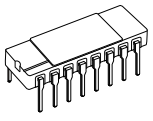
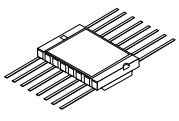
M54HC367

RAD-HARD HEX BUS BUFFER WITH 3 STATE OUTPUT NON INVERTING

- HIGH SPEED:
  t_{PD} = 9ns (TYP.) at V_{CC} = 6V
- LOW POWER DISSIPATION:
  I_{CC} = 4μA(MAX.) at T_A=25°C
- HIGH NOISE IMMUNITY:
  $V_{NIH} = V_{NIL}$ = 28% V_{CC} (MIN.)
- SYMMETRICAL OUTPUT IMPEDANCE:
  $|I_{OH}| = I_{OL}$ = 6mA (MIN)
- BALANCED PROPAGATION DELAYS:
  $t_{PLH} \cong t_{PHL}$
- WIDE OPERATING VOLTAGE RANGE:
  V_{CC} (OPR) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE WITH 54 SERIES 367
- SPACE GRADE-1: ESA SCC QUALIFIED
- 50 krad QUALIFIED, 100 krad AVAILABLE ON REQUEST
- NO SEL UNDER HIGH LET HEAVY IONS IRRADIATION
- DEVICE FULLY COMPLIANT WITH SCC-9401-044



DILC-16



FPC-16

ORDER CODES

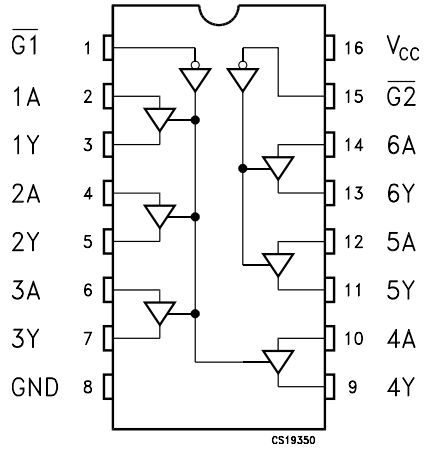
PACKAGE	FM	EM
DILC	M54HC367D	M54HC367D1
FPC	M54HC367K	M54HC367K1

DESCRIPTION

The M54HC367 is an high speed CMOS HEX BUS BUFFER 3-STATE OUTPUTS fabricated with silicon gate C^2MOS technology.

This device contains six buffers, four buffers are controlled by an enable input ($\overline{G1}$) and the other two buffers are controlled by the other enable input ($\overline{G2}$); the outputs of each buffer group are enabled when $\overline{G1}$ and/or $\overline{G2}$ inputs are held low, and when held high, these outputs are disabled in a high-impedance state.
All inputs are equipped with protection circuits against static discharge and transient excess voltage.

PIN CONNECTION



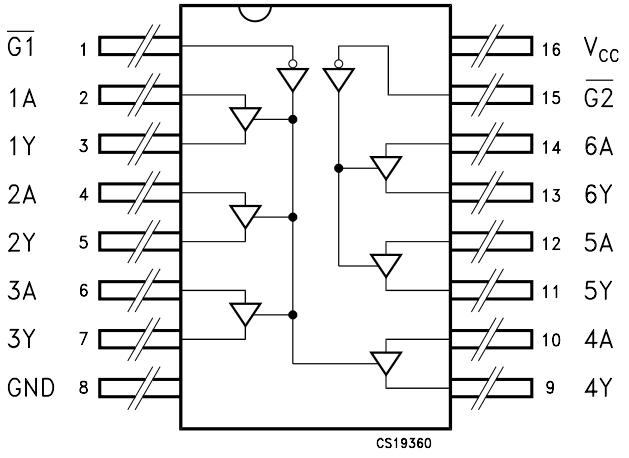


Figure 1: IEC Logic Symbols

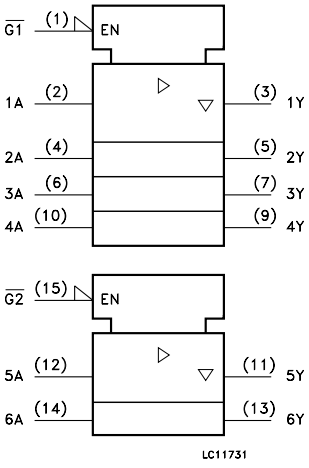


Figure 2: Input And Output Equivalent Circuit

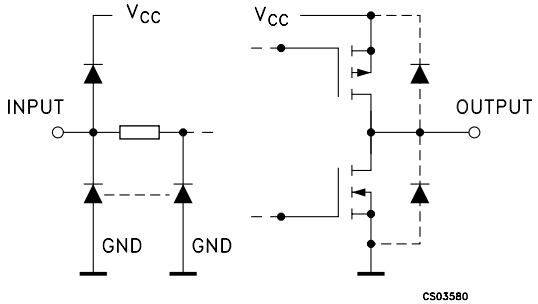


Table 1: Pin Description

PIN N°	SYMBOL	NAME AND FUNCTION
1, 15	$\overline{G1}$, $\overline{G2}$	3 State Output Enable Input
2, 4, 6, 10, 12, 14	1A to 6A	Data Inputs
3, 5, 7, 9, 11, 13	1Y to 6Y	Data Outputs
8	GND	Ground (0V)
16	V_{CC}	Positive Supply Voltage

Table 2: Truth Table

INPUTS		OUTPUTS
$\overline{G}$	An	Yn
L	L	L
L	H	H
H	X	Z

X: Don't Care
Z: High Impedance

Table 3: 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	± 35	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 70	mA
P_D	Power Dissipation	420	mW
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	265	°C

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

Table 4: 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
t_r, t_f	Input Rise and Fall Time	V_{CC} = 2.0V	0 to 1000	ns
		V_{CC} = 4.5V	0 to 500	ns
		V_{CC} = 6.0V	0 to 400	ns

Table 5: DC Specifications

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_{IH}	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}	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}	High Level Output Voltage	2.0	I_O=-20 µA	1.9	2.0		1.9		1.9		V
		4.5	I_O=-20 µA	4.4	4.5		4.4		4.4		
		6.0	I_O=-20 µA	5.9	6.0		5.9		5.9		
		4.5	I_O=-6.0 mA	4.18	4.31		4.13		4.10		
		6.0	I_O=-7.8 mA	5.68	5.8		5.63		5.60		
V_{OL}	Low Level Output Voltage	2.0	I_O=20 µA		0.0	0.1		0.1		0.1	V
		4.5	I_O=20 µA		0.0	0.1		0.1		0.1	
		6.0	I_O=20 µA		0.0	0.1		0.1		0.1	
		4.5	I_O=6.0 mA		0.17	0.26		0.33		0.40	
		6.0	I_O=7.8 mA		0.18	0.26		0.33		0.40	
I_I	Input Leakage Current	6.0	V_I = V_{CC} or GND			± 0.1		± 1		± 1	µA
I_{OZ}	High Impedance Output Leakage Current	6.0	V_I = V_{IH} or V_{IL} V_O = V_{CC} or GND			± 0.5		± 5		± 10	µA
I_{CC}	Quiescent Supply Current	6.0	V_I = V_{CC} or GND			4		40		80	µA

Table 6: AC Electrical Characteristics (C_L = 50 pF, Input $t_r = t_f$ = 6ns)

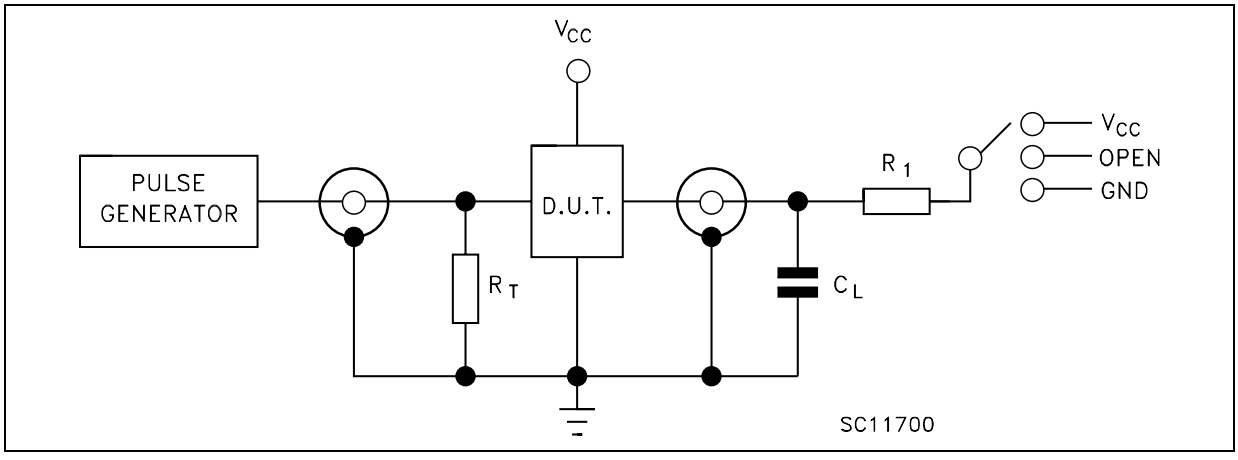
Symbol	Parameter	Test Condition			Value							Unit
		V_{CC} (V)	C_L (pF)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
					Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{TLH} t_{THL}	Output Transition Time	2.0	50			25	60		75		90	ns
		4.5				7	12		15		18	
		6.0				6	10		13		15	
t_{PLH} t_{PHL}	Propagation Delay Time	2.0	50			30	85		105		130	ns
		4.5				10	17		21		26	
		6.0				9	14		18		22	
		2.0	150			42	105		130		160	ns
		4.5				14	21		26		32	
		6.0				12	18		22		27	
t_{PZL} t_{PZH}	High Impedance Output Enable Time	2.0	50	R_L = 1 KΩ		36	90		115		135	ns
		4.5				11	18		23		27	
		6.0				9	15		20		23	
		2.0	150	R_L = 1 KΩ		49	110		140		165	ns
		4.5				15	22		28		33	
		6.0				13	19		24		28	
t_{PLZ} t_{PHZ}	High Impedance Output Disable Time	2.0	50	R_L = 1 KΩ		32	95		120		145	ns
		4.5				14	19		24		29	
		6.0				12	16		20		25	

Table 7: Capacitive Characteristics

Symbol	Parameter	Test Condition			Value							Unit
		V_{CC} (V)			T_A = 25°C			-40 to 85°C		-55 to 125°C		
					Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
C_{IN}	Input Capacitance					5	10		10		10	pF
C_{PD}	Power Dissipation Capacitance (note 1)					33						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. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/6$ (per Channel)

Figure 3: Test Circuit



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

C_L = 50pF/150pF or equivalent (includes jig and probe capacitance)
R_1 = 1KΩ or equivalent
R_T = Z_{OUT} of pulse generator (typically 50Ω)

Figure 4: Waveform - Propagation Delay Times (f=1MHz; 50% duty cycle)

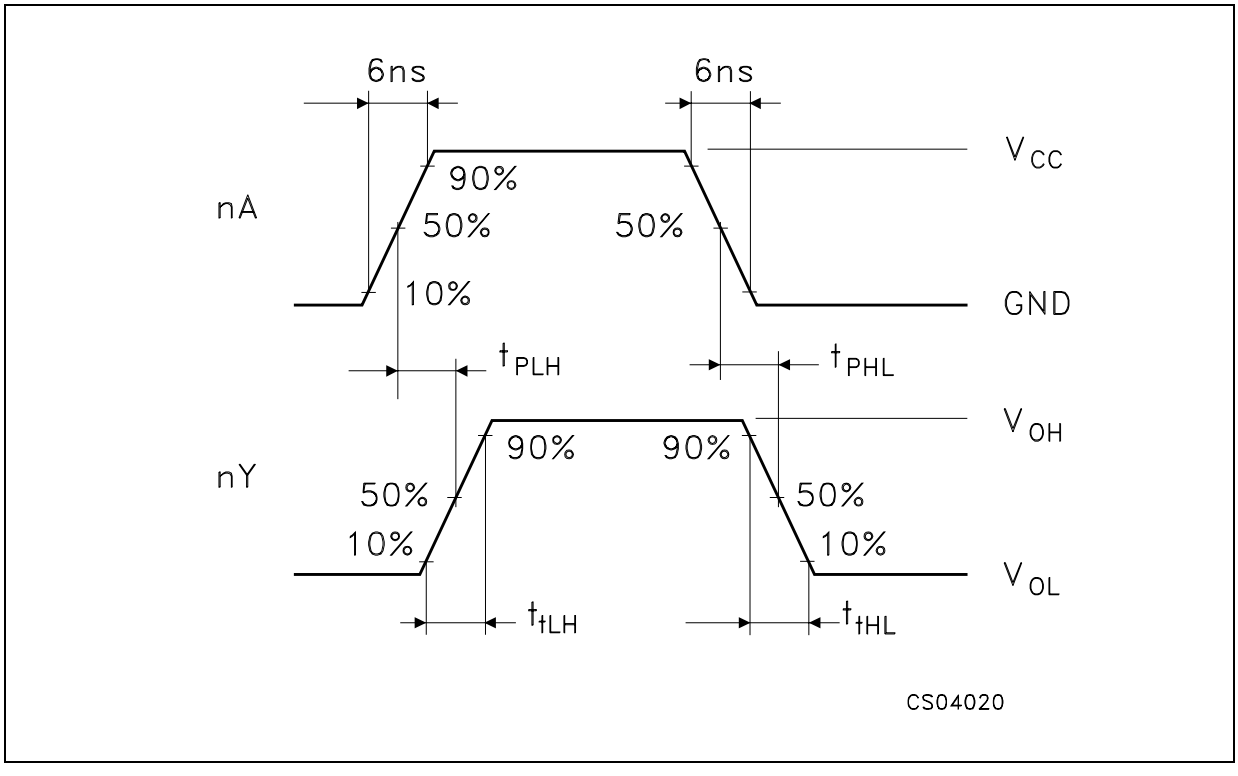
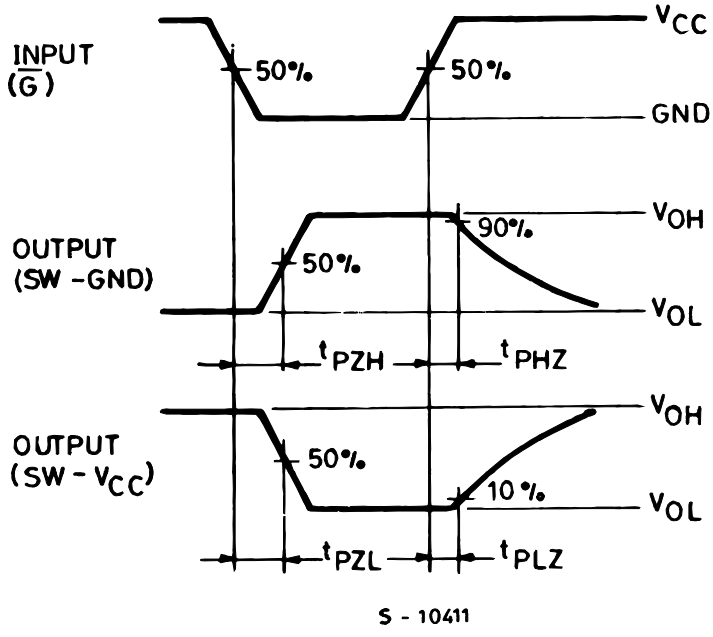
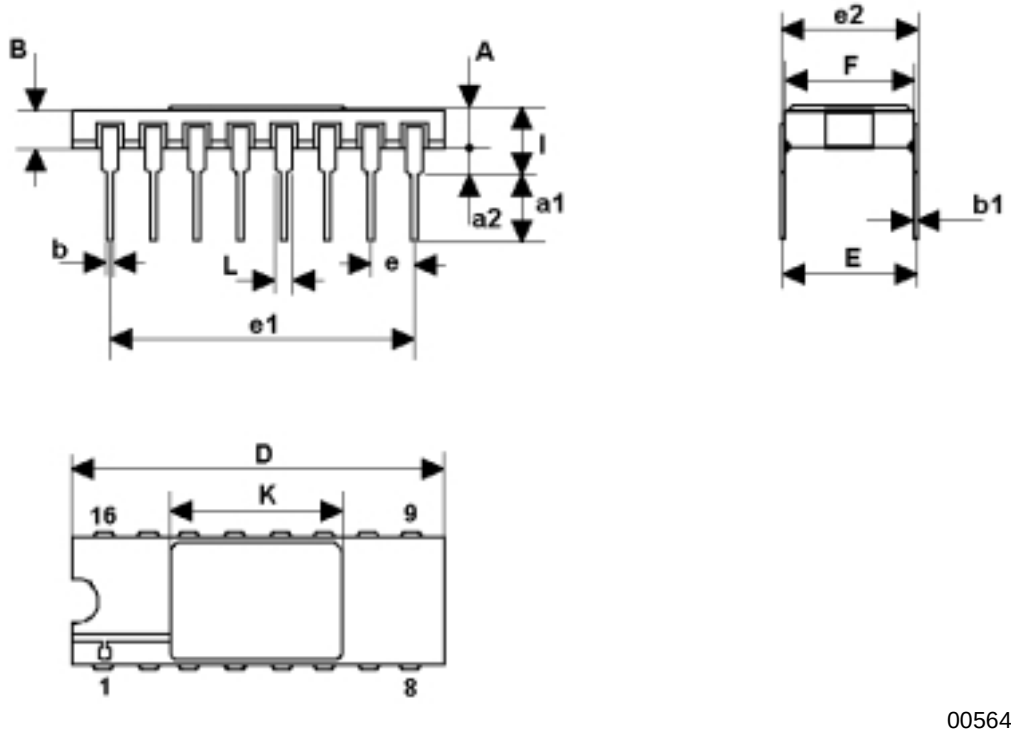


Figure 5: Waveform - Output Enable And Disable Times (f=1MHz; 50% duty cycle)



DILC-16 MECHANICAL DATA

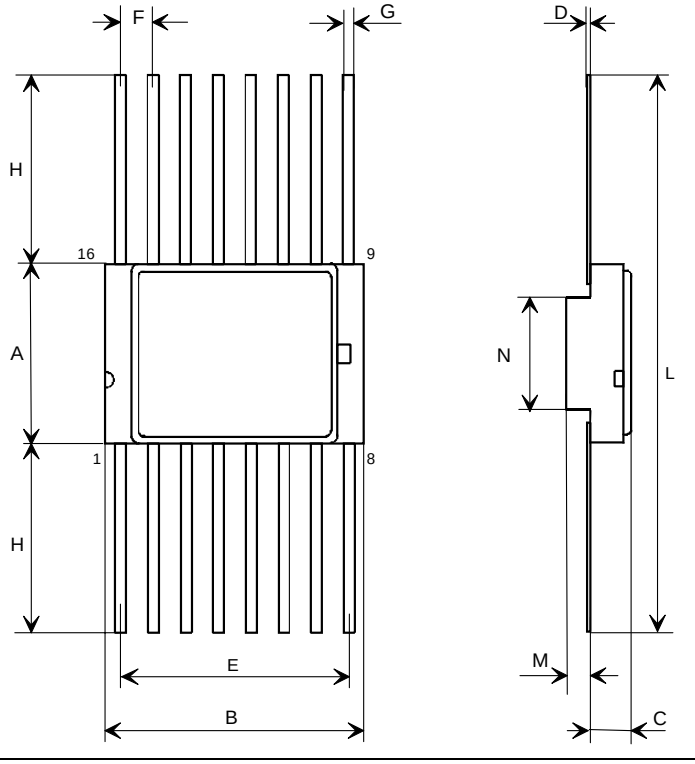
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.1		2.71	0.083		0.107
a1	3.00		3.70	0.118		0.146
a2	0.63	0.88	1.14	0.025	0.035	0.045
B	1.82		2.39	0.072		0.094
b	0.40	0.45	0.50	0.016	0.018	0.020
b1	0.20	0.254	0.30	0.008	0.010	0.012
D	20.06	20.32	20.58	0.790	0.800	0.810
e	7.36	7.62	7.87	0.290	0.300	0.310
e1		2.54			0.100	
e2	17.65	17.78	17.90	0.695	0.700	0.705
e3	7.62	7.87	8.12	0.300	0.310	0.320
F	7.29	7.49	7.70	0.287	0.295	0.303
I			3.83			0.151
K	10.90		12.1	0.429		0.476
L	1.14		1.5	0.045		0.059



0056437F

FPC-16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	6.75	6.91	7.06	0.266	0.272	0.278
B	9.76	9.94	10.14	0.384	0.392	0.399
C	1.49		1.95	0.059		0.077
D	0.102	0.127	0.152	0.004	0.005	0.006
E	8.76	8.89	9.01	0.345	0.350	0.355
F		1.27			0.050	
G	0.38	0.43	0.48	0.015	0.017	0.019
H	6.0			0.237		
L	18.75		22.0	0.738		0.867
M	0.33	0.38	0.43	0.013	0.015	0.017
N		4.31			0.170	



0016030E

Table 8: Revision History

Date	Revision	Description of Changes
10-May-2004	1	First Release