HEWLETT PACKARD

IDA-07318
MagIC™ Silicon Bipolar MMIC
1.5 Gb/s Laser Diode Driver

Features

- **High Data Rates: 1.5 Gb/s NRZ**
- **High Modulation Current: 50 mA**
- **High Prebias Current: 50 mA**
- **Low VSWR 50 Ω Input, ECL Level Compatible**
- **Differential or Single-ended Inputs**
- **Separate Modulation and Prebias Controls**
- **Single Power Supply: +5 V or -5.2 V**
- **Hermetic Glass-metal Surface Mount Package**

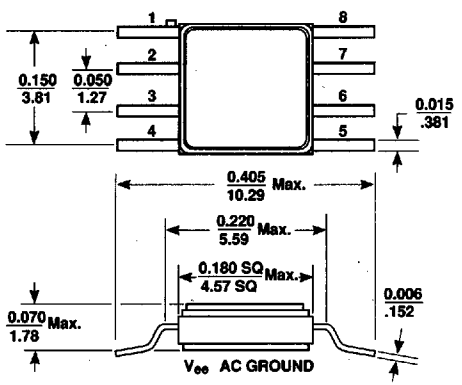
Description

The IDA-07318 is a wideband silicon bipolar Monolithic Microwave Integrated Circuit (MMIC), Laser Diode (LD) driver, housed in a miniature glass-metal hermetic surface mount package. It is designed to provide high speed current drive for laser diodes or light emitting diodes (LEDs). On-chip termination resistors and flexible prebias and modulation control inputs simplify your design.

Typical applications include fiber optic data communications (e.g., FDDI, serial HIPPI) and telecommunications (e.g., SONET) systems where high speed laser diodes are used with data rates up to 1.5 Gb/s. In addition, instrumentation and communication circuits can use the high speed current modulation feature of the IDA-07138.

The IDA series of laser diode drivers is fabricated using HP's 10 GHz f_T, 25 GHz f_{MAX} ISOSAT™-1 silicon bipolar process that uses nitride self-alignment, submicrometer lithography, trench isolation, ion implantation, gold metalization, and polyimide inter-metal dielectric and scratch protection to achieve excellent performance uniformity, and reliability.

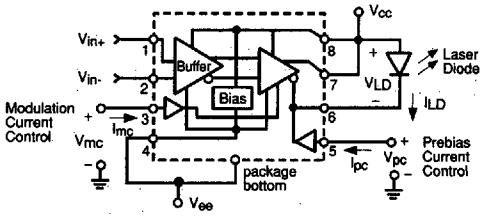
180 mil Package

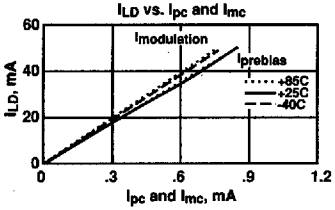


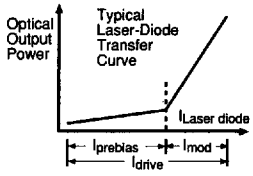
PIN DESCRIPTION	
1 Vin+	8 Vcc
2 Vin-	7 Output Current-
3 Mod. Input	6 Output Current+ (to LD)
4 Vee	5 Prebias Input
Bottom of Package is Vee	

Notes:
(unless otherwise specified)
1. Dimensions are in / mm
2. Tolerances
in .xxx = ±.005
mm .xx = ±.13

Functional Block Diagram







Guaranteed Electrical Specifications, T_A = 25°C, V_{cc} = 0 V, V_{ee} = -5.2 V, Z Load = 12 Ω (see Test Configuration)

Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.
t_r	Output Rise Time, 20% to 80% (Pin 6)	I_{mod} = 25 mA, I_{pb} = 50 mA	ps		220	300
t_f	Output Fall Time, 20% to 80% (Pin 6)	I_{mod} = 25 mA, I_{pb} = 50 mA	ps		240	320
I_{pb}	Laser Diode Prebias Current Set Range		mA	0-50		
I_{mod}	Laser Diode Modulation Current Set Range[1]		mA	5-50		
I_d	Device Current	V_{cc} - V_{cc} = 5 V, I_{mod} = 0 mA, I_{pb} = 0 mA		30	40	50

Notes: 1. Recommended operating range for Modulation Current Set is 10 to 50 mA.

Design Information, T_A = 25°C, V_{cc} = 0 V, V_{ee} = -5.2 V, Z Load = 12 Ω (see Test Configuration)

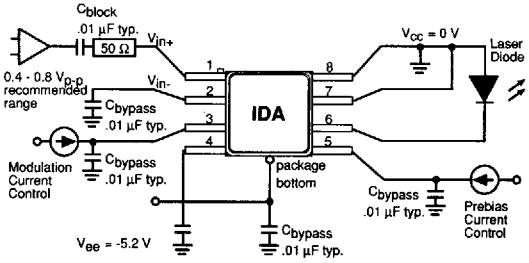
Symbol	Parameters and Test Conditions		Units	Typ.
τ_p	Propagation Delay Time, Input to Output	I_{mod} = 25 mA	ps	300
BW	Small Signal -3 dB Bandwidth	I_{mod} = 25 mA	GHz	1.0
VSWR	V_{in}+, V_{in}- VSWR	f = 0.1 to 2 GHz		2:1
$t_{r\,pb}$, $t_{r\,mod}$	Modulation or Prebias Current Output Rise Time (Inputs Pin 3 or 5)		ns	6

Absolute Maximum Ratings

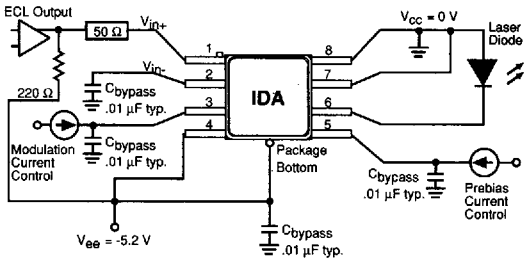
Parameter	Absolute Maximum[1]
Device Voltage	10 V
Power Dissipation[2, 3]	2.5 W
I_{mod} or I_{pb}	150 mA rms
Junction Temperature	200°C
Storage Temperature	-65 to 200°C
Thermal Resistance[2]: θ_{jc} = 50°C/W	

Notes:
1. Permanent damage may occur if any of these limits are exceeded.
2. T_{case} = 25°C
3. Derate at 20 mW/°C for T_C > 75°C

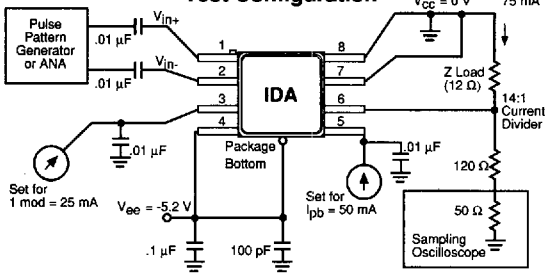
Typical Use: AC Coupled, Single-ended 50Ω Input



Typical Use: DC Coupled, Single-ended ECL Input

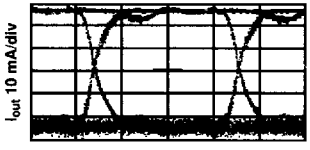


Test Configuration

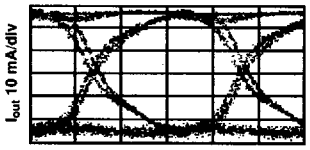


Typical Performance, T_A = 25°C
V_{CC} = 0 V, V_{ee} = 5.2 V, R_L = 12 Ω
(unless otherwise noted)

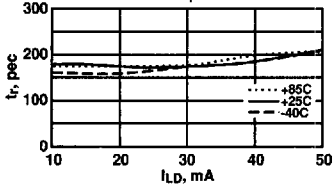
Eye Diagram, 622 Mb/s



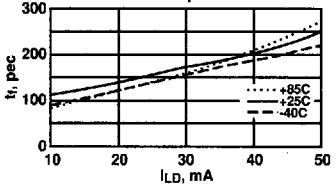
Eye Diagram, 1.5 Gb/s



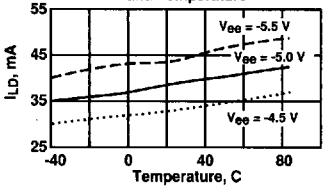
Rise Time vs. I_{LD} and Temperature



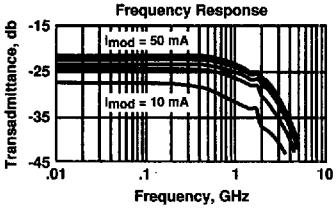
Fall Time vs. I_{LD} and Temperature



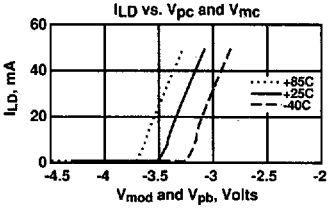
I_{device} vs. Power Supply and Temperature



Frequency Response



I_{LD} vs. V_{pc} and V_{mc}



Input VSWR vs. Frequency