

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

MM74HC125, MM74HC126

3-STATE Quad Buffers

Features

- Typical propagation delay: 13ns
- Wide operating voltage range: 2V–6V
- Low input current: 1μA maximum
- Low quiescent current: 80μA maximum (74HC)
- Fanout of 15 LS-TTL loads

General Description

The MM74HC125 and MM74HC126 are general purpose 3-STATE high speed non-inverting buffers utilizing advanced silicon-gate CMOS technology. They have high drive current outputs which enable high speed operation even when driving large bus capacitances. These circuits possess the low power dissipation of CMOS circuitry, yet have speeds comparable to low power Schottky TTL circuits. Both circuits are capable of driving up to 15 low power Schottky inputs.

The MM74HC125 require the 3-STATE control input C to be taken high to put the output into the high impedance condition, whereas the MM74HC126 require the control input to be low to put the output into high impedance.

All inputs are protected from damage due to static discharge by diodes to V_{CC} and ground.

Ordering Information

Order Number	Package Number	Package Description
MM74HC125M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
MM74HC125SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
MM74HC125MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
MM74HC125N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
MM74HC126M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
MM74HC126SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
MM74HC126MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
MM74HC126N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

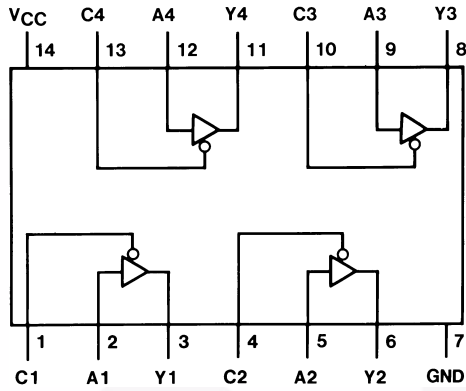
Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering number.



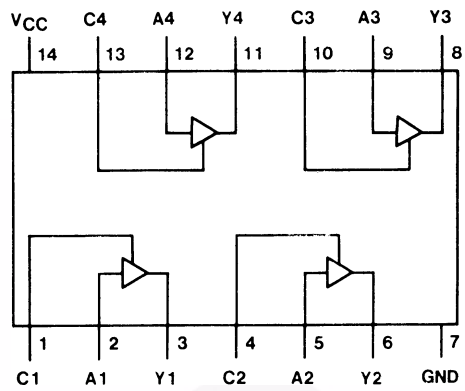
All packages are lead free per JEDEC: J-STD-020B standard.

Connection Diagrams

Pin Assignments for DIP, SOIC, SOP and TSSOP



Top View (MM74HC125)



Top View (MM74HC126)

Truth Tables

Inputs		Output
A	C	Y
H	L	H
L	L	L
X	H	Z

MM74HC125

Inputs		Output
A	C	Y
H	H	H
L	H	L
X	L	Z

MM74HC126

Absolute Maximum Ratings⁽¹⁾

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	-0.5 to +7.0V
V_{IN}	DC Input Voltage	-1.5 to $V_{CC}+1.5V$
V_{OUT}	DC Output Voltage	-0.5 to $V_{CC}+0.5V$
I_{IK}, I_{OK}	Clamp Diode Current	$\pm 20mA$
I_{OUT}	DC Output Current, per pin	35mA
I_{CC}	DC V_{CC} or GND Current, per pin	$\pm 70mA$
T_{STG}	Storage Temperature Range	-65°C to +150°C
P_D	Power Dissipation Note 2	600mW
	S.O. Package only	500mW
T_L	Lead Temperature (Soldering 10 seconds)	260°C

Notes:

1. Unless otherwise specified all voltages are referenced to ground.
2. Power Dissipation temperature derating — plastic "N" package: -12mW/°C from 65°C to 85°C.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

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

DC Electrical Characteristics⁽³⁾

Symbol	Parameter	Conditions	V _{CC} (V)	T _A = 25°C			T _A = -40°C to 85°C	T _A = -40°C to 125°C	Units
				Typ.	Guaranteed Limits				
V _{IH}	Minimum 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}	Maximum 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}	Minimum HIGH Level Output Voltage	V _{IN} = V _{IH} or V _{IL} , I _{OUT} ≤ 20μA	2.0	2.0	1.9	1.9	1.9	V	
			4.5	4.5	4.4	4.4	4.4		
			6.0	6.0	5.9	5.9	5.9		
		4.5	4.2	3.98	3.84	3.7			
		6.0	5.7	5.48	5.34	5.2			
V _{OL}	Maximum LOW Level Output Voltage	V _{IN} = V _{IH} or V _{IL} , I _{OUT} ≤ 20μA	2.0	0	0.1	0.1	0.1	V	
			4.5	0	0.1	0.1	0.1		
			6.0	0	0.1	0.1	0.1		
		4.5	0.2	0.26	0.33	0.4			
		6.0	0.2	0.26	0.33	0.4			
I _{OZ}	Maximum 3-STATE Output Leakage Current	V _{IN} = V _{IH} or V _{IL} , V _{OUT} = V _{CC} or GND, C _n = Disabled	6.0		±0.5	±5	±10	μA	
I _{IN}	Maximum Input Current	V _{IN} = V _{CC} or GND	6.0		±0.1	±1.0	±1.0	μA	
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND, I _{OUT} = 0μA	6.0		8.0	80	160	μA	

Note:

3. For a power supply of 5V ±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 $V_{CC} = 5V$, $T_A = 25^\circ C$, $C_L = 45pF$, $t_r = t_f = 6ns$

Symbol	Parameter	Conditions	Typ.	Guaranteed Limit	Units
t_{PHL} , t_{PLH}	Maximum Propagation Delay Time		13	18	ns
t_{PZH}	Maximum Output Enable Time to HIGH Level	$R_L = 1k\Omega$	13	25	ns
t_{PHZ}	Maximum Output Disable Time from HIGH Level	$R_L = 1k\Omega$, $C_L = 5pF$	17	25	ns
t_{PZL}	Maximum Output Enable Time to LOW Level	$R_L = 1k\Omega$	18	25	ns
t_{PLZ}	Maximum Output Disable Time from LOW Level	$R_L = 1k\Omega$, $C_L = 5pF$	13	25	ns

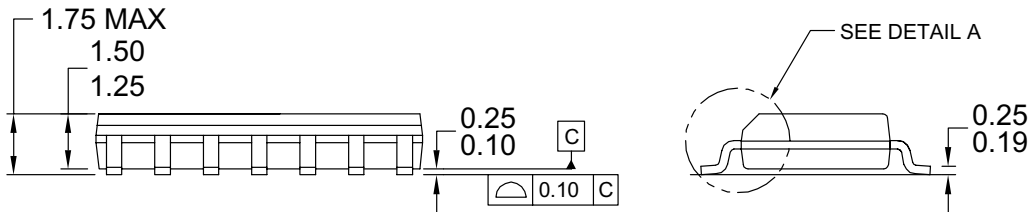
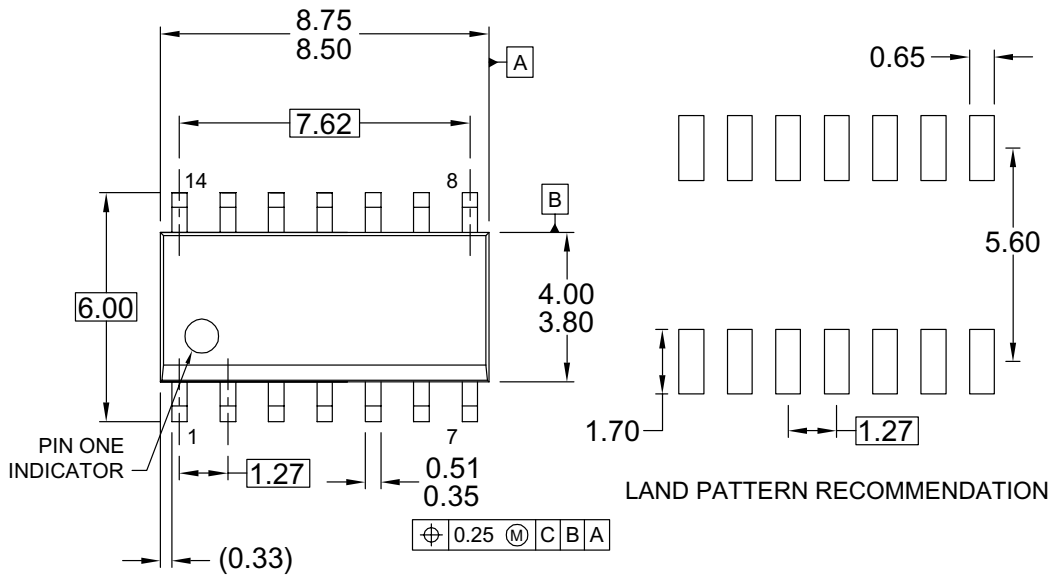
AC Electrical Characteristics $V_{CC} = 2.0V$ to $6.0V$, $C_L = 50pF$, $t_r = t_f = 6ns$ (unless otherwise specified)

Symbol	Parameter	V_{CC} (V)	Conditions	$T_A = 25^\circ C$		$T_A = -40^\circ C$ to $85^\circ C$		$T_A = -40^\circ C$ to $125^\circ C$		Units
				Typ.	Guaranteed Limits	Guaranteed Limits	Guaranteed Limits			
t_{PHL} , t_{PLH}	Maximum Propagation Delay Time	2.0		40	100	125	150	ns		
		4.5		14	20	25	30			
		6.0		12	17	21	25			
t_{PLH} , t_{PHL}	Maximum Propagation Delay Time	2.0	$C_L = 150pF$	35	130	163	195	ns		
		4.5		14	26	33	39			
		6.0		12	22	28	39			
t_{PZH} , t_{PZL}	Maximum Output Enable Time	2.0	$R_L = 1k\Omega$	25	125	156	188	ns		
		4.5		14	25	31	38			
		6.0		12	21	26	31			
t_{PHZ} , t_{PLZ}	Maximum Output Disable Time	2.0	$R_L = 1k\Omega$	25	125	156	188	ns		
		4.5		14	25	31	38			
		6.0		12	21	26	31			
t_{PZL} , t_{PZH}	Maximum Output Enable Time	2.0	$C_L = 150pF$, $R_L = 1k\Omega$	35	140	175	210	ns		
		4.5		15	28	35	42			
		6.0		13	24	30	36			
t_{TLH} , t_{THL}	Maximum Output Rise and Fall Time	2.0V	$C_L = 50pF$	30	60	75	90	ns		
		4.5V		7	12	15	18			
		6.0V		6	10	13	15			
C_{IN}	Input Capacitance			5	10	10	10	pF		
C_{OUT}	Output Capacitance Outputs			15	20	20	20	pF		
C_{PD}	Power Dissipation Capacitance (per gate) ⁽⁴⁾		Enabled	45				pF		
			Disabled	6						

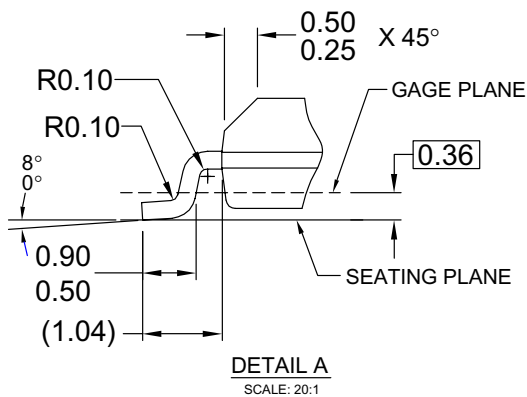
Note:

4. 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



NOTES: UNLESS OTHERWISE SPECIFIED



- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AB, ISSUE C,
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
- D) LANDPATTERN STANDARD: SOIC127P600X145-14M
- E) DRAWING CONFORMS TO ASME Y14.5M-1994
- F) DRAWING FILE NAME: M14AREV13

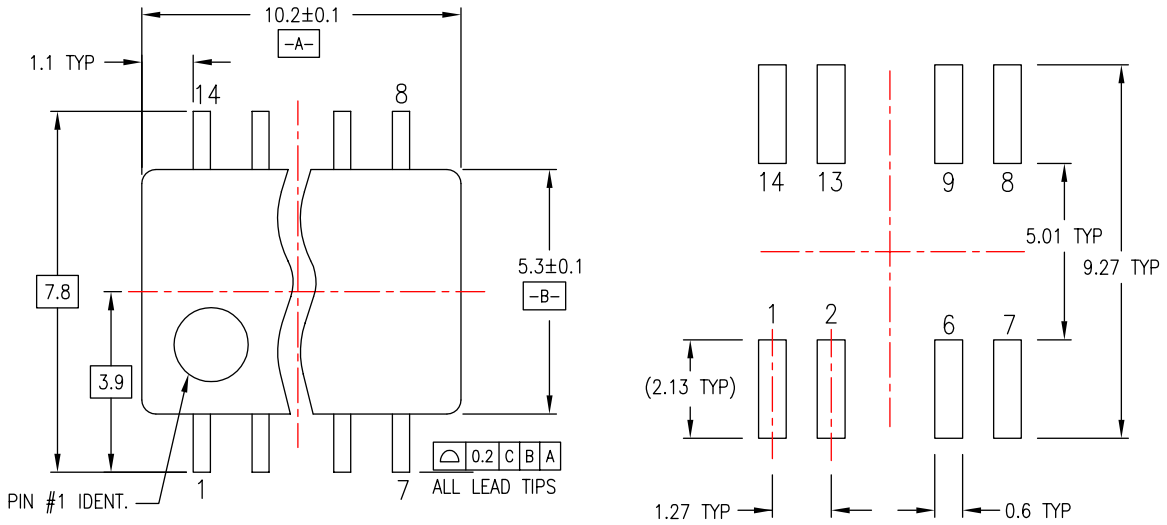
Figure 1. 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow

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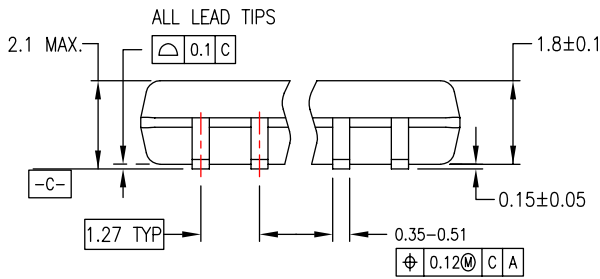
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Physical Dimensions (Continued)



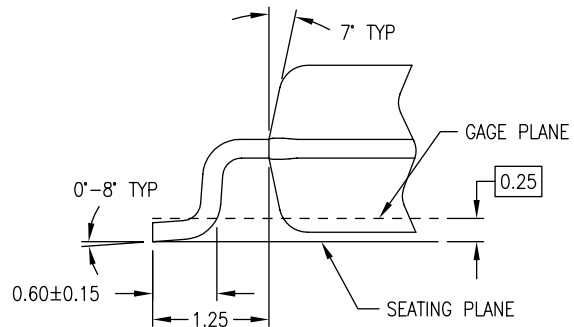
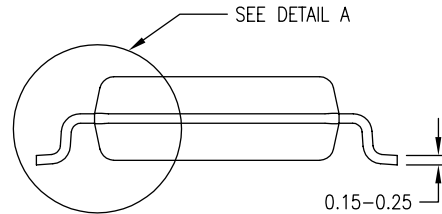
LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS

NOTES:

- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.



DETAIL A

M14DREVC

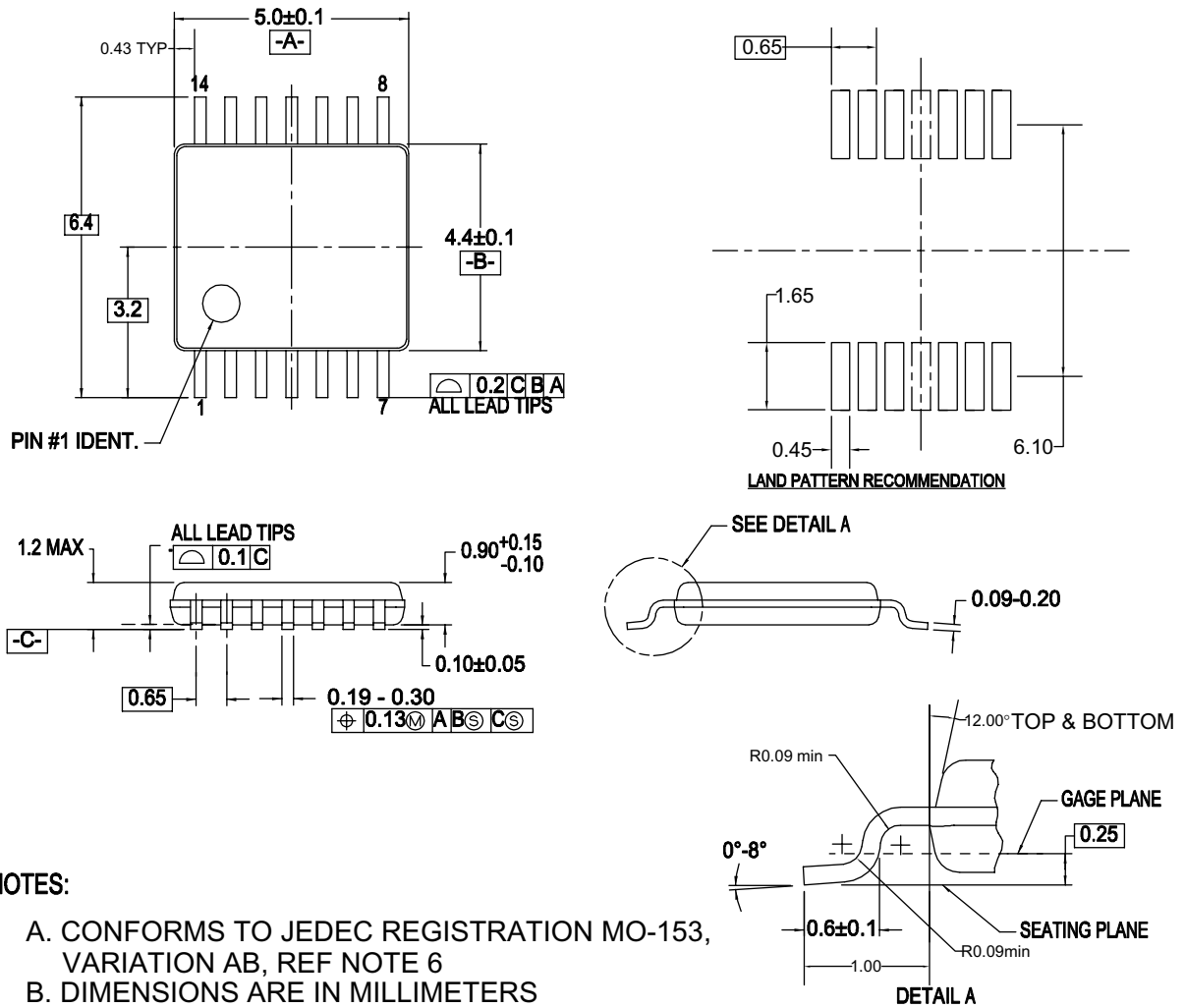
Figure 2. 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

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Physical Dimensions (Continued)



NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6
- B. DIMENSIONS ARE IN MILLIMETERS
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
- D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 1982
- E. LANDPATTERN STANDARD: SOP65P640X110-14M
- F. DRAWING FILE NAME: MTC14REV6

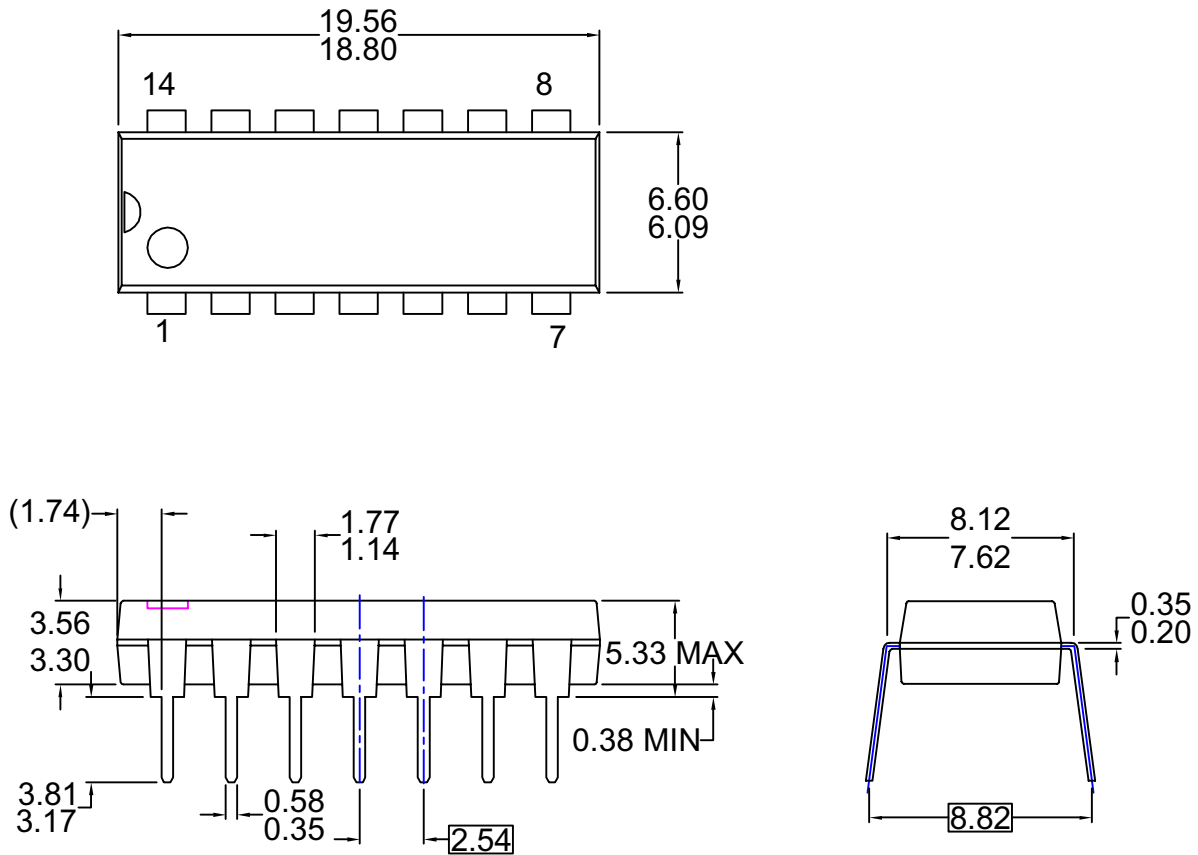
Figure 3. 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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Physical Dimensions (Continued)



- NOTES: UNLESS OTHERWISE SPECIFIED**
THIS PACKAGE CONFORMS TO
A) JEDEC MS-001 VARIATION BA
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS ARE EXCLUSIVE OF BURRS,
MOLD FLASH, AND TIE BAR EXTRUSIONS.
D) DIMENSIONS AND TOLERANCES PER
ASME Y14.5-1994
E) DRAWING FILE NAME: MKT-N14AREV7

Figure 4. 14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

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

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2. A critical component in 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.

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Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor. The datasheet is printed for reference information only.

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