

## MM74HC151 8-Channel Digital Multiplexer

### General Description

The MM74HC151 high speed Digital multiplexer utilizes advanced silicon-gate CMOS technology. Along with the high noise immunity and low power dissipation of standard CMOS integrated circuits, it possesses the ability to drive 10 LS-TTL loads. The MM74HC151 selects one of the 8 data sources, depending on the address presented on the A, B, and C inputs. It features both true (Y) and complement (W) outputs. The STROBE input must be at a low logic level to enable this multiplexer. A high logic level at the STROBE forces the W output HIGH and the Y output LOW.

The 74HC logic family is functionally as well as pin-out compatible with the standard 74LS logic family. All inputs are protected from damage due to static discharge by internal diode clamps to  $V_{CC}$  and ground.

### Features

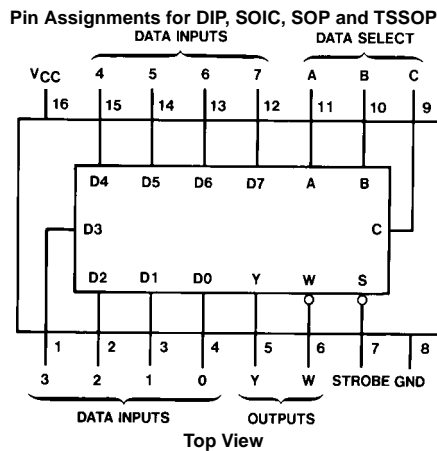
- Typical propagation delay data select to output Y: 26 ns
- Wide operating supply voltage range: 2–6V
- Low input current: 1  $\mu$ A maximum
- Low quiescent supply current: 80  $\mu$ A maximum (74HC)
- High output drive current: 4 mA minimum

### Ordering Code:

Order Number	Package Number	Package Description
MM74HC151M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
MM74HC151SJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
MM74HC151MTC	MTC16	16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
MM74HC151N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

### Connection Diagram



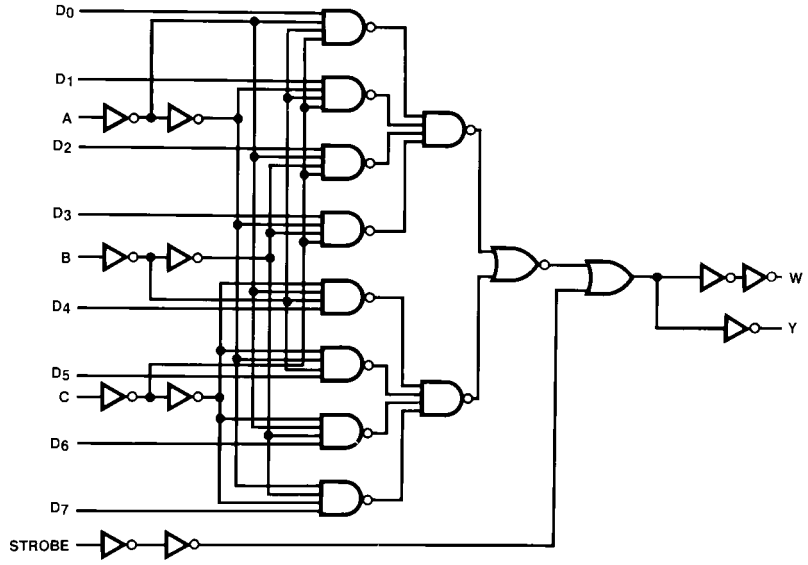
### Truth Table

Inputs				Outputs	
Select			Strobe S	Y	W
C	B	A			
X	X	X	H	L	H
L	L	L	L	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$

H = HIGH Level, L = LOW Level, X = Don't Care  
D0, D1...D7 = the level of the respective D input

MM74HC151

### Logic Diagram



**Absolute Maximum Ratings** (Note 1)

(Note 2)

Supply Voltage ( $V_{CC}$ )	-0.5 to +7.0V
DC Input Voltage ( $V_{IN}$ )	-1.5 to $V_{CC} + 1.5V$
DC Output Voltage ( $V_{OUT}$ )	-0.5 to $V_{CC} + 0.5V$
Clamp Diode Current ( $I_{IK}, I_{OK}$ )	$\pm 20$ mA
DC Output Current, per pin ( $I_{OUT}$ )	$\pm 25$ mA
DC $V_{CC}$ or GND Current, per pin ( $I_{CC}$ )	$\pm 50$ mA
Storage Temperature Range ( $T_{STG}$ )	-65°C to +150°C
Power Dissipation ( $P_D$ )	
(Note 3)	600 mW
S.O. Package only	500 mW
Lead Temperature ( $T_L$ )	260°C
(Soldering 10 seconds)	

**Recommended Operating Conditions**

	Min	Max	Units
Supply Voltage ( $V_{CC}$ )	2	6	V
DC Input or Output Voltage ( $V_{IN}, V_{OUT}$ )	0	$V_{CC}$	V
Operating Temperature Range ( $T_A$ )	-40	+85	°C
Input Rise or Fall Times ( $t_r, t_f$ )			
$V_{CC} = 2.0V$		1000	ns
$V_{CC} = 4.5V$		500	ns
$V_{CC} = 6.0V$		400	ns

**Note 1:** Absolute Maximum Ratings are those values beyond which damage to the device may occur.

**Note 2:** Unless otherwise specified all voltages are referenced to ground.

**Note 3:** Power Dissipation temperature derating — plastic "N" package: — 12 mW/°C from 65°C to 85°C.

**DC Electrical Characteristics** (Note 4)

Symbol	Parameter	Conditions	$V_{CC}$	$T_A = 25^\circ C$			$T_A = -40 \text{ to } 85^\circ C$			$T_A = -55 \text{ to } 125^\circ C$			Units
				Typ	Guaranteed Limits		Guaranteed Limits		Guaranteed Limits				
$V_{IH}$	Minimum HIGH Level Input Voltage		2.0V		1.5	1.5	1.5					V	
			4.5V		3.15	3.15	3.15				V		
			6.0V		4.2	4.2	4.2				V		
$V_{IL}$	Maximum LOW Level Input Voltage		2.0V		0.5	0.5	0.5					V	
			4.5V		1.35	1.35	1.35				V		
			6.0V		1.8	1.8	1.8				V		
$V_{OH}$	Minimum HIGH Level Output Voltage	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $ I_{OUT}  \leq 20 \mu A$	2.0V	2.0	1.9	1.9	1.9					V	
			4.5V	4.5	4.4	4.4	4.4				V		
			6.0V	6.0	5.9	5.9	5.9				V		
		$V_{IN} = V_{IH} \text{ or } V_{IL}$ $ I_{OUT}  \leq 4.0 \text{ mA}$ $ I_{OUT}  \leq 5.2 \text{ mA}$	4.5V	4.2	3.98	3.84	3.7				V		
			6.0V	5.7	5.48	5.34	5.2				V		
$V_{OL}$	Maximum LOW Level Output Voltage	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $ I_{OUT}  \leq 20 \mu A$	2.0V	0	0.1	0.1	0.1					V	
			4.5V	0	0.1	0.1	0.1				V		
			6.0V	0	0.1	0.1	0.1				V		
		$V_{IN} = V_{IH} \text{ or } V_{IL}$ $ I_{OUT}  \leq 4.0 \text{ mA}$ $ I_{OUT}  \leq 5.2 \text{ mA}$	4.5V	0.2	0.26	0.33	0.4				V		
			6.0V	0.2	0.26	0.33	0.4				V		
$I_{IN}$	Maximum Input Current	$V_{IN} = V_{CC} \text{ or } GND$	6.0V		$\pm 0.1$	$\pm 1.0$	$\pm 1.0$				$\mu A$		
$I_{CC}$	Maximum Quiescent Supply Current	$V_{IN} = V_{CC} \text{ or } GND$ $I_{OUT} = 0 \mu A$	6.0V		8.0	80	160				$\mu A$		

**Note 4:** For a power supply of  $5V \pm 10\%$  the worst case output voltages ( $V_{OH}$  and  $V_{OL}$ ) occur for HC at 4.5V. Thus the 4.5V values should be used when designing with this supply. Worst case  $V_{IH}$  and  $V_{IL}$  occur at  $V_{CC} = 5.5V$  and 4.5V respectively. (The  $V_{IH}$  value at 5.5V is 3.85V.) The worst case leakage current ( $I_{IN}$ ,  $I_{CC}$ , and  $I_{OZ}$ ) occur for CMOS at the higher voltage and so the 6.0V values should be used.

**AC Electrical Characteristics** $V_{CC} = 5V, T_A = 25^\circ C, C_L = 15 \text{ pF}, t_r = t_f = 6 \text{ ns}$ 

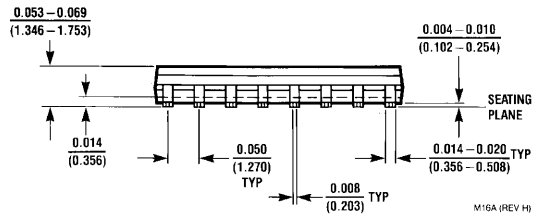
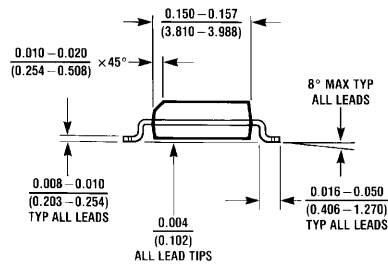
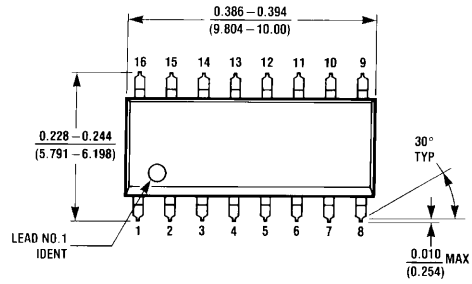
Symbol	Parameter	Conditions	Typ	Guaranteed Limit	Units
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay A, B or C to Y		26	35	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay A, B or C to W		27	35	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay Any D to Y		22	29	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay any D to W		24	32	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay Strobe to Y		17	23	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay Strobe to W		16	21	ns

**AC Electrical Characteristics** $C_L = 50 \text{ pF}, t_r = t_f = 6 \text{ ns}$  (unless otherwise specified)

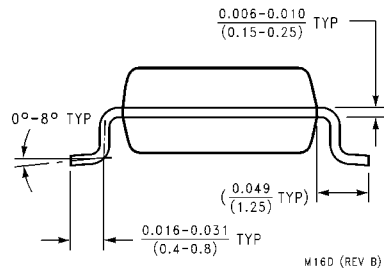
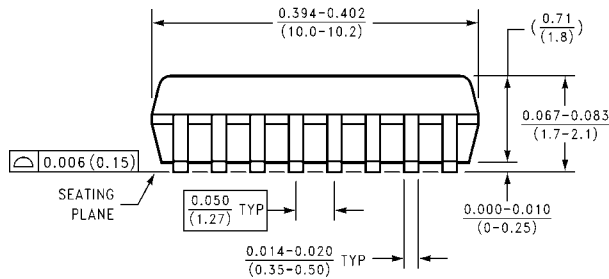
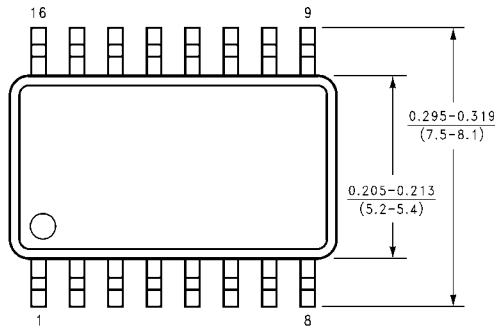
Symbol	Parameter	Conditions	$V_{CC}$	$T_A = 25^\circ C$		$T_A = -40 \text{ to } 85^\circ C$	$T_A = -55 \text{ to } 125^\circ C$	Units
				Typ	Guaranteed Limits			
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay A, B or C to Y		2.0V	90	205	256	300	ns
			4.5V	31	41	51	60	ns
			6.0V	26	35	44	51	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay A, B or C to W		2.0V	95	205	256	300	ns
			4.5V	32	41	51	60	ns
			6.0V	27	35	44	51	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay any D to Y		2.0V	70	195	244	283	ns
			4.5V	27	39	49	57	ns
			6.0V	23	33	41	48	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay any D to W		2.0V	75	185	231	268	ns
			4.5V	29	37	46	54	ns
			6.0V	25	32	40	46	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay Strobe to Y		2.0V	50	140	175	203	ns
			4.5V	21	28	35	41	ns
			6.0V	18	24	30	35	ns
$t_{PHL}, t_{PLH}$	Maximum Propagation Delay Strobe to W		2.0V	45	127	159	185	ns
			4.5V	20	25	32	37	ns
			6.0V	17	22	28	32	ns
$t_{TLH}, t_{THL}$	Maximum Output Rise and Fall Time		2.0V	30	75	95	110	ns
			4.5V	8	15	19	22	ns
			6.0V	7	13	16	19	ns
$C_{PD}$	Power Dissipation Capacitance (Note 5)	(per package)		110				pF
$C_{IN}$	Maximum Input Capacitance			5	10	10	10	pF

**Note 5:**  $C_{PD}$  determines the no load dynamic power consumption,  $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$ , and the no load dynamic current consumption,  $I_S = C_{PD} V_{CC} f + I_{CC}$ .

**Physical Dimensions** inches (millimeters) unless otherwise noted

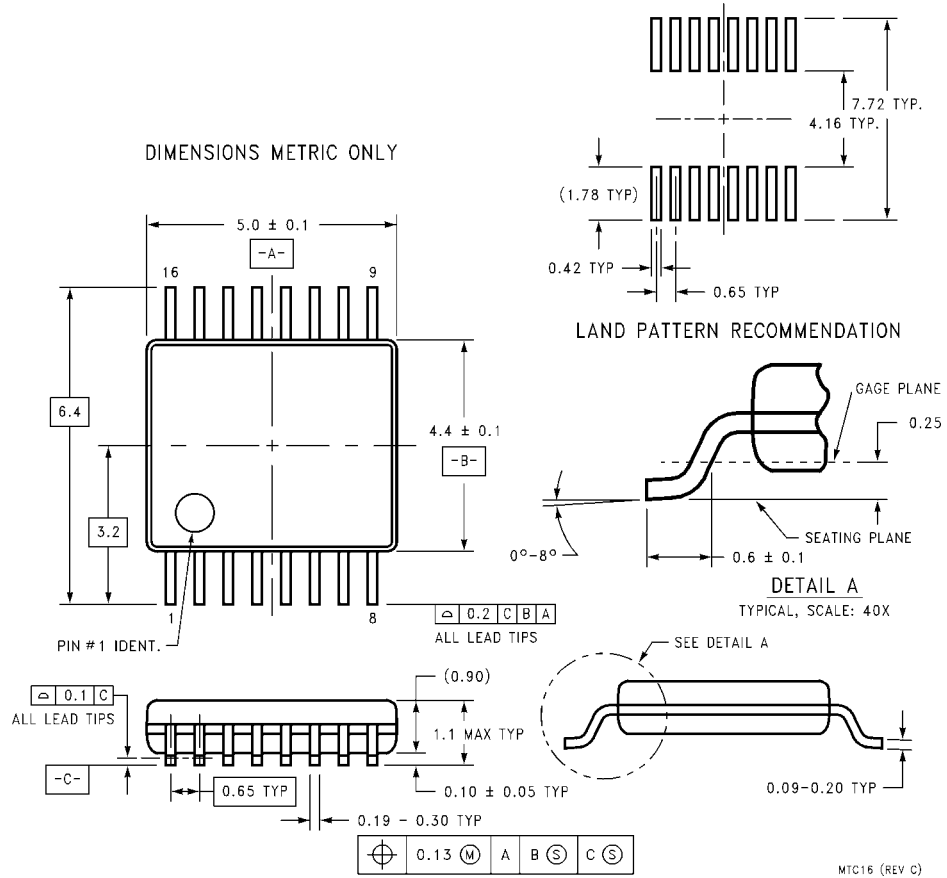


**16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow  
Package Number M16A**



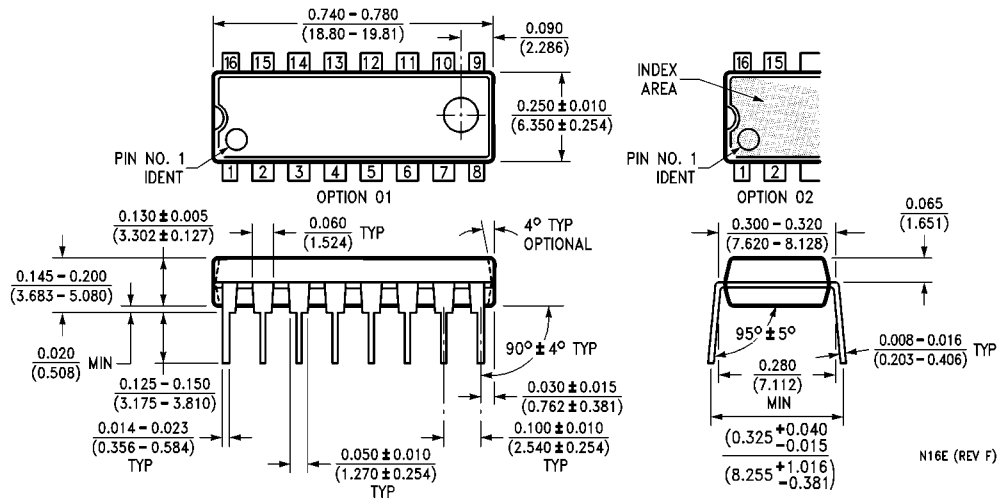
**16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M16D**

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



**16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide  
Package Number MTC16**

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



**16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide Package Number N16E**

N16E (REV F)

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