

HA13444

Quad Solenoid Driver

Description

HA13444 is a low-active quad driver IC, designed to act as a solenoid driver for motor vehicles.

Functions

- 0.6-A × 4-channel output circuit
- Clamp diode
- Chip enable

Features

- High voltage: 60 V
- Low saturation voltage
- Non-inverting input
- Small input current
- Compatible with TTL, LS-TTL, 5-V CMOS input

Truth Table

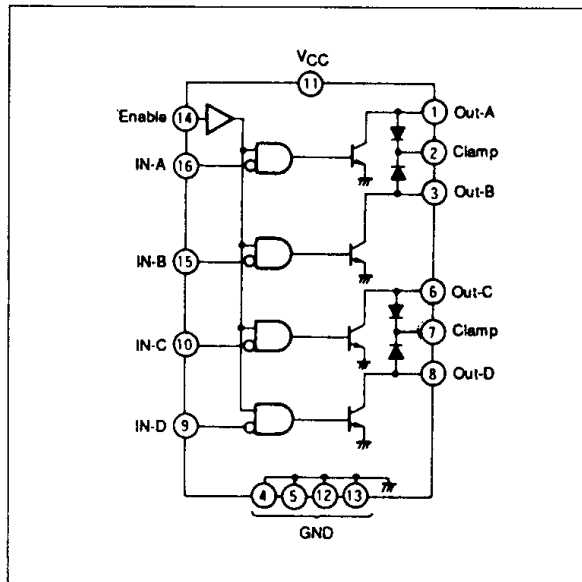
Enable	Input	Output
H	L	On
H	H	Off
L	X	Off

H : High level (2.0 V)

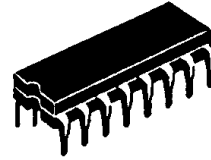
L : Low level (0.8 V)

X : High, low, or open

Block Diagram

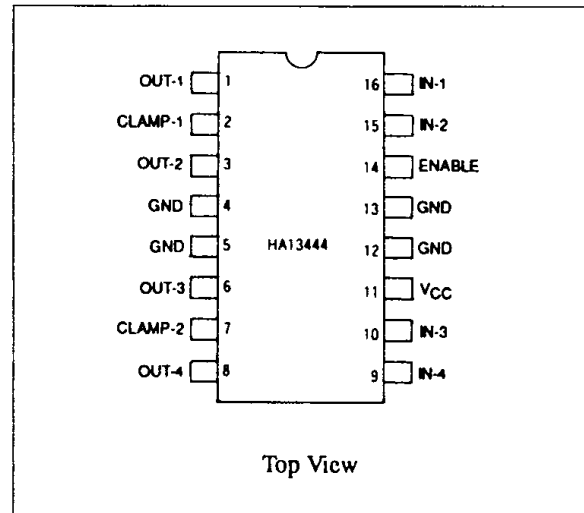


HA13444



(DP-16C)

Pin Assignment



Top View

HA13444

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Rating	Unit	Note
Power supply voltage	V _{CC}	7	V	1
Input voltage	V _{in}	15	V	
Output voltage	V _{CEx}	60	V	
Output current	I _{out}	0.6	A	
Power dissipation	P _T	1.85	W	2
Junction temperature	T _j	150	°C	
Operating junction temperature	T _{jop}	-40 to +125	°C	
Storage temperature	T _{stg}	-55 to +150	°C	

The absolute maximum ratings are limiting values, to be applied individually, beyond which the device may be permanently damaged. Functional operation under any of these conditions is not guaranteed. Exposing a circuit to its absolute maximum rating for extended periods of time may affect the device's reliability.

Notes:

- Recommended operating temperature range is 4.5 to 5.5V.
- The following are thermal resistance values:
 - $\theta_{j-a1} \leq 60^\circ\text{C/W}$ (for printed circuit board patterning)
 - $\theta_{j-a2} \leq 35^\circ\text{C/W}$ (for printed circuit board with sufficient wiring density)
 - $\theta_{j-a3} \leq 15^\circ\text{C/W}$ (for assuming infinite heat sink at pins 4, 5, 12, 13)

Electrical Characteristics (Ta = 25°C, V_{CC} = 5.0V)

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions	Pins	Notes
Power supply current	I _{CC}	—	60	80	mA	ENABLE = 2 V, V _{in} = 0.8 V, I _{out} = 0.6 A × 4 channels	11	
	I _{CCO}	—	6	—	mA	ENABLE = 0.8 V		
Input low-level voltage	V _{IL}	—	—	0.8	V		9, 10, 14,	
Input high-level voltage	V _{IH}	2.0	—	—	V		15, 16	
Input low-level current	I _{IL}	—	-1	±10	μA	V _{in} = 0.4 V		
Input high-level current	I _{IH}	—	0	±10	μA	V _{in} = 5.5 V		
Collector-emitter saturation voltage	V _{CE(sat)}	—	0.1	0.3	V	V _{CC} = 4.75 V, I _{out} = 0.1 A	1, 3, 6, 8	
		—	0.25	0.4	V	V _{in} = 0.8 V, I _{out} = 0.3 A		
		—	0.4	0.7	V	I _{out} = 0.6 A		
Output leak current	I _{CEX}	—	—	100	μA	V _{CEx} = 60 V		
Output sustained voltage	V _{CE(sus)}	60	—	—	V	V _{in} = 2 V, I _{out} = 0.1 A		1
Clamp diode forward voltage	V _F	—	1.2	1.6	V	I _F = 0.8 A	1, 3, 6, 8	
		—	1.5	2.0	V	I _F = 1.5 A	2, 7	
Clamp diode leak current	I _R	—	—	100	μA	V _R = 60 V		
Propagation delay time	t _{pHL}	—	0.2	0.5	μs	I _{out} = 0.6 A	9, 10, 15, 16	
	t _{pLH}	—	1.5	8.0	μs	I _{out} = 0.6 A	1, 3, 6, 8	

Note:

- See figure 1 for measurement.

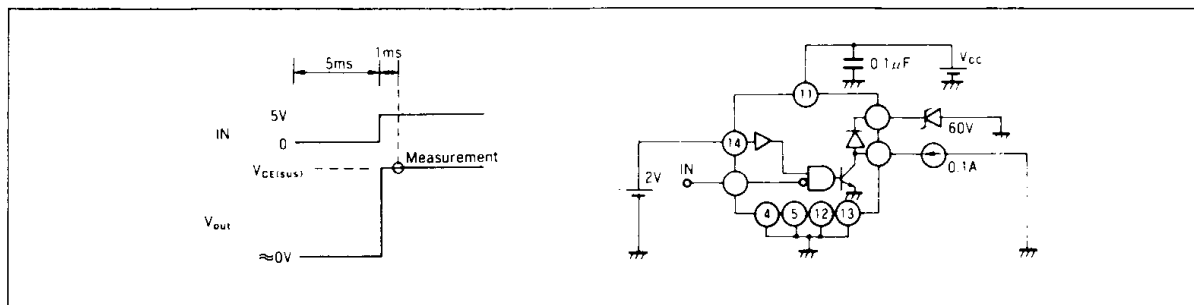


Figure 1 V_{CE(sus)} Measurement Circuit

