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74F579

8-Bit Bidirectional Binary Counter with 3-STATE Outputs

General Description

The 74F579 is a fully synchronous 8-stage up/down counter with multiplexed 3-STATE I/O ports for bus-oriented applications. It features a preset capability for programmable operation, carry lookahead for easy cascading and a U/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

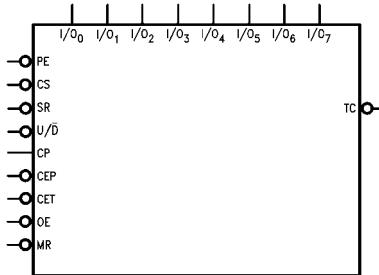
- Multiplexed 3-STATE I/O ports
- Built-in lookahead carry capability
- Count frequency 100 MHz typical
- Supply current 75 mA typical
- Guaranteed 4000V minimum ESD protection

Ordering Code:

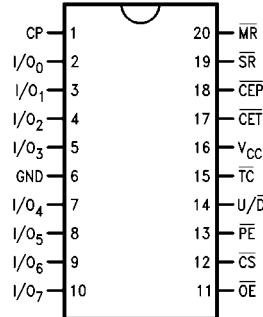
Order Number	Package Number	Package Description
74F579SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74F579SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F579PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

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

Logic Symbol



Connection Diagram



Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$I/O_0-I/O_7$	Data Inputs or 3-STATE Outputs	3.5/0.333 75/15	70 μ A/0.2 mA -3 mA/24 mA
\overline{PE}	Parallel Enable Input (Active LOW)	0.25/0.333	5 μ A/0.2 mA
$\overline{U/D}$	Up-Down Count Control Input	0.25/0.333	5 μ A/0.2 mA
\overline{MR}	Master Reset Input (Active LOW)	0.25/0.333	5 μ A/0.2 mA
\overline{SR}	Synchronous Reset Input (Active LOW)	0.25/0.333	5 μ A/0.2 mA
\overline{CEP}	Count Enable Parallel Input (Active LOW)	0.25/0.333	5 μ A/0.2 mA
\overline{CET}	Count Enable Trickle Input (Active LOW)	0.25/0.333	5 μ A/0.2 mA
\overline{CS}	Chip Select Input Active (Active LOW)	0.25/0.333	5 μ A/0.2 mA
\overline{OE}	Output Enable Input (Active LOW)	0.25/0.333	5 μ A/0.2 mA
CP	Clock Pulse Input (Active Rising Edge)	0.25/0.333	5 μ A/0.2 mA
\overline{TC}	Terminal Count Output (Active LOW)	25/12.5	-1 mA/5 mA

Function Table

MR	\overline{SR}	CS	PE	CEP	CET	$\overline{U/D}$	\overline{OE}	CP	Function
X	X	H	X	X	X	X	X	X	I/O _a to I/O _h in High Z (\overline{PE} Disabled)
X	X	L	H	X	X	X	H	X	I/O _a to I/O _h in High Z
X	X	L	H	X	X	X	L	X	Flip-Flop Outputs Appear on I/O Lines
L	X	X	X	X	X	X	X	X	Asynchronous Reset for all Flip-Flops
H	L	X	X	X	X	X	X	\swarrow	Synchronous Reset for all Flip-Flops
H	H	L	L	X	X	X	X	\swarrow	Parallel Load all Flip-Flops
H	H	(Not LL)	H	X	X	X	X	\swarrow	Hold
H	H	(Not LL)	X	H	X	X	\swarrow		Hold (\overline{TC} Held HIGH)
H	H	(Not LL)	L	L	H	X	\swarrow		Count Up
H	H	(Not LL)	L	L	L	X	\swarrow		Count Down

H = HIGH Voltage Level

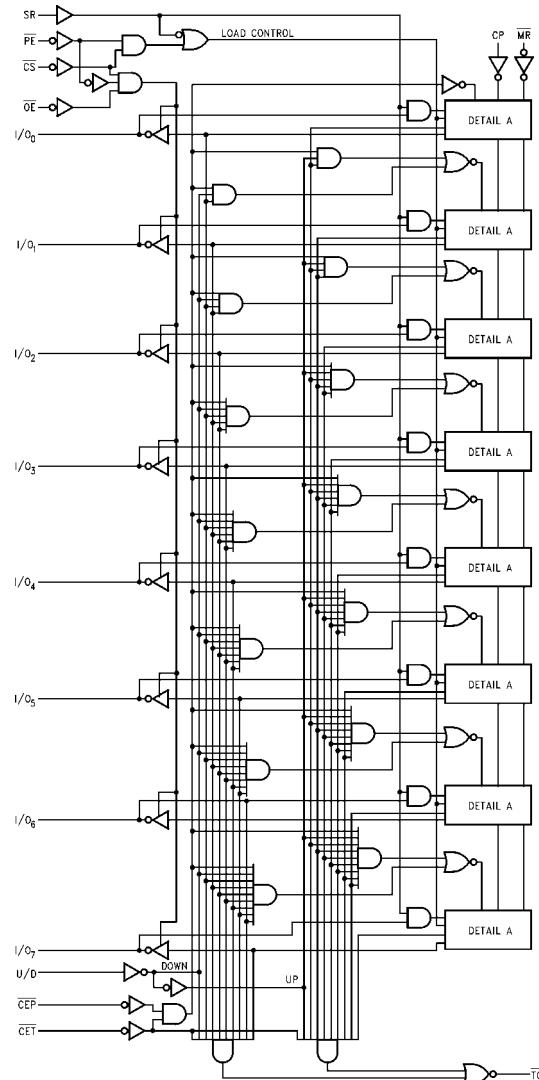
L = LOW Voltage Level

X = Immaterial

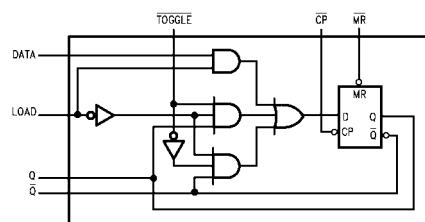
\swarrow = LOW to HIGH Clock Transition

Not LL = CS and PE should never both be LOW voltage level at the same time.

Logic Diagrams



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.



V_{CC} = Pin 16

GND = Pin 6

() = Pin Numbers

Detail A

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)
ESD Last Passing Voltage (Min)	4000V

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

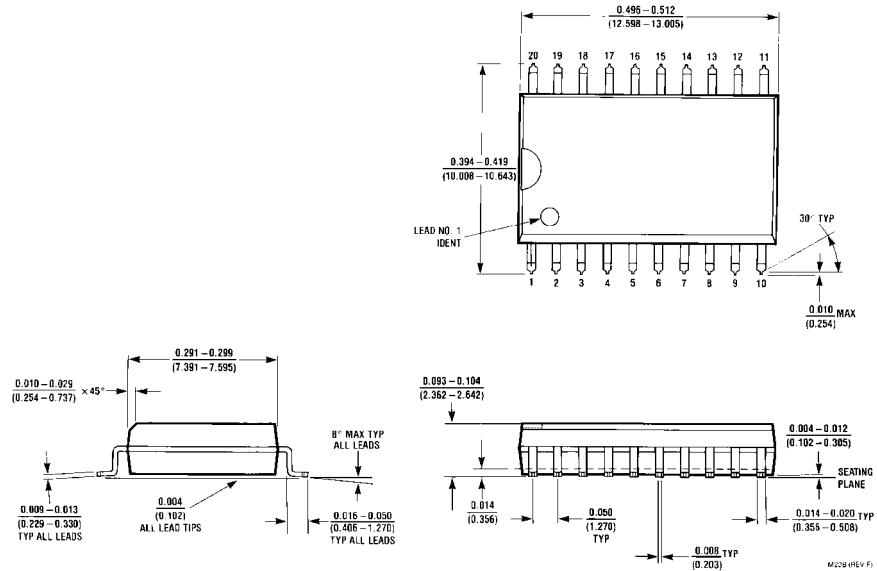
Symbol	Parameter	Min	Typ	Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage		0.8		V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage		–1.2		V	Min	$I_{IN} = –18$ mA
V_{OH}	Output HIGH Voltage	10% V_{CC}	2.4		V	Min	$I_{OH} = –3$ mA
		5% V_{CC}	2.7				
V_{OL}	Output LOW Voltage	10% V_{CC}	0.5		V	Min	$I_{OL} = 20$ mA (\overline{TC}), $I_{OL} = 24$ mA (I/O_n)
		5% V_{CC}	0.5				$I_{OL} = 20$ mA (\overline{TC}), $I_{OL} = 24$ mA (I/O_n)
I_{IH}	Input HIGH Current			5.0	μ A	Max	$V_{IN} = 2.7$ V (Non-I/O Pins)
I_{BVI}	Input HIGH Current Breakdown Test			7.0	μ A	Max	$V_{IN} = 7.0$ V (Non-I/O Pins)
I_{BVIT}	Input HIGH Current Breakdown (I/O)			0.5	mA	Max	$V_{IN} = 5.5$ V (I/O_n)
I_{CEX}	Output HIGH Leakage Current			50	μ A	Max	$V_{OUT} = V_{CC}$
V_{ID}	Input Leakage Test	4.75			V	0.0	$I_{ID} = 1.9$ μ A All Other Pins Grounded
I_{OD}	Output Leakage Circuit Control			3.75	μ A	0.0	$V_{IOD} = 150$ mV All Other Pins Grounded
I_{ZZ}	Bus Drainage Test			500	μ A	0.0	$V_{OUT} = 5.25$ V
I_{IL}	Input LOW Current			–0.2	mA	Max	$V_{IN} = 0.5$ V (Non-I/O Pins)
$I_{IH} & I_{OZH}$	Output Leakage Current			70	μ A	Max	$V_{OUT} = 2.7$ V (I/O_n)
$I_{IL} & I_{OZL}$	Output Leakage Current			–200	μ A	Max	$V_{OUT} = 0.5$ V (I/O_n)
I_{OS}	Output Short-Circuit Current	–60	–150		mA	Max	$V_{OUT} = 0$ V
I_{CCH}	Power Supply Current	70	110		mA	Max	$V_O =$ HIGH
I_{CCL}	Power Supply Current	85	120		mA	Max	$V_O =$ LOW
I_{CCZ}	Power Supply Current	85	125		mA	Max	$V_O =$ HIGH Z

AC Electrical Characteristics

Symbol	Parameter	$T_A = +25^\circ C$			$T_A = 0^\circ C$ to $+70^\circ C$		Units	
		$V_{CC} = +5.0V$			$V_{CC} = +5.0V$			
		Min	Typ	Max	Min	Max		
t_{MAX}	Maximum Clock Frequency	70	85	80				
t_{PLH}	Propagation Delay CP to I/O_n	3.0 5.0	5.0 8.0	7.5 11.5	3.0 5.0	8.0 11.5	ns	
t_{PLH}	Propagation Delay CP to \overline{TC}	5.0	7.5 7.0	11.5	5.0	12.0	ns	
t_{PLH}	Propagation Delay U/\overline{D} to TC	4.5 4.5	7.0 8.0	9.0 9.5	4.5 4.5	10.0 10.0	ns	
t_{PLH}	Propagation Delay \overline{CEP} or \overline{CET} to TC	2.5 3.5	3.8 6.0	6.0 8.0	2.5 3.5	6.5 8.5	ns	
t_{PHL}	Propagation Delay MR to I/O_n	5.0	7.5	10.0	5.0	10.0	ns	
t_{PHL}	Propagation Delay MR to TC	6.5	10.0	13.0	6.5	13.5	ns	
t_{PZH}	Output Enable Time CS or PE to I/O	3.0 5.5	5.0 8.0	8.5 10.5	3.0 5.5	9.0 11.5	ns	
t_{PHZ}	Output Disable Time CS or PE to I/O	2.0 2.0	5.0 4.5	8.5 8.0	2.0 2.0	9.0 8.5	ns	
t_{PZH}	Output Enable Time OE to I/O_n	3.0 5.0	5.0 8.0	8.0 11.0	3.0 5.0	8.5 12.0	ns	
t_{PHZ}	Output Disable Time OE to I/O_n	2.0 2.0	4.0 4.0	6.5 6.0	2.0 2.0	6.5 6.5	ns	

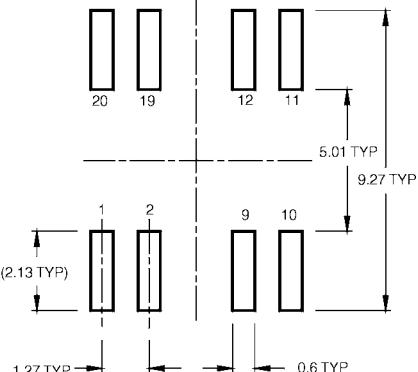
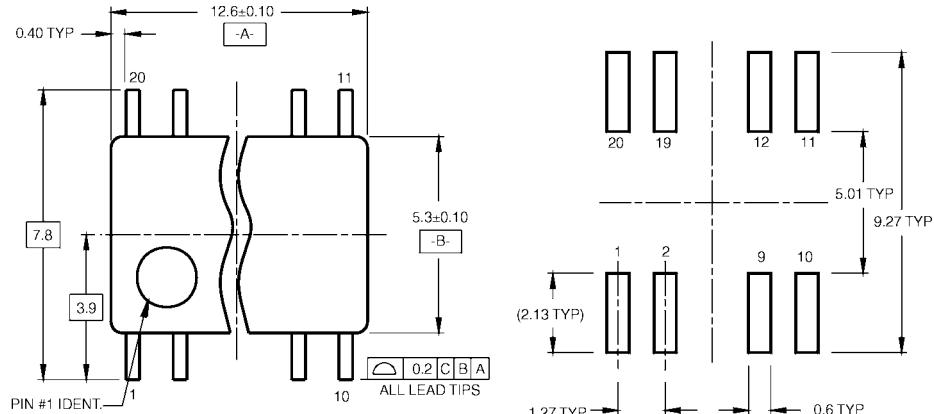
AC Operating Requirements

Symbol	Parameter	$T_A = +25^\circ C$			$T_A = 0^\circ C$ to $+70^\circ C$		Units	
		$V_{CC} = +5.0V$			$V_{CC} = +5.0V$			
		Min	Typ	Max	Min	Max		
$t_S(H)$	Setup Time I/O_n to CP	4.0		4.0		4.0	ns	
$t_H(H)$	Hold Time I/O_n to CP	0.0		0.0		0.0	ns	
$t_S(H)$	Setup Time \overline{PE} , CS or \overline{SR} to CP	9.5		9.5		9.5	ns	
$t_H(H)$	Hold Time \overline{PE} , CS or \overline{SR} to CP	0.0		0.0		0.0	ns	
$t_S(H)$	Setup Time CET or \overline{CET} to CP	6.5		6.5		6.5	ns	
$t_H(H)$	Hold Time CET or \overline{CET} to CP	0.0		0.0		0.0	ns	
$t_S(H)$	Setup Time U/\overline{D} to CP	9.0		9.5		9.5	ns	
$t_H(H)$	Hold Time U/\overline{D} to CP	0.0		0.0		0.0	ns	
$t_W(H)$	Clock Pulse Width HIGH or LOW	4.5		4.5		4.5	ns	
$t_W(L)$	MR Pulse Width	3.0		3.0		3.0	ns	
t_{REC}	Recovery Time MR to CP	4.0		4.0		4.0	ns	

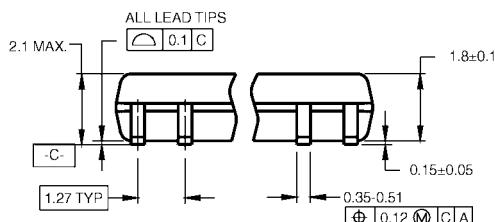
Physical Dimensions inches (millimeters) unless otherwise noted

20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
Package Number M20B

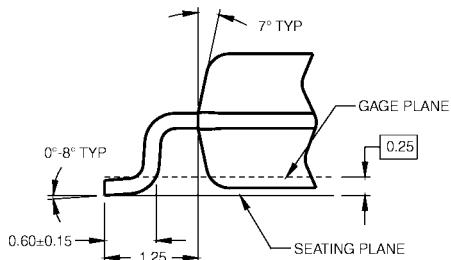
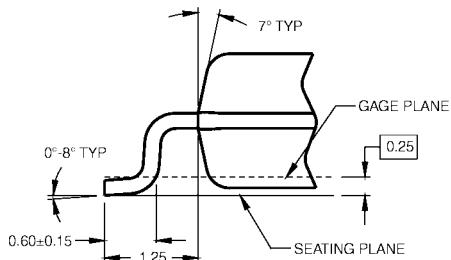
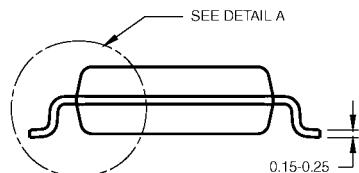
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



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NOTES:

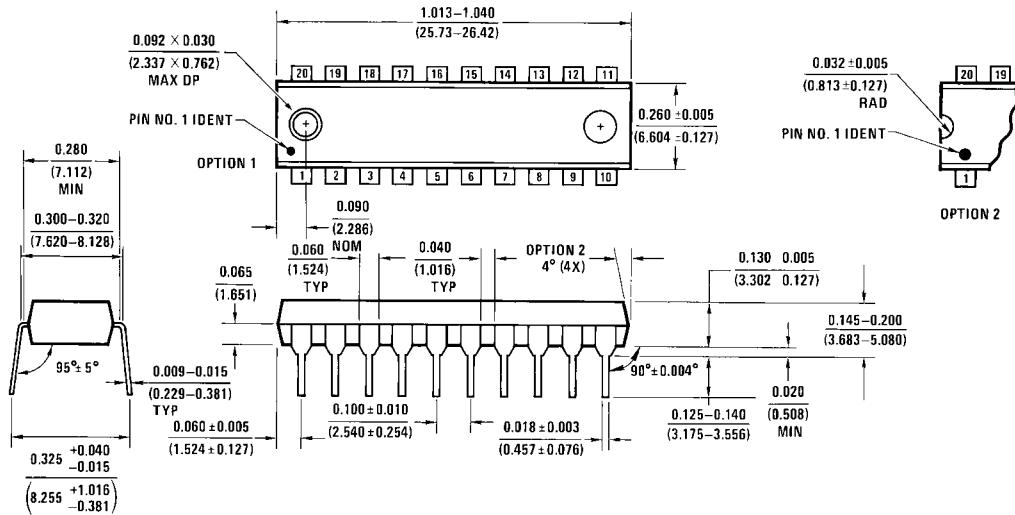
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M20DRevB1

DETAIL A

20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M20D

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



N20A (REV G)

20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N20A

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