

32-Channel Serial-to-Parallel Converters with High-Voltage Push-Pull Outputs

Features

- 5V CMOS Compatible Inputs
- Low-Power Level Shifting
- 8 MHz Shift Register Speed
- Latched Data Outputs
- Diode to V_{PP} allows Efficient Power Recovery

Applications

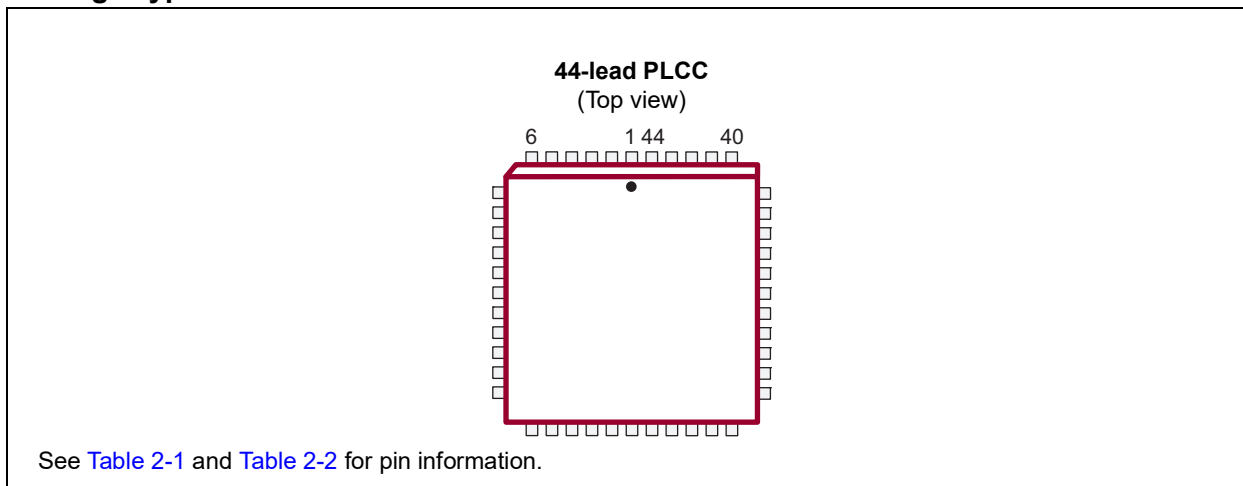
- Piezoelectric Driver
- Inkjet Printer Driver
- Display Driver
- Microelectromechanical Systems Applications

General Description

The HV9308 and HV9408 are low-voltage to high-voltage serial-to-parallel converters with push-pull outputs. These devices are designed as drivers for AC-electroluminescent displays. They can also be used in any application requiring multiple-output high-voltage low-current sourcing-and-sinking capabilities, such as driving plasma panels, vacuum fluorescent displays, and large matrix LCD displays.

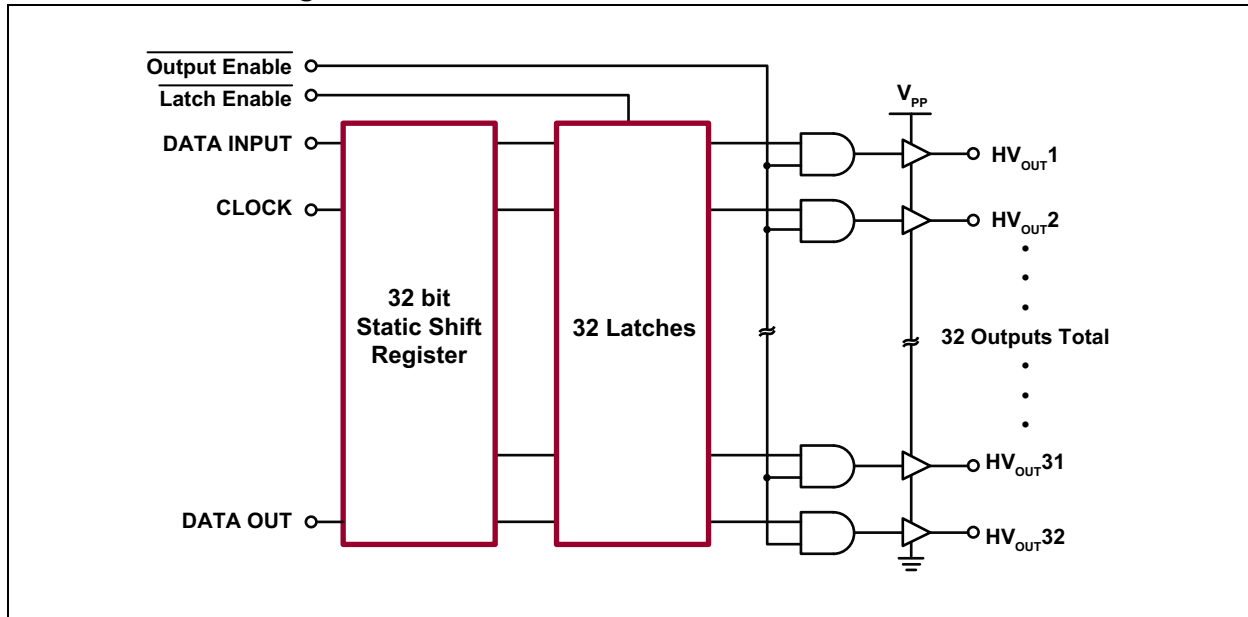
Each device consists of a 32-bit Shift register, 32 latches and control logic to perform the polarity select and blanking of the outputs. HV_{OUT1} is connected to the first stage of the Shift register through the Output Enable logic. Data is shifted through the Shift register on the low-to-high transition of the clock. The HV9308 shifts clockwise, and the HV9408 shifts counter-clockwise when viewed from the top of the package. A data output buffer is provided for cascading devices. This output reflects the current status of the last bit of the Shift register, 32. Operation of the Shift register is not affected by the latch enable (\overline{LE}) and the output enable (\overline{OE}) inputs. Transfer of data from the Shift register to the latch occurs when the \overline{LE} input is high. The data in the latch is retained when \overline{LE} is low.

Package Type

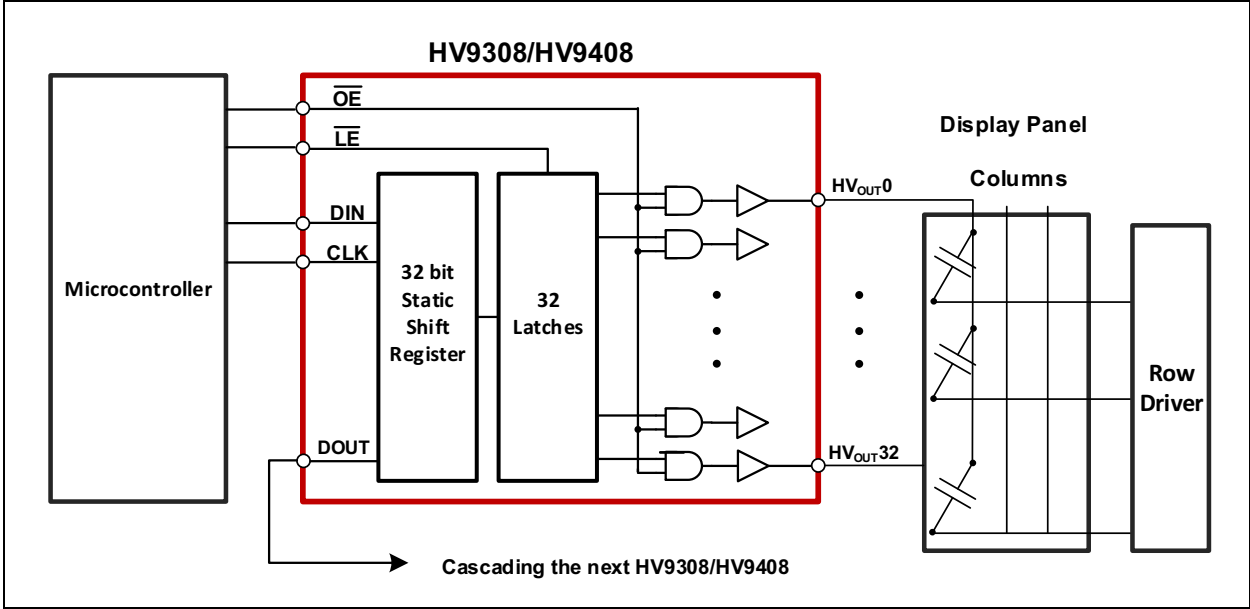


HV9308/HV9408

Functional Block Diagram



Typical Application Circuit



HV9308/HV9408

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings†

Supply Voltage, V_{DD}	-0.5V to +7V
Output Voltage, V_{PP}	-0.5V to +90V
Logic Input Levels	-0.5V to $V_{DD}+0.5V$
Ground Current (Note 1)	1.5A
Maximum Ambient Temperature, T_A	+85°C
Storage Temperature, T_S	-65°C to +150°C
Continuous Total Power Dissipation:	
44-lead PLCC (Note 2).....	1200 mW

† **Notice:** Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

- Note 1:** Duty cycle is limited by the total power dissipated in the package.
Note 2: For operations above 25°C ambient, derate linearly to the maximum operating temperature at 20 mW/°C.

RECOMMENDED OPERATING CONDITIONS

Parameter	Sym.	Min.	Typ.	Max.	Unit	Conditions
Logic Supply Voltage	V_{DD}	4.5	—	5.5	V	
High-Voltage Supply	V_{PP}	8	—	80	V	
High-Level Input Voltage	V_{IH}	$V_{DD}-0.5$	—	V_{DD}	V	
Low-Level Input Voltage	V_{IL}	0	—	0.5	V	
Clock Frequency	f_{CLK}	—	—	8	MHz	
Operating Ambient Temperature	T_A	-40	—	+85	°C	

DC ELECTRICAL CHARACTERISTICS

Electrical Specifications: $V_{PP} = 60V$, $V_{DD} = 5V$, $T_A = 25^\circ C$.							
Parameter	Sym.	Min.	Typ.	Max.	Unit	Conditions	
V_{PP} Supply Current	I_{PP}	—	—	100	μA	HV _{OUT} high to low	
Quiescent V_{DD} Supply Current	I_{DDQ}	—	—	100	μA	All $V_{IN} = V_{DD}$ or GND	
Operating V_{DD} Supply Current	I_{DD}	—	—	15	mA	$V_{DD} = V_{DD}$ maximum, $f_{CLK} = 8$ MHz	
High-Level Logic Input Current	I_{IH}	—	—	1	μA	$V_{IN} = V_{DD}$	
Low-Level Logic Input Current	I_{IL}	—	—	-1	μA	$V_{IN} = GND$	
High-Level Output	HV _{OUT}	V_{OH}	52	—	—	V	$I_{OH} = -20$ mA, $0^\circ C$ to $70^\circ C$
	Data Out		$V_{DD}-0.5$	—	—	V	$I_O = -100$ μA
Low-Level Output	HV _{OUT}	V_{OL}	—	—	4	V	$I_{OL} = 5$ mA, $0^\circ C$ to $70^\circ C$
	Data Out		—	—	0.5	V	$I_O = 100$ μA
High-Voltage Output Clamp Diode Voltage	V_{OC}	—	—	-1.5	V	$I_{OC} = -5$ mA	

AC ELECTRICAL CHARACTERISTICS

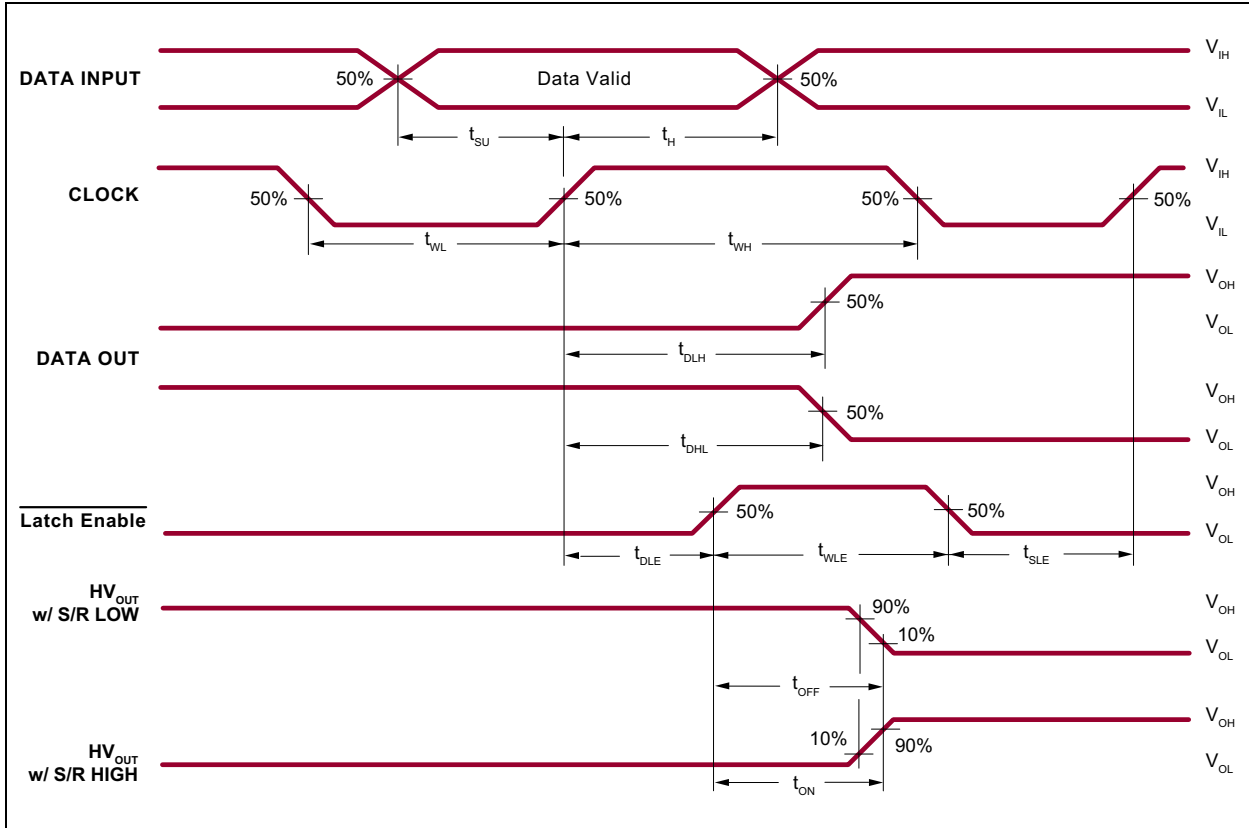
Electrical Specifications: $V_{PP} = 60V$, $V_{DD} = 5V$, $T_A = 25^\circ C$.						
Parameter	Sym.	Min.	Typ.	Max.	Unit	Conditions
Clock Frequency	f_{CLK}	—	—	8	MHz	
Clock Width High or Low	t_{WL} , t_{WH}	62	—	—	ns	
Data Set-Up Time before Clock Rises	t_{SU}	25	—	—	ns	
Data Hold Time after Clock Rises	t_H	10	—	—	ns	
Time from Latch Enable to HV _{OUT}	t_{ON} , t_{OFF}	—	—	500	ns	
Latch Enable Pulse Width	t_{WLE}	50	—	—	ns	
Delay Time Clock to Latch Enable Low to High	t_{DLE}	50	—	—	ns	
Latch Enable Set-Up Time before Clock Rises	t_{SLE}	50	—	—	ns	
Delay Time Clock to Data Low to High	t_{DLH}	—	—	110	ns	$C_L = 15$ pF
Delay Time Clock to Data High to Low	t_{DHL}	—	—	110	ns	$C_L = 15$ pF

TEMPERATURE SPECIFICATIONS

Parameter	Sym.	Min.	Typ.	Max.	Unit	Conditions
TEMPERATURE RANGE						
Operating Ambient Temperature	T_A	-40	—	+85	$^\circ C$	
Storage Temperature	T_S	-65	—	+150	$^\circ C$	
PACKAGE THERMAL RESISTANCE						
44-lead PLCC	θ_{JA}	—	37	—	$^\circ C/W$	

HV9308/HV9408

Timing Waveforms



2.0 PIN DESCRIPTION

The details on the pins of HV9308/HV9408 are listed in [Table 2-1](#) and [Table 2-2](#). Refer to [Package Type](#) for the location of pins.

TABLE 2-1: HV9308 PIN FUNCTION TABLE

Pin Number	Pin Name	Description
1	HVOUT17	High-voltage output
2	HVOUT16	High-voltage output
3	HVOUT15	High-voltage output
4	HVOUT14	High-voltage output
5	HVOUT13	High-voltage output
6	HVOUT12	High-voltage output
7	HVOUT11	High-voltage output
8	HVOUT10	High-voltage output
9	HVOUT9	High-voltage output
10	HVOUT8	High-voltage output
11	HVOUT7	High-voltage output
12	HVOUT6	High-voltage output
13	HVOUT5	High-voltage output
14	HVOUT4	High-voltage output
15	HVOUT3	High-voltage output
16	HVOUT2	High-voltage output
17	HVOUT1	High-voltage output
18	Data Out	Serial data output. Data output for cascading to the data input of the next device.
19	NC	No connection
20	NC	No connection
21	NC	No connection
22	CLK	Data shift register clock. Inputs are shifted into the Shift register on the positive edge of the clock.
23	GND	Logic and high-voltage ground
24	VPP	High-voltage power rail
25	VDD	Low-voltage logic power rail
26	$\overline{\text{Latch Enable}}$	Latch enable input. When $\overline{\text{LE}}$ is high, Shift register data is transferred into a data latch. When $\overline{\text{LE}}$ is low, data is latched, and new data can be clocked into the Shift register.
27	Data In	Serial data input. Data needs to be present before each rising edge of the clock.
28	$\overline{\text{Output Enable}}$	Output enable input. When $\overline{\text{OE}}$ is low, all HV outputs are forced into a Low state, regardless of data in each channel. When $\overline{\text{OE}}$ is high, all high-voltage outputs reflect data latched.
29	N/C	No connection
30	HVOUT32	High-voltage output
31	HVOUT31	High-voltage output
32	HVOUT30	High-voltage output

HV9308/HV9408

TABLE 2-1: HV9308 PIN FUNCTION TABLE (CONTINUED)

Pin Number	Pin Name	Description
33	HVOUT29	High-voltage output
34	HVOUT28	High-voltage output
35	HVOUT27	High-voltage output
36	HVOUT26	High-voltage output
37	HVOUT25	High-voltage output
38	HVOUT24	High-voltage output
39	HVOUT23	High-voltage output
40	HVOUT22	High-voltage output
41	HVOUT21	High-voltage output
42	HVOUT20	High-voltage output
43	HVOUT19	High-voltage output
44	HVOUT18	High-voltage output

TABLE 2-2: HV9408 PIN FUNCTION TABLE

Pin Number	Pin Name	Description
1	HVOUT16	High-voltage output
2	HVOUT17	High-voltage output
3	HVOUT18	High-voltage output
4	HVOUT19	High-voltage output
5	HVOUT20	High-voltage output
6	HVOUT21	High-voltage output
7	HVOUT22	High-voltage output
8	HVOUT23	High-voltage output
9	HVOUT24	High-voltage output
10	HVOUT25	High-voltage output
11	HVOUT26	High-voltage output
12	HVOUT27	High-voltage output
13	HVOUT28	High-voltage output
14	HVOUT29	High-voltage output
15	HVOUT30	High-voltage output
16	HVOUT31	High-voltage output
17	HVOUT32	High-voltage output
18	Data Out	Serial data output. Data output for cascading to the data input of the next device.
19	NC	No connection
20	NC	No connection
21	NC	No connection
22	CLK	Data Shift register clock. Inputs are shifted into the Shift register on the positive edge of the clock.
23	GND	Logic and high-voltage ground

TABLE 2-2: HV9408 PIN FUNCTION TABLE (CONTINUED)

Pin Number	Pin Name	Description
24	VPP	High-voltage power rail
25	VDD	Low-voltage logic power rail
26	$\overline{\text{Latch Enable}}$	Latch enable input. When $\overline{\text{LE}}$ is high, Shift register data is transferred into a data latch. When $\overline{\text{LE}}$ is low, data is latched and new data can be clocked into the Shift register.
27	Data In	Serial data input. Data needs to be present before each rising edge of the clock.
28	$\overline{\text{Output Enable}}$	Output enable input. When $\overline{\text{OE}}$ is low, all high-voltage outputs are forced into a Low state, regardless of data in each channel. When $\overline{\text{OE}}$ is high, all high-voltage outputs reflect data latched.
29	NC	No connection
30	HVOUT1	High-voltage output
31	HVOUT2	High-voltage output
32	HVOUT3	High-voltage output
33	HVOUT4	High-voltage output
34	HVOUT5	High-voltage output
35	HVOUT6	High-voltage output
36	HVOUT7	High-voltage output
37	HVOUT8	High-voltage output
38	HVOUT9	High-voltage output
39	HVOUT10	High-voltage output
40	HVOUT11	High-voltage output
41	HVOUT12	High-voltage output
42	HVOUT13	High-voltage output
43	HVOUT14	High-voltage output
44	HVOUT15	High-voltage output

HV9308/HV9408

3.0 FUNCTIONAL DESCRIPTION

Follow the steps in [Table 3-1](#) to power up and power down the HV9308/HV9408.

TABLE 3-1: POWER-UP AND POWER-DOWN SEQUENCE

Power-Up		Power-Down	
Step	Description	Step	Description
1	Connect ground.	1	Remove V_{PP} . (Note 1)
2	Apply V_{DD} .	2	Remove all inputs.
3	Set all inputs (Data, CLK, Enable, etc.) to a known state.	3	Remove V_{DD} .
4	Apply V_{PP} . (Note 1)	4	Disconnect ground.

Note 1: The V_{PP} should not drop below V_{DD} during operation.

TABLE 3-2: TRUTH FUNCTION TABLE 1

Data Input	CLK	Data Output
H	↑	H
L	↑	L
X	No ↑	No change

Note: ↑ = Low-to-high transition

TABLE 3-3: TRUTH FUNCTION TABLE 2

Data Input	\overline{LE}	\overline{OE}	High-Voltage Output
X	X	L	All $HV_{OUT} = \text{low}$
X	L	H	Previously latched data
H	H	H	H
L	H	H	L

Note: ↑ = Low-to-high transition

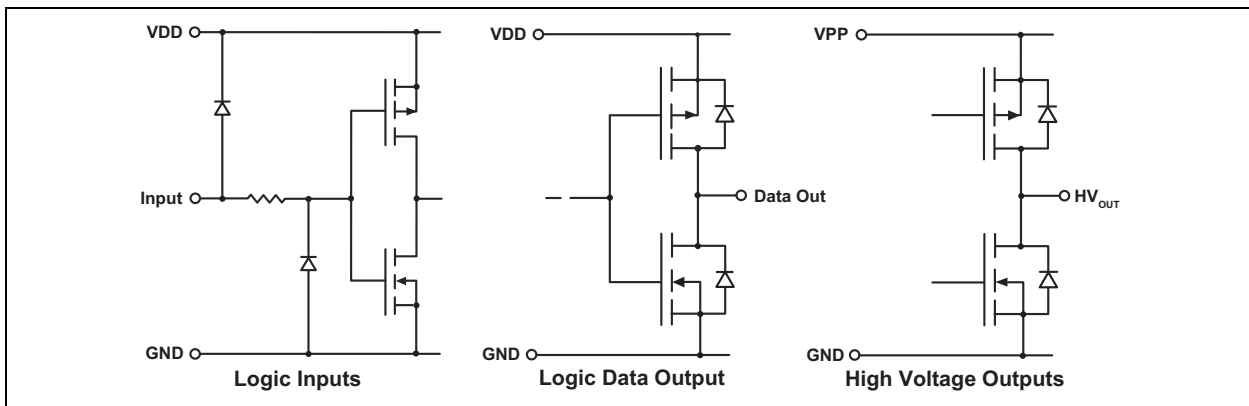
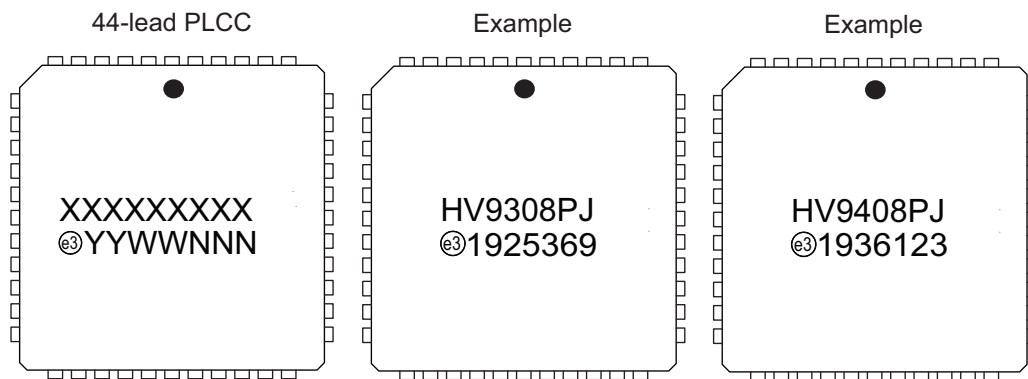


FIGURE 3-1: Input and Output Equivalent Circuits.

4.0 PACKAGE MARKING INFORMATION

4.1 Packaging Information

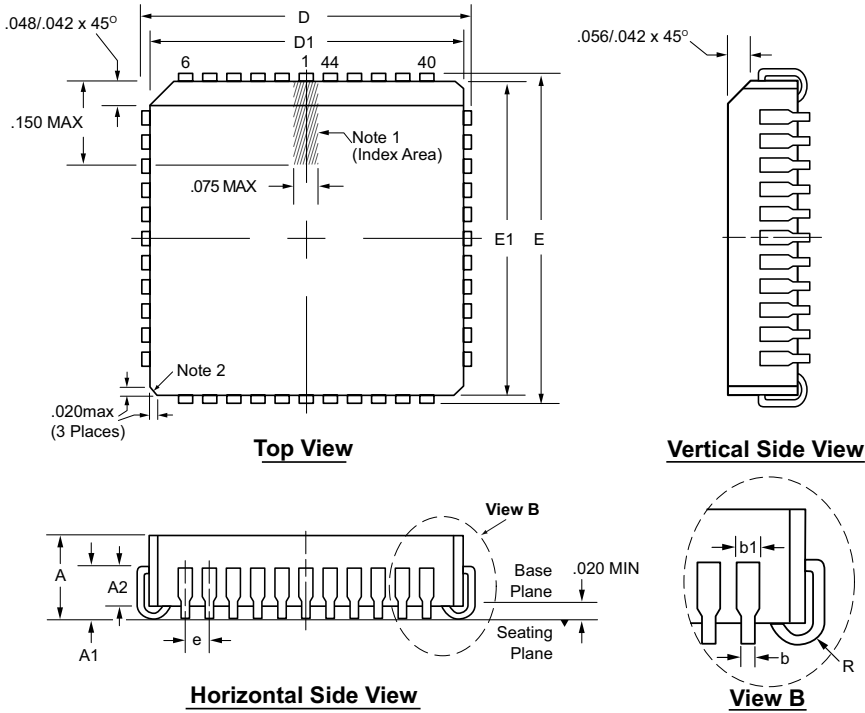


Legend:	XX...X	Product Code or Customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week '01')
	NNN	Alphanumeric traceability code
	Ⓔ3	Pb-free JEDEC [®] designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator (Ⓔ3) can be found on the outer packaging for this package.

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for product code or customer-specific information. Package may or not include the corporate logo.

HV9308/HV9408

44-Lead PLCC Package Outline (PJ) .653x.653in body, .180in height (max), .050in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.
2. Actual shape of this feature may vary.

Symbol	A	A1	A2	b	b1	D	D1	E	E1	e	R	
Dimension (inches)	MIN	.165	.090	.062	.013	.026	.685	.650	.685	.650	.050 BSC	.025
	NOM	.172	.105	-	-	-	.690	.653	.690	.653		.035
	MAX	.180	.120	.083	.021	.036†	.695	.656	.695	.656		.045

JEDEC Registration MS-018, Variation AC, Issue A, June, 1993.

† This dimension differs from the JEDEC drawing.

Drawings not to scale.

APPENDIX A: REVISION HISTORY

Revision A (September 2019)

- Converted Supertex Docs # DSFP-HV9308 and DSFP-HV9408 to Microchip DS20005912A
- Removed “Processed with HVCMOS[®] Technology” in the Features section
- Changed the package marking format
- Removed the 44-lead PLCC PJ M903 media type
- Made minor changes throughout the document

HV9308/HV9408

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

<u>PART NO.</u>	<u>XX</u>	-	<u>X</u>	-	<u>X</u>																														
Device	Package Options		Environmental		Media Type																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Devices:</td> <td style="width: 15%;">HV9308</td> <td style="width: 5%;">=</td> <td colspan="3">32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs</td> </tr> <tr> <td></td> <td>HV9408</td> <td>=</td> <td colspan="3">32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs</td> </tr> <tr> <td>Package:</td> <td>PJ</td> <td>=</td> <td colspan="3">44-lead PLCC</td> </tr> <tr> <td>Environmental:</td> <td>G</td> <td>=</td> <td colspan="3">Lead (Pb)-free/RoHS-compliant Package</td> </tr> <tr> <td>Media Type:</td> <td>(blank)</td> <td>=</td> <td colspan="3">27/Tube for a PJ Package</td> </tr> </table>						Devices:	HV9308	=	32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs				HV9408	=	32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs			Package:	PJ	=	44-lead PLCC			Environmental:	G	=	Lead (Pb)-free/RoHS-compliant Package			Media Type:	(blank)	=	27/Tube for a PJ Package		
Devices:	HV9308	=	32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs																																
	HV9408	=	32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs																																
Package:	PJ	=	44-lead PLCC																																
Environmental:	G	=	Lead (Pb)-free/RoHS-compliant Package																																
Media Type:	(blank)	=	27/Tube for a PJ Package																																
Examples: a) HV9308PJ-G: 32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs, 44-lead PLCC, 27/Tube b) HV9408PJ-G: 32-Channel Serial-to-Parallel Converter with High-Voltage Push-Pull Outputs, 44-lead PLCC, 27/Tube																																			

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as “unbreakable.”

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AnyRate, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, HELDO, IGLoo, JukeBlox, KeeLoq, Klear, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PackeTime, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TempTrackr, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

APT, ClockWorks, The Embedded Control Solutions Company, EtherSynch, FlashTec, Hyper Speed Control, HyperLight Load, IntelliMOS, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, Temux, TimeCesium, TimeHub, TimePictra, TimeProvider, Vite, WinPath, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KlearNet, KlearNet logo, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2019, Microchip Technology Incorporated, All Rights Reserved.

ISBN: 978-1-5224-5007-8

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.



MICROCHIP

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
<http://www.microchip.com/support>
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880-3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Microchip:](#)

[HV9408PJ-G](#)