FEATURES

- **Differential D and Q**
- **Extended 100E VEE range of –4.2V to –5.5V**
- **700ps max. propagation delay**
- **High frequency outputs**
- **Internal 75KΩ input pull-down resistors**
- **Fully compatible with Motorola 10E/100E404**
- **Available in 28-pin PLCC package**

DESCRIPTION

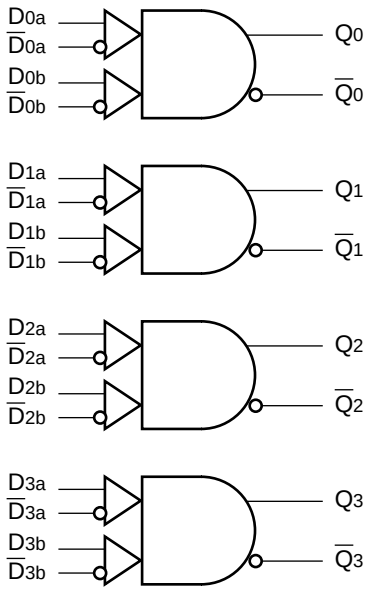
The SY10/100E404 are 4-bit differential AND/NAND devices. The differential operation of these devices make them ideal for pulse shaping applications where duty cycle skew is critical. Special design techniques were incorporated to minimize the skew between the upper and lower level gate inputs.

Because a negative 2-input NAND function is equivalent to a 2-input OR function, the differential inputs and outputs of the devices also allow for their use as fully differential 2-input OR/NOR functions.

The output RISE/FALL times of these devices are significantly faster than most other standard ECLinPS devices, resulting in an increased bandwidth.

The differential inputs have clamp structures which will force the Q output of a gate in an open input condition to go to a LOW state. Thus, inputs of unused gates can be left open and will not affect the operation of the rest of the device.

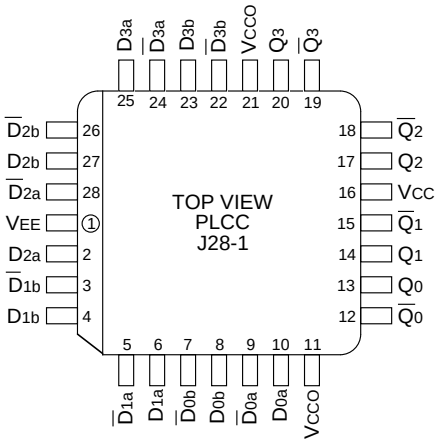
BLOCK DIAGRAM



PIN NAMES

Pin	Function
D[0:4], D̄[0:4]	Differential Data Inputs
Q[0:4], Q̄[0:4]	Differential Data Outputs
VCCO	VCC to Output

PACKAGE/ORDERING INFORMATION



28-Pin PLCC (J28-1)

Ordering Information[1]

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10E404JC	J28-1	Commercial	SY10E404JC	Sn-Pb
SY10E404JCTR[2]	J28-1	Commercial	SY10E404JC	Sn-Pb
SY100E404JC	J28-1	Commercial	SY100E404JC	Sn-Pb
SY100E404JCTR[2]	J28-1	Commercial	SY100E404JC	Sn-Pb
SY10E404JZ[3]	J28-1	Commercial	SY10E404JZ with Pb-Free bar-line indicator	Matte-Sn
SY10E404JZTR[2, 3]	J28-1	Commercial	SY10E404JZ with Pb-Free bar-line indicator	Matte-Sn
SY100E404JZ[3]	J28-1	Commercial	SY100E404JZ with Pb-Free bar-line indicator	Matte-Sn
SY100E404JZTR[2, 3]	J28-1	Commercial	SY100E404JZ with Pb-Free bar-line indicator	Matte-Sn

Notes:

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

TRUTH TABLE

Da	Db	Q	$\overline{Da}$	$\overline{Db}$	$\overline{Q}$
L	L	L	L	L	L
L	H	L	L	H	H
H	L	L	H	L	H
H	H	H	H	H	H

DC ELECTRICAL CHARACTERISTICS

V_{EE} = V_{EE} (Min.) to V_{EE} (Max.); V_{CC} = V_{CCO} = GND

Symbol	Parameter	T_A = 0°C			T_A = +25°C			T_A = +85°C			Unit	Condition
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
I_{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	µA	—
I_{EE}	Power Supply Current										mA	—
	10E	—	106	127	—	106	127	—	106	127		
	100E	—	106	127	—	106	127	—	122	146		
$V_{PP\ (DC)}$	Input Sensitivity	50	—	—	50	—	—	50	—	—	mV	1
V_{CMR}	Common Mode Range	–1.5	—	0	–1.5	—	0	–1.5	—	0	V	2

Notes:

1. Differential input voltage required to obtain a full ECL swing on the outputs.
2. V_{CMR} is referenced to the most positive side of the differential input signal. Normal operation is obtained when the input signals are within the V_{CMR} range and the input swing is greater than V_{PP} (min.) and <1V.

AC ELECTRICAL CHARACTERISTICS

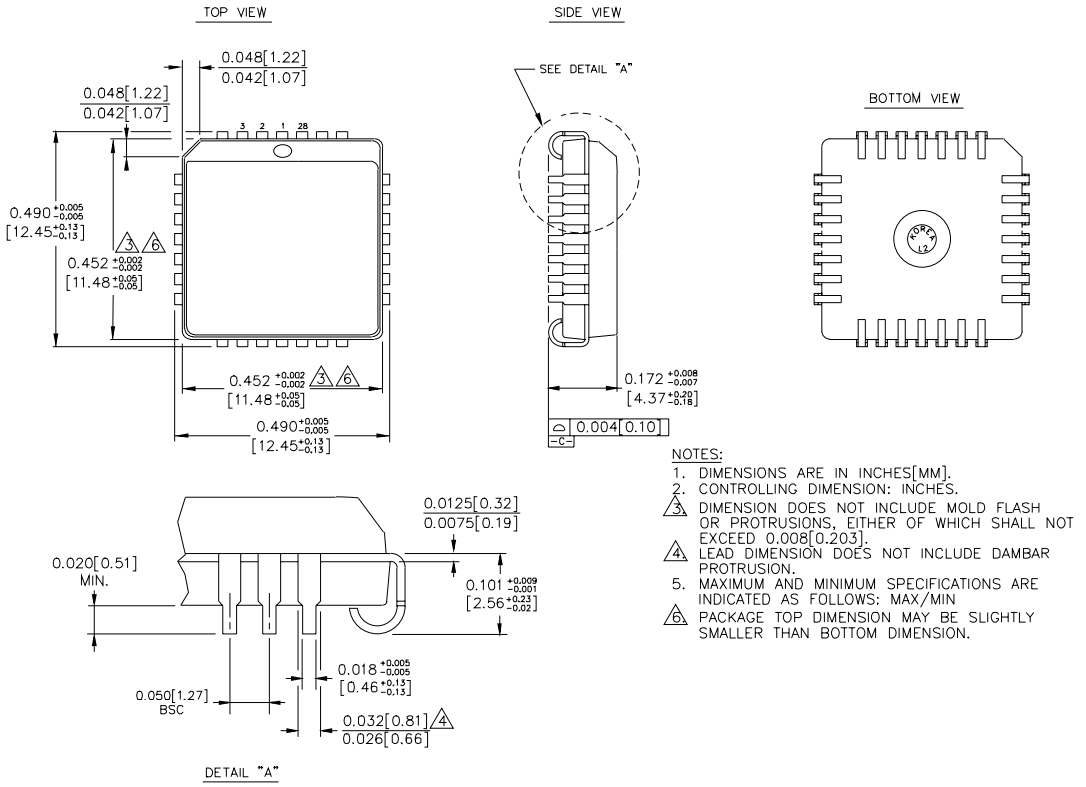
V_{EE} = V_{EE} (Min.) to V_{EE} (Max.); V_{CC} = V_{CCO} = GND

Symbol	Parameter	T_A = 0°C			T_A = +25°C			T_A = +85°C			Unit	Condition
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
t_{PD}	Propagation Delay to Output										ps	—
	D_a (Diff)	350	475	650	350	475	650	350	475	650		
	D_a (SE)	300	475	700	300	475	700	300	475	700		
	D_b (Diff)	375	500	675	375	500	675	375	500	675		
	D_b (SE)	325	500	725	325	500	725	325	500	725		
t_{skew}	Within-Device Skew	—	50	—	—	50	—	—	50	—	ps	1
$V_{PP(AC)}$	Minimum Input Swing	150	—	—	150	—	—	150	—	—	mV	2
t_r t_f	Rise/Fall Time 20–80%	150	—	400	150	—	400	150	—	400	ps	—

Notes:

1. Within-device skew is defined as identical transitions on similar paths through a device.
2. Minimum input swing for which AC parameters are guaranteed.

28-PIN PLCC (J28-1)



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