Welcome to E-XFL.COM

Understanding Embedded - FPGAs (Field Programmable Gate Array)

Embedded - FPGAs, or Field Programmable Gate Arrays, are advanced integrated circuits that offer unparalleled flexibility and performance for digital systems. Unlike traditional fixed-function logic devices, FPGAs can be programmed and reprogrammed to execute a wide array of logical operations, enabling customized functionality tailored to specific applications. This reprogrammability allows developers to iterate designs quickly and implement complex functions without the need for custom hardware.

Applications of Embedded - FPGAs

The versatility of Embedded - FPGAs makes them indispensable in numerous fields. In telecommunications.

Details	
Product Status	Obsolete
Number of LABs/CLBs	4300
Number of Logic Elements/Cells	107500
Total RAM Bits	8936448
Number of I/O	744
Number of Gates	-
Voltage - Supply	0.86V ~ 1.15V
Mounting Type	Surface Mount
Operating Temperature	0°C ~ 85°C (TJ)
Package / Case	1152-BBGA, FCBGA
Supplier Device Package	1152-FBGA (35x35)
Purchase URL	https://www.e-xfl.com/product-detail/intel/ep3se110f1152c2n

Table 1–1. Absolute Maximum Ratings for Stratix III Devices *(Note 1)* (Part 2 of 2)

Symbol	Parameter	Minimum	Maximum	Unit
V_{CC_CLKIN}	Differential clock input power supply (top and bottom I/O banks only)	-0.5	3.75	V
V_{CCBAT}	Battery back-up power supply for design security volatile key register	-0.5	3.75	V
V_I	DC Input voltage	-0.5	4.0	V
T_J	Operating junction temperature	-55	125	°C
I_{OUT}	DC output current, per pin	-25	40	mA
T_{STG}	Storage temperature (No bias)	-65	150	°C

Note to Table 1–1:

(1) Supply voltage specifications apply to voltage readings taken at the device pins, not the power supply.

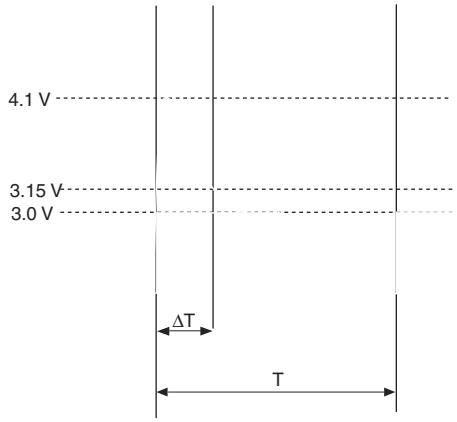
Sinusoidal Maximum Allowed Overshoot/Undershoot Voltage

During transitions, input signals may overshoot to the voltage listed in Table 1–2 and undershoot to –2.0 V for input currents less than 100 mA and periods shorter than 20 ns.

Table 1–2 lists the maximum allowed input overshoot voltage and the duration of the overshoot voltage as a percentage over the lifetime of the device. The maximum allowed overshoot duration is specified as percentage of high-time over the lifetime of the device.

A DC signal is equivalent to 100% duty cycle. For example, a signal that overshoots to 4.2 V can only be at 4.2 V for 15.8% over the lifetime of the device; for a device lifetime of 10 years, this is equivalent to 15.8% of ten years which is 18.96 months. Figure 1–1 shows how to determine the overshoot duration.

Figure 1–1. Overshoot Duration

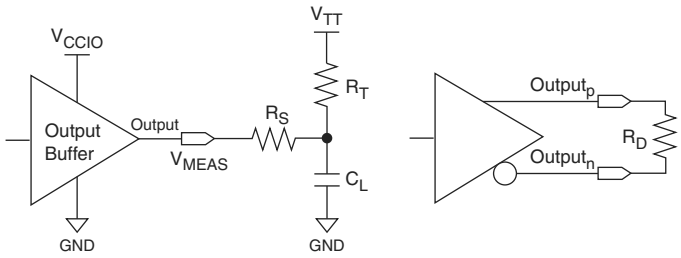


In the example shown in Figure 1–1, the overshoot voltage is shown in red and is present at the Stratix III pin, up to 4.1 V. From Table 1–2, for an overshoot of up to 4.1 V, the percentage of high time for overshoot > 3.15 V can be as high as 46% over an 11.4-year period. The percentage of high time is calculated as (delta T/T) * 100. This 11.4-year period assumes the device is always turned on with 100% I/O toggle rate and 50% duty cycle signal. For lower I/O toggle rates and situations where the device is in an idle state, lifetimes are increased.

5. Compare the results of steps 2 and 4. The increase or decrease in delay must be added to or subtracted from the I/O Standard Output Adder delays to yield the actual worst-case propagation delay (clock-to-output) of the PCB trace.

The Quartus II software reports the timing with the conditions listed in Table 1–37 using Equation 1–1 on page 1–7. Figure 1–6 shows the circuit that is represented by the output timing of the Quartus II software.

Figure 1–6. Output Delay Timing Report Setup for Single-Ended Outputs and Dedicated Differential Outputs *(Note 1)*



Note to Figure 1–6:

(1) Output pin timing is reported at the output pin of the FPGA device. Additional delays for loading and board trace delay must be accounted for with IBIS model simulations.

Figure 1–7 and Figure 1–8 show the circuit that is represented by the output timing of the Quartus II software for differential outputs with single and multiple external resistors, respectively.

Figure 1–7. Output Delay Timing Report Setup for Differential Outputs with Single External Resistor

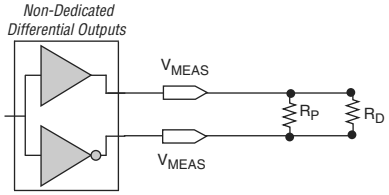


Figure 1–8. Output Delay Timing Report Setup for Differential Outputs with Three External Resistor

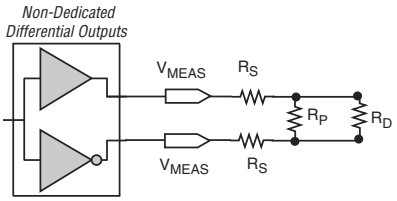


Table 1–41. EP3SL50 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	GCLK	t_{su}	-0.701	-0.700	-1.003	-1.105	-1.310	-1.265	-1.626	-1.105	-1.310	-1.265	-1.626	ns
		t_h	0.827	0.825	1.181	1.306	1.530	1.474	1.829	1.306	1.530	1.474	1.829	ns
	GCLK PLL	t_{su}	-0.986	-0.986	-1.404	-1.534	-1.772	-1.712	-2.025	-1.534	-1.772	-1.712	-2.025	ns
		t_h	1.237	1.237	1.773	1.949	2.231	2.147	2.470	1.949	2.231	2.147	2.470	ns
2.5 V	GCLK	t_{su}	-0.696	-0.695	-1.012	-1.117	-1.329	-1.284	-1.645	-1.117	-1.329	-1.284	-1.645	ns
		t_h	0.822	0.820	1.190	1.318	1.549	1.493	1.848	1.318	1.549	1.493	1.848	ns
	GCLK PLL	t_{su}	-0.981	-0.981	-1.413	-1.546	-1.791	-1.731	-2.044	-1.546	-1.791	-1.731	-2.044	ns
		t_h	1.232	1.232	1.782	1.961	2.250	2.166	2.489	1.961	2.250	2.166	2.489	ns
1.8 V	GCLK	t_{su}	-0.716	-0.715	-1.052	-1.153	-1.327	-1.282	-1.643	-1.153	-1.327	-1.282	-1.643	ns
		t_h	0.844	0.842	1.230	1.354	1.547	1.491	1.846	1.354	1.547	1.491	1.846	ns
	GCLK PLL	t_{su}	-1.003	-1.003	-1.453	-1.582	-1.789	-1.729	-2.042	-1.582	-1.789	-1.729	-2.042	ns
		t_h	1.256	1.256	1.822	1.997	2.248	2.164	2.487	1.997	2.248	2.164	2.487	ns
1.5 V	GCLK	t_{su}	-0.706	-0.705	-1.029	-1.121	-1.257	-1.212	-1.573	-1.121	-1.257	-1.212	-1.573	ns
		t_h	0.834	0.832	1.207	1.322	1.477	1.421	1.776	1.322	1.477	1.421	1.776	ns
	GCLK PLL	t_{su}	-0.993	-0.993	-1.430	-1.550	-1.719	-1.659	-1.972	-1.550	-1.719	-1.659	-1.972	ns
		t_h	1.246	1.246	1.799	1.965	2.178	2.094	2.417	1.965	2.178	2.094	2.417	ns
1.2 V	GCLK	t_{su}	-0.654	-0.653	-0.952	-1.022	-1.101	-1.056	-1.417	-1.022	-1.101	-1.056	-1.417	ns
		t_h	0.782	0.780	1.130	1.223	1.321	1.265	1.620	1.223	1.321	1.265	1.620	ns
	GCLK PLL	t_{su}	-0.941	-0.941	-1.353	-1.451	-1.563	-1.503	-1.816	-1.451	-1.563	-1.503	-1.816	ns
		t_h	1.194	1.194	1.722	1.866	2.022	1.938	2.261	1.866	2.022	1.938	2.261	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.625	-0.624	-0.924	-1.006	-1.103	-1.058	-1.419	-1.006	-1.103	-1.058	-1.419	ns
		t_h	0.753	0.751	1.102	1.207	1.323	1.267	1.622	1.207	1.323	1.267	1.622	ns
	GCLK PLL	t_{su}	-0.912	-0.912	-1.325	-1.435	-1.565	-1.505	-1.818	-1.435	-1.565	-1.505	-1.818	ns
		t_h	1.165	1.165	1.694	1.850	2.024	1.940	2.263	1.850	2.024	1.940	2.263	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.625	-0.624	-0.924	-1.006	-1.103	-1.058	-1.419	-1.006	-1.103	-1.058	-1.419	ns
		t_h	0.753	0.751	1.102	1.207	1.323	1.267	1.622	1.207	1.323	1.267	1.622	ns
	GCLK PLL	t_{su}	-0.912	-0.912	-1.325	-1.435	-1.565	-1.505	-1.818	-1.435	-1.565	-1.505	-1.818	ns
		t_h	1.165	1.165	1.694	1.850	2.024	1.940	2.263	1.850	2.024	1.940	2.263	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.619	-0.618	-0.912	-1.001	-1.103	-1.056	-1.417	-1.001	-1.103	-1.056	-1.417	ns
		t_h	0.747	0.745	1.089	1.199	1.320	1.264	1.615	1.199	1.320	1.264	1.615	ns
	GCLK PLL	t_{su}	-0.906	-0.906	-1.312	-1.427	-1.562	-1.500	-1.816	-1.427	-1.562	-1.500	-1.816	ns
		t_h	1.159	1.159	1.681	1.839	2.018	1.934	2.256	1.839	2.018	1.934	2.256	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.619	-0.618	-0.912	-1.001	-1.103	-1.056	-1.417	-1.001	-1.103	-1.056	-1.417	ns
		t_h	0.747	0.745	1.089	1.199	1.320	1.264	1.615	1.199	1.320	1.264	1.615	ns
	GCLK PLL	t_{su}	-0.906	-0.906	-1.312	-1.427	-1.562	-1.500	-1.816	-1.427	-1.562	-1.500	-1.816	ns
		t_h	1.159	1.159	1.681	1.839	2.018	1.934	2.256	1.839	2.018	1.934	2.256	ns

Table 1–45. EP3SL50 Column Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.724	-0.746	-1.103	-1.209	-1.329	-1.274	-1.558	-1.209	-1.324	-1.273	-1.591	ns
		t_h	0.841	0.878	1.290	1.419	1.560	1.492	1.779	1.427	1.565	1.501	1.811	ns
	GCLK PLL	t_{su}	1.116	1.130	1.790	2.026	2.244	2.129	2.138	2.037	2.260	2.142	2.190	ns
		t_h	-0.865	-0.864	-1.391	-1.576	-1.743	-1.658	-1.657	-1.579	-1.749	-1.662	-1.708	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.724	-0.746	-1.103	-1.209	-1.329	-1.274	-1.558	-1.209	-1.324	-1.273	-1.591	ns
		t_h	0.841	0.878	1.290	1.419	1.560	1.492	1.779	1.427	1.565	1.501	1.811	ns
	GCLK PLL	t_{su}	1.116	1.130	1.790	2.026	2.244	2.129	2.138	2.037	2.260	2.142	2.190	ns
		t_h	-0.865	-0.864	-1.391	-1.576	-1.743	-1.658	-1.657	-1.579	-1.749	-1.662	-1.708	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns

Table 1–47 lists the EP3SL50 column pins output timing parameters for differential I/O standards.

Table 1–47. EP3SL50 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
LVDS_E_3R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.056	3.279	4.646	5.054	5.571	5.431	5.649	5.181	5.698	5.560	5.717	ns
		GCLK PLL	t_{co}	3.046	3.269	4.636	5.043	5.561	5.421	5.639	5.170	5.688	5.550	5.707	ns
RSDS_E_1R	—	GCLK	t_{co}	3.046	3.269	4.639	5.047	5.565	5.425	5.643	5.175	5.693	5.555	5.712	ns
		GCLK PLL	t_{co}	3.039	3.263	4.632	5.041	5.559	5.419	5.637	5.168	5.687	5.549	5.706	ns
RSDS_E_3R	—	GCLK	t_{co}	3.038	3.261	4.629	5.038	5.556	5.416	5.634	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.060	3.283	4.650	5.058	5.575	5.435	5.653	5.185	5.703	5.565	5.722	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.050	3.272	4.629	5.035	5.550	5.410	5.628	5.161	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.045	3.268	4.629	5.035	5.551	5.411	5.629	5.162	5.678	5.540	5.697	ns
	6mA	GCLK	t_{co}	3.043	3.266	4.628	5.034	5.549	5.409	5.627	5.161	5.677	5.539	5.696	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
	8mA	GCLK	t_{co}	3.036	3.259	4.624	5.031	5.548	5.408	5.626	5.159	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.035	3.256	4.607	5.012	5.526	5.386	5.604	5.138	5.652	5.514	5.671	ns
	10mA	GCLK	t_{co}	3.047	3.269	4.625	5.030	5.544	5.404	5.622	5.157	5.671	5.533	5.690	ns
		GCLK PLL	t_{co}	3.043	3.266	4.626	5.032	5.548	5.408	5.626	5.159	5.675	5.537	5.694	ns
	12mA	GCLK	t_{co}	3.033	3.255	4.615	5.021	5.536	5.396	5.614	5.148	5.663	5.525	5.682	ns
		GCLK PLL	t_{co}	3.031	3.253	4.613	5.018	5.534	5.394	5.612	5.146	5.661	5.523	5.680	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.031	3.254	4.616	5.023	5.539	5.399	5.617	5.150	5.667	5.529	5.686	ns
		GCLK PLL	t_{co}	3.035	3.257	4.613	5.018	5.533	5.393	5.611	5.145	5.660	5.522	5.679	ns

Table 1–56 lists the EP3SL70 row pins input timing parameters for differential I/O standards.

Table 1–56. EP3SL70 Row Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
MINI-LVDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
RSDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.734	-0.764	-1.085	-1.186	-1.286	-1.234	-1.505	-1.193	-1.291	-1.242	-1.543	ns
		t_h	0.850	0.893	1.274	1.394	1.516	1.451	1.720	1.410	1.531	1.470	1.758	ns
	GCLK PLL	t_{su}	1.077	1.081	1.776	2.019	2.257	2.138	2.163	2.024	2.263	2.144	2.209	ns
		t_h	-0.827	-0.819	-1.375	-1.570	-1.756	-1.667	-1.687	-1.565	-1.751	-1.663	-1.730	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.734	-0.764	-1.085	-1.186	-1.286	-1.234	-1.505	-1.193	-1.291	-1.242	-1.543	ns
		t_h	0.850	0.893	1.274	1.394	1.516	1.451	1.720	1.410	1.531	1.470	1.758	ns
	GCLK PLL	t_{su}	1.077	1.081	1.776	2.019	2.257	2.138	2.163	2.024	2.263	2.144	2.209	ns
		t_h	-0.827	-0.819	-1.375	-1.570	-1.756	-1.667	-1.687	-1.565	-1.751	-1.663	-1.730	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns

Table 1–57. EP3SL70 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.056	3.279	4.646	5.054	5.571	5.431	5.649	5.181	5.698	5.560	5.717	ns
		GCLK PLL	t_{co}	3.046	3.269	4.636	5.043	5.561	5.421	5.639	5.170	5.688	5.550	5.707	ns
	6mA	GCLK	t_{co}	3.046	3.269	4.639	5.047	5.565	5.425	5.643	5.175	5.693	5.555	5.712	ns
		GCLK PLL	t_{co}	3.039	3.263	4.632	5.041	5.559	5.419	5.637	5.168	5.687	5.549	5.706	ns
	8mA	GCLK	t_{co}	3.038	3.261	4.629	5.038	5.556	5.416	5.634	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.060	3.283	4.650	5.058	5.575	5.435	5.653	5.185	5.703	5.565	5.722	ns
	10mA	GCLK	t_{co}	3.050	3.272	4.629	5.035	5.550	5.410	5.628	5.161	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.045	3.268	4.629	5.035	5.551	5.411	5.629	5.162	5.678	5.540	5.697	ns
	12mA	GCLK	t_{co}	3.043	3.266	4.628	5.034	5.549	5.409	5.627	5.161	5.677	5.539	5.696	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.036	3.259	4.624	5.031	5.548	5.408	5.626	5.159	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.035	3.256	4.607	5.012	5.526	5.386	5.604	5.138	5.652	5.514	5.671	ns
	16mA	GCLK	t_{co}	3.047	3.269	4.625	5.030	5.544	5.404	5.622	5.157	5.671	5.533	5.690	ns
		GCLK PLL	t_{co}	3.043	3.266	4.626	5.032	5.548	5.408	5.626	5.159	5.675	5.537	5.694	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.033	3.255	4.615	5.021	5.536	5.396	5.614	5.148	5.663	5.525	5.682	ns
		GCLK PLL	t_{co}	3.031	3.253	4.613	5.018	5.534	5.394	5.612	5.146	5.661	5.523	5.680	ns
	6mA	GCLK	t_{co}	3.031	3.254	4.616	5.023	5.539	5.399	5.617	5.150	5.667	5.529	5.686	ns
		GCLK PLL	t_{co}	3.035	3.257	4.613	5.018	5.533	5.393	5.611	5.145	5.660	5.522	5.679	ns
	8mA	GCLK	t_{co}	3.061	3.286	4.658	5.066	5.583	5.443	5.661	5.193	5.710	5.572	5.729	ns
		GCLK PLL	t_{co}	3.047	3.272	4.646	5.055	5.573	5.433	5.651	5.183	5.701	5.563	5.720	ns
	10mA	GCLK	t_{co}	3.035	3.259	4.629	5.037	5.555	5.415	5.633	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.035	3.259	4.632	5.041	5.559	5.419	5.637	5.169	5.688	5.550	5.707	ns
	12mA	GCLK	t_{co}	3.031	3.255	4.625	5.033	5.552	5.412	5.630	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.036	3.259	4.626	5.034	5.551	5.411	5.629	5.161	5.679	5.541	5.698	ns
		GCLK PLL	t_{co}	3.064	3.289	4.657	5.064	5.581	5.441	5.659	5.192	5.708	5.570	5.727	ns
	16mA	GCLK	t_{co}	3.053	3.277	4.645	5.052	5.569	5.429	5.647	5.180	5.696	5.558	5.715	ns
		GCLK PLL	t_{co}	3.048	3.273	4.645	5.053	5.570	5.430	5.648	5.181	5.698	5.560	5.717	ns

Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
2.5 V	4mA	GCLK	t_{co}	3.439	3.439	4.846	5.240	5.749	5.619	5.912	5.240	5.749	5.619	5.912	ns
		GCLK PLL	t_{co}	3.829	3.829	5.422	5.873	6.438	6.281	6.661	5.873	6.438	6.281	6.661	ns
	8mA	GCLK	t_{co}	3.339	3.339	4.727	5.114	5.617	5.487	5.779	5.114	5.617	5.487	5.779	ns
		GCLK PLL	t_{co}	3.729	3.729	5.303	5.747	6.306	6.149	6.529	5.747	6.306	6.149	6.529	ns
	12mA	GCLK	t_{co}	3.295	3.295	4.640	5.024	5.522	5.391	5.685	5.024	5.522	5.391	5.685	ns
		GCLK PLL	t_{co}	3.685	3.685	5.216	5.656	6.210	6.052	6.434	5.656	6.210	6.052	6.434	ns
	16mA	GCLK	t_{co}	3.257	3.257	4.601	4.981	5.479	5.348	5.642	4.981	5.479	5.348	5.642	ns
		GCLK PLL	t_{co}	3.647	3.647	5.177	5.614	6.167	6.009	6.391	5.614	6.167	6.009	6.391	ns
1.8 V	2mA	GCLK	t_{co}	3.630	3.630	5.168	5.600	6.154	6.023	6.317	5.600	6.154	6.023	6.317	ns
		GCLK PLL	t_{co}	4.020	4.020	5.743	6.233	6.842	6.684	7.066	6.233	6.842	6.684	7.066	ns
	4mA	GCLK	t_{co}	3.449	3.449	4.889	5.291	5.806	5.676	5.968	5.291	5.806	5.676	5.968	ns
		GCLK PLL	t_{co}	3.839	3.839	5.464	5.924	6.495	6.338	6.718	5.924	6.495	6.338	6.718	ns
	6mA	GCLK	t_{co}	3.367	3.367	4.782	5.176	5.696	5.565	5.859	5.176	5.696	5.565	5.859	ns
		GCLK PLL	t_{co}	3.757	3.757	5.357	5.809	6.384	6.226	6.608	5.809	6.384	6.226	6.608	ns
	8mA	GCLK	t_{co}	3.347	3.347	4.723	5.123	5.630	5.499	5.793	5.123	5.630	5.499	5.793	ns
		GCLK PLL	t_{co}	3.737	3.737	5.299	5.755	6.318	6.160	6.542	5.755	6.318	6.160	6.542	ns
	10mA	GCLK	t_{co}	3.284	3.284	4.662	5.048	5.549	5.418	5.712	5.048	5.549	5.418	5.712	ns
		GCLK PLL	t_{co}	3.674	3.674	5.238	5.680	6.237	6.079	6.461	5.680	6.237	6.079	6.461	ns
	12mA	GCLK	t_{co}	3.266	3.266	4.642	5.026	5.526	5.395	5.689	5.026	5.526	5.395	5.689	ns
		GCLK PLL	t_{co}	3.656	3.656	5.217	5.659	6.214	6.056	6.438	5.659	6.214	6.056	6.438	ns

Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.250	3.267	4.605	4.969	5.470	5.318	5.653	4.969	5.470	5.318	5.653	ns
		GCLK PLL	t_{co}	3.673	3.669	5.192	5.634	6.186	6.006	6.388	5.634	6.186	6.006	6.388	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.269	3.286	4.641	5.010	5.516	5.364	5.699	5.010	5.516	5.364	5.699	ns
		GCLK PLL	t_{co}	3.692	3.688	5.228	5.675	6.232	6.052	6.434	5.675	6.232	6.052	6.434	ns
	6mA	GCLK	t_{co}	3.261	3.278	4.632	5.001	5.507	5.355	5.690	5.001	5.507	5.355	5.690	ns
		GCLK PLL	t_{co}	3.684	3.680	5.219	5.666	6.223	6.043	6.425	5.666	6.223	6.043	6.425	ns
	8mA	GCLK	t_{co}	3.262	3.279	4.640	5.010	5.516	5.364	5.699	5.010	5.516	5.364	5.699	ns
		GCLK PLL	t_{co}	3.685	3.681	5.227	5.675	6.232	6.052	6.434	5.675	6.232	6.052	6.434	ns
	10mA	GCLK	t_{co}	3.251	3.268	4.627	4.996	5.502	5.350	5.685	4.996	5.502	5.350	5.685	ns
		GCLK PLL	t_{co}	3.674	3.670	5.214	5.661	6.218	6.038	6.420	5.661	6.218	6.038	6.420	ns
	12mA	GCLK	t_{co}	3.251	3.268	4.627	4.996	5.503	5.351	5.686	4.996	5.503	5.351	5.686	ns
		GCLK PLL	t_{co}	3.674	3.670	5.214	5.661	6.219	6.039	6.421	5.661	6.219	6.039	6.421	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.272	3.289	4.643	5.011	5.516	5.364	5.699	5.011	5.516	5.364	5.699	ns
		GCLK PLL	t_{co}	3.695	3.691	5.230	5.676	6.233	6.052	6.434	5.676	6.233	6.052	6.434	ns
3.0-V PCI	—	GCLK	t_{co}	3.375	3.392	4.688	5.045	5.541	5.389	5.724	5.045	5.541	5.389	5.724	ns
		GCLK PLL	t_{co}	3.798	3.794	5.275	5.710	6.264	6.077	6.459	5.710	6.264	6.077	6.459	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.375	3.392	4.688	5.045	5.541	5.389	5.724	5.045	5.541	5.389	5.724	ns
		GCLK PLL	t_{co}	3.798	3.794	5.275	5.710	6.264	6.077	6.459	5.710	6.264	6.077	6.459	ns

Table 1–86. EP3SL200 Row Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-1.169	-1.249	-1.881	-1.908	-2.071	-1.995	-2.440	-1.928	-2.086	-1.995	-2.440	ns
		t_h	1.306	1.402	2.121	2.156	2.341	2.250	2.701	2.186	2.369	2.250	2.701	ns
	GCLK PLL	t_{su}	1.032	1.038	1.829	1.945	2.171	2.052	2.073	1.954	2.182	2.052	2.073	ns
		t_h	-0.751	-0.739	-1.348	-1.445	-1.615	-1.528	-1.532	-1.440	-1.612	-1.528	-1.532	ns
	GCLK	t_{su}	-1.169	-1.249	-1.881	-1.908	-2.071	-1.995	-2.440	-1.928	-2.086	-1.995	-2.440	ns
		t_h	1.306	1.402	2.121	2.156	2.341	2.250	2.701	2.186	2.369	2.250	2.701	ns
	GCLK PLL	t_{su}	1.032	1.038	1.829	1.945	2.171	2.052	2.073	1.954	2.182	2.052	2.073	ns
		t_h	-0.751	-0.739	-1.348	-1.445	-1.615	-1.528	-1.532	-1.440	-1.612	-1.528	-1.532	ns

Table 1–87. EP3SL200 Column Pins output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.511	3.790	5.589	5.802	6.366	6.202	6.609	5.946	6.509	6.202	6.609	ns
		GCLK PLL	t_{co}	3.497	3.776	5.577	5.791	6.356	6.192	6.599	5.936	6.500	6.192	6.599	ns
	6mA	GCLK	t_{co}	3.485	3.763	5.560	5.773	6.338	6.174	6.581	5.918	6.482	6.174	6.581	ns
		GCLK PLL	t_{co}	3.485	3.763	5.563	5.777	6.342	6.178	6.585	5.922	6.487	6.178	6.585	ns
	8mA	GCLK	t_{co}	3.481	3.759	5.556	5.769	6.335	6.171	6.578	5.915	6.479	6.171	6.578	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
	10mA	GCLK	t_{co}	3.486	3.763	5.557	5.770	6.334	6.170	6.577	5.914	6.478	6.170	6.577	ns
		GCLK PLL	t_{co}	3.514	3.793	5.588	5.800	6.364	6.200	6.607	5.945	6.507	6.200	6.607	ns
	12mA	GCLK	t_{co}	3.503	3.781	5.576	5.788	6.352	6.188	6.595	5.933	6.495	6.188	6.595	ns
		GCLK PLL	t_{co}	3.498	3.777	5.576	5.789	6.353	6.189	6.596	5.934	6.497	6.189	6.596	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.484	3.762	5.558	5.770	6.334	6.170	6.577	5.915	6.479	6.170	6.577	ns
		GCLK PLL	t_{co}	3.482	3.760	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.486	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
		GCLK PLL	t_{co}	3.486	3.763	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
	6mA	GCLK	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
		GCLK PLL	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
	8mA	GCLK	t_{co}	3.492	3.770	5.562	5.773	6.336	6.172	6.579	5.918	6.480	6.172	6.579	ns
		GCLK PLL	t_{co}	3.485	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
	10mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
	12mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns

Table 1–88. EP3SL200 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.546	3.829	5.658	5.872	6.445	6.278	6.657	6.024	6.599	6.278	6.657	ns
		GCLK PLL	t_{co}	3.557	3.839	5.659	5.873	6.444	6.277	6.656	6.023	6.597	6.277	6.656	ns
	6mA	GCLK	t_{co}	3.547	3.830	5.657	5.871	6.443	6.276	6.655	6.023	6.597	6.276	6.655	ns
		GCLK PLL	t_{co}	3.533	3.816	5.642	5.856	6.429	6.262	6.641	6.008	6.582	6.262	6.641	ns
	8mA	GCLK	t_{co}	3.530	3.812	5.638	5.852	6.425	6.258	6.637	6.004	6.578	6.258	6.637	ns
		GCLK PLL	t_{co}	3.527	3.810	5.639	5.855	6.428	6.261	6.640	6.007	6.582	6.261	6.640	ns
	10mA	GCLK	t_{co}	3.528	3.810	5.629	5.843	6.415	6.248	6.627	5.994	6.568	6.248	6.627	ns
		GCLK PLL	t_{co}	3.577	3.863	5.700	5.916	6.491	6.324	6.703	6.068	6.644	6.324	6.703	ns
	12mA	GCLK	t_{co}	3.553	3.839	5.682	5.899	6.474	6.307	6.686	6.051	6.629	6.307	6.686	ns
		GCLK PLL	t_{co}	3.535	3.820	5.660	5.877	6.452	6.285	6.664	6.029	6.607	6.285	6.664	ns
	8mA	GCLK	t_{co}	3.581	3.866	5.700	5.916	6.490	6.323	6.702	6.068	6.644	6.323	6.702	ns
		GCLK PLL	t_{co}	3.566	3.851	5.686	5.901	6.475	6.308	6.687	6.053	6.629	6.308	6.687	ns
	16mA	GCLK	t_{co}	3.555	3.840	5.681	5.898	6.472	6.305	6.684	6.050	6.627	6.305	6.684	ns
		GCLK PLL	t_{co}	3.535	3.820	5.658	5.874	6.449	6.282	6.661	6.027	6.603	6.282	6.661	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.532	3.816	5.654	5.871	6.445	6.278	6.657	6.023	6.600	6.278	6.657	ns
		GCLK PLL	t_{co}	3.537	3.820	5.645	5.859	6.431	6.264	6.643	6.010	6.584	6.264	6.643	ns
	12mA	GCLK	t_{co}	3.530	3.813	5.644	5.860	6.434	6.267	6.646	6.013	6.589	6.267	6.646	ns
		GCLK PLL	t_{co}	3.568	3.852	5.682	5.897	6.470	6.303	6.682	6.049	6.624	6.303	6.682	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.550	3.835	5.667	5.882	6.455	6.288	6.667	6.034	6.609	6.288	6.667	ns
		GCLK PLL	t_{co}	3.536	3.819	5.644	5.858	6.430	6.263	6.642	6.010	6.584	6.263	6.642	ns

Table 1–92. EP3SL340 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS I	GCLK	t_{su}	-1.141	-1.232	-1.824	-1.825	-1.954	-1.887	-2.333	-1.833	-1.964	-1.908	-2.377	ns
		t_h	1.267	1.371	2.038	2.044	2.195	2.117	2.564	2.062	2.214	2.147	2.611	ns
	GCLK PLL	t_{su}	0.937	1.021	1.778	1.804	2.104	1.990	1.814	1.790	2.127	2.005	1.863	ns
		t_h	-0.672	-0.735	-1.323	-1.336	-1.580	-1.496	-1.313	-1.312	-1.591	-1.499	-1.355	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-1.141	-1.232	-1.824	-1.825	-1.954	-1.887	-2.333	-1.833	-1.964	-1.908	-2.377	ns
		t_h	1.267	1.371	2.038	2.044	2.195	2.117	2.564	2.062	2.214	2.147	2.611	ns
	GCLK PLL	t_{su}	0.937	1.021	1.778	1.804	2.104	1.990	1.814	1.790	2.127	2.005	1.863	ns
		t_h	-0.672	-0.735	-1.323	-1.336	-1.580	-1.496	-1.313	-1.312	-1.591	-1.499	-1.355	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-1.132	-1.220	-1.815	-1.815	-1.938	-1.871	-2.317	-1.824	-1.948	-1.892	-2.361	ns
		t_h	1.258	1.359	2.029	2.034	2.179	2.101	2.548	2.053	2.198	2.131	2.595	ns
	GCLK PLL	t_{su}	0.946	1.033	1.787	1.814	2.120	2.006	1.830	1.799	2.143	2.021	1.879	ns
		t_h	-0.681	-0.747	-1.332	-1.346	-1.596	-1.512	-1.329	-1.321	-1.607	-1.515	-1.371	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-1.132	-1.220	-1.815	-1.815	-1.938	-1.871	-2.317	-1.824	-1.948	-1.892	-2.361	ns
		t_h	1.258	1.359	2.029	2.034	2.179	2.101	2.548	2.053	2.198	2.131	2.595	ns
	GCLK PLL	t_{su}	0.946	1.033	1.787	1.814	2.120	2.006	1.830	1.799	2.143	2.021	1.879	ns
		t_h	-0.681	-0.747	-1.332	-1.346	-1.596	-1.512	-1.329	-1.321	-1.607	-1.515	-1.371	ns
3.0-V PCI	GCLK	t_{su}	-1.245	-1.307	-1.922	-1.957	-2.202	-2.138	-2.590	-1.972	-2.209	-2.147	-2.527	ns
		t_h	1.368	1.446	2.134	2.178	2.445	2.369	2.825	2.204	2.461	2.387	2.768	ns
	GCLK PLL	t_{su}	0.873	0.934	1.673	1.686	1.783	1.677	1.686	1.690	1.802	1.690	1.741	ns
		t_h	-0.609	-0.649	-1.219	-1.216	-1.260	-1.185	-1.175	-1.209	-1.268	-1.188	-1.226	ns
3.0-V PCI-X	GCLK	t_{su}	-1.245	-1.307	-1.922	-1.957	-2.202	-2.138	-2.590	-1.972	-2.209	-2.147	-2.527	ns
		t_h	1.368	1.446	2.134	2.178	2.445	2.369	2.825	2.204	2.461	2.387	2.768	ns
	GCLK PLL	t_{su}	0.873	0.934	1.673	1.686	1.783	1.677	1.686	1.690	1.802	1.690	1.741	ns
		t_h	-0.609	-0.649	-1.219	-1.216	-1.260	-1.185	-1.175	-1.209	-1.268	-1.188	-1.226	ns

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.290	3.290	4.656	5.044	5.499	5.450	5.726	5.044	5.499	5.450	5.726	ns
		GCLK PLL	t_{co}	3.691	3.697	5.245	5.683	6.257	6.071	6.492	5.683	6.257	6.071	6.492	ns
	16mA	GCLK	t_{co}	3.279	3.279	4.649	5.039	5.511	5.455	5.738	5.039	5.511	5.455	5.738	ns
		GCLK PLL	t_{co}	3.694	3.700	5.253	5.692	6.269	6.083	6.504	5.692	6.269	6.083	6.504	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.334	3.334	4.714	5.107	5.541	5.521	5.768	5.107	5.541	5.521	5.768	ns
		GCLK PLL	t_{co}	3.715	3.721	5.280	5.722	6.299	6.113	6.534	5.722	6.299	6.113	6.534	ns
	6mA	GCLK	t_{co}	3.309	3.309	4.693	5.086	5.532	5.495	5.759	5.086	5.532	5.495	5.759	ns
		GCLK PLL	t_{co}	3.701	3.707	5.270	5.712	6.290	6.104	6.525	5.712	6.290	6.104	6.525	ns
	8mA	GCLK	t_{co}	3.289	3.289	4.672	5.065	5.518	5.471	5.745	5.065	5.518	5.471	5.745	ns
		GCLK PLL	t_{co}	3.690	3.696	5.256	5.698	6.276	6.090	6.511	5.698	6.276	6.090	6.511	ns
	10mA	GCLK	t_{co}	3.280	3.280	4.666	5.059	5.522	5.460	5.749	5.059	5.522	5.460	5.749	ns
		GCLK PLL	t_{co}	3.689	3.695	5.259	5.701	6.280	6.094	6.515	5.701	6.280	6.094	6.515	ns
	12mA	GCLK	t_{co}	3.275	3.275	4.659	5.051	5.516	5.450	5.743	5.051	5.516	5.450	5.743	ns
		GCLK PLL	t_{co}	3.686	3.692	5.254	5.696	6.274	6.088	6.509	5.696	6.274	6.088	6.509	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.284	3.284	4.652	5.042	5.499	5.450	5.726	5.042	5.499	5.450	5.726	ns
		GCLK PLL	t_{co}	3.688	3.694	5.243	5.682	6.257	6.071	6.492	5.682	6.257	6.071	6.492	ns
	16mA	GCLK	t_{co}	3.274	3.274	4.646	5.036	5.510	5.456	5.737	5.036	5.510	5.456	5.737	ns
		GCLK PLL	t_{co}	3.691	3.697	5.250	5.691	6.268	6.082	6.503	5.691	6.268	6.082	6.503	ns

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.308	3.308	4.665	5.052	5.497	5.464	5.724	5.052	5.497	5.464	5.724	ns
		GCLK PLL	t_{co}	3.698	3.704	5.245	5.682	6.255	6.069	6.490	5.682	6.255	6.069	6.490	ns
	6mA	GCLK	t_{co}	3.294	3.294	4.652	5.040	5.496	5.461	5.723	5.040	5.496	5.461	5.723	ns
		GCLK PLL	t_{co}	3.691	3.697	5.243	5.680	6.254	6.068	6.489	5.680	6.254	6.068	6.489	ns
	8mA	GCLK	t_{co}	3.278	3.278	4.642	5.029	5.489	5.434	5.716	5.029	5.489	5.434	5.716	ns
		GCLK PLL	t_{co}	3.683	3.689	5.235	5.673	6.247	6.061	6.482	5.673	6.247	6.061	6.482	ns
	10mA	GCLK	t_{co}	3.279	3.279	4.644	5.032	5.493	5.436	5.720	5.032	5.493	5.436	5.720	ns
		GCLK PLL	t_{co}	3.686	3.692	5.238	5.676	6.251	6.065	6.486	5.676	6.251	6.065	6.486	ns
	12mA	GCLK	t_{co}	3.271	3.271	4.640	5.028	5.497	5.436	5.724	5.028	5.497	5.436	5.724	ns
		GCLK PLL	t_{co}	3.683	3.689	5.241	5.680	6.255	6.069	6.490	5.680	6.255	6.069	6.490	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.274	3.274	4.631	5.018	5.493	5.432	5.720	5.018	5.493	5.432	5.720	ns
		GCLK PLL	t_{co}	3.691	3.697	5.240	5.677	6.251	6.065	6.486	5.677	6.251	6.065	6.486	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.314	3.314	4.676	5.065	5.508	5.480	5.735	5.065	5.508	5.480	5.735	ns
		GCLK PLL	t_{co}	3.703	3.709	5.253	5.692	6.266	6.080	6.501	5.692	6.266	6.080	6.501	ns
	6mA	GCLK	t_{co}	3.302	3.302	4.670	5.060	5.511	5.469	5.738	5.060	5.511	5.469	5.738	ns
		GCLK PLL	t_{co}	3.699	3.705	5.254	5.693	6.269	6.083	6.504	5.693	6.269	6.083	6.504	ns
	8mA	GCLK	t_{co}	3.296	3.296	4.664	5.053	5.506	5.463	5.733	5.053	5.506	5.463	5.733	ns
		GCLK PLL	t_{co}	3.695	3.701	5.250	5.689	6.264	6.078	6.499	5.689	6.264	6.078	6.499	ns
	10mA	GCLK	t_{co}	3.284	3.284	4.652	5.042	5.499	5.450	5.726	5.042	5.499	5.450	5.726	ns
		GCLK PLL	t_{co}	3.688	3.694	5.243	5.682	6.257	6.071	6.492	5.682	6.257	6.071	6.492	ns
	12mA	GCLK	t_{co}	3.279	3.279	4.653	5.043	5.509	5.446	5.736	5.043	5.509	5.446	5.736	ns
		GCLK PLL	t_{co}	3.689	3.695	5.250	5.690	6.267	6.081	6.502	5.690	6.267	6.081	6.502	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.275	3.275	4.629	5.015	5.483	5.425	5.710	5.015	5.483	5.425	5.710	ns
		GCLK PLL	t_{co}	3.687	3.693	5.231	5.668	6.241	6.055	6.476	5.668	6.241	6.055	6.476	ns

Table 1–114. EP3SE80 Row Pins Output Timing Parameters (Part 2 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.248	3.497	4.864	5.250	5.761	5.613	5.911	5.374	5.895	5.739	5.994	ns
		GCLK PLL	t_{co}	1.449	1.638	2.047	2.126	2.347	2.338	2.318	2.232	2.434	2.445	2.313	ns
	8mA	GCLK	t_{co}	3.081	3.314	4.613	4.999	5.490	5.358	5.640	5.119	5.617	5.477	5.716	ns
		GCLK PLL	t_{co}	1.251	1.429	1.796	1.866	2.076	2.067	2.109	1.964	2.156	2.167	2.095	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.192	3.439	4.808	5.198	5.713	5.565	5.863	5.325	5.849	5.693	5.948	ns
		GCLK PLL	t_{co}	1.393	1.580	1.991	2.074	2.299	2.290	2.275	2.183	2.388	2.399	2.267	ns
	8mA	GCLK	t_{co}	3.082	3.319	4.655	5.039	5.549	5.401	5.699	5.163	5.685	5.528	5.783	ns
		GCLK PLL	t_{co}	1.268	1.453	1.838	1.915	2.135	2.126	2.130	2.021	2.224	2.234	2.121	ns
	12mA	GCLK	t_{co}	3.045	3.281	4.582	4.957	5.461	5.313	5.611	5.077	5.592	5.435	5.690	ns
		GCLK PLL	t_{co}	1.229	1.402	1.756	1.832	2.047	2.038	2.060	1.935	2.131	2.141	2.048	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.106	3.358	4.702	5.091	5.603	5.455	5.753	5.217	5.738	5.581	5.836	ns
		GCLK PLL	t_{co}	1.307	1.499	1.885	1.967	2.189	2.180	2.166	2.075	2.277	2.287	2.157	ns
	8mA	GCLK	t_{co}	3.032	3.265	4.554	4.928	5.422	5.281	5.572	5.047	5.552	5.401	5.650	ns
		GCLK PLL	t_{co}	1.207	1.380	1.721	1.793	2.008	1.999	2.032	1.895	2.091	2.101	2.019	ns
2.5 V	4mA	GCLK	t_{co}	3.218	3.475	4.940	5.352	5.885	5.737	6.035	5.485	6.028	5.871	6.126	ns
		GCLK PLL	t_{co}	1.419	1.616	2.123	2.228	2.471	2.462	2.420	2.343	2.567	2.577	2.419	ns
	8mA	GCLK	t_{co}	3.124	3.377	4.785	5.189	5.715	5.567	5.865	5.318	5.854	5.697	5.952	ns
		GCLK PLL	t_{co}	1.309	1.518	1.968	2.065	2.301	2.292	2.278	2.176	2.393	2.403	2.274	ns
	12mA	GCLK	t_{co}	3.067	3.321	4.679	5.070	5.589	5.441	5.739	5.195	5.724	5.567	5.822	ns
		GCLK PLL	t_{co}	1.263	1.441	1.857	1.946	2.175	2.166	2.187	2.053	2.263	2.273	2.180	ns
1.8 V	2mA	GCLK	t_{co}	3.451	3.722	5.326	5.781	6.360	6.212	6.510	5.922	6.504	6.356	6.611	ns
		GCLK PLL	t_{co}	1.652	1.862	2.507	2.657	2.761	2.937	2.944	2.780	2.883	3.062	2.957	ns
	4mA	GCLK	t_{co}	3.229	3.520	4.999	5.412	5.955	5.807	6.105	5.557	6.098	5.949	6.204	ns
		GCLK PLL	t_{co}	1.427	1.660	2.180	2.288	2.401	2.532	2.539	2.415	2.522	2.655	2.550	ns
	6mA	GCLK	t_{co}	3.161	3.418	4.846	5.262	5.796	5.648	5.946	5.389	5.925	5.777	6.032	ns
		GCLK PLL	t_{co}	1.362	1.558	2.027	2.138	2.301	2.373	2.380	2.247	2.416	2.483	2.378	ns
	8mA	GCLK	t_{co}	3.136	3.379	4.770	5.176	5.699	5.552	5.849	5.300	5.831	5.683	5.938	ns
		GCLK PLL	t_{co}	1.315	1.497	1.950	2.044	2.235	2.276	2.297	2.152	2.344	2.389	2.290	ns

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.321	3.321	4.681	5.070	5.547	5.412	5.724	5.070	5.547	5.412	5.724	ns
		GCLK PLL	t_{co}	3.701	3.713	5.266	5.693	6.303	6.139	6.541	5.693	6.303	6.139	6.541	ns
	16mA	GCLK	t_{co}	3.324	3.324	4.689	5.079	5.559	5.424	5.736	5.079	5.559	5.424	5.736	ns
		GCLK PLL	t_{co}	3.703	3.716	5.274	5.702	6.315	6.151	6.553	5.702	6.315	6.151	6.553	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.345	3.345	4.716	5.109	5.589	5.454	5.766	5.109	5.589	5.454	5.766	ns
		GCLK PLL	t_{co}	3.723	3.737	5.302	5.731	6.345	6.181	6.583	5.731	6.345	6.181	6.583	ns
	6mA	GCLK	t_{co}	3.331	3.331	4.706	5.099	5.580	5.445	5.757	5.099	5.580	5.445	5.757	ns
		GCLK PLL	t_{co}	3.711	3.723	5.291	5.722	6.336	6.172	6.574	5.722	6.336	6.172	6.574	ns
	8mA	GCLK	t_{co}	3.320	3.320	4.692	5.085	5.566	5.431	5.743	5.085	5.566	5.431	5.743	ns
		GCLK PLL	t_{co}	3.699	3.712	5.278	5.708	6.322	6.158	6.560	5.708	6.322	6.158	6.560	ns
	10mA	GCLK	t_{co}	3.319	3.319	4.695	5.088	5.570	5.435	5.747	5.088	5.570	5.435	5.747	ns
		GCLK PLL	t_{co}	3.698	3.711	5.281	5.711	6.326	6.162	6.564	5.711	6.326	6.162	6.564	ns
	12mA	GCLK	t_{co}	3.316	3.316	4.690	5.083	5.564	5.429	5.741	5.083	5.564	5.429	5.741	ns
		GCLK PLL	t_{co}	3.695	3.708	5.275	5.705	6.320	6.156	6.558	5.705	6.320	6.156	6.558	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.318	3.318	4.679	5.069	5.547	5.412	5.724	5.069	5.547	5.412	5.724	ns
		GCLK PLL	t_{co}	3.697	3.710	5.264	5.692	6.303	6.139	6.541	5.692	6.303	6.139	6.541	ns
	16mA	GCLK	t_{co}	3.321	3.321	4.686	5.078	5.558	5.423	5.735	5.078	5.558	5.423	5.735	ns
		GCLK PLL	t_{co}	3.700	3.713	5.271	5.700	6.314	6.150	6.552	5.700	6.314	6.150	6.552	ns

Table 1–126. EP3SE110 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.781	-0.827	-1.178	-1.275	-1.384	-1.333	-1.673	-1.273	-1.378	-1.329	-1.712	ns
		t_h	0.907	0.969	1.379	1.502	1.631	1.568	1.912	1.509	1.636	1.573	1.952	ns
	GCLK PLL	t_{su}	1.124	1.141	1.827	2.068	2.299	2.178	2.118	2.089	2.323	2.199	2.170	ns
		t_h	-0.861	-0.861	-1.411	-1.601	-1.780	-1.688	-1.617	-1.610	-1.792	-1.699	-1.665	ns

Table 1–127 lists the EP3SE110 column pins output timing parameters for differential I/O standards.

Table 1–127. EP3SE110 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	
LVDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
LVDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns
RSDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
RSDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns

Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.835	3.868	5.701	5.915	6.815	6.353	6.775	5.915	6.815	6.353	6.775	ns
		GCLK PLL	t_{co}	4.278	4.267	6.336	6.599	7.217	7.045	7.864	6.599	7.217	7.045	7.864	ns
	4mA	GCLK	t_{co}	3.654	3.687	5.422	5.606	6.354	6.007	6.427	5.606	6.354	6.007	6.427	ns
		GCLK PLL	t_{co}	4.097	4.086	6.057	6.290	6.870	6.699	7.402	6.290	6.870	6.699	7.402	ns
	6mA	GCLK	t_{co}	3.572	3.605	5.315	5.491	6.180	5.895	6.317	5.491	6.180	5.895	6.317	ns
		GCLK PLL	t_{co}	4.015	4.004	5.950	6.175	6.759	6.587	7.229	6.175	6.759	6.587	7.229	ns
	8mA	GCLK	t_{co}	3.552	3.585	5.257	5.437	6.068	5.829	6.251	5.437	6.068	5.829	6.251	ns
		GCLK PLL	t_{co}	3.995	3.984	5.892	6.121	6.693	6.521	7.117	6.121	6.693	6.521	7.117	ns
	10mA	GCLK	t_{co}	3.489	3.522	5.196	5.362	5.954	5.748	6.170	5.362	5.954	5.748	6.170	ns
		GCLK PLL	t_{co}	3.932	3.921	5.831	6.046	6.612	6.440	7.003	6.046	6.612	6.440	7.003	ns
	12mA	GCLK	t_{co}	3.471	3.504	5.175	5.341	5.916	5.725	6.147	5.341	5.916	5.725	6.147	ns
		GCLK PLL	t_{co}	3.914	3.903	5.810	6.025	6.589	6.417	6.965	6.025	6.589	6.417	6.965	ns
1.5 V	2mA	GCLK	t_{co}	3.781	3.814	5.630	5.847	6.732	6.291	6.713	5.847	6.732	6.291	6.713	ns
		GCLK PLL	t_{co}	4.224	4.213	6.265	6.531	7.155	6.983	7.781	6.531	7.155	6.983	7.781	ns
	4mA	GCLK	t_{co}	3.569	3.602	5.311	5.491	6.176	5.899	6.321	5.491	6.176	5.899	6.321	ns
		GCLK PLL	t_{co}	4.012	4.001	5.946	6.175	6.763	6.591	7.225	6.175	6.763	6.591	7.225	ns
	6mA	GCLK	t_{co}	3.544	3.577	5.244	5.431	6.059	5.832	6.254	5.431	6.059	5.832	6.254	ns
		GCLK PLL	t_{co}	3.987	3.976	5.879	6.115	6.696	6.524	7.108	6.115	6.696	6.524	7.108	ns
	8mA	GCLK	t_{co}	3.533	3.566	5.227	5.406	6.027	5.812	6.234	5.406	6.027	5.812	6.234	ns
		GCLK PLL	t_{co}	3.976	3.965	5.862	6.090	6.676	6.504	7.076	6.090	6.676	6.504	7.076	ns
	10mA	GCLK	t_{co}	3.478	3.511	5.189	5.355	5.945	5.742	6.164	5.355	5.945	5.742	6.164	ns
		GCLK PLL	t_{co}	3.921	3.910	5.824	6.039	6.606	6.434	6.994	6.039	6.606	6.434	6.994	ns
	12mA	GCLK	t_{co}	3.473	3.506	5.172	5.344	5.903	5.731	6.153	5.344	5.903	5.731	6.153	ns
		GCLK PLL	t_{co}	3.916	3.905	5.807	6.028	6.595	6.423	6.952	6.028	6.595	6.423	6.952	ns

Table 1–138. EP3SE260 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.581	3.866	5.700	5.916	6.490	6.323	6.702	6.068	6.644	6.323	6.702	ns
		GCLK PLL	t_{co}	3.566	3.851	5.686	5.901	6.475	6.308	6.687	6.053	6.629	6.308	6.687	ns
	6mA	GCLK	t_{co}	3.555	3.840	5.681	5.898	6.472	6.305	6.684	6.050	6.627	6.305	6.684	ns
		GCLK PLL	t_{co}	3.535	3.820	5.658	5.874	6.449	6.282	6.661	6.027	6.603	6.282	6.661	ns
	8mA	GCLK	t_{co}	3.532	3.816	5.654	5.871	6.445	6.278	6.657	6.023	6.600	6.278	6.657	ns
		GCLK PLL	t_{co}	3.537	3.820	5.645	5.859	6.431	6.264	6.643	6.010	6.584	6.264	6.643	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.530	3.813	5.644	5.860	6.434	6.267	6.646	6.013	6.589	6.267	6.646	ns
		GCLK PLL	t_{co}	3.568	3.852	5.682	5.897	6.470	6.303	6.682	6.049	6.624	6.303	6.682	ns
	6mA	GCLK	t_{co}	3.550	3.835	5.667	5.882	6.455	6.288	6.667	6.034	6.609	6.288	6.667	ns
		GCLK PLL	t_{co}	3.536	3.819	5.644	5.858	6.430	6.263	6.642	6.010	6.584	6.263	6.642	ns
	8mA	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
	10mA	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
	12mA	GCLK	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
		GCLK PLL	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.562	3.845	5.678	5.894	6.468	6.301	6.680	6.046	6.621	6.301	6.680	ns
	6mA	GCLK	t_{co}	3.548	3.831	5.665	5.881	6.455	6.288	6.667	6.032	6.608	6.288	6.667	ns
		GCLK PLL	t_{co}	3.544	3.827	5.663	5.881	6.456	6.289	6.668	6.032	6.610	6.289	6.668	ns
	8mA	GCLK	t_{co}	3.560	3.842	5.664	5.878	6.450	6.283	6.662	6.029	6.603	6.283	6.662	ns
		GCLK PLL	t_{co}	3.549	3.832	5.660	5.874	6.447	6.280	6.659	6.026	6.600	6.280	6.659	ns