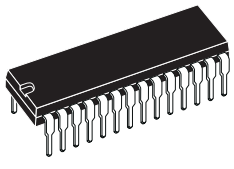
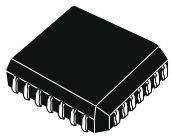
L5170

OCTAL LINE DRIVER

ADVANCE DATA

- OCTAL LINE DRIVER FOR:
  – EIA STD: RS232D; RS423A
  – CCIT: V.10; V.28
- NO EXTERNAL COMPONENTS
- VERY LONG TRANSMISSION LINE (5000ft)
- 50V EOS OUTPUT PROTECTION





DIP28 **PLCC28**

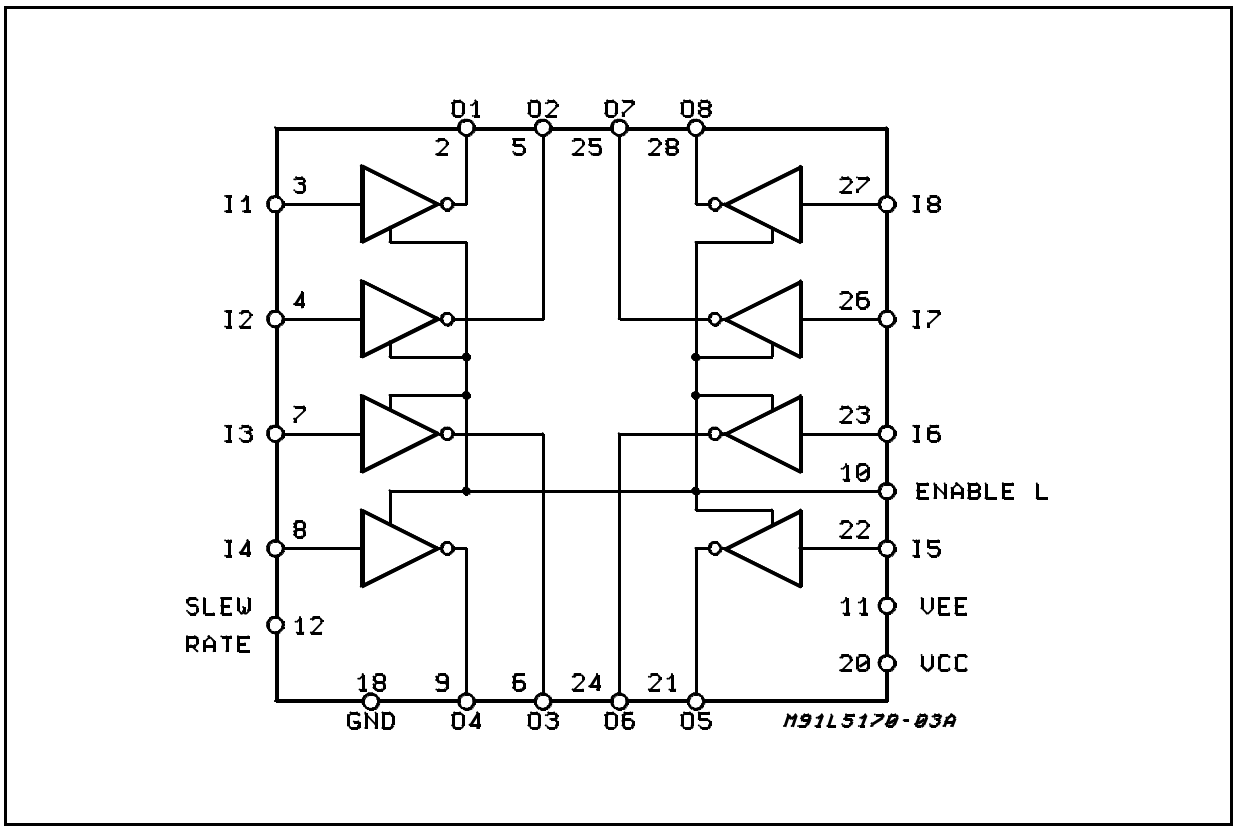
ORDERING NUMBERS:

L5170A L5170D

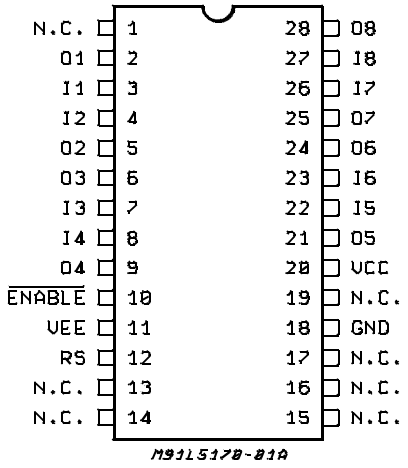
DESCRIPTION

L5170 is an octal line driver unit in DIP28 and PLCC28 packages intended for use in the EIA std RS232D, RS423A and CCITT V.10 and V.28 applications.
With no external components L5170 is able to drive a line up to 5000ft assuming the line capacitance is 35pF per ft and the capacitance of the filter connectors/protection components add up to the total capacitance load. The drivers typically run in short circuit current mode whenever the cable attached is over 500ft.

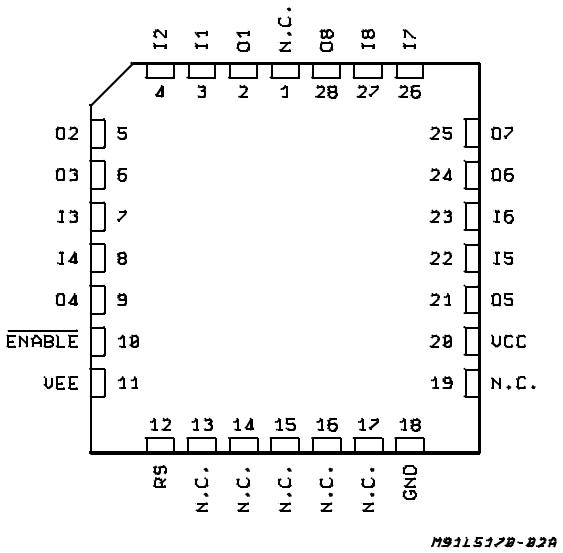
BLOCK DIAGRAM



PIN CONNECTIONS (Top views)



DIP28



PLCC28

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	+15	V
V_{EE}	Supply Voltage	– 15	V
V_i	Input Voltage (Enable Data)	– 1.5 to 7	V
V_O	Output Voltage	±6	V
I_O	Output Current (**)	±150	mA
SR	Minimum Slew Resistor (***)	1.5	1KΩ
P_{tot}	Power Dissipation at T_{amb} = 70°C **(PLCC28)** (*) **(DIP28)** (*)	1.2 1.3	W W
T_{op}	Operating Free Air Temperature Range	0 to +70	°C
T_{stg}	Storage Temperature Range	-65 to 150	°C

Notes:
(*) Mounted on board with minimized dissipating copper area.
(**) Minimum Current per driver. Do not exceed maximum power dissipation if more than one input is on.
(***) Minimum value of the resistor used to set the slew rate.

THERMAL DATA

Symbol	Description		PLCC28	DIP28	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient (*)	Max.	67	62	°C/W

AC ELECTRICAL CHARACTERISTICS (V_{CC} = 9 to 11V; V_{EE} = – 9 to – 11V T_{amb} =0 to 70°C, unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{OH}	High Level Output Voltage	V_{in} = 0.8V R_L = inf R_L = 3KΩ R_L = 450Ω (see note 1)	 5 5 4.5		 6 6 6	 V V V
V_{OL}	Low Level Output Voltage	V_{in} = 2.4V R_L = inf R_L = 3KΩ R_L = 450Ω (see note 1)	 – 6 – 6 – 6		 – 5 – 5 – 4.5	 V V V
V_{OI}	Output Voltage Balance	$\|V_{CC}\| = \|V_{EE}\|$; R_L = 450Ω			0.4	V
V_{IH}	High Level Input Voltage		2			V
V_{IL}	Low Level Input Voltage				0.8	V
V_{IK}	Input Clamp Voltage	I_{IN} = – 15mA	– 1.5			V
I_{IH}	High Level Input Current	V_{IN} = 2.4V			40	µA
I_{IL}	Low Level Input Current	V_{IN} = 0.4V	– 400			µA
I_{CC}	Positive Supply Current	V_{IN} = 2.4V; R_S = 2KΩ; R_L = 3KΩ C_L = 2.5nF; (See note 2)			30	mA
I_{CC1}	Positive Supply Current	V_{IN} = 0.4V; R_S = 2KΩ; R_L = 3KΩ C_L = 2.5nF; (See note 2)			40	mA
I_{EE}	Negative Supply Current	V_{IN} = 2.4V; R_S = 2KΩ; R_L = 3KΩ C_L = 2.5nF; (See note 2)	– 30			mA
I_{EE1}	Negative Supply Current	V_{IN} = 0.4V; R_S = 2KΩ; R_L = 3KΩ C_L = 2.5nF; (See note 2)	– 40			mA
I_{sh}	Output Short Circuit Current	V_O = 0V; V_{IN} = 2.4V; (see fig.1)	25		100	mA
I_{sl}	Output Short Circuit Current	V_O = 0V; V_{IN} = 2.4V; (see fig.1)	– 100		– 25	mA
I_{bal}	Output Current Balance	Ish/Isl = Ibal	0.625		1.6	mA/mA
I_x	Output Leakage Current	See fig.2,3 and note 3 V_O = 6V V_O = – 6V	 – 70		70	 µA µA
t_r	Rise time (see note 4 and 5; see figure 4A)	R_L = 450Ω; C_L = 50pF R_{slew} = 5.34KΩ ±1%	2		2.7	µs
t_{rc1}		R_L = 450Ω; C_L = 0.01µF R_{slew} = 10KΩ ±1%			10	µs
t_{rc2}		R_L = 450Ω; C_L = 0.1µF R_{slew} = 10KΩ ±1%			50	µs
t_{rc3}		R_L = 450Ω; C_L = 2.5nF R_{slew} = 2KΩ ±1%	0.65		1.2	µs
t_{rc4}		R_L = 450Ω; C_L = 2.5nF R_{slew} = 10KΩ ±1%	3.25		6	µs
t_f	Fall time (see note 4 and 5; see figure 4A)	R_L = 450Ω; C_L = 50pF R_{slew} = 5.34KΩ ±1%	2		2.7	µs
t_{fc1}		R_L = 450Ω; C_L = 0.01µF R_{slew} = 10KΩ ±1%			10	µs
t_{fc2}		R_L = 450Ω; C_L = 0.1µF R_{slew} = 10KΩ ±1%			50	µs
t_{fc3}		R_L = 450Ω; C_L = 2.5nF R_{slew} = 2KΩ ±1%	0.65		1.2	µs
t_{fc4}		R_L = 450Ω; C_L = 2.5nF R_{slew} = 10KΩ ±1%	3.25		6	µs

Note 1: The Output under load must not drop below 90% of the open circuit drive level.

Note 2: This represents the static condition only. Applications can see 130mA normal current draw for clock and data lines with up to 500mA transients when all lines are transitioning at the same time. Over 500ft of cable slew rate is governed by the drivers ability to sink current. The currents are rougly equivalent to the short circuit current.

AC ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
t_{lz}	Output Enable to Output (see figure 4B)	R_L = 450Ω; C_L = 50pF R_{slew} = 10KΩ			5	µs
t_{nz}					5	µs
t_{zl}					150	µs
t_{zh}					150	µs
t_{plh}	Propagation (see figure 4C)	R_L = 450Ω; C_L = 50pF R_{slew} = 2KΩ	0.3		0.9	µs
t_{ph1}			0.3		0.9	µs

LINE TRANSIENT IMMUNITY (Considering the following cases: Powered ON, Powered OFF-Low impedance power supply and Powered OFF-High impedance supply).

ESD	Elettrostatic Discharge	Tested per MIL-STD-883 (see note 6)	2			KV
EOS	Electrical Overstress	Transient pulse both polarities for 100µs (see note 7)	50			V

Note 3: The output leakage is measured under the following conditions:
a) The Driver tristated
b) Power supply OFF, and the power pins shorted to Ground
c) Power supply OFF. Impedances between power pins open and power pins shorted to Ground.

Note 4: The output waveform should not show any signs of oscillations under any load variation between o.1VVss and 0.9Vss. The oscillation allowed when V_{SS} < 0.1V_{SS} and V_{ss} >0.9V_{ss} shall be 10% of V_{ss}.

Note 5: t_{fc1} thru t_{rc4} shall be within ±20% of t_{rc1} thru t_{rc4} respectively.

Note 6: All pins are required to withstand parameter.

Note 7: Output pins are required to withstand fig.5 without any degradation to the circuit.

TEST CIRCUIT

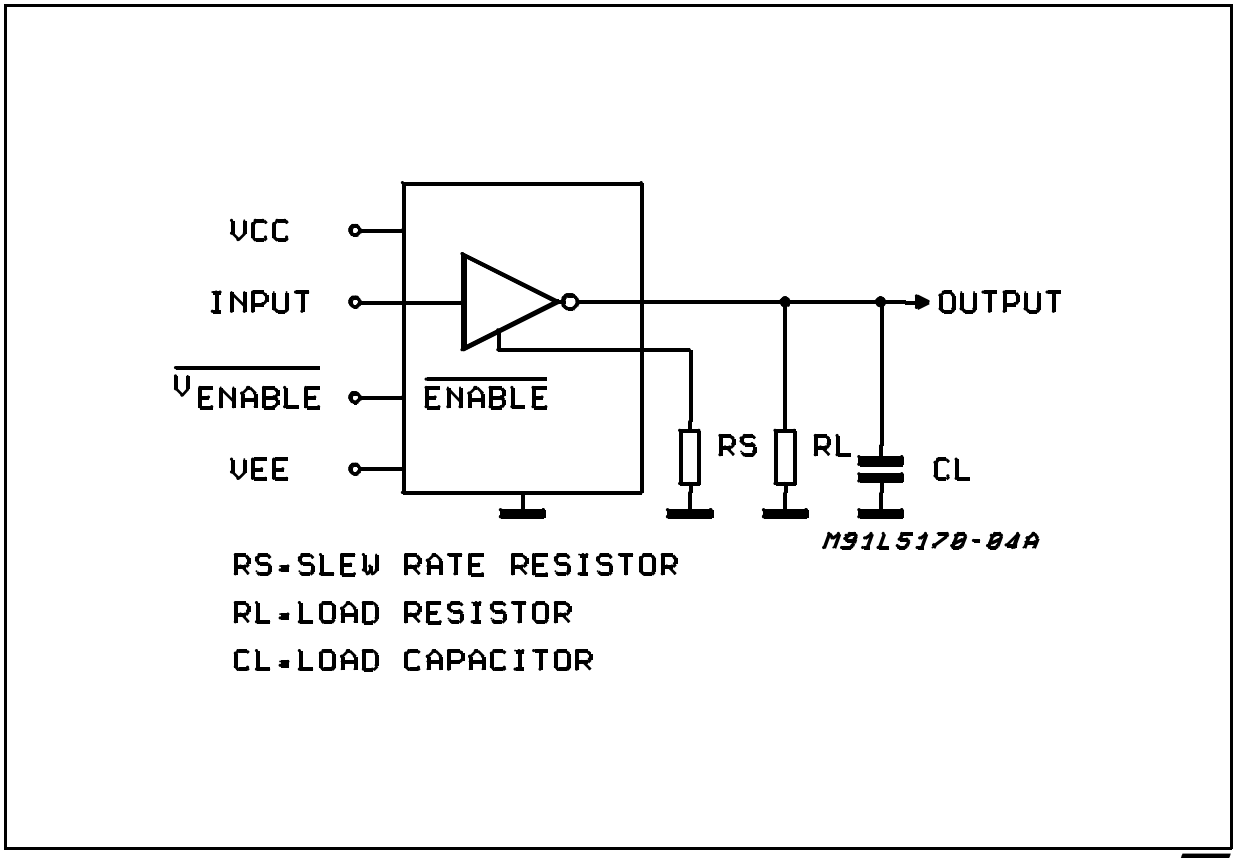


Figure 1: Output Leakage Test Circuit

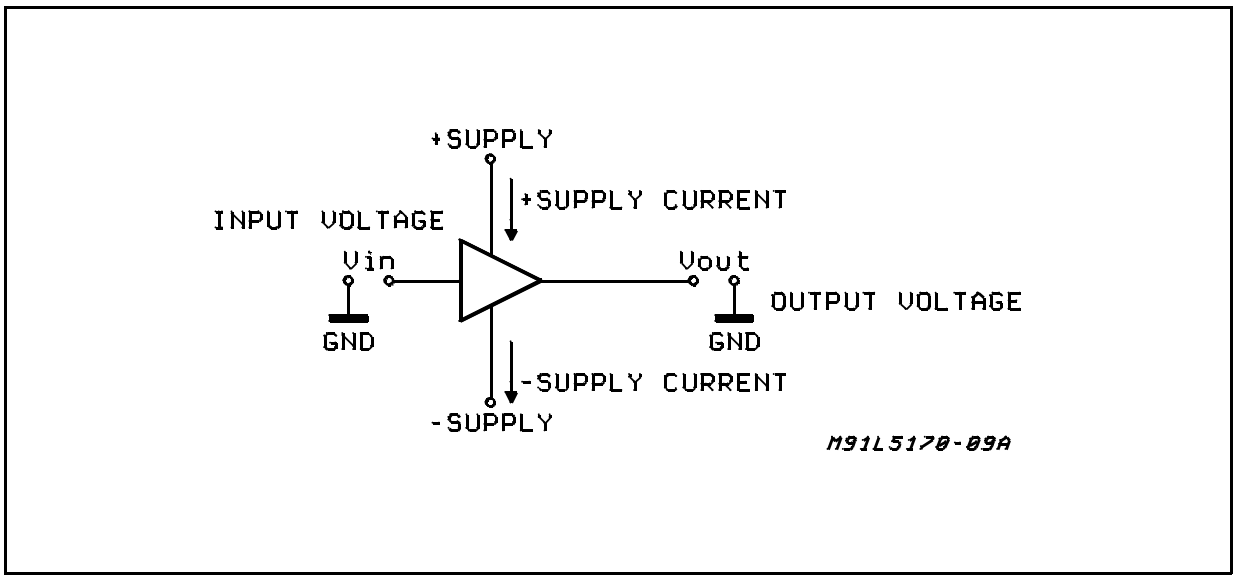


Figure 2: Output Voltage Rise Time

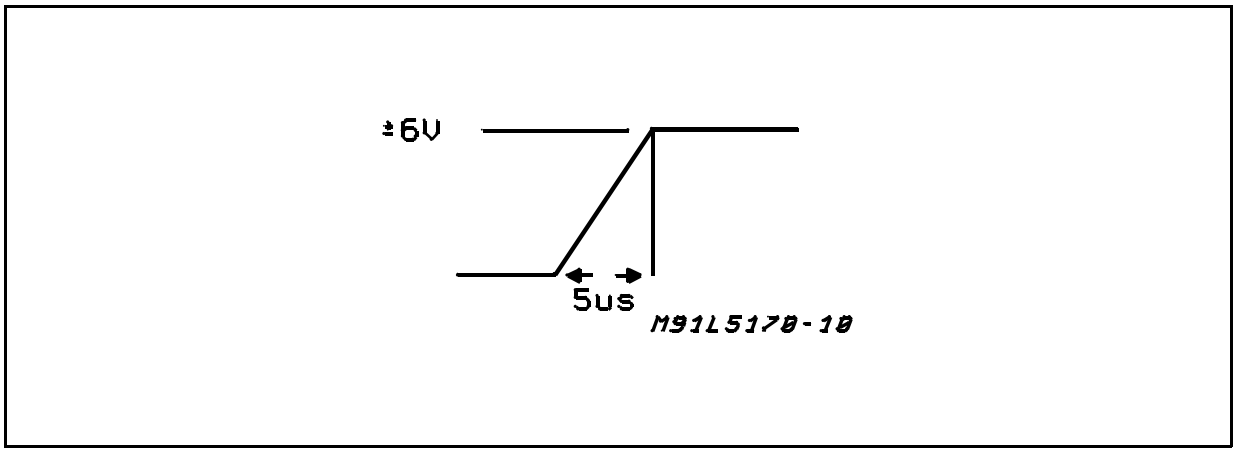


Figure 3: EOS Requirements

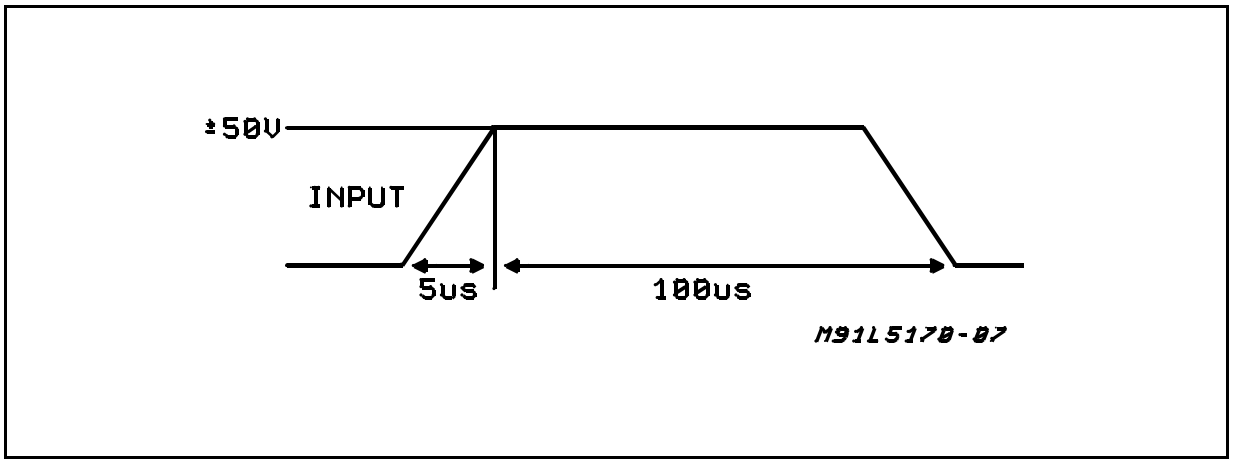
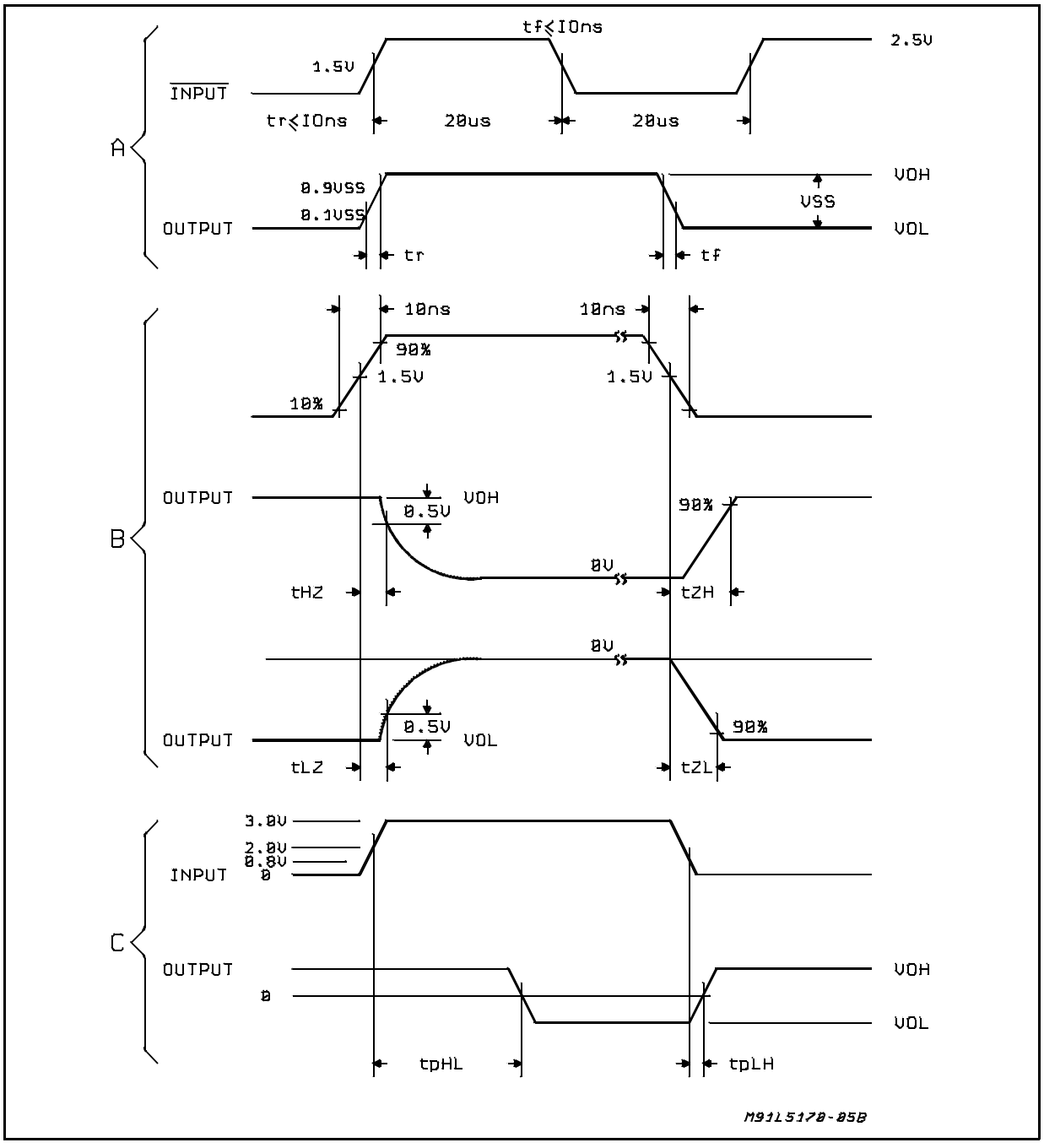
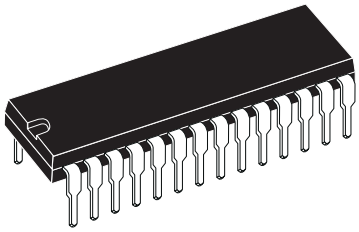


Figure 4: Waveforms

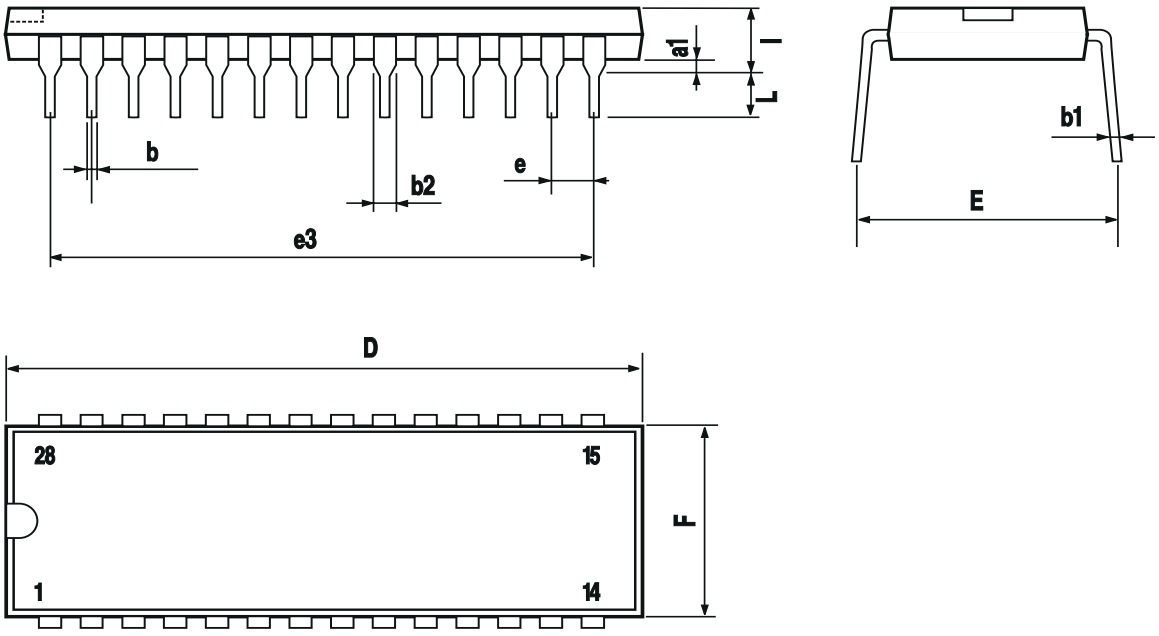


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1		0.63			0.025	
b		0.45			0.018	
b1	0.23		0.31	0.009		0.012
b2		1.27			0.050	
D			37.34			1.470
E	15.2		16.68	0.598		0.657
e		2.54			0.100	
e3		33.02			1.300	
F			14.1			0.555
I		4.445			0.175	
L		3.3			0.130	

OUTLINE AND MECHANICAL DATA

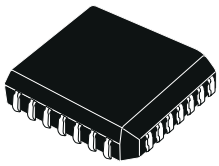


DIP28



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	

OUTLINE AND MECHANICAL DATA



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