National Semiconductor

54F/74F366•54F/74F368
Hex Inverter Buffer with TRI-STATE® Outputs

Features

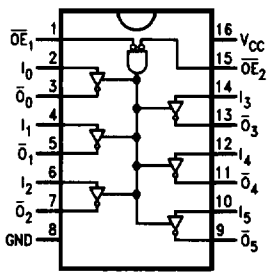
- TRI-STATE buffer outputs sink 64 mA
- High-speed
- Bus-oriented
- High impedance npn base inputs for reduced loading

Ordering Code: See Section 5

Connection Diagrams

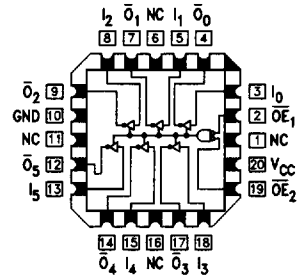
'F366

Pin Assignment for DIP, SOIC and Flatpak



TL/F/9521-2

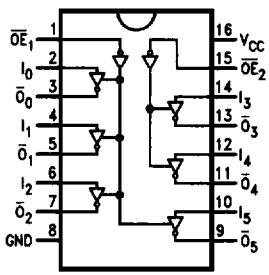
Pin Assignment for LCC



TL/F/9521-1

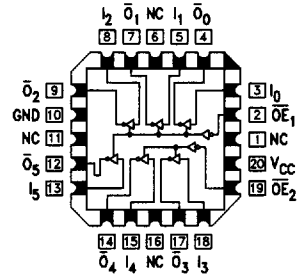
'F368

Pin Assignment for DIP, SOIC and Flatpak



TL/F/9521-4

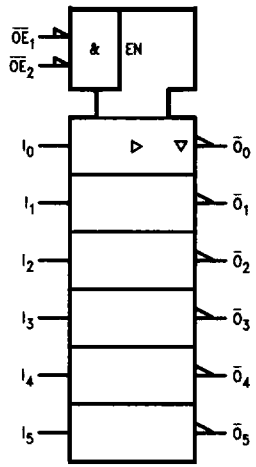
Pin Assignment for LCC



TL/F/9521-3

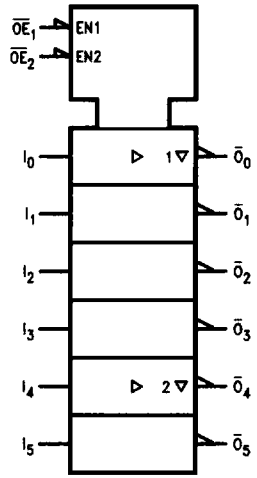
Logic Symbols

IEEE/IEC
'F366



TL/F/9521–5

IEEE/IEC
'F368



TL/F/9521–6

Unit Loading/Fan Out: See Section 2 for U.L. definitions

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$\overline{OE}_1$, $\overline{OE}_2$	Output Enable Input (Active LOW)	1.0/0.033	20 μA/−20 μA
I_n	Input	1.0/0.033	20 μA/−20 μA
O_n, $\overline{O}_n$	Outputs	600/106.6 (80)	−12 mA/64 mA (48 mA)

Function Tables

'F366

Inputs			Output
$\overline{OE}_1$	$\overline{OE}_2$	I	$\overline{O}$
L	L	L	H
L	L	H	L
X	H	X	Z
H	X	X	Z

'F368

Inputs		Output
$\overline{OE}$	I	$\overline{O}$
L	L	H
L	H	L
H	X	Z

L = LOW Voltage Level
H = HIGH Voltage Level
X = Immaterial
Z = High Impedance

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	−55°C to +175°C
V_{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V_{CC} = 0V)	
Standard Output	−0.5V to V_{CC}
TRI-STATE Output	−0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated I_{OL} (mA)

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

Free Air Ambient Temperature	
Military	−55°C to +125°C
Commercial	0°C to +70°C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

DC Electrical Characteristics

Symbol	Parameter	54F/74F Min	54F/74F Typ	54F/74F Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage			−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage 54F 10% V_{CC}	2.0			V	Min	I_{OH} = −12 mA
	Output HIGH Voltage 74F 10% V_{CC}	2.0					I_{OH} = −15 mA
V_{OL}	Output LOW Voltage 54F 10% V_{CC}			0.55	V	Min	I_{OL} = 48 mA
	Output LOW Voltage 74F 10% V_{CC}			0.55			I_{OL} = 64 mA
I_{IH}	Input HIGH Current			20	μA	Max	V_{IN} = 2.7V
I_{BVI}	Input HIGH Current Breakdown Test			100	μA	Max	V_{IN} = 7.0V
I_{IL}	Input LOW Current			−20	μA	Max	V_{IN} = 0.5V
I_{OZH}	Output Leakage Current			50	μA	Max	V_{OUT} = 2.7V
I_{OZL}	Output Leakage Current			−50	μA	Max	V_{OUT} = 0.5V
I_{OS}	Output Short-Circuit Current	−100		−225	mA	Max	V_{OUT} = 0V
I_{CEX}	Output HIGH Leakage Current			250	μA	Max	V_{OUT} = V_{CC}
I_{ZZ}	Bus Drainage Test			500	μA	0.0V	V_{OUT} = 5.25V
I_{CCH}	Power Supply Current		20	25	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current		49	62	mA	Max	V_O = LOW
I_{CCZ}	Power Supply Current		35	48	mA	Max	V_O = HIGH Z

AC Electrical Characteristics: See Section 2 for Waveforms and Load Configurations

Symbol	Parameter	74F $T_A = +25°C$ $V_{CC} = +5.0V$ $C_L = 50\ pF$			54F $T_A, V_{CC} = Mil$ $C_L = 50\ pF$		74F $T_A, V_{CC} = Com$ $C_L = 50\ pF$		Units	Fig. No.
		Min	Typ	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay	2.5	4.0	6.5			2.0	7.5	ns	2-3
t_{PHL}		1.0	1.8	5.0			1.0	5.5		
t_{PZH}	Enable Time ('F366)	2.5	4.2	9.5			2.5	10.0	ns	2-5
t_{PZL}		2.5	4.2	9.0			2.5	9.5		
t_{PZH}	Enable Time ('F368)	2.5	4.2	7.5			2.0	8.5	ns	2-5
t_{PZL}		3.0	5.6	8.5			3.0	9.0		
t_{PHZ}	Disable Time	2.0	3.3	6.5			2.0	7.0	ns	2-5
t_{PLZ}		2.0	4.1	6.5			2.0	7.0		