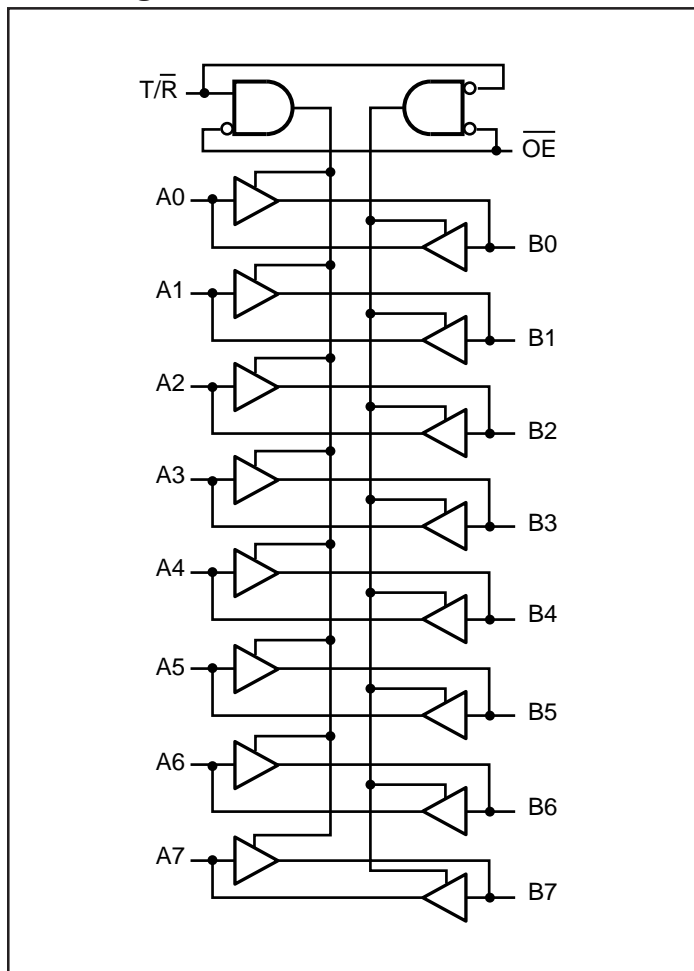# PERICOM®

Fast CMOS Octal Bidirectional Transceivers

Features

- Pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- 25-ohm series resistor on all outputs (FCT2245T only)
- 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 on request
- Packaging:
  - 20-pin 173-mil wide plastic TSSOP (L)
  - 20-pin 150-mil wide plastic QSOP (Q)
  - 20-pin 300-mil wide plastic SOIC (S)
 - 20-pin 209-mil wide plastic SSOP (H)

Description

Pericom Semiconductor's PI74FCT245T and PI74FCT2245T are 8-bit wide octal buffer bidirectional transceivers designed for asynchronous two-way communication between data buses. The transmit/receive $(T/\overline{R})$ input determines the direction of data flow through the bidirectional transceiver. Transmit (active HIGH) enables data from A ports to B ports, and receive (active LOW) from B ports to A ports. The output enable $(\overline{OE})$ input, when HIGH, disables both A and B ports by placing them in Hi-Z condition.

PI74FCT2245T has a built-in 25-ohm series resistor on all outputs to reduce noise because of reflections, thus eliminating the need for an external terminating resistor.

Block Diagram

Pin Configuration
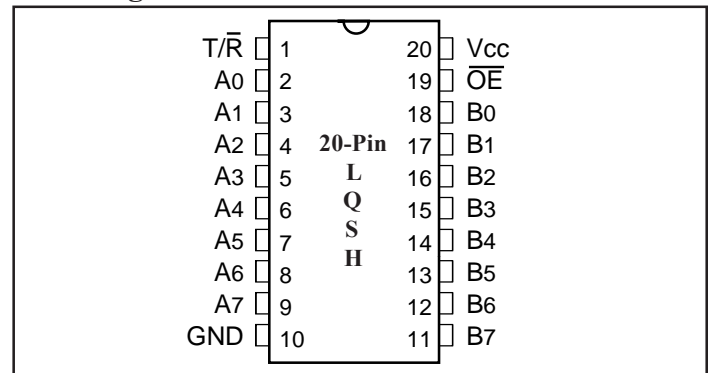
Pin Description

Pin Name	Description
$\overline{OE}$	3-State Output Enable Inputs (Active LOW)
$T/\overline{R}$	Transmit/Receive Input
A0-A7	Side A Inputs or 3-State Outputs
B0-B7	Side B Inputs or 3-State Outputs
GND	Ground
V_{CC}	Power

Truth Table[1]

Inputs		
$\overline{OE}$	$T/\overline{R}$	Outputs
L	L	Bus B Data to Bus A[2]
L	H	Bus A Data to Bus B[2]
H	X	High Z State

1. H = High Voltage Level, X = Don't Care, L = Low Voltage Level, 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 & V_{CC} 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	120mA
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}	$I_{OH} = -15.0mA$	2.4	3.0		V
V_{OL}	Output LOW Current	$V_{CC} = $ Min., $V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 64mA$		0.3	0.55	V
V_{OL}	Output LOW Current	$V_{CC} = $ Min., $V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 12mA$ (25Ω Series)		0.3	0.50	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	(Except I/O pins) $V_{CC} = $ Max.	$V_{IN} = V_{CC}$			1	μA
I_{IL}	Input LOW Current	(Except I/O pins) $V_{CC} = $ Max.	$V_{IN} = GND$			-1	μA
I_{IH}	Input HIGH Current	(I/O pins Only) $V_{CC} = $ Max.	$V_{IN} = V_{CC}$			1	μA
I_{IL}	Input LOW Current	(I/O pins Only) $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

Capacitance ($T_A = 25°C$, $f = 1$ MHz)

Parameters[4]	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. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{CC} = 5.0V$, $+25°C$ 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.
4. 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 $T/\overline{R}$ = GND or V_{CC} One Input 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 $T/\overline{R}$ = $\overline{OE}$ = GND One Bit Toggling	V_{IN} = V_{CC} V_{IN} = GND		1.5	3.5[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 $T/\overline{R}$ = $\overline{OE}$ = GND 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 Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} 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. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + DI_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_I N_I)$
   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
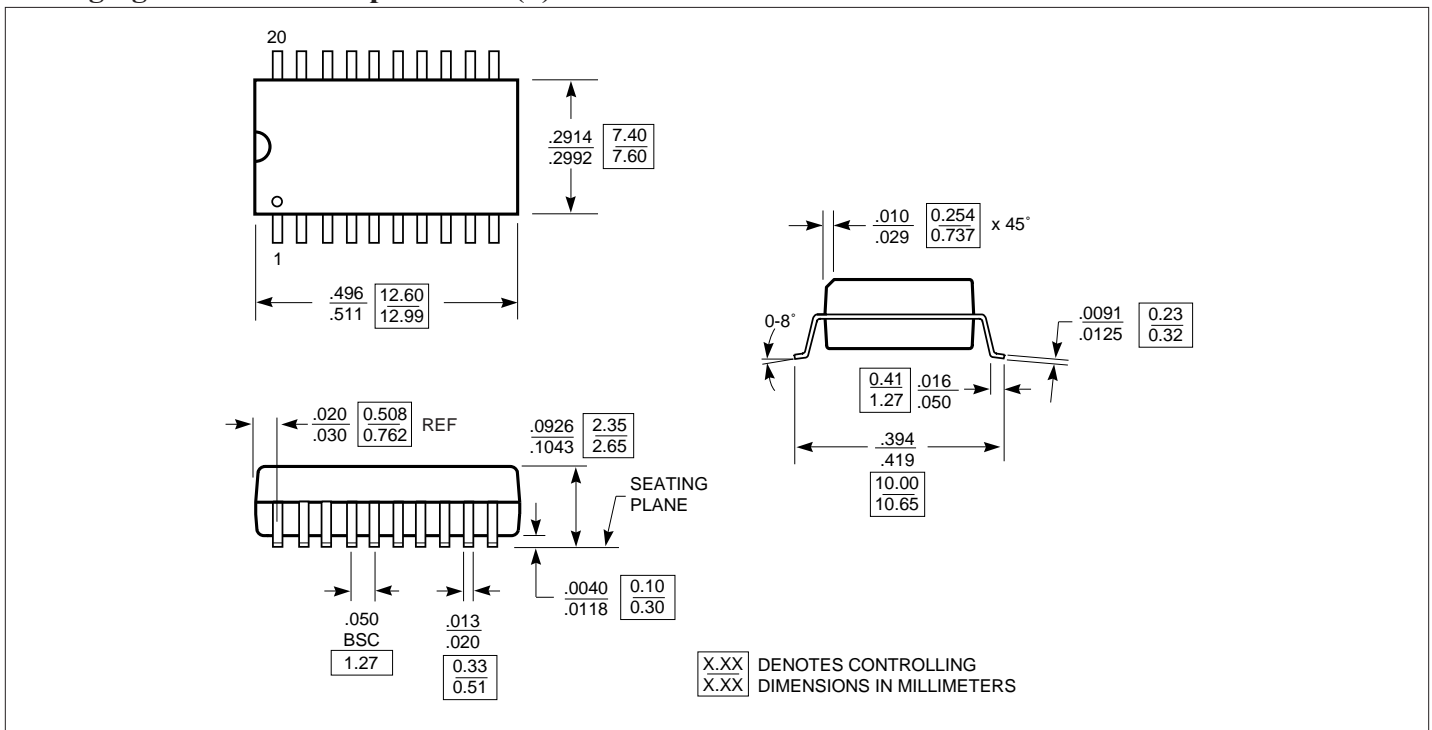   All currents are in milliamps and all frequencies are in megahertz.

Switching Characteristics over Operating Range

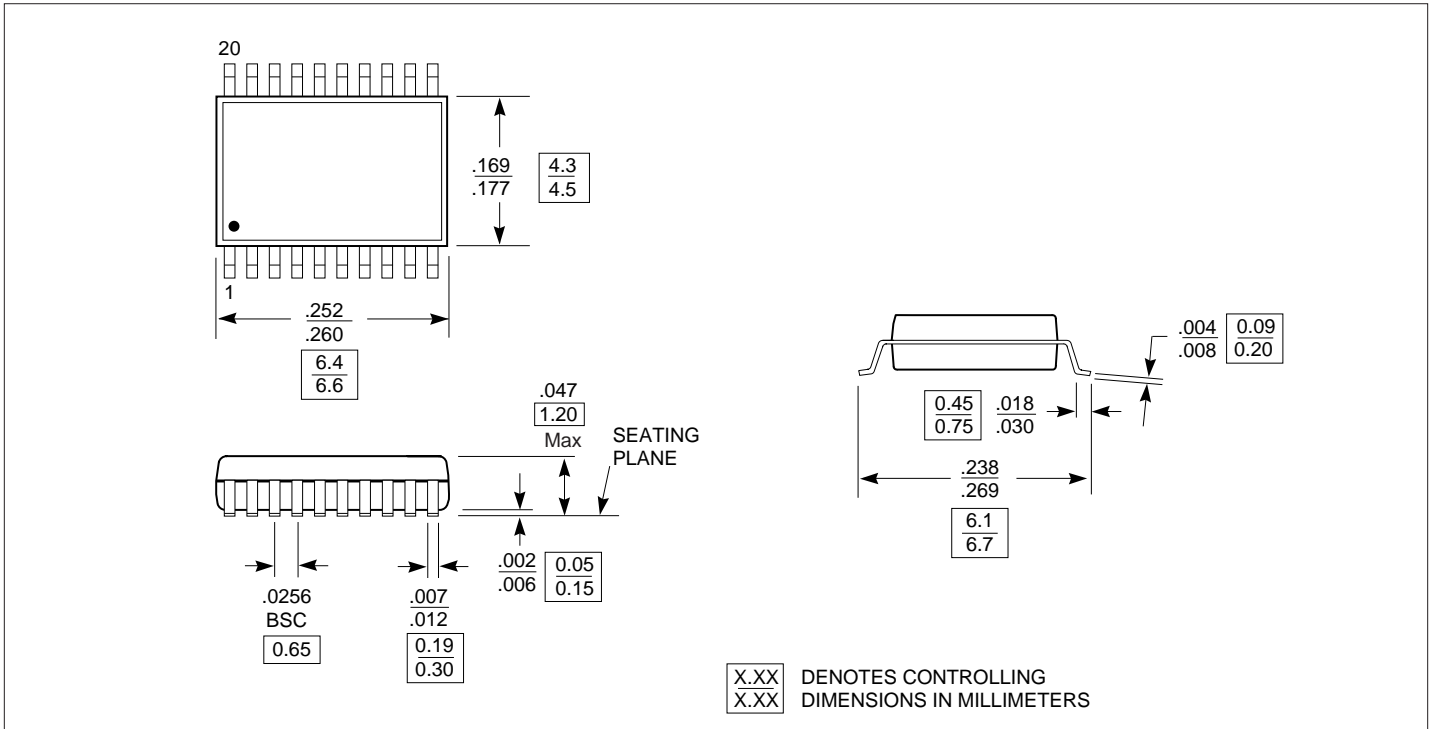| Parameters	Description	Conditions[1]	245T/2245T Com. Min.	245T/2245T Com. Max.	245AT/2245AT Com. Min.	245AT/2245AT Com. Max.	245CT/2245CT Com. Min.	245CT/2245CT Com. Max.	245DT Com. Min	245DT Com. Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay A to B, B to A	$C_L = 50\,pF$ $R_L = 500\,Ohm$	1.5	7.0	1.5	4.6	1.5	4.1	1.5	3.8	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}$ to A or B		1.5	9.0	1.5	6.2	1.5	5.8	1.5	5.0	ns
t_{PHZ} t_{PLZ}	Output Disable Time $\overline{OE}$ to A or B[3]		1.5	7.5	1.5	5.0	1.5	4.8	1.5	4.3	ns
t_{PZH} t_{PZL}	Output Enable Time $T/\overline{R}$ to A or B		1.5	9.0	1.5	6.2	1.5	5.8	1.5	5.0	ns
t_{PHZ} t_{PLZ}	Output Disable Time[3] $T/\overline{R}$ to A or B[3]		1.5	7.5	1.5	5.0	1.5	4.8	1.5	4.3	ns

Notes:

1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
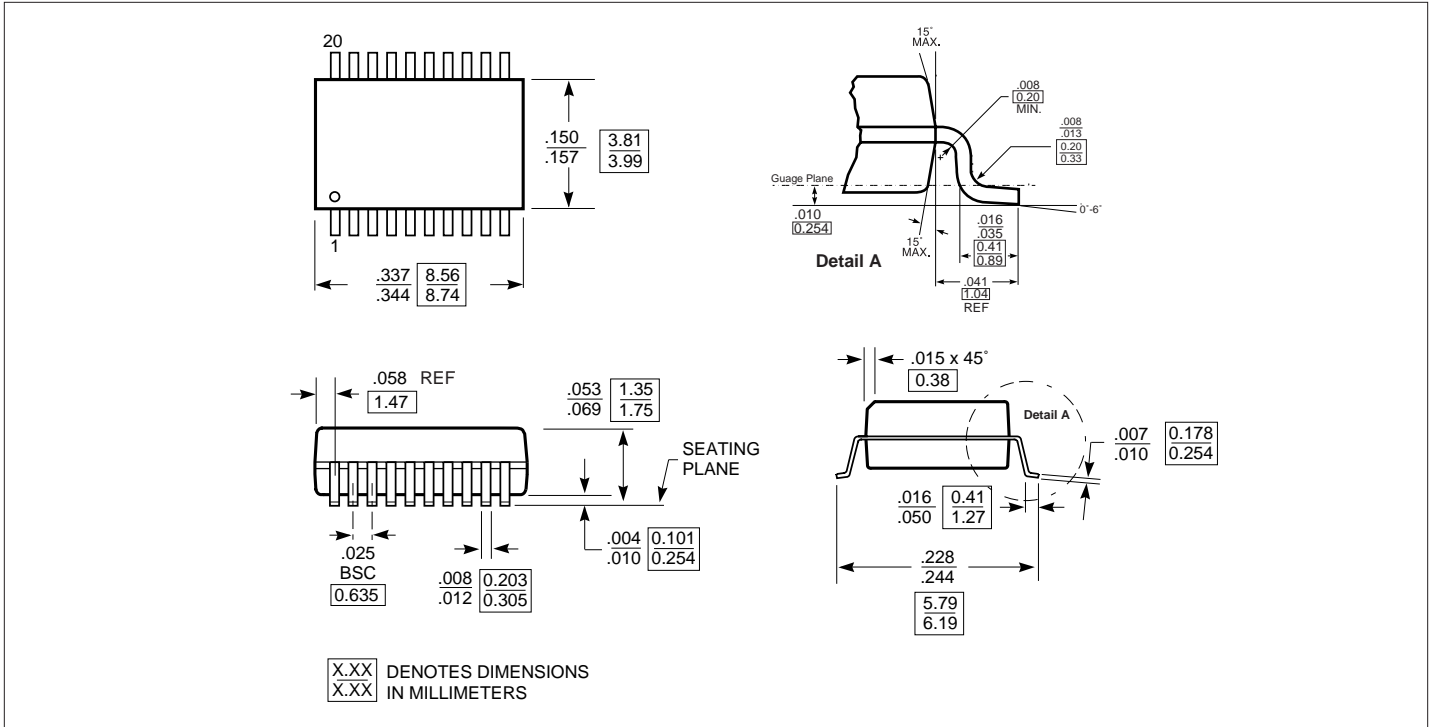3. This parameter is guaranteed but not production tested.

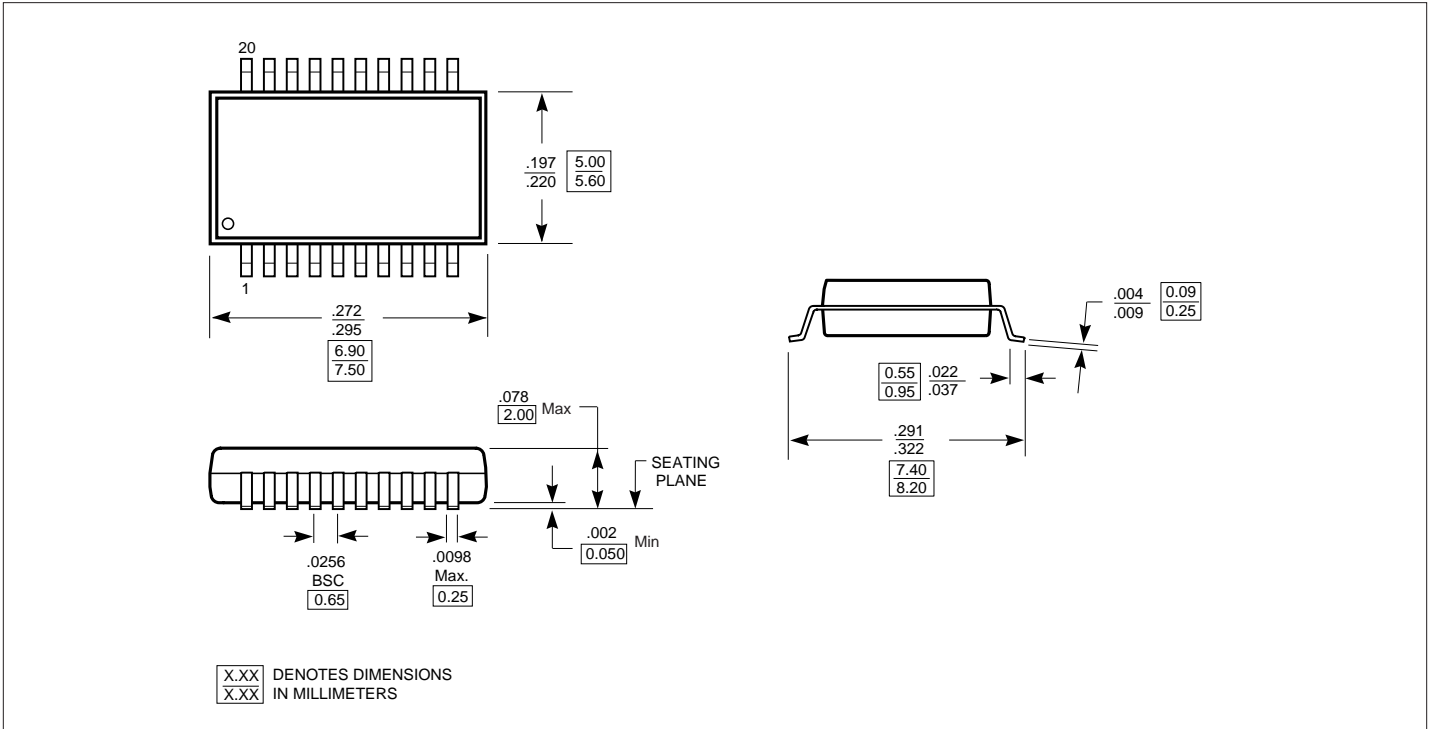## Packaging Mechanical: 20-pin SOIC (S)

Packaging Mechanical: 20-Pin TSSOP (L)

| .169 | 4.3 |
| .177 | 4.5 |

| .252 | 6.4 |
| .260 | 6.6 |

.047
1.20
Max

SEATING PLANE

| .002 | 0.05 |
| .006 | 0.15 |

.0256 BSC
0.65

| .007 | 0.19 |
| .012 | 0.30 |

| .004 | 0.09 |
| .008 | 0.20 |

0.45
0.75

| .018 | .030 |

| .238 | 6.1 |
| .269 | 6.7 |

| X.XX | DENOTES CONTROLLING |
| X.XX | DIMENSIONS IN MILLIMETERS |

Packaging Mechanical: 20-pin QSOP (Q)

| .150 | 3.81 |
| .157 | 3.99 |

| .337 | 8.56 |
| .344 | 8.74 |

15° MAX.

.008
0.20
MIN.

| .008 | 0.20 |
| .013 | 0.33 |

Guage Plane

.010
0.254

15° MAX.

| .016 | 0.41 |
| .035 | 0.89 |

0°–6°

Detail A

.041
1.04
REF

.058 REF
1.47

| .053 | 1.35 |
| .069 | 1.75 |

SEATING PLANE

.025 BSC
0.635

| .008 | 0.203 |
| .012 | 0.305 |

| .004 | 0.101 |
| .010 | 0.254 |

.015 x 45°
0.38

Detail A

| .007 | 0.178 |
| .010 | 0.254 |

| .016 | 0.41 |
| .050 | 1.27 |

| .228 | 5.79 |
| .244 | 6.19 |

| X.XX | DENOTES DIMENSIONS |
| X.XX | IN MILLIMETERS |

5

Packaging Mechanical: 20-Pin SSOP (H)

PI74FCT245T Ordering Information

Ordering Code	Package Code	Speed Grade	Package Type
PI74FCT245TQ	Q	Blank	20-pin QSOP
PI74FCT245TS	S	Blank	20-pin SOIC
PI74FCT245ATH	H	A	20-pin SSOP
PI74FCT245ATL	L	A	20-pin TSSOP
PI74FCT245ATS	S	A	20-pin SOIC
PI74FCT245ATQ	Q	A	20-pin QSOP
PI74FCT245CTH	H	C	20-pin SSOP
PI74FCT245CTL	L	C	20-pin TSSOP
PI74FCT245CTS	S	C	20-pin SOIC
PI74FCT245CTQ	Q	C	20-pin QSOP
PI74FCT245DTQ	Q	D	20-pin QSOP
PI74FCT245DTL	L	D	20-pin TSSOP
PI74FCT245DTS	S	D	20-pin SOIC

Notes:

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/

PI74FCT2245T Ordering Information

Ordering Code	Package Code	Speed Grade	Package Type
PI74FCT2245TQ	Q	Blank	20-pin QSOP
PI74FCT2245TS	S	Blank	20-pin SOIC
PI74FCT2245ATH	H	A	20-pin SSOP
PI74FCT2245ATL	L	A	20-pin TSSOP
PI74FCT2245ATS	S	A	20-pin SOIC
PI74FCT2245ATQ	Q	A	20-pin QSOP
PI74FCT2245CTH	H	C	20-pin SSOP
PI74FCT2245CTL	L	C	20-pin TSSOP
PI74FCT2245CTS	S	C	20-pin SOIC
PI74FCT2245CTQ	Q	C	20-pin QSOP
PI74FCT2245DTS	S	D	20-pin SOIC

Notes:
1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/