

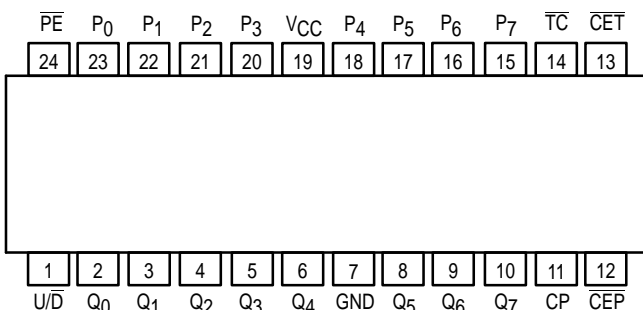


## 8-BIT BIDIRECTIONAL BINARY COUNTER

The MC74F269 is a fully synchronous 8-stage up/down counter featuring a preset capability for programmable operation, carry look-ahead for easy cascading and a  $U/\bar{D}$  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.

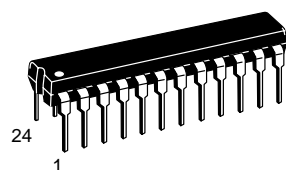
- Synchronous Counting and Loading
- Built-In Lookahead Carry Capability
- Count Frequency 115 MHz Typical
- Supply Current 95 mA Typical

### PIN ASSIGNMENT

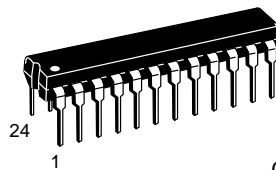


# MC74F269

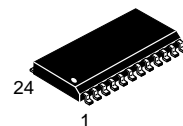
**8-BIT BIDIRECTIONAL BINARY COUNTER**  
FAST™ SCHOTTKY TTL



**J SUFFIX**  
CERAMIC  
CASE 758-01



**N SUFFIX**  
PLASTIC  
CASE 724-03



**DW SUFFIX**  
SOIC  
CASE 751E-03

### ORDERING INFORMATION

MC74FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXDW	SOIC

### GUARANTEED OPERATING RANGES

Symbol	Parameter	74	Min	Typ	Max	Unit
$V_{CC}$	Supply Voltage	74	4.5	5.0	5.5	V
$T_A$	Operating Ambient Temperature Range	74	0	25	70	°C
$I_{OH}$	Output Current — High	74			-1.0	mA
$I_{OL}$	Output Current — Low	74			20	mA

## MC74F269

FUNCTION TABLE

Operating Mode	Inputs						Outputs	
	CP	U/D	$\overline{\text{CEP}}$	$\overline{\text{CET}}$	$\overline{\text{PE}}$	$\text{P}_n$	$\text{Q}_n$	$\overline{\text{TC}}$
Parallel Load	↑	X	X	X	l	l	L	(a)
	↑	X	X	X	l	h	H	(a)
Count Up	↑	h	l	l	h	X	Count Up	(a)
Count Down	↑	l	l	l	h	X	Count Down	(a)
Hold Do Nothing	↑	X	h	X	h	X	$q_n$	(a)
	↑	X	X	h	h	X	$q_n$	H

H = HIGH voltage level steady state

h = HIGH voltage level one set-up time prior to the LOW-to-HIGH clock transition

L = LOW voltage level steady state

l = LOW voltage level one set-up time prior to the LOW-to-HIGH clock transition

X = Don't care

q = Lower case letters indicate the state of the referenced output prior to the LOW-to-HIGH clock transition

↑ = LOW-to-HIGH clock transition

(a) = The TC is LOW when CET is LOW and the counter is at Terminal Count. Terminal Count Up is with all  $\text{Q}_n$  outputs HIGH and Terminal Count Down is with all  $\text{Q}_n$  outputs LOW.

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (Unless otherwise specified)

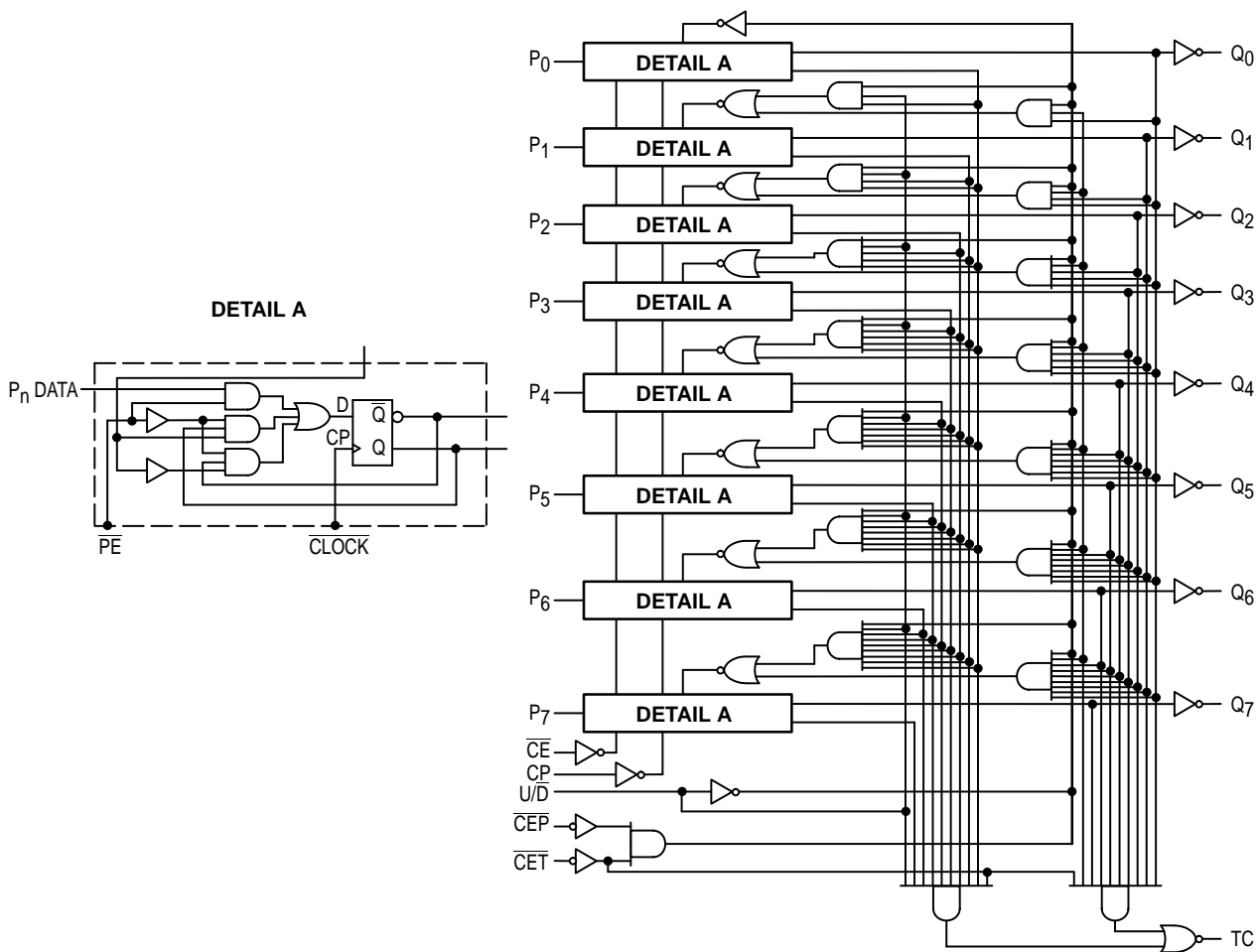
Symbol	Parameter		Limits			Unit	Test Conditions	
			Min	Typ	Max			
$V_{OH}$	Output HIGH Voltage	74	2.5			V	$I_{OH} = -1.0 \text{ mA}$	$V_{CC} = 4.5 \text{ V}$
			2.7	3.4				$V_{CC} = 4.75 \text{ V}$
$V_{OL}$	Output LOW Voltage	74		0.35	0.5	V	$I_{OL} = 20 \text{ mA}, V_{CC} = 4.5 \text{ V}$	
$V_{IK}$	Input Clamp Diode Voltage				-1.2	V	$V_{CC} = \text{MIN}, I_{IN} = -18 \text{ mA}$	
$I_{IH}$	Input HIGH Current				100	$\mu\text{A}$	$V_{CC} = \text{MAX}$	$V_{IN} = 7.0 \text{ V}$
					20			$V_{IN} = 2.7 \text{ V}$
$I_{IL}$	Input LOW Current				-0.6	mA	$V_{CC} = \text{MAX}, V_{IN} = 0.5 \text{ V}$	
$I_{OS}$	Output Short Circuit Current (Note 2)		-60		-150	mA	$V_{CC} = \text{MAX}, V_{OUT} = 0 \text{ V}$	
$I_{CC}$	Total Supply Current (total)		$I_{CCH}$	93	120	mA	$V_{CC} = \text{MAX}$	(Note 3)
			$I_{CCL}$	98	125			(Note 4)

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating conditions for the applicable device type.
- Not more than one output should be shorted at a time, nor for more than 1 second.
- $\overline{\text{PE}} = \overline{\text{CET}} = \overline{\text{CEP}} = \text{U/D} = \text{GND}; \text{P}_n = 4.5 \text{ V}; \text{CP} = \uparrow$
- $\overline{\text{PE}} = \overline{\text{CET}} = \overline{\text{CEP}} = \text{U/D} = \text{GND}; \text{CP} = \uparrow$

# MC74F269

## LOGIC DIAGRAM



## MC74F269

## AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	74F			74F		Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0 V C <sub>L</sub> = 50 pF			T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0 V ±10% C <sub>L</sub> = 50 pF		
		Min	Typ	Max	Min	Max	
f <sub>MAX</sub>	Maximum Clock Frequency	100			85		MHz
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay CP to Q <sub>n</sub> (Load) $\overline{PE}$ = LOW	3.0 4.0	5.5 5.0	9.0 9.0	3.0 4.0	9.5 9.5	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay CP to Q <sub>n</sub> (Count) $\overline{PE}$ = HIGH	3.0 4.5	6.0 7.0	9.0 10	2.5 4.5	10 10.5	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay CP to $\overline{TC}$	4.5 5.0	7.5 7.5	10 10	4.5 5.0	10.5 11	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay $\overline{CET}$ to $\overline{TC}$	3.5 3.5	5.0 5.5	9.0 9.0	3.5 3.5	10 10	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay U/ $\overline{D}$ to $\overline{TC}$	4.0 4.5	6.0 5.5	9.0 9.5	4.0 4.5	10 10	ns

## AC SETUP REQUIREMENTS

Symbol	Parameter	74F			74F			Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0 V C <sub>L</sub> = 50 pF			T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0 V ±10% C <sub>L</sub> = 50 pF			
		Min	Typ	Max	Min	Typ	Max	
t <sub>s</sub> (H) t <sub>s</sub> (L)	Set-up Time, HIGH or LOW P to CP	2.0 2.0			2.5 2.5			ns
t <sub>h</sub> (H) t <sub>h</sub> (L)	Hold Time, HIGH or LOW P to CP	1.0 1.0			1.0 1.0			ns
t <sub>s</sub> (H) t <sub>s</sub> (L)	Set-up Time, HIGH or LOW $\overline{PE}$ to CP	5.0 5.5			5.5 6.5			ns
t <sub>h</sub> (H) t <sub>h</sub> (L)	Hold Time, HIGH or LOW $\overline{PE}$ to CP	0 0			0 0			ns
t <sub>s</sub> (H) t <sub>s</sub> (L)	Set-up Time, HIGH or LOW $\overline{CET}$ , $\overline{CEP}$ to CP	4.5 4.5			5.5 5.5			ns
t <sub>h</sub> (H) t <sub>h</sub> (L)	Hold Time, HIGH or LOW $\overline{CET}$ , $\overline{CEP}$ to CP	0 0			0 0			ns
t <sub>s</sub> (H) t <sub>s</sub> (L)	Set-up Time, HIGH or LOW U/ $\overline{D}$ to CP	6.0 7.0			7.0 8.0			ns
t <sub>h</sub> (H) t <sub>h</sub> (L)	Hold Time, HIGH or LOW U/ $\overline{D}$ to CP	0 0			0 0			ns
t <sub>w</sub> (H) t <sub>w</sub> (L)	Clock Pulse Width CP	4.0 4.5			4.0 5.0			ns

# MC74F269

## TIMING DIAGRAM

