FAIRCHILD SEMICONDUCTOR™

April 1988
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74F269
8-Bit Bidirectional Binary Counter

General Description

The 74F269 is a fully synchronous 8-stage up/down counter featuring a preset capability for programmable operation, carry lookahead for easy cascading and a U/$\overline{D}$ input to control the direction of counting. All state changes, whether in counting or parallel loading, are initiated by the rising edge of the clock.

Features

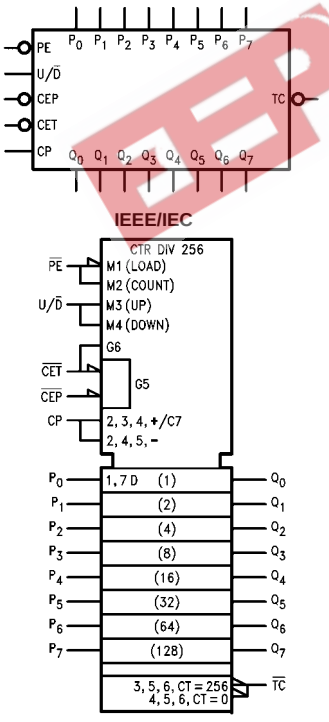
- Synchronous counting and loading
- Built-in lookahead carry capability
- Count frequency 100 MHz
- Supply current 113 mA typ
- 300 mil slimline package

Ordering Code:

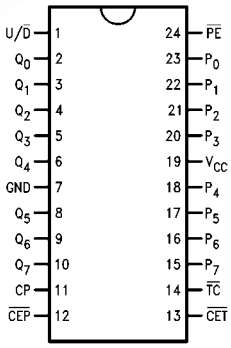
Order Number	Package Number	Package Description
74F269SC	M24B	24-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
74F269SPC	N24C	24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbols



Connection Diagram



Function Table

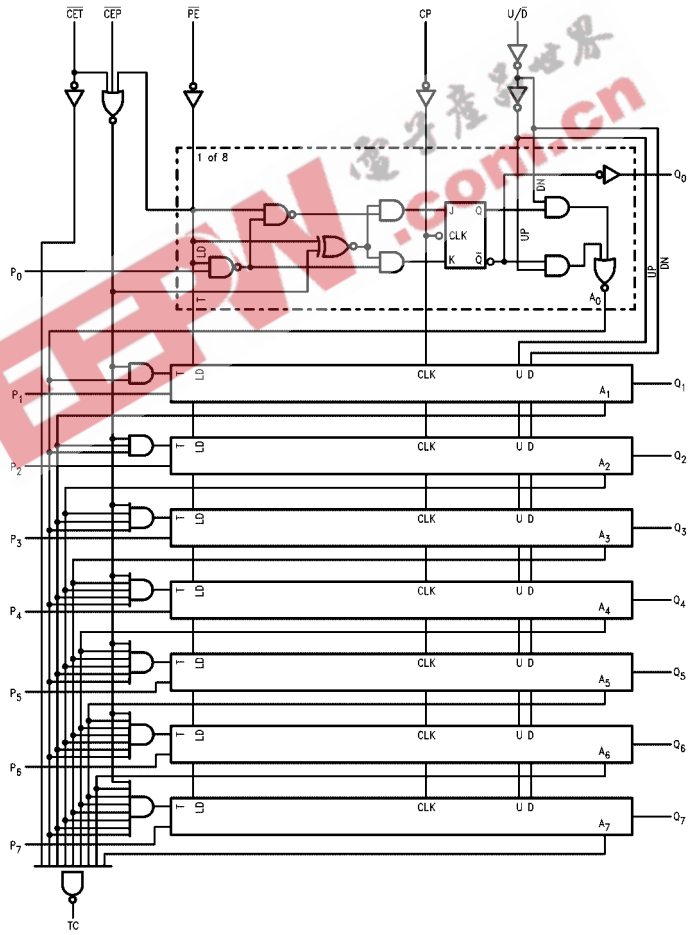
$\overline{PE}$	$\overline{CEP}$	$\overline{CET}$	U/$\overline{D}$	CP	Function
L	X	X	X	⌐	Parallel Load All Flip-Flops
H	H	X	X	⌐	Hold
H	X	H	X	⌐	Hold ($\overline{TC}$ Held HIGH)
H	L	L	H	⌐	Count Up
H	L	L	L	⌐	Count Down

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
⌐ = Transition LOW-to-HIGH

Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
P_0–P_7	Parallel Data Inputs	1.0/1.0	20 µA/–0.6 mA
$\overline{PE}$	Parallel Enable Input (Active LOW)	1.0/1.0	20 µA/–0.6 mA
U/$\overline{D}$	Up-Down Count Control Input	1.0/1.0	20 µA/–0.6 mA
$\overline{CEP}$	Count Enable Parallel Input (Active LOW)	1.0/1.0	20 µA/–0.6 mA
$\overline{CET}$	Count Enable Trickle Input (Active LOW)	1.0/1.0	20 µA/–0.6 mA
CP	Clock Input	1.0/1.0	20 µA/–0.6 mA
$\overline{TC}$	Terminal Count Output (Active LOW)	5.0/33.3	–1 mA/20 mA
Q_0–Q_7	Flip-Flop Outputs	50/33.3	–1 mA/20 mA

Logic Diagram



Absolute Maximum Ratings(Note 1)

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	−55°C to +150°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}
3-STATE Output	−0.5V to +5.5V
Current Applied to Output	
in LOW State (Max)	twice the rated I_{OL} (mA)

Recommended Operating Conditions

Free Air Ambient Temperature	0°C to +70°C
Supply Voltage	+4.5V to +5.5V

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.

DC Electrical Characteristics

Symbol	Parameter		Min	Typ	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	10% V_{CC}	2.5			V	Min	I_{OH} = −1 mA
		5% V_{CC}	2.7					I_{OH} = −1 mA
V_{OL}	Output LOW Voltage	10% V_{CC}			0.5	V	Min	I_{OL} = 20 mA
I_{IH}	Input HIGH Current				5.0	µA	Max	V_{IN} = 2.7V
I_{BVI}	Input HIGH Current Breakdown Test				7.0	µA	Max	V_{IN} = 7.0V
I_{CEX}	Output HIGH Leakage Current				50	µA	Max	V_{OUT} = V_{CC}
V_{ID}	Input Leakage Test		4.75			V	0.0	I_{ID} = 1.9 µA, All Other Pins Grounded
I_{OD}	Output Leakage Circuit Current				3.75	µA	0.0	V_{IOD} = 150 mV All Other Pins Grounded
I_{IL}	Input LOW Current				−0.6	mA	Max	V_{IN} = 0.5V
I_{OS}	Output Short-Circuit Current		−60		−150	mA	Max	V_{OUT} = 0V
I_{CCH}	Power Supply Current			104	125	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current			113	135	mA	Max	V_O = LOW

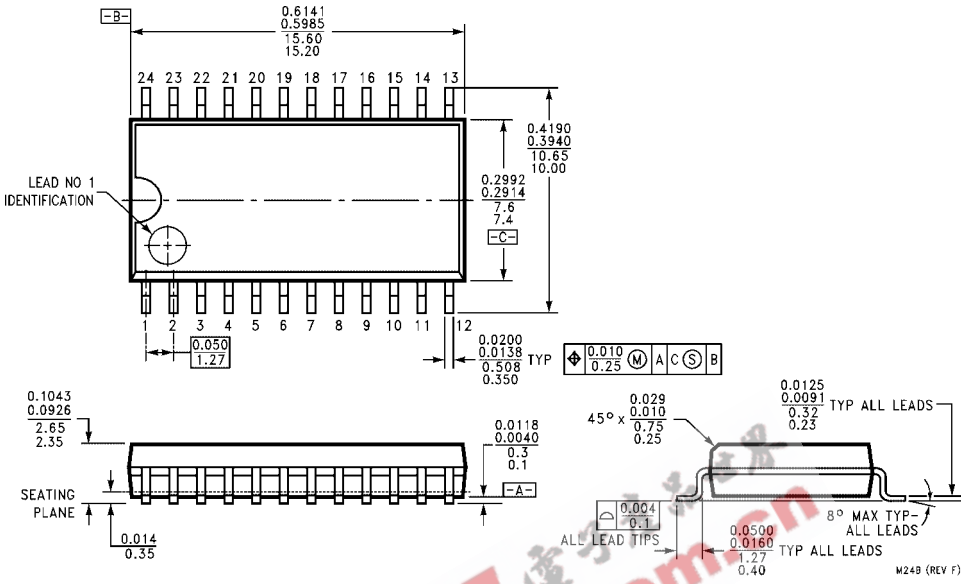
AC Electrical Characteristics

Symbol	Parameter	$T_A = +25°C$, $V_{CC} = +5.0V$, $C_L = 50$ pF			$T_A = 0°C$ to $+70°C$, $V_{CC} = 5.0V$, $C_L = 50$ pF		Units
		Min	Typ	Max	Min	Max	
f_{MAX}	Maximum Clock Frequency	100			85		MHz
t_{PLH}	Propagation Delay	3.5		8.0	3.5	7.0	ns
t_{PHL}	CP to Q_n (Count-Up)	4.5		10.5	4.5	11.0	
t_{PLH}	Propagation Delay	3.5		7.5	3.5	10.0	ns
t_{PHL}	U/$\overline{D}$ to $\overline{TC}$	4.5		7.5	4.5	11.0	
t_{PLH}	Propagation Delay	3.5		7.0	3.5	10.5	ns
t_{PHL}	$\overline{CET}$ to $\overline{TC}$	3.0		10.5	3.0	11.5	
t_{PLH}	Propagation Delay	4.5		10.0	4.5	10.5	ns
t_{PHL}	CP to $\overline{TC}$	5.0		10.0	4.5	10.5	
t_{PLH}	Propagation Delay	3.5		10.5	3.5	11.0	ns
t_{PHL}	CP to Q_n (Count-Down)	4.5		10.5	4.5	11.0	
t_{PLH}	Propagation Delay	3.5		7.0	3.5	10.0	ns
t_{PHL}	CP to Q_n (Load)	4.0		7.0	4.0	7.0	

AC Operating Requirements

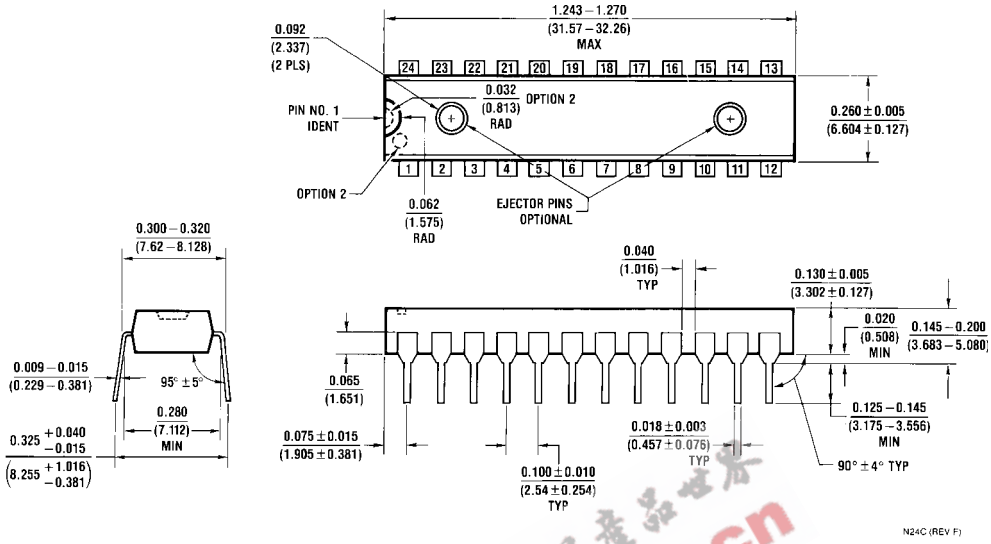
Symbol	Parameter	$T_A = +25°C$, $V_{CC} = +5.0V$		$T_A = 0°C$ to $+70°C$, $V_{CC} = 5.0V$		Units
		Min	Max	Min	Max	
$t_S(H)$	Setup Time, HIGH or LOW	3.5		4.0		ns
$t_S(L)$	Data to CP	3.0		3.0		
$t_H(H)$	Hold Time, HIGH or LOW	1.0		2.0		
$t_H(L)$	Data to CP	1.0		1.0		
$t_S(H)$	Setup Time, HIGH or LOW	5.5		6.5		ns
$t_S(L)$	$\overline{PE}$ to CP	5.5		6.5		
$t_H(H)$	Hold Time, HIGH or LOW	0		0		
$t_H(L)$	$\overline{PE}$ to CP	0		0		
$t_S(H)$	Setup Time, HIGH or LOW	6.0		6.5		ns
$t_S(L)$	$\overline{CET}$ or $\overline{CEP}$ to CP	8.0		9.0		
$t_H(H)$	Hold Time, HIGH or LOW	0		0		
$t_H(L)$	$\overline{CET}$ or $\overline{CEP}$ to CP	0		0		
$t_W(H)$	Clock Pulse Width, HIGH or LOW	3.5		3.5		ns
$t_W(L)$		3.5		4.0		
$t_S(H)$	Setup Time, HIGH or LOW	8.0		9.5		ns
$t_S(L)$	U/$\overline{D}$ to CP	6.0		7.0		
$t_H(H)$	Hold Time, HIGH or LOW	0.0		0.0		ns
$t_H(L)$	U/$\overline{D}$ to CP	0.0		0.0		

Physical Dimensions inches (millimeters) unless otherwise noted



28-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
Package Number M24B

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N24C

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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