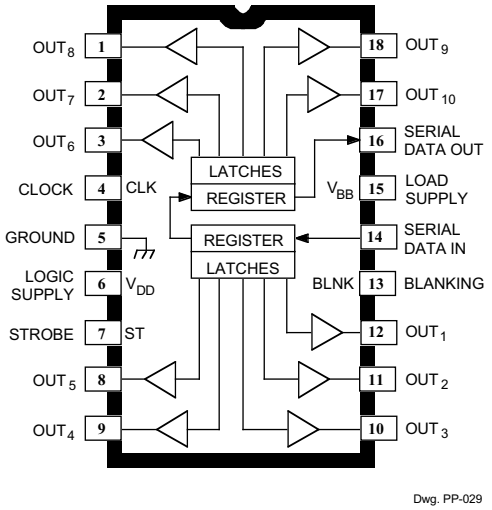
6810

Data Sheet
26182.124E

DABiC-IV, 10-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

A6810xA



ABSOLUTE MAXIMUM RATINGS
at T_A = 25°C

Logic Supply Voltage, V_{DD} ..... **7.0 V**
Driver Supply Voltage, V_{BB} ..... **60 V**
Continuous Output Current Range,
I_{OUT} ..... **-40 mA to +15 mA**
Input Voltage Range,
V_{IN} ..... **-0.3 V to V_{DD} + 0.3 V**
Package Power Dissipation,
P_D ..... **See Graph**
Operating Temperature Range, T_A
(Suffix 'E–') ..... **-40°C to +85°C**
(Suffix 'K–') ..... **-40°C to +125°C**
(Suffix 'S–') ..... **-20°C to +85°C**
Storage Temperature Range,
T_S ..... **-55°C to +125°C**

Caution: These CMOS devices have input static protection (Class 2) but are still susceptible to damage if exposed to extremely high static electrical charges.

The A6810– devices combine 10-bit CMOS shift registers, accompanying data latches and control circuitry with bipolar sourcing outputs and pnp active pull downs. Designed primarily to drive vacuum-fluorescent displays, the 60 V and -40 mA output ratings also allow these devices to be used in many other peripheral power driver applications. The A6810– feature an increased data input rate (compared with the older UCN/UCQ5810-F) and a controlled output slew rate.

The CMOS shift register and latches allow direct interfacing with microprocessor-based systems. With a 3.3 V or 5 V logic supply, serial-data input rates of at least 10 MHz .

A CMOS serial data output permits cascade connections in applications requiring additional drive lines. Similar devices are available as the A6812– (20 bits) and A6818– (32 bits).

The A6810– output source drivers are npn Darlingtons, capable of sourcing up to 40 mA. The controlled output slew rate reduces electromagnetic noise, which is an important consideration in systems that include telecommunications and/or microprocessors and to meet government emissions regulations. For inter-digit blanking, all output drivers can be disabled and all sink drivers turned on with a BLANKING input high. The pnp active pull-downs will sink at least 2.5 mA.

The A6810– are available in three temperature ranges for optimum performance in commercial (suffix S-), industrial (suffix E-), or automtoive (suffix K–) applications. They are provided in two package styles for through-hole DIP (suffix -A) or minimum-area surface-mount SOIC (suffix -LW). Copper lead frames, low logic-power dissipation, and low output-saturation voltages allow all devices to source 25 mA from all outputs continuously over the maximum operating temperature range.

The lead (Pb) free versions are provided with 100% matte tin leadframe plating.

FEATURES

- Controlled Output Slew Rate
- High-Speed Data Storage
- 60 V Minimum Output Breakdown
- High Data Input Rate
- PNP Active Pull-Downs
- Low Output-Saturation Voltages
- Low-Power CMOS Logic and Latches
- Improved Replacements for TL4810–, UCN5810–, and UCQ5810–

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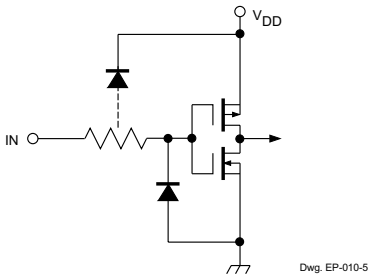
10-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

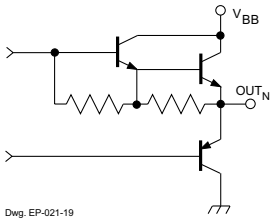
PRODUCT SELECTION GUIDE

Part Number	Pb-free	Packing	Ambient Temperature, T_A (°C)	Package
A6810SA A6810SA-T	– Yes	21 pieces/tube	–20 to 85	18-pin DIP
A6810EA A6810EA-T	– Yes		–40 to 85	
A6810KA A6810KA-T	– Yes		–40 to 125	
A6810SLW A6810SLW-T	– Yes	37 pieces/tube	–20 to 85	20-pin SOIC-W
A6810SLWTR A6810SLWTR-T	– Yes	1000 pieces/13-in. reel		
A6810ELW A6810ELW-T	– Yes	37 pieces/tube	–40 to 85	
A6810ELWTR A6810ELWTR-T	– Yes	1000 pieces/13-in. reel		
A6810KLW A6810KLW-T	– Yes	37 pieces/tube	–40 to 125	
A6810KLWTR A6810KLWTR-T	– Yes	1000 pieces/13-in. reel		

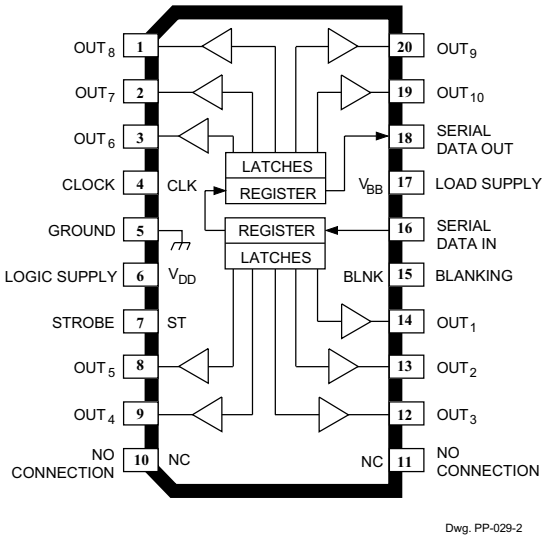
TYPICAL INPUT CIRCUIT

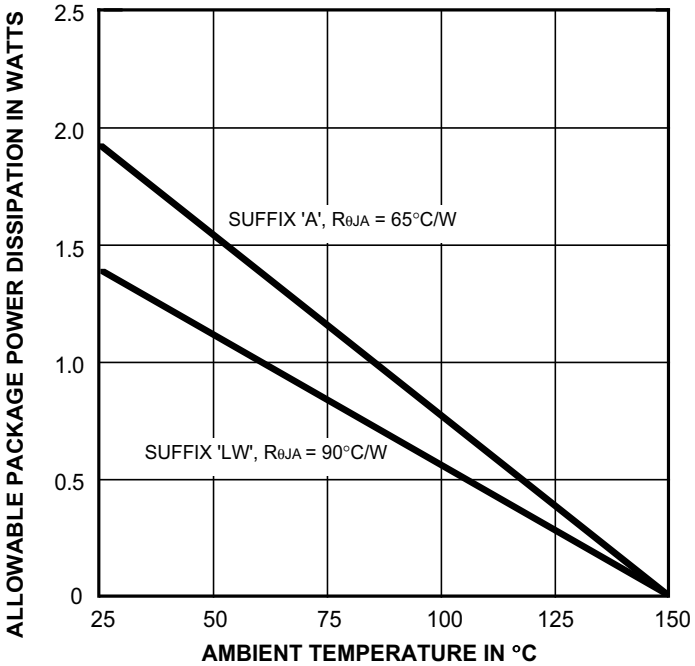


TYPICAL OUTPUT DRIVER



A6810xLW





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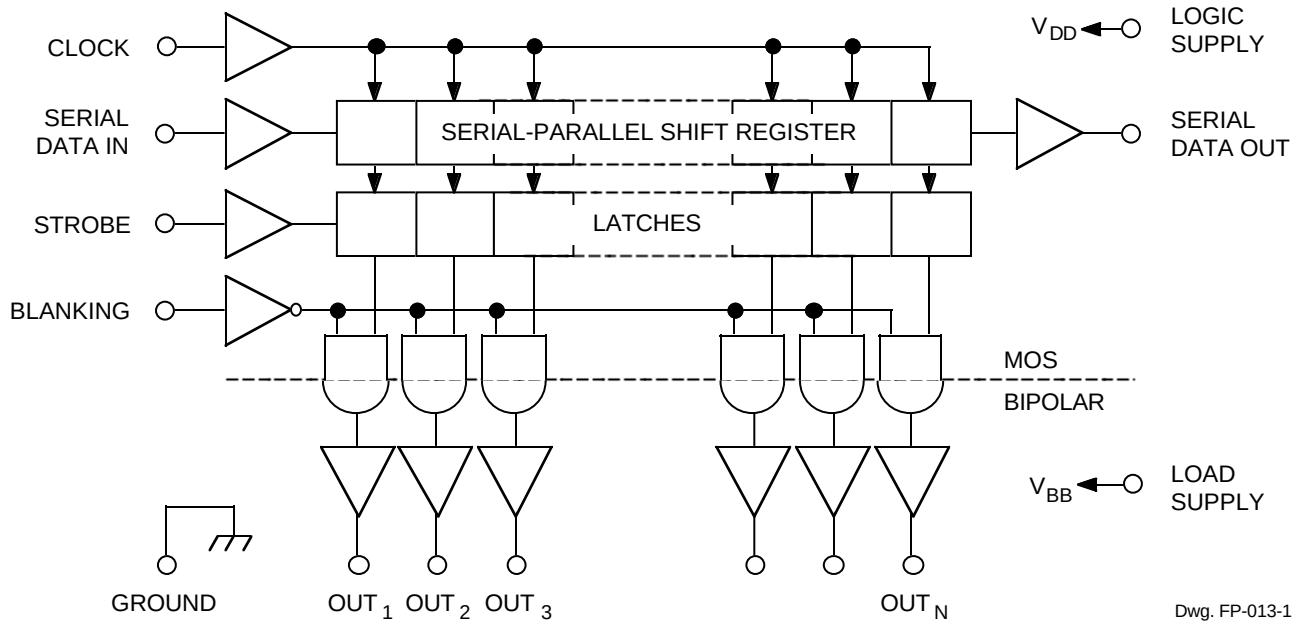
FUNCTIONAL BLOCK DIAGRAM



TRUTH TABLE

Serial Data Input	Clock Input	Shift Register Contents	Serial Data Output	Strobe Input	Latch Contents	Blanking	Output Contents
		I_1 I_2 I_3 ... I_{N-1} I_N			I_1 I_2 I_3 ... I_{N-1} I_N		I_1 I_2 I_3 ... I_{N-1} I_N
H	⌐	H R_1 R_2 ... R_{N-2} R_{N-1}	R_{N-1}				
L	⌐	L R_1 R_2 ... R_{N-2} R_{N-1}	R_{N-1}				
X	⌐	R_1 R_2 R_3 ... R_{N-1} R_N	R_N				
		X X X ... X X	X	L	R_1 R_2 R_3 ... R_{N-1} R_N		
		P_1 P_2 P_3 ... P_{N-1} P_N	P_N	H	P_1 P_2 P_3 ... P_{N-1} P_N	L	P_1 P_2 P_3 ... P_{N-1} P_N
					X X X ... X X	H	L L L ... L L

L = Low Logic Level H = High Logic Level X = Irrelevant P = Present State R = Previous State

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10-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

ELECTRICAL CHARACTERISTICS at T_A = +25°C (A6810S-) or over operating temperature range (A6810E-), V_{BB} = 60 V unless otherwise noted.

Characteristic	Symbol	Test Conditions	Limits @ V_{DD} = 3.3 V			Limits @ V_{DD} = 5 V			Units
			Mln.	Typ.	Max.	Min.	Typ.	Max.	
Output Leakage Current	I_{CEX}	V_{OUT} = 0 V	—	<-0.1	-15	—	<-0.1	-15	µA
Output Voltage	$V_{OUT(1)}$	I_{OUT} = -25 mA	57.5	58.3	—	57.5	58.3	—	V
	$V_{OUT(0)}$	I_{OUT} = 1 mA	—	1.0	1.5	—	1.0	1.5	V
Output Pull-Down Current	$I_{OUT(0)}$	V_{OUT} = 5 V to V_{BB}	2.5	5.0	—	2.5	5.0	—	mA
Input Voltage	$V_{IN(1)}$		2.2	—	—	3.3	—	—	V
	$V_{IN(0)}$		—	—	1.1	—	—	1.7	V
Input Current	$I_{IN(1)}$	V_{IN} = V_{DD}	—	<0.01	1.0	—	<0.01	1.0	µA
	$I_{IN(0)}$	V_{IN} = 0 V	—	<-0.01	-1.0	—	<-0.01	-1.0	µA
Input Clamp Voltage	V_{IK}	I_{IN} = -200 µA	—	-0.8	-1.5	—	-0.8	-1.5	V
Serial Data Output Voltage	$V_{OUT(1)}$	I_{OUT} = -200 µA	2.8	3.05	—	4.5	4.75	—	V
	$V_{OUT(0)}$	I_{OUT} = 200 µA	—	0.15	0.3	—	0.15	0.3	V
Maximum Clock Frequency	f_c		10*	—	—	10*	—	—	MHz
Logic Supply Current	$I_{DD(1)}$	All Outputs High	—	0.25	0.75	—	0.3	1.0	mA
	$I_{DD(0)}$	All Outputs Low	—	0.25	0.75	—	0.3	1.0	mA
Load Supply Current	$I_{BB(1)}$	All Outputs High, No Load	—	1.5	3.0	—	1.5	3.0	mA
	$I_{BB(0)}$	All Outputs Low	—	0.2	20	—	0.2	20	µA
Blanking-to-Output Delay	$t_{dis(BQ)}$	C_L = 30 pF, 50% to 50%	—	0.7	2.0	—	0.7	2.0	µs
	$t_{en(BQ)}$	C_L = 30 pF, 50% to 50%	—	1.8	3.0	—	1.8	3.0	µs
Strobe-to-Output Delay	$t_{p(STH-QL)}$	R_L = 2.3 kΩ, C_L ≤ 30 pF	—	0.7	2.0	—	0.7	2.0	µs
	$t_{p(STH-QH)}$	R_L = 2.3 kΩ, C_L ≤ 30 pF	—	1.8	3.0	—	1.8	3.0	µs
Output Fall Time	t_f	R_L = 2.3 kΩ, C_L ≤ 30 pF	2.4	—	12	2.4	—	12	µs
Output Rise Time	t_r	R_L = 2.3 kΩ, C_L ≤ 30 pF	2.4	—	12	2.4	—	12	µs
Output Slew Rate	dV/dt	R_L = 2.3 kΩ, C_L ≤ 30 pF	4.0	—	20	4.0	—	20	V/µs
Clock-to-Serial Data Out Delay	$t_{p(CH-SQX)}$	I_{OUT} = ±200 µA	—	50	—	—	50	—	ns

Negative current is defined as coming out of (sourcing) the specified device terminal.

Typical data is is for design information only and is at T_A = +25°C.

*Operation at a clock frequency greater than the specified minimum value is possible but not warranteed.

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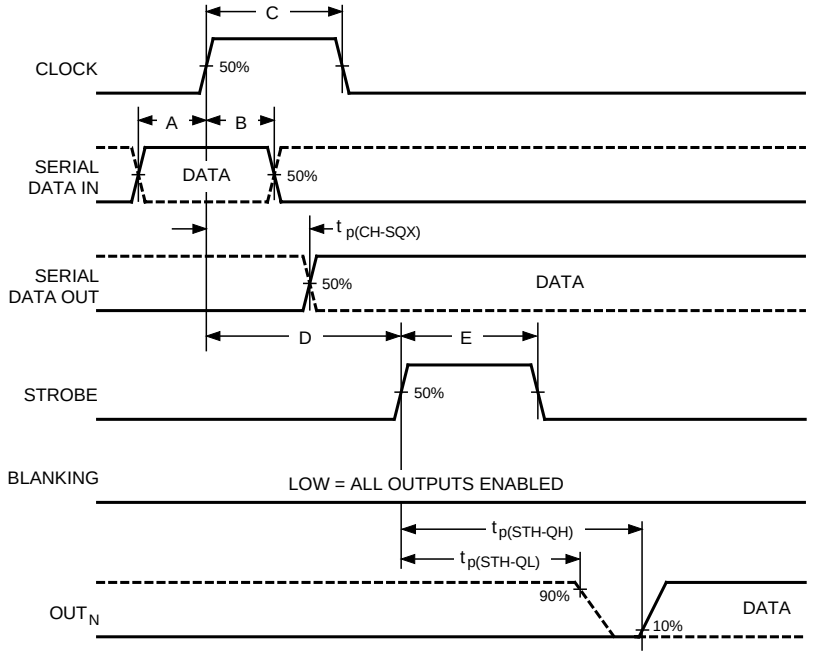
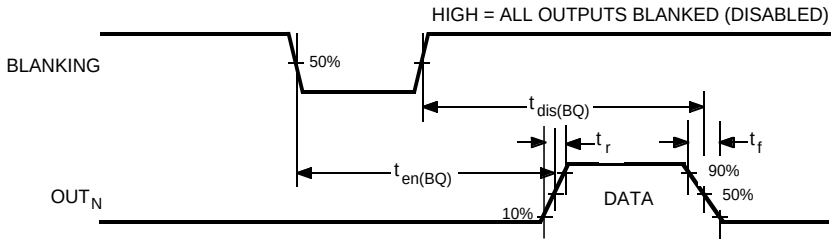
TIMING REQUIREMENTS and SPECIFICATIONS
(Logic Levels are V_{DD} and Ground)



Dwg. WP-029



Dwg. WP-030A

A. Data Active Time Before Clock Pulse (Data Set-Up Time), $t_{su(D)}$ ..... **25 ns**
B. Data Active Time After Clock Pulse (Data Hold Time), $t_{h(D)}$ ..... **25 ns**
C. Clock Pulse Width, $t_{w(CH)}$ ..... **50 ns**
D. Time Between Clock Activation and Strobe, $t_{su(C)}$ ..... **100 ns**
E. Strobe Pulse Width, $t_{w(STH)}$ ..... **50 ns**

NOTE – Timing is representative of a 10 MHz clock. Higher speeds may be attainable; operation at high temperatures will reduce the specified maximum clock frequency.

Serial Data present at the input is transferred to the shift register on the logic "0" to logic "1" transition of the CLOCK input pulse. On succeeding CLOCK pulses, the registers shift data information towards the SERIAL DATA OUTPUT. The SERIAL DATA must appear at the input prior to the rising edge of the CLOCK input waveform.

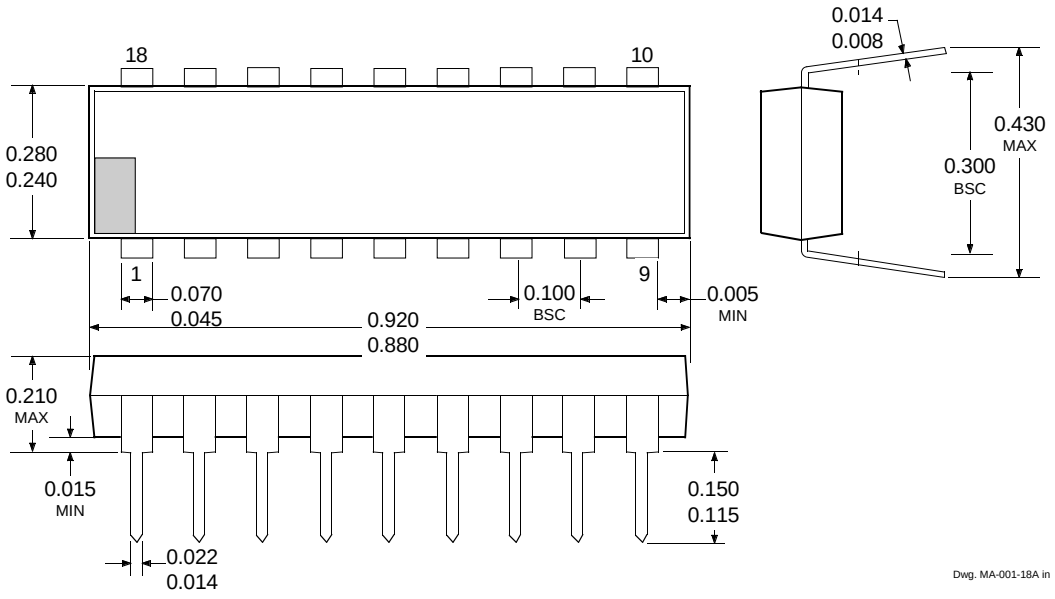
Information present at any register is transferred to the respective latch when the STROBE is high (serial-to-parallel conversion). The latches will continue to accept new data as long as the STROBE is held high. Applications where the latches are bypassed (STROBE tied high) will require that the BLANKING input be high during serial data entry.

When the BLANKING input is high, the output source drivers are disabled (OFF); the pnp active pull-down sink drivers are ON. The information stored in the latches is not affected by the BLANKING input. With the BLANKING input low, the outputs are controlled by the state of their respective latches.

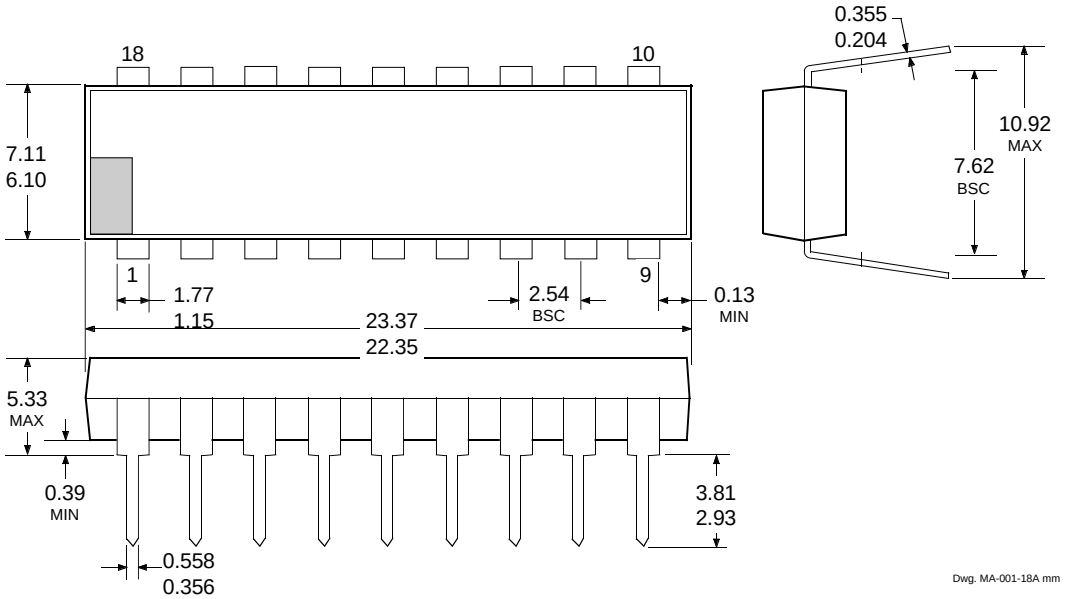
6810
10-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

A6810EA & A6810SA

Dimensions in Inches
(controlling dimensions)



Dimensions in Millimeters
(for reference only)



NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.
2. Lead spacing tolerance is non-cumulative.
3. Lead thickness is measured at seating plane or below.
4. Supplied in standard sticks/tubes of 21 devices.

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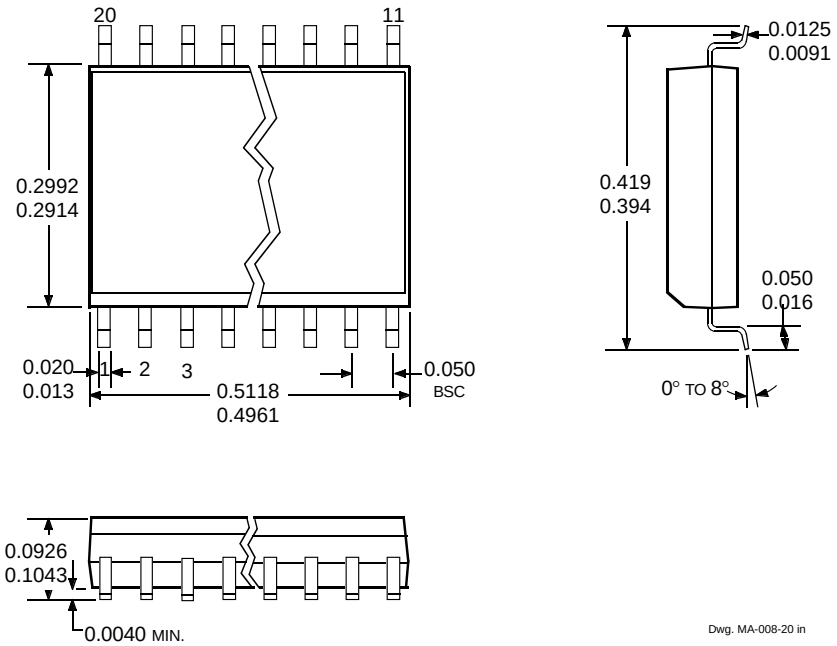
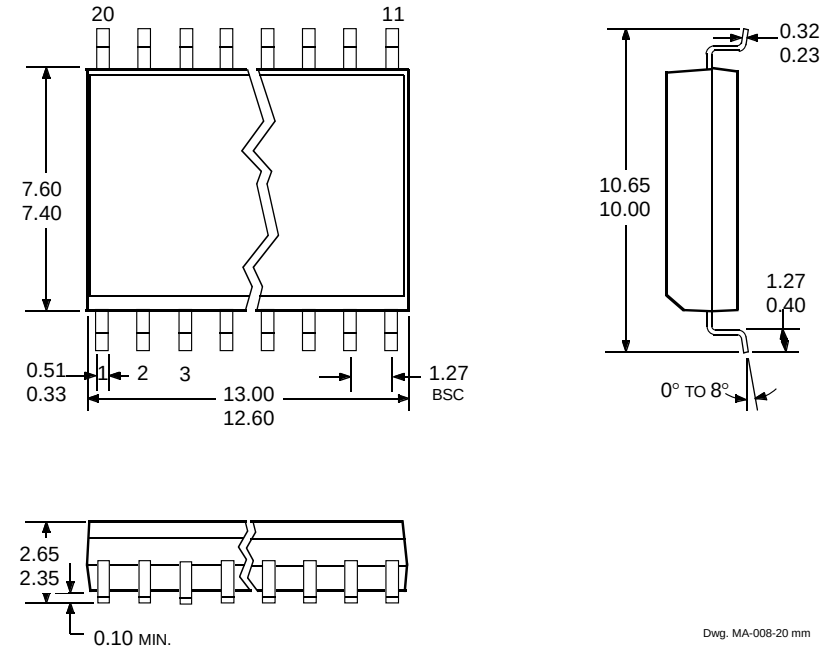
A6810ELW & A6810SLW

Dimensions in Inches
(for reference only)



Dwg. MA-008-20 in

Dimensions in Millimeters
(controlling dimensions)



Dwg. MA-008-20 mm

NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.
2. Lead spacing tolerance is non-cumulative.
3. Supplied in standard sticks/tubes of 37 devices or add "TR" to part number for tape and reel.

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10-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

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