3.3V Zero Delay Buffer

General Features

- 15MHz to 133MHz operating range, compatible with CPU and PCI bus frequencies.
- Zero input - output propagation delay.
- Multiple low-skew outputs.
  - Output-output skew less than 250pS.
  - Device-device skew less than 700pS.
  - One input drives 9 outputs, grouped as 4 + 4 + 1(ASM5P2309A).
  - One input drives 5 outputs (ASM5P2305A).
- Less than 200 pS cycle-to-cycle jitter is compatible with Pentium® based systems.
- Test Mode to bypass PLL (ASM5P2309A only, Refer Select Input Decoding Table).
- Available in 16pin 150-mil SOIC, 4.4 mm TSSOP (ASM5P2309A), and in 8pin 150-mil SOIC package (ASM5P2305A).
- 3.3V operation, advanced 0.35µ CMOS technology.

Functional Description

ASM5P2309A is a versatile, 3.3V zero-delay buffer designed to distribute high-speed clocks. It accepts one reference input and drives out nine low-skew clocks. It is available in a 16-pin package. The ASM5P2305A is the eight-pin version of the ASM5P2309A. It accepts one reference input and drives out five low-skew clocks.

The -1H version of the ASM5P23XXA operates at up to 133MHz frequencies, and has higher drive than the -1 devices. All parts have on-chip PLLs that lock to an input clock on the REF pin. The PLL feedback is on-chip and is obtained from the CLKOUT pad.

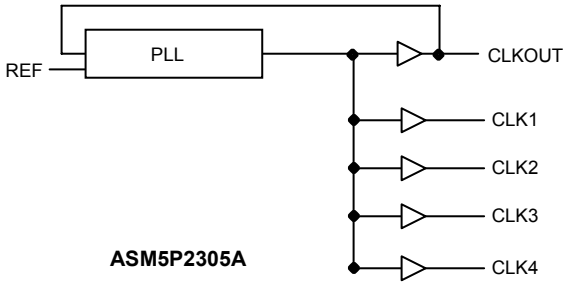
The ASM5P2309A has two banks of four outputs each, which can be controlled by the Select inputs as shown in the Select Input Decoding Table. The select input also allows the input clock to be directly applied to the outputs for chip and system testing purposes.

Multiple ASM5P2309A and ASM5P2305A devices can accept the same input clock and distribute it. In this case the skew between the outputs of the two devices is guaranteed to be less than 700pS.

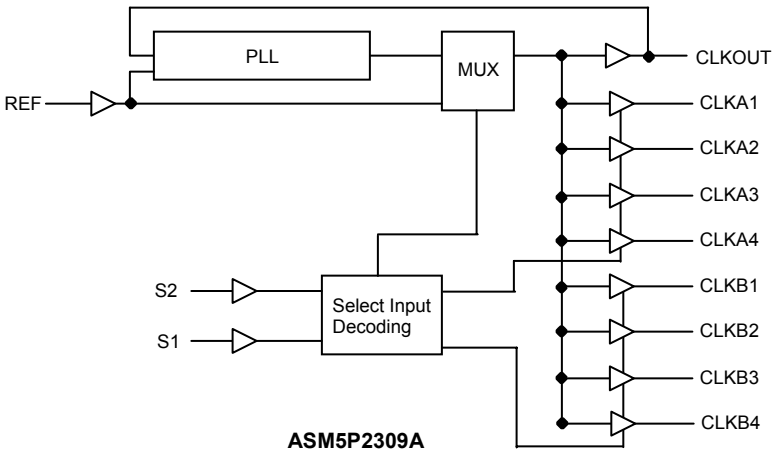
All outputs have less than 200pS of cycle-to-cycle jitter. The input and output propagation delay is guaranteed to be less than 350pS, and the output to output skew is guaranteed to be less than 250pS.

The ASM5P2309A and the ASM5P2305A are available in two different configurations, as shown in the ordering information table. The ASM5P2305A-1/ ASM5P2309A-1 is the base part. The ASM5P2305A-1H/ ASM5P2309A-1H is the high drive version of the -1 and its rise and fall times are much faster than -1 part.

Block Diagram



ASM5P2305A



ASM5P2309A

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Select Input Decoding for ASM5P2309A

S2	S1	Clock A1 - A4	Clock B1 - B4	CLKOUT[1]	Output Source	PLL Shut-Down
0	0	Three-state	Three-state	Driven	PLL	N
0	1	Driven	Three-state	Driven	PLL	N
1	0	Driven	Driven	Driven	Reference	Y
1	1	Driven	Driven	Driven	PLL	N

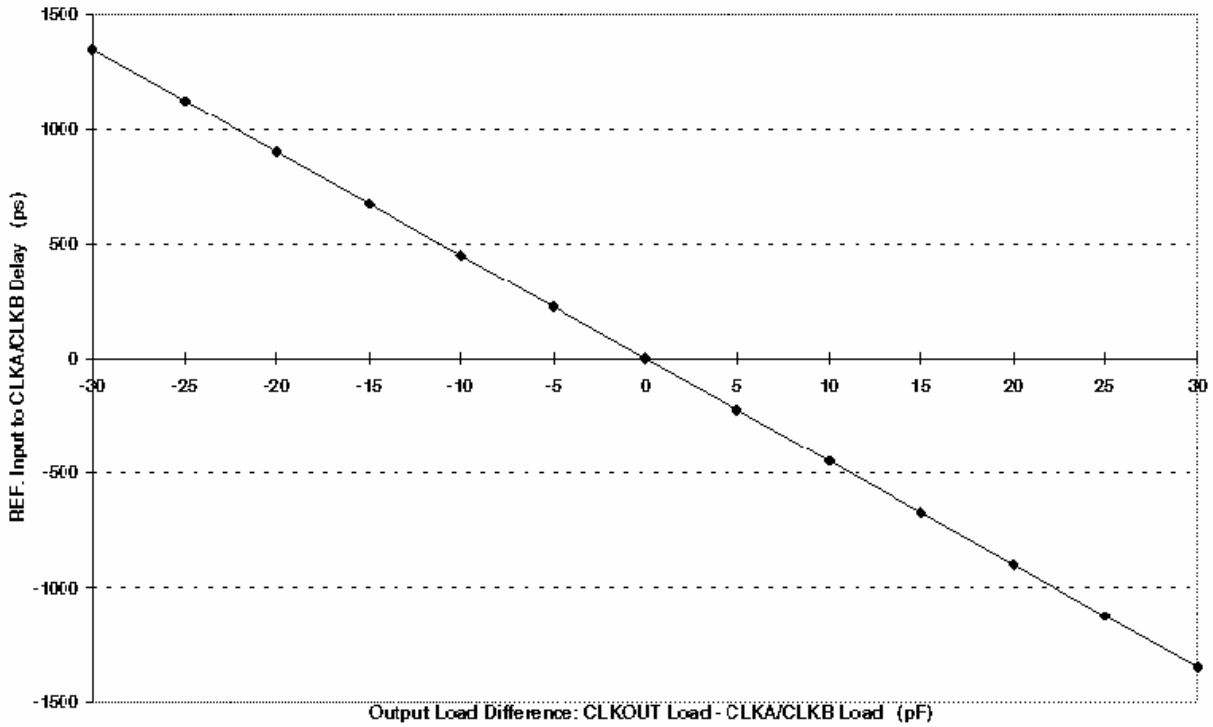
Notes:

1. This output is driven and has an internal feedback for the PLL. The load on this output can be adjusted to change the skew between the reference and the output.

Zero Delay and Skew Control

All outputs should be uniformly loaded to achieve Zero Delay between input and output. Since the CLKOUT pin is the internal feedback to the PLL, its relative loading can adjust the input-output delay.

For applications requiring zero input-output delay, all outputs, including CLKOUT, must be equally loaded. Even if CLKOUT is not used, it must have a capacitive load equal to that on other outputs, for obtaining zero-input-output delay.



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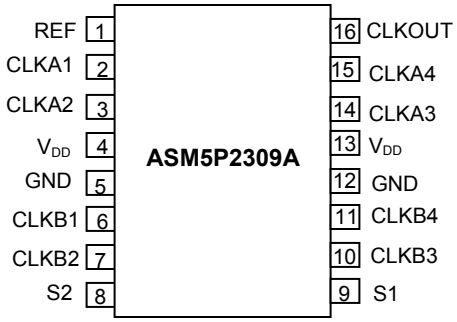
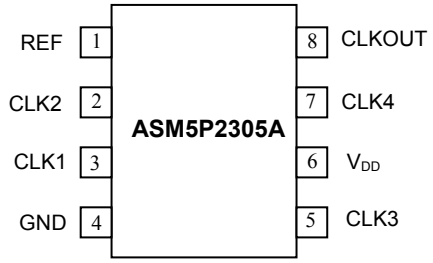
Pin Configuration





Pin Description for ASM5P2309A

Pin #	Pin Name	Description
1	REF[2]	Input reference frequency, 5V tolerant input
2	CLKA1[3]	Buffered clock output, bank A
3	CLKA2[3]	Buffered clock output, bank A
4	V_{DD}	3.3V supply
5	GND	Ground
6	CLKB1[3]	Buffered clock output, bank B
7	CLKB2[3]	Buffered clock output, bank B
8	S2[4]	Select input, bit 2
9	S1[4]	Select input, bit 1
10	CLKB3[3]	Buffered clock output, bank B
11	CLKB4[3]	Buffered clock output, bank B
12	GND	Ground
13	V_{DD}	3.3V supply
14	CLKA3[3]	Buffered clock output, bank A
15	CLKA4[3]	Buffered clock output, bank A
16	CLKOUT[3]	Buffered output, internal feedback on this pin

Notice: The information in this document is subject to change without notice.

Pin Description for ASM5P2305A

Pin #	Pin Name	Description
1	REF[2]	Input reference frequency, 5V-tolerant input
2	CLK2 [3]	Buffered clock output
3	CLK1[3]	Buffered clock output
4	GND	Ground
5	CLK3 [3]	Buffered clock output
6	V_{DD}	3.3V supply
7	CLK4[3]	Buffered clock output
8	CLKOUT [3]	Buffered clock output, internal feedback on this pin

Notes:

2. Weak pull-down.

3. Weak pull-down on all outputs.

4. Weak pull-up on these inputs.

Notice: The information in this document is subject to change without notice.

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply Voltage to Ground Potential	-0.5	+7.0	V
DC Input Voltage (Except REF)	-0.5	V_{DD} + 0.5	V
DC Input Voltage (REF)	-0.5	7	V
Storage Temperature	-65	+150	°C
Max. Soldering Temperature (10 sec)		260	°C
Junction Temperature		150	°C
Static Discharge Voltage (As per JEDEC STD22- A114-B)		2000	V

Note: These are stress ratings only and functional usage is not implied. Exposure to absolute maximum ratings for prolonged periods can affect device reliability.

Operating Conditions for ASM5P2305A and ASM5P2309A - Commercial Temperature Devices

Parameter	Description	Min	Max	Unit
V_{DD}	Supply Voltage	3.0	3.6	V
T_A	Operating Temperature (Ambient Temperature)	0	70	°C
C_L	Load Capacitance, below 100MHz		30	pF
C_L	Load Capacitance, from 100MHz to 133MHz		10	pF
C_{IN}	Input Capacitance		7	pF

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Electrical Characteristics for ASM5P2305A and ASM5P2309A - Commercial Temperature Devices

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
V_{IL}	Input LOW Voltage [5]				0.8	V
V_{IH}	Input HIGH Voltage [5]		2.0			V
I_{IL}	Input LOW Current	V_{IN} = 0V			50	µA
I_{IH}	Input HIGH Current	V_{IN} = V_{DD}			100	µA
V_{OL}	Output LOW Voltage [6]	I_{OL} = 8mA (-1) I_{OH} = 12mA (-1H)			0.4	V
V_{OH}	Output HIGH Voltage [6]	I_{OL} = -8mA (-1) I_{OH} = -12mA (-1H)	2.4			V
I_{DD}	Supply Current	Unloaded outputs at 66.67MHz, SEL inputs at V_{DD}			34	mA
Zo	Output Impedance			23		Ω

Switching Characteristics for ASM5P2305A-1 and ASM5P2309A-1 -- Commercial Temperature Devices[7]

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
$1/t_1$	Output Frequency	30pF load 10pF load	15 15		100 133	MHz
	Duty Cycle[6] = (t_2 / t_1) * 100	Measured at 1.4V, F_{OUT} = 66.67MHz	40	50	60	%
t_3	Output Rise Time[6]	Measured between 0.8V and 2.0V			2.50	nS
t_4	Output Fall Time [6]	Measured between 2.0V and 0.8V			2.50	nS
t_5	Output-to-output skew [6]	All outputs equally loaded			250	pS
t_6	Delay, REF Rising Edge to CLKOUT Rising Edge [6]	Measured at V_{DD} /2		0	±350	pS
t_7	Device-to-Device Skew [6]	Measured at V_{DD}/2 on the CLKOUT pins of the device		0	700	pS
t_J	Cycle-to-cycle jitter [6]	Measured at 66.67MHz, loaded outputs			200	pS
t_{LOCK}	PLL Lock Time [6]	Stable power supply, valid clock presented on REF pin			1.0	mS

Notes:

5. REF input has a threshold voltage of V_{DD} /2

6. Parameter is guaranteed by design and characterization. Not 100% tested in production

7. All parameters specified with loaded outputs.

Notice: The information in this document is subject to change without notice.

Switching Characteristics for ASM5P2305A-1H and ASM5P2309A-1H Commercial Temperature Devices[9]

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
$1/t_1$	Output Frequency	30pF load 10pF load	15 15		100 133	MHz
	Duty Cycle [8] = $(t_2 / t_1) * 100$	Measured at 1.4 V, F_{OUT} = 66.67MHz	40	50	60	%
	Duty Cycle [8] = $(t_2 / t_1) * 100$	Measured at 1.4 V, F_{OUT} < 50.0MHz	45	50	55	
t_3	Output Rise Time [8]	Measured between 0.8V and 2.0V			1.5	nS
t_4	Output Fall Time [8]	Measured between 2.0V and 0.8V			1.5	nS
t_5	Output-to-output skew [8]	All outputs equally loaded			250	pS
t_6	Delay, REF Rising Edge to CLKOUT Rising Edge [8]	Measured at V_{DD} /2		0	± 350	pS
t_7	Device-to-Device Skew [8]	Measured at V_{DD}/2 on the CLKOUT pins of the device		0	700	pS
t_8	Output Slew Rate [8]	Measured between 0.8V and 2.0V using Test Circuit #2	1			V/nS
t_J	Cycle-to-cycle jitter [8]	Measured at 66.67 MHz, loaded outputs			200	pS
t_{LOCK}	PLL Lock Time [8]	Stable power supply, valid clock presented on REF pin			1.0	mS

Notes:

8. Parameter is guaranteed by design and characterization. Not 100% tested in production

9. All parameters specified with loaded outputs.

Operating Conditions for ASM5I2305A and ASM5I2309A Industrial Temperature Devices

Parameter	Description	Min	Max	Unit
V_{DD}	Supply Voltage	3.0	3.6	V
T_A	Operating Temperature (Ambient Temperature)	-40	85	°C
C_L	Load Capacitance, below 100MHz		30	pF
C_L	Load Capacitance, from 100MHz to 133MHz		15	pF
C_{IN}	Input Capacitance		7	pF

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Electrical Characteristics for ASM5I2305A and ASM5I2309A Industrial Temperature Devices

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
V_{IL}	Input LOW Voltage[10]				0.8	V
V_{IH}	Input HIGH Voltage[10]		2.0			V
I_{IL}	Input LOW Current	V_{IN} = 0V			50	µA
I_{IH}	Input HIGH Current	V_{IN} = V_{DD}			100	µA
V_{OL}	Output LOW Voltage[11]	I_{OL} = 8mA (-1) I_{OH} = 12mA (-1H)			0.4	V
V_{OH}	Output HIGH Voltage[11]	I_{OL} = -8mA (-1) I_{OH} = -12mA (-1H)	2.4			V
I_{DD}	Supply Current	Unloaded outputs at 100MHz, SEL inputs at V_{DD} or GND, at room temp.			50	mA
		Unloaded outputs at 66.67MHz, SEL inputs at V_{DD} or GND, at room temp.			34	
		Unloaded outputs at 33MHz, SEL inputs at V_{DD} or GND, at room temp.			19	
Zo	Output Impedance			23		Ω

Notes:

10. REF input has a threshold voltage of V_{DD} /2

11. Parameter is guaranteed by design and characterization. Not 100% tested in production

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Switching Characteristics for ASM5I2305A-1H and ASM5I2309A-1H - Industrial Temperature Devices[13]

Parameter	Description	Test Conditions	Min	Typ	Max	Unit
$1/t_1$	Output Frequency	30pF load 10pF load	15 15		100 133	MHz
	Duty Cycle[12] = $(t_2 / t_1) * 100$	Measured at 1.4V, F_{OUT} = 66.67MHz	40	50	60	%
	Duty Cycle[12] = $(t_2 / t_1) * 100$	Measured at 1.4V, F_{OUT} < 50.0MHz	45	50	55	
t_3	Output Rise Time[12]	Measured between 0.8V and 2.0V			1.5	nS
t_4	Output Fall Time[12]	Measured between 2.0V and 0.8V			1.5	nS
t_5	Output-to-output skew[12]	All outputs equally loaded			250	pS
t_6	Delay, REF Rising Edge to CLKOUT Rising Edge[12]	Measured at V_{DD} /2		0	± 350	pS
t_7	Device-to-Device Skew[12]	Measured at V_{DD}/2 on the CLKOUT pins of the device		0	700	pS
t_8	Output Slew Rate[12]	Measured between 0.8V and 2.0V using Test Circuit #2	1			V/nS
t_J	Cycle-to-cycle jitter[12]	Measured at 66.67MHz, loaded outputs			200	pS
t_{LOCK}	PLL Lock Time[12]	Stable power supply, valid clock presented on REF pin			1.0	mS

Notes:

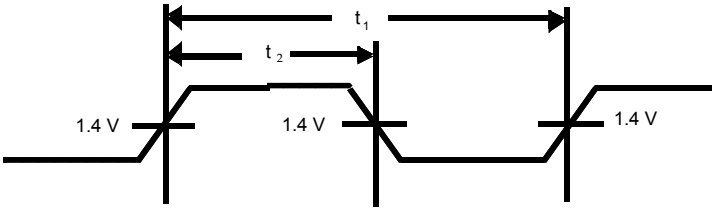
12. Parameter is guaranteed by design and characterization. Not 100% tested in production

13. All parameters specified with loaded outputs.

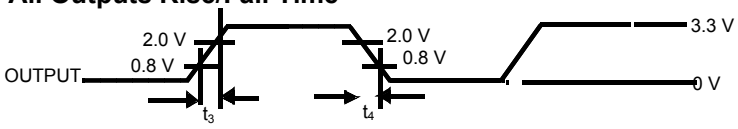
Notice: The information in this document is subject to change without notice.

Switching Waveforms

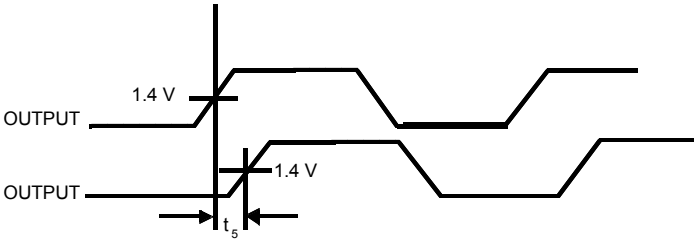
Duty Cycle Timing



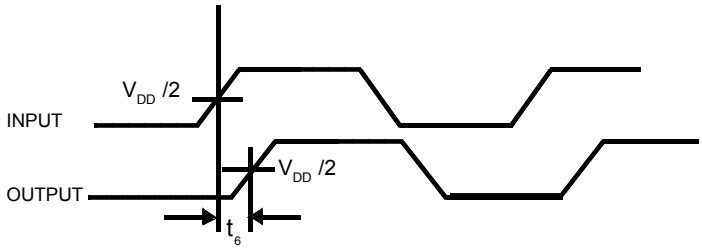
All Outputs Rise/Fall Time



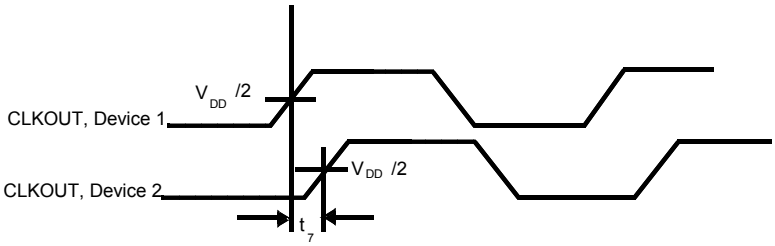
Output - Output Skew



Input - Output Propagation Delay



Device - Device Skew



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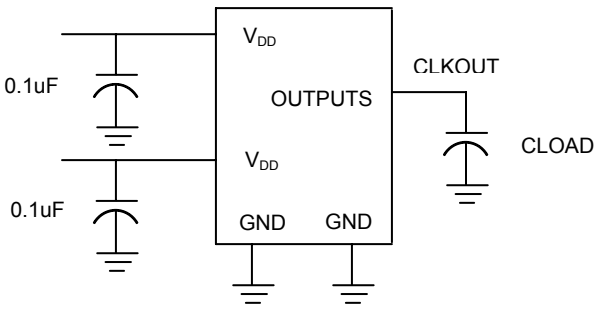
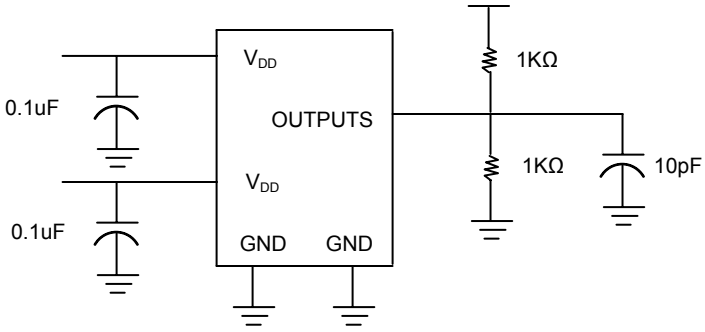
Test Circuits

TEST CIRCUIT # 1



TEST CIRCUIT # 2

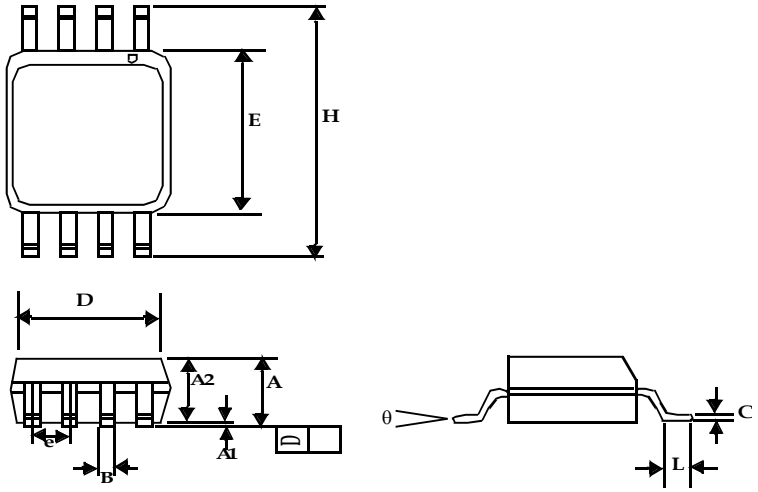


For parameter t_8 (output skew rate) on -1H devices

Notice: The information in this document is subject to change without notice.

Package Information

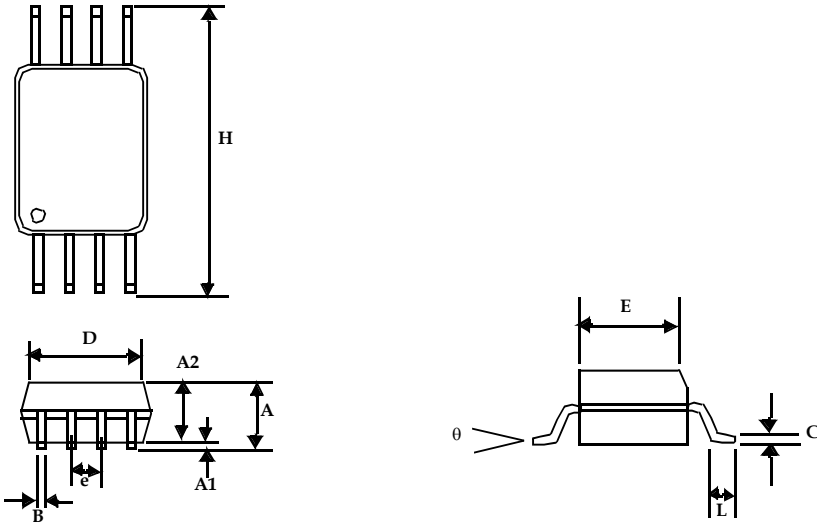
8-lead (150-mil) SOIC Package



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050	0.41	1.27
θ	0°	8°	0°	8°

Notice: The information in this document is subject to change without notice.

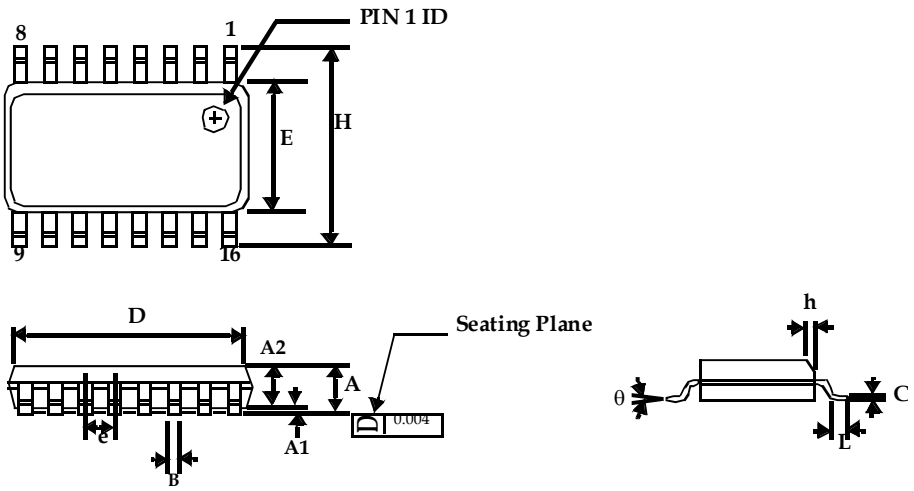
8-lead Thin Shrunk Small Outline Package (4.40-MM Body)



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50	0.70
θ	0°	8°	0°	8°

Notice: The information in this document is subject to change without notice.

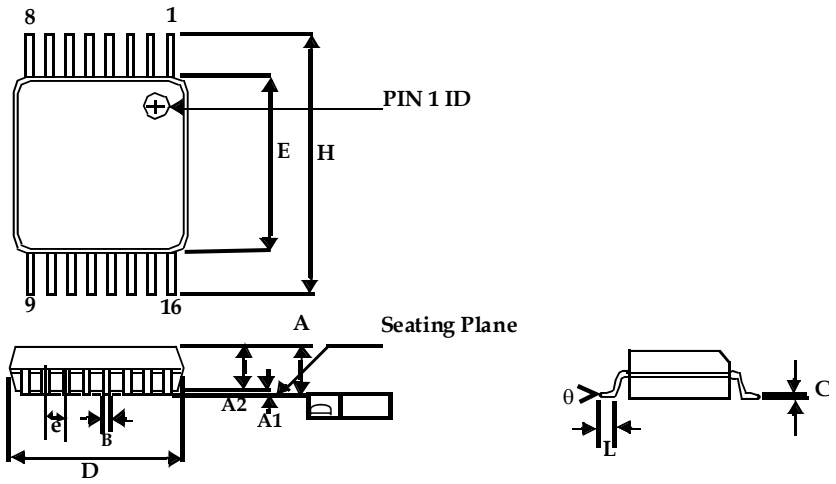
16-lead (150 Mil) Molded SOIC



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
A2	0.049	0.059	1.25	1.50
B	0.013	0.022	0.33	0.53
C	0.008	0.012	0.19	0.27
D	0.386	0.394	9.80	10.01
E	0.150	0.157	3.80	4.00
e	0.050 BSC		1.27 BSC	
H	0.228	0.244	5.80	6.20
h	0.010	0.016	0.25	0.41
L	0.016	0.035	0.40	0.89
θ	0°	8°	0°	8°

Notice: The information in this document is subject to change without notice.

16-lead Thin Shrunk Small Outline Package (4.40-MM Body)



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.20
A1	0.002	0.006	0.05	0.15
A2	0.031	0.041	0.80	1.05
B	0.007	0.012	0.19	0.30
C	0.004	0.008	0.09	0.20
D	0.193	0.201	4.90	5.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.030	0.50	0.75
θ	0°	8°	0°	8°

Notice: The information in this document is subject to change without notice.

Ordering Codes

Ordering Code	Marking	Package Type	Operating Range
ASM5P2309A-1-16-ST	5P2309A-1	16-pin 150-mil SOIC-TUBE	Commercial
ASM5I2309A-1-16-ST	5I2309A-1	16-pin 150-mil SOIC- TUBE	Industrial
ASM5P2309A-1-16-SR	5P2309A-1	16-pin 150-mil SOIC-TAPE & REEL	Commercial
ASM5I2309A-1-16-SR	5I2309A-1	16-pin 150-mil SOIC-TAPE & REEL	Industrial
ASM5P2309A-1-16-TT	5P2309A-1	16-pin 4.4-mm TSSOP - TUBE	Commercial
ASM5I2309A-1-16-TT	5I2309A-1	16-pin 4.4-mm TSSOP - TUBE	Industrial
ASM5P2309A-1-16-TR	5P2309A-1	16-pin 4.4-mm TSSOP - TAPE & REEL	Commercial
ASM5I2309A-1-16-TR	5I2309A-1	16- pin 4.4-mm TSSOP - TAPE & REEL	Industrial
ASM5P2309A-1H-16-ST	5P2309A-1H	16-pin 150-mil SOIC-TUBE	Commercial
ASM5I2309A-1H-16-ST	5I2309A-1H	16-pin 150-mil SOIC- TUBE	Industrial
ASM5P2309A-1H-16-SR	5P2309A-1H	16-pin 150-mil SOIC-TAPE & REEL	Commercial
ASM5I2309A-1H-16-SR	5I2309A-1H	16-pin 150-mil SOIC-TAPE & REEL	Industrial
ASM5P2309A-1H-16-TT	5P2309A-1H	16-pin 4.4-mm TSSOP - TUBE	Commercial
ASM5I2309A-1H-16-TT	5I2309A-1H	16-pin 4.4-mm TSSOP - TUBE	Industrial
ASM5P2309A-1H-16-TR	5P2309A-1H	16-pin 4.4-mm TSSOP - TAPE & REEL	Commercial
ASM5I2309A-1H-16-TR	5I2309A-1H	16-pin 4.4-mm TSSOP - TAPE & REEL	Industrial
ASM5P2305A-1-08-ST	5P2305A-1	8-pin 150-mil SOIC-TUBE	Commercial
ASM5I2305A-1-08-ST	5I2305A-1	8-pin 150-mil SOIC- TUBE	Industrial
ASM5P2305A-1-08-SR	5P2305A-1	8-pin 150-mil SOIC-TAPE & REEL	Commercial
ASM5I2305A-1-08-SR	5I2305A-1	8-pin 150-mil SOIC-TAPE & REEL	Industrial
ASM5P2305A-1-08-TT	5P2305A-1	8-pin 4.4-mm TSSOP - TUBE	Commercial
ASM5I2305A-1-08-TT	5I2305A-1	8-pin 4.4-mm TSSOP - TUBE	Industrial
ASM5P2305A-1-08-TR	5P2305A-1	8-pin 4.4-mm TSSOP - TAPE & REEL	Commercial
ASM5I2305A-1-08-TR	5I2305A-1	8-pin 4.4-mm TSSOP - TAPE & REEL	Industrial
ASM5P2305A-1H-08-ST	5P2305A-1H	8-pin 150-mil SOIC-TUBE	Commercial
ASM5I2305A-1H-08-ST	5I2305A-1H	8-pin 150-mil SOIC- TUBE	Industrial
ASM5P2305A-1H-08-SR	5P2305A-1H	8-pin 150-mil SOIC-TAPE & REEL	Commercial
ASM5I2305A-1H-08-SR	5I2305A-1H	8-pin 150-mil SOIC-TAPE & REEL	Industrial
ASM5P2305A-1H-08-TT	5P2305A-1H	8-pin 4.4-mm TSSOP - TUBE	Commercial
ASM5I2305A-1H-08-TT	5I2305A-1H	8-pin 4.4-mm TSSOP - TUBE	Industrial
ASM5P2305A-1H-08-TR	5P2305A-1H	8-pin 4.4-mm TSSOP - TAPE & REEL	Commercial
ASM5I2305A-1H-08-TR	5I2305A-1H	8-pin 4.4-mm TSSOP - TAPE & REEL	Industrial

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Ordering Codes (cont'd)

Ordering Code	Marking	Package Type	Operating Range
ASM5P2309AF-1-16-ST	5P2309AF-1	16-pin 150-mil SOIC-TUBE,Pb Free	Commercial
ASM5I2309AF-1-16-ST	5I2309AF-1	16-pin 150-mil SOIC- TUBE,Pb Free	Industrial
ASM5P2309AF-1-16-SR	5P2309AF-1	16-pin 150-mil SOIC-TAPE & REEL,Pb Free	Commercial
ASM5I2309AF-1-16-SR	5I2309AF-1	16-pin 150-mil SOIC-TAPE & REEL,Pb Free	Industrial
ASM5P2309AF-1-16-TT	5P2309AF-1	16-pin 4.4-mm TSSOP - TUBE,Pb Free	Commercial
ASM5I2309AF-1-16-TT	5I2309AF-1	16-pin 4.4-mm TSSOP - TUBE,Pb Free	Industrial
ASM5P2309AF-1-16-TR	5P2309AF-1	16-pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Commercial
ASM5I2309AF-1-16-TR	5I2309AF-1	16- pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Industrial
ASM5P2309AF-1H-16-ST	5P2309AF-1H	16-pin 150-mil SOIC-TUBE,Pb Free	Commercial
ASM5I2309AF-1H-16-ST	5I2309AF-1H	16-pin 150-mil SOIC- TUBE,Pb Free	Industrial
ASM5P2309AF-1H-16-SR	5P2309AF-1H	16-pin 150-mil SOIC-TAPE & REEL,Pb Free	Commercial
ASM5I2309AF-1H-16-SR	5I2309AF-1H	16-pin 150-mil SOIC-TAPE & REEL,Pb Free	Industrial
ASM5P2309AF-1H-16-TT	5P2309AF-1H	16-pin 4.4-mm TSSOP - TUBE,Pb Free	Commercial
ASM5I2309AF-1H-16-TT	5I2309AF-1H	16-pin 4.4-mm TSSOP - TUBE,Pb Free	Industrial
ASM5P2309AF-1H-16-TR	5P2309AF-1H	16-pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Commercial
ASM5I2309AF-1H-16-TR	5I2309AF-1H	16-pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Industrial
ASM5P2305AF-1-08-ST	5P2305AF-1	8-pin 150-mil SOIC-TUBE,Pb Free	Commercial
ASM5I2305AF-1-08-ST	5I2305AF-1	8-pin 150-mil SOIC- TUBE,Pb Free	Industrial
ASM5P2305AF-1-08-SR	5P2305AF-1	8-pin 150-mil SOIC-TAPE & REEL,Pb Free	Commercial
ASM5I2305AF-1-08-SR	5I2305AF-1	8-pin 150-mil SOIC-TAPE & REEL,Pb Free	Industrial
ASM5P2305AF-1-08-TT	5P2305AF-1	8-pin 4.4-mm TSSOP - TUBE,Pb Free	Commercial
ASM5I2305AF-1-08-TT	5I2305AF-1	8-pin 4.4-mm TSSOP - TUBE,Pb Free	Industrial
ASM5P2305AF-1-08-TR	5P2305AF-1	8-pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Commercial
ASM5I2305AF-1-08-TR	5I2305AF-1	8-pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Industrial
ASM5P2305AF-1H-08-ST	5P2305AF-1H	8-pin 150-mil SOIC-TUBE,Pb Free	Commercial
ASM5I2305AF-1H-08-ST	5I2305AF-1H	8-pin 150-mil SOIC- TUBE,Pb Free	Industrial
ASM5P2305AF-1H-08-SR	5P2305AF-1H	8-pin 150-mil SOIC-TAPE & REEL,Pb Free	Commercial
ASM5I2305AF-1H-08-SR	5I2305AF-1H	8-pin 150-mil SOIC-TAPE & REEL,Pb Free	Industrial
ASM5P2305AF-1H-08-TT	5P2305AF-1H	8-pin 4.4-mm TSSOP - TUBE,Pb Free	Commercial
ASM5I2305AF-1H-08-TT	5I2305AF-1H	8-pin 4.4-mm TSSOP - TUBE,Pb Free	Industrial
ASM5P2305AF-1H-08-TR	5P2305AF-1H	8-pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Commercial
ASM5I2305AF-1H-08-TR	5I2305AF-1H	8-pin 4.4-mm TSSOP - TAPE & REEL,Pb Free	Industrial

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Ordering Codes (cont'd)

Ordering Code	Marking	Package Type	Operating Range
ASM5P2309AG-1-16-ST	5P2309AG-1	16-pin 150-mil SOIC-TUBE, Green	Commercial
ASM5I2309AG-1-16-ST	5I2309AG-1	16-pin 150-mil SOIC- TUBE, Green	Industrial
ASM5P2309AG-1-16-SR	5P2309AG-1	16-pin 150-mil SOIC-TAPE & REEL, Green	Commercial
ASM5I2309AG-1-16-SR	5I2309AG-1	16-pin 150-mil SOIC-TAPE & REEL, Green	Industrial
ASM5P2309AG-1-16-TT	5P2309AG-1	16-pin 4.4-mm TSSOP - TUBE, Green	Commercial
ASM5I2309AG-1-16-TT	5I2309AG-1	16-pin 4.4-mm TSSOP - TUBE, Green	Industrial
ASM5P2309AG-1-16-TR	5P2309AG-1	16-pin 4.4-mm TSSOP - TAPE & REEL, Green	Commercial
ASM5I2309AG-1-16-TR	5I2309AG-1	16- pin 4.4-mm TSSOP - TAPE & REEL, Green	Industrial
ASM5P2309AG-1H-16-ST	5P2309AG-1H	16-pin 150-mil SOIC-TUBE, Green	Commercial
ASM5I2309AG-1H-16-ST	5I2309AG-1H	16-pin 150-mil SOIC- TUBE, Green	Industrial
ASM5P2309AG-1H-16-SR	5P2309AG-1H	16-pin 150-mil SOIC-TAPE & REEL, Green	Commercial
ASM5I2309AG-1H-16-SR	5I2309AG-1H	16-pin 150-mil SOIC-TAPE & REEL, Green	Industrial
ASM5P2309AG-1H-16-TT	5P2309AG-1H	16-pin 4.4-mm TSSOP - TUBE, Green	Commercial
ASM5I2309AG-1H-16-TT	5I2309AG-1H	16-pin 4.4-mm TSSOP - TUBE, Green	Industrial
ASM5P2309AG-1H-16-TR	5P2309AG-1H	16-pin 4.4-mm TSSOP - TAPE & REEL, Green	Commercial
ASM5I2309AG-1H-16-TR	5I2309AG-1H	16-pin 4.4-mm TSSOP - TAPE & REEL, Green	Industrial
ASM5P2305AG-1-08-ST	5P2305AG-1	8-pin 150-mil SOIC-TUBE, Green	Commercial
ASM5I2305AG-1-08-ST	5I2305AG-1	8-pin 150-mil SOIC- TUBE, Green	Industrial
ASM5P2305AG-1-08-SR	5P2305AG-1	8-pin 150-mil SOIC-TAPE & REEL, Green	Commercial
ASM5I2305AG-1-08-SR	5I2305AG-1	8-pin 150-mil SOIC-TAPE & REEL, Green	Industrial
ASM5P2305AG-1-08-TT	5P2305AG-1	8-pin 4.4-mm TSSOP - TUBE, Green	Commercial
ASM5I2305AG-1-08-TT	5I2305AG-1	8-pin 4.4-mm TSSOP - TUBE, Green	Industrial
ASM5P2305AG-1-08-TR	5P2305AG-1	8-pin 4.4-mm TSSOP - TAPE & REEL, Green	Commercial
ASM5I2305AG-1-08-TR	5I2305AG-1	8-pin 4.4-mm TSSOP - TAPE & REEL, Green	Industrial
ASM5P2305AG-1H-08-ST	5P2305AG-1H	8-pin 150-mil SOIC-TUBE, Green	Commercial
ASM5I2305AG-1H-08-ST	5I2305AG-1H	8-pin 150-mil SOIC- TUBE, Green	Industrial
ASM5P2305AG-1H-08-SR	5P2305AG-1H	8-pin 150-mil SOIC-TAPE & REEL, Green	Commercial
ASM5I2305AG-1H-08-SR	5I2305AG-1H	8-pin 150-mil SOIC-TAPE & REEL, Green	Industrial
ASM5P2305AG-1H-08-TT	5P2305AG-1H	8-pin 4.4-mm TSSOP - TUBE, Green	Commercial
ASM5I2305AG-1H-08-TT	5I2305AG-1H	8-pin 4.4-mm TSSOP - TUBE, Green	Industrial
ASM5P2305AG-1H-08-TR	5P2305AG-1H	8-pin 4.4-mm TSSOP - TAPE & REEL, Green	Commercial
ASM5I2305AG-1H-08-TR	5I2305AG-1H	8-pin 4.4-mm TSSOP - TAPE & REEL, Green	Industrial

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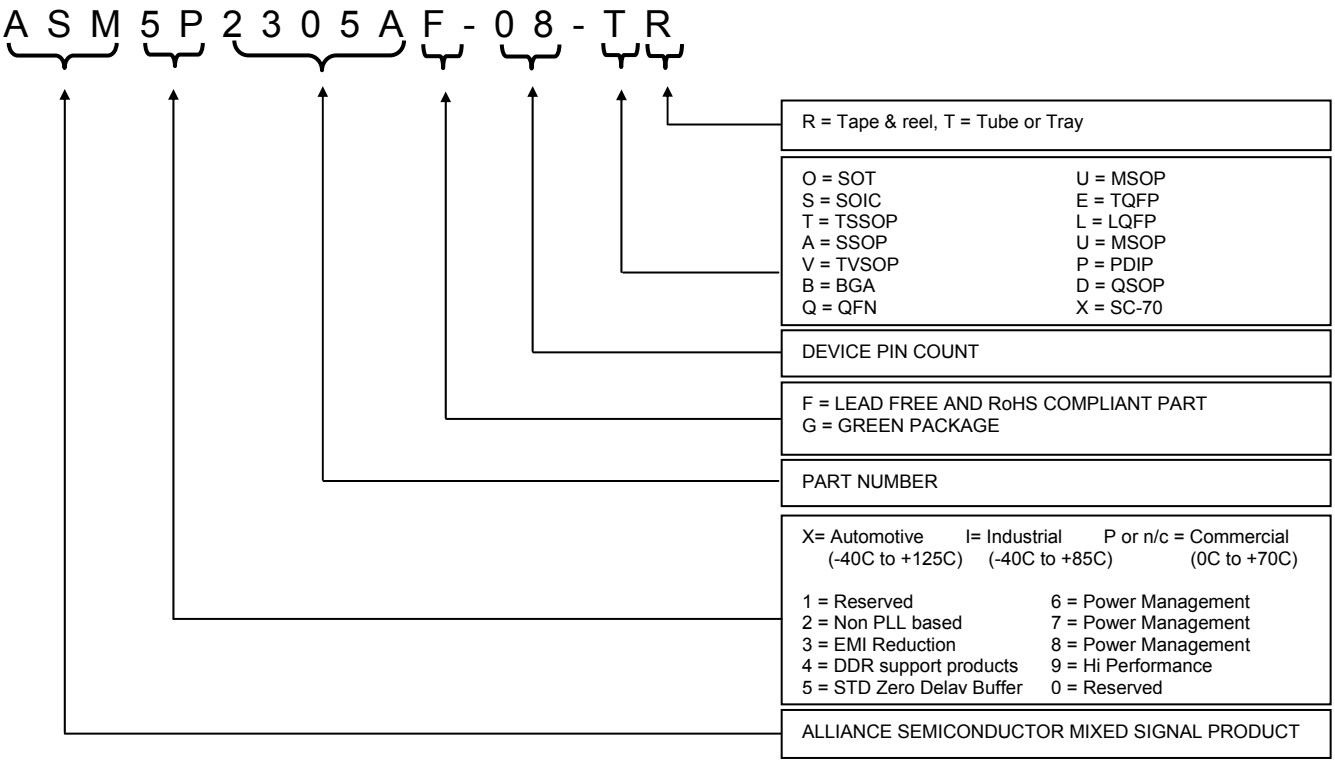
Device Ordering Information



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Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to Alliance Semiconductor, dated 11-11-2003

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