Octal Transparent Latches

Features:

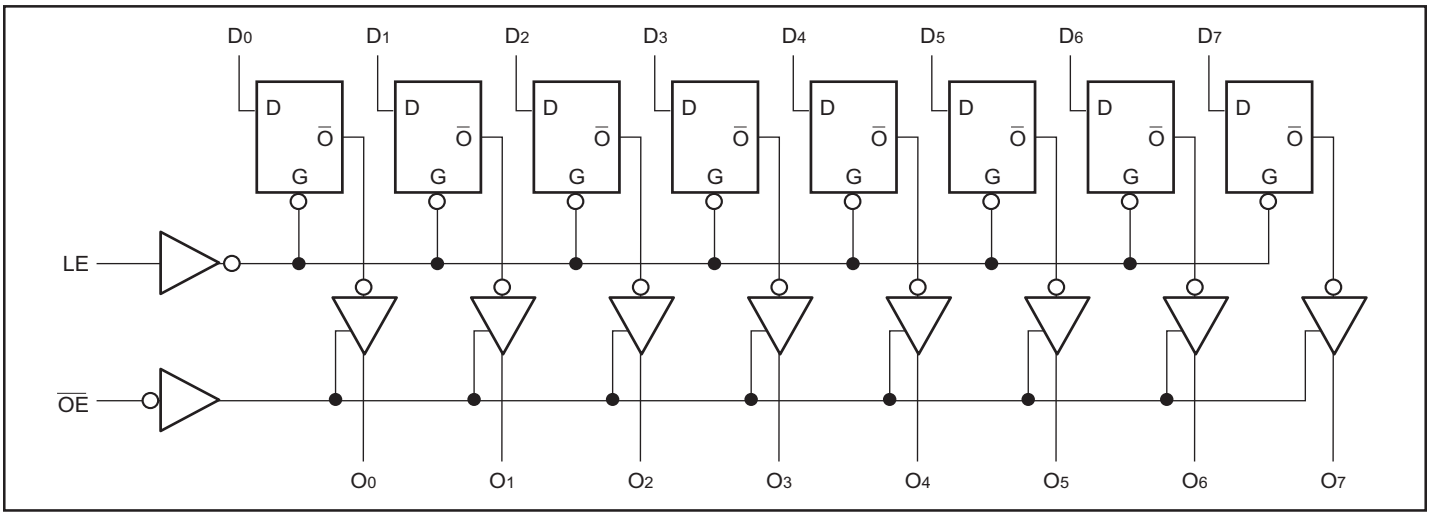
- PI74FCT373/573T are pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- TTL input and output levels
- Low ground bounce outputs
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: –40°C to +85°C
- Device models available upon request
- Packaging:
  PI74FCT373T (Pb-free & Green available)
  – 20-pin TSSOP (L)
  – 20-pin QSOP (Q)
  – 20-pin SOIC (S)

  PI74FCT573T (Pb-free & Green available)
  – 20-pin QSOP (Q)
  – 20-pin SOIC (S)

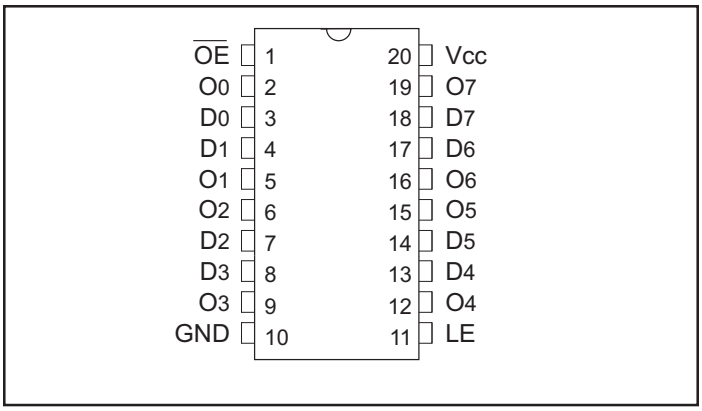
Description:

Pericom Semiconductor's PI74FCT373T and PI74FCT 573T are 8-bit wide octal transparent latches designed with 3-state outputs and are intended for bus oriented applications. When Latch Enable (LE) is HIGH, the flip-flops appear transparent to the data. The data that meets the set-up time when LE is LOW is latched. When $\overline{OE}$ is HIGH, the bus output is in the high impedance state.

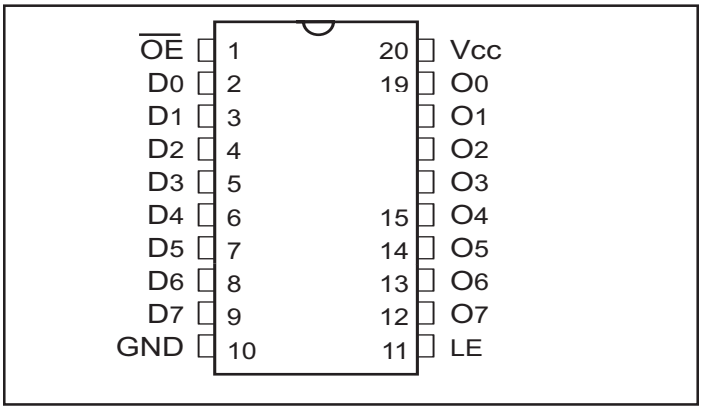
Block Diagram



PI74FCT373 Pin Configuration



PI74FCT573 Pin Configuration



Pin Description

Pin Name	Description
$\overline{OE}$	Output Enable Input (Active LOW)
LE	Latch Enable Input (Active HIGH)
D0-D7	Data Inputs
O0-O7	3-State Outputs
$\overline{O}$0-$\overline{O}$7	Complementary 3-State Outputs
GND	Ground
Vcc	Power

Truth Table[1]

Inputs			Outputs
D_N	LE	$\overline{OE}$	O_N
H	H	L	H
L	H	L	L
X	X	H	Z

Notes:
1. H = High Voltage Level
   L = Low Voltage Level
   X = Don't Care
   Z = High Impedance

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature	–65°C to +150°C
Ambient Temperature with Power Applied	-40°C to +85°C
Supply Voltage to Ground Potential (Inputs & Vcc Only)	–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +7.0V
DC Input Voltage	–0.5V to +7.0V
DC Output Current	120 mA
Power Dissipation	0.5W

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics (Over the Operating Range, $T_A = –40°C$ to $+85°C$, $V_{CC} = 5.0V \pm 5\%$)

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
V_{OH}	Output HIGH Voltage	V_{CC} = Min., $V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = –15.0$ mA	2.4	3.0		V
V_{OL}	Output LOW Current	V_{CC} = Min., $V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 64$ mA		0.3	0.55	V
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level		2.0			V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level				0.8	V
I_{IH}	Input HIGH Current	V_{CC} = Max.	$V_{IN} = V_{CC}$			1	µA
I_{IL}	Input LOW Current	V_{CC} = Max.	V_{IN} = GND			–1	µA
I_{OZH}	High Impedance	V_{CC} = MAX.	$V_{OUT} = 2.7V$			1	µA
I_{OZL}	Output Current		$V_{OUT} = 0.5V$			–1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., $I_{IN} = –18$ mA			–0.7	–1.2	V
I_{OFF}	Power Down Disable	V_{CC} = GND, $V_{OUT} = 4.5V$				100	µA
I_{OS}	Short Circuit Current	V_{CC} = Max.[3], V_{OUT} = GND		–60	–120		mA
V_H	Input Hysteresis				200		mV

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 5.0V, +25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.

Capacitance ($T_A = 25°C$, f = 1 MHz)

Parameters[1]	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0V$	6	10	pF
C_{OUT}	Output Capacitance	$V_{OUT} = 0V$	8	12	pF

Notes:
1. This parameter is determined by device characterization but is not production tested.

Power Supply Characteristics

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}		0.1	500	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.,	V_{IN} = 3.4V[3]		0.5	2.0	mA
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., Outputs Open $\overline{OE}$ = GND LE = V_{CC} One Bit Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND		0.15	0.25	mA/ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max., Outputs Open f_i = 10 MHz 50% Duty Cycle $\overline{OE}$ = GND LE = V_{CC} One Bit Toggling	V_{IN} = V_{CC} V_{IN} = GND		1.5	3.0[5]	mA
			V_{IN} = 3.4V V_{IN} = GND		1.8	4.5[5]	
		V_{CC} = Max., Outputs Open f_i = 2.5 MHz 50% Duty Cycle $\overline{OE}$ = GND LE = V_{CC} Eight Bits Toggling	V_{IN} = V_{CC} V_{IN} = GND		3.0	6.0[5]	
			V_{IN} = 3.4V V_{IN} = GND		5.0	14.0[5]	

Notes:

1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at Vcc = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V); all other inputs at Vcc or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
5. Values for these conditions are examples of the Icc formula. These limits are guaranteed but not tested.
6. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$
   I_{CC} = Quiescent Current
   ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
   D_H = Duty Cycle for TTL Inputs High
   N_T = Number of TTL Inputs at D_H
   I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
   f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
   f_i = Input Frequency
   N_i = Number of Inputs at f_i
   All currents are in milliamps and all frequencies are in megahertz.

PI74FCT373T Switching Characteristics over Operating Range

Parameters	Description	Conditions	373T Com. Min	373T Com. Max	373AT Com. Min	373AT Com. Max	373CT Com. Min	373CT Com. Max	373DT Com. Min	373DT Com. Max	Unit
t_{PLH} t_{PHL}	Propagation Delay[1] D_N to O_N	$C_L = 50$ pF $R_L = 500\Omega$	1.5	8.0	1.5	5.2	1.5	4.2	1.5	3.8	ns
t_{PLH} t_{PHL}	Propagation Delay[1] LE to O_N		2.0	13.0	2.0	8.5	2.0	5.5	1.5	4.9	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}$ to O_N		1.5	12.0	1.5	6.5	1.5	5.5	1.5	5.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time[2] $\overline{OE}$ to O_N		1.5	7.5	1.5	5.5	1.5	5.0	1.5	5.0	ns
t_{SU}	Setup Time HIGH or LOW, D_N to LE		2.0		2.0		2.0		2.0		ns
t_H	Hold Time HIGH or LOW, D_N to LE		1.5		1.5		1.5		1.5		ns
t_W	LE Pulse Width[2] HIGH		6.0		5.0		5.0		4.0		ns

Notes:
1. Minimum limits are guaranteed but not tested on Propagation Delays.
2. This parameter guaranteed but not production tested.

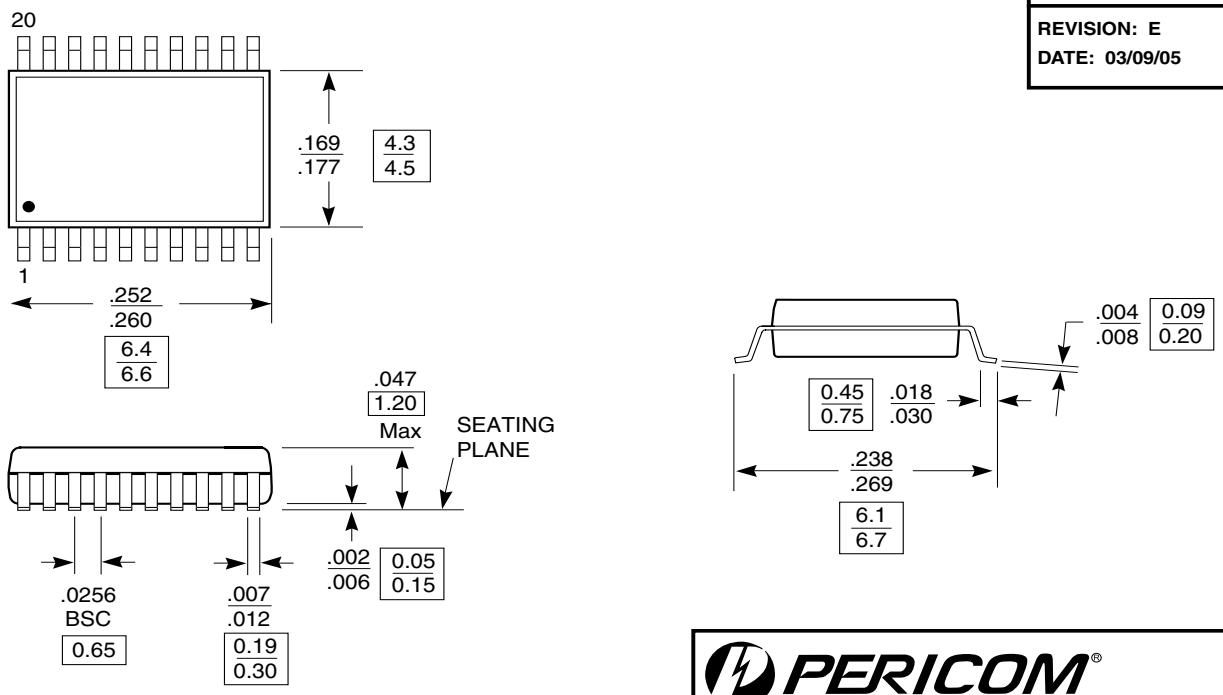
PI74FCT573T Switching Characteristics over Operating Range

Parameters	Description	Conditions	573T Com. Min	573T Com. Max	573AT Com. Min	573AT Com. Max	573CT Com. Min	573CT Com. Max	573DT Com. Min	573DT Com. Max	Unit
t_{PLH} t_{PHL}	Propagation Delay[1] D_N to O_N	$C_L = 50$ pF $R_L = 500\Omega$	1.5	8.0	1.5	5.2	1.5	4.2	1.5	3.8	ns
t_{PLH} t_{PHL}	Propagation Delay[1] LE to O_N		2.0	12.0	2.0	8.5	2.0	5.5	2.0	4.9	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}$ to O_N		1.5	9.5	1.5	6.5	1.5	5.5	1.5	5.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time[2] $\overline{OE}$ to O_N		1.5	6.5	1.5	5.5	1.5	5.0	1.5	5.0	ns
t_{SU}	Setup Time HIGH or LOW, D_N to LE		2.0		2.0		2.0		1.5		ns
t_H	Hold Time HIGH or LOW, D_N to LE		1.5		1.5		1.5		1.0		ns
t_W	LE Pulse Width[2] HIGH		6.0		5.0		5.0		3.0		ns

Notes:
1. Minimum limits are guaranteed but not tested on Propagation Delays.
2. This parameter guaranteed but not production tested.

Packaging Mechanical: 20-Pin TSSOP (L)

DOCUMENT CONTROL NO.
PD - 1311
REVISION: E
DATE: 03/09/05



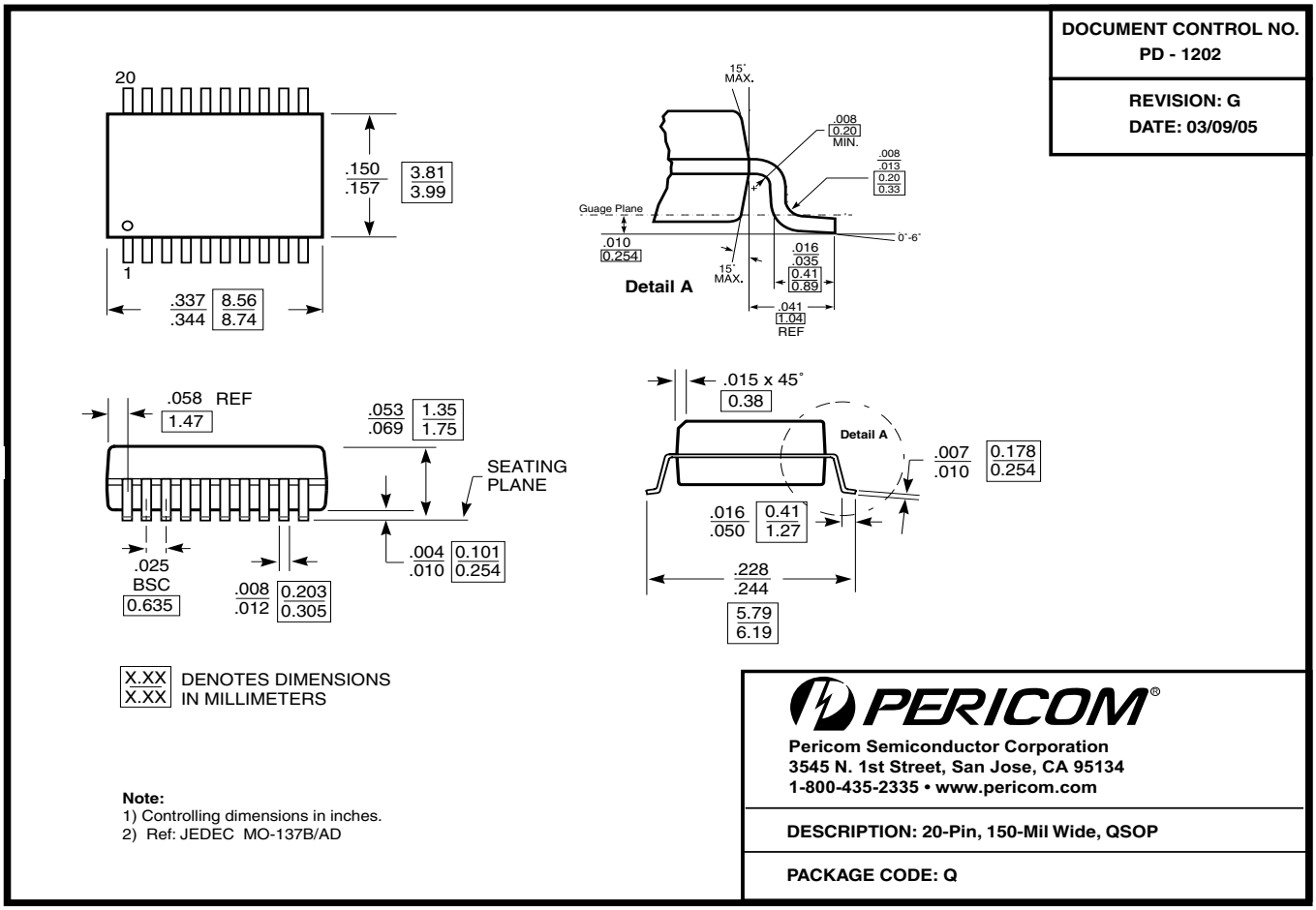
Note:
1. Package Outline Exclusive of Mold Flash and Metal Burr
2. Controlling dimentions in millimeters
3. Ref: JEDEC MO-153F/AC

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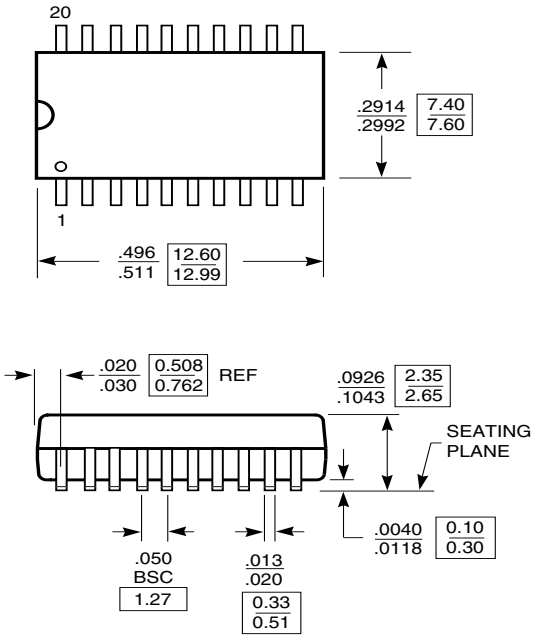
DESCRIPTION: 20-Pin, 173-Mil Wide, TSSOP

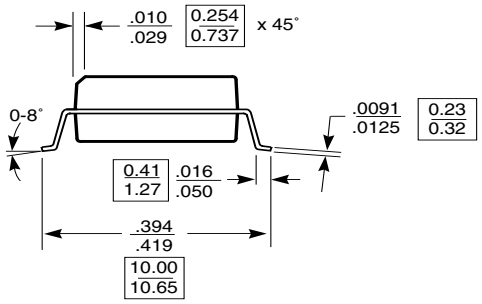
PACKAGE CODE: L

Packaging Mechanical: 20-pin QSOP (Q)



Packaging Mechanical: 20-pin SOIC (S)





DOCUMENT CONTROL NO.
PD - 1006

REVISION: D
DATE: 03/09/05

X.XX
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DENOTES CONTROLLING DIMENSIONS IN MILLIMETERS

Notes:
1) Controlling dimensions in millimeters.
2) Ref: JEDEC MS-013D/AC

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DESCRIPTION: 20-Pin, 300-Mil Wide, SOIC

PACKAGE CODE: S

PI74FCT373T Ordering Information

Ordering Code	Package Code	Speed Grade	Package Type
PI74FCT373TL	L	Blank	20-pin TSSOP
PI74FCT373TLE	L	Blank	Pb-free & Green, 20-pin TSSOP
PI74FCT373TQ	Q	Blank	20-pin QSOP
PI74FCT373TQE	Q	Blank	Pb-free & Green, 20-pin QSOP
PI74FCT373TS	S	Blank	20-pin SOIC
PI74FCT373TSE	S	Blank	Pb-free & Green, 20-pin SOIC
PI74FCT373ATQ	Q	A	20-pin QSOP
PI74FCT373ATQE	Q	A	Pb-free & Green, 20-pin QSOP
PI74FCT373CTL	L	C	20-pin TSSOP

PI74FCT573T Ordering Information

Ordering Code	Package Code	Speed Grade	Package Type
PI74FCT573TQ	Q	Blank	Pb-free & Green, 20-pin QSOP
PI74FCT573TS	S	Blank	20-pin SOIC
PI74FCT573TSE	S	Blank	Pb-free & Green, 20-pin SOIC
PI74FCT573ATS	S	A	20-pin SOIC
PI74FCT573ATSE	S	A	Pb-free & Green, 20-pin SOIC
PI74FCT573ATQ	Q	A	20-pin QSOP
PI74FCT573ATQE	Q	A	Pb-free & Green, 20-pin QSOP
PI74FCT573CTS	S	C	20-pin SOIC
PI74FCT573CTSE	S	C	Pb-free & Green, 20-pin SOIC
PI74FCT573CTQ	Q	C	20-pin QSOP
PI74FCT573CTQE	Q	C	Pb-free & Green, 20-pin QSOP
PI74FCT573DTQ	Q	D	20-pin QSOP
PI74FCT573DTQE	Q	D	Pb-free & Green, 20-pin QSOP

Notes:
- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free & Green
- Adding an X suffix = Tape/Reel

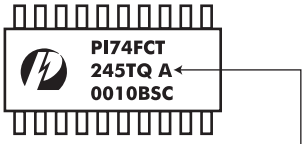
Part Marking Information

Pericom's standard product mark follows our standard part number ordering information, except for those products with a speed letter code. For marking purposes, the speed letter code mark is placed after the package code letter, rather than after the device number as it is ordered.

Although all products are marked immediately after assembly to assure material traceability, Pericom does not usually mark the speed code at that time. After electrical test screening and speed binning have been completed, we then perform an "add mark" operation which places the speed code letter at the end of the complete part number.

Please refer to the example shown below:

- Part Number as ordered: PI74FCT245ATQ
- Example of Part Number as marked:



"A" is the speed code letter identifier

Notes:

1) 8-pin DIP, 8-pin SOIC, 8-pin TSSOP, 14-pin SOIC, 16-pin QSOP, SC70, MSOP, and SOT23 packages are not marked with the Pericom logo due to space limitations on the package.