

# HA13007

## Quad Driver

### Description

The HA13007 monolithic, bipolar, high-voltage, high-current quad driver is especially designed for switching applications. This device is recommended for interfacing low-level logic to peripheral loads such as relays, solenoids, stepping motors, LED, heaters, and other similar high-voltage, high-current loads.

### Features

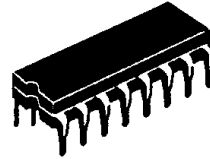
- Guaranteed minimum output breakdown of 60 V, and maximum output current of 0.7 A
- Low output collector-emitter saturation voltage
- Input compatible with TTL, LSTTL and 5 V CMOS.
- Integral transient suppression diodes for inductive loads
- Lower input current

**Table 1 Truth Table**

ENABLE	IN	OUT
H	H	L
H	L	H
L	X	H

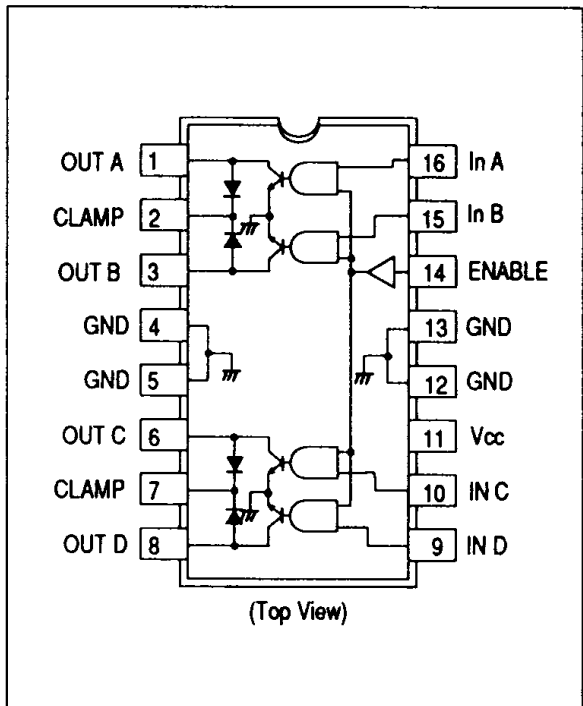
Note: H=High level: 2.0 V  
L=Low level: 0.8 V  
X=Don't care

**HA13007**



(DP-16C)

### Pin Arrangement



### Ordering Information

Type No.	Package
HA13007	DC-16C



**Table 2 Absolute Maximum Ratings (Ta=25 °C)**

Item	Symbol	Rating	Unit	Note
Supply voltage	V <sub>CC</sub>	7.0	V	1
Input voltage	V <sub>IN</sub>	0 to V <sub>CC</sub>	V	
Output voltage	V <sub>CEX</sub>	60	V	
Output current	I <sub>OUT</sub>	0.7	A	
Power dissipation	P <sub>T</sub>	1.85	W	2
Thermal resistance	Junction-case	θ <sub>jc</sub>	15	°C/W
	Junction-ambient	θ <sub>ja</sub>	60	°C/W
Junction temperature	T <sub>j</sub>	150	°C	
Operating junction temperature range	T <sub>jop</sub>	-40 to +125	°C	
Storage temperature range	T <sub>stg</sub>	-55 to +125	°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: 1. Recommended operating voltage V<sub>CC</sub> = 4.75 to 5.5 V  
 2. Thermal resistances are as follows:  
 θ<sub>j-a1</sub> ≤ 60 °C/W (Soldered on a print circuit board)  
 θ<sub>j-a2</sub> ≤ 35 °C/W (Soldered on a print circuit board with copper sufficiently)  
 θ<sub>j-a3</sub> ≤ 15 °C/W (Soldered on pins 4, 5, 12, and 13 with an infinite heat sink)

**Table 3 Electrical Characteristics (Ta=25 °C, V<sub>CC</sub>=5.5 V)**

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Output leakage current	I <sub>CEX</sub>	—	—	100	μA	V <sub>CE</sub> =60 V, V <sub>IN</sub> =0.8 V
Output sustaining voltage	V <sub>CE(sus)</sub>	60	—	—	V	V <sub>IN</sub> =0.8 V, I <sub>c</sub> =10 mA
Output saturation voltage	V <sub>CE(sat)</sub>	—	0.3	0.5	V	V <sub>CC</sub> =4.75 V, I <sub>c</sub> =0.4 A V <sub>IN</sub> =2.0 V
		—	0.5	0.7		
Input low voltage	V <sub>IL</sub>	—	—	0.8	V	
Input low current	I <sub>IL</sub>	—	-1	±10	μA	V <sub>IN</sub> =0.8 V, I <sub>c</sub> =0
Input high voltage	V <sub>IH</sub>	2.0	—	—	V	



# HA13007

## Electrical Characteristics (Ta=25 °C, Vcc=5.5 V) (cont)

Input high current	I <sub>IH</sub>	—	0	±10	μA	I <sub>C</sub> =0.7 A x 4	V <sub>IN</sub> =2.0 V
		—	—	1.0	mA		V <sub>IN</sub> =5.0 V
Supply current (all outputs on)	I <sub>S</sub>	—	50	65	mA	I <sub>C</sub> =0.7 A x 4, V <sub>IN</sub> =5.5 V (All Inputs)	
Supply current (all outputs off)	I <sub>SO</sub>	—	8.0	—	mA	V <sub>IN</sub> =0.8 V (All Inputs)	
Clamp diode leakage current	I <sub>R</sub>	—	—	100	μA	V <sub>R</sub> =60 V	
Clamp diode forward voltage	V <sub>F</sub>	—	1.2	1.6	V	V <sub>IN</sub> =0.8 V	I <sub>F</sub> =1.0 A
		—	1.3	2.0	V		I <sub>F</sub> =1.5 A
Turn-on delay	t <sub>PLH</sub>	—	1.0	—	μs		
Turn-off delay	t <sub>PHL</sub>	—	0.3	—	μs		

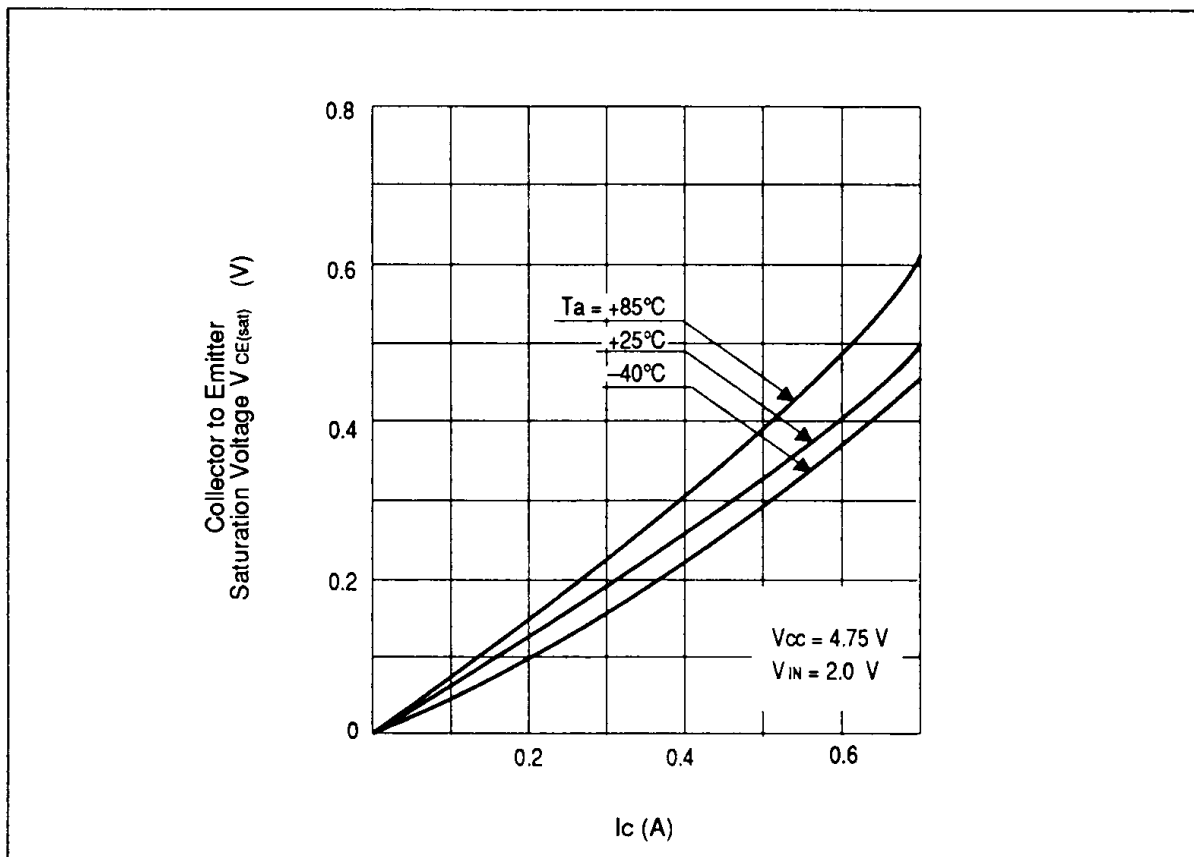


Figure 1 Output Saturation Voltage vs Output Current



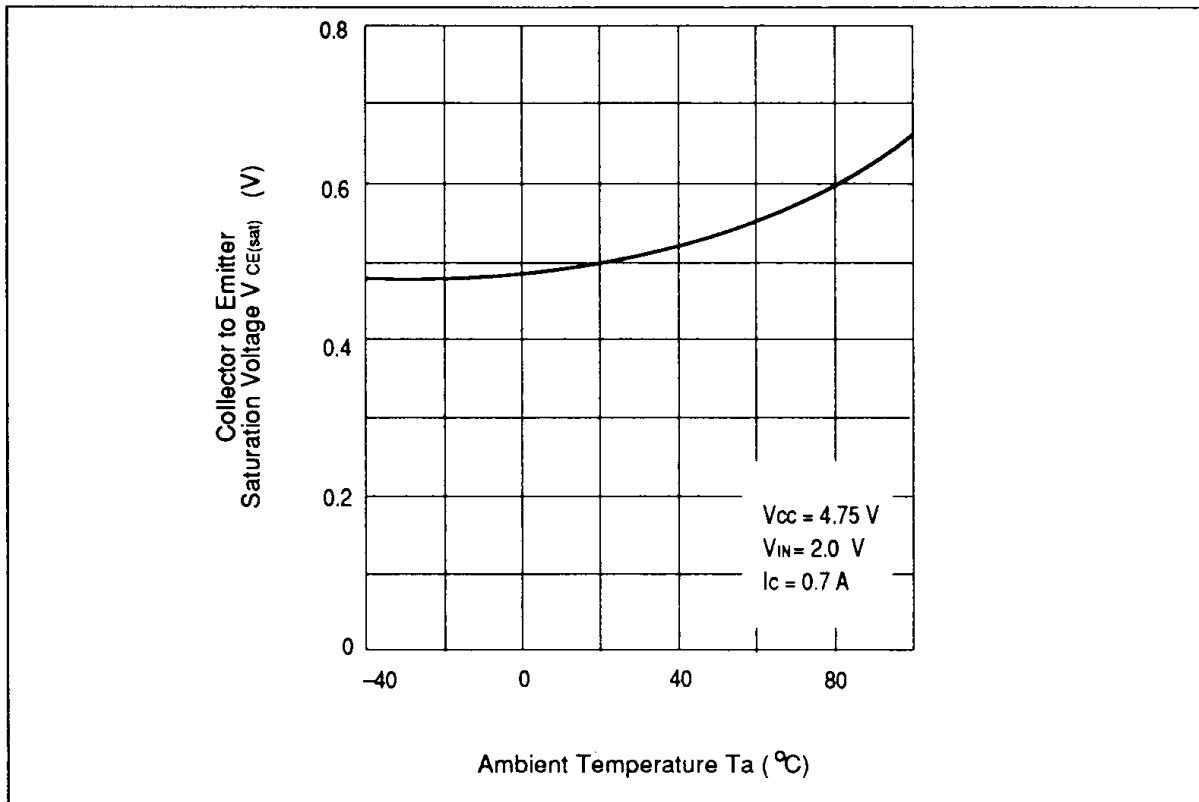


Figure 2 Output Saturation Voltage vs Ambient Temperature

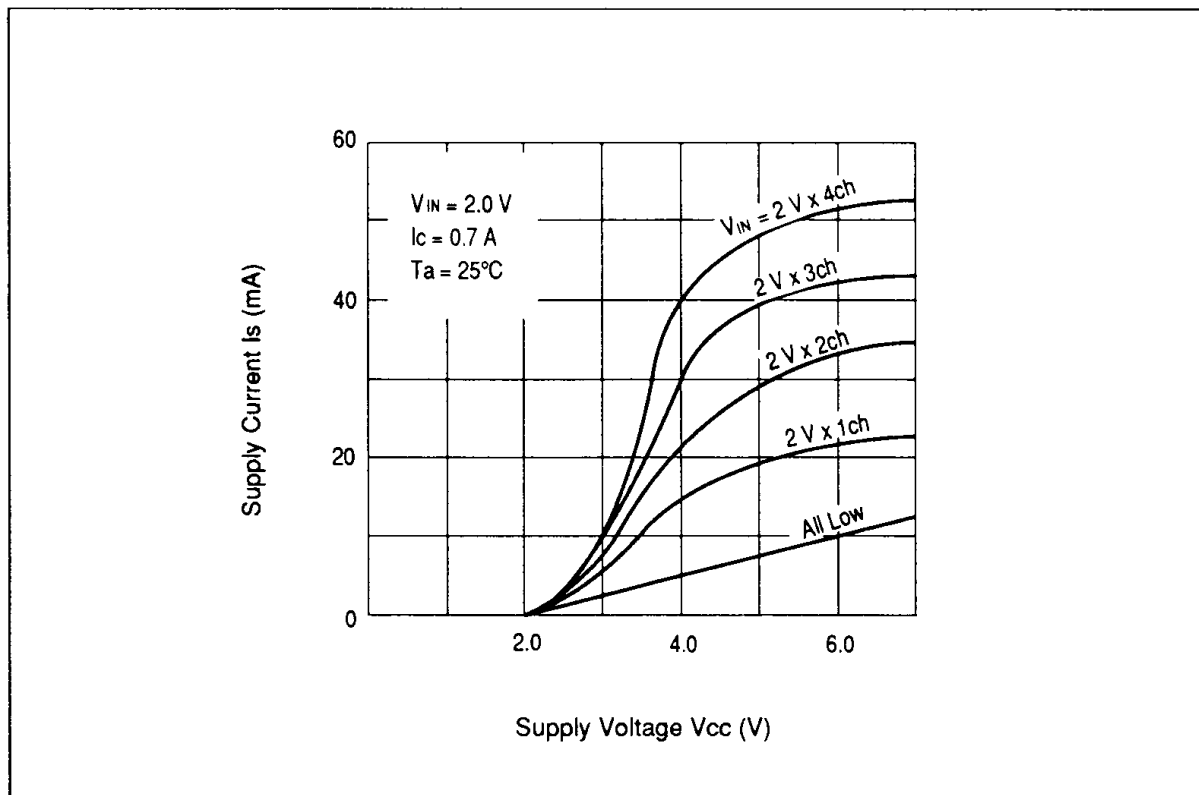


Figure 3 Output Current vs Supply Voltage



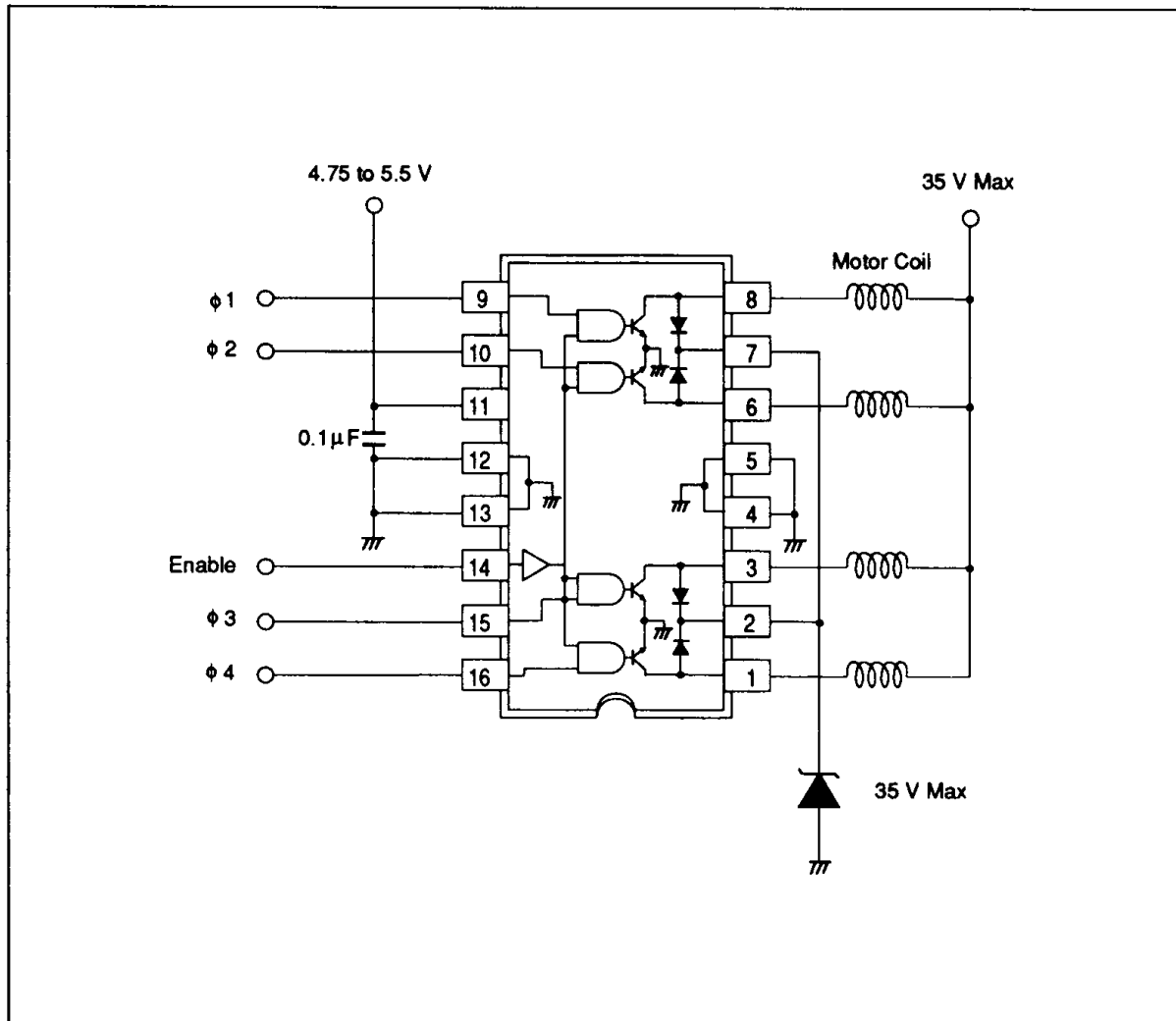


Figure 4 Stepping Motor Drive Application