INTEGRATED POWER SEMICONDUCTORS, LTD.

Ten Channel Half-Bridge Driver

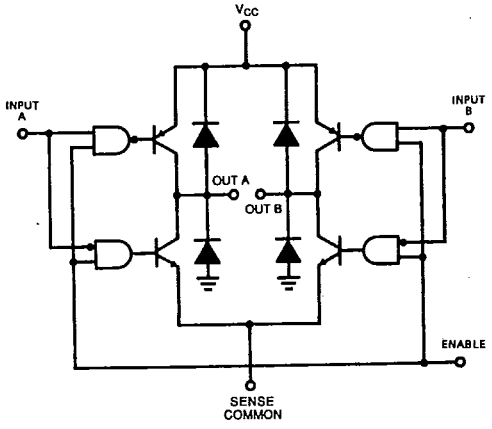
Description

The IP3M02 is a ten channel push-pull driver capable of delivering continuous output currents to 250mA per channel. Each channel is controlled by a TTL compatible logic input and each of the five full-bridge drivers is equiped with an enable input for high impedance output state. A single external resistor allows for chop mode or applications which require more accurate current control. The device is packaged in either a 28 pin SOIC or DIP package.

Features

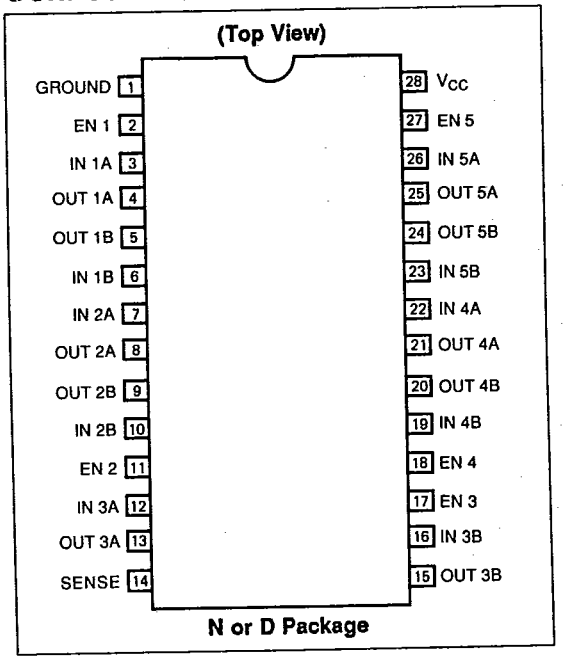
- Five full H-bridge drivers
- TTL compatible input and enable logic
- External current sense
- Internal flyback protection diodes
- 250mA continuous output currents
- 4.3 to 15V voltage supply range
- Internal thermal shutdown with hysteresis
- 28 pin plastic SOIC or DIP package

Block Diagram



One of 5 identical bridges

Connections



N or D Package

Absolute Maximun Ratings (T_A = 25°C)

Supply Voltage, V_{CC}		20V	**Operating Ambient Temperature, T_A**	0°C to 70°C
Input Voltage, V_{IN}		20V	**Maximum Junction Temperature, T_J**	150°C
Sense Voltage, V_{SENSE}		0.5V	**Storage Temperature, T_S**	-65°C to 150°C
Continuous Output Current, I_O		250mA	**Peak Non-repetative Output Current, I_{pk} ($t \leq 5$ msec.)**	500mA
Max. Power Dissipation, P_D	28 pin DIP	2W		
	28 pin SOIC	1W		

Absolute maximum ratings are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The electrical characteristics provide conditions for actual device operation.

Electrical Characteristics

(Unless otherwise noted, specifications apply for 4.3V ≤ V_{CC} ≤ 15V, I_O = 0mA and 0°C ≤ T_A ≤ 70°C. Typical values measured at V_{CC} = 12V).

Parameter	Conditions		Min	Typ	Max	Unit
Supply Voltage, V_{CC}		•	4.3		15	V
Supply Current, I_S	EN = H, A_{IN} = H, B_{IN} = L	•		15	20	mA
	EN = H, IN = H	•		30	40	mA
	EN = H, IN = L	•		5	8	mA
	EN = L	•		5	8	mA
Logic Input Low Voltage, V_{IL}		•	-0.3		0.8	V
Logic Input High Voltage, V_{IH}		•	2.0		V_S	V
Logic Input Low Current, I_{IL}	V_{IL} = 0.8V	•		-50	-100	µA
Logic Input High Current, I_{IH}	V_{IH} = 2.0V	•		1	10	µA
Output Saturation Voltage, V_{SAT} (Note 2)	I_O = 250mA	•		2.25	2.6	V
	I_O = 100mA	•		1.85	2.2	V
Output Differential Voltage, V_{OD} (Note 3)	I_O = 250mA	•		50	100	mV
	I_O = 100mA	•		20	100	mV
Diode Forward Voltage, V_F	I_O = 250mA	•		1.2	2.0	V
Sense Voltage, V_{SENSE}		•	-0.3		0.3	V
Output Leakage Current, I_{LK}	V_S = 20V per channel, V_{CC} = 20V	•		1	25	µA
Thermal Shutdown Temperature, T_{TSD}	Note 1	•	150	175		°C

The • denotes specifications which apply over the full operating range, all others apply at T_A = 25°C unless otherwise specified.

Note 1: Guaranteed by design only. Not tested in production.

Note 2: Output Saturation Voltage, V_{SAT} — Output saturation voltage is the total voltage drop across the sink and source output transistors for a given channel. Output saturation voltage is measured under two load conditions and a graph of typical V_{SAT} values is shown in figure 1.

Note 3: Output Differential Voltage, V_{OD} — Output differential voltage is the absolute value of the difference between any two output saturation voltage measurements. For applications which require well matched applied load voltages this parameter specifies the maximum delta in saturation voltages between any two channels. Output differential voltage is measured under two load conditions and a graph of typical and maximum V_{OD} values is shown in figure 3.

Switching Characteristics

(V_{CC} = 12V, f = 10kHz, I_O = 250mA and T_A = 25°C)

Parameter	Conditions	Min	Typ	Max	Unit
Sink Current Turn-on Delay, t_{on}			900		nS
Sink Current Rise Time, t_r			500		nS
Sink Current Turn-off Delay, t_{off}			350		nS
Sink Current Fall Time, t_f			350		nS
Source Current Turn-on Delay, t_{on}			250		nS
Source Current Rise Time, t_r			200		nS
Source Current Turn-off Delay, t_{off}			550		nS
Source Current Fall Time, t_f			150		nS

Note: Switching times apply for resistive loads only and are not tested in production.

Truth Table

Input	Enable*	Output
H	H	H
L	H	L
H	L	Z
L	L	Z

*Relative to the considered channel
Z = High Impedence

Order Information

Part Number	Temperature Range	Package
IP3M02D	0°C to 70°C	28 Pin SOIC
IP3M02N	0°C to 70°C	28 Pin DIP

Integrated Power Semiconductors, Ltd.
2727 Walsh Avenue, Suite 201, Santa Clara, CA 95051 • Telephone : 408-727-2772 • Telex: 350073 (IPS SNTA) • FAX: 408-988-6185
8 Quaker Drive, West Warwick, RI 02893 • Telephone: 401-821-4260 • Telex: 332948 (IPS RI) • FAX: 401-823-7260
2081 Business Center Drive, Suite 140, Irvine, CA 92715 • Telephone: 714-752-0188 • FAX: 714-752-5019
789 Turnpike Street, North Andover, MA 01845 • Telephone: 617-683-9042 • FAX: 617-975-0193