Am106/206/306

Voltage Comparator/Buffer

Distinctive Characteristics

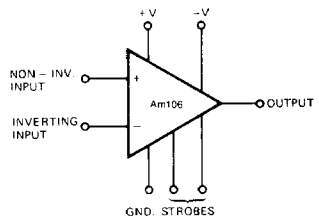
- Functionally, electrically, and pin-for-pin equivalent to the National LM 106/206/306
- Drives RTL, DTL or TTL directly
- Output can switch voltages up to 24 V @ 100 mA
- Fan-out of 10 with DTL or TTL
- 100% reliability assurance testing in compliance with MIL STD 883.
- Electrically tested and optically inspected die for assemblers of hybrid products.
- Available in metal can and hermetic flat package.

2

FUNCTIONAL DESCRIPTION

The Am106/206/306 are high-speed voltage comparators/buffers designed to be used in applications where high accuracy and fast response times are required. The device is useful as a pulse-height discriminator, relay or lamp driver or a line receiver.

FUNCTIONAL DIAGRAM



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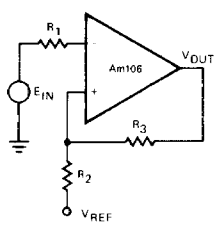
APPLICATION

Level Detector With Hysteresis



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Upper and Lower Trip Points:

$$V_{UT} = V_{REF} + \frac{R_2 [V_{O\,MAX} - V_{REF}]}{R_2 + R_3}$$

and

$$V_{LT} = V_{REF} + \frac{R_2 [V_{O\,MIN} - V_{REF}]}{R_2 + R_3}$$

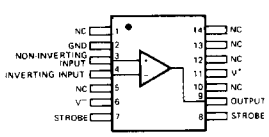
$$\text{Hysteresis} = V_H = V_{UT} - V_{LT} = \frac{R_2 [V_{O\,MAX} - V_{O\,MIN}]}{R_2 + R_3}$$

ORDERING INFORMATION

Part Number	Package Type	Temperature Range	Order Number
Am306	Metal Can	0°C to +70°C	LM306H
	Dice	0°C to +70°C	LD306
Am206	Metal Can	–25°C to +85°C	LM206H
Am106	Metal Can	–55°C to +125°C	LM106H
	Flat Pak	–55°C to +125°C	LM106F
	Dice	–55°C to +125°C	LD106

CONNECTION DIAGRAMS
Top Views

Flat Package



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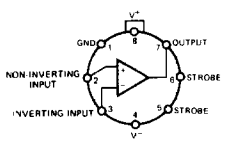
Note: Pin 6 connected to bottom of package.

Metal Can



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Note: Pin 4 connected to case.

MAXIMUM RATINGS

Positive Supply Voltage	15 V
Negative Supply Voltage	−15 V
Output Voltage	24 V
Output to Negative Supply Voltage	30 V
Differential Input Voltage	±5 V
Input Voltage	±7 V
Power Dissipation (Note 1)	600 mW
Output Short Circuit Duration	10 sec
Operating Temperature Range	
Am106	−55°C to +125°C
Am206	−25°C to +85°C
Am306	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (soldering, 60 sec)	300°C

ELECTRICAL CHARACTERISTICS ($T_A = 25°C$ unless otherwise specified) (Note 2)

Parameter (see definitions)	Conditions	Am306 Min	Am306 Typ	Am306 Max	Am106 Am206 Min	Am106 Am206 Typ	Am106 Am206 Max	Units
Input Offset Voltage	Note 3		1.6	5.0		0.5	2.0	mV
Input Offset Current	Note 3		1.8	5.0		0.7	3.0	μA
Input Bias Current			16	25		10	20	μA
Voltage Gain			40			40		V/mV
Response Time	Note 4		30	40		30	40	ns
Saturation Voltage	$V_{IN} \leq -5$ mV, $I_{sink} = 100$ mA		0.8	2.0		1.0	1.5	V
Output Leakage Current	$V_{IN} \geq 5$ mV, $8 V \leq V_{OUT} \leq 24 V$		0.02	2.0		0.02	1.0	μA
The Following Specifications Apply Over The Operating Temperature Ranges								
Input Offset Voltage	Note 3			6.5			3.0	mV
Average Temperature Coefficient of Input Offset Voltage	$T_{A(min)} \leq T_A \leq T_{A(max)}$		5.0	20		3.0	10	μV/°C
Input Offset Current	$T_A = T_{A(max)}$		0.6	5.0		0.25	3.0	μA
	Note 3, $T_A = T_{A(min)}$		2.4	7.5		1.8	7.0	μA
Average Temperature Coefficient of Input Offset Current	$25°C \leq T_A \leq T_{A(max)}$		15	50		5.0	25	nA/°C
	$T_{A(min)} \leq T_A \leq 25°C$		24	100		15	75	nA/°C
Input Bias Current				40			45	μA
Input Voltage Range	$-7 V \geq V^- \geq -12 V$	±5.0			±5.0			V
Differential Input Voltage Range		±5.0			±5.0			V
Saturation Voltage	$V_{IN} \leq -5$ mV, $I_{sink} = 50$ mA			1.0			1.0	V
Saturation Voltage	$V_{IN} \leq -5$ mV, $I_{sink} \leq 16$ mA			0.4			0.4	V
Positive Output Level	$V_{IN} \geq 5$ mV, $I_{OUT} = 400$ μA	2.5		5.5	2.5		5.5	V
Output Leakage Current	$V_{IN} \geq 5$ mV, $8 V \leq V_{OUT} \leq 24 V$			100			100	μA
Strobe Current	$V_{strobe} = 0.4$ V		1.7	3.3		1.7	3.3	mA
Strobe ON Voltage		0.9	1.4		0.9	1.4		V
Strobe OFF Voltage	$I_{sink} \leq 16$ mA		1.4	2.5		1.4	2.5	V
Positive Supply Current	$V_{IN} = -5$ mV		5.5	10		5.5	10	mA
Negative Supply Current			1.5	3.6		1.5	3.6	mA

Note 1: Derate metal can package at 6.8 mW/°C for operation at ambient temperatures above 60°C; derate flat package at 5.4 mW/°C for operation at ambient temperatures above 40°C.

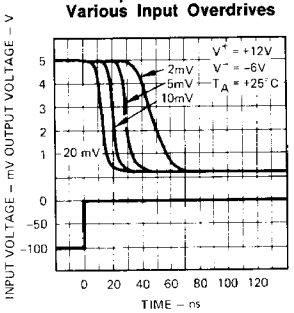
Note 2: These specifications apply for $-3 V \geq V^- \geq -12 V$, $V^+ = 12$ V and $T_A = 25°C$ unless otherwise specified.

Note 3: The offset voltages, offset currents, and bias currents given are the maximum values required to drive the output from the minimum output level up to the maximum output level. Thus, these parameters actually define an error band and take into account the worst-case effects of voltage gain and input impedance.

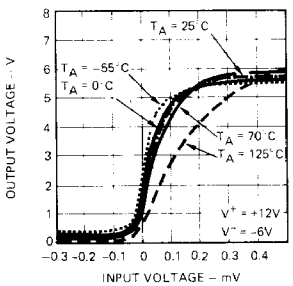
Note 4: The response time specified (see definitions) is for a 100 mV input step with 5 mV overdrive.

PERFORMANCE CURVES

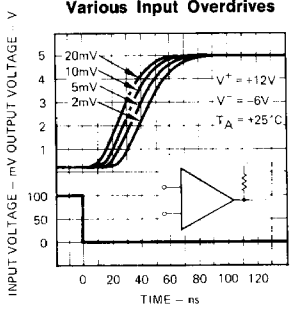
Response Time For Various Input Overdrives



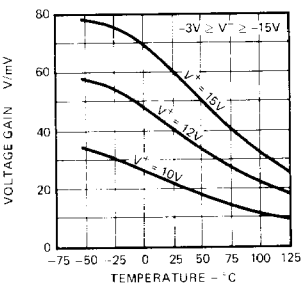
Transfer Function



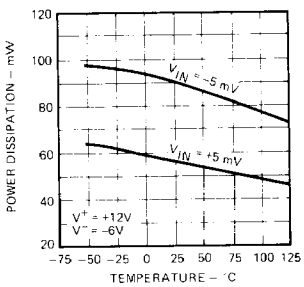
Response Time For Various Input Overdrives



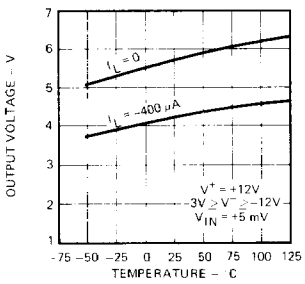
Voltage Gain



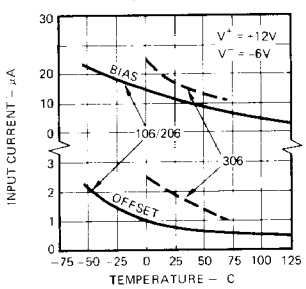
Power Consumption



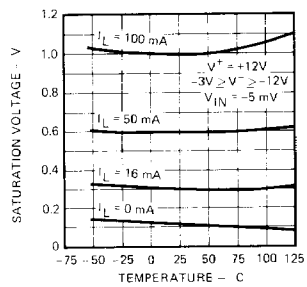
Positive Output Level



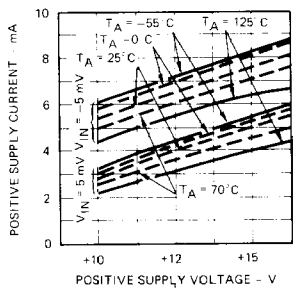
Input Current



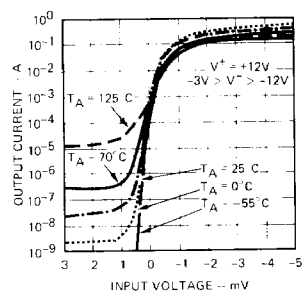
Saturation Voltage



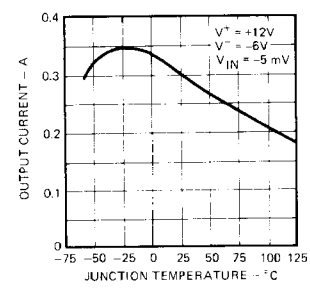
Positive Supply Current



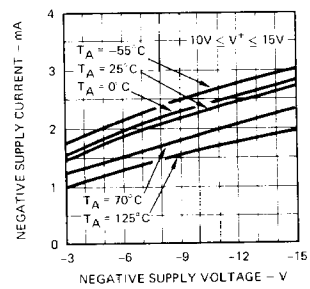
Transconductance



Short Circuit Output Current



Negative Supply Current



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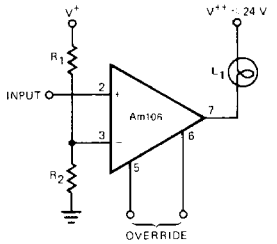
ADDITIONAL APPLICATIONS

Level Detector and Lamp Driver



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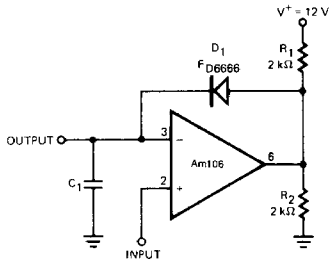
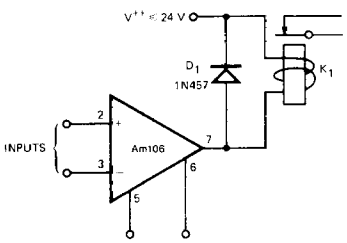
Fast Response Peak Detector



LIC-078

Relay Driver



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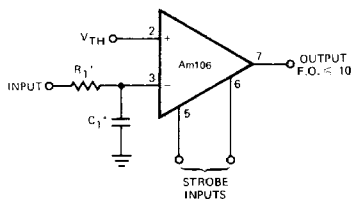
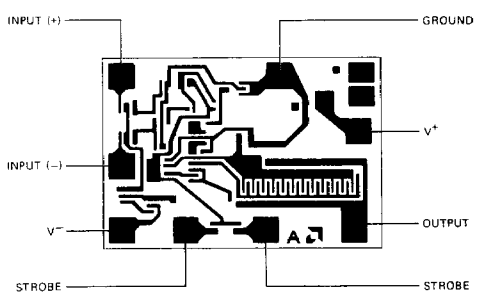
Adjustable Threshold Line Receiver



LIC-080

*Optional for response time control

Metallization and Pad Layout



33 x 46 Mils