W
14L-Ceramic DIP	1.36 W
8L-Ceramic DIP	1.30 W
Positive Supply Voltage	+8.0 V
Negative Supply Voltage	−8.0 V
Peak Output Current	10 mA
Differential Input Voltage	±5.0 V
Input Voltage	$V+ \geqslant V_I \geqslant V-$

Notes
1. $T_{J\ Max}$ = 175°C.
2. Ratings apply to ambient temperature at 25°C. Above this temperature, derate the 8L-Metal Can at 6.7 mW/°C, the 14L-Ceramic DIP at 9.1 mW/°C, and the 8L-Ceramic DIP at 8.7 mW/°C.

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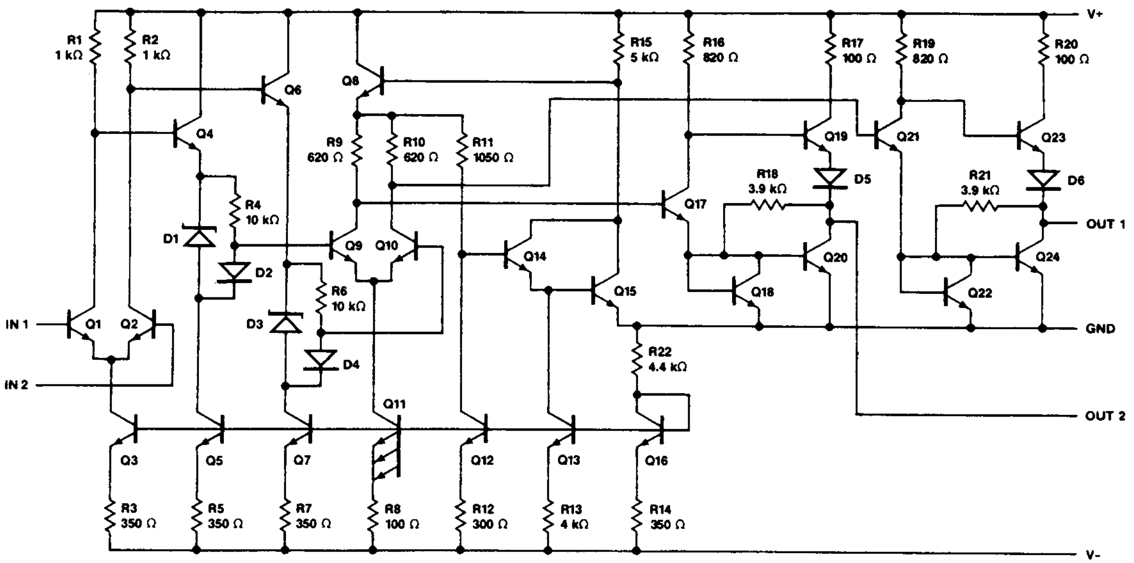
Equivalent Circuit



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μA760

Electrical Characteristics $V_{CC} = \pm 4.5$ V to ± 6.5 V, $T_A = -55°C$ to $+125°C$, $T_A = 25°C$ for typical figures, unless otherwise specified.

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
V_{IO}	Input Offset Voltage	$R_S \leq 200\ \Omega$		1.0	6.0	mV
I_{IO}	Input Offset Current			0.5	7.5	μA
I_{IB}	Input Bias Current			8.0	60	μA
R_O	Output Resistance (either output)	$V_O = V_{OH}$		100		Ω
t_{PD}	Response Time	$T_A = 25°C$[1]		18	30	ns
		$T_A = 25°C$[2]			25	
		(Note 3)		16		
Δt_{PD}	Response Time Difference between Outputs[1] (t_{PD} of $+V_{I1}$) − (t_{PD} of $-V_{I2}$)	$T_A = 25°C$			5.0	ns
	(t_{PD} of $+V_{I2}$) − (t_{PD} of $-V_{I1}$)	$T_A = 25°C$			5.0	
	(t_{PD} of $+V_{I1}$) − (t_{PD} of $+V_{I2}$)	$T_A = 25°C$			7.5	
	(t_{PD} of $-V_{I1}$) − (t_{PD} of $-V_{I2}$)	$T_A = 25°C$			7.5	
R_I	Input Resistance	f = 1.0 MHz		12		kΩ
C_I	Input Capacitance	f = 1.0 MHz		8.0		pF
$\Delta V_{IO}/\Delta T$	Average Temperature Coefficient of Input Offset Voltage	$R_S = 50\ \Omega$, $T_A = -55°C$ to $+125°C$		3.0		μV/°C
$\Delta I_{IO}/\Delta T$	Average Temperature Coefficient of Input Offset Current	$T_A = 25°C$ to $125°C$		2.0		nA/°C
		$T_A = +25°C$ to $-55°C$		7.0		
V_{IR}	Input Voltage Range	$V_{CC} = \pm 6.5$ V	±4.0	±4.5		V
V_{IDR}	Differential Input Voltage Range			±5.0		V
V_{OH}	Output Voltage HIGH (either output)	0 mA $\leq I_{OH} \leq$ 5.0 mA $V_{CC} = +5.0$ V	2.4	3.2		V
		$I_{OH} = 80$ μA, $V_{CC} = \pm 4.5$ V	2.4	3.0		
V_{OL}	Output Voltage LOW (either output)	$I_{OL} = 3.2$ mA		0.25	0.4	V
I+	Positive Supply Current	$V_{CC} = \pm 6.5$ V		18	32	mA
I−	Negative Supply Current	$V_{CC} = \pm 6.5$ V		9.0	16	mA

Notes

1. Response time measured from the 50% point of a 30 mVp-p 10 MHz sinusoidal input to the 50% point of the output.
2. Response time measured from the 50% point of a 2.0 V p-p 10 MHz sinusoidal input to the 50% point of the output.
3. Response time measured from the start of a 100 mV input step with 5.0 mV overdrive to the time when the output crosses the logic threshold.

μA760C

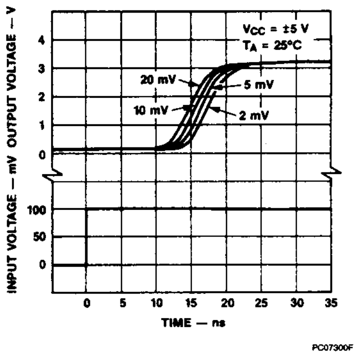
Electrical Characteristics $V_{CC} = \pm 4.5$ V to ± 6.5 V, $T_A = 0°C$ to 70°C, $T_A = 25°C$ for typical figures, unless otherwise specified.

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
V_{IO}	Input Offset Voltage	$R_S \leq 200\ \Omega$		1.0	6.0	mV
I_{IO}	Input Offset Current			0.5	7.5	μA
I_{IB}	Input Bias Current			8.0	60	μA
R_O	Output Resistance (either output)	$V_O = V_{OH}$		100		Ω
t_{PD}	Response Time	$T_A = 25°C$[1]		18	30	ns
		$T_A = 25°C$[2]			25	
		(Note 3)		16		
Δt_{PD}	Response Time Difference between Outputs[1] (t_{PD} of $+V_{I1}$) − (t_{PD} of $-V_{I2}$)	$T_A = 25°C$			5.0	ns
	(t_{PD} of $+V_{I2}$) − (t_{PD} of $-V_{I1}$)	$T_A = 25°C$			5.0	
	(t_{PD} of $+V_{I1}$) − (t_{PD} of $+V_{I2}$)	$T_A = 25°C$			10	
	(t_{PD} of $-V_{I1}$) − (t_{PD} of $-V_{I2}$)	$T_A = 25°C$			10	
R_I	Input Resistance	f = 1.0 MHz		12		kΩ
C_I	Input Capacitance	f = 1.0 MHz		8.0		pF
$\Delta V_{IO}/\Delta T$	Average Temperature Coefficient of Input Offset Voltage	$R_S = 50\ \Omega$, $T_A = 0°C$ to 70°C		3.0		μV/°C
$\Delta I_{IO}/\Delta T$	Average Temperature Coefficient of Input Offset Current	$T_A = 25°C$ to 70°C		5.0		nA/°C
		$T_A = 25°C$ to 0°C		10		
V_{IR}	Input Voltage Range	$V_{CC} = \pm 6.5$ V	±4.0	±4.5		V
V_{IDR}	Differential Input Voltage Range			±5.0		V
V_{OH}	Output Voltage HIGH (either output)	0 mA $\leq I_{OH} \leq$ 5.0 mA $V_{CC} = +5.0$ V	2.4	3.2		V
		$I_{OH} = 80\ \mu$A, $V_{CC} = \pm 4.5$ V	2.5	3.0		
V_{OL}	Output Voltage LOW (either output)	$I_{OL} = 3.2$ mA		0.25	0.4	V
I+	Positive Supply Current	$V_{CC} = \pm 6.5$ V		18	34	mA
I−	Negative Supply Current	$V_{CC} = \pm 6.5$ V		9.0	16	mA

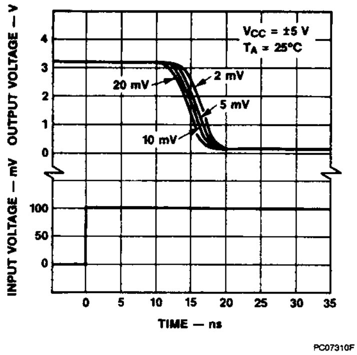
Notes
1. Response time measured from the 50% point of a 30 mVp-p 10 MHz sinusoidal input to the 50% point of the output.
2. Response time measured from the 50% point of a 2.0 V p-p 10 MHz sinusoidal input to the 50% point of the output.
3. Response time measured from the start of a 100 mV input step with 5.0 mV overdrive to the time when the output crosses the logic threshold.

Typical Performance Curves

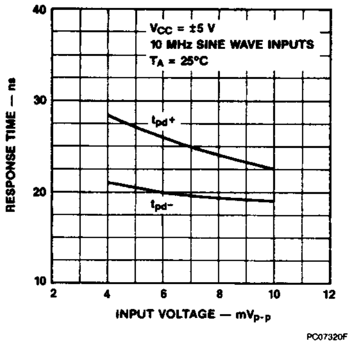
Response Time for Various Input Overdrives



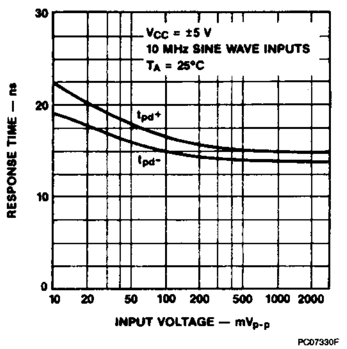
Response Time for Various Input Overdrives



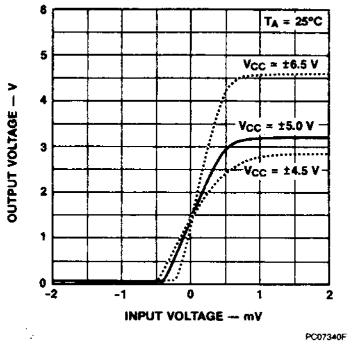
Response Time vs Input Voltage



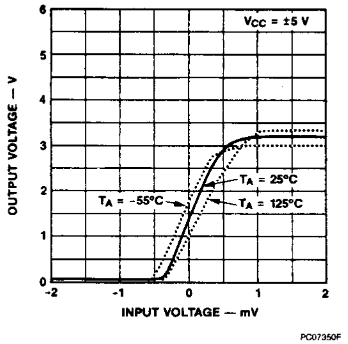
Response Time vs Input Voltage



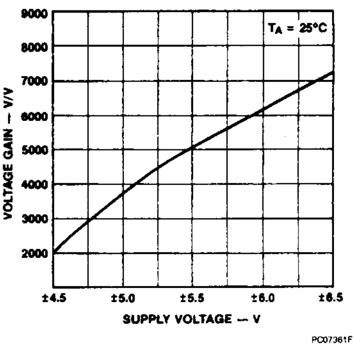
Voltage Transfer Characteristic



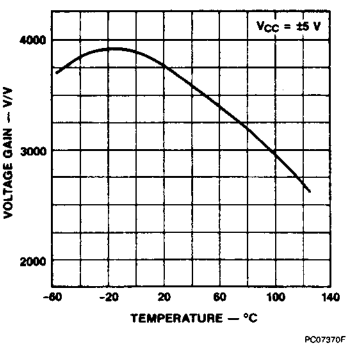
Voltage Transfer Characteristic



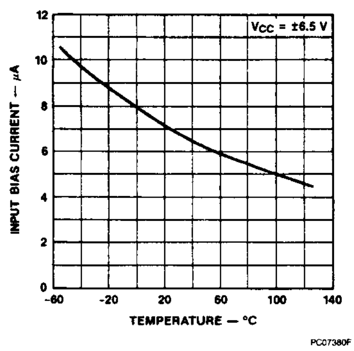
Voltage Gain vs Supply Voltage



Voltage Gain vs Temperature

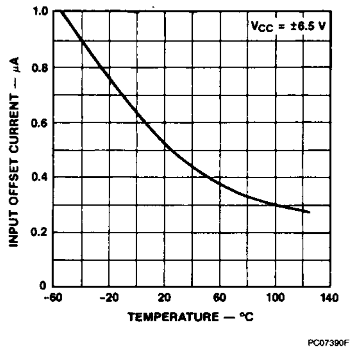


Input Bias Current vs Temperature

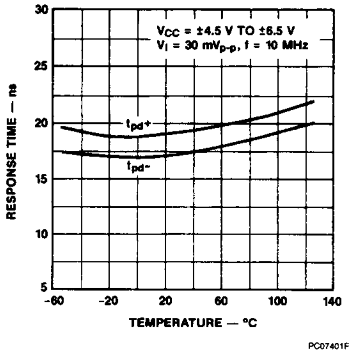


Typical Performance Curves (Cont.)

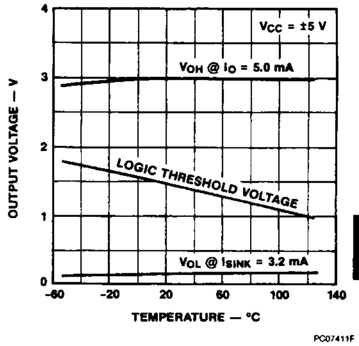
Input Offset Current vs Temperature



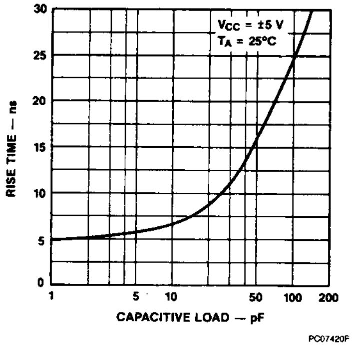
Response Time vs Temperature



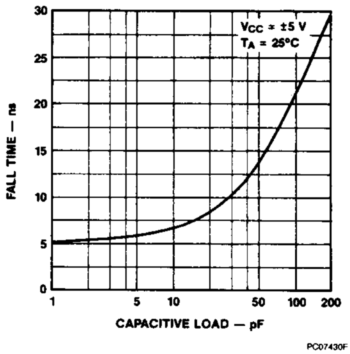
Output Voltage Levels vs Temperature



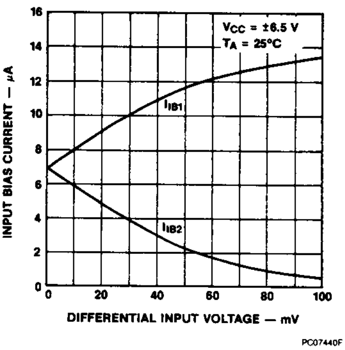
Rise Time vs Capacitive Load



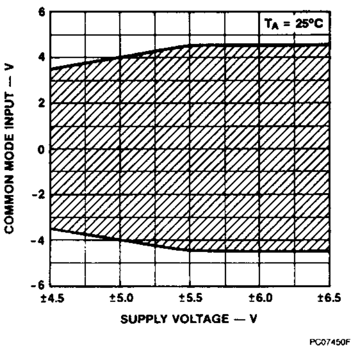
Fall Time vs Capacitive Load



Input Bias Current vs Differential Input Voltage



Common Mode Range vs Supply Voltage



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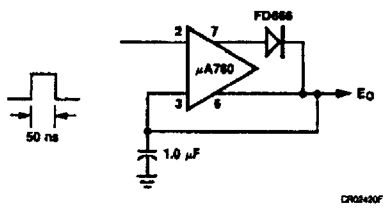
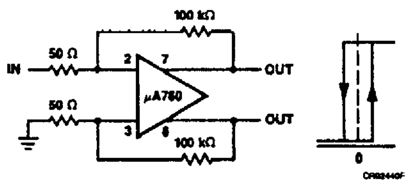
Typical Applications (Note 1)

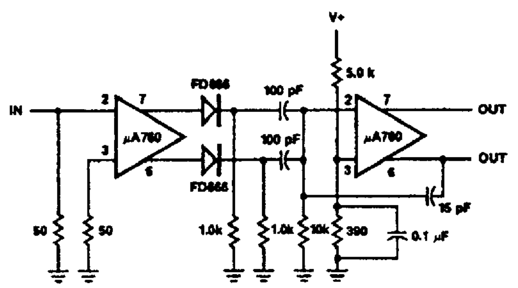
Fast Positive Peak Detector



Level Detector with Hysteresis



Zero Crossing Detector (Note 2)

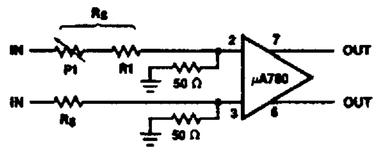


Total delay = 30 ns
Input frequency = 300 Hz to 3.0 MHz
Minimum input voltage = 20 mV_{p-p}

CR02450F

Notes
1. Lead numbers shown are for Metal Package only.
2. All resistor values in ohms.

Line Receiver With High Common Mode Range



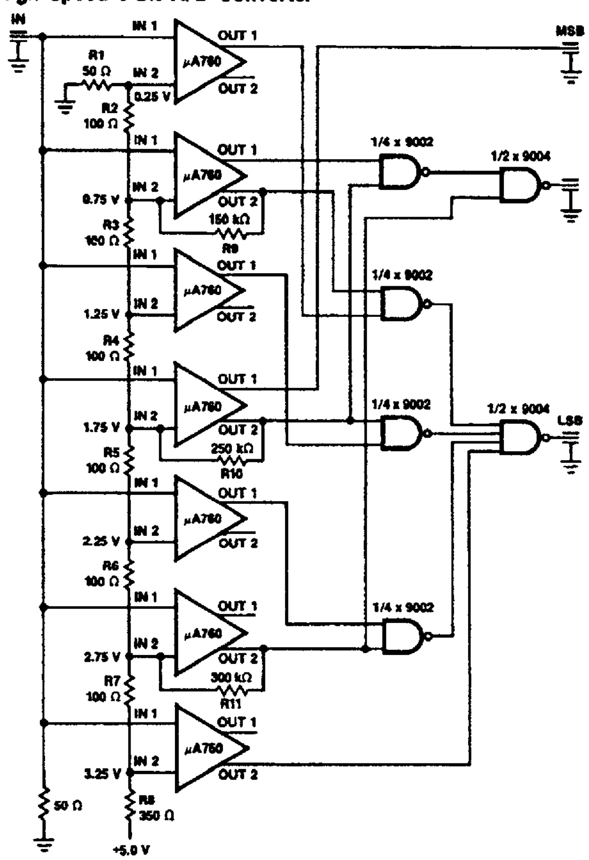
Common mode range = ±4 × $\frac{RS}{50}$ V

Differential input sensitivity = 5 × $\frac{RS}{50}$ mV

P_1 must be adjusted for optimum common mode rejection
For R_S = 200 Ω
Common mode range = ±16 V
Sensitivity = 20 mV

CR02430F

High Speed 3-Bit A/D Converter



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

CR02460F