



M74HC353

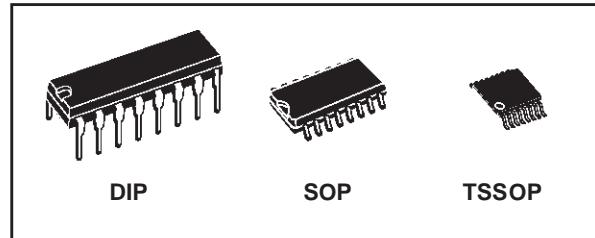
DUAL 4 CHANNEL MULTIPLEXER WITH 3 STATE OUTPUT (INVERTING)

- HIGH SPEED:
 $t_{PD} = 18\text{ns}$ (TYP.) at $V_{CC} = 6\text{V}$
- LOW POWER DISSIPATION:
 $I_{CC} = 4\mu\text{A}$ (MAX.) at $T_A=25^\circ\text{C}$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\%$ V_{CC} (MIN.)
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OHI}| = I_{OL} = 4\text{mA}$ (MIN)
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \approx t_{PHL}$
- WIDE OPERATING VOLTAGE RANGE:
 V_{CC} (OPR) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE WITH
74 SERIES 353

DESCRIPTION

The M74HC353 is an high speed CMOS DUAL 4 CHANNEL MULTIPLEXER fabricated with silicon gate C²MOS technology.

Each of these data (1C0-1C3, 2C0-2C3) is selected by the two address inputs A and B. Separate strobe inputs ($1\bar{G}$, $2\bar{G}$) are provided for each of the two four-line sections. The strobe input



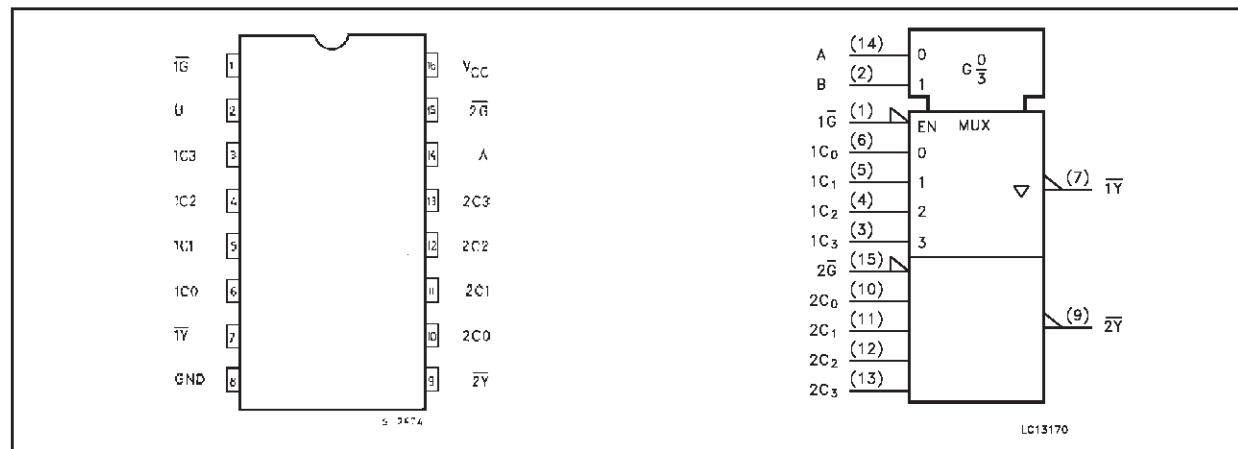
ORDER CODES

PACKAGE	TUBE	T & R
DIP	M74HC353B1R	
SOP	M74HC353M1R	M74HC353RM13TR
TSSOP		M74HC353TTR

(\bar{G}) can be used to inhibit the data output; the output of M74HC353 is at high impedance, unconditionally.

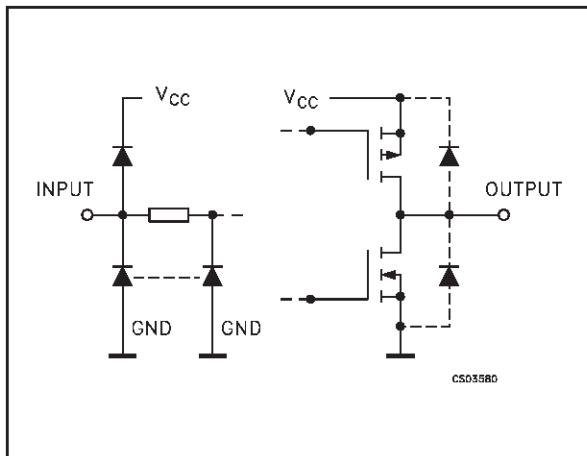
All inputs are equipped with protection circuits against static discharge and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



M74HC353

INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 15	1G, 2G	Output Enable Inputs
6, 5, 4, 3	1C0 to 1C3	Data Inputs From Source 1
7	1Y	Data Outputs from Source 1
9	2Y	Data Outputs from Source 2
10, 11, 12, 13	2C0 to 2C3	Data Inputs From Source 2
14, 2	A, B	Common Data Select Input
8	GND	Ground (0V)
16	V _{CC}	Positive Supply Voltage

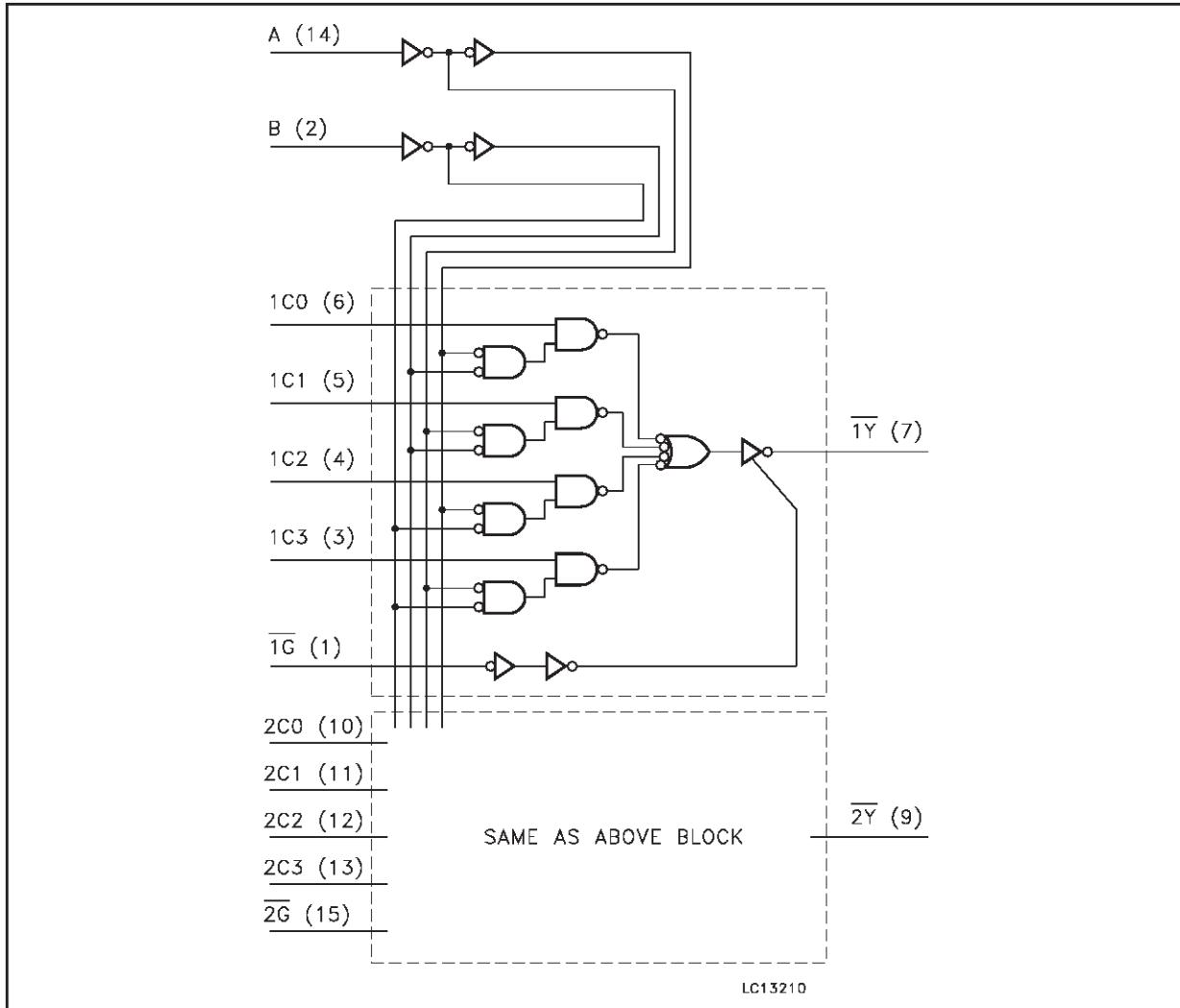
TRUTH TABLE

SELECT INPUTS		DATA INPUTS				STROBE Ḡ	OUTPUT Ȳ
B	A	C ₀	C ₁	C ₂	C ₃		
X	X	X	X	X	X	H	Z
L	L	L	X	X	X	L	H
L	L	H	X	X	X	L	L
L	H	X	L	X	X	L	H
L	H	X	H	X	X	L	L
H	L	X	X	L	X	L	H
H	L	X	X	H	X	L	L
H	H	X	X	X	L	L	H
H	H	X	X	X	H	L	L

X : Don't Care

Z : High Impedance

LOGIC DIAGRAM



This logic diagram has not been used to estimate propagation delays

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7	V
V_I	DC Input Voltage	-0.5 to $V_{CC} + 0.5$	V
V_O	DC Output Voltage	-0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Current	± 35	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 70	mA
P_D	Power Dissipation	500(*)	mW
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied

(*) 500mW at 65 °C; derate to 300mW by 10mW/°C from 65°C to 85°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value		Unit	
V_{CC}	Supply Voltage	2 to 6		V	
V_I	Input Voltage	0 to V_{CC}		V	
V_O	Output Voltage	0 to V_{CC}		V	
T_{op}	Operating Temperature	-55 to 125		°C	
t_p, t_f	Input Rise and Fall Time	$V_{CC} = 2.0V$	0 to 1000		ns
		$V_{CC} = 4.5V$	0 to 500		ns
		$V_{CC} = 6.0V$	0 to 400		ns

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value						Unit	
		V_{CC} (V)		$T_A = 25^\circ C$			$-40 \text{ to } 85^\circ C$		$-55 \text{ to } 125^\circ C$		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_{IH}	High Level Input Voltage	2.0		1.5			1.5		1.5		V
		4.5		3.15			3.15		3.15		
		6.0		4.2			4.2		4.2		
V_{IL}	Low Level Input Voltage	2.0				0.5		0.5		0.5	V
		4.5				1.35		1.35		1.35	
		6.0				1.8		1.8		1.8	
V_{OH}	High Level Output Voltage	2.0	$I_O = -20 \mu A$	1.9	2.0		1.9		1.9		V
		4.5	$I_O = -20 \mu A$	4.4	4.5		4.4		4.4		
		6.0	$I_O = -20 \mu A$	5.9	6.0		5.9		5.9		
		4.5	$I_O = -4.0 mA$	4.18	4.31		4.13		4.10		
		6.0	$I_O = -5.2 mA$	5.68	5.8		5.63		5.60		
V_{OL}	Low Level Output Voltage	2.0	$I_O = 20 \mu A$		0.0	0.1		0.1		0.1	V
		4.5	$I_O = 20 \mu A$		0.0	0.1		0.1		0.1	
		6.0	$I_O = 20 \mu A$		0.0	0.1		0.1		0.1	
		4.5	$I_O = 4.0 mA$		0.17	0.26		0.33		0.40	
		6.0	$I_O = 5.2 mA$		0.18	0.26		0.33		0.40	
I_I	Input Leakage Current	6.0	$V_I = V_{CC} \text{ or GND}$			± 0.1		± 1		± 1	µA
I_{OZ}	High Impedance Output Leakage Current	6.0	$V_I = V_{IH} \text{ or } V_{IL}$ $V_O = V_{CC} \text{ or GND}$			± 0.5		± 5		± 5	µA
I_{CC}	Quiescent Supply Current	6.0	$V_I = V_{CC} \text{ or GND}$			4		40		80	µA

AC ELECTRICAL CHARACTERISTICS ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6\text{ns}$)

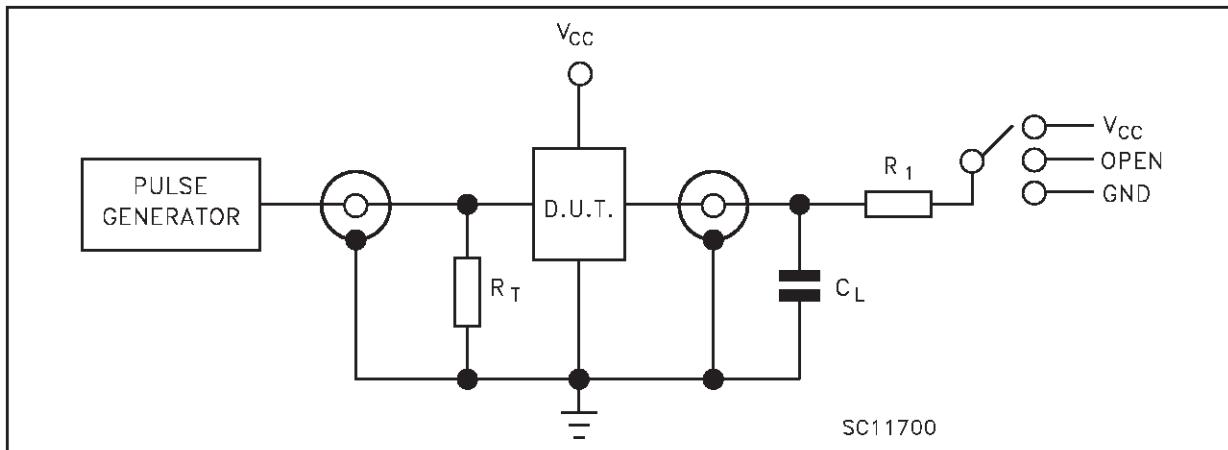
Symbol	Parameter	Test Condition		Value						Unit	
		V_{CC} (V)		$T_A = 25^\circ\text{C}$			$-40 \text{ to } 85^\circ\text{C}$		$-55 \text{ to } 125^\circ\text{C}$		
				Min.	Typ.	Max.	Min.	Max.	Min.		
$t_{TLH} t_{THL}$	Output Transition Time	2.0			30	75		95		110	ns
		4.5			8	15		19		22	
		6.0			7	13		16		19	
$t_{PLH} t_{PHL}$	Propagation Delay Time ($C_n - \bar{Y}$)	2.0			64	125		155		95	ns
		4.5			16	25		31		38	
		6.0			14	21		26		32	
$t_{PLH} t_{PHL}$	Propagation Delay Time ($A, B - \bar{Y}$)	2.0			84	150		190		225	ns
		4.5			21	30		38		45	
		6.0			18	26		33		38	
$t_{PZL} t_{PZH}$	High Impedance Output Enable Time ($\bar{G} - Y$)	2.0	$R_L = 1\text{K}\Omega$		64	115		145		175	ns
		4.5			16	23		29		35	
		6.0			14	20		25		30	
$t_{PLZ} t_{PHZ}$	High Impedance Output Disable Time ($\bar{G} - Y$)	2.0	$R_L = 1\text{K}\Omega$		44	100		125		150	ns
		4.5			11	20		25		30	
		6.0			9	17		21		26	

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Condition		Value						Unit	
		V_{CC} (V)		$T_A = 25^\circ\text{C}$			$-40 \text{ to } 85^\circ\text{C}$		$-55 \text{ to } 125^\circ\text{C}$		
				Min.	Typ.	Max.	Min.	Max.	Min.		
C_{IN}	Input Capacitance	5.0			5	10		10		10	pF
C_{PD}	Power Dissipation Capacitance (note 1)	5.0			61						pF

1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(\text{opr})} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

TEST CIRCUIT



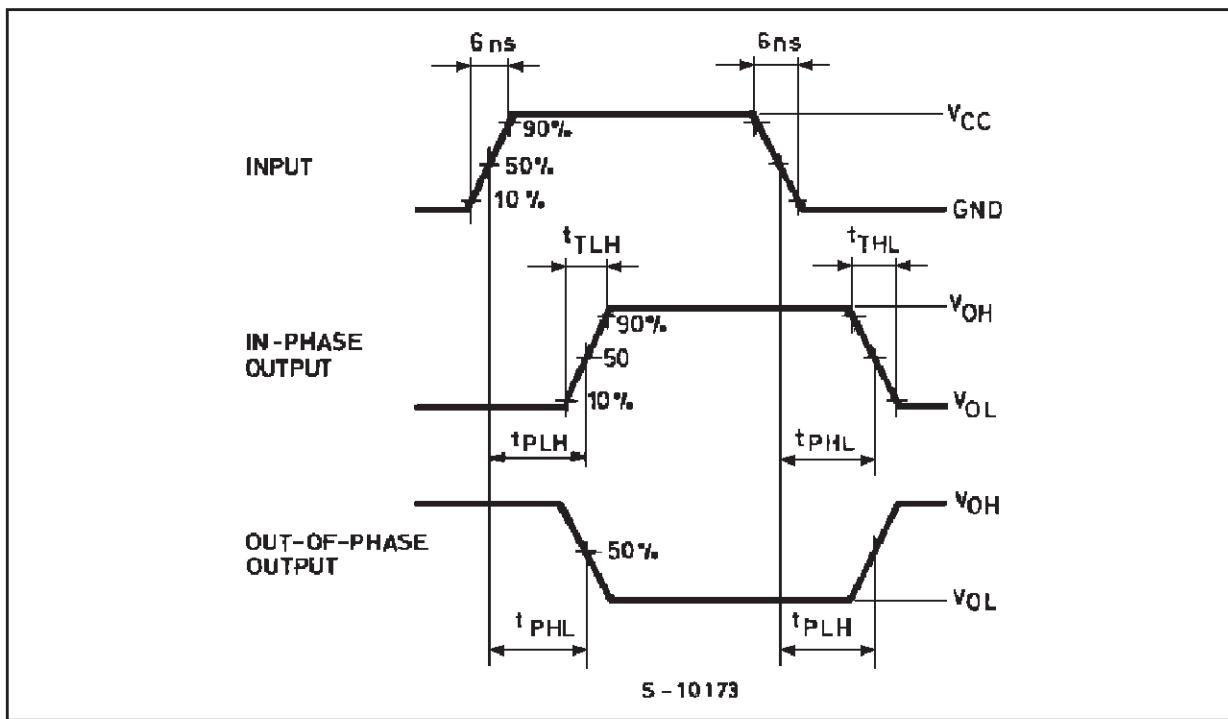
TEST	SWITCH
t_{PLH}, t_{PHL}	Open
t_{PZL}, t_{PLZ}	V_{CC}
t_{PZH}, t_{PHZ}	GND

$C_L = 50\text{pF}/150\text{pF}$ or equivalent (includes jig and probe capacitance)

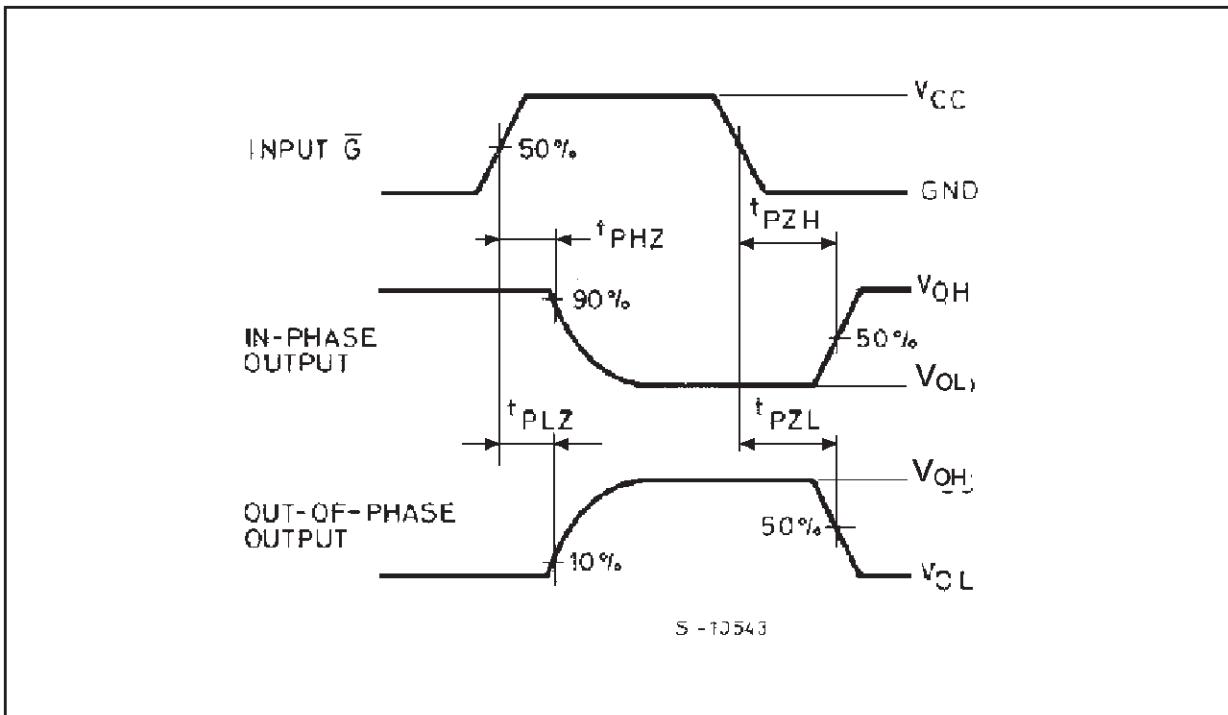
$R_1 = 1\text{k}\Omega$ or equivalent

$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

WAVEFORM 1 : PROPAGATION DELAY TIME ($f=1\text{MHz}$; 50% duty cycle)

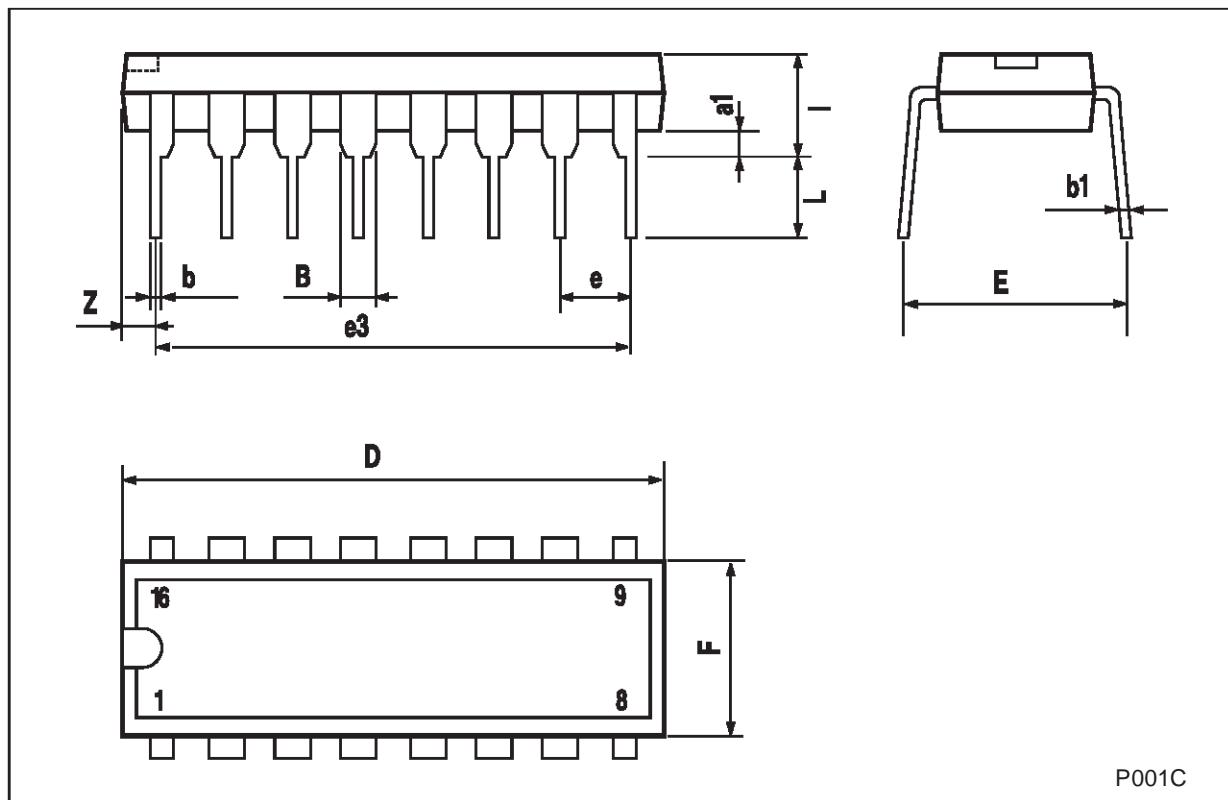


WAVEFORM 2 : OUTPUT ENABLE AND DISABLE TIME (f=1MHz; 50% duty cycle)



Plastic DIP-16 (0.25) MECHANICAL DATA

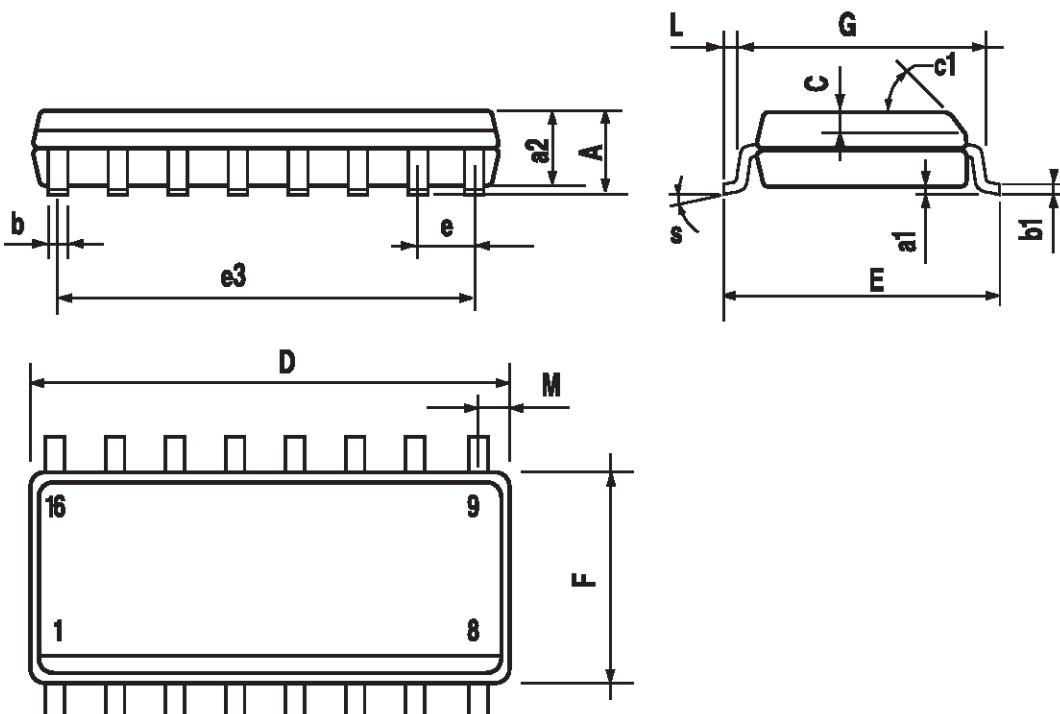
DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



P001C

SO-16 MECHANICAL DATA

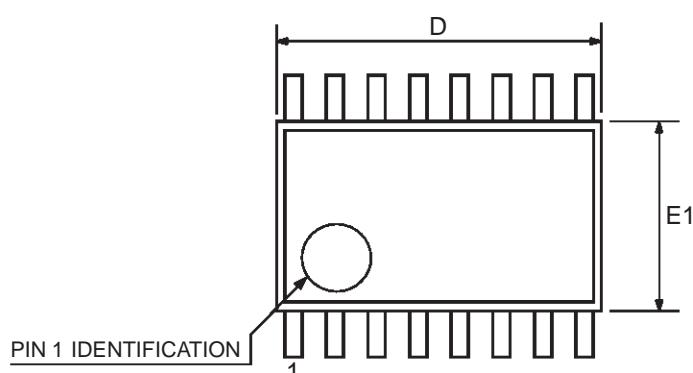
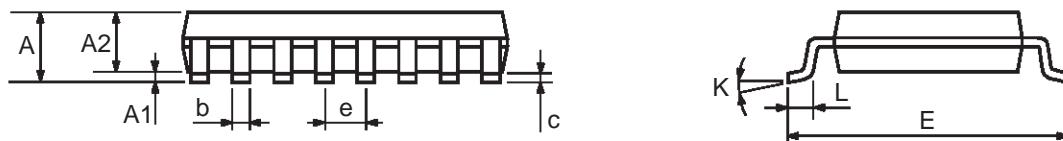
DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



PO13H

TSSOP16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030



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