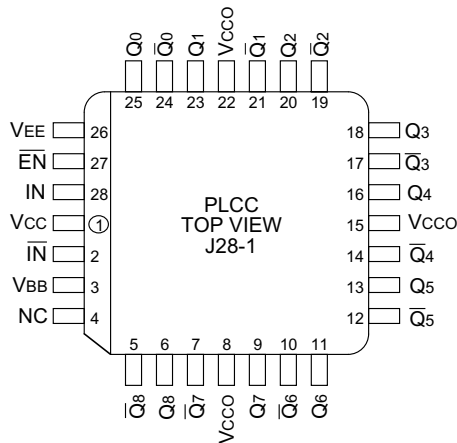


PACKAGE/ORDERING INFORMATION



28-Pin PLCC (J28-1)

Ordering Information⁽¹⁾

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10E111AEJI	J28-1	Industrial	SY10E111AEJI	Sn-Pb
SY10E111AEJITR ⁽²⁾	J28-1	Industrial	SY10E111AEJI	Sn-Pb
SY100E111AEJI	J28-1	Industrial	SY100E111AEJI	Sn-Pb
SY100E111AEJITR ⁽²⁾	J28-1	Industrial	SY100E111AEJI	Sn-Pb
SY10E111AEJC	J28-1	Commercial	SY10E111AEJI	Sn-Pb
SY10E111AEJCTR ⁽²⁾	J28-1	Commercial	SY10E111AEJI	Sn-Pb
SY100E111AEJC	J28-1	Commercial	SY100E111AEJI	Sn-Pb
SY100E111AEJCTR ⁽²⁾	J28-1	Commercial	SY100E111AEJI	Sn-Pb
SY10E111LEJI	J28-1	Industrial	SY10E111LEJI	Sn-Pb
SY10E111LEJITR ⁽²⁾	J28-1	Industrial	SY10E111LEJI	Sn-Pb
SY100E111LEJI	J28-1	Industrial	SY100E111LEJI	Sn-Pb
SY100E111LEJITR ⁽²⁾	J28-1	Industrial	SY100E111LEJI	Sn-Pb
SY10E111LEJC	J28-1	Commercial	SY10E111LEJI	Sn-Pb
SY10E111LEJCTR ⁽²⁾	J28-1	Commercial	SY10E111LEJI	Sn-Pb
SY100E111LEJC	J28-1	Commercial	SY100E111LEJI	Sn-Pb
SY100E111LEJCTR ⁽²⁾	J28-1	Commercial	SY100E111LEJI	Sn-Pb
SY10E111AEJY ⁽³⁾	J28-1	Industrial	SY10E111AEJY with Pb-Free bar-line indicator	Matte-Sn
SY10E111AEJYTR ^(2, 3)	J28-1	Industrial	SY10E111AEJY with Pb-Free bar-line indicator	Matte-Sn
SY100E111AEJY ⁽³⁾	J28-1	Industrial	SY100E111AEJY with Pb-Free bar-line indicator	Matte-Sn
SY100E111AEJYTR ^(2, 3)	J28-1	Industrial	SY100E111AEJY with Pb-Free bar-line indicator	Matte-Sn
SY10E111LEJZ ⁽³⁾	J28-1	Commercial	SY10E111LEJZ with Pb-Free bar-line indicator	Matte-Sn
SY10E111LEJZTR ^(2, 3)	J28-1	Commercial	SY10E111LEJZ with Pb-Free bar-line indicator	Matte-Sn
SY100E111LEJZ ⁽³⁾	J28-1	Commercial	SY100E111LEJZ with Pb-Free bar-line indicator	Matte-Sn
SY100E111LEJZTR ^(2, 3)	J28-1	Commercial	SY100E111LEJZ with Pb-Free bar-line indicator	Matte-Sn
SY10E111LEJY ⁽³⁾	J28-1	Industrial	SY10E111LEJY with Pb-Free bar-line indicator	Matte-Sn
SY10E111LEJYTR ^(2, 3)	J28-1	Industrial	SY10E111LEJY with Pb-Free bar-line indicator	Matte-Sn
SY100E111LEJY ⁽³⁾	J28-1	Industrial	SY100E111LEJY with Pb-Free bar-line indicator	Matte-Sn
SY100E111LEJYTR ^(2, 3)	J28-1	Industrial	SY100E111LEJY with Pb-Free bar-line indicator	Matte-Sn

Notes:

1. Contact factory for die availability. Dice are guaranteed at $T_A = 25^\circ\text{C}$, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

SYMBOL	PARAMETER	RATING	UNIT
VEE	Power Supply (VCC = 0V)	–8.0 to 0	V
VI	Input Voltage (VCC = 0V)	0 to –6.0	V
IOUT	Output Current: Continuous Surge	50 100	mA
TA	Operating Temperature Range	–40 to +85	°C
VEE ⁽²⁾	Operating Range	–5.7 to –4.2	V
Tstore	Storage Temperature Range	–65 to +150	°C

ECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾

VEE = VEE (Min.) to VEE (Max.); VCC = GND

Symbol	Parameter	TA = –40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
VOH	Output HIGH Voltage													mV
	10EL	–1080	—	–890	–1020	—	–840	–980	—	–810	–910	—	–720	
	100EL	–1085	—	–880	–1025	—	–880	–1025	—	–880	–1025	—	–880	
VOL	Output LOW Voltage													mV
	10EL	–1950	—	–1650	–1950	—	–1630	–1950	—	–1630	–1950	—	–1595	
	100EL	–1830	—	–1550	–1810	—	–1620	–1810	—	–1620	–1810	—	–1620	
VIH	Input HIGH Voltage													mV
	10EL	–1230	—	–890	–1170	—	–840	–1130	—	–810	–1060	—	–720	
	100EL	–1165	—	–880	–1165	—	–880	–1165	—	–880	–1165	—	–880	
VIL	Input LOW Voltage													mV
	10EL	–1950	—	–1500	–1950	—	–1480	–1950	—	–1480	–1950	—	–1445	
	100EL	–1810	—	–1475	–1810	—	–1475	–1810	—	–1475	–1810	—	–1475	
VBB	Output Reference Voltage													V
	10EL	–1.43	—	–1.30	–1.38	—	–1.27	–1.35	—	–1.25	–1.31	—	–1.19	
	100EL	–1.38	—	–1.26	–1.38	—	–1.26	–1.38	—	–1.26	–1.38	—	–1.26	
I _{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I _{IL}	Input LOW Current													μA
	10EL	0.5	—	—	0.5	—	—	0.5	—	—	0.3	—	—	
	100EL	0.5	—	—	0.5	—	—	0.5	—	—	0.5	—	—	
IEE	Power Supply Current													mA
	10EL	—	—	66	—	—	66	—	—	66	—	—	66	
	100EL	—	—	66	—	—	66	—	—	66	—	—	78	

Notes:

1. Absolute maximum rating, beyond which device life may be impaired unless otherwise specified.

2. Parametric values specified at:

5 volt Power Supply Range	100EL Series:	–4.2V to –5.5V.
	10EL Series	–4.75V to –5.5V.
3 volt Power Supply Range	10/100EL Series:	–3.0V to –3.8V.

3.3V PECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾

VCC = +3.0V to +3.8V, VEE = GND

Symbol	Parameter	TA = -40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
VOH	Output HIGH Voltage ⁽²⁾ 10EL 100EL	2220 2215	— —	2110 2120	2280 2275	— —	2460 2420	2320 2275	— —	2490 2420	2390 2275	— —	2580 2420	mV
VOL	Output LOW Voltage ⁽²⁾ 10EL 100EL	1350 1470	— —	1650 1750	1350 1490	— —	1670 1680	1350 1490	— —	1670 1680	1350 1490	— —	1705 1680	mV
VIH	Input HIGH Voltage ⁽²⁾ 10EL 100EL	2070 2135	— —	2410 2420	2130 2135	— —	2460 2420	2170 2135	— —	2490 2420	2240 2135	— —	2580 2420	mV
VIL	Input LOW Voltage ⁽²⁾ 10EL 100EL	1350 1490	— —	1800 1825	1350 1490	— —	1820 1825	1350 1490	— —	1820 1825	1350 1490	— —	1855 1825	mV
VBB	Output Reference Voltage ⁽²⁾ 10EL 100EL	1.87 1.92	— —	2.00 2.04	1.92 1.92	— —	2.03 2.04	1.95 1.92	— —	2.05 2.04	1.99 1.92	— —	2.11 2.04	V
I _{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I _{IL}	Input LOW Current 10EL 100EL	0.5 0.5	— —	— —	0.5 0.5	— —	— —	0.5 0.5	— —	— —	0.3 0.5	— —	— —	μA
I _{EE}	Power Supply Current 10EL 100EL	— —	— —	66 66	— —	— —	66 66	— —	— —	66 66	— —	— —	66 78	mA

Notes:

- Parametric values specified at: 3 volt Power Supply Range 10/100E111LE Series: +3.0V to +3.8V.
- These values are for VCC = 3.3V. Level specifications will vary 1:1 with VCC.

5V PECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾

VCC = VCC (Min.) to VCC (Max.); VEE = GND

Symbol	Parameter	TA = -40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
VOH	Output HIGH Voltage ⁽²⁾ 10EL 100EL	3920 3915	— —	4110 4120	3980 3975	— —	4160 4120	4020 3975	— —	4190 4120	4090 3975	— —	4280 4120	mV
VOL	Output LOW Voltage ⁽²⁾ 10EL 100EL	3050 3170	— —	3350 3450	3050 3190	— —	3370 3380	3050 3190	— —	3370 3380	3050 3190	— —	3405 3380	mV
VIH	Input HIGH Voltage ⁽²⁾ 10EL 100EL	3770 3835	— —	4110 4120	3830 3835	— —	4160 4120	3870 3835	— —	4190 4120	3940 3835	— —	4280 4120	mV
VIL	Input LOW Voltage ⁽²⁾ 10EL 100EL	3050 3190	— —	3500 3525	3050 3190	— —	3520 3525	3050 3190	— —	3520 3525	3050 3190	— —	3555 3525	mV
VBB	Output Reference Voltage ⁽²⁾ 10EL 100EL	3.57 3.62	— —	3.70 3.74	3.62 3.62	— —	3.73 3.74	3.65 3.62	— —	3.75 3.74	3.69 3.62	— —	3.81 3.74	V
I _{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I _{IL}	Input LOW Current 10EL 100EL	0.5 0.5	— —	— —	0.5 0.5	— —	— —	0.5 0.5	— —	— —	0.3 0.5	— —	— —	μA
I _{EE}	Power Supply Current 10EL 100EL	— —	— —	66 66	— —	— —	66 66	— —	— —	66 66	— —	— —	66 78	mA

Notes:

- Parametric values specified at: 5 volt Power Supply Range 100E111AE Series: +4.2V to +5.5V.
10E111AE Series: +4.75V to +5.5V.
- These values are for VCC = 5V. Level specifications will vary 1:1 with VCC.

AC ELECTRICAL CHARACTERISTICS⁽¹⁾V_{EE} = V_{EE} (Min.) to V_{EE} (Max.); V_{CC} = GND

Symbol	Parameter	T _A = -40°C			T _A = 0°C			T _A = +25°C			T _A = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
f _{MAX}	Maximum Toggle Frequency		800			800			800			800		MHz
t _{PD}	Propagation Delay to Output IN (differential) ⁽²⁾	380	—	680	430	—	630	430	—	630	430	—	630	ps
	IN (single-ended) ⁽³⁾	280	—	780	330	—	730	330	—	730	330	—	730	
	Enable ⁽⁴⁾	400	—	900	450	—	850	450	—	850	450	—	850	
	Disable ⁽⁴⁾	400	—	900	450	—	850	450	—	850	450	—	850	
t _{skew}	Within-Device Skew ⁽⁵⁾	—	—	75	—	—	50	—	—	50	—	—	50	ps
	Part-to-Part Skew (Diff.)	—	—	250	—	—	200	—	—	200	—	—	200	
t _s	Set-up Time, $\overline{\text{EN}}$ to IN ⁽⁶⁾	250	—	0	200	0	—	200	0	—	200	0	—	ps
t _H	Hold Time, IN to $\overline{\text{EN}}$ ⁽⁷⁾	0	—	-200	0	-200	—	0	-200	—	0	-200	—	ps
t _R	Release Time, $\overline{\text{EN}}$ to IN ⁽⁸⁾	350	—	100	300	100	—	300	100	—	300	100	—	ps
t _{JITTER}	Random Clock Jitter		1	2		1	2		1	2		1	2	ps _{RMS}
V _{PP}	Minimum Input Swing ⁽⁹⁾	250	—	—	250	—	—	250	—	—	250	—	—	mV
V _{CMR}	Common Mode Range ⁽¹⁰⁾	-1.5	—	-0.4	-1.5	—	-0.4	-1.5	—	-0.4	-1.5	—	-0.4	V
t _r t _f	Rise/Fall Times 20% to 80%	200	—	650	200	—	600	200	—	600	200	—	600	ps

Notes:

- Parametric values specified at: 5 volt Power Supply Range 100E111AE Series: -4.2V to -5.5V.
10E111AE Series -4.75V to -5.5V.
3 volt Power Supply Range 10/100E111LE Series: -3.0V to -3.8V.
- The differential propagation delay is defined as the delay from the crossing points of the differential input signals to the crossing point of the differential output signals.
- The single-ended propagation delay is defined as the delay from the 50% point of the input signal to the 50% point of the output signal.
- Enable is defined as the propagation delay from the 50% point of a negative transition on $\overline{\text{EN}}$ to the 50% point of a positive transition on Q (or a negative transition on Q). Disable is defined as the propagation delay from the 50% point of a positive transition on EN to the 50% point of a negative transition on Q (or a positive transition on Q).
- The within-device skew is defined as the worst case difference between any two similar delay paths within a single device.
- The set-up time is the minimum time that $\overline{\text{EN}}$ must be asserted prior to the next transition of IN/ $\overline{\text{IN}}$ to prevent an output response greater than $\pm 75\text{mV}$ to that IN/ $\overline{\text{IN}}$ transition (see Figure 1).
- The hold time is the minimum time that $\overline{\text{EN}}$ must remain asserted after a negative going IN or a positive going $\overline{\text{IN}}$ to prevent an output response greater than $\pm 75\text{mV}$ to that IN/ $\overline{\text{IN}}$ transition (see Figure 2).
- The release time is the minimum time that $\overline{\text{EN}}$ must be de-asserted prior to the next IN/ $\overline{\text{IN}}$ transition to ensure an output response that meets the specified IN to Q propagation delay and output transition times (see Figure 3).
- V_{PP} (min) is defined as the minimum input differential voltage which will cause no increase in the propagation delay. The V_{PP} (min) is AC limited for the E111AE/LE, as a differential input as low as 50mV will still produce full ECL levels at the output.
- V_{CMR} is defined as the range within the V_{IH} level may vary, with the device still meeting the propagation delay specification. the V_{IL} level must be such that the peak-to-peak voltage is less than 1.0V and greater than or equal to V_{PP} (min).
For PECL operation: V_{CMR} (max) = V_{CC} - |V_{CMR} (max)| and
V_{CMR} (min) = V_{CC} - |V_{CMR} (min)|

TIMING DIAGRAMS

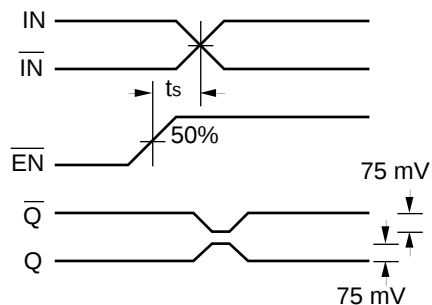


Figure 1. Set-up Time

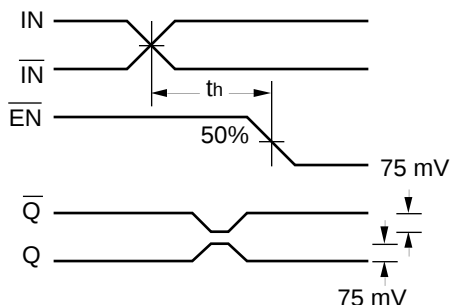


Figure 2. Hold Time

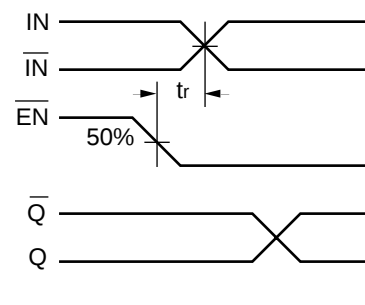
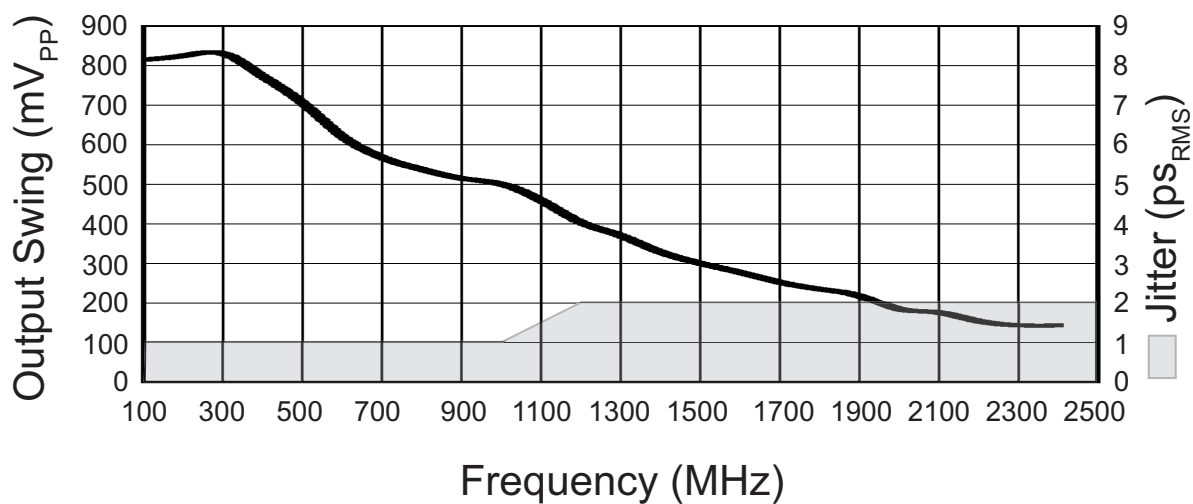
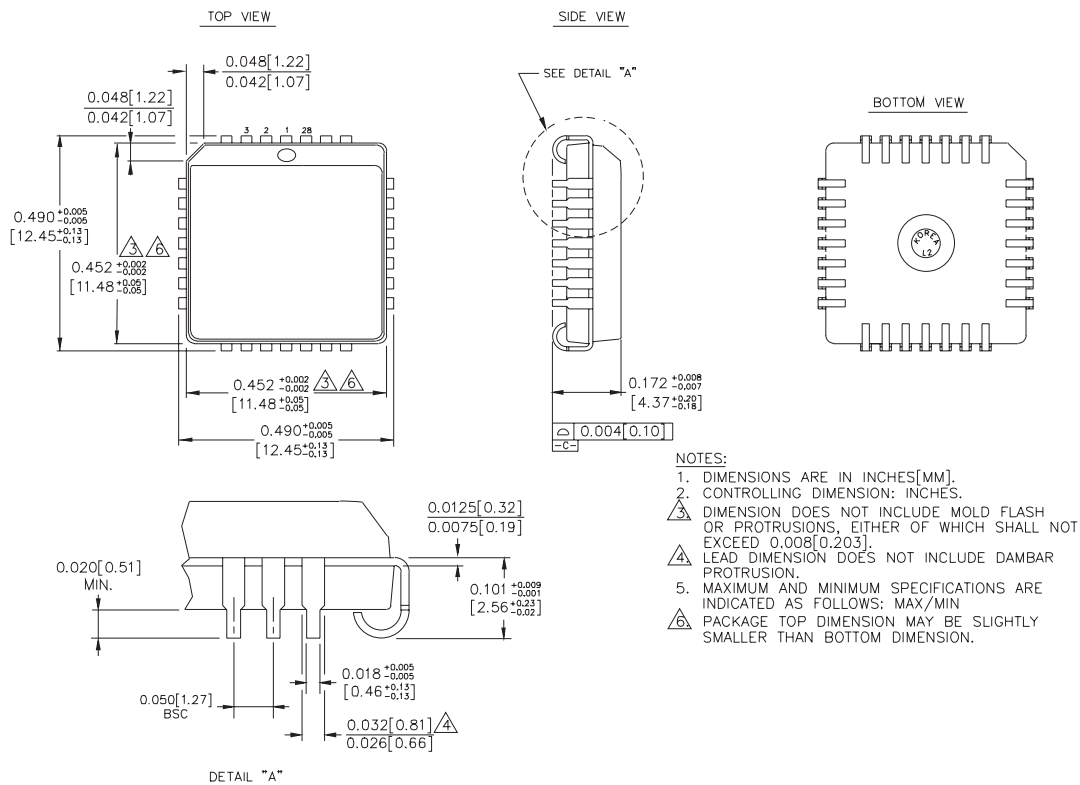


Figure 3. Release Time

Frequency Response/Jitter



28-PIN PLCC (J28-1)



Rev. 03

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