

54F/74F379 Quad Parallel Register with Enable

General Description

The 'F379 is a 4-bit register with buffered common Enable. This device is similar to the 'F175 but features the common Enable rather than common Master Reset.

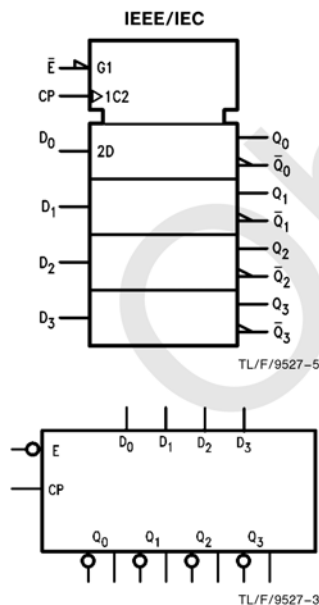
Features

- Edge triggered D-type inputs
- Buffered positive edge-triggered clock
- Buffered common enable input
- True and complement outputs
- Guaranteed 4000V minimum ESD protection

Commercial	Military	Package Number	Package Description
74F379PC		N16E	16-Lead (0.300" Wide) Molded Dual-In-Line
	54F379DM (QB)	J16A	16-Lead Ceramic Dual-In-Line
74F379SC (Note 1)		M16A	16-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F379SJ (Note 1)		M16D	16-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F379FM (QB)	W16A	16-Lead Cerpack
	54F379LM (QB)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

Note 1: Devices also available in 13" reel. Use suffix = SCX and SJX.

Logic Symbols



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Unit Loading/Fan Out

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$\bar{E}$	Enable Input (Active LOW)	1.0/1.0	20 μ A/ -0.6 mA
D_0-D_3	Data Inputs	1.0/1.0	20 μ A/ -0.6 mA
CP	Clock Pulse Input (Active Rising Edge)	1.0/1.0	20 μ A/ -0.6 mA
Q_0-Q_3	Flip-Flop Outputs	50/33.3	-1 mA/20 mA
$\bar{Q}_0-\bar{Q}_3$	Complement Outputs	50/33.3	-1 mA/20 mA

Functional Description

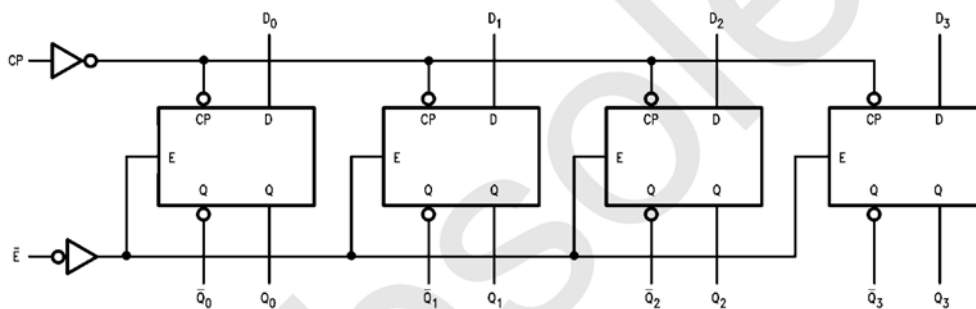
The 'F379 consists of four edge-triggered D-Type flip-flops with individual D inputs and Q and $\bar{Q}$ outputs. The Clock (CP) and Enable ($\bar{E}$) inputs are common to all flip-flops. When the $\bar{E}$ is input HIGH, the register will retain the present data independent of the CP input. The D_n and $\bar{E}$ inputs can change when the clock is in either state, provided that the recommended setup and hold times are observed.

Truth Table

Inputs			Outputs	
$\bar{E}$	CP	D_n	Q_n	$\bar{Q}_n$
H	—	X	NC	NC
L	—	H	H	L
L	—	L	L	H

H = HIGH Voltage Level
 L = LOW Voltage Level
 X = Immaterial
 — = LOW-to-HIGH Transition
 NC = No Change

Logic Diagram



TL/F/9527-4

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

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
Plastic	−55°C to +150°C

V _{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
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Input Voltage (Note 2)	−0.5V to +7.0V
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Input Current (Note 2)	−30 mA to +5.0 mA
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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)
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ESD Last Passing Voltage (Min)	4000V
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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			Units	V _{CC}	Conditions
		Min	Typ	Max			
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}	2.5		V	Min	I _{OH} = −1 mA I _{OH} = −1 mA I _{OH} = −1 mA
		74F 10% V _{CC}	2.5				
		74F 5% V _{CC}	2.7				
V _{OL}	Output LOW Voltage	54F 10% V _{CC}		0.5	V	Min	I _{OL} = 20 mA I _{OL} = 20 mA
		74F 10% V _{CC}		0.5			
I _{IH}	Input HIGH Current	54F		20.0	μA	Max	V _{IN} = 2.7V
		74F		5.0			
I _{BVI}	Input HIGH Current Breakdown Test	54F		100	μA	Max	V _{IN} = 7.0V
		74F		7.0			
I _{CEX}	Output HIGH Leakage Current	54F		250	μA	Max	V _{OUT} = V _{CC}
		74F		50			
V _{ID}	Input Leakage Test	74F	4.75		V	0.0	I _{ID} = 1.9 μA All Other Pins Grounded
I _{OD}	Output Leakage Circuit Current	74F		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 _{CCL}	Power Supply Current		28	40	mA	Max	V _O = LOW

AC Electrical Characteristics

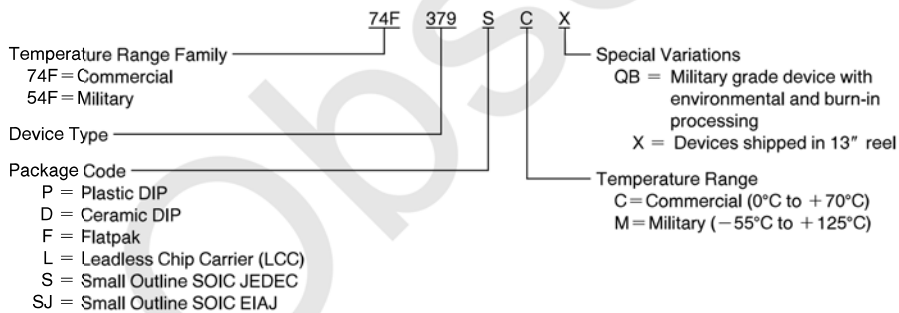
Symbol	Parameter	74F			54F		74F		Units
		T _A = +25°C V _{CC} = +5.0V C _L = 50 pF			T _A , V _{CC} = Mil C _L = 50 pF		T _A , V _{CC} = Com C _L = 50 pF		
		Min	Typ	Max	Min	Max	Min	Max	
f _{max}	Maximum Clock Frequency	100	140		75		100		MHz
t _{PLH}	Propagation Delay	3.5	5.0	6.5	3.0	8.5	3.5	7.5	ns
t _{PHL}	CP to Q _n , Q̄ _n	5.0	6.5	8.5	4.0	10.0	5.0	9.5	

AC Operating Requirements

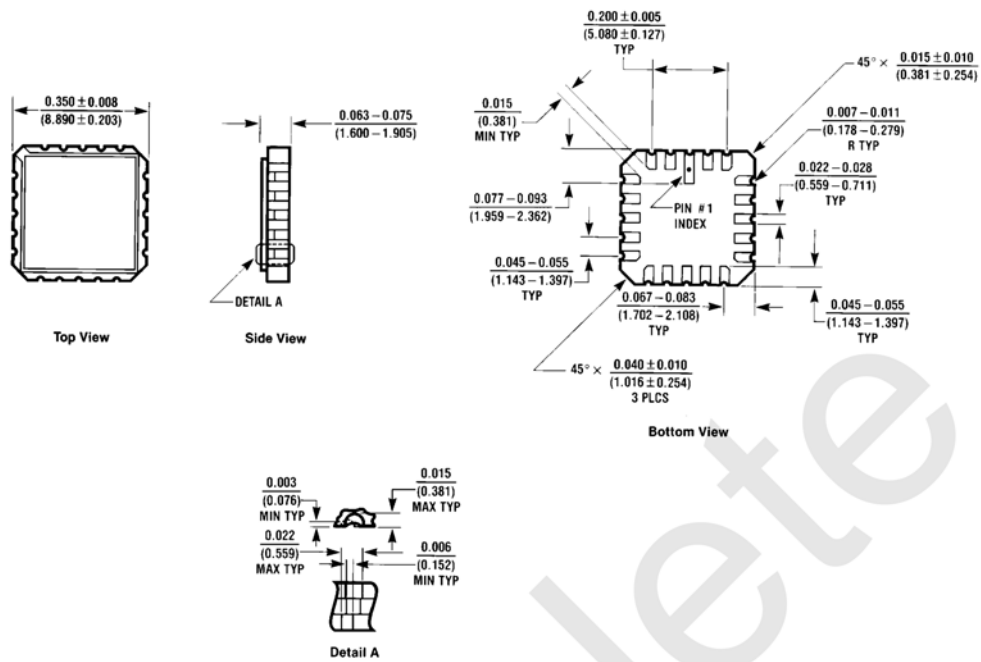
Symbol	Parameter	74F		54F		74F		Units
		$T_A = +25^{\circ}\text{C}$ $V_{CC} = +5.0\text{V}$		$T_A, V_{CC} = \text{Mil}$		$T_A, V_{CC} = \text{Com}$		
		Min	Max	Min	Max	Min	Max	
$t_s(\text{H})$	Setup Time, HIGH or LOW	3.0		4.0		3.0		ns
$t_s(\text{L})$	D_n to CP	3.0		4.0		3.0		
$t_h(\text{H})$	Hold Time, HIGH or LOW	1.0		2.0		1.0		ns
$t_h(\text{L})$	D_n to CP	1.0		2.0		1.0		
$t_s(\text{H})$	Setup Time, HIGH or LOW	6.0		8.0		6.0		ns
$t_s(\text{L})$	$\overline{E}$ to CP	6.0		8.0		6.0		
$t_h(\text{H})$	Hold Time, HIGH or LOW	0		0		0		ns
$t_h(\text{L})$	$\overline{E}$ to CP	0		0		0		
$t_w(\text{H})$	CP Pulse Width	4.0		5.0		4.0		ns
$t_w(\text{L})$	HIGH or LOW	5.0		7.0		5.0		

Ordering Information

The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:

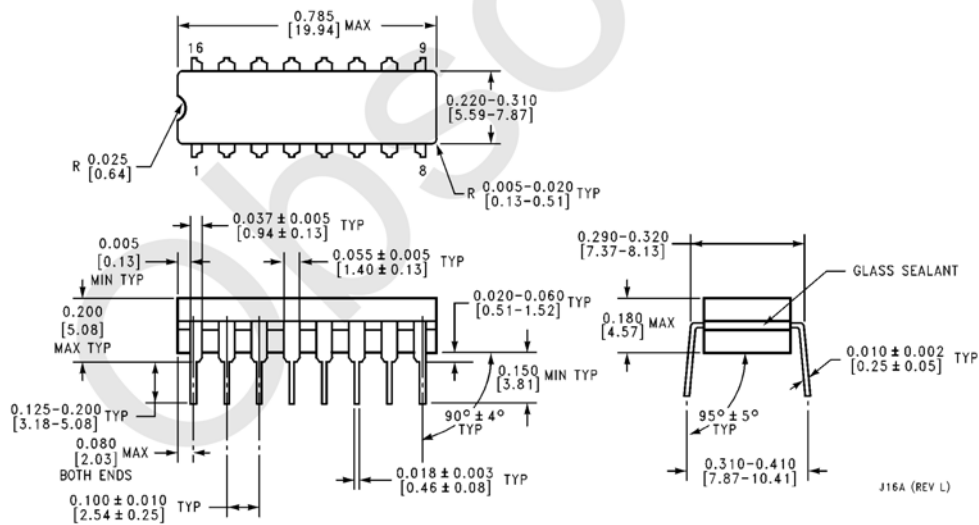


Physical Dimensions inches (millimeters)



20-Lead Ceramic Leadless Chip Carrier (L)
NS Package Number E20A

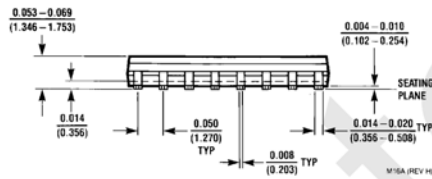
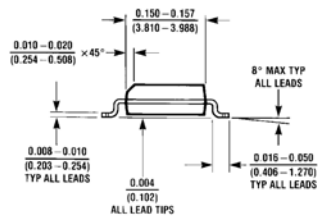
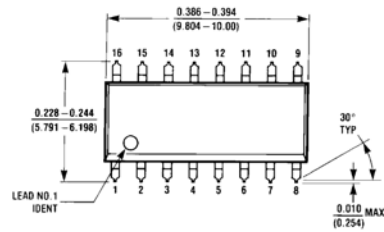
E20A (REV D)



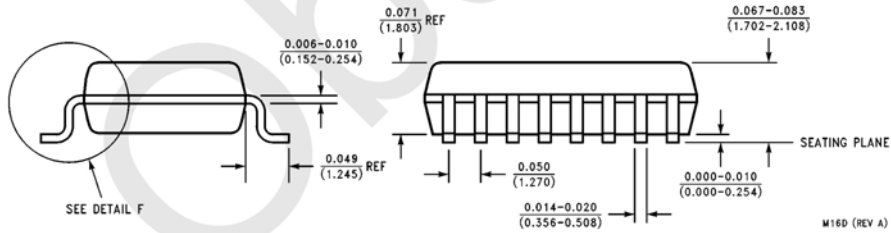
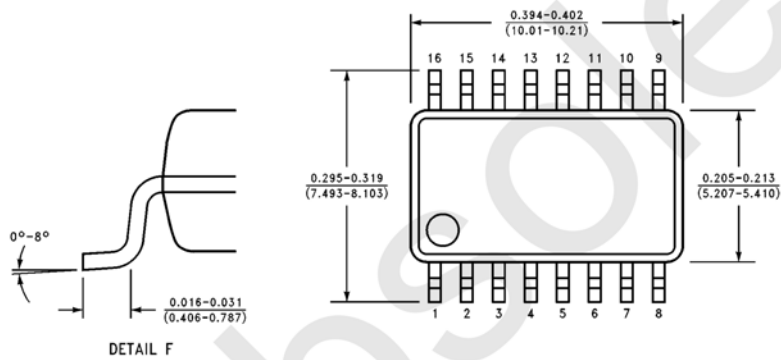
16-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J16A

J16A (REV L)

Physical Dimensions inches (millimeters) (Continued)

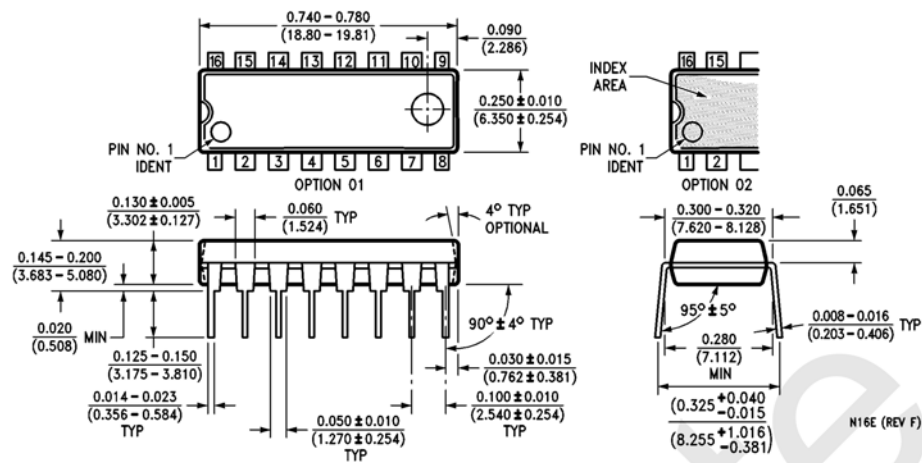


16-Lead (0.150" Wide) Molded Small Outline Integrated Circuit (S)
NS Package Number M16A



16-Lead (0.300" Wide) Molded Small Outline Package, EIAJ (SJ)
NS Package Number M16D

Physical Dimensions inches (millimeters) (Continued)



16-Lead (0.300" Wide) Molded Dual-In-Line Package (P)
NS Package Number N16E