



Preliminary

## 64-Channel Military TFT ±10V Liquid Crystal Display Driver

T-52-13-07

### Ordering Information

Device	Package Options		
	80-Lead Quad Ceramic Gullwing	80-Lead Quad Ceramic Gullwing (MIL-STD-883 Processed*)	Die
HV61	HV6101DG	RBHV6101DG	HV6101X

\* For Hi-Rel process flows, refer to page 5-3 of the Databook.

### Features

- Symmetrical + 10V output swing
- Active return to ground
- +12V control logic
- Bidirectional shift control pin
- Data out for cascading
- 8MHz clock

### Absolute Maximum Ratings

Supply Voltage, $V_{DD}$	-0.5 to +15.0 $V_{DC}$
Supply Voltage, $V_{SS}$	-0.5 to +15.0 $V_{DC}$
Logic Input Levels	(-0.5) to ( $V_{DD} + 0.5$ ) $V_{DC}$
Continuous Total Power Disipation	1500mW
Operating Temperature Range	-55°C to +125°C
Storage Temperature Range	-65°C to +150°C
Die Storage Temperature Range	-65°C to +150°C

**Notes:**

1. All voltages are referenced to GND.
2. Duty cycle is limited by the total power dissipated in the package.

### General Description

The HV61 is a 64-channel latched serial-to-parallel converter with bidirectional shifting capability and high-voltage outputs that can be switched in polarity from  $V_{PP}$  to  $V_{NN}$ . It is intended mainly as a driver for active-matrix liquid crystal displays in military systems.

The shift direction is controlled by pins SHFL and CSB. A low at CSB enables the shift function, which occurs at the low-to-high transition of the clock. A high at SHFL causes data to be shifted "right-to left" (from  $L_{IN}$   $R_{OUT}$  toward  $L_{OUT}$   $R_{IN}$ ), and vice versa.

The 64 latches are transparent when LOAD is high, and the data is latched when load is low.

The FRAME control reverses the voltage polarity of outputs that are in the logical high state. For FRAME = high, high-level outputs will be at  $V_{DD}$  level; for FRAME = low, high-level outputs will be at  $V_{SS}$  level. Outputs at logic low will be low regardless of FRAME.

**Electrical Characteristics**

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**DC Characteristics**

Notes 1 & 2

Symbol	Parameter	Min	Typ	Max	Units	Conditions
$I_{DD}$	$V_{DD}$ Current	0		500	mA	$V_{DD} = 12V^3$
$I_{SS}$	$V_{SS}$ Current	—		-500	mA	$V_{SS} = -12V^3$
$I_{IH}$	Input High Leakage Current	0		10	mA	$V_{IH} = 12V$
$I_{IL}$	Input Low Leakage Current	-10		0	mA	$V_{IL} = 0V$
$I_{OMP}$	Output Source Current	-1.0		—	mA	$V_{OH} = 11.5V$
$I_{OHN}$	Output Source Current	1.0		—	mA	$V_{OH} = 11.5V$
$I_{OL}$	Output Sink Current	1.0		—	mA	$V_{OH} = 0.5V$

- Notes:  
 1.  $V_{DD} = 12V$ .  $V_{SS} = -12V$   
 2. Negative current indicates current flow out of the device  
 3. No load

**Recommended Operating Conditions**

Symbol	Parameter	Min	Typ	Max	Units	Conditions
$V_{DD}$	Supply Voltage	9	10	13.2	V	
$V_{SS}$	Supply Voltage	9	10	13.2	V	
$V_{IH}$	High-level input voltage	$V_{DD} - 2$		$V_{DD}$	V	
$V_{IL}$	Low-level input voltage	0		2	V	

- Note:  
 Power-up sequence should be the following:  
 1. Connect ground.  
 2. Apply  $V_{DD}$ .  
 3. Set all inputs (Data, CLK, Enable, etc.) to a known state.  
 4. Apply  $V_{PP}$ .

Power-down sequence should be the reverse of the above.

**Truth Tables**

**Input**

CSB	SHFL	Shift Register
H	X	No Shift
L	H	Shift Left ( $L_{IN}$ $R_{OUT}$ to $L_{OUT}$ $R_{IN}$ )
L	L	Shift Right ( $L_{OUT}$ $R_{IN}$ to $L_{IN}$ $R_{OUT}$ )

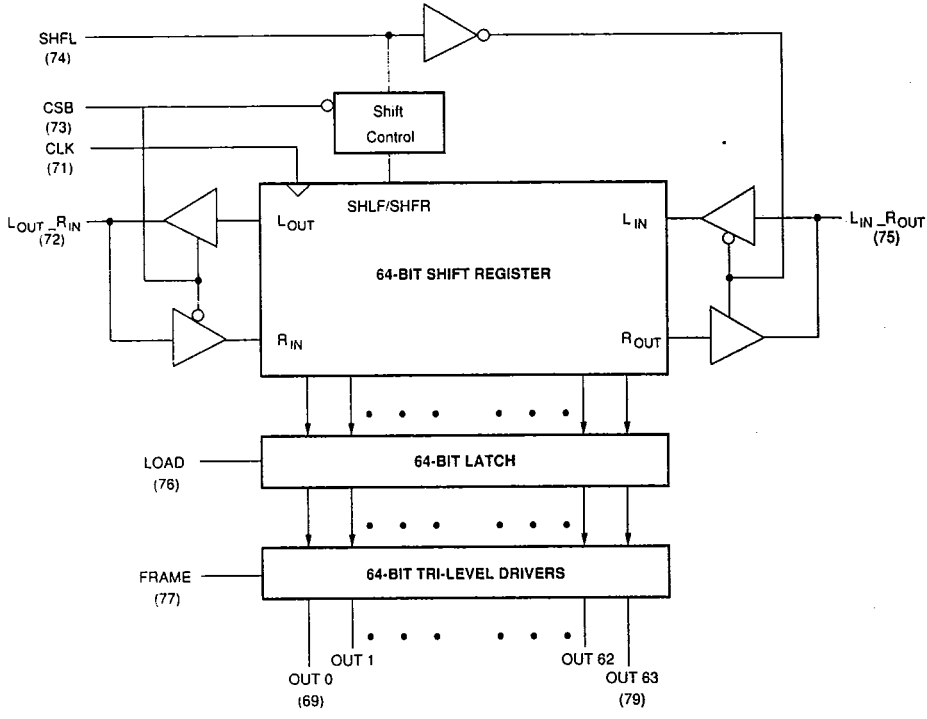
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**Output**

Load	FRAME	Outputs
L	X	L (Previous Data)
H	H	$V_{DD}$ (New Data: Latch Transparent)

# Functional Block Diagram

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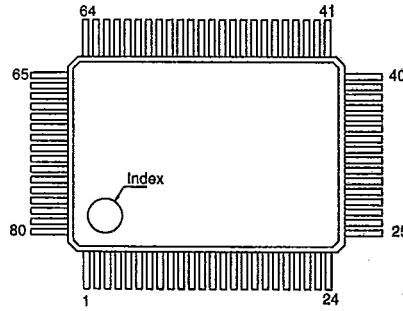
Pin Configuration

Package Outline

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80-Gullwing Package

Pin	Function	Pin	Function
1	GND	41	Q25
2	Q61	42	Q24
3	Q60	43	V <sub>SS</sub>
4	Q59	44	Q23
5	Q58	45	Q22
6	Q57	46	Q21
7	Q56	47	Q20
8	Q55	48	Q19
9	Q54	49	Q18
10	Q53	50	Q17
11	V <sub>SS</sub>	51	Q16
12	Q52	52	V <sub>DD</sub>
13	Q51	53	Q15
14	Q50	54	Q14
15	Q49	55	Q13
16	Q48	56	Q12
17	Q47	57	Q11
18	Q46	58	Q10
19	Q45	59	Q09
20	Q44	60	Q08
21	V <sub>DD</sub>	61	Q07
22	Q43	62	Q06
23	Q42	63	Q05
24	Q41	64	V <sub>SS</sub>
25	Q40	65	Q04
26	Q39	66	Q03
27	Q38	67	Q02
28	Q37	68	Q01
29	Q36	69	Q00
30	Q35	70	GND
31	Q34	71	CLK
32	GND	72	L <sub>OUT</sub> R <sub>IN</sub>
33	Q33	73	CSB
34	Q32	74	SHFL
35	Q31	75	L <sub>IN</sub> R <sub>OUT</sub>
36	Q30	76	Load
37	Q29	77	Frame
38	Q28	78	V <sub>DD</sub>
39	Q27	79	Q63
40	Q26	80	Q62



top view  
80-pin Gullwing Package

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