![SGS-THOMSON MICROELECTRONICS logo]

74ACT157

QUAD 2 CHANNEL MULTIPLEXER

- HIGH SPEED: t_{PD} = 5.5 ns (TYP.) at V_{CC} = 5V
- LOW POWER DISSIPATION:
  I_{CC} = 8 µA (MAX.) at T_A = 25 ^{o}C
- COMPATIBLE WITH TTL OUTPUTS
  V_{IH} = 2V (MIN), V_{IL} = 0.8V (MAX)
- 50Ω TRANSMISSION LINE DRIVING CAPABILITY
- SYMMETRICAL OUTPUT IMPEDANCE:
  $|I_{OH}|$ = I_{OL} = 24 mA (MIN)
- BALANCED PROPAGATION DELAYS:
  $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:
  V_{CC} (OPR) = 4.5V to 5.5V
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 157
- IMPROVED LATCH-UP IMMUNITY

DESCRIPTION

The ACT157 is an high-speed CMOS QUAD 2-CHANNEL MULTIPLEXER fabricated with sub-micron silicon gate and double-layer metal wiring C^{2}MOS technology. It is ideal for low power applications maintaining high speed operation similar to equivalent Bipolar Schottky TTL.

It consists of four 2-input digital multiplexers with

B
(Plastic Package)

M
(Micro Package)

ORDER CODES :
74ACT157B   74ACT157M
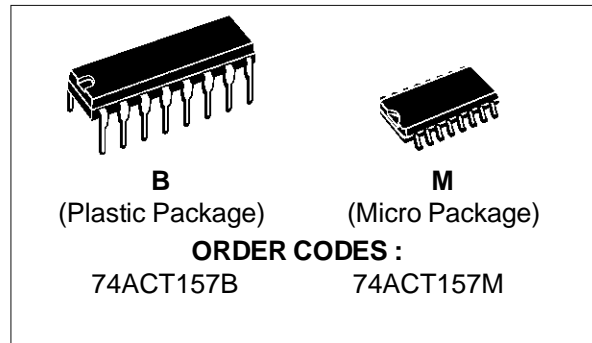
common select and strobe inputs. It is a non-inverting multiplexer. When the STROBE input is held High selection of data is inhibit and all the outputs become low. The SELECT decoding determines whether the A or B inputs get routed to their corresponding Y outputs.
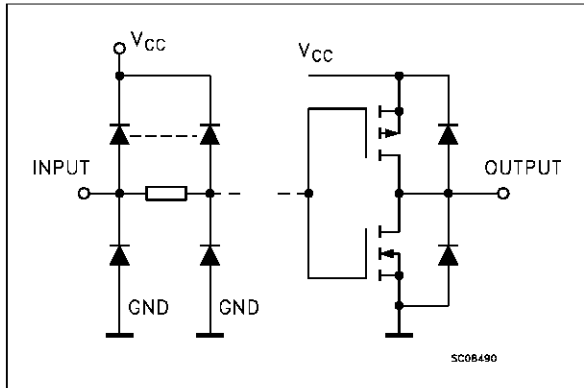
The device is designed to interface directly High Speed CMOS systems with TTL, NMOS and CMOS output voltage levels.

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
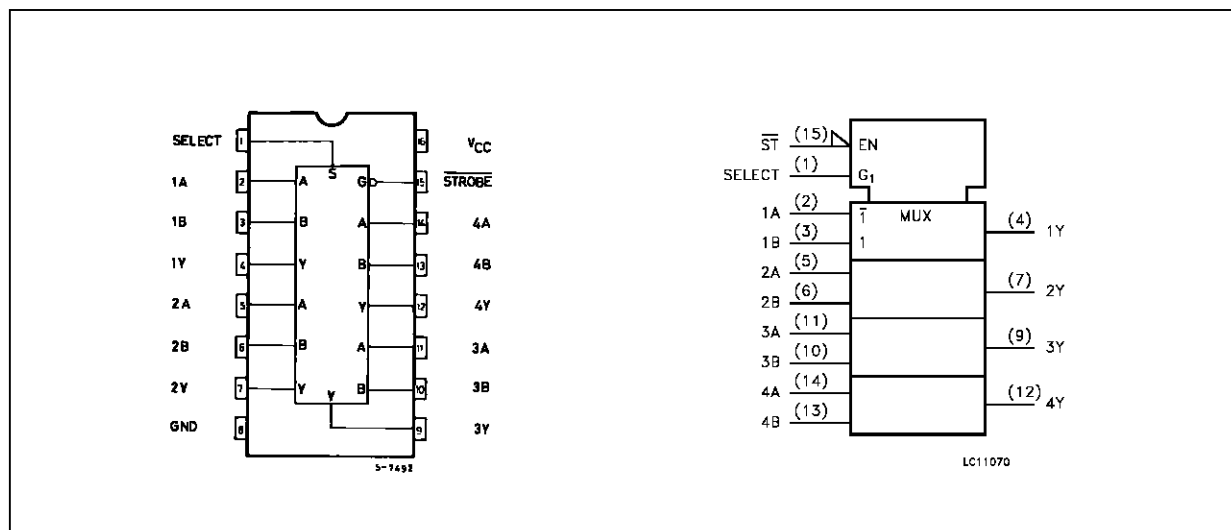
INPUT AND OUTPUT EQUIVALENT CIRCUIT

SC08490

PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1	SELECT	Common Data Select Input
2, 5, 11, 14	1A to 4A	Data Inputs From Source A
3, 6, 10, 13	1B to 4B	Data Inputs From Source B
4, 7, 9, 12	1Y to 4Y	Multiplexer Outputs
15	STROBE	Strobe Input
8	GND	Ground (0V)
16	V_{CC}	Positive Supply Voltage

TRUTH TABLE

INPUT				OUTPUT
STROBE	SELECT	A	B	Y
H	X	X	X	L
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

X : "H" or "L"

ABSOLUTE MAXIMUM RATING

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	± 200	mA
T_{stg}	Storage Temperature	-65 to +150	^oC
T_L	Lead Temperature (10 sec)	300	^oC

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

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	4.5 to 5.5	V
V_I	Input Voltage	0 to V_{CC}	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature:	-40 to +85	^oC
dt/dv	Input Rise and Fall Time V_{CC} = 4.5 to 5.5V (note 1)	8	ns/V

1) V_{IN} from 0.8 V to 2.0 V

DC SPECIFICATIONS

Symbol	Parameter	Test Conditions			Value					Unit
		V_{CC} (V)			$T_A = 25\ ^oC$			-40 to 85 ^oC		
					Min.	Typ.	Max.	Min.	Max.	
V_{IH}	High Level Input Voltage	4.5	$V_O = 0.1$ V or $V_{CC} - 0.1$ V		2.0	1.5		2.0		V
		5.5			2.0	1.5		2.0		
V_{IL}	Low Level Input Voltage	4.5	$V_O = 0.1$ V or $V_{CC} - 0.1$ V			1.5	0.8		0.8	V
		5.5				1.5	0.8		0.8	
V_{OH}	High Level Output Voltage	4.5	$V_I^{(*)} =$ V_{IH} or V_{IL}	$I_O = -50\ \mu A$	4.4	4.49		4.4		V
		5.5		$I_O = -50\ \mu A$	5.4	5.49		5.4		
		4.5		$I_O = -24$ mA	3.86			3.76		
		5.5		$I_O = -24$ mA	4.86			4.76		
V_{OL}	Low Level Output Voltage	4.5	$V_I^{(*)} =$ V_{IH} or V_{IL}	$I_O = 50\ \mu A$		0.001	0.1		0.1	V
		5.5		$I_O = 50$ mA		0.001	0.1		0.1	
		4.5		$I_O = 24$ mA			0.36		0.44	
		5.5		$I_O = 24$ mA			0.36		0.44	
I_I	Input Leakage Current	5.5	$V_I = V_{CC}$ or GND				±0.1		±1	μA
I_{CCT}	Max I_{CC} /Input	5.5	$V_I = V_{CC}$ -2.1 V			0.6			1.5	mA
I_{CC}	Quiescent Supply Current	5.5	$V_I = V_{CC}$ or GND				8		80	μA
I_{OLD}	Dynamic Output Current (note 1, 2)	5.5	$V_{OLD} = 1.65$ V max						75	mA
I_{OHD}			$V_{OHD} = 3.85$ V min						-75	mA

1) Maximum test duration 2ms, one output loaded at time
2) Incident wave switching is guaranteed on transmission lines with impedances as low as 50 Ω.
(*) All outputs loaded.

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AC ELECTRICAL CHARACTERISTICS (C_L = 50 pF, R_L = 500 Ω, Input t_r = t_f = 3 ns)

Symbol	Parameter	Test Condition		Value					Unit
		V_{CC} (V)		T_A = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay Time SELECT to Y	5.0[*]		1.5	5.5	9.0	1.0	10.0	ns
t_{PLH} t_{PHL}	Propagation Delay Time STROBE to Y	5.0[*]		1.5	5.0	8.5	1.0	9.0	ns
t_{PLH} t_{PHL}	Propagation Delay Time A, B to Y	5.0[*]		1.5	4.0	7.0	1.0	8.5	ns

(*) Voltage range is 5V $\pm$ 0.5V

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions		Value					Unit
		V_{CC} (V)		T_A = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
C_{IN}	Input Capacitance	5.0			4				pF
C_{PD}	Power Dissipation Capacitance (note 1)	5.0			TDB				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}(opr) = $C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}/n$ (per circuit)

TEST CIRCUIT

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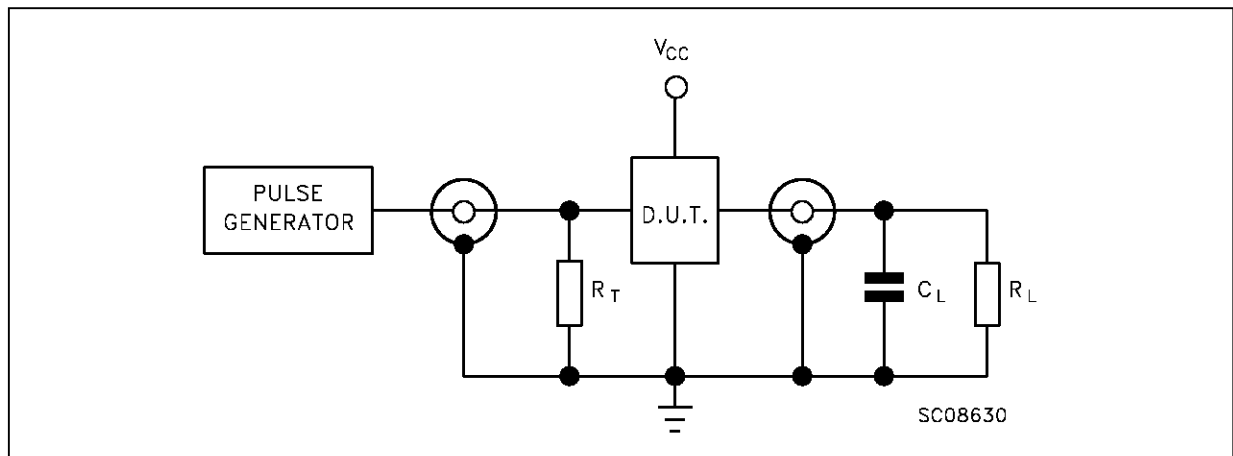
WAVEFORM 1: PROPAGATION DELAYS FOR INVERTING CONDITIONS
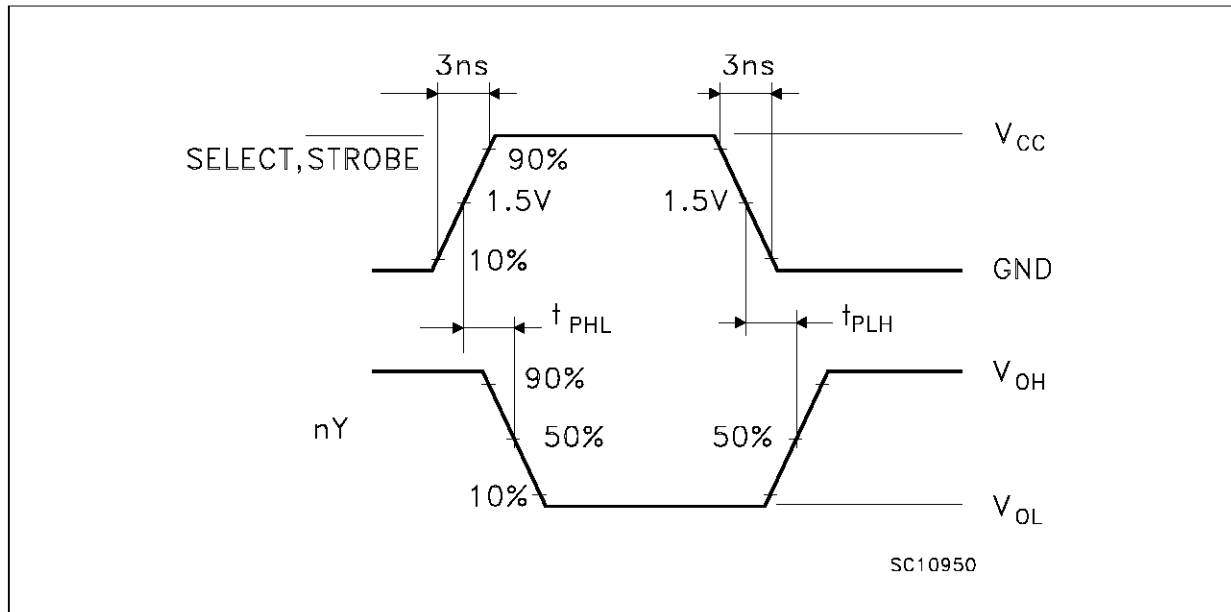
WAVEFORM 2: PROPAGATION DELAYS FOR NON-INVERTING CONDITIONS

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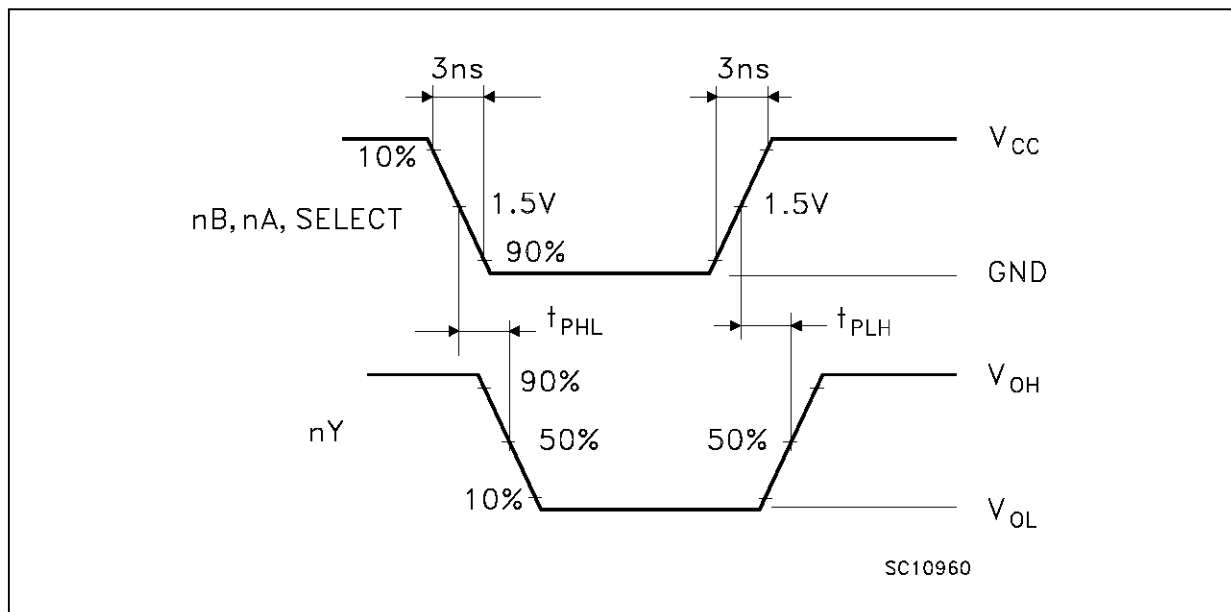
Plastic DIP-16 (0.25) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050

P001C

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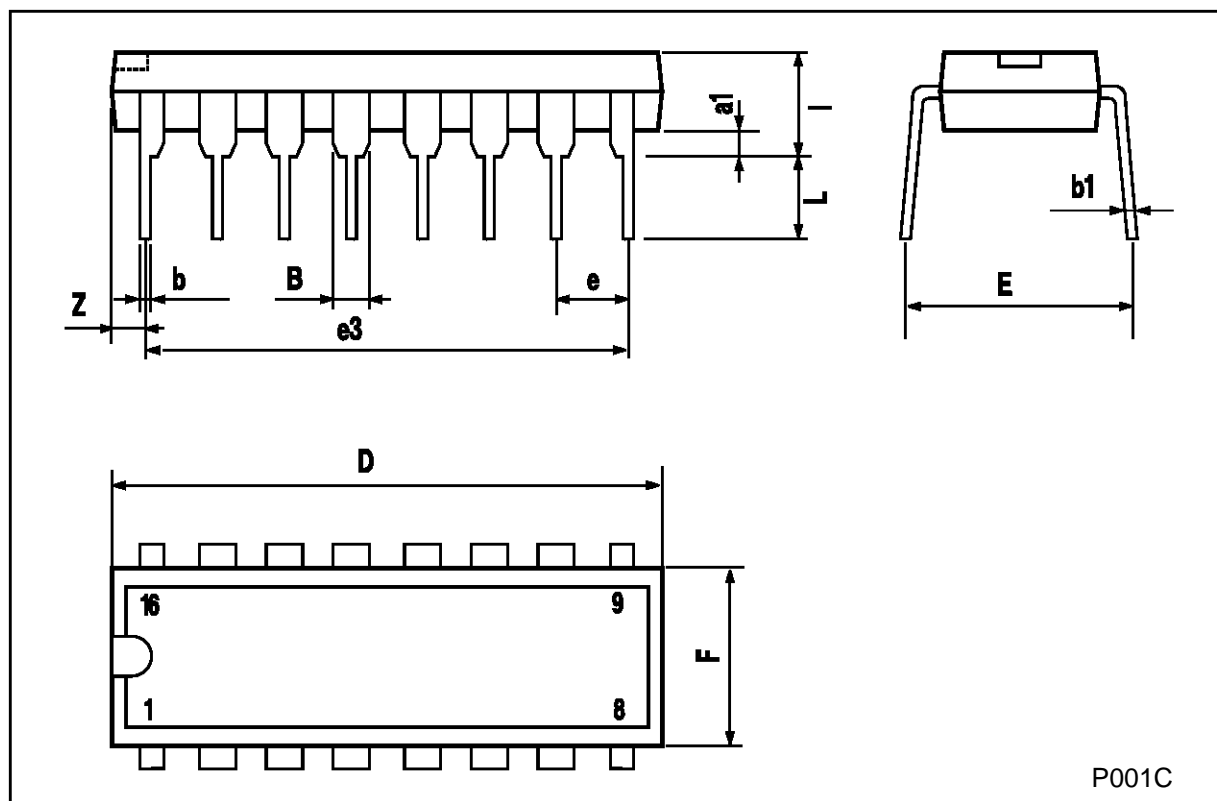
SO-16 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.004		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45 (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8 (max.)					

P013H

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