

MM54C150,MM74C150,MM74C19,MM82C19

MM54C150 MM74C150 16-Line to 1-Line Multiplexer MM72C19 MM82C19

TRI-STATE(RM) 16-Line to 1-Line Multiplexer



Literature Number: SNOS319A

MM54C150/MM74C150 16-Line to 1-Line Multiplexer MM72C19/MM82C19 TRI-STATE® 16-Line to 1-Line Multiplexer

General Description

The MM54C150/MM74C150 and MM72C19/MM82C19 multiplex 16 digital lines to 1 output. A 4-bit address code determines the particular 1-of-16 inputs which is routed to the output. The data is inverted from input to output.

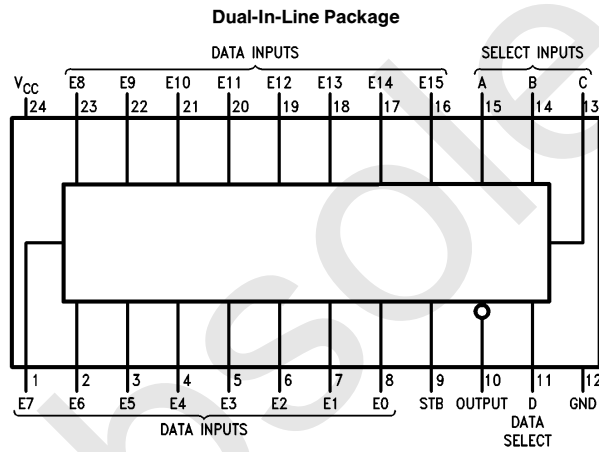
A strobe override places the output of MM54C150/MM74C150 in the logical "1" state and the output of MM72C19/MM82C19 in the high-impedance state.

All inputs are protected from damage due to static discharge by diode clamps to V_{CC} and GND.

Features

- Wide supply voltage range 3.0V to 15V
- Guaranteed noise margin 1.0V
- High noise immunity 0.45 V_{CC} (typ.)
- TTL compatibility Drive 1 TTL Load

Connection Diagram



Order Number MM54C150, MM74C150, MM72C19 or MM82C19

TL/F/5891-1

MM54C150/MM74C150 16-Line to 1-Line Multiplexer
MM72C19/MM82C19 TRI-STATE 16-Line to 1-Line Multiplexer

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Voltage at Any Pin	-0.3V to $V_{CC} + 0.3V$
Operating Temperature Range	-55°C to +125°C
MM54C150, MM72C19	-40°C to +85°C
MM74C150, MM82C19	

Storage Temperature Range	-65°C to +150°C
Power Dissipation	
Dual-In-Line	700 mW
Small Outline	500 mW
Operating V_{CC} Range	3.0V to 15V
V_{CC}	18V
Lead Temperature (soldering, 10 seconds)	260°C

DC Electrical Characteristics

Min/Max limits apply across temperature range unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
CMOS to CMOS						
$V_{IN(1)}$	Logical "1" Input Voltage	$V_{CC} = 5.0V$ $V_{CC} = 10V$	3.5 8.0			V V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC} = 5.0V$ $V_{CC} = 10V$			1.5 2.0	V V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC} = 5.0V, I_O = -10 \mu A$ $V_{CC} = 10V, I_O = -10 \mu A$	4.5 9.0			V V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC} = 5.0V, I_O = +10 \mu A$ $V_{CC} = 10V, I_O = +10 \mu A$			0.5 1.0	V V
$I_{IN(1)}$	Logical "1" Input Current	$V_{CC} = 15V, V_{IN} = 15V$		0.005	1.0	V
$I_{IN(0)}$	Logical "0" Input Current	$V_{CC} = 15V, V_{IN} = 0V$	-1.0	-0.005		μA
I_{OZ}	Output Current in High Impedance State MM72C19/MM82C19	$V_{CC} = 15V, V_O = 15V$ $V_{CC} = 15V, V_O = 0V$	-1.0	0.005 -0.005	1.0	μA μA
I_{CC}	Supply Current	$V_{CC} = 15V$		0.05	300	μA
CMOS/LPTTL Interface						
$V_{IN(1)}$	Logical "1" Input Voltage	54C, 72C, $V_{CC} = 4.5V$ 74C, 82C, $V_{CC} = 4.75V$	$V_{CC} - 1.5$ $V_{CC} - 1.5$			V V
$V_{IN(0)}$	Logical "0" Input Voltage	54C, 72C, $V_{CC} = 4.5V$ 74C, 82C, $V_{CC} = 4.75V$			0.8 0.8	V V
$V_{OUT(1)}$	Logical "1" Output Voltage	54C, 72C, $V_{CC} = 4.5V, I_O = -1.6 mA$ 74C, 82C, $V_{CC} = 4.75V, I_O = -1.6 mA$	2.4 2.4			V V
$V_{OUT(0)}$	Logical "0" Output Voltage	54C, 72C, $V_{CC} = 4.5V, I_O = 1.6 mA$ 74C, 82C, $V_{CC} = 4.75V, I_O = 1.6 mA$			0.4 0.4	V V
Output Drive (Short Circuit Current)						
I_{SOURCE}	Output Source Current (P-Channel)	$V_{CC} = 5.0V, V_{OUT} = 0V, T_A = 25^\circ C$	-4.35	-8		mA
I_{SOURCE}	Output Source Current (P-Channel)	$V_{CC} = 10V, V_{OUT} = 0V, T_A = 25^\circ C$	-20	-40		mA
I_{SINK}	Output Sink Current (N-Channel)	$V_{CC} = 5.0V, V_{OUT} = V_{CC}, T_A = 25^\circ C$	4.35	8		mA
I_{SINK}	Output Sink Current (N-Channel)	$V_{CC} = 10V, V_{OUT} = V_{CC}, T_A = 25^\circ C$	20	40		mA

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

AC Electrical Characteristics* $T_A = 25^\circ\text{C}$, $C_L = 50\text{ pF}$, unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd0} , t_{pd1}	Propagation Delay Time to a Logical "0" or Logical "1" from Data Inputs to Output	$V_{CC} = 5.0\text{V}$ $V_{CC} = 10\text{V}$ $V_{CC} = 5.0\text{V}$, $C_L = 150\text{ pF}$ $V_{CC} = 10\text{V}$, $C_L = 150\text{ pF}$		250 110 290 120	600 300 650 330	ns ns ns ns
t_{pd0} , t_{pd1}	Propagation Delay Time to a Logical "0" or Logical "1" from Data Select Inputs to Output	$V_{CC} = 5.0\text{V}$ $V_{CC} = 10\text{V}$		290 120	650 330	ns ns
t_{pd0} , t_{pd1}	Propagation Delay Time to a Logical "0" or Logical "1" from Strobe to Output MM54C150/MM74C150	$V_{CC} = 5.0\text{V}$ $V_{CC} = 10\text{V}$		120 55	300 150	ns ns
t_{1H} , t_{0H}	Delay from Strobe to High Impedance State MM72C19/MM82C19	$V_{CC} = 5.0\text{V}$, $R_L = 10\text{k}$, $C_L = 5\text{ pF}$ $V_{CC} = 10\text{V}$, $R_L = 10\text{k}$, $C_L = 5\text{ pF}$		80 60	200 150	ns ns
t_{H1} , t_{H0}	Delay from Strobe to Logical "1" Level or to Logical "0" Level (from High Impedance State) MM72C19/MM82C19	$V_{CC} = 5.0\text{V}$, $R_L = 10\text{k}$, $C_L = 5\text{ pF}$ $V_{CC} = 10\text{V}$, $R_L = 10\text{k}$, $C_L = 5\text{ pF}$		80 30	250 120	ns ns
C_{IN}	Input Capacitance	Any Input (Note 2)		5.0		pF
C_{OUT}	Output Capacitance MM72C19/MM82C19	(Note 2)		11.0		pF
C_{PD}	Power Dissipation Capacitance	(Note 3)		100		pF

*AC Parameters are guaranteed by DC correlated testing.

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

Note 2: Capacitance is guaranteed by periodic testing.

Note 3: C_{PD} determines the no load AC power consumption of any CMOS device. For complete explanation, see 54C/74C Family Characteristics, application note AN-90.

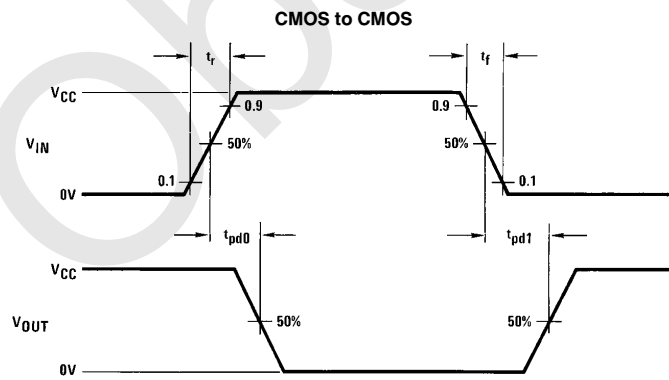
Truth Table

MM54C150/MM74C150

				Inputs															Output			
D	C	B	A	STROBE	E0	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	W	
X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1*
0	0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
0	0	0	0	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
0	0	0	1	0	0	X	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1
0	0	0	1	0	0	X	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
0	0	1	0	0	0	X	X	0	X	X	X	X	X	X	X	X	X	X	X	X	X	1
0	0	1	0	0	0	X	X	1	X	X	X	X	X	X	X	X	X	X	X	X	X	0
0	0	1	1	0	0	X	X	X	0	X	X	X	X	X	X	X	X	X	X	X	X	1
0	0	1	1	0	0	X	X	X	1	X	X	X	X	X	X	X	X	X	X	X	X	0
0	1	0	0	0	0	X	X	X	0	X	X	X	X	X	X	X	X	X	X	X	X	1
0	1	0	0	0	0	X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	X	0
0	1	0	1	0	0	X	X	X	X	0	X	X	X	X	X	X	X	X	X	X	X	1
0	1	0	1	0	0	X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	X	0
0	1	1	0	0	0	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	X	1
0	1	1	0	0	0	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	0
0	1	1	1	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
0	1	1	1	0	0	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	0
1	0	0	0	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	0	0	0	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	0	0	1	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	0	0	1	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	0	1	0	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	0	1	0	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	0	1	1	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	0	1	1	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	0	1	1	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	0	1	1	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	1	0	0	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	1	0	0	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	1	0	1	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	1	0	1	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	1	1	0	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	1	1	0	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	1	1	1	0	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	1	1	1	0	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	1	1	1	1	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	1	1	1	1	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0
1	1	1	1	1	0	X	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	1
1	1	1	1	1	0	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X	0

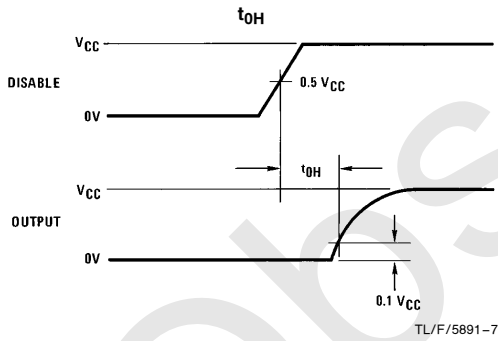
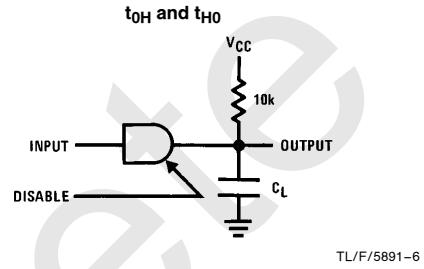
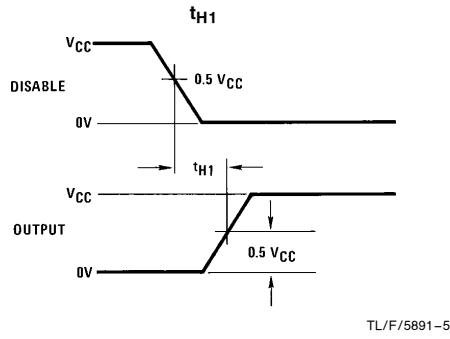
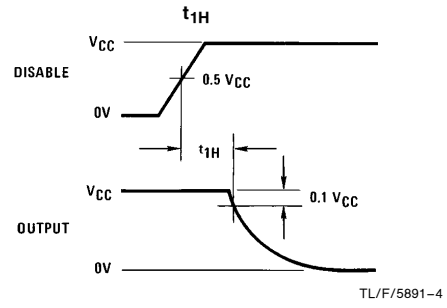
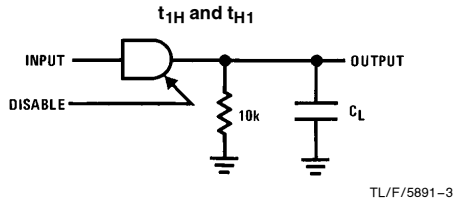
*For MM72C19/MM82C19 this would be Hi-Z, everything else is the same.

Switching Time Waveforms

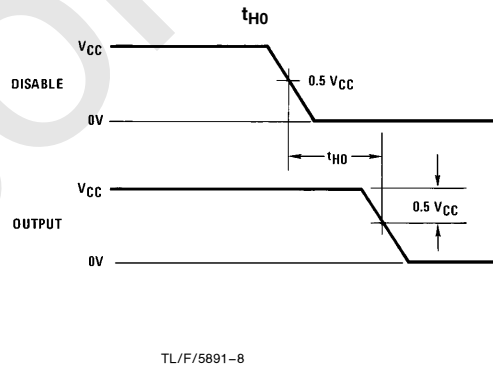


TL/F/5891-2

Switching Time Waveforms (Continued)

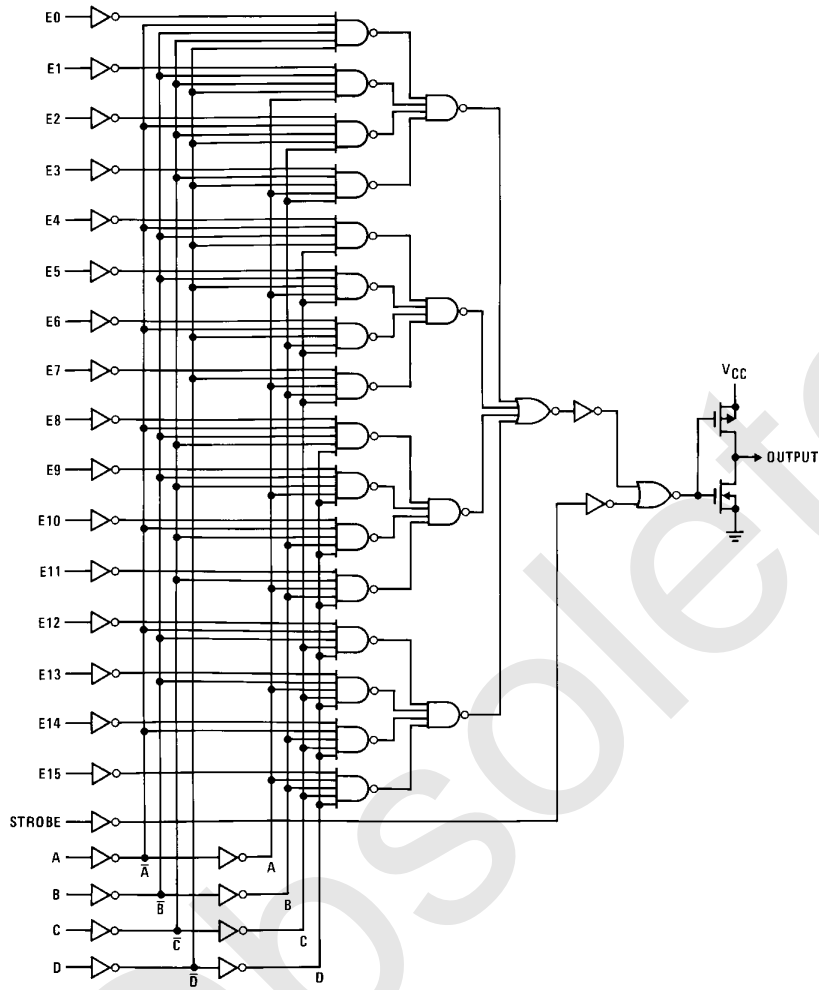


Note: Delays measured with input $t_r, t_f \leq 20$ ns.



Logic Diagrams

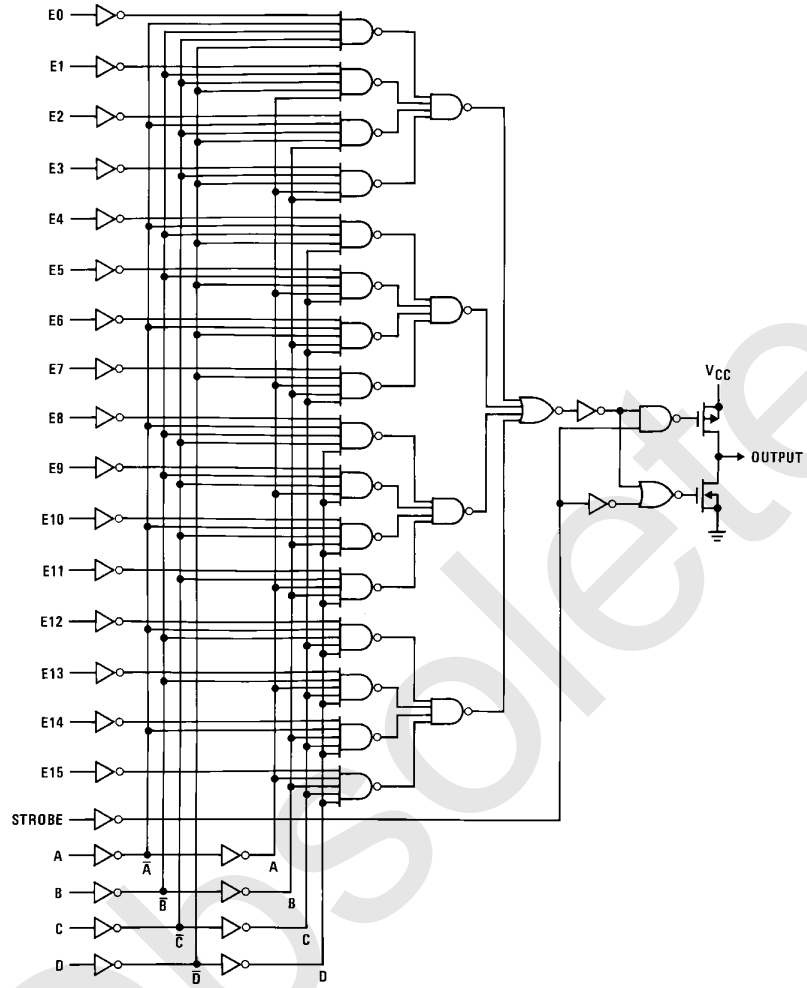
MM54C150/MM74C150



TL/F/5891-9

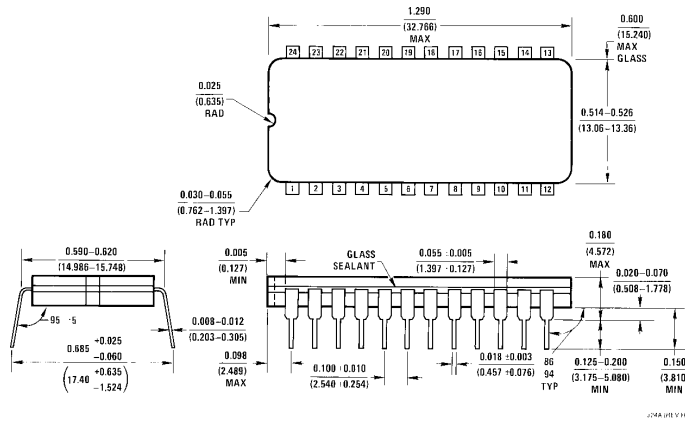
Logic Diagrams (Continued)

MM72C19/MM82C19

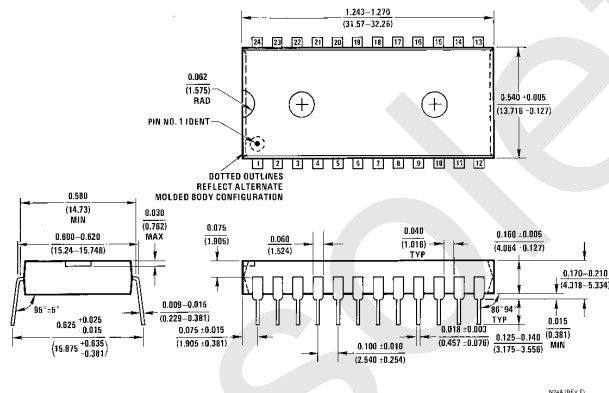


TL/F/5891-10

Physical Dimensions inches (millimeters)



Ceramic Dual-In-Line Package (J)
 Order Number MM54C150J or MM74C150J, MM72C19J or MM82C19J
 NS Package Number J24A



Molded Dual-In-Line Package (N)
 Order Number MM54C150N, MM74C150N, MM72C19N or MM82C19N
 NS Package Number N24A

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

 <p>National Semiconductor Corporation 1111 West Bardin Road Arlington, TX 76017 Tel: 1(800) 272-9959 Fax: 1(800) 737-7018</p>	<p>National Semiconductor Europe</p> <p>Fax: (+49) 0-180-530 85 86 Email: cnjwge@tevm2.nsc.com Deutsch Tel: (+49) 0-180-530 85 85 English Tel: (+49) 0-180-532 78 32 Français Tel: (+49) 0-180-532 93 58 Italiano Tel: (+49) 0-180-534 16 80</p>	<p>National Semiconductor Hong Kong Ltd. 19th Floor, Straight Block, Ocean Centre, 5 Canton Rd. Tsimshatsui, Kowloon Hong Kong Tel: (852) 2737-1600 Fax: (852) 2736-9960</p>	<p>National Semiconductor Japan Ltd. Tel: 81-043-299-2309 Fax: 81-043-299-2408</p>
--	--	---	---

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Mobile Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Transportation and Automotive	www.ti.com/automotive
Video and Imaging	www.ti.com/video

TI E2E Community Home Page

e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2011, Texas Instruments Incorporated