QP SEMICONDUCTOR

October 9, 2007

QP82S100 – PLS100 Field Programmable Logic Array (16 x 48 x 8)

General Description

The QP82S100 – PLS100 PLA is a tri-state output bi-polar programmable logic array with field programmable metal fuse technology (NiChrome). The device utilizes the standard AND/OR/NOT (invert) architecture to directly implement custom sum of product logic equations.
Each Device consists of 16 dedicated inputs and 8 dedicated outputs. Each output is capable of being actively controlled by any or all of the 48 product terms. The True, Complement, or Don't Care condition of each of the 16 inputs can be ANDed together to comprise one P-Term. All 48 P-Terms can be selectively Ored to each output.

The device is fully TTL compatible, and chip enable control for expansion of input variables and output inhibit. The device features Tri-State outputs for ease of expansion terms and application in bus-organized systems.

The QP82S100 – PLS100 features:

- Field-Programmable (Ni-Cr link)
- Output Functions: 8
- I/O propagation delay: 50ns
- Input loading: -100uA
- Tri-State Output
- Input Variables: 16
- Product Terms: 48
- Power Dissipation: 600mW (typ.)
- Chip Enable Input
- Output Disable Function: High-Z

Applications:

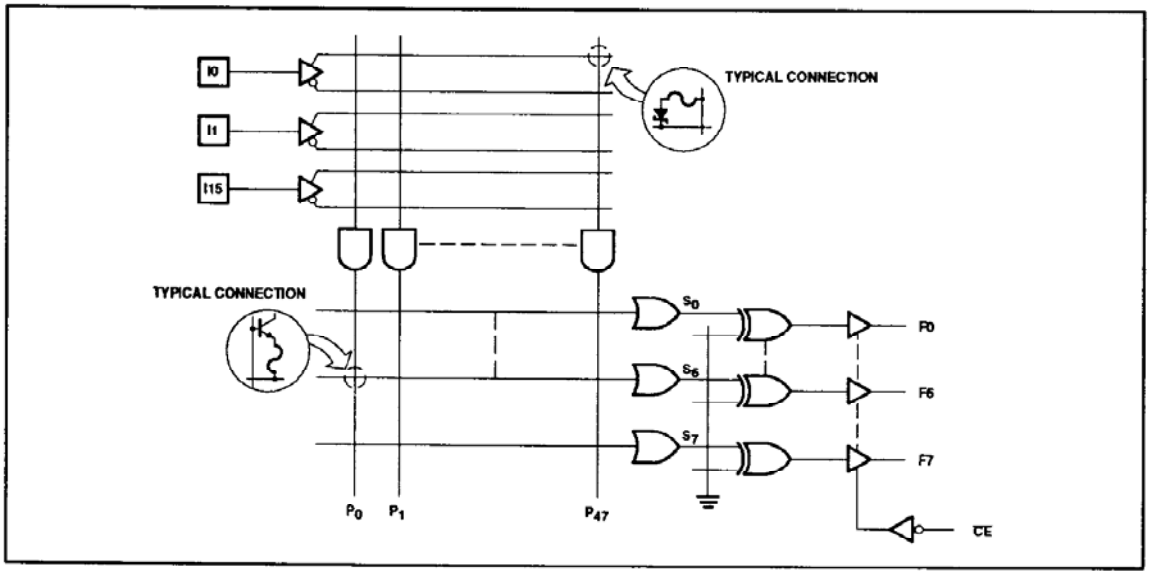
- CRT Display Systems
- Code Conversion
- Peripheral Controllers
- Function Generators
- Look-up and Decision Tables
- Microprogramming
- Address Mapping
- Character Generators
- Data Security Encoders
- Fault Detectors
- Frequency Synthesizers
- 16-bit to 8-bit Bus Interface
- Random Logic Replacement

The device/family is constructed using Bipolar/NiChrome processing.

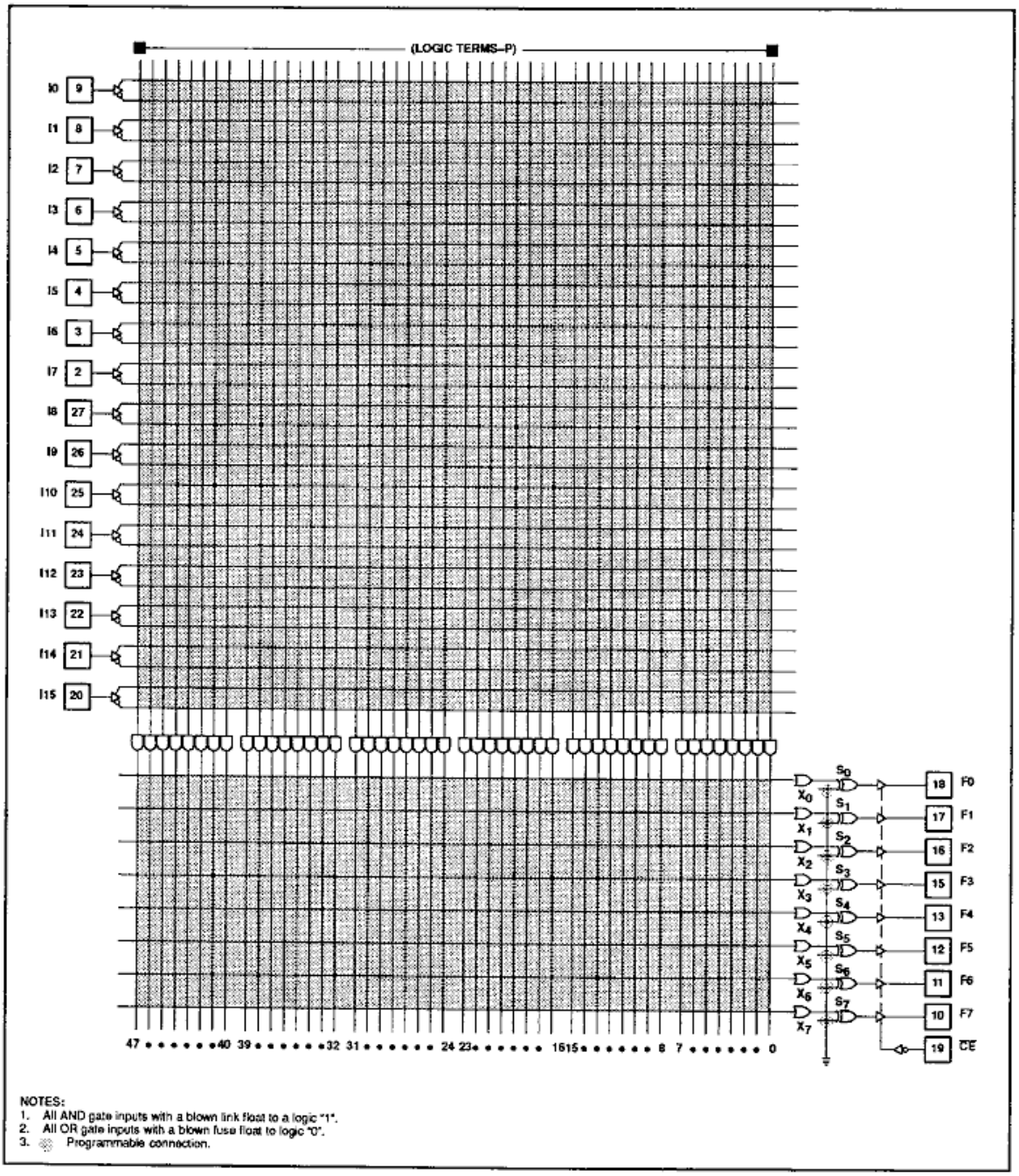
Programming supported by Data I/O under QP Semi/Qualified Parts Lab 82S100

Functional Diagram

QP82S100
PLS100



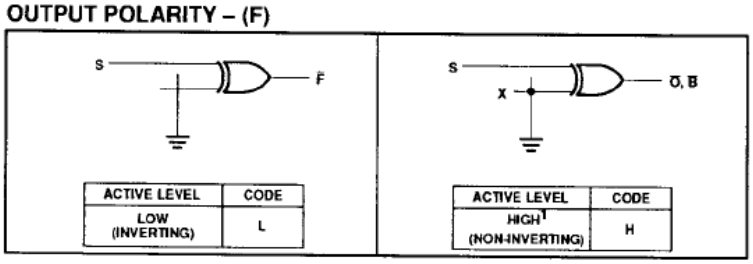
Logic Diagram



NOTES:
1. All AND gate inputs with a blown link float to a logic "1".
2. All OR gate inputs with a blown fuse float to logic "0".
3. ⊗ Programmable connection.

Fuse Function

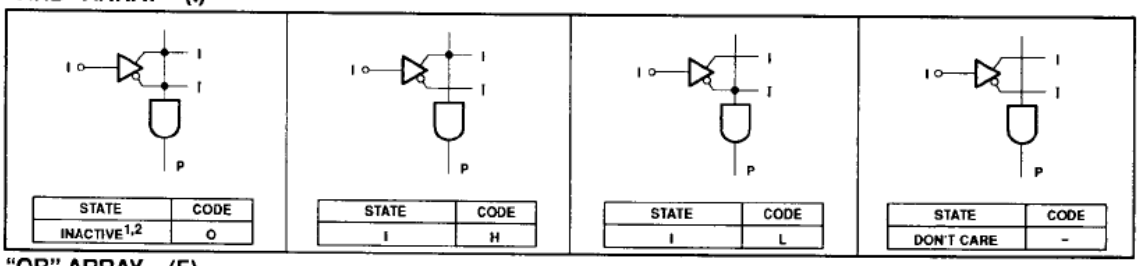
OUTPUT POLARITY – (F)



ACTIVE LEVEL	CODE
LOW (INVERTING)	L

ACTIVE LEVEL	CODE
HIGH[1] (NON-INVERTING)	H

"AND" ARRAY – (I)



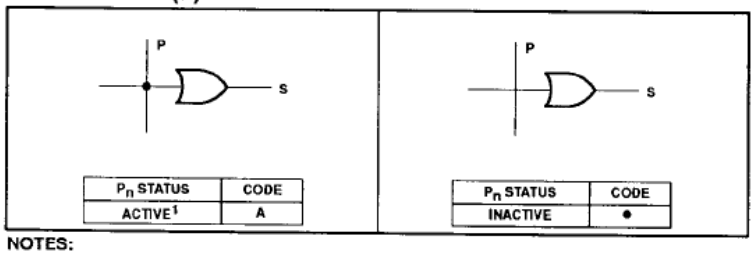
STATE	CODE
INACTIVE[1,2]	O

STATE	CODE
I	H

STATE	CODE
I	L

STATE	CODE
DON'T CARE	-

"OR" ARRAY – (F)



P_n STATUS	CODE
ACTIVE[1]	A

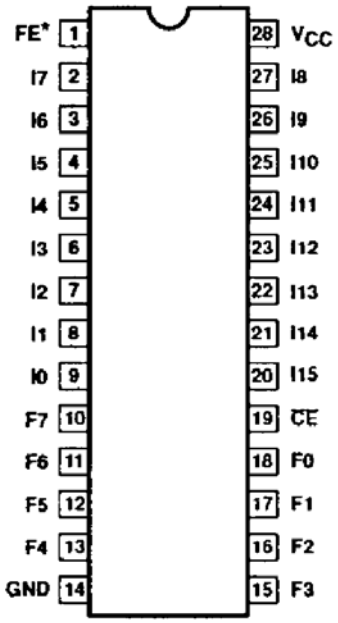
P_n STATUS	CODE
INACTIVE	•

NOTES:
1. This is the initial unprogrammed state of all links. It is normally associated with all unused (inactive) AND gates P_n.
2. Any gate P_n will be unconditionally inhibited if any one of its (I) link pairs is left intact.

Connection Diagrams

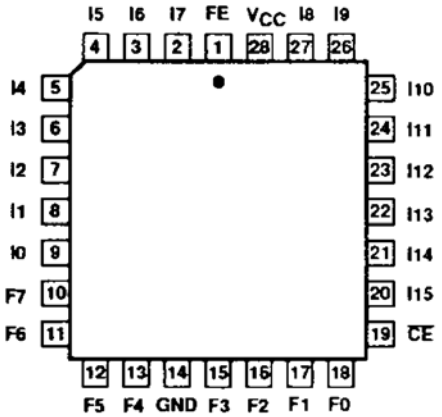
QP82S100 – PLS100

CERDIP/CERPACK



* Fuse Enable Pin: It is recommended that this pin be left open or connected to ground during normal operation.

LCC



Absolute Maximum Ratings

Stresses above the AMR may cause permanent damage; extended operation at AMR may degrade performance and affect reliability

Condition		Units	Notes
Power Supply and Input Voltage	-0.5 to +7.0	Volts DC	
Output Current	+100	mA	
Input Clamp Current	-30 to +30	mA	
No Terminal may exceed VCC	>0.5	Volts	/1
Storage Temperature Range	-65 to +150	ºC	
Lead Temperature (soldering, 10 seconds)	+300	ºC	
Junction Temperature (T_J)	+150	ºC	

Recommended Operating Conditions

Condition		Units	Notes
Supply Voltage Range (V_{CC})	4.5 to 5.5	Volts DC	
Input or Output Voltage Range	0.0 to V_{CC}	Volts DC	/1
Minimum High-Level Input Voltage (V_{IH})	2.0	Volts DC	
Maximum Low-Level Input Voltage (V_{IL})	0.8	Volts DC	
Case Operating Range (T_c)	-55C to +125	ºC	/2

/1 – For VCC≥6.5V, the upper limit on the range is limited to 7.0V
/2 – Maximum PD, Maximum T_J Are Not to Be Exceeded

TABLE I – ELECTRICAL PERFORMANCE CHARACTERISTICS

Test	Symbol	Conditions -55ºC ≤TA≤+125ºC Unless Otherwise Specified	Min	Max	Unit
Input High Voltage	V_{IH}	V_{CC} = 5.5V	2.0		V
Input Low Voltage	V_{IL}	V_{CC} = 4.5V		0.8	V
Input High Current	I_{IH}	V_{CC}=5.5V, V_{IN}=5.5V		50	uA
Input Low Current	I_{IL}	V_{CC}=5.5V, V_{IN}=0.45V	-1.0	-250	uA
Input Clamp	Vic	V_{CC} = 4.5V, I_{IN}=-18mA		1.2	V
Output High Voltage	V_{OH}	V_{CC} = 4.5V, I_{OH}= -2mA	2.4		V
Output Low Voltage	V_{OL}	V_{CC} = 5.5V, I_{OH}= 9.6mA		0.5	V
Tri-State Output Current	I_{OZL}	V_{CC} = 5.5V, V_{OUT} = 0.45V, CE_{BAR}=High	-60.0		uA
(High Impedance State)	I_{OZH}	V_{CC} = 5.5V,V_{OUT} = 5.5V, CE_{BAR}=High		+100.0	uA
Short Circuit Current	I_{OS}	V_{CC} = 5.5V,V_{OUT} = 0V, CE_{BAR}=Low Duration not to exceed 1 second, one output at a time	-15	-85	mA
Power Supply Current	I_{CC}	V_{CC} = 5.5V		180	mA

TABLE I – ELECTRICAL PERFORMANCE CHARACTERISTICS					
Test	Symbol	Conditions -55ºC ≤TA≤+125ºC Unless Otherwise Specified	Min	Max	Unit
Input to Output Propagation Delay	t_{PD}	V_{CC} = 4.5 - 5.5V		80	ns
Chip Enable Delay ENABLE to OUTPUT	t_{CE}	V_{CC} = 4.5 - 5.5V		50	ns
Chip Disable Delay ENABLE to OUTPUT	t_{CD}	V_{CC} = 4.5 - 5.5V		50	ns

Ordering Information

Part Number	Package (Mil-Std-1835)	Generic
QP82S100/B3A-MIL	CQCC1-N28 (LCC)	82S100 – PLS100
QP82S100/BXA-MIL	GDIP1-T28 CDIP2-T28 (DIP)	82S100 – PLS100
QP82S100/BYA-MIL	GDFP2-F28 CDFP3-F28 (FLATPACK)	82S100 – PLS100

QP Semiconductor supports Source Control Drawing (SCD), and custom package development for this product family.

Notes:

Package outline information and specifications are defined by Mil-Std-1835 package dimension requirements.

"-MIL" products manufactured by QP Semiconductor are compliant to the assembly, burn-in, test and quality conformance requirements of Test Methods 5004 & 5005 of Mil-Std-883 for Class B devices. This datasheet defines the electrical test requirements for the device(s).

The listed drawings, Mil-PRF-38535, Mil-Std-883 and Mil-Std-1835 are available online at http://www.dscc.dla.mil/

Additional information is available at our website http://www.qpsemi.com

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5AGXBA5D4F27I5N 5AGXMA3D4F27I3N 5CEFA7F27C6N 5CGTFD7D5F27I7N EP1C4F400C7N EP1S25F672I7 EP1SGX25DF672I6N EP2C50F672C8N EP2S30F672C5 EP2S60F672C5N EP4CGX110DF27C8N EP4CGX150DF27I7N EP4CGX50DF27I7N EP4CGX75DF27I7N LAMXO640C-3FTN256E LFE2-12E-6QN208I LFE2-20E-6FN484I LFE2-6SE-6FN256I LFEC1E-3QN208C LFXP6C-3QN208CACD PLUS16L87N PLUS16R67N PLUS20L87N PLUS20R87N LCMXO2280C-4FTN324I LFXP15-C-4F388C LFXP2-8E-6FT256I 5AGTMC3D3F27I3N 5AGXBA5D6F27C6N 5AGXMA5D6F27C6N 5CGXBC4C6F27C7N EP2C70F672C8N EP2S15F672C3N EP4CGX110DF27I7N QP82S100/BXA LCMXO640C-3FT256CAHW LFE2-6E-5TN144I LFSC3GA40E-7FFA1020C LFXP2-8E-6M132IAEJ LFE2M50SE-6F484I9A LFE3-70EA-8F672C LFSC3GA25E-7FFA1020C LFSC3GA40E-5FFA1020C LFSC3GA40E-6FFA1020I LFSCM3GA40EP1-5FFA1020C LFSCM3GA40EP1-6FFA1020C LFXP10C-5F388CA1370 LFXP2-5E-5M132I LFXP2-8E-6M132CAEJ 5962-9154507MXA