

Absolute Maximum Ratings (Note 1)

Supply Voltage (V_{CC})	−0.5V to +6V
DC Input Voltage (V_{IN})	−0.5V to +6V
DC Output Voltage (V_{OUT})	−0.5V to +6V
DC Input Diode Current (I_{IK})	
@ $V_{IN} < -0.5V$	−50 mA
@ $V_{IN} > 6V$	+20 mA
DC Output Diode Current (I_{OK})	
@ $V_{OUT} < -0.5V$	−50 mA
@ $V_{OUT} > 6V$, $V_{CC} = GND$	+20 mA
DC Output Current (I_{OUT})	± 50 mA
DC V_{CC}/GND Current (I_{CC}/I_{GND})	± 50 mA
Storage Temperature (T_{STG})	−65°C to +150°C
Junction Temperature under Bias (T_J)	150°C
Junction Lead Temperature (T_L); (Soldering, 10 seconds)	260°C
Power Dissipation (P_D) @ +85°C	
SOT23-5	200 mW
SC70-5	150 mW

Recommended Operating Conditions (Note 2)

Supply Voltage Operating (V_{CC})	1.8V to 5.5V
Supply Voltage Data Retention (V_{CC})	1.5V to 5.5V
Input Voltage (V_{IN})	0V to 5.5V
Output Voltage (V_{OUT})	0V to V_{CC}
Operating Temperature (T_A)	−40°C to +85°C
Input Rise and Fall Time (t_r , t_f)	
$V_{CC} = 1.8V, 2.5V \pm 0.2V$	0 ns/V–20 ns/V
$V_{CC} = 3.3V \pm 0.3V$	0 ns/V–10 ns/V
$V_{CC} = 5.0V \pm 0.5V$	0 ns/V–5 ns/V
Thermal Resistance (θ_{JA})	
SOT23-5	300°C/W
SC70-5	425°C/W

Note 1: Absolute maximum ratings are DC values beyond which the device may be damaged or have its useful life impaired. The datasheet specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Fairchild does not recommend operation outside datasheet specifications.

Note 2: Unused inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

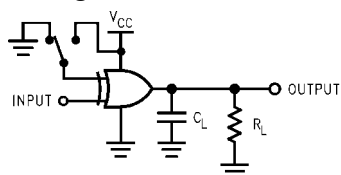
Symbol	Parameter	V _{CC} (V)	T _A = +25°C			T _A = -40°C to +85°C		Units	Conditions		
			Min	Typ	Max	Min	Max				
V _{IH}	HIGH Level Input Voltage	1.8 2.3–5.5	0.75 V _{CC} 0.7 V _{CC}			0.75 V _{CC} 0.7 V _{CC}		V			
V _{IL}	LOW Level Input Voltage	1.8 2.3–5.5	0.25 V _{CC} 0.3 V _{CC}			0.25 V _{CC} 0.3 V _{CC}		V			
V _{OH}	HIGH Level Output Voltage	1.8	1.7	1.8	1.7		V	V _{IN} = V _{IH} , V _{IL}	I _{OH} = -100 μA		
		2.3	2.2	2.3	2.2						
		3.0	2.9	3.0	2.9						
		4.5	4.4	4.5	4.4						
		2.3	1.9	2.15	1.9		V		I _{OH} = -8 mA I _{OH} = -16 mA I _{OH} = -24 mA I _{OH} = -32 mA		
		3.0	2.4	2.80	2.4						
		3.0	2.3	2.68	2.3						
		4.5	3.8	4.20	3.8						
V _{OL}	LOW Level Output Voltage	1.8	0.0			0.1	0.1		V	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 100 μA
		2.3	0.0			0.1	0.1				
		3.0	0.0			0.1	0.1				
		4.5	0.0			0.1	0.1				
		2.3	0.10			0.3	0.3		V		I _{OL} = 8 mA I _{OL} = 16 mA I _{OL} = 24 mA I _{OL} = 32 mA
		3.0	0.15			0.4	0.4				
		3.0	0.22			0.55	0.55				
		4.5	0.22			0.55	0.55				
I _{IN}	Input Leakage Current	0–5.5	±1			±10		μA	V _{IN} = 5.5V, GND		
I _{OFF}	Power Off Leakage Current	0.0	1			10		μA	V _{IN} or V _{OUT} = 5.5V		
I _{CC}	Quiescent Supply Current	1.8–5.5	2.0			20		μA	V _{IN} = 5.5V, GND		

AC Electrical Characteristics

Symbol	Parameter	V _{CC} (V)	T _A = +25°C			T _A = -40°C to +85°C		Units	Conditions	Fig. No.
			Min	Typ	Max	Min	Max			
t _{PLH} , t _{PHL}	Propagation Delay	1.8	2.0	5.7	11.5	2.0	12	ns	C _L = 15 pF, R _L = 1 MΩ	Figures 1, 3
		2.5 ± 0.2	0.8	3.8	8.0	0.8	8.5			
		3.3 ± 0.3	0.5	3.0	5.7	0.5	6.0			
		5.0 ± 0.5	0.5	2.4	5.0	0.5	5.4			
t _{PLH} , t _{PHL}	Propagation Delay	3.3 ± 0.3	1.5	3.5	6.2	1.5	6.5	ns	C _L = 50 pF, R _L = 500Ω	Figures 1, 3
		5.0 ± 0.5	0.8	2.9	5.4	1.0	5.8			
C _{IN}	Input Capacitance	0	4					pF		
C _{PD}	Power Dissipation Capacitance	3.3	25					pF	(Note 3)	Figure 2
		5.0	31							

Note 3: C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle. (See Figure 2.) C_{PD} is related to I_{CCD} dynamic operating current by the expression:
 $I_{CCD} = (C_{PD})(V_{CC})(f_{IN}) + I_{CCStatic}$.

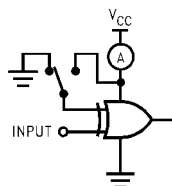
AC Loading and Waveforms



C_L includes load and stray capacitance

Input PRR = 1.0 MHz; t_w = 500 ns

FIGURE 1. AC Test Circuit



Input = AC Waveform; t_r = t_f = 1.8 ns;

PRR = 10 MHz; Duty Cycle = 50%

FIGURE 2. I_{CCD} Test Circuit

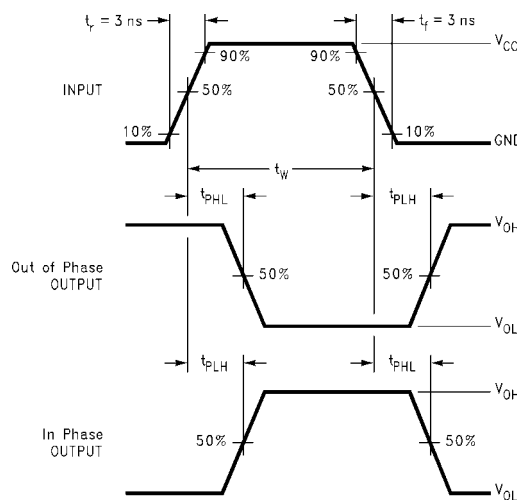


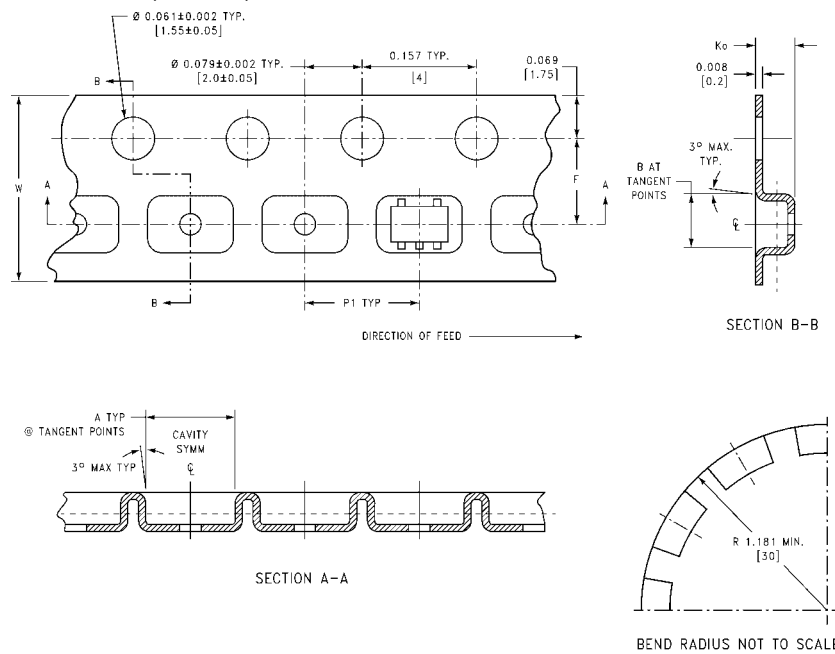
FIGURE 3. AC Waveforms

Tape and Reel Specification

TAPE FORMAT

Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status
M5, P5	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	250	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed
M5X, P5X	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	3000	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed

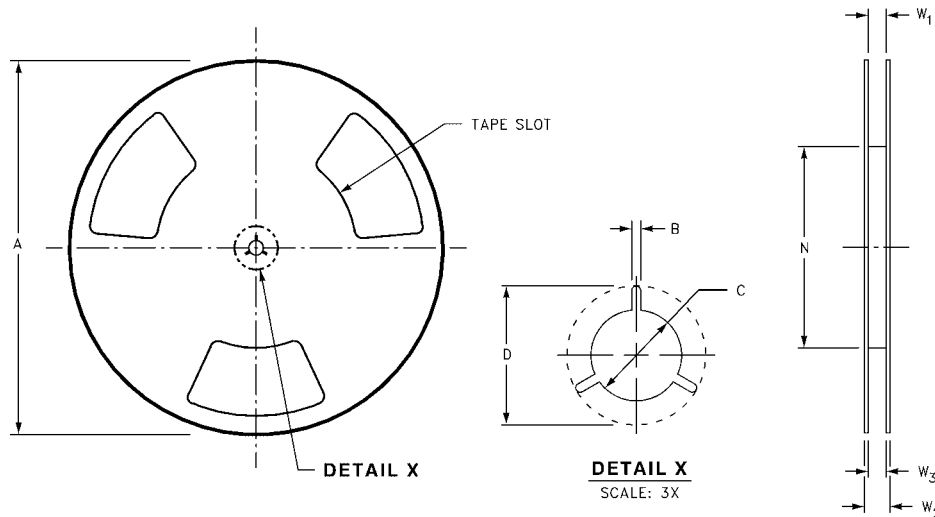
TAPE DIMENSIONS inches (millimeters)



Package	Tape Size	DIM A	DIM B	DIM F	DIM K ₀	DIM P1	DIM W
SC70-5	8 mm	0.093 (2.35)	0.096 (2.45)	0.138 ± 0.004 (3.5 ± 0.10)	0.053 ± 0.004 (1.35 ± 0.10)	0.157 (4)	0.315 ± 0.004 (8 ± 0.1)
SOT23-5	8 mm	0.130 (3.3)	0.130 (3.3)	0.138 ± 0.002 (3.5 ± 0.05)	0.055 ± 0.004 (1.4 ± 0.11)	0.157 (4)	0.315 ± 0.012 (8 ± 0.3)

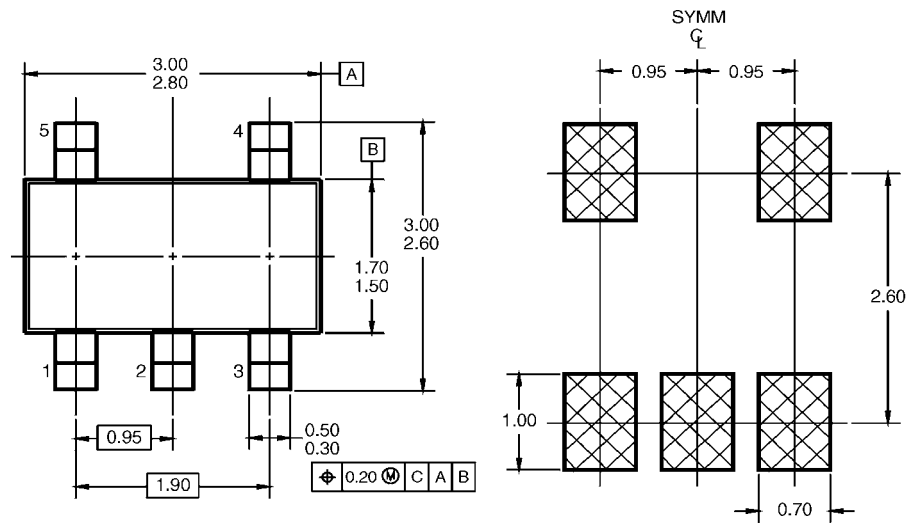
Tape and Reel Specification (Continued)

REEL DIMENSIONS inches (millimeters)

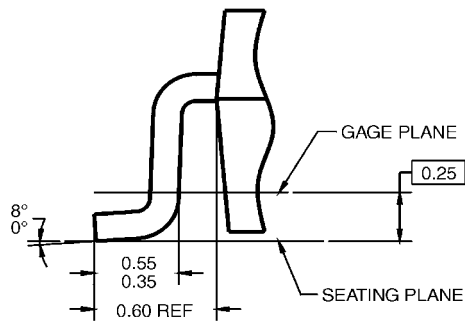
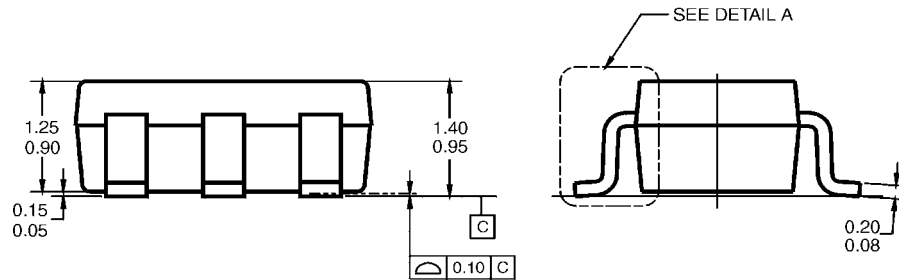


Tape Size	A	B	C	D	N	W1	W2	W3
8 mm	7.0 (177.8)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	2.165 (55.00)	0.331 + 0.059/-0.000 (8.40 + 1.50/-0.00)	0.567 (14.40)	W1 + 0.078/-0.039 (W1 + 2.00/-1.00)

Physical Dimensions inches (millimeters) unless otherwise noted



LAND PATTERN RECOMMENDATION



NOTES: UNLESS OTHERWISE SPECIFIED

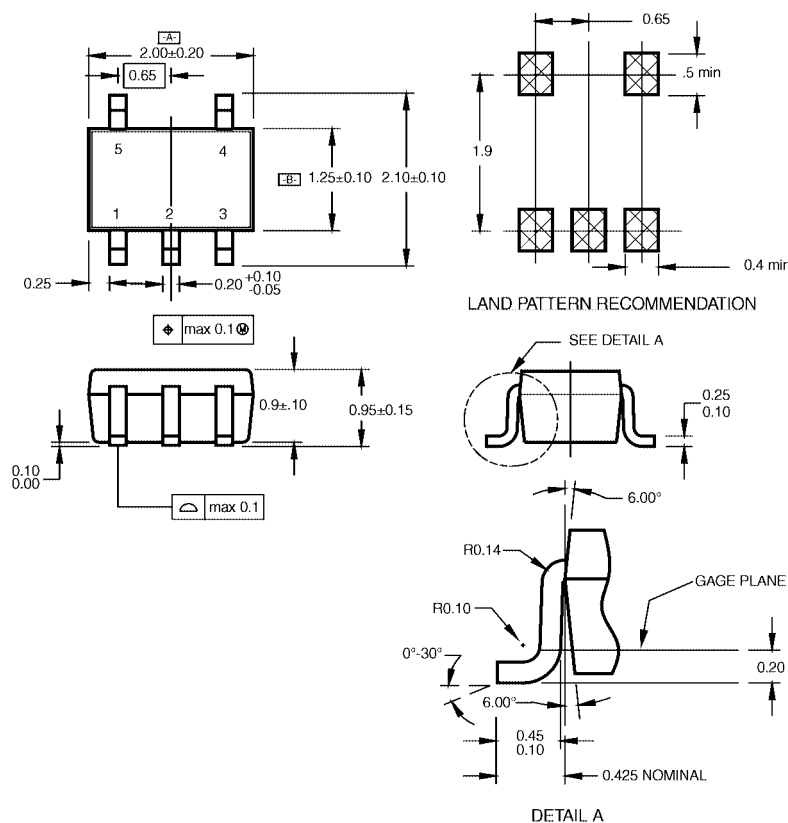
- A) THIS PACKAGE CONFORMS TO JEDEC MO-178, ISSUE B, VARIATION AA, DATED JANUARY 1999.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.

MA05BRevC

DETAIL A

5-Lead SOT23, JEDEC MO-178, 1.6mm
Package Number MA05B

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



NOTES:

- CONFORMS TO EIAJ REGISTERED OUTLINE DRAWING SC88A.
- DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
- DIMENSIONS ARE IN MILLIMETERS.

MAA05ARevC

**5-Lead SC70, EIAJ SC-88a, 1.25mm Wide
Package Number MAA05A**

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