Am2617

Quad RS-232C Line Receiver

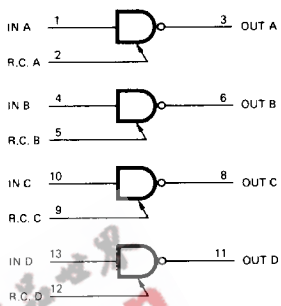
Distinctive Characteristics

- Full military temperature range
- Compatible with EIA specification RS-232C
- Input signal range ±30 volts
- Guaranteed input thresholds over full military temperature range
- 100% reliability assurance testing in compliance with MIL-STD-883
- Includes response control input and built-in hysterisis

FUNCTIONAL DESCRIPTION

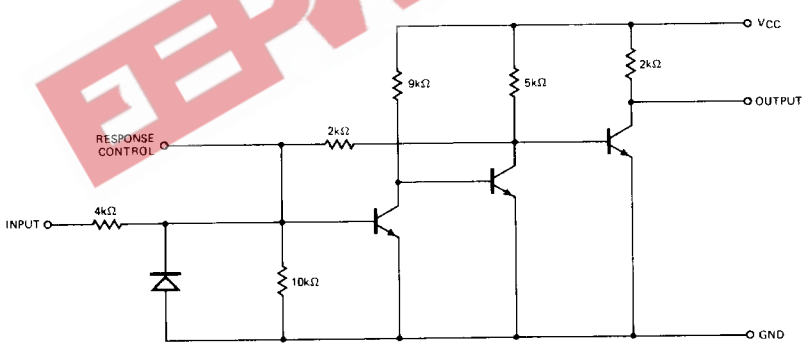
The Am2617 is a quad line receiver whose electrical characteristics conform to EIA specification RS-232C. Each receiver has a single data input that can accept signal swings of up to ±30V. The output of each receiver is TTL/DTL compatible, and includes a 2kΩ resistor pull-up to V_{CC}. An internal feedback resistor causes the input to exhibit hysterisis so that AC noise immunity is maintained at a high level even near the switching thresholds. For example, at 25°C when a receiver is in a LOW state on the output, the input may drop as LOW as 1.25 volts without affecting the output. The device is guaranteed to switch to the HIGH state when the input voltage is below 0.75V. Once the output has switched to the HIGH state, the input may rise to 1.75V without causing a change in the output. The Am2617 is guaranteed to switch to a LOW output when its input reaches 2.25V. Because of this hysterisis in switching thresholds, the device can receive signals with superimposed noise or with slow rise and fall times without generating oscillations on the output. The threshold levels may be offset by a constant voltage by applying a DC bias to the response control input. A capacitor added to the response control input will reduce the frequency response of the receiver for applications in the presence of high frequency noise spikes. The companion line driver is the Am2616.

LOGIC SYMBOL



LIC-417

CIRCUIT DIAGRAM
(One Receiver)

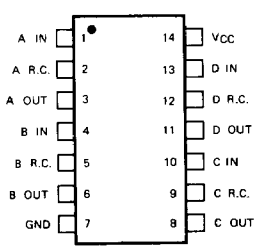


LIC-418

ORDERING INFORMATION

	Temperature Range	Order Number
Molded DIP	0°C to +75°C	AM2617PC
Hermetic DIP	0°C to +75°C	AM2617DC
Dice	0°C to +75°C	AM2617XC
Hermetic DIP	−55°C to +125°C	AM2617DM
Hermetic Flat Pack	−55°C to +125°C	AM2617FM
Dice	−55°C to +125°C	AM2617XM

CONNECTION DIAGRAM
Top View



Note: Pin 1 is marked for orientation.

LIC-419

MAXIMUM RATINGS (Above which the useful life may be impaired)

Storage Temperature	−65°C to +175°C
Temperature (Ambient) Under Bias	−55°C to +125°C
Supply Voltage to Ground Potential (Pin 14 to Pin 7) Continuous	−0.5 V to +10 V
DC Voltage Applied to Outputs for High Output State	−0.5 V to +V_{CC} max.
Input Signal Range	−30 V to +30 V
Output Current, Into Outputs	30 mA
DC Input Current	Defined by Input Voltage Limits

ELECTRICAL CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (Unless Otherwise Noted)

T_A = 0°C to +75°C, V_{CC} = 5.0 V ± 5%
T_A = −55°C to +125°C, V_{CC} = 5.0 V ± 10%
} Response control pin open.

Parameters	Description	Test Conditions	Min.	Typ. (Note 1)	Max.	Units
V_{OH}	Output HIGH Voltage	I_{OH} = −0.5 mA, V_{IN} = 0.4 V or open	2.4	4.0		Volts
V_{OL}	Output LOW Voltage	I_{OL} = 10 mA, V_{IN} = 3.0 V		0.2	0.45	Volts
I_{IL}	Input LOW Current	V_{IN} = −3.0 V	−0.43			mA
		V_{IN} = −25 V	−3.6		−8.3	
I_{IH}	Input HIGH Current	V_{IN} = +3.0 V	0.43			mA
		V_{IN} = +25 V	3.6		8.3	
I_{SC}	Output Short Circuit Current	V_{IN} = 0.0 V, V_{OUT} = 0.0 V	1.9	2.5	3.8	mA
I_{CC}	Power Supply Current	V_{CC} = MAX.		20	26	mA

Note 1. Typical Limits are at V_{CC} = 5.0 V, 25°C ambient and maximum loading.

Threshold Characteristics (Note 2)

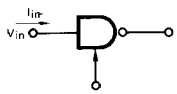
Parameters	Description	Test Conditions	T_A	Min.	Typ. (Note 1)	Max.	Units
V_{T+}	Positive-Going Threshold Voltage	V_{OL} = 0.45V, V_{CC} = 5.0V	−55°C	2.3		3.1	Volts
			0°C	1.9		2.5	
			25°C	1.75	2.0	2.25	
			75°C	1.45		1.90	
			125°C	1.20		1.65	
V_{T-}	Negative-Going Threshold Voltage	V_{OH} = 2.5V, V_{CC} = 5.0V	−55°C	0.85		1.65	Volts
			0°C	0.75		1.40	
			25°C	0.75	0.95	1.25	
			75°C	0.60		1.10	
			125°C	0.50		0.95	

Notes: 1. Typical Limits are at V_{CC} = 5.0V, 25°C ambient and maximum loading.
2. The input threshold margin for the device is greater than the voltage computed as the $V_{T+}-V_{T-}$ value. For the minimum value see the input threshold margin versus temperature graph.

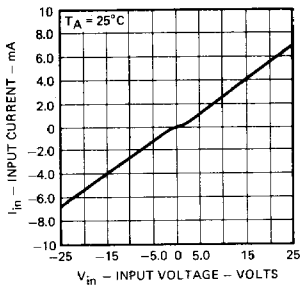
Switching Characteristics (T_A = 25°C, response control pin open, C_L = 15 pF)

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units
t_{PLH}	Delay from Input LOW to Output HIGH	R_L = 3.9 kΩ		25	85	ns
t_{PHL}	Delay from Input HIGH to Output LOW	R_L = 390 Ω		25	50	ns
t_r	Output Rise Time (10% to 90%)	R_L = 3.9 kΩ		120	175	ns
t_f	Output Fall Time (90% to 10%)	R_L = 390 Ω		10	20	ns

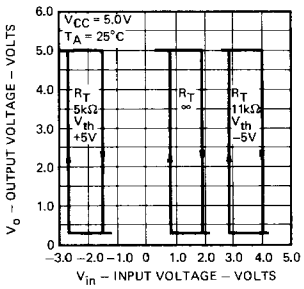
TYPICAL CHARACTERISTICS

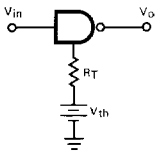


Input Current

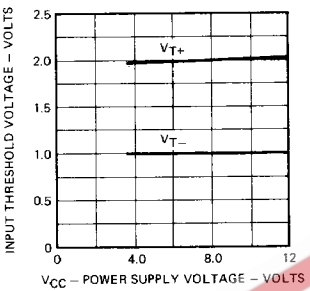


Input Threshold Voltage Adjustment

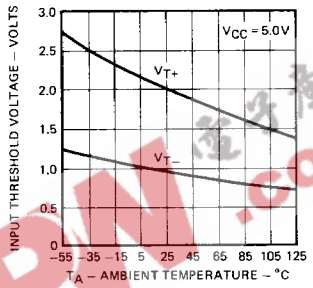




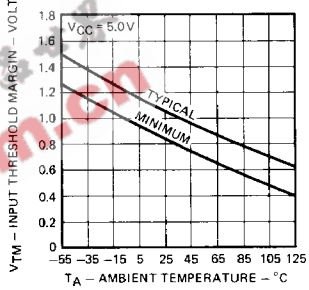
Input Threshold Versus Power-Supply Voltage



Input Threshold Voltage Versus Temperature



Input Threshold Margin Versus Temperature



LIC-420

DEFINITION OF TERMS

FUNCTIONAL TERMS

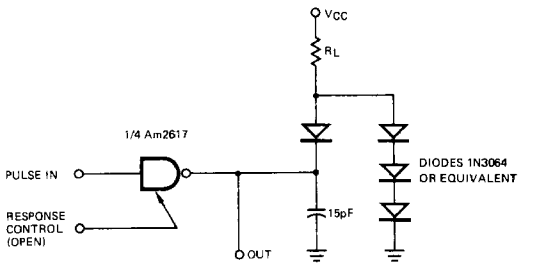
Response Control Pin A pin available on each receiver that allows the user to set the switching thresholds and frequency response of the receiver.

Threshold Voltage The voltage level on the input that will cause the output to change state. Because the device exhibits hysterisis, the LOW level input threshold is different from the HIGH level input threshold. Both thresholds can be moved by applying a bias to the response control pin.

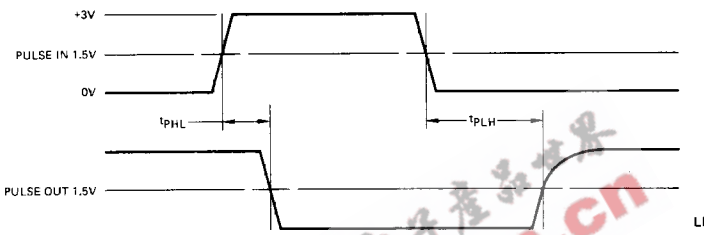
RS-232C A specification of the Electronic Industries Association that defines the electrical characteristics of data signals transmitted between two pieces of digital equipment.

Input Signal Range The permitted range of DC voltages that can be applied to the receiver input without damage to the device.

SWITCHING TIME TEST CIRCUIT & WAVEFORMS

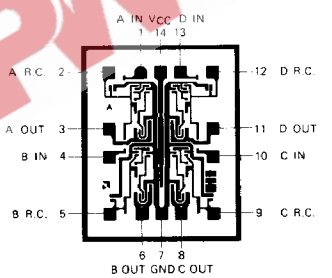


LIC-421



LIC-422

Metallization and Pad Layout



DIE SIZE 0.047" X 0.059"