POTTER & BRUMFIELD INPUT/OUTPUT MODULES

T-52-13-35

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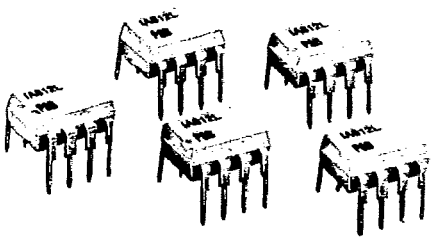

IA8 series

DUAL IN-LINE PACKAGE INPUT/OUTPUT MODULES

File E29244

GENERAL INFORMATION

Potter & Brumfield IA8 series input/output (I/O) modules are 8 pin, dual in-line package (DIP) units which require half the space of 16 pin models. These modules provide a means of reliably interfacing microprocessor- or computer-based control systems with external control devices and telecommunications equipment.

The IA8 can act as an AC/DC input module or a DC output module. The input circuitry consists of two LEDs connected inverse parallel which allows operation of the module from either AC or DC voltages. The output circuitry is an open drain MOSFET which sinks the output current to the common terminal. The output does require logic voltage to operate.

IA8 series I/O modules feature a hybrid leadframe design and terminals spaced on a .100" (2.54 mm) grid suitable for automatic insertion on printed circuit boards. Surface mount terminals are also available.

FEATURES

- Mini-DIP Package
- All Solid State AC or DC Input
- High Immunity to False Operation
- 4,000V rms Optical Isolation (Exceeds FCC Part 68 Surge Test)
- 200 mA Output Current Rating
- 60V DC Output Voltage Rating
- 4 to 28V DC Logic Voltage Operation
- Optional Surface Mount Terminals
- Directly Replaces Older IA8-11 & IA8-12 Models and Offers Enhanced Performance

ENGINEERING DATA

Switch Form: 1 Form A (SPST-NO).
Duty: Continuous.
Isolation: 4,000V rms, 60 Hz. (Pins 1, 2, 3 & 4 shorted; pins 5, 6, 7 & 8 shorted).
Insulation Resistance: 10^{11} ohms @ 500V DC, minimum.
Moisture Resistance: 10^{11} ohms @ 500V DC, minimum, per MIL-STD-883C Method 1004.4.
Capacitance: 10 pF maximum (input to output).
Operating Temperature: −30°C to +85°C
Storage Temperature: −40°C to +100°C
Vibration: 100 g, 10 to 2,000 Hz.
Shock: 1,500 g @ 0.5 millisecond, per MIL-STD-883C Method 2002.3.
Case: 8 pin DIP style package.
Case Material: Self extinguishing, filled epoxy, 94V1
Solderability: 260°C for 10 seconds, maximum.
Approximate Weight: 0.02 oz. (0.5 gram).

ORDERING INFORMATION

Sample Part Number	IA	8	−1	1L

1. BASIC SERIES:
IA = AC or DC input/DC output module

2. CASE TYPE & SIZE:
8 = 8 pin DIP (Dual In-Line Package) style

3. OUTPUT CURRENT & VOLTAGE:
1 = 200 mA, 60V DC (4 to 28V DC logic voltage)

4. INPUT RATING:
1L = 5 mA*
2L = 2.5 mA*

5. TERMINAL TYPE:
Blank = Standard DIP style terminals
S = Optional gull-wing style terminals (for surface mounting)

*Dual LED input. Unit does not have an internal limiting resistor. An external resistor must be provided to maintain proper operating current at the desired input voltage.

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INPUT SPECIFICATIONS @ 25°C

Parameter	Condition	Units	IA8-11L			IA8-12L		
			Min.	Typ.	Max.	Min.	Typ.	Max.
Control Current Range I_f	Pin 1 to 2 or 3	mA	5		30	2.5		30
Operate Current	Pin 1 to 2 or 3	mA			5			2.5
Release Current	Pin 1 to 2 or 3	mA	.05			.05		
LED Voltage Drop	Pin 1 to 2 or 3 I_f = 20 mA	VDC		±1.2	±1.7		±1.2	±1.7

Unit does not have an internal limiting resistor. An external resistor must be provided to maintain proper operating current at the desired input voltage.

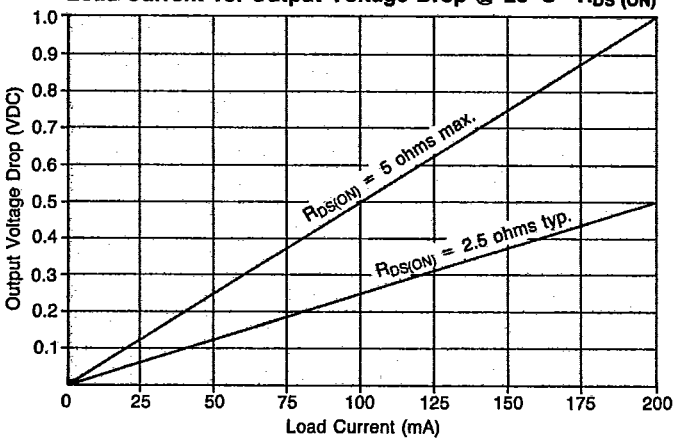
OUTPUT SPECIFICATIONS (@ 25°C, unless otherwise specified)

Parameter	Condition	Units	IA8-11L, IA8-12L		
			Min.	Typ.	Max.
Output Voltage $V_{DS(OFF)}$		VDC			60
Output Current I_{SINK}*		mA DC			200
Leakage Current	@V_{DS} = 60V DC	μA DC			50
Output Voltage Drop $V_{DS(ON)}$	@ V_{CC} = 5V DC; I_{SINK} = 200 mA	VDC		.5	1.0
Output ON Resistance $R_{DS(ON)}$		Ohms		2.5	5
Logic Supply Voltage V_{CC}		VDC	4		28
Logic Supply Current	@ V_{CC} = 5V DC	μA DC		1.0	
Turn-On Time	@ V_{CC} = 4V DC; I_f = 5 mA	μsec		100	200
Turn-Off Time	@ V_{CC} 4V DC; I_f = 5 mA	msec		.75	1.5

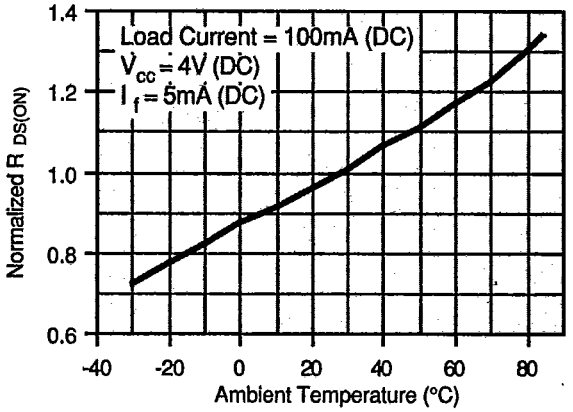
*Inductive loads should be diode suppressed.

ELECTRICAL CHARACTERISTICS

Load Current vs. Output Voltage Drop @ 25°C—$R_{DS\ (ON)}$

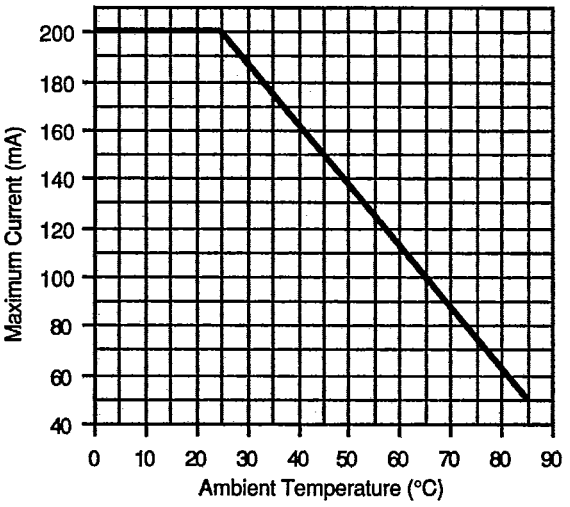


Ambient Temperature vs. Normalized Output ON Resistance (Typ.)



Example:
$R_{DS(ON)}$ @ −25°C = 0.76 x 5Ω = 3.8Ω max.
@ +25°C = 1.0 x 5Ω = 5.0Ω max.
@ +75°C = 1.26 x 5Ω = 6.3Ω max.

Ambient Temperature vs. Maximum Steady State DC Current Rating



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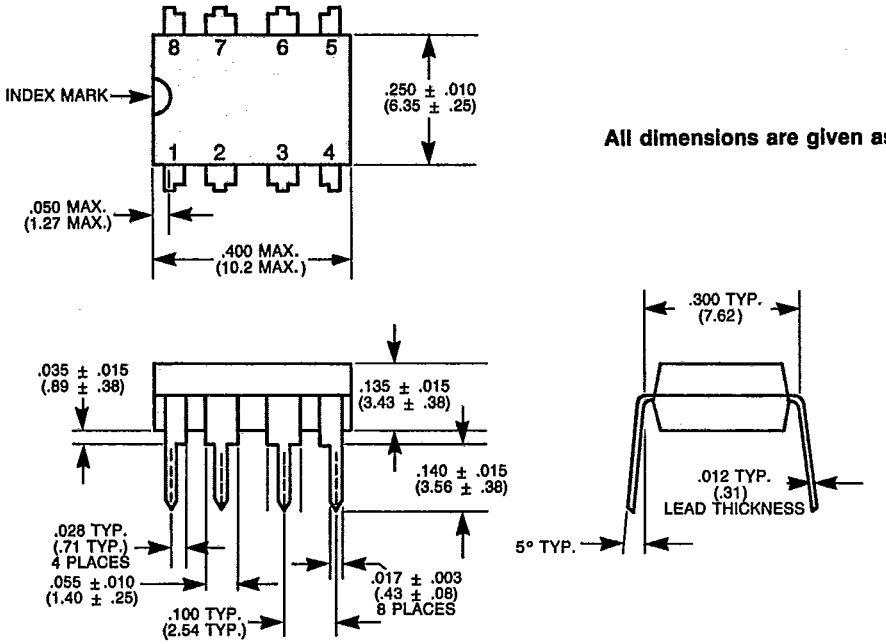
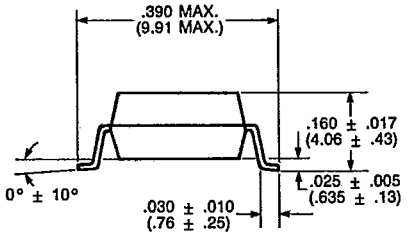
OUTLINE DIMENSIONS



All dimensions are given as **inches (mm)**

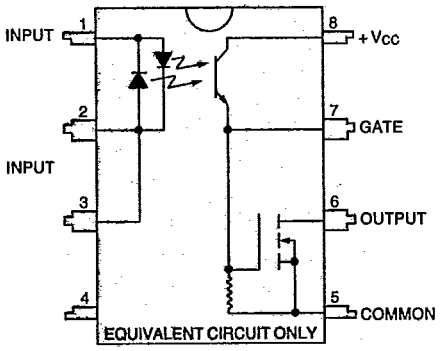
NOTE: Terminal numbers are for reference only. They do not appear on the module.

SURFACE MOUNTING OPTION



Add an **S** to the module part number for gull-wing style, DIP terminals.
Example: **IA8-11LS**

OPERATING DIAGRAM (Top View)



Caution

Static Sensitive Devices

Handle Only at
Static Safe Work Stations

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TYPICAL HOOK UP DIAGRAMS

Operation From DC Input Voltage
(Input Low/High to Logic High/Low Indicator)

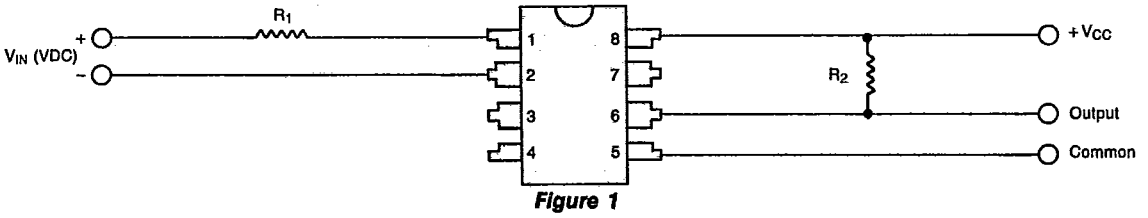

Figure 1

R_1 = Input current limiting resistor; This resistor is needed to maintain the proper operating current at the desired input voltage. See chart below for values.

R_2 = 10 KΩ to 100 KΩ typical; Pull-up resistor is needed to keep the output high with no input voltage applied.

Operation From AC Input Voltage
(Input Low/High to Logic High/Low Indicator)

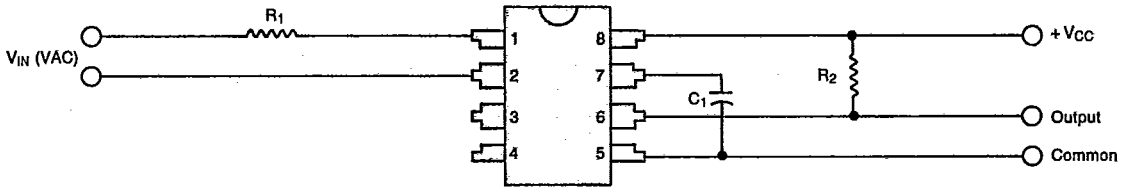

Figure 2

R_1 & R_2 = Same as above.

C_1 = .01 μF, capacitor voltage ≥ V_{CC}; Filter capacitor is needed to keep the output low during AC zero voltage crossover. C also increases the turn-on and turn-off time.

NOTE: Terminal numbers are for reference only. They do not appear on the module.

RECOMMENDED R_1 VALUE AND OPERATING VOLTAGE RANGE

V_{IN} (VDC)—Figure 1
V_{IN} (VAC)—Figure 2

V_{IN}(VAC/VDC)		IA8-11L			IA8-12L		
Nom.	Range	R_1 (Ohms)	$PD_{(R_1)}$ (Watts)	$I_{NOM.}$ (mA)	R_1 (Ohms)	$PD_{(R_1)}$ (Watts)	$I_{NOM.}$ (mA)
5	4-8	470	¼	8	1,000	¼	4
12	10-20	1,500	½	7	3,300	¼	3
24	20-28	3,300	½	7	6,800	¼	3
48	44-52	6,800	1	7	18 K	¼	3
120	90-140	15 K	3	8	33 K	1	4
240	180-280	27 K	5	9	68 K	3	4
480	430-530	68 K	10	7	180 K	4	3
600	540-660	91 K	10	7	220 K	5	3

Equations Used:

$$R_1 = \frac{V_{IN} - 1.2}{I_{NOM.}}$$

$$PD_{(R_1)} = \frac{(V_{IN} - 1.2)^2}{R_1}$$

R_1 = Series resistor
V_{IN} = Input voltage
1.2 = IA8 LED voltage drop
$I_{NOM.}$ = Nominal input current at nominal V_{IN}
$PD_{(R_1)}$ = Power dissipation of R_1; Value listed is about twice the wattage calculated at maximum voltage of V_{IN} Range.

NOTE: For detailed application information request Application Note (13C279).

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