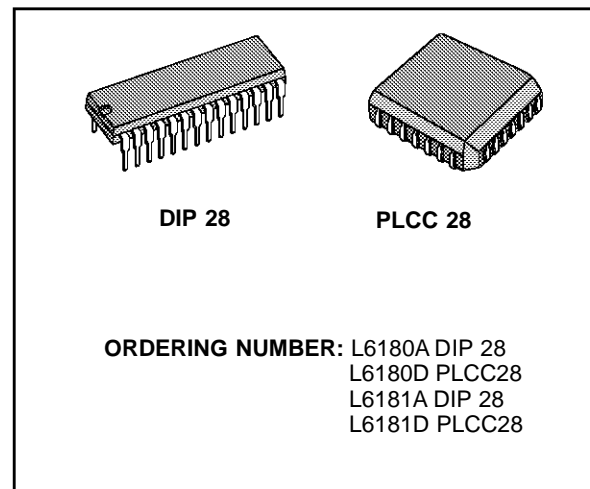


OCTAL LINE RECEIVER

ADVANCE DATA

- OCTAL LINE RECEIVER FOR:
 - EIA STD RS232D
 - RS423A
 - RS422A
 - CCIT V.10
 - V.11
 - V.28
 - X.26
- NO EXTERNAL COMPONENTS
- INPUT FAIL SAFING CAPABILITY
- HIGH CROSSTALK REJECTION
- L6180 DATA RATE < 100KBIT/S
- L6181 DATA RATE < 1MBIT/S
- 50V EOS OUTPUT PROTECTION

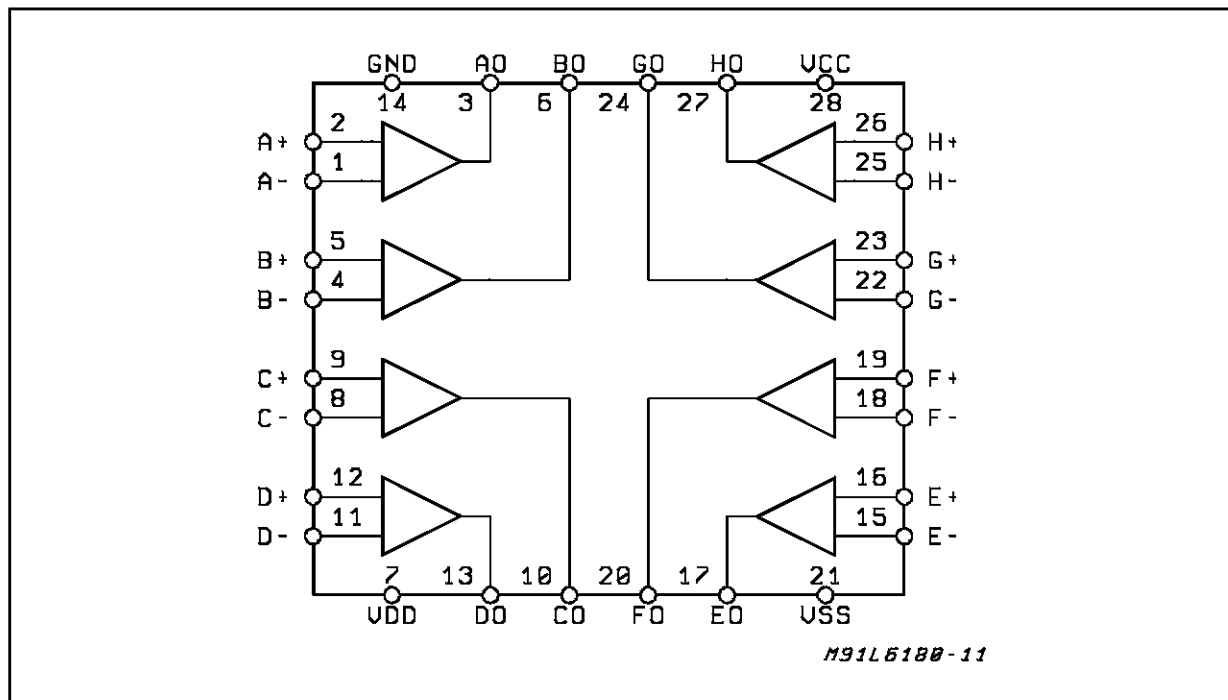


DESCRIPTION

L6180/1 is an octal line receiver in a plastic DIP or PLCC designed to meet a wide range of digital communications requirements as outlined in the EIA standards RS232A without additional components, as well as the low speed applications of RS422A.

The receiver meets the CCIT recommendations V.10, V.11, X.26 and V.28 low speed applications (below 100KBS).
A low pass filter on the input starts to roll off at a frequency of 100KHz.

BLOCK DIAGRAM

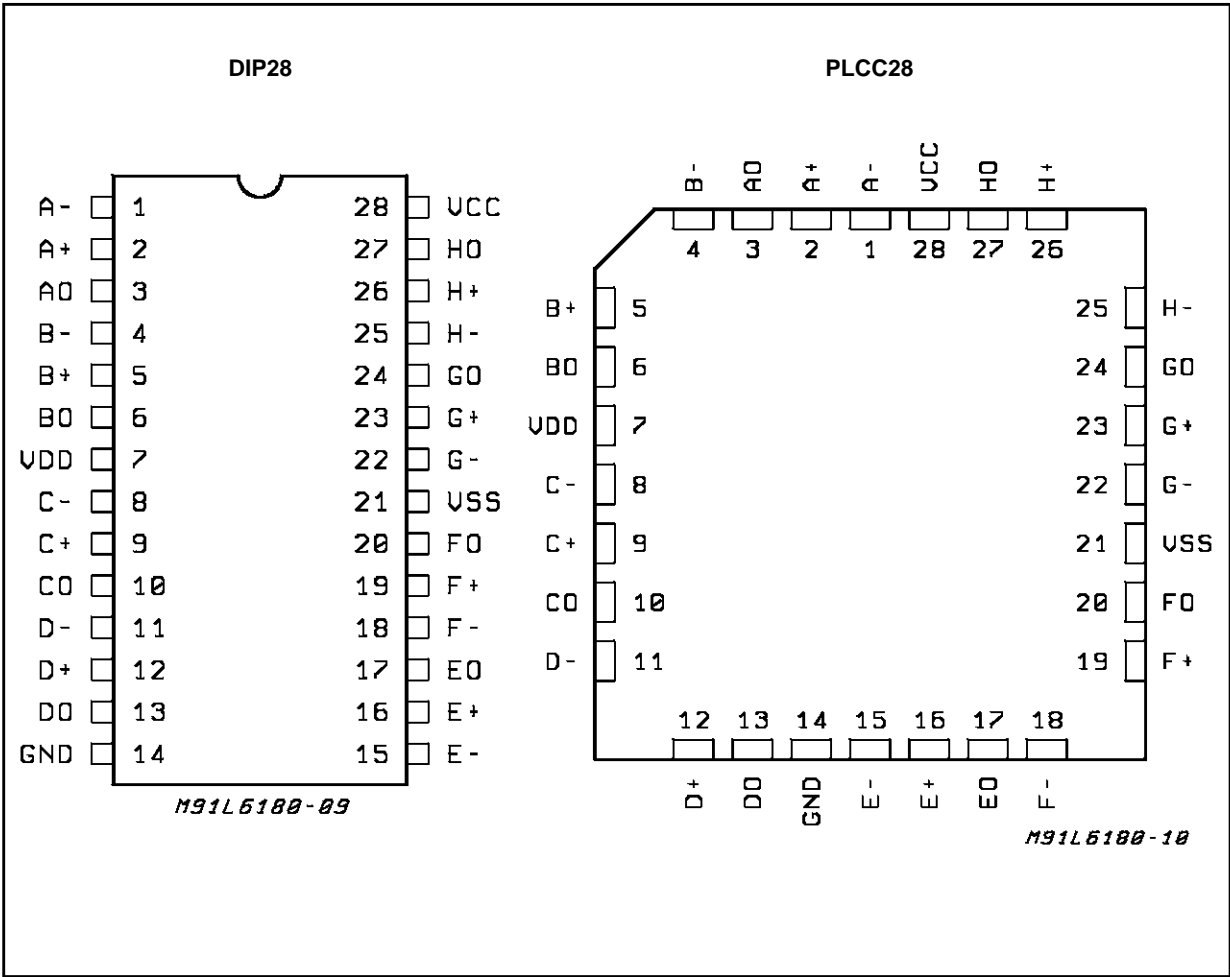


L6180 - L6181

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	7	V
V _{DD}	Supply Voltage	13.5	V
V _{SS}	Logic Supply Voltage	-13.5	V
C _{RR}	Common Mode Range	±15	V
V _{ID}	Differential Input Voltage	±25	V
P _{tot}	Power Dissipation (PLCC 28)	800	mW
	Power Dissipation (DIP 28)	1200	mW
I _{OS}	Output Sink Current	50	mA
t	Output Short Circuit Time	1	sec
T _{op}	Operating Free Air Temperature Range	0 to 70	°C
T _{stg}	Storage Temperature Range	-65 to 150	°C
	ESD	2KV max ESD 50µJ	
	Input Transient Protection	50V min EOS 100µs	

PIN CONNECTIONS (Top views)



ELECTRICAL CHARACTERISTICS ($V_{CC} = 5V \pm 5\%$; $V_{CM} = -7$ to $7V$; $T_{amb} = 0$ to $70^{\circ}C$;
 $V_{SS} = -9$ to $13.5V$; $V_{DD} = 9$ to $13.5V$; unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{IN}	Input Current	(See Fig.1 and note2) $V_{CC} = 0$ to $5.25V$; $V_{SS}, V_{DD} = 0$ to $13.5V$ $V_{IN} = -10$ to $10V$ $V_{IN} = -15$ to $15V$			± 3 ± 4.25	mA mA
R_I	Input Resistance	V_{IA} or $V_{IB} = 3$ to $15V$; (see fig.1) $R_I = \frac{[(V_{IA} \text{ or } V_{IN}) - V_{IOC}]}{I_{IN}}$	3		7	K Ω
V_{FS}	Failsafe Output Voltage	$I_O = -440\mu A$ (See Fig.3)	2.7			V
V_{OH}	High Level Output Voltage	$V_{CC} = 4.75V$; $V_{ID} = -1V$; $I_{OH} = -440\mu A$	2.7			V
V_{OL}	Low Level Output Voltage	$V_{CC} = 5.25V$; $V_{ID} = -1V$; $I_{OL} = 2mA$			0.4	V
V_{IT2}	V_{IOH} Comparator Threshold Voltage	(See Fig.4)	1.8	2.2	2.6	V
I_{IH2}	High Operating Threshold Voltage	$V_{OL} = 0.4V$; $I_{OL} = 2mA$; (See Fig.4)	-25		-75	mV
I_{IH1}	Low Operating Threshold Voltage	$V_{OH} = 2.7V$; $I_O = -440\mu A$ (See Fig.4)	-125		-175	mV
V_H	Input Hysteresis Voltage	$ V_{TH2} - V_{TH1} $	50		150	mV
V_{IOC1}	Open Circuit Input Voltage	Measured in accordance with V.28 and RS-232D (see note 4 and 7)		0.6	2	V
V_{IOCH}	Open Circuit Input Voltage	Measured in presence of AC Input Signal (see note 7)	3.5	4	4.5	V
I_{OS}	Open Short Circuit Current	$V_{CC} = 5.25V$; $V_O = 0$; $V_{ID} = 1V$; (see note 5)	20		100	mA
V_{IBV}	Input for Balance Test	(see Figure 7 and note 11)			0.4	V
C_i	Input Capacitance				100	pF
V_{CC}	Supply Current	$V_{CC} = 4.75V$ to $5.25V$; (see note 6)			100	mA
V_{dd}	Supply Current	$V_{dd} = 9$ to $3.5V$; (see note 6)			30	mA
V_{SS}	Supply Current	$V_{SS} = -9$ to $13.5V$; (see note 6)			30	mA
I_{OS}	Open Short Circuit Current	$V_{CC} = 5.25V$; $V_O = 0$; $V_{ID} = 1V$; (see note 5)	20		100	mA
T_{plh}	Propagation Delay Low to High	$R_L = 390\Omega$; $C_L = 50pF$; $ V_{IN} = 1V $; (see fig 5 test Circuit Fig. 6)	0		1500	ns
T_{phl}	Propagation Delay Low to High	$R_L = 390\Omega$; $C_L = 50pF$; $ V_{IN} = 1V $; (see fig 5 test Circuit Fig. 6)	0		1500	ns
V_{IOCH}	Delay V_{IOCL} to V_{IOCH} Switching	(see note 7A)			5	ms
V_{IOCL}	Delay V_{IOCH} to V_{IOCL} Switching	(see note 7B)	200			ms
V_{ist}	$ T_{plh} - T_{phl} $	$R_L = 390\Omega$; $C_L = 50pF$; $ V_{IN} = 1V$; (see fig. 5; Test Circuit Fig. 6)	0		500	ns
T_{SKEW1}	Skew between rec's in PKg Tp (1) hI/1h - Tp (2) hI/1h	$R_L = 390\Omega$; $C_L = 50pF$; $ V_{IN} = 1V$; (see fig. 5; Test Circuit Fig. 6)	0		300	ns
f_A	Frequency Accepted (Receiver will Output)	$V_{IN} = 200mV_{pp}$; (see fig. 8 and note 7;	100			KHz

ELECTRICAL CHARACTERISTICS ($V_{CC} = 5V \pm 5\%$; $V_{CM} = -7$ to $7V$; $T_{amb} = 0$ to $70^\circ C$; $V_{SS} = -9$ to $13.5V$; $V_{DD} = 9$ to $13.5V$; unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
f_R	Frequency Rejected (No Receiver Output)	$V_{IN} = 2V_{pp}$; (see fig. 8 and note 7)		5		MHz

Note:

- 1) The algebraic convention, where the less positive (more negative) is designed the minimum
- 2) With the voltage V_{IA} or (V_{IB}) ranging between $\pm 15V$, while V_{IB} or (V_{IA}) is open or grounded, the resultant input current I_{IA} or (I_{IB}) shall remain within the shaded region shown in the graph in Fig.1.
- 3) Either Point B' or Point A' is grounded in Figure 1
- 4) V_{ICC} measured from grounded to (+) input with (-) input grounded
 V_{ICC} measured from grounded to (+) input with (-) input grounded
- 5) Not more than one output should be shorted at a time and for less than 1 second
- 6) The sum of the product of the maximum supply currents and voltages cannot exceed the maximum power dissipation
- 7) A: The conditions for the input switching from V_{IOCL} to V_{IOCH} mode is: V_{Id} in start bit "spacing condition" for less than TpV_{IOCH} (5ms).
B: The conditions for the input switching from V_{IOCH} to V_{IOCL} mode is: $V_{Id} > W_{W2}$ for greater than TpV_{IOCL} (200ms)
- 8) An example of a frequency response plot meeting the rejection/acceptance requirements is provided in figure 8.

LINE TRANSIENT IMMUNITY (Considering the following cases; powered ON, Powered OFF-LOW impedance power supply and powered OFF-HIGH impedance supply)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
ESD	Static	tested per MIL-STD-883 (see note 9)	2			KV
EOS	Stress	transient pulse both polarities for $100\mu s$ (see note 9 and Fig. 2)	50			V

Note:

- 9) All pins are required to withstand this parameters.
- 10) Input pins are required to withstand fig.2 without any degradation to the circuit.
- 11) The balance test requirement can be met by use of a current limit circuit which reduces the input bias current I_{IB} (see figure 7)
for input voltages below a threshold voltage given by $(I_{IB} \times 1K) - 400mV$.

Figure 1: Input Current Voltage Measurements

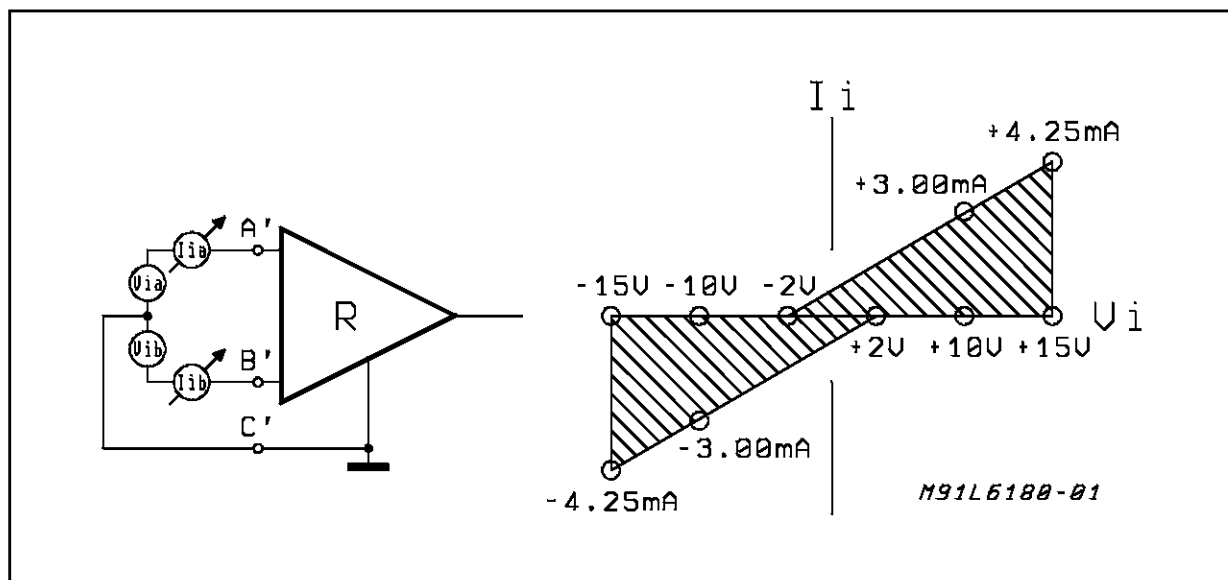
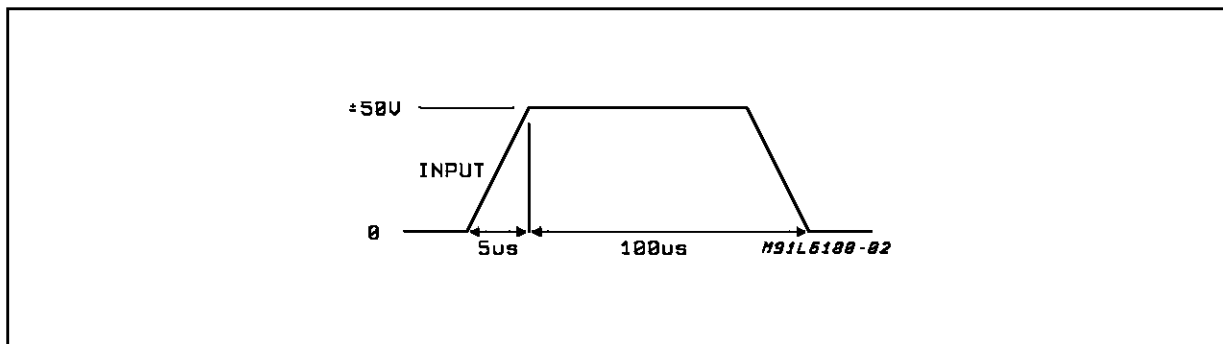
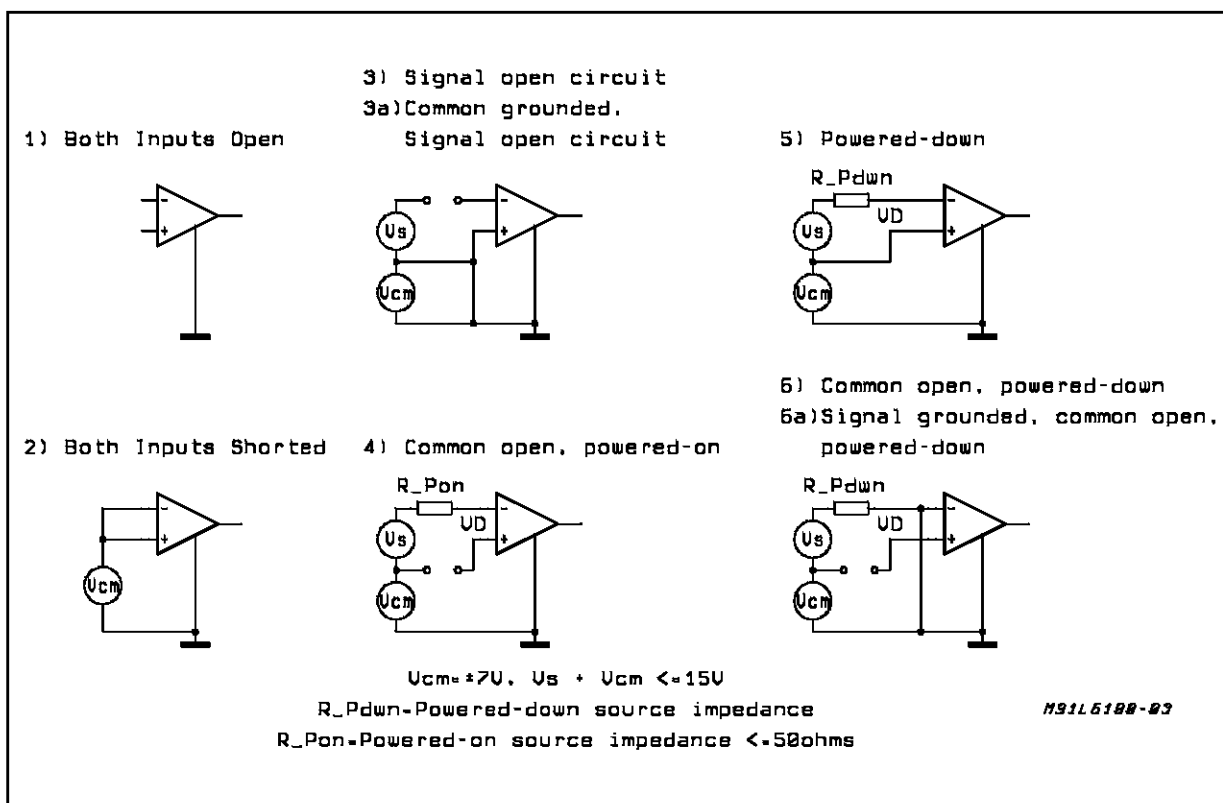


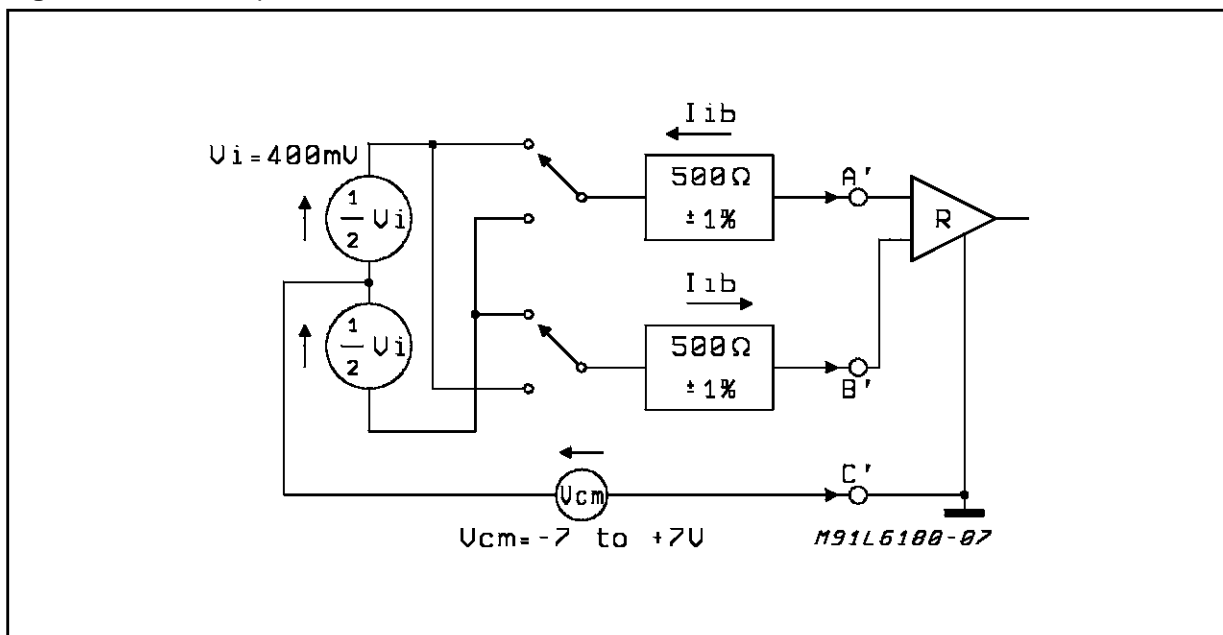
Figure 2: EOS Requirements**Figure 3: Output Failsafing**

The output assumes a logic "1" under the following conditions, (see figure 3)

- 1 Both inputs open
- 2 Both inputs shorted
- 3 Signal Opencircuit
- 3a Common grounded, signal open circuit
- 4 Common open, generator powered-on
- 5 Generator powered-down (see note 7)
- 6 Common open, generator powered-down
- 6a Signal grounded, common open, generator powered-down
- 7 Less than 250mVpp differential signal

Timing diagram for the input and output of the 74161. The diagram shows two waveforms: INPUT ($V_{in+} - V_{in-}$) and OUTPUT (V_{oh} and V_{ol}). The input is a square wave with a period of 100 ns. The output is a square wave that transitions from V_{oh} to V_{ol} at the rising edge of the input and from V_{ol} to V_{oh} at the falling edge of the input. The propagation delay T_{phl} is indicated as the time from the input transition to the output transition.

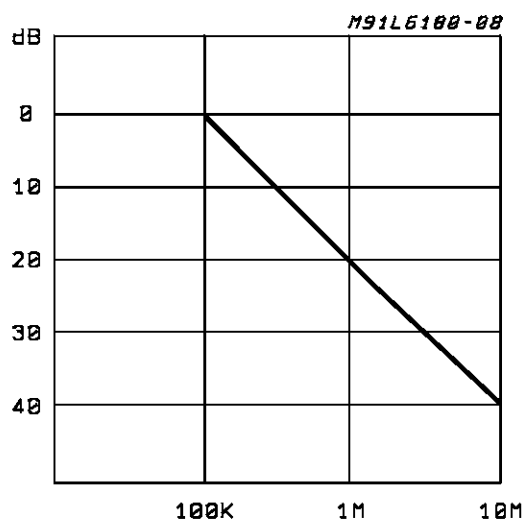
The diagram shows a 3-input NAND gate with inputs A', B', and C'. The output of the gate is connected to a load resistor R_L to V_{CC} and a load capacitor C_L to ground. The output is also connected to a chain of four diodes, each pointing towards the output, which eventually connect to ground. The gate is labeled **M91L6180-06**.

Figure 7: Receiver input Balance Measurement**Figure 8:** High Frequency Signal Rejection**INPUT BALANCE MEASUREMENT**

The balance of the receiver input voltage-current characteristics and bias voltages shall be such that the receiver will remain in the intended binary state when a differential voltage V_i of 400mV is applied through $500\Omega \pm 1\%$ to each input terminal, as shown above, and V_{cm} is varied between -7 and +7V.

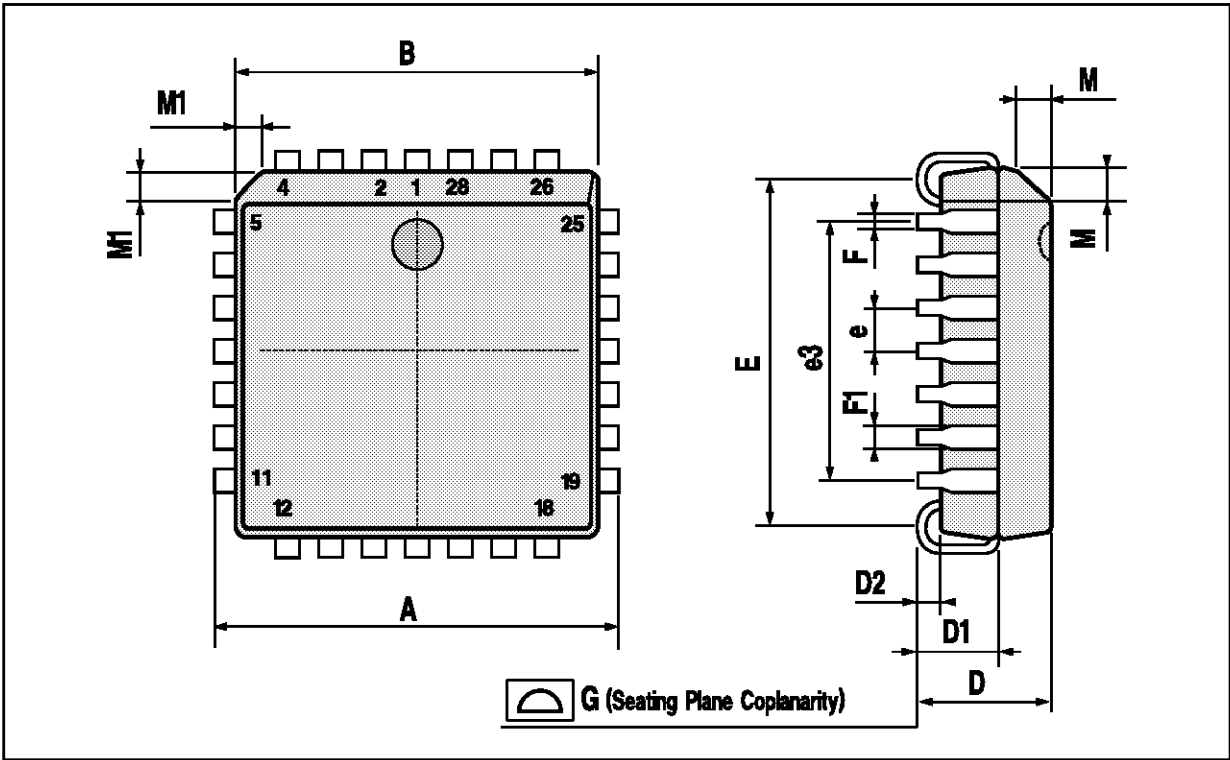
When the polarity of V_i is reversed, the opposite binary state shall be maintained under the same conditions. Maintain input balance with input B common with another receiver.

The voltage input (V_{IN}) rejection is checked at the center point between the High Operating Threshold (V_{th2}) and the Low Operating Threshold (V_{th1})



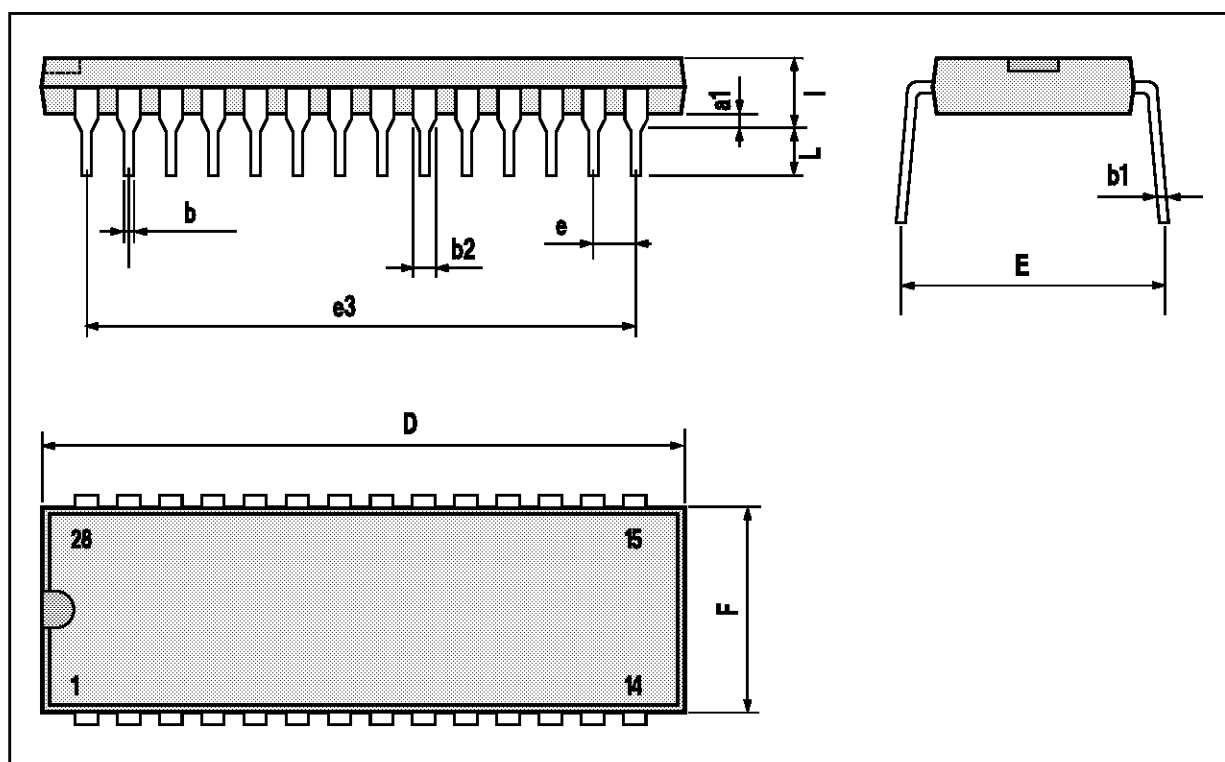
PLCC28 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.32		12.57	0.485		0.495
B	11.43		11.58	0.450		0.456
D	4.2		4.57	0.165		0.180
D1	2.29		3.04	0.090		0.120
D2	0.51			0.020		
E	9.91		10.92	0.390		0.430
e		1.27			0.050	
e3		7.62			0.300	
F		0.46			0.018	
F1		0.71			0.028	
G			0.101			0.004
M		1.24			0.049	
M1		1.143			0.045	



DIP28 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1		0.63			0.025	
b		0.45			0.018	
b1	0.23		0.31	0.009		0.012
b2		1.27			0.050	
D			37.34			1.470
E	15.2		16.68	0.598		0.657
e		2.54			0.100	
e3		33.02			1.300	
F			14.1			0.555
I		4.445			0.175	
L		3.3			0.130	



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore -