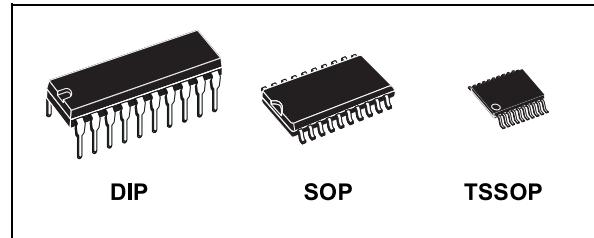


OCTAL BUS TRANSCEIVER WITH 3 STATE OUTPUTS (NON INVERTED)

- HIGH SPEED: $t_{PD} = 4.5\text{ns}$ (TYP.) at $V_{CC} = 5\text{V}$
- LOW POWER DISSIPATION:
 $I_{CC} = 4\mu\text{A}$ (MAX.) at $T_A=25^\circ\text{C}$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\%$ V_{CC} (MIN.)
- 50 Ω TRANSMISSION LINE DRIVING CAPABILITY
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OHI}| = I_{OL} = 24\text{mA}$ (MIN)
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \approx t_{PHL}$
- OPERATING VOLTAGE RANGE:
 V_{CC} (OPR) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 244
- IMPROVED LATCH-UP IMMUNITY

DESCRIPTION

The 74AC245 is an advanced high-speed CMOS OCTAL BUS TRANSCEIVER (3-STATE) fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology. This IC is intended for two-way asynchronous communication between data buses and the direction of data transmission is determined by



ORDER CODES

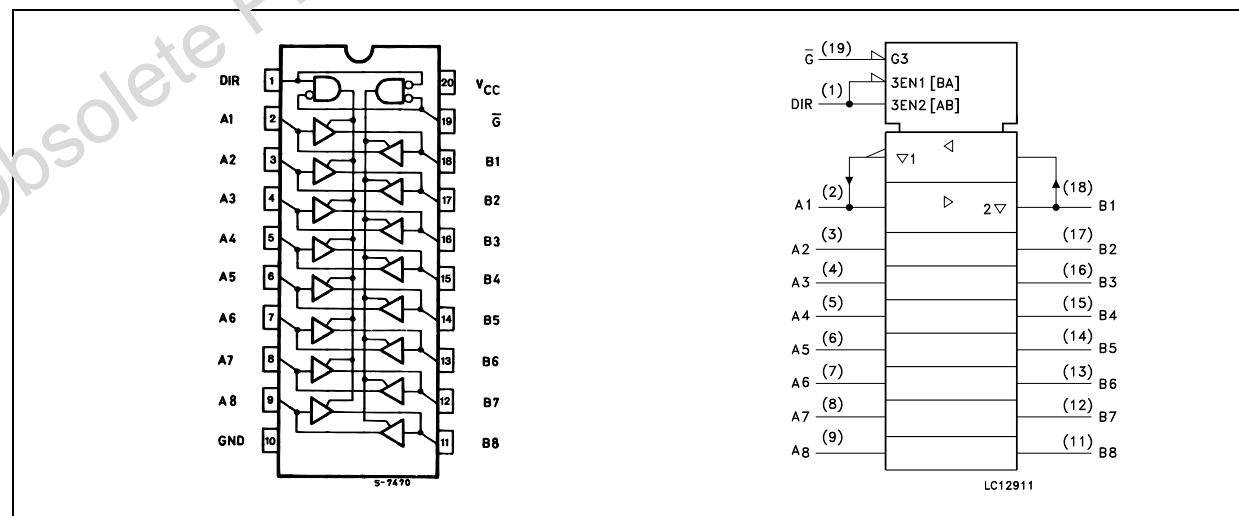
PACKAGE	TUBE	MARKING
DIP	74AC245B	
SOP	74AC245M	74AC245MTR
TSSOP		74AC245TTR

DIR input. The enable input \bar{G} can be used to disable the device so that the buses are effectively isolated.

All floating bus terminals during HIGH-Z state must be held HIGH or LOW

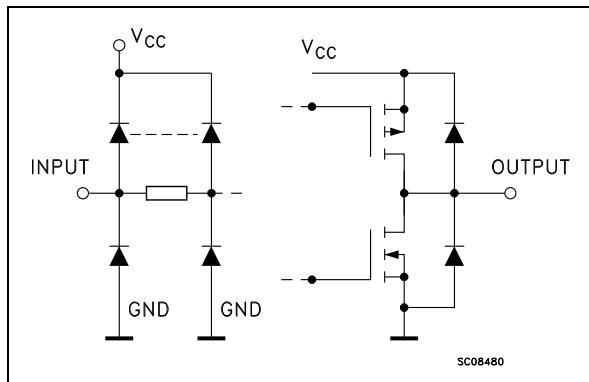
All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



74AC245

INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1	DIR	Directional Control
2, 3, 4, 5, 6, 7, 8, 9	A1 to A8	Data Inputs/Outputs
18, 17, 16, 15, 14, 13, 12, 11	B1 to B8	Data Inputs/Outputs
19	G	Output Enable Input
10	GND	Ground (0V)
20	V _{CC}	Positive Supply Voltage

TRUTH TABLE

INPUTS		FUNCTION		OUTPUT
\bar{G}	DIR	A BUS	B BUS	Y_n
L	L	OUTPUT	INPUT	A = B
L	H	INPUT	OUTPUT	B = A
H	X	Z	Z	Z

X : Don't Care

Z : High Impedance

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7	V
V_I	DC Input Voltage	-0.5 to V_{CC} + 0.5	V
V_O	DC Output Voltage	-0.5 to V_{CC} + 0.5	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Current	± 50	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 400	mA
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	2 to 6	V
V_I	Input Voltage	0 to V_{CC}	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature	-55 to 125	°C
dt/dv	Input Rise and Fall Time $V_{CC} = 3.0, 4.5$ or $5.5V$ (note 1)	8	ns/V

1) V_{IN} from 30% to 70% of V_{CC}

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value						Unit	
		V_{CC} (V)		$T_A = 25^\circ C$			$-40 \text{ to } 85^\circ C$		$-55 \text{ to } 125^\circ C$		
				Min.	Typ.	Max.	Min.	Max.	Min.		
V_{IH}	High Level Input Voltage	3.0	$V_O = 0.1 \text{ V or } V_{CC}-0.1\text{V}$	2.1	1.5		2.1		2.1	V	
		4.5		3.15	2.25		3.15		3.15		
		5.5		3.85	2.75		3.85		3.85		
V_{IL}	Low Level Input Voltage	3.0	$V_O = 0.1 \text{ V or } V_{CC}-0.1\text{V}$		1.5	0.9		0.9		V	
		4.5			2.25	1.35		1.35			
		5.5			2.75	1.65		1.65			
V_{OH}	High Level Output Voltage	3.0	$I_O=-50 \mu A$	2.9	2.99		2.9		2.9	V	
		4.5	$I_O=-50 \mu A$	4.4	4.49		4.4		4.4		
		5.5	$I_O=-50 \mu A$	5.4	5.49		5.4		5.4		
		3.0	$I_O=-12 \text{ mA}$	2.56			2.46		2.4		
		4.5	$I_O=-24 \text{ mA}$	3.86			3.76		3.7		
		5.5	$I_O=-24 \text{ mA}$	4.86			4.76		4.7		
V_{OL}	Low Level Output Voltage	3.0	$I_O=50 \mu A$		0.002	0.1		0.1		V	
		4.5	$I_O=50 \mu A$		0.001	0.1		0.1			
		5.5	$I_O=50 \mu A$		0.001	0.1		0.1			
		3.0	$I_O=12 \text{ mA}$			0.36		0.44			
		4.5	$I_O=24 \text{ mA}$			0.36		0.44			
		5.5	$I_O=24 \text{ mA}$			0.36		0.44			
I_I	Input Leakage Current	5.5	$V_I = V_{CC} \text{ or GND}$			± 0.1		± 1		μA	
I_{OZ}	High Impedance Output Leakage Current	5.5	$V_I = V_{IH} \text{ or } V_{IL}$ $V_O = V_{CC} \text{ or GND}$			± 0.5		± 5		μA	
I_{CC}	Quiescent Supply Current	5.5	$V_I = V_{CC} \text{ or GND}$			4		40		μA	
I_{OLD}	Dynamic Output Current (note 1, 2)	5.5	$V_{OLD} = 1.65 \text{ V max}$					75		50	mA
			$V_{OHD} = 3.85 \text{ V min}$					-75		-50	

1) Maximum test duration 2ms, one output loaded at time

2) Incident wave switching is guaranteed on transmission lines with impedances as low as 50Ω

74AC245

AC ELECTRICAL CHARACTERISTICS ($C_L = 50 \text{ pF}$, $R_L = 500 \Omega$, Input $t_r = t_f = 3\text{ns}$)

Symbol	Parameter	Test Condition		Value						Unit	
		V_{CC} (V)		$T_A = 25^\circ\text{C}$			$-40 \text{ to } 85^\circ\text{C}$		$-55 \text{ to } 125^\circ\text{C}$		
				Min.	Typ.	Max.	Min.	Max.	Min.		
t_{PLH}, t_{PHL}	Propagation Delay Time	3.3 ^(*)		1.5	5.5	8.5	1.5	9.0	1.5	11.5	ns
		5.0 ^(**)		1.5	4.5	6.5	1.5	7.0	1.5	8.5	
t_{PZL}, t_{PZH}	Output Enable Time	3.3 ^(*)		1.5	7.5	12.0	1.5	13.5	1.5	14.0	ns
		5.0 ^(**)		1.5	5.5	9.0	1.5	9.5	1.5	10.5	
t_{PLZ}, t_{PHZ}	Output Disable Time	3.3 ^(*)		1.5	6.2	12.0	1.5	13.0	1.5	14.0	ns
		5.0 ^(**)		1.5	5.2	9.0	1.5	10.0	1.5	10.5	

(*) Voltage range is $3.3\text{V} \pm 0.3\text{V}$

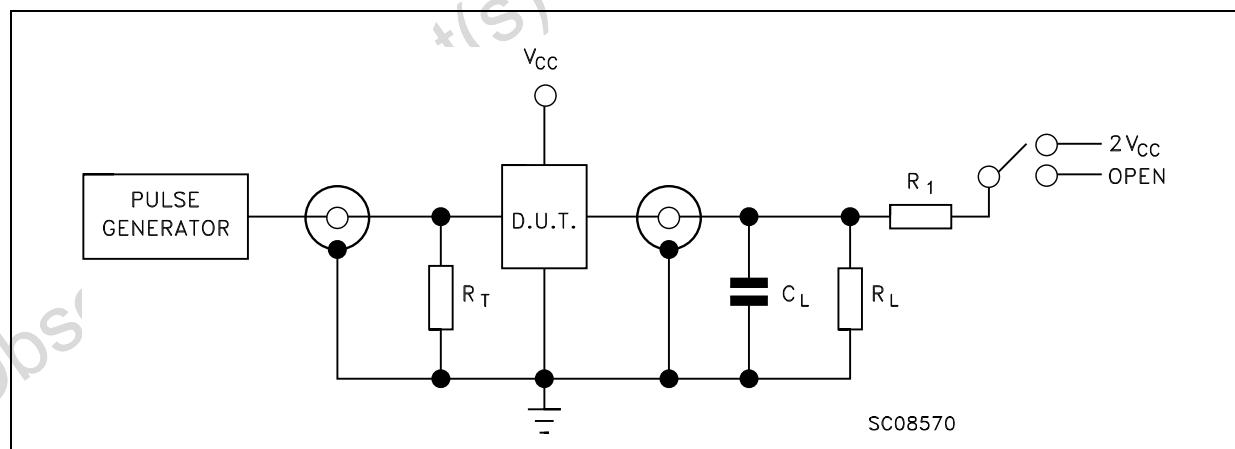
(**) Voltage range is $5.0\text{V} \pm 0.5\text{V}$

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Condition		Value						Unit	
		V_{CC} (V)		$T_A = 25^\circ\text{C}$			$-40 \text{ to } 85^\circ\text{C}$		$-55 \text{ to } 125^\circ\text{C}$		
				Min.	Typ.	Max.	Min.	Max.	Min.		
C_{IN}	Input Capacitance	5.0			5					pF	
$C_{I/O}$	I/O Capacitance	5.0			10					pF	
C_{PD}	Power Dissipation Capacitance (note 1)	5.0	$f_{IN} = 10\text{MHz}$		21					pF	

1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(\text{opr})} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/16$ (per circuit)

TEST CIRCUIT



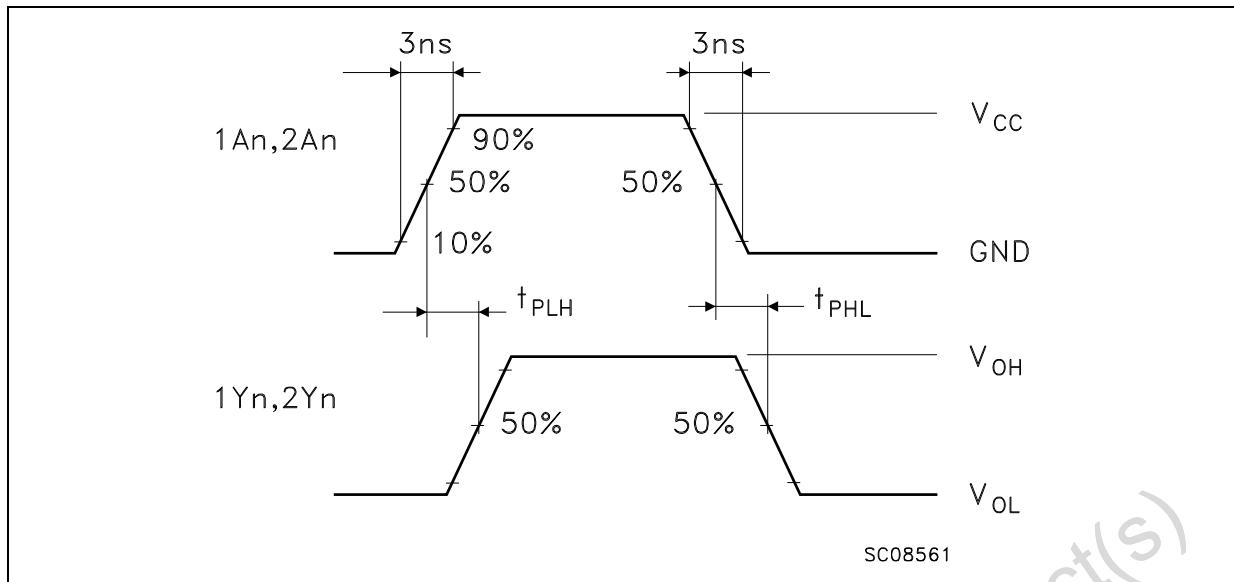
TEST	SWITCH
t_{PLH}, t_{PHL}	Open
t_{PZL}, t_{PLZ}	2 V_{CC}
t_{PZH}, t_{PHZ}	Open

$C_L = 50\text{pF}$ or equivalent (includes jig and probe capacitance)

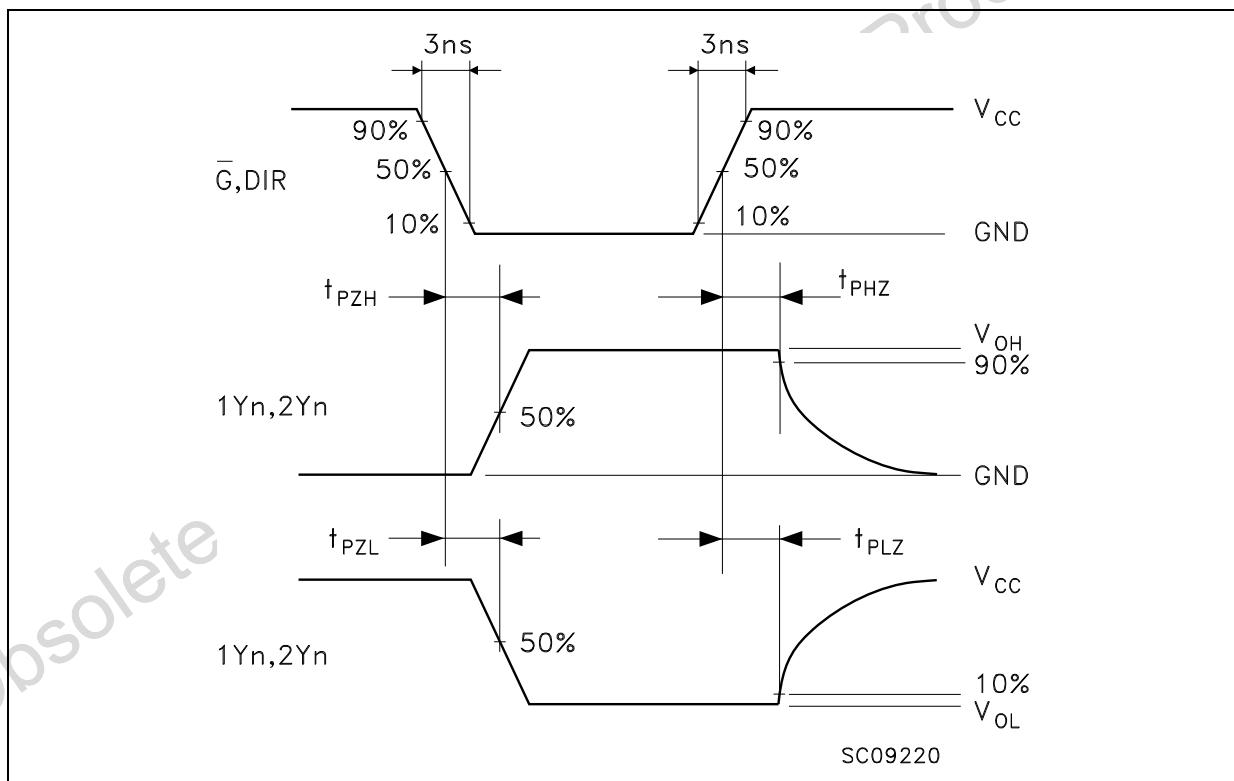
$R_L = R_1 = 500\Omega$ or equivalent

$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

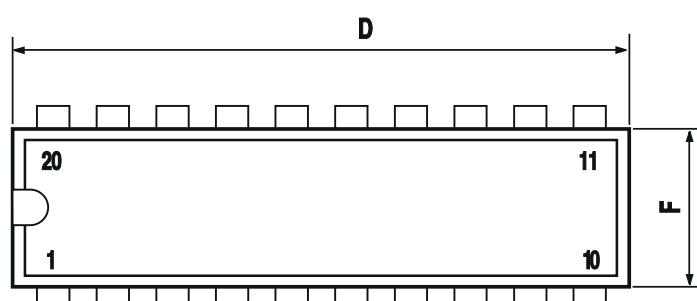
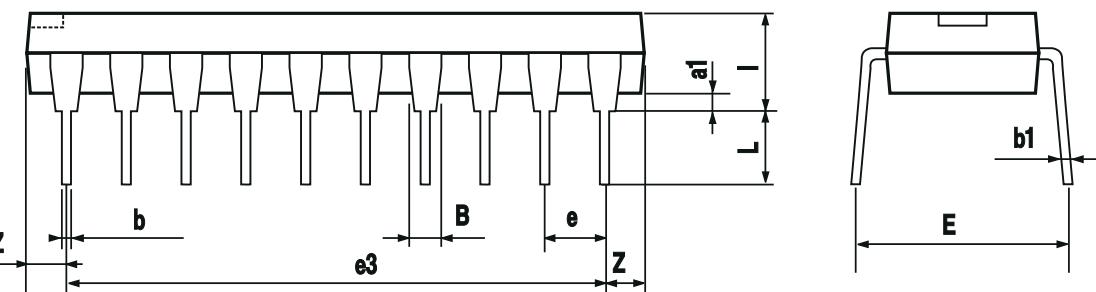
WAVEFORM 1: PROPAGATION DELAYS (f=1MHz; 50% duty cycle)



WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIME (f=1MHz; 50% duty cycle)



Plastic DIP-20 (0.25) MECHANICAL DATA						
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.254			0.010		
B	1.39		1.65	0.055		0.065
b		0.45			0.018	
b1		0.25			0.010	
D			25.4			1.000
E		8.5			0.335	
e		2.54			0.100	
e3		22.86			0.900	
F			7.1			0.280
I			3.93			0.155
L		3.3			0.130	
Z			1.34			0.053



P001J