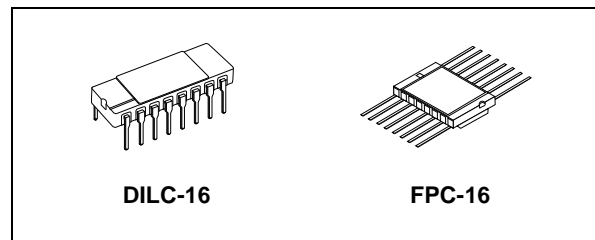




## RAD-HARD 8 CHANNEL MULTIPLEXER

- HIGH SPEED:  
 $t_{PD} = 17\text{ns}$  (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:  
 $|I_{OH}| = I_{OL} = 4\text{mA}$  (MIN)
- BALANCED PROPAGATION DELAYS:  
 $t_{PLH} \approx t_{PHL}$
- WIDE OPERATING VOLTAGE RANGE:  
 $V_{CC}$  (OPR) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE WITH  
 54 SERIES 151
- SPACE GRADE-1: ESA SCC QUALIFIED
- 50 krad QUALIFIED, 100 krad AVAILABLE ON  
 REQUEST
- NO SEL UNDER HIGH LET HEAVY IONS  
 IRRADIATION
- DEVICE FULLY COMPLIANT WITH  
 SCC-9408-054



### ORDER CODES

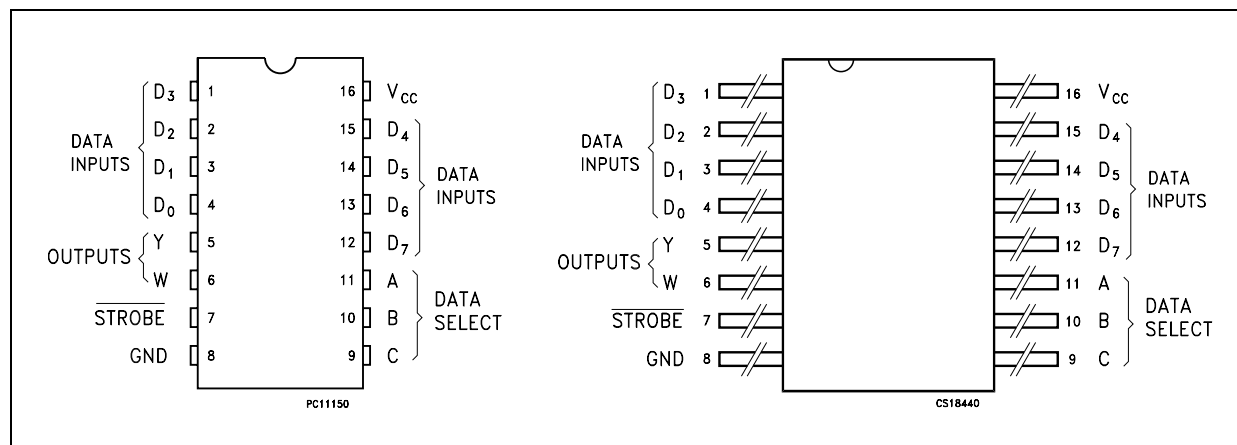
PACKAGE	FM	EM
DILC	M54HC151D	M54HC151D1
FPC	M54HC151K	M54HC151K1

It provides, in one package, the ability to select one bit of data from up to eight sources. The M54HC151 can be used as a universal function generator to generate any logic function of four variables. Outputs Y and W are complementary; the selection depends on the address inputs A, B, and C. The strobe input must be taken low to enable this device, when the strobe is high W output is forced high and consequently Y output goes low. All inputs are equipped with protection circuits against static discharge and transient excess voltage.

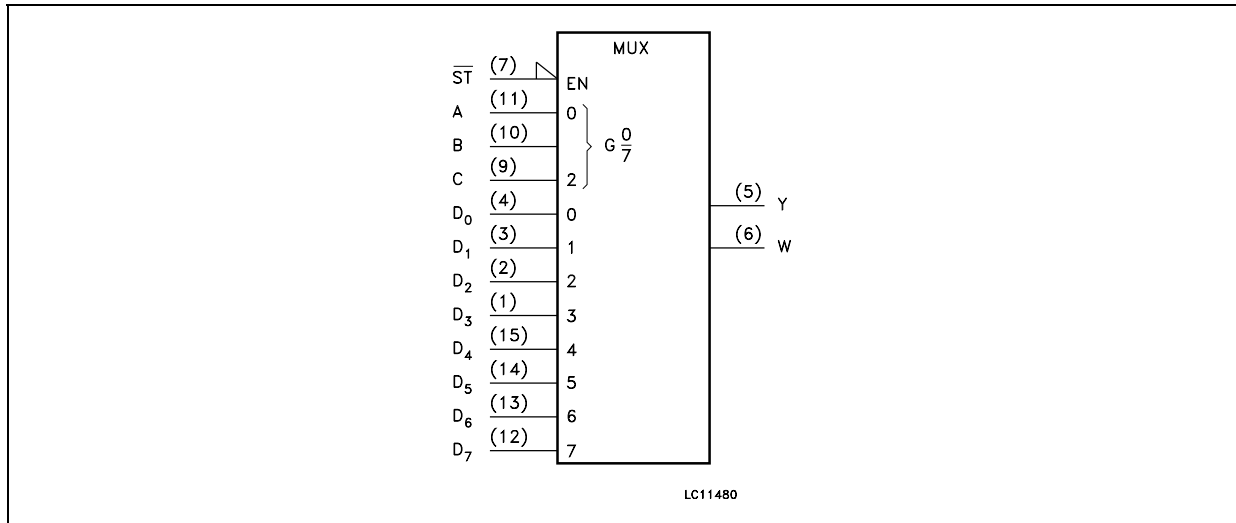
### DESCRIPTION

The M54HC151 is an high speed CMOS 8 CHANNEL MULTIPLEXER fabricated with silicon gate C<sup>2</sup>MOS technology.

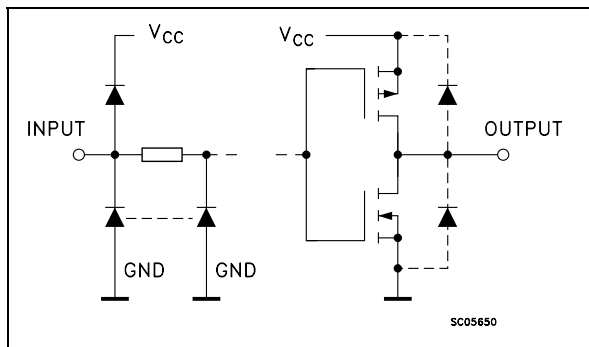
### PIN CONNECTION



IEC LOGIC SYMBOLS



INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

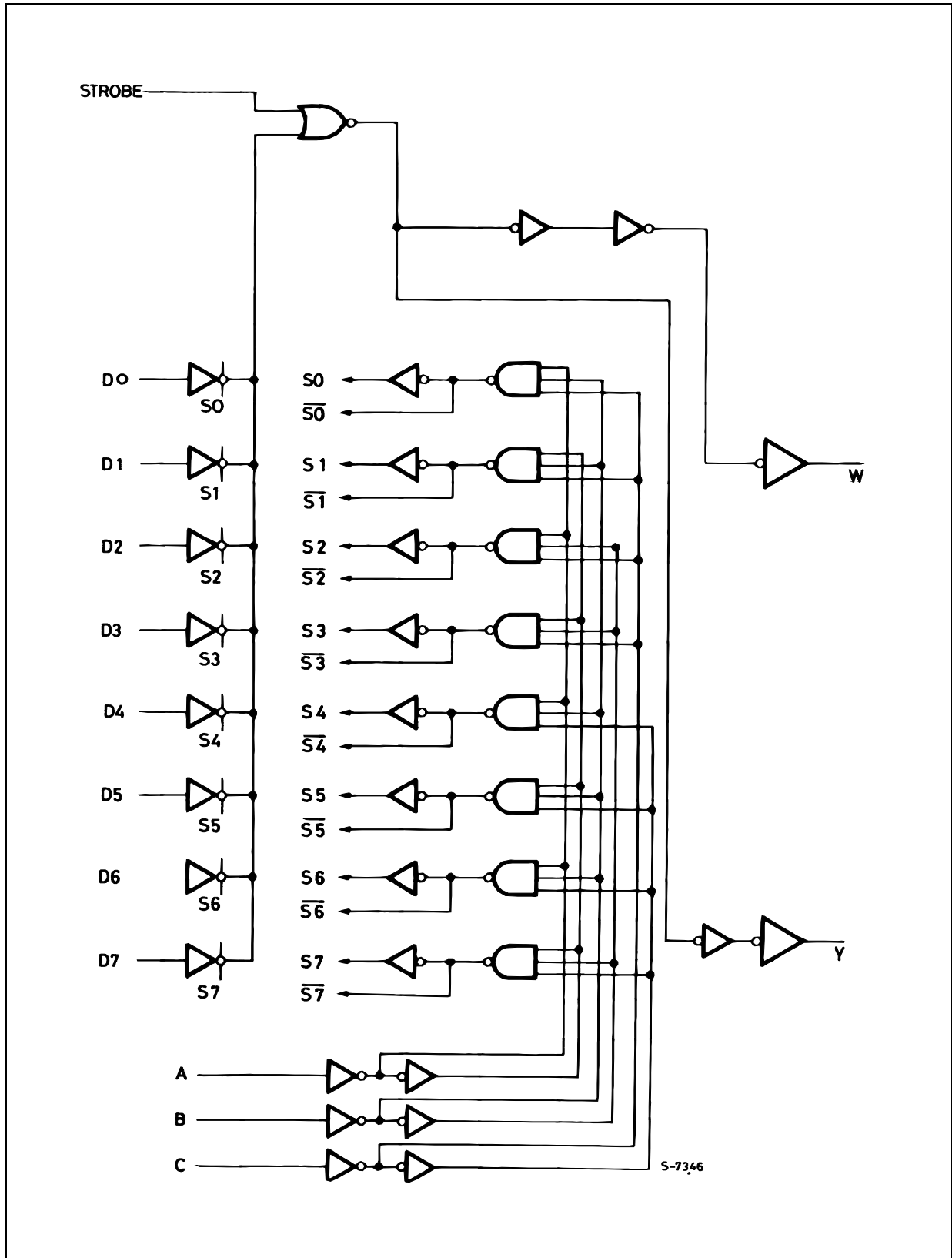
PIN N°	SYMBOL	NAME AND FUNCTION
4, 3, 2, 1, 15, 14, 13, 12	D <sub>0</sub> to D <sub>7</sub>	Multiplexer Inputs
5	Y	Multiplexer Output
6	W	Complementary Multiplexer Output
7	STROBE	Strobe Input
11, 10, 9	A, B, C	Select Inputs
8	GND	Ground (0V)
16	V <sub>CC</sub>	Positive Supply Voltage

TRUTH TABLE

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	S		
X	X	X	H	L	H
L	L	L	L	D <sub>0</sub>	D <sub>0</sub>
L	L	H	L	D <sub>1</sub>	D <sub>1</sub>
L	H	L	L	D <sub>2</sub>	D <sub>2</sub>
L	H	H	L	D <sub>3</sub>	D <sub>3</sub>
H	L	L	L	D <sub>4</sub>	D <sub>4</sub>
H	L	H	L	D <sub>5</sub>	D <sub>5</sub>
H	H	L	L	D <sub>6</sub>	D <sub>6</sub>
H	H	H	L	D <sub>7</sub>	D <sub>7</sub>

X : Don't Care

## LOGIC DIAGRAM



This logic diagram has not be 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	$\pm 20$	mA
$I_{OK}$	DC Output Diode Current	$\pm 20$	mA
$I_O$	DC Output Current	$\pm 25$	mA
$I_{CC}$ or $I_{GND}$	DC $V_{CC}$ or Ground Current	$\pm 50$	mA
$P_D$	Power Dissipation	300	mW
$T_{stg}$	Storage Temperature	-65 to +150	°C
$T_L$	Lead Temperature (10 sec)	265	°C

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

## 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	
$t_r, t_f$	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 <sub>CC</sub> (V)		T <sub>A</sub> = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
V <sub>IH</sub>	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 <sub>IL</sub>	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 <sub>OH</sub>	High Level Output Voltage	2.0	I <sub>O</sub> =-20 μA	1.9	2.0		1.9		1.9		V
		4.5	I <sub>O</sub> =-20 μA	4.4	4.5		4.4		4.4		
		6.0	I <sub>O</sub> =-20 μA	5.9	6.0		5.9		5.9		
		4.5	I <sub>O</sub> =-4.0 mA	4.18	4.31		4.13		4.10		
		6.0	I <sub>O</sub> =-5.2 mA	5.68	5.8		5.63		5.60		
V <sub>OL</sub>	Low Level Output Voltage	2.0	I <sub>O</sub> =20 μA		0.0	0.1		0.1		0.1	V
		4.5	I <sub>O</sub> =20 μA		0.0	0.1		0.1		0.1	
		6.0	I <sub>O</sub> =20 μA		0.0	0.1		0.1		0.1	
		4.5	I <sub>O</sub> =4.0 mA		0.17	0.26		0.33		0.40	
		6.0	I <sub>O</sub> =5.2 mA		0.18	0.26		0.33		0.40	
I <sub>I</sub>	Input Leakage Current	6.0	V <sub>I</sub> = V <sub>CC</sub> or GND			± 0.1		± 1		± 1	μA
I <sub>CC</sub>	Quiescent Supply Current	6.0	V <sub>I</sub> = V <sub>CC</sub> or GND			4		40		80	μA

## M54HC151

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

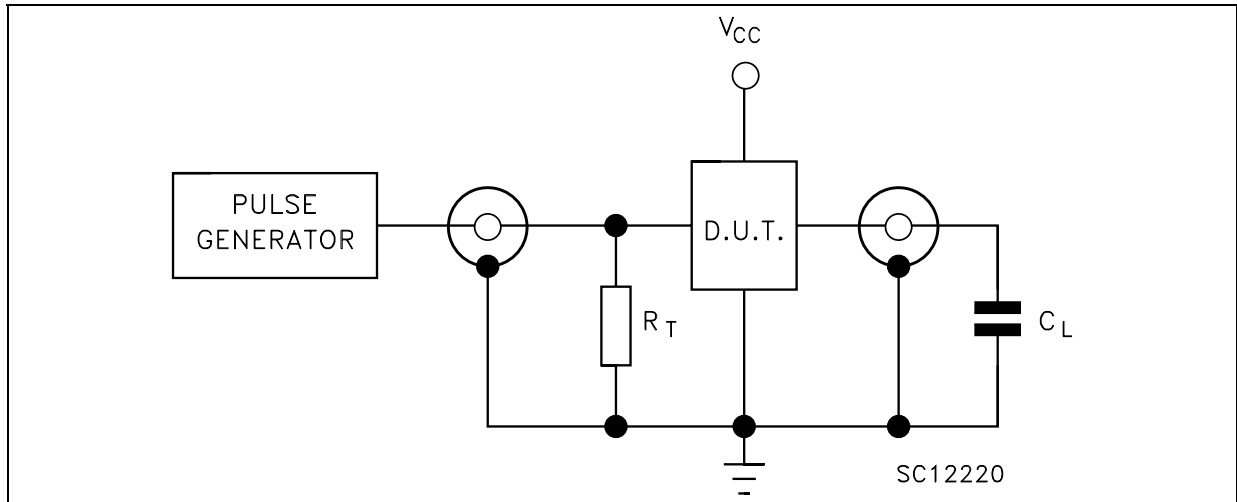
Symbol	Parameter	Test Condition		Value						Unit	
		$V_{CC}$ (V)		$T_A = 25^\circ\text{C}$			$-40 \text{ to } 85^\circ\text{C}$		$-55 \text{ to } 125^\circ\text{C}$		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
$t_{TLH}$ $t_{THL}$	Output Transition Time	2.0			30	75		95		110	ns
		4.5			8	15		19		22	
		6.0			7	13		16		19	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time (D - W)	2.0			56	130		165		190	ns
		4.5			16	26		33		38	
		6.0			14	22		28		32	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time (D - Y)	2.0			56	130		165		190	ns
		4.5			16	26		33		38	
		6.0			14	22		28		32	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time (STROBE-W)	2.0			30	85		105		125	ns
		4.5			10	17		21		25	
		6.0			9	14		18		21	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time (STROBE-Y)	2.0			30	85		105		125	ns
		4.5			10	17		21		25	
		6.0			9	14		18		21	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time (A, B, C - W)	2.0			72	160		200		235	ns
		4.5			20	32		40		47	
		6.0			17	27		34		40	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time (A, B, C - Y)	2.0			72	160		200		235	ns
		4.5			20	32		40		47	
		6.0			17	27		34		40	

### CAPACITIVE CHARACTERISTICS

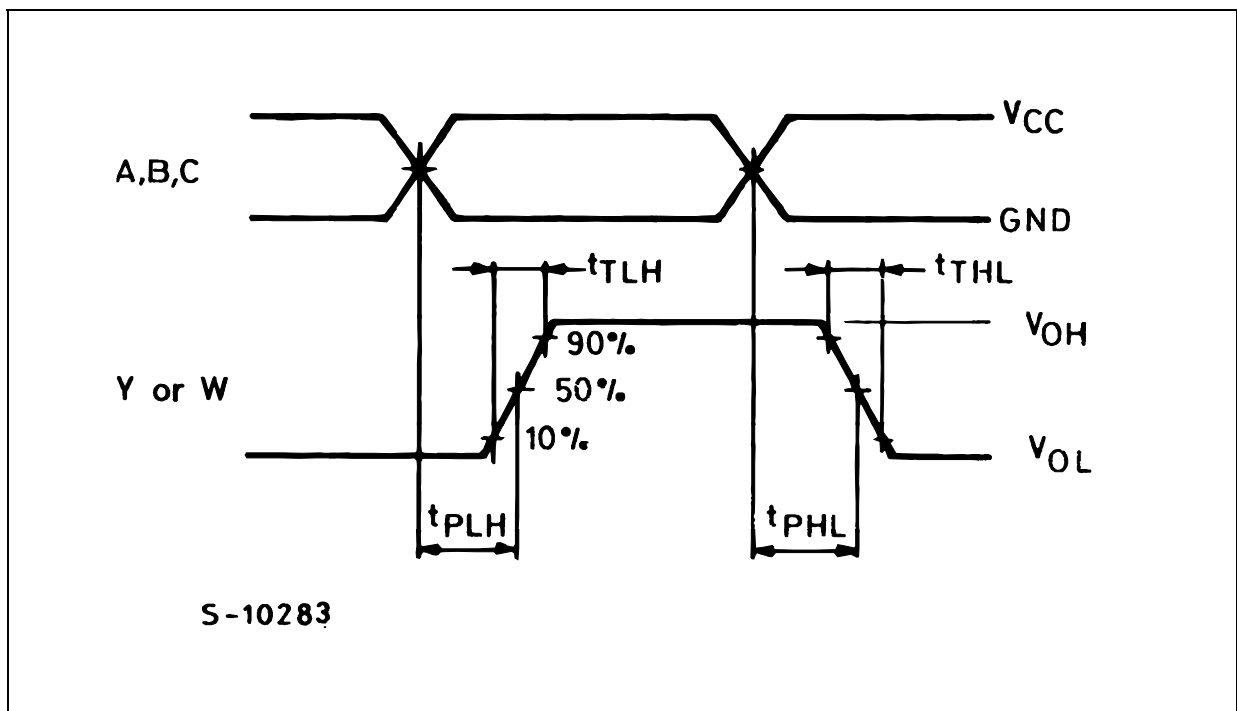
Symbol	Parameter	Test Condition		Value						Unit	
		$V_{CC}$ (V)		$T_A = 25^\circ\text{C}$			$-40 \text{ to } 85^\circ\text{C}$		$-55 \text{ to } 125^\circ\text{C}$		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
$C_{IN}$	Input Capacitance	5.0			5	10		10		10	pF
$C_{PD}$	Power Dissipation Capacitance (note 1)	5.0			63						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.  $I_{CC(oper)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

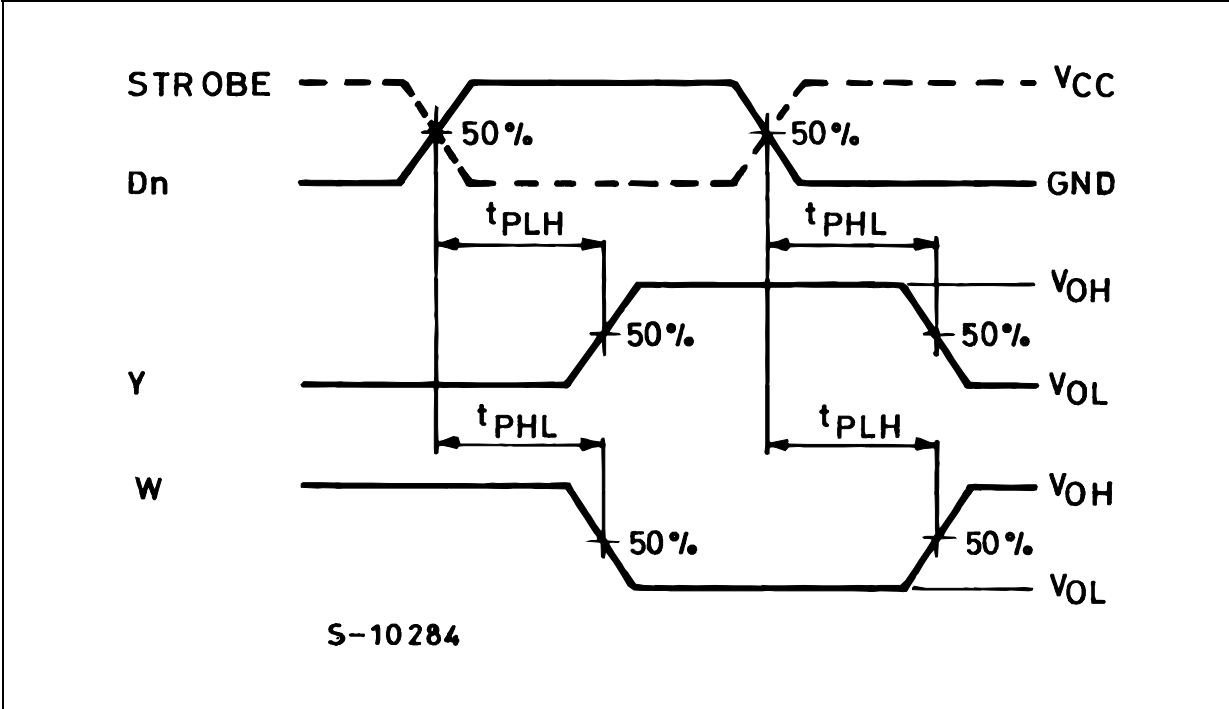
## TEST CIRCUIT



$C_L = 50\text{pF}$  or equivalent (includes jig and probe capacitance)  
 $R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

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

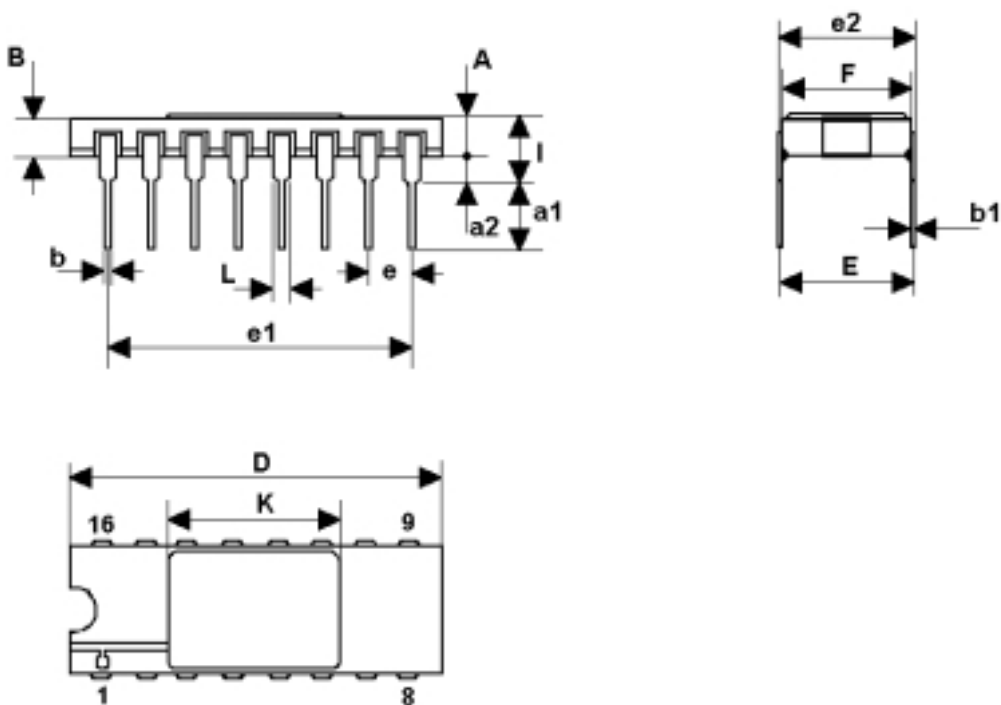
WAVEFORM 2: PROPAGATION DELAY TIMES (f=1MHz; 50% duty cycle)





## DILC-16 MECHANICAL DATA

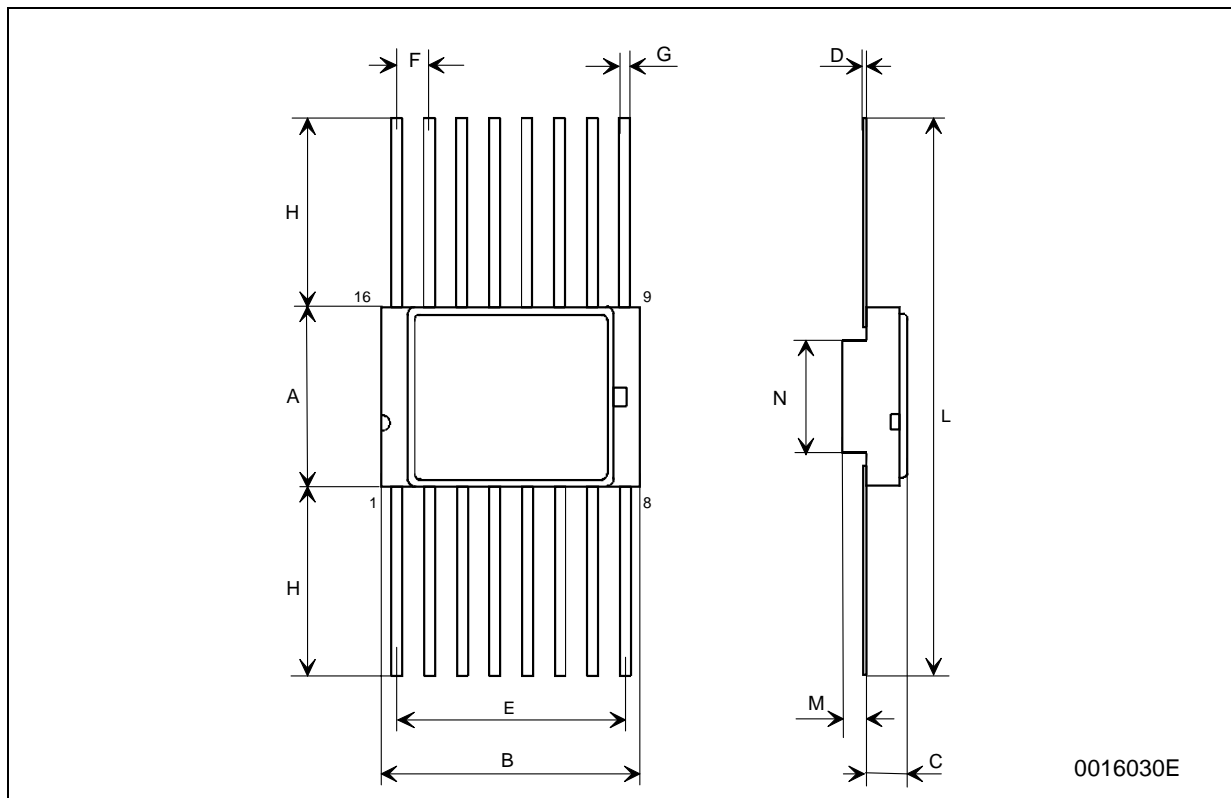
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.1		2.71	0.083		0.107
a1	3.00		3.70	0.118		0.146
a2	0.63	0.88	1.14	0.025	0.035	0.045
B	1.82		2.39	0.072		0.094
b	0.40	0.45	0.50	0.016	0.018	0.020
b1	0.20	0.254	0.30	0.008	0.010	0.012
D	20.06	20.32	20.58	0.790	0.800	0.810
e	7.36	7.62	7.87	0.290	0.300	0.310
e1		2.54			0.100	
e2	17.65	17.78	17.90	0.695	0.700	0.705
e3	7.62	7.87	8.12	0.300	0.310	0.320
F	7.29	7.49	7.70	0.287	0.295	0.303
I			3.83			0.151
K	10.90		12.1	0.429		0.476
L	1.14		1.5	0.045		0.059



0056437F

**FPC-16 MECHANICAL DATA**

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	6.75	6.91	7.06	0.266	0.272	0.278
B	9.76	9.94	10.14	0.384	0.392	0.399
C	1.49		1.95	0.059		0.077
D	0.102	0.127	0.152	0.004	0.005	0.006
E	8.76	8.89	9.01	0.345	0.350	0.355
F		1.27			0.050	
G	0.38	0.43	0.48	0.015	0.017	0.019
H	6.0			0.237		
L	18.75		22.0	0.738		0.867
M	0.33	0.38	0.43	0.013	0.015	0.017
N		4.31			0.170	



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