Advance Information

Configurable Dual Supply Octal Transceiver
with 3-State Outputs for 3V Systems

MC74LVXC3245

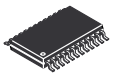
LVX

LOW–VOLTAGE CMOS

The 74LVXC3245 is a 24–pin dual–supply, octal configurable voltage interface transceiver especially well suited for PCMCIA and other real time configurable I/O applications. The V_{CCA} pin accepts a 3V supply level; the A port is a dedicated 3V port. The V_{CCB} pin accepts a 3V–to–5V supply level. The B port is configured to track the V_{CCB} supply level. A 5V level on the V_{CCB} pin will configure the I/O pins at a 5V level and a 3V V_{CCB} will configure the I/O pins at a 3V level. The A port interfaces with a 3V host system and the B port to the card slots. This device will allow the V_{CCB} voltage source pin and I/O pins on the B port to float when OE is High. This feature is necessary to buffer data to and from a PCMCIA socket that permits PCMCIA cards to be inserted and removed during normal operation. The Transmit/Receive (T/R) input determines the direction of data flow. Transmit (active–High) enables data from the A port to B port. Receive (active–Low) enables data from the B port to the A port.

- Bidirectional Interface Between 3V and 3V/5V Buses
- Control Inputs Compatible with TTL Level
- Outputs Source/Sink Up to 24mA
- Guaranteed Simultaneous Switching Noise Level and Dynamic Threshold Performance
- Available in SOIC and TSSOP Packages
- Flexible V_{CCB} Operating Range
- Allows B Port and V_{CCB} to Float Simultaneously When $\overline{OE}$ Is High
- Functionally Compatible with the 74 Series 245

DW SUFFIX
24–LEAD PLASTIC WIDE SOIC PACKAGE
CASE 751E–04



DT SUFFIX
24–LEAD PLASTIC TSSOP PACKAGE
CASE 948H–01

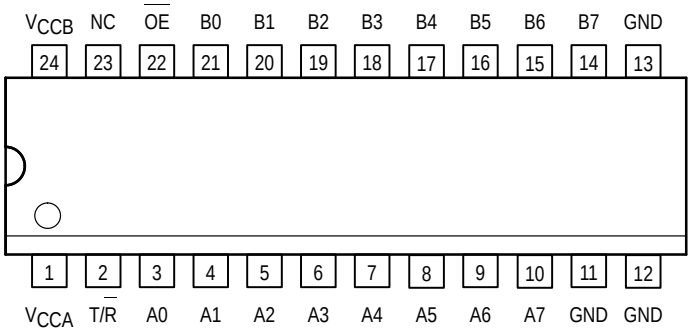


Figure 1. 24–Lead Pinout (Top View)

PIN NAMES

Pins	Function
$\overline{OE}$	Output Enable Input
T/R	Transmit/Receive Input
A0–A7	Side A 3–State Inputs or 3–State Outputs
B0–B7	Side B 3–State Inputs or 3–State Outputs

This document contains information on a new product. Specifications and information herein are subject to change without notice.

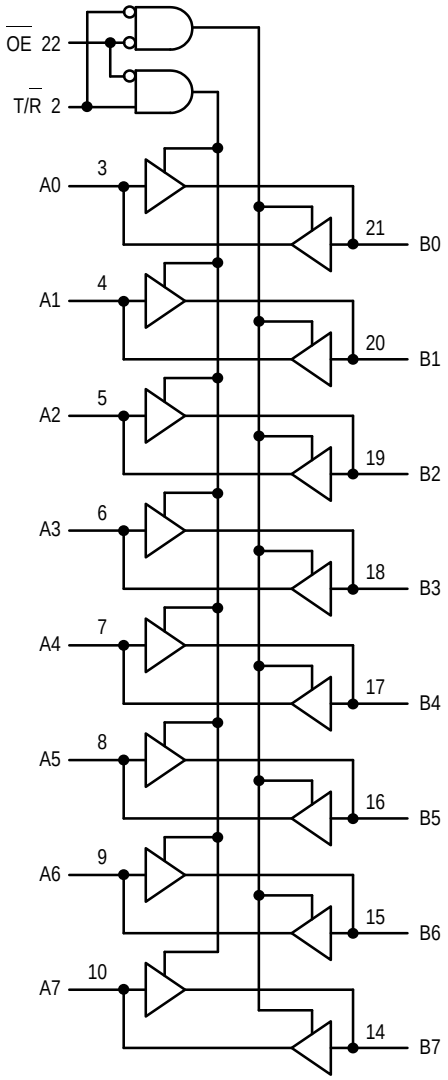


Figure 2. Logic Diagram

INPUTS		OPERATING MODE Non–Inverting
OE	T/R	
L	L	B Data to A Bus
L	H	A Data to B Bus
H	X	Z

H = High Voltage Level; L = Low Voltage Level; Z = High Impedance State; X = High or Low Voltage Level and Transitions are Acceptable; For I_{CC} reasons, Do Not Float Inputs

ABSOLUTE MAXIMUM RATINGS*

Symbol	Parameter		Value	Condition	Unit
V_{CCA}, V_{CCB}	DC Supply Voltage		–0.5 to +7.0		V
V_I	DC Input Voltage	$\overline{OE}$, T/R	–0.5 to V_{CCA} +0.5		V
$V_{I/O}$	DC Input/Output Voltage	An	–0.5 to V_{CCA} +0.5		V
		Bn	–0.5 to V_{CCB} +0.5		V
I_{IK}	DC Input Diode Current	$\overline{OE}$, T/R	±20	V_I < GND	mA
I_{OK}	DC Output Diode Current		±50	V_O < GND; V_O > V_{CC}	mA
I_O	DC Output Source/Sink Current		±50		mA
I_{CC}, I_{GND}	DC Supply Current	Per Output Pin Maximum Current	±50 ±200		mA
T_{STG}	Storage Temperature Range		–65 to +150		°C
	DC Latchup Source/Sink Current		±300		mA

* Absolute maximum continuous ratings are those values beyond which damage to the device may occur. Exposure to these conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under absolute–maximum–rated conditions is not implied.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Max	Unit
V_{CCA}, V_{CCB}	Supply Voltage ($V_{CCA} \le V_{CCB}$)	V_{CCA} V_{CCB}	2.7 3.0	3.6 5.5	V
V_I	Input Voltage	$\overline{OE}$, T/R	0	V_{CCA}	V
$V_{I/O}$	Input/Output Voltage	An Bn	0 0	V_{CCA} V_{CCB}	V
T_A	Operating Free–Air Temperature		–40	+85	°C
$\Delta t/\Delta V$	Minimum Input Edge Rate V_{IN} from 30% to 70% of V_{CC}; V_{CC} at 3.0V, 4.5V, 5.5V		0	8	ns/V

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter		Condition	V_{CCA}	V_{CCB}	T_A = 25°C	T_A = –40 to +85°C		Unit
						Typ	Guaranteed Limits		
V_{IHA}	Minimum HIGH Level Input Voltage	$\overline{An}$ $\overline{OE}$ T/R	$V_{OUT} \le 0.1V$ or $\ge V_{CC} - 0.1V$	2.7 3.0 3.6	3.0 3.6 5.5		2.0 2.0 2.0	2.0 2.0 2.0	V
V_{IHB}		Bn		2.7 3.0 3.6	3.0 3.6 5.5		2.00 2.00 3.85	2.00 2.00 3.85	V
V_{ILA}	Maximum LOW Level Input Voltage	$\overline{An}$ $\overline{OE}$ T/R	$V_{OUT} \le 0.1V$ or $\ge V_{CC} - 0.1V$	2.7 3.0 3.6	3.0 3.6 5.5		0.8 0.8 0.8	0.8 0.8 0.8	V
V_{ILB}		Bn		2.7 3.0 3.6	3.0 3.6 5.5		0.80 0.80 1.65	0.80 0.80 1.65	V
V_{OHA}	Minimum HIGH Level Output Voltage		I_{OUT} = –100µA I_{OH} = –12mA I_{OH} = –24mA I_{OH} = –12mA I_{OH} = –24mA	3.0 3.0 3.0 2.7 2.7	3.0 3.0 3.0 3.0 4.5	2.99 2.85 2.65 2.50 2.30	2.90 2.56 2.35 2.30 2.10	2.90 2.46 2.25 2.20 2.00	V
V_{OHB}			I_{OUT} = –100µA I_{OH} = –12mA I_{OH} = –24mA I_{OH} = –24mA	3.0 3.0 3.0 3.0	3.0 3.0 3.0 4.5	2.99 2.85 2.65 4.25	2.90 2.56 2.35 3.86	2.90 2.46 2.25 3.76	V

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter		Condition	V_{CCA}	V_{CCB}	T_A = 25°C	T_A = –40 to +85°C		Unit
						Typ	Guaranteed Limits		
V_{OLA}	Maximum LOW Level Output Voltage		I_{OUT} = 100μA I_{OL} = 24mA I_{OL} = 12mA I_{OL} = 24mA	3.0 3.0 2.7 2.7	3.0 3.0 3.0 4.5	0.002 0.21 0.11 0.22	0.10 0.36 0.36 0.42	0.10 0.44 0.44 0.50	V
V_{OLB}			I_{OUT} = 100μA I_{OL} = 24mA I_{OL} = 24mA	3.0 3.0 3.0	3.0 3.0 4.5	0.002 0.21 0.18	0.10 0.36 0.36	0.10 0.44 0.44	V
I_{IN}	Max Input Leakage Current	$\overline{OE}$, T/R	V_I = V_{CCA}, GND	3.6 3.6	3.6 5.5		±0.1 ±0.1	±1.0 ±1.0	μA
I_{OZA}	Max 3–State Output Leakage	An	V_I = V_{IH}, V_{IL} OE = V_{CCA} V_O = V_{CCA}, GND	3.6 3.6	3.6 5.5		±0.5 ±0.5	±5.0 ±5.0	μA
I_{OZB}	Max 3–State Output Leakage	Bn	V_I = V_{IH}, V_{IL} OE = V_{CCA} V_O = V_{CCB}, GND	3.6 3.6	3.6 5.5		±0.5 ±0.5	±5.0 ±5.0	μA
ΔI_{CC}	Maximum I_{CC}/Input	Bn	V_I=V_{CCB}–2.1V	3.6	5.5	1.0	1.35	1.5	mA
		All Inputs	V_I=V_{CC}–0.6V	3.6	3.6		0.35	0.5	mA
I_{CCA1}	Quiescent V_{CCA} Supply Current as B Port Floats		An=V_{CCA} or GND Bn=Open, OE=V_{CCA}, T/R=V_{CCA}, V_{CCB}=Open	3.6	Open		5	50	μA
I_{CCA2}	Quiescent V_{CCA} Supply Current		An=V_{CCA} or GND Bn=V_{CCB} or GND, OE=GND, T/R=GND	3.6 3.6	3.6 5.5		5 5	50 50	μA
I_{CCB}	Quiescent V_{CCB} Supply Current		An=V_{CCA} or GND Bn=V_{CCB} or GND, OE=GND, T/R=V_{CCA}	3.6 3.6	3.6 5.5		5 8	50 80	μA
V_{OLPA}	Quiet Output Max Dynamic V_{OL}		Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		0.8 0.8		V
V_{OLPB}			Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		0.8 1.5		V
V_{OLVA}	Quiet Output Min Dynamic V_{OL}		Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		–0.8 –0.8		V
V_{OLVB}			Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		–0.8 –1.2		V
V_{IHDA}	Min HIGH Level Dynamic Input Voltage		Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		2.0 2.0		V
V_{IHDB}			Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		2.0 3.5		V
V_{ILDA}	Max LOW Level Dynamic Input Voltage		Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		0.8 0.8		V
V_{ILDB}			Notes NO TAG, NO TAG	3.3 3.3	3.3 5.0		0.8 1.5		V

1. Worst case package.
2. Max number of outputs defined as (n). Data inputs are driven 0V to V_{CC} level; one output at GND.
3. Max number of data inputs (n) switching. (n–1) inputs switching 0V to V_{CC} level. Input under test switching: V_{CC} level to threshold (V_{IHD}), 0V to threshold (V_{ILD}), f = 1MHz.

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	T_A = –40 to +85°C; C_L = 50pF						Unit
		V_{CCA} = 2.7–3.6V V_{CCB} = 4.5–5.5V			V_{CCA} = 2.7–3.6V V_{CCB} = 3.0–3.6V			
		Min	Typ (Note 4.)	Max	Min	Typ (Note 5.)	Max	
t_{PHL} t_{PLH}	Propagation Delay A to B	1.0 1.0	4.8 3.9	8.5 7.0	1.0 1.0	5.5 5.2	9.0 8.5	ns
t_{PHL} t_{PLH}	Propagation Delay B to A	1.0 1.0	3.8 4.3	7.0 8.0	1.0 1.0	4.4 5.1	7.5 8.0	ns
t_{PZL} t_{PZH}	Output Enable Time $\overline{OE}$ to B	1.0 1.0	4.7 4.8	8.5 9.0	1.0 1.0	6.0 6.1	9.5 10.0	ns
t_{PZL} t_{PZH}	Output Enable Time $\overline{OE}$ to A	1.0 1.0	5.9 5.4	10.0 9.5	1.0 1.0	6.4 5.8	10.5 9.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time $\overline{OE}$ to B	1.0 1.0	4.0 3.8	8.5 8.0	1.0 1.0	6.3 4.5	10.0 8.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time $\overline{OE}$ to A	1.0 1.0	4.6 3.1	10.0 7.0	1.0 1.0	5.2 3.4	10.0 7.0	ns
t_{OSHL} t_{OSLH}	Output to Output Skew, Data to Output (Note NO TAG)		1.0	1.5		1.0	1.5	ns

4. Typical values at V_{CCA} = 3.3V, V_{CCB} = 5.0V at 25°C.
5. Typical values at V_{CCA} = 3.3V, V_{CCB} = 3.3V at 25°C.
6. Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH–to–LOW (t_{OSHL}) or LOW–to–HIGH (t_{OSLH}); parameter guaranteed by design.

CAPACITIVE CHARACTERISTICS

Symbol	Parameter		Condition	Typical	Unit
C_{IN}	Input Capacitance		V_{CCA} = 3.3V; V_{CCB} = 5.0V	4.5	pF
$C_{I/O}$	Input/Output Capacitance		V_{CCA} = 3.3V; V_{CCB} = 5.0V	10	pF
C_{PD}	Power Dissipation Capacitance (Measured at 10MHz)	A→B B→A	V_{CCB} = 5.0V V_{CCA} = 3.3V	50 40	pF

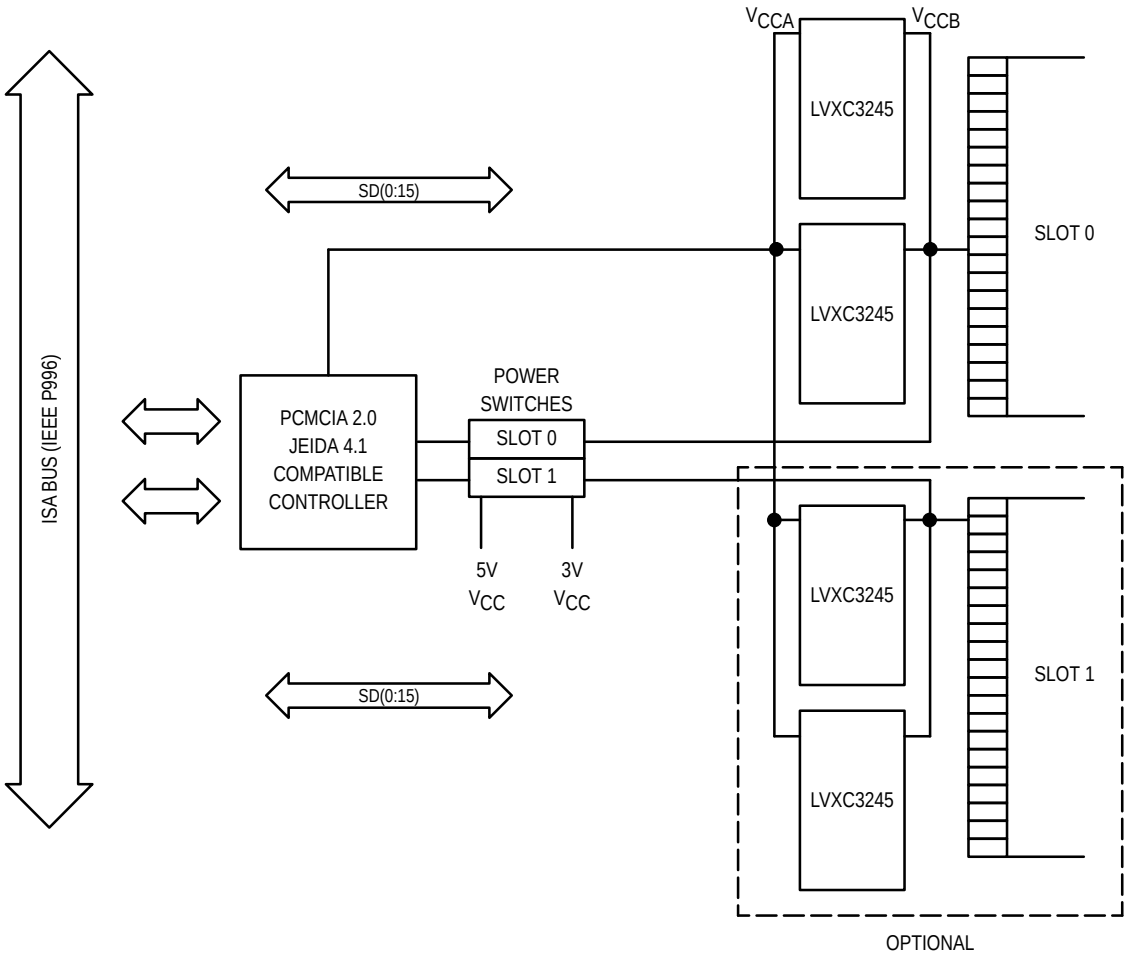
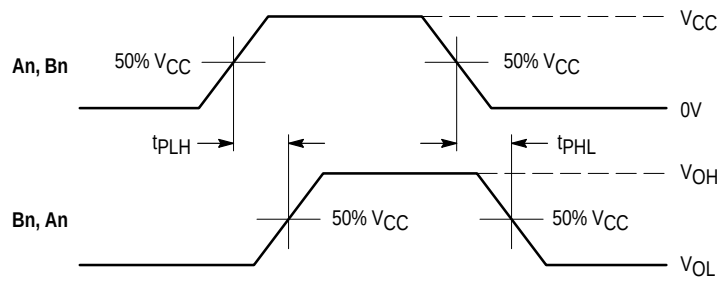


Figure 3. Block Diagram

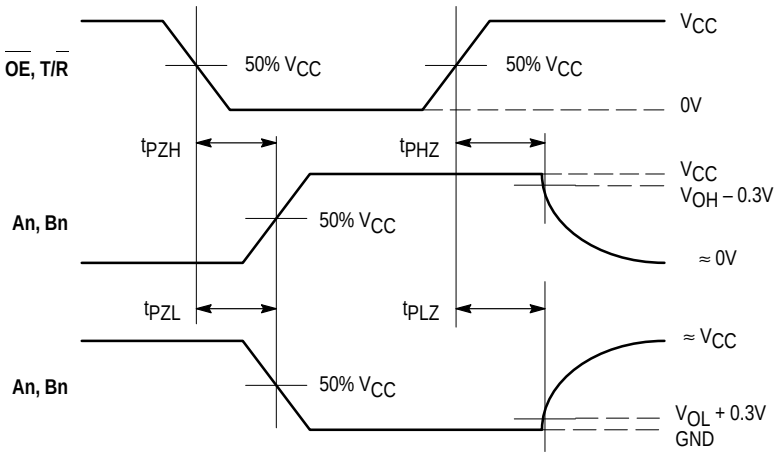
Configurable I/O Application for PCMCIA Cards

The 74LVXC3245 is a dual–supply device well suited for PCMCIA configurable I/O applications. The LVXC3245 consumes less than 1mW of quiescent power in all modes of operation, making it ideal for low power notebook designs. The LVXC3245 meets all PCMCIA I/O voltage requirements at 5V and 3.3V operation. By tying the V_{CCB} pin to the card voltage supply, the PCMCIA card will always have rail–to–rail output swings, maximizing the reliability of the interface.

The V_{CCA} pin must always be tied to a 3.3V power supply. This voltage connection provides internal references needed to account for variations in V_{CCB}. When connected as in the figure above, the LVXC3245 meets all the voltage and current requirements of the ISA bus standard (IEEE P996).

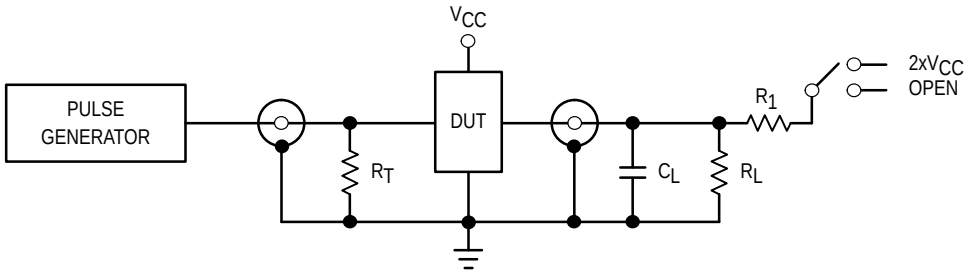


WAVEFORM 1 – PROPAGATION DELAYS
$t_R = t_F$ = 2.5ns, 10% to 90%; f = 1MHz; t_W = 500ns



WAVEFORM 2 – OUTPUT ENABLE AND DISABLE TIMES
$t_R = t_F$ = 2.5ns, 10% to 90%; f = 1MHz; t_W = 500ns

Figure 4. AC Waveforms



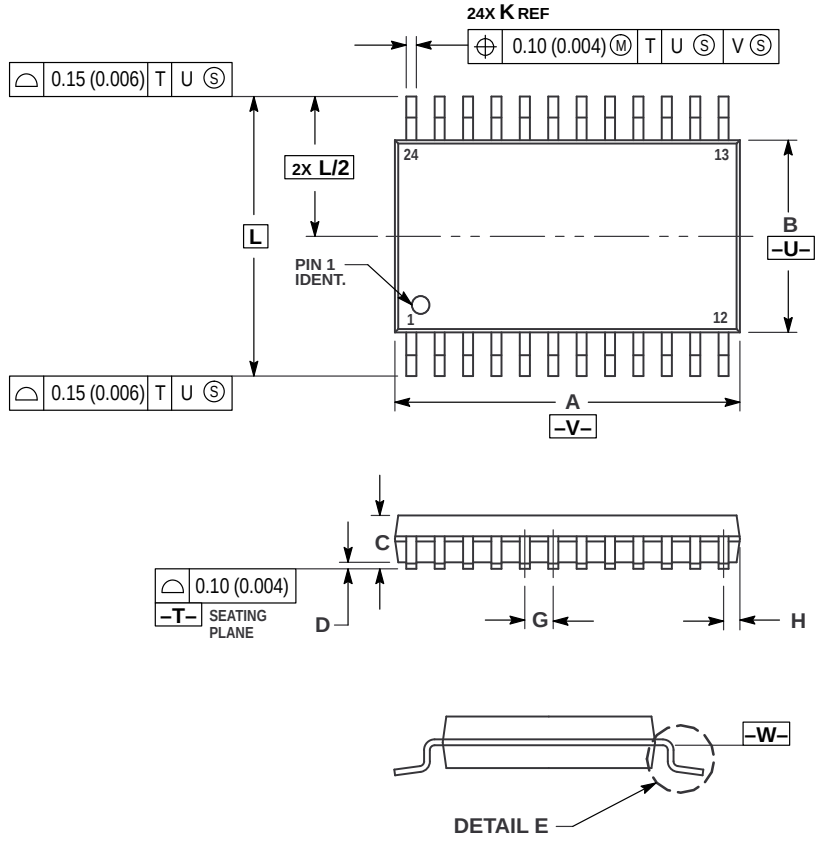
TEST	SWITCH
t_{PLH}, t_{PHL}, t_{PZH}, t_{PHZ}	Open
t_{PZL}, t_{PLZ}	2xV_{CC}

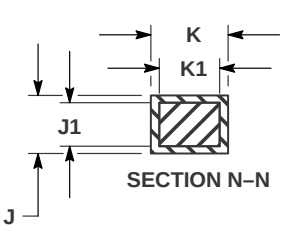
C_L = 50pF or equivalent (Includes jig and probe capacitance)
$R_L = R_1$ = 500Ω or equivalent
$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

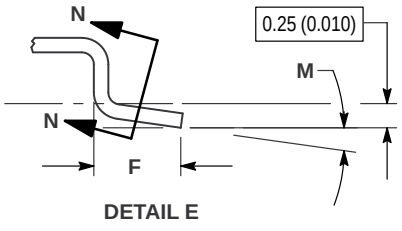
Figure 5. Test Circuit

OUTLINE DIMENSIONS

DT SUFFIX
PLASTIC TSSOP PACKAGE
CASE 948H–01
ISSUE O





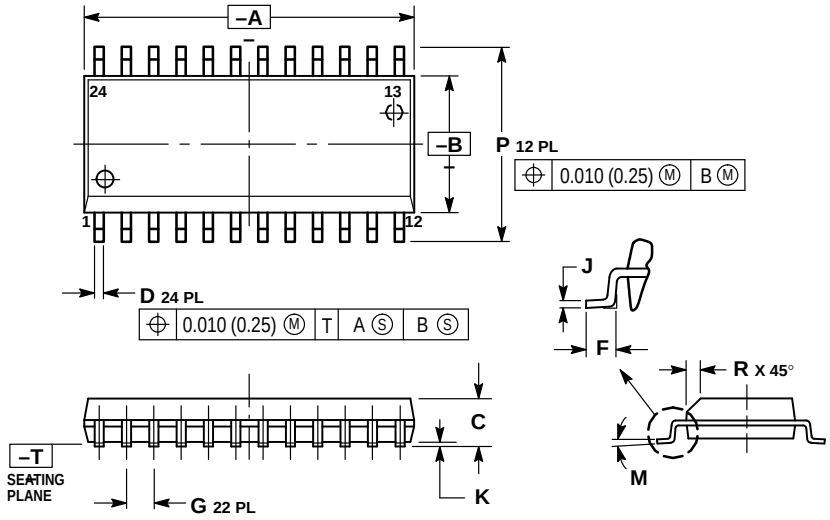


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE –W–.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	7.70	7.90	0.303	0.311
B	4.30	4.50	0.169	0.177
C	—	1.20	—	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0 °	8 °	0 °	8 °

OUTLINE DIMENSIONS

DW SUFFIX
PLASTIC SOIC PACKAGE
CASE 751E–04
ISSUE E



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	15.25	15.54	0.601	0.612
B	7.40	7.60	0.292	0.299
C	2.35	2.65	0.093	0.104
D	0.35	0.49	0.014	0.019
F	0.41	0.90	0.016	0.035
G	1.27 BSC		0.050 BSC	
J	0.23	0.32	0.009	0.013
K	0.13	0.29	0.005	0.011
M	0°	8°	0°	8°
P	10.05	10.55	0.395	0.415
R	0.25	0.75	0.010	0.029

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