200mA DUAL H BRIDGE

IP1M10, IP2M10, IP3M10, IP1M12, IP2M12, IP3M12

DESCRIPTION

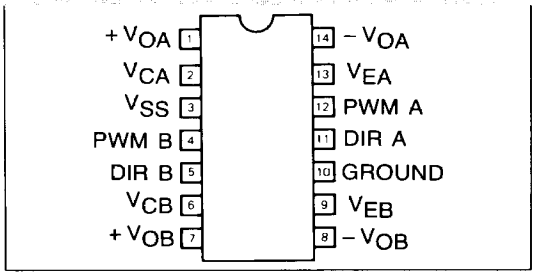
The IP1M10 and IP1M12 series each contain two full H-bridge power drivers capable of delivering 200 mA continuous output current per channel (100mA for IMXX/2MXX). Each bridge may be run from its own supply voltage of up to 36V and is controlled by 2 high voltage protected logic level inputs with internal hysteresis for noise immunity. Protection features include thermal shutdown, peak current limiting, crossover current blanking, and internal output clamp diodes. Logic supply current is provided by a separate pin so that standby power dissipation may be minimized. The IP1M10 series requires a +5V logic supply while the IP1M12 series requires a logic supply voltage of +7V or greater, and is typically used in single supply applications.

The IP1M10 and IP1M12 are available in a 14 lead ceramic DIP while the IP2M10, IP2M12, IP3M10, IP3M12 are available in the 14 lead ceramic DIP, 14 lead plastic DIP, and 14 lead plastic SOIC packages.

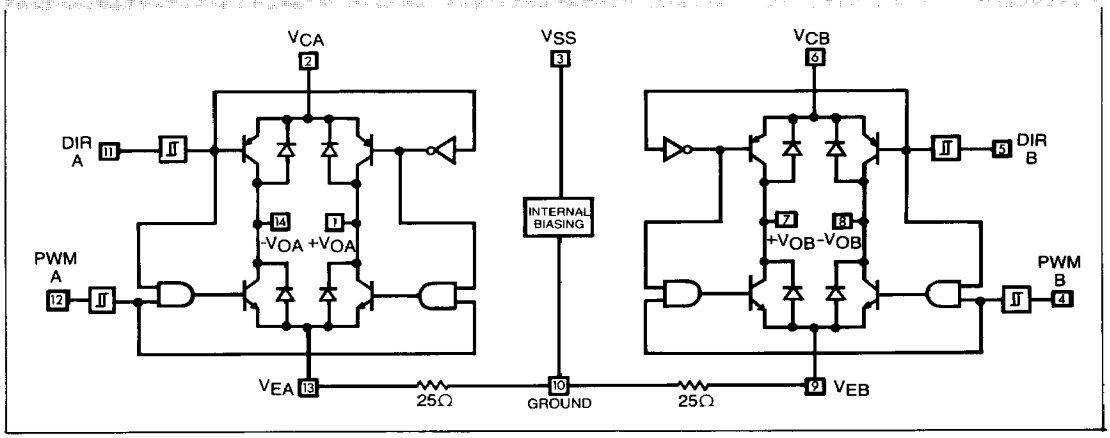
FEATURES

- 200mA continuous output current per bridge (100mA for IMXX/2MXX)
- Internal output clamp diodes
- Hysteretic logic inputs for noise immunity
- Thermal shutdown protection
- Peak current limit protection
- Crossover current blanking
- Separate +5V logic supply for minimum power dissipation (1M10 series only)
- Separate +7 to +36V logic supply (1M12 series only)

CONNECTIONS



BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

Logic Supply Voltage, Pin 3 (1M10, 2M10, 3M10) + 7V

Logic Supply Voltage, Pin 3 (1M12, 2M12, 3M12) +40V

Driver Supply Voltage, Pins 2 and 6 +40V

Logic Inputs −0.3V to +40V

Output Current, DC ±250mA

Output Current, Peak INTERNALLY LIMITED

Power Dissipation, T_A = +25°C (Note 1) 1000mW

Power Dissipation, T_C = +25°C (Note 2) 2000mW

Operating Junction Temperature +150°C

Storage Temperature Range −65°C to +150°C

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

RECOMMENDED OPERATING CONDITIONS (NOTE 3)

Logic Supply Voltage, Pin 3 (1M10, 2M10, 3M10) +4.75V to +5.25V

Logic Supply Voltage, Pin 3 (1M12, 2M12, 3M12) +7V to +36V

Driver Supply Voltage, Pins 2 and 6 +4.75V to +36V

Logic Inputs 0V to +36V

Output Current, DC
(3MXX) ±200mA
(1MXX/2MXX) ±100mA

Output Current, peak
(3MXX) ±250mA
(1MXX/2MXX) ±125mA

Operating Ambient Temperature Range
IP1M10/1M12 −55°C to +125°C
IP2M10/2M12 −40°C to + 85°C
IP3M10/3M12 0°C to + 70°C

Note 1 Derate at 10mW/°C for ambient temperature above + 50°C
Note 2 Derate at 16mW/°C for case temperature above + 25°C
Note 3 Range over which the device is functional and parameter limits are guaranteed

TRUTH TABLE

INPUTS		OUTPUTS	
DIR	PWM	$+V_O$	$-V_O$
L	L	Z*	H
L	H	L	H
H	L	H	Z*
H	H	H	L

* Z = High Impedance

200mA DUAL H BRIDGE

ELECTRICAL CHARACTERISTICS

Unless otherwise noted, specifications apply over the recommended operating conditions. (See Notes 1-3).

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNITS
Logic Supply Current (Pin 3)	XM10	Vss = +5.25V, I_{LOADS} = 0mA	●		5	12	mA
		Vss = +5.25V, I_{LOADS} = 100mA	●		8	20	
		Vss = +5.25V, I_{LOADS} = 200mA	●		12	28	
	XM12	Vss = +36V, I_{LOADS} = 0mA	●		8	18	
		Vss = +36V, I_{LOADS} = 100mA	●		11	25	
		Vss = +20V, I_{LOADS} = 200mA	●		15	32	
Quiescent Bridge Current (Pin 2 or 6)		I_{LOAD} = 0mA	●		2.5	8	mA
PWM Input Threshold (Pins 4 and 12)	Falling		●	0.8	1.5	2.0	V
	Rising		●	1.2	2.5	3.0	
	Hysterisis		●	0.4	1.0		
PWM Input Current (Pins 4 and 12)	Low	V_{IN} = 0V	●		−20	−100	µA
	High	V_{IN} = 36V	●		0.1	±10	
DIR Input Threshold (Pins 5 and 11)	Falling		●	0.8	1.5	2.0	V
	Rising		●	1.2	2.3	3.0	
	Hysterisis		●	0.2	0.8		
DIR Input Current (Pins 5 and 11)	Low	V_{IN} = 0V	●		−20	−100	µA
	High	V_{IN} = +36V	●		0.1	±10	
Total Saturation Voltage (V_{SAT} (Sink) + V_{SAT} (Source))		I_{LOAD} = 100 mA	●		1.8	2.25	V
	3M10/3M12 Only	I_{LOAD} = 200 mA	●		2.1	2.70	
Diode Forward Voltage		I_{DIODE} = 100 mA	●		1.1	1.4	V
		I_{DIODE} = 200 mA	●		1.2	1.6	
Output Leakage Current (Pins 1, 7, 8 and 14)	Low	Vo = 0V, Vc = 36V	●		1	100	µA
	High	Vo = Vc = 36V	●		1	100	

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNITS
Sink Turn-on Delay	Δt: V_i = $V_{i(TH)}$ to V_o = Vs/2			1250		nS
Sink Current Rise Time	Δt: I_o = (0.1 to 0.9) I_{LOAD}			200		nS
Sink Turn-off Delay	Δt: V_i = $V_{i(TH)}$ to V_o = $V_{s/2}$			300		nS
Sink Current Fall Time	Δt: I_o = (0.9 to 0.1) I_{LOAD}load			200		nS
Source Turn-on Delay	Δt: V_i = $V_{i(TH)}$ to V_o = $V_{s/2}$			800		nS
Source Rise Time	Δt: I_o = (0.1 to 0.9) I_{LOAD}			400		nS
Source Turn-off Delay	Δt: V_i = $V_{i(TH)}$ to V_o = $V_{s/2}$			1000		nS
Source Fall Time	Δt: I_o = (0.9 to 0.1) I_{LOAD}			500		nS
Sink to Source Deadtime				500		nS
Source to Sink Deadtime				250		nS

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

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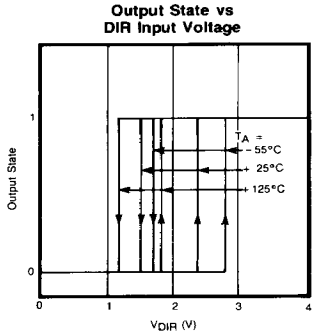
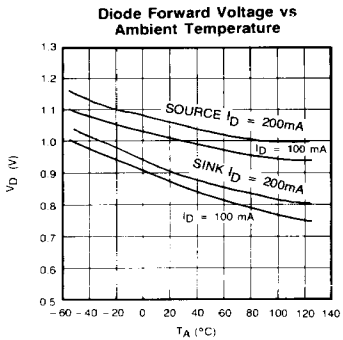
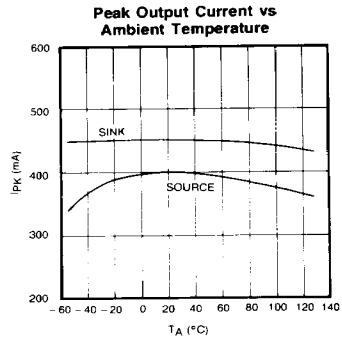
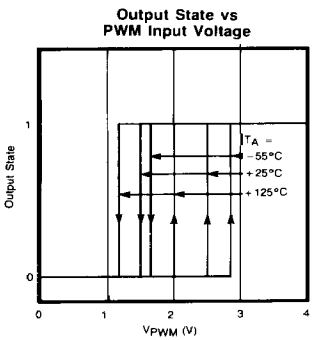
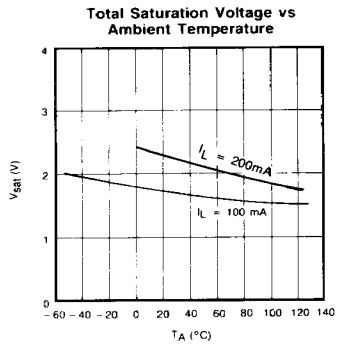
TYPICAL PERFORMANCE CHARACTERISTICS

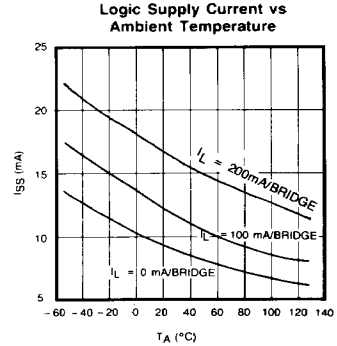












ORDER INFORMATION

Part Number	Temperature Range	Package
IP1M10J	−55°C to +125°C	14 Pin Ceramic DIP
IP2M10J	−40°C to + 85°C	14 Pin Ceramic DIP
IP2M10N	−40°C to + 85°C	14 Pin Plastic DIP
IP2M10D	−40°C to + 85°C	14 Pin SOIC
IP3M10J	0°C to + 70°C	14 Pin Ceramic DIP
IP3M10N	0°C to + 70°C	14 Pin Plastic DIP
IP3M10D	0°C to + 70°C	14 Pin SOIC
IP1M12J	−55°C to +125°C	14 Pin Ceramic DIP
IP2M12J	−40°C to + 85°C	14 Pin Ceramic DIP
IP2M12N	−40°C to + 85°C	14 Pin Plastic DIP
IP2M12D	−40°C to + 85°C	14 Pin SOIC
IP3M12J	0°C to + 70°C	14 Pin Ceramic DIP
IP3M12N	0°C to + 70°C	14 Pin Plastic DIP
IP3M12D	0°C to + 70°C	14 Pin SOIC