



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

100325 Low Power Hex ECL-to-TTL Translator

General Description

The 100325 is a hex translator for converting F100K logic levels to TTL logic levels. Differential inputs allow each circuit to be used as an inverting, non-inverting or differential receiver. An internal reference voltage generator provides V_{BB} for single-ended operation, or for use in Schmitt trigger applications. All inputs have 50k Ω pull-down resistors. When the inputs are either unconnected or at the same potential the outputs will go LOW.

When used in single-ended operation the apparent input threshold of the true inputs is 20mV to 40mV higher (positive) than the threshold of the complementary inputs. The V_{EE} and V_{TTL} power may be applied in either order.

Features

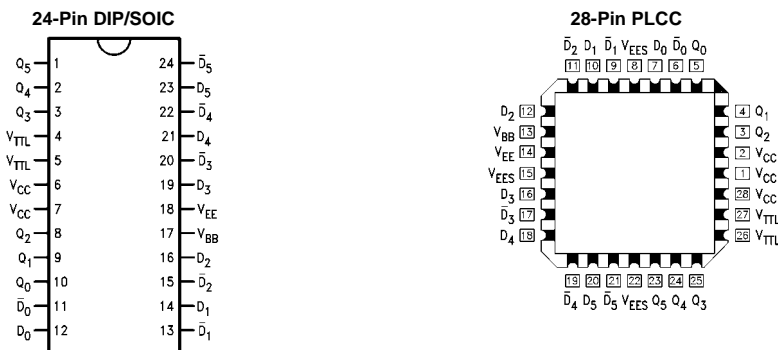
- Pin/function compatible with 100125
- Meets 100125 AC specifications
- 50% power reduction of the 100125
- Differential inputs with built in offset
- Standard FAST® outputs
- 2000V ESD protection
- -4.2V to -5.7V operating range
- Available to industrial grade temperature range

Ordering Code:

Order Number	Package Number	Package Description
100325SC	M24B	24-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
100325PC	N24E	24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-010, 0.400 Wide
100325QI	V28A	28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square
100325QC	V28A	28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square Industrial Temperature Range (-40°C to +85°C)

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

Connection Diagrams



Pin Descriptions

Pin Names	Description
D_0 - D_5	Data Inputs
\bar{D}_0 - \bar{D}_5	Inverting Data Inputs
Q_0 - Q_5	Data Outputs

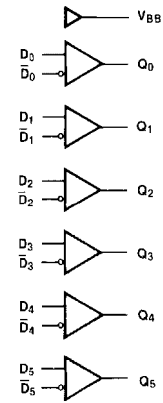
FAST® is a registered trademark of Fairchild Semiconductor Corporation.

Truth Table

Inputs		Outputs
D_n	\bar{D}_n	Q_n
L	H	L
H	L	H
L	L	L
H	H	L
OPEN	OPEN	L
V_{EE}	V_{EE}	L
L	V_{BB}	L
H	V_{BB}	H
V_{BB}	L	H
V_{BB}	H	L

H = HIGH Voltage Level
L = LOW Voltage Level

Logic Diagram



Absolute Maximum Ratings(Note 1)

Storage Temperature (T_{STG})	-65°C to +150°C
Maximum Junction Temperature (T_J)	+150°C
V_{EE} Pin Potential to Ground Pin	-7.0V to +0.5V
V_{TTL} Pin Potential to Ground Pin	-0.5V to +6.0V
Input Voltage (DC)	V_{EE} to +0.5V
Voltage Applied to Output in HIGH State (with $V_{CC} = 0V$)	-0.5V to V_{CC}
Current Applied to Output in LOW State (Max)	twice the rated I_{OL} (mA)
ESD (Note 2)	≥2000V

Recommended Operating Conditions

Case Temperature (T_C)	0°C to +85°C
Commercial	-40°C to +85°C
Industrial	-5.7V to -4.2V
Supply Voltage (V_{EE})	

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum rating. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Note 2: ESD testing conforms to MIL-STD-883, Method 3015.

Commercial Version**DC Electrical Characteristics**

$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = GND$, $V_{TTL} = +4.5V$ to $5.5V$, $T_C = 0°C$ to $+85°C$ (Note 3)

Symbol	Parameter	Min	Typ	Max	Units	Conditions
V_{BB}	Output Reference Voltage	-1380	-1320	-1260	mV	$I_{VBB} = -2.1$ mA
V_{IH}	Single-Ended Input HIGH Voltage	-1165		-870	mV	Guaranteed HIGH Signal for All Inputs (with One Input Tied to V_{BB})
V_{IL}	Single-Ended Input LOW Voltage	-1830		-1475	mV	Guaranteed LOW Signal for All Inputs (with One Input Tied to V_{BB})
V_{OH}	Output HIGH Voltage	2.5			V	$I_{OH} = -2.0$ mA
V_{OL}	Output LOW Voltage			0.5	V	$I_{OL} = 20$ mA
V_{DIFF}	Input Voltage Differential	150			mV	Required for Full Output Swing
V_{CM}	Common Mode Voltage	$V_{CC} - 2.0$		$V_{CC} - 0.5$	V	
I_{IH}	Input HIGH Current			350	μA	$V_{IN} = V_{IH} (Max)$, $D_0-D_5 = V_{BB}$, $\overline{D_0}-\overline{D_5} = V_{IL} (Min)$
I_{IL}	Input LOW Current	0.5			μA	$V_{IN} = V_{IL} (Min)$, $D_0-D_5 = V_{BB}$
I_{OS}	Output Short-Circuit Current	-150		-60	mA	$V_{OUT} = GND$ (Note 4)
I_{EE}	V_{EE} Power Supply Current	-37	-27	-17	mA	$D_0-D_5 = V_{BB}$
I_{TTL}	V_{TTL} Power Supply Current		45	65	mA	$D_0-D_5 = V_{BB}$

Note 3: The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

Note 4: Test one output at a time.

DIP AC Electrical Characteristics

$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = GND$, $V_{TTL} = +4.5V$ to $+5.5V$

Symbol	Parameter	$T_C = 0°C$		$T_C = +25°C$		$T_C = +85°C$		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay Data to Output	0.80	3.50	0.90	3.70	1.00	4.00	ns	$C_L = 15$ pF Figures 1, 2
t_{PLH} t_{PHL}	Propagation Delay Data to Output	1.60	4.30	1.70	4.50	1.80	4.80	ns	$C_L = 50$ pF Figures 1, 3

Commercial Version (Continued) SOIC and PLCC AC Electrical Characteristics

$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = GND$, $V_{TTL} = +4.5V$ to $+5.5V$

Symbol	Parameter	$T_C = 0^\circ C$		$T_C = +25^\circ C$		$T_C = +85^\circ C$		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay	0.80	3.30	0.90	3.50	1.00	3.80	ns	$C_L = 15$ pF Figures 1, 2
t_{PHL}	Data to Output								
t_{PLH}	Propagation Delay	1.60	4.10	1.70	4.30	1.80	4.60	ns	$C_L = 50$ pF Figures 1, 3
t_{PHL}	Data to Output								
t_{OSHL}	Maximum Skew Common Edge Output-to-Output Variation Data to Output Path		0.65		0.65		0.65	ns	PLCC Only (Note 5)
t_{OSLH}	Maximum Skew Common Edge Output-to-Output Variation Data to Output Path		0.65		0.65		0.65	ns	PLCC Only (Note 5)
t_{OST}	Maximum Skew Opposite Edge Output-to-Output Variation Data to Output Path		2.20		2.20		2.20	ns	PLCC Only (Note 5)
t_{PS}	Maximum Skew Pin (Signal) Transition Variation Data to Output Path		2.10		2.10		2.10	ns	PLCC Only (Note 5)

Note 5: Output-to-Output Skew is defined as the absolute value of the difference between the actual propagation delay for any outputs within the same packaged device. The specifications apply to any outputs switching in the same direction either HIGH-to-LOW (t_{OSHL}), or LOW-to-HIGH (t_{OSLH}), or in opposite directions both HL and LH (t_{OST}). Parameters t_{OST} and t_{PS} guaranteed by design.

Industrial Version**PLCC DC Electrical Characteristics**
 $V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = GND$, $T_C = -40^\circ C$ to $+85^\circ C$ (Note 6)

Symbol	Parameter	$T_C = -40^\circ C$		$T_C = 0^\circ C$ to $+85^\circ C$		Units	Conditions
		Min	Max	Min	Max		
V_{BB}	Output Reference Voltage	-1395	-1255	-1380	-1260	mV	$I_{V_{BB}} = -2.1$ mA
V_{IH}	Single-Ended Input HIGH Voltage	-1170	-870	-1165	-870	mV	Guaranteed HIGH Signal for All Inputs (with One Input Tied to V_{BB})
V_{IL}	Single-Ended Input LOW Voltage	-1830	-1480	-1830	-1475	mV	Guaranteed LOW Signal for All Inputs (with One Input Tied to V_{BB})
V_{OH}	Output HIGH Voltage	2.5		2.5		V	$I_{OH} = -2.0$ mA
V_{OL}	Output LOW Voltage		0.5		0.5	V	$I_{OL} = 20$ mA
V_{DIFF}	Input Voltage Differential	150		150		mV	Required for Full Output Swing
V_{CM}	Common Mode Voltage	$V_{CC} - 2.0$	$V_{CC} - 0.5$	$V_{CC} - 2.0$	$V_{CC} - 0.5$	V	
I_{IH}	Input HIGH Current		450		350	μA	$V_{IN} = V_{IH} (Max)$, $D_0-D_5 = V_{BB}$, $\bar{D}_0-\bar{D}_5 = V_{IL} (Min)$
I_{IL}	Input LOW Current	0.5		0.5		μA	$V_{IN} = V_{IL} (Min)$, $D_0-D_5 = V_{BB}$
I_{OS}	Output Short-Circuit Current	-150	-60	-150	-60	mA	$V_{OUT} = GND$ (Note 7)
I_{EE}	V_{EE} Power Supply Current	-37	-15	-37	-17	mA	$D_0-D_5 = V_{BB}$
I_{TTL}	V_{TTL} Power Supply Current		65		65	mA	$D_0-D_5 = V_{BB}$

Note 6: The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

Note 7: Test one output at a time.

PLCC AC Electrical Characteristics
 $V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = GND$, $V_{TTL} = +4.5V$ to $+5.5V$

Symbol	Parameter	$T_C = -40^\circ C$		$T_C = +25^\circ C$		$T_C = +85^\circ C$		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay							ns	$C_L = 15$ pF
t_{PHL}	Data to Output	0.80	3.30	0.90	3.50	1.00	3.80	ns	Figures 1, 2
t_{PLH}	Propagation Delay							ns	$C_L = 50$ pF
t_{PHL}	Data to Output	1.60	4.10	1.70	4.30	1.80	4.60	ns	Figures 1, 3

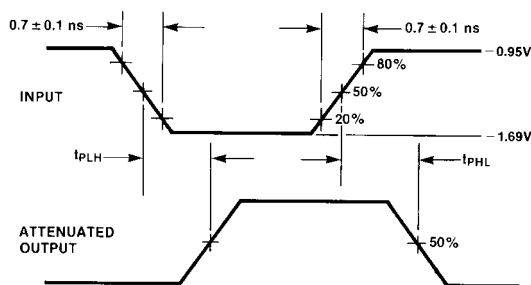
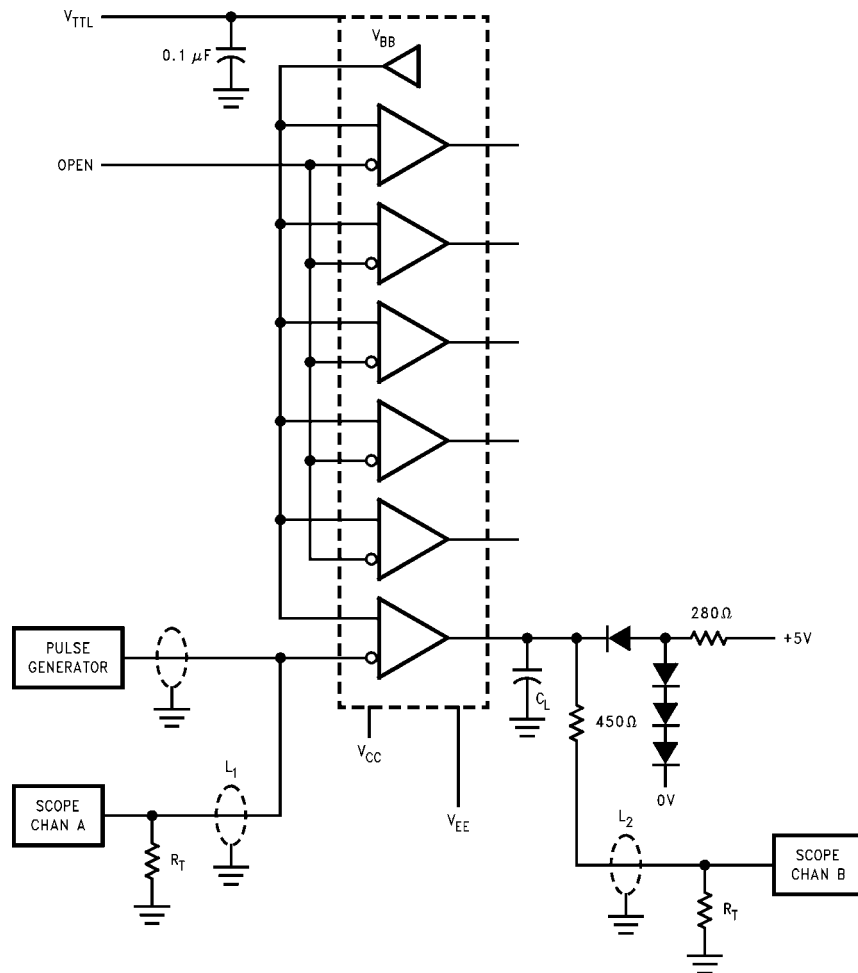
Switching Waveform

FIGURE 1. Propagation Delay

Test Circuits

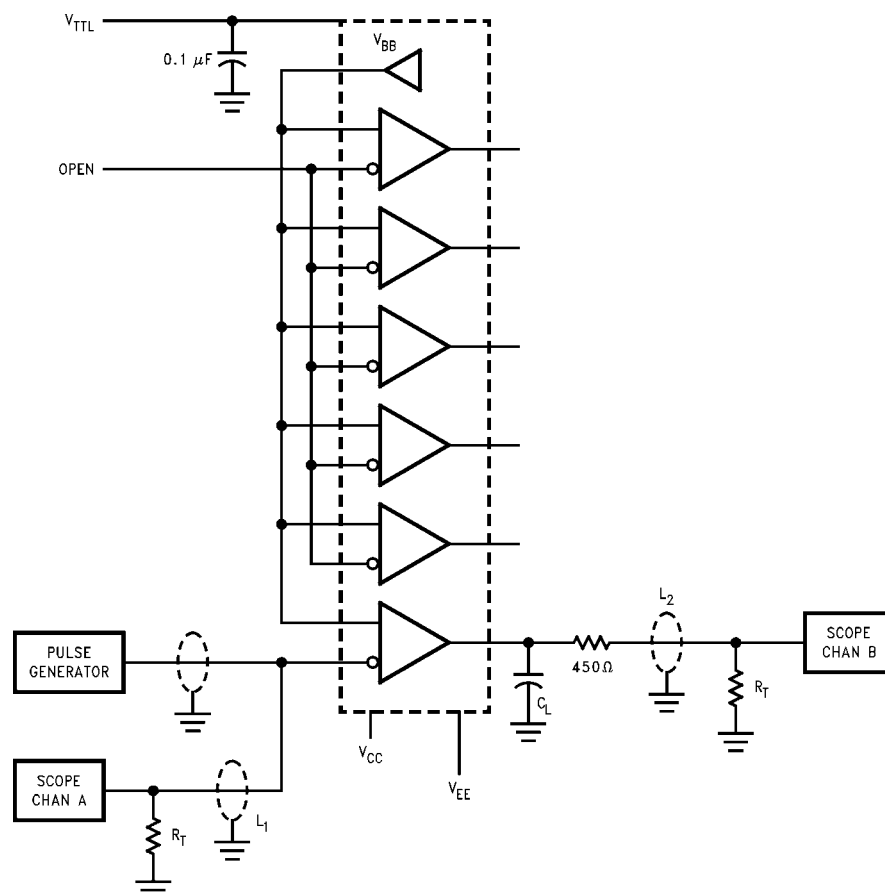


Note:

- $V_{CC} = 0V$, $V_{EE} = -4.5V$, $V_{TTL} = +5V$
- $L1$ and $L2$ = equal length 50Ω impedance lines
- $R_T = 50\Omega$ terminator internal to scope
- Decoupling $0.1\mu F$ from GND to V_{CC} , V_{EE} and V_{TTL}
- All unused outputs are loaded with 500Ω to GND
- C_L = Fixture and stray capacitance = 15 pF

FIGURE 2. AC Test Circuit for 15 pF Loading

Test Circuits (Continued)

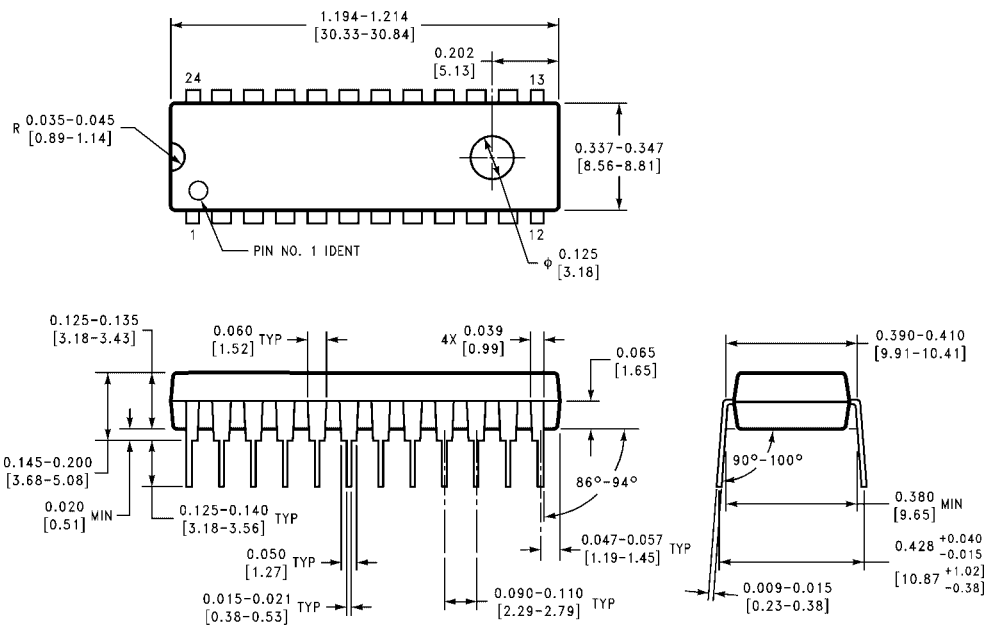
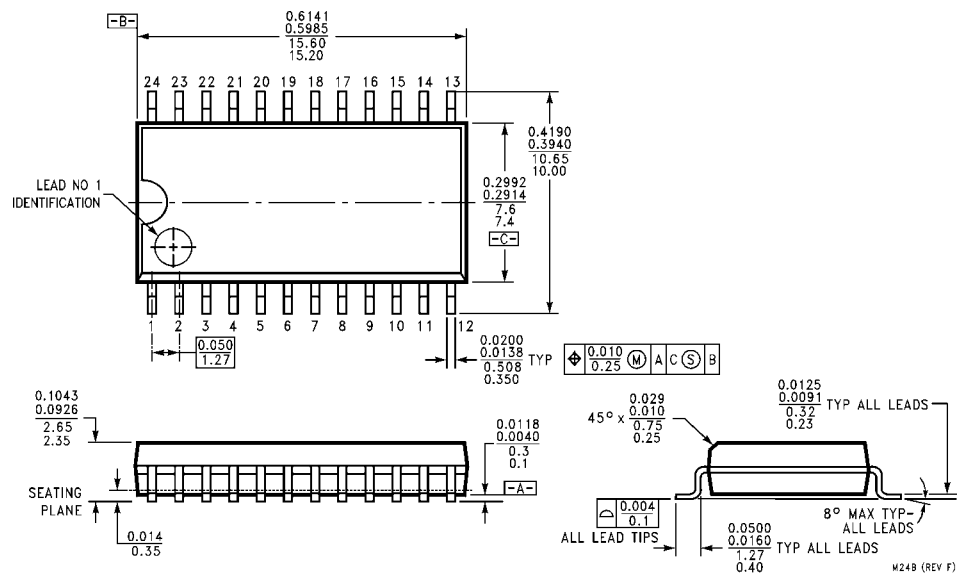


Note:

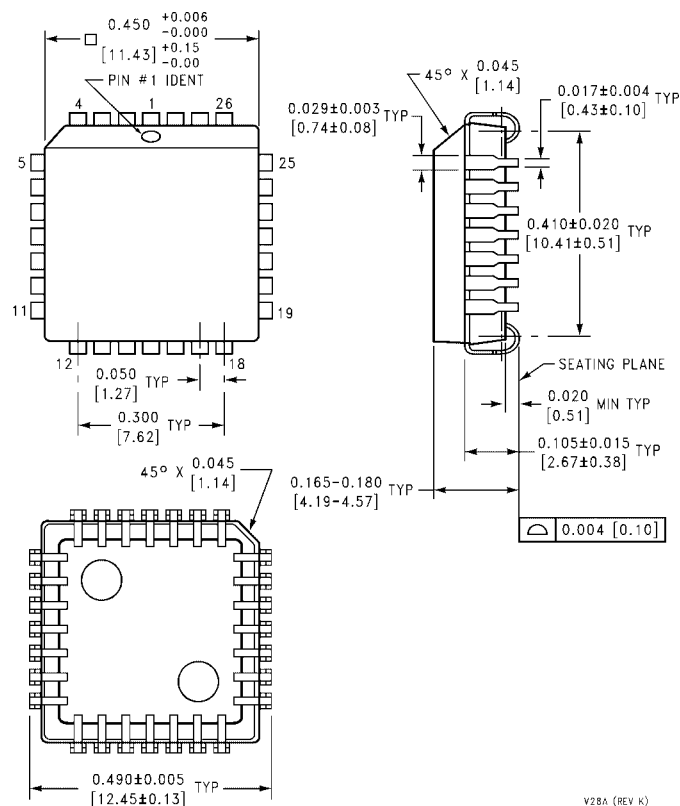
- $V_{CC} = 0V$, $V_{EE} = -4.5V$, $V_{TTL} = +5V$
- $L1$ and $L2$ = equal length 50Ω impedance lines
- $R_T = 50\Omega$ terminator internal to scope
- Decoupling $0.1 \mu F$ from GND to V_{CC} , V_{EE} and V_{TTL}
- All unused outputs are loaded with 500Ω to GND
- C_L = Fixture and stray capacitance = $50 pF$

FIGURE 3. AC Test Circuit for 50 pF Loading

Physical Dimensions inches (millimeters) unless otherwise noted



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



**28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square
Package Number V28A**

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

LIFE SUPPORT POLICY

FAIRCHILD'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 FAIRCHILD 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 (c) 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 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.

www.fairchildsemi.com

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local
Sales Representative