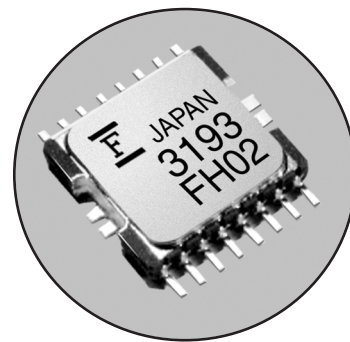


FEATURES

- Operation DC to 2.5Gbit/s, NRZ
- Modulation Current Drive Only
- Capability to Drive Direct Modulation Laser and MI-Laser
- Maximum Peak Current of 80mA Typical@RL = 24Ω
- Peak-to-Peak Output Voltage, Min: 3V@RL = 50Ω
- Single-ended or Differential ECL Input
- Single-5.2V Power Supply
- Small Outline Package similar to SSOP-16



DESCRIPTION

The FMM3193VI GaAs Laser Driver is a high-rate driver circuit designed for fiber optic transmitters operating at NRZ data rates up to 2.5Gbit/s. The FMM3193VI is capable of driving high-power Laser diodes at peak current up to 80mA typically, and driving MI-Laser at peak-to-peak voltage of 3V. The FMM3193VI outputs only modulation current, and an external bias current circuit is required. This driver is assembled in a small outline ceramic package having a similar footprint to SSOP-16.

ABSOLUTE MAXIMUM RATINGS (V_{DD} = 0V, Ta=25°C)

Parameter	Symbol	Ratings	Unit
Supply Voltage	V _{SS}	-7.0 to 0	V
Input Voltage	V _{IN}	V _{SS} to 0	V
Power Supply Current	I _{SS}	300	mA
Peak Current Control Voltage	V _{IP}	V _{SS} -2.0 to V _{SS} +1.2	V
Output Voltage*	V _{out} , $\overline{V_{out}}$	-3.1 to +0.6	V
Storage Temperature	T _{stg}	-55 to 125	°C

(*) Applied in less than 10 min.

Direct Modulation Laser Application

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, T_c=25°C, V_{SS}=-5.2V)

Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Maximum Data Rate		NRZ	2.5	-	-	Gbps
Maximum Peak Current (OUT)	I _P	V _{IP} = -4.1V, DIN = "HIGH", RL = 25Ω	60	80	-	mA
Output Voltage (OUT)	V _{out}	V _{IP} = -4.1V, DIN = "HIGH", RL = 50Ω	-	-	-3.0	V
Leakage Current (OUT)	I _{PDH}	V _{IP} = -4.1V, DIN = "LOW"	-	-	4	mA
Power Supply Current	I _{SS}	V _{IP} = -5.2V	-	100	145	mA
Rise Time	t _r	20% to 80%	-	120	160	ps
Fall Time	t _f	20% to 80%	-	120	160	ps
Reference Voltage	V _{ref}	Duty 50%	-1.4	-	-1.2	V

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Tc=25°C, VSS=-5.2V)

Parameter	Symbol	Test Condition	Limit			Unit	
			Min.	Typ.	Max.		
Minimum Peak Current (\overline{OUT})	IPmin	VIP = -5.2V DIN = "HIGH"	Tc = 0°C	-	-	3.5	mA
			Tc = 25°C	-	-	4.0	
			Tc = 70°C	-	-	10.5	

MI-Laser Application

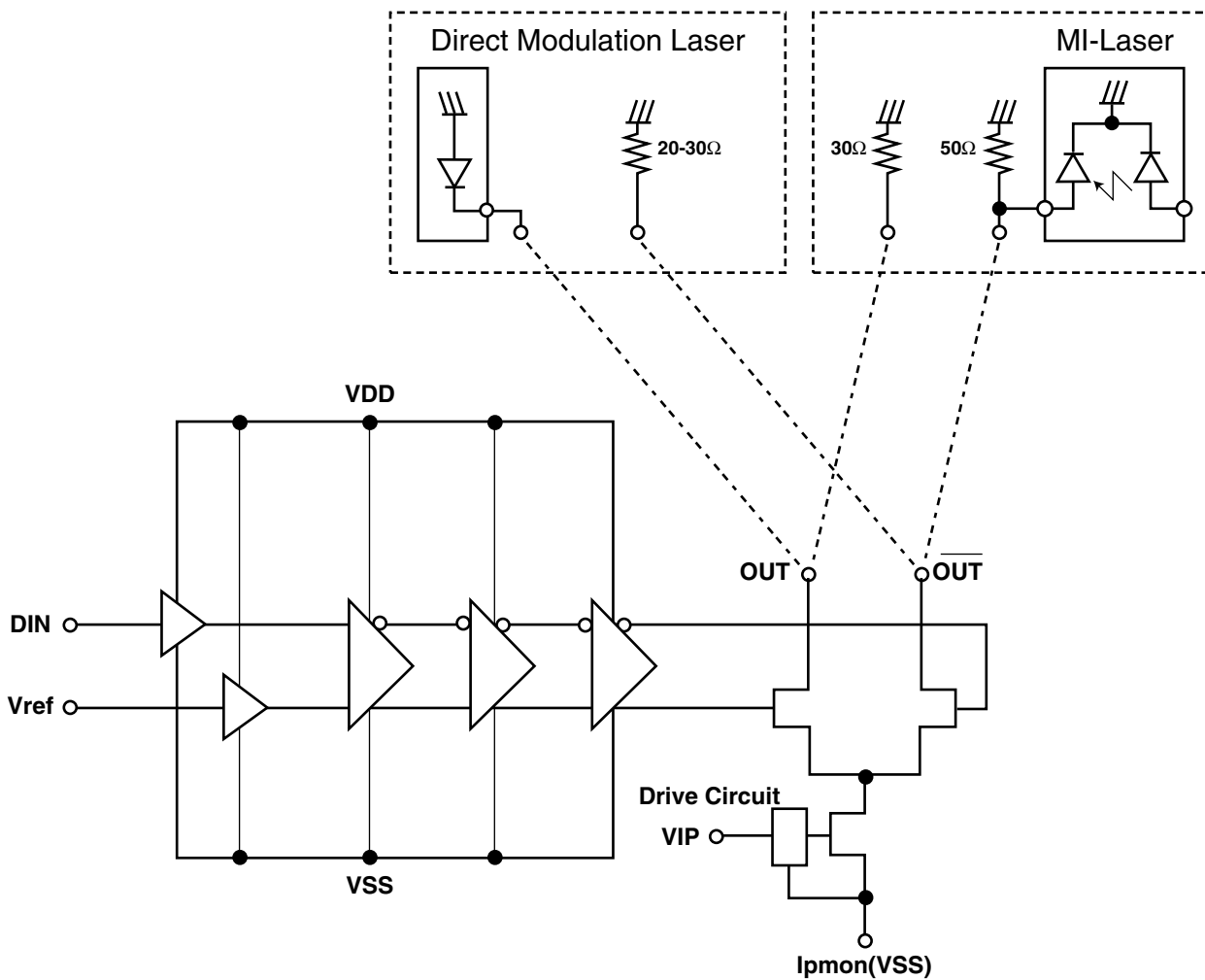
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Tc=25°C, VSS=-5.2V)

Parameter	Symbol	Test Conditions	Limit			Unit	
			Min.	Typ.	Max.		
Maximum Data Rate		NRZ	2.5	-	-	Gbps	
Maximum Peak Current (\overline{OUT})	IP	VIP = -4.1V, DIN = "LOW", RL = 25Ω	60	80	-	mA	
Output Voltage (\overline{OUT})	Vout	VIP = -4.1V, DIN = "LOW", RL = 50Ω	-	-	-3.0	V	
Leakage Current (\overline{OUT})	IPDH	VIP = -4.1V, DIN = "HIGH"	-	-	4	mA	
Power Supply Current	Iss	VIP = -5.2V	-	100	145	mA	
Rise Time	tr	20% to 80%	-	120	160	ps	
Fall Time	tf	20% to 80%	-	120	160	ps	
Reference Voltage	Vref	Duty 50%	-1.4	-	-1.2	V	
Minimum Peak Current (\overline{OUT})	IPmin	VIP = -5.2V DIN = "LOW"	Tc = 0°C	-	-	3.5	mA
			Tc = 25°C	-	-	4.0	
			Tc = 70°C	-	-	10.5	

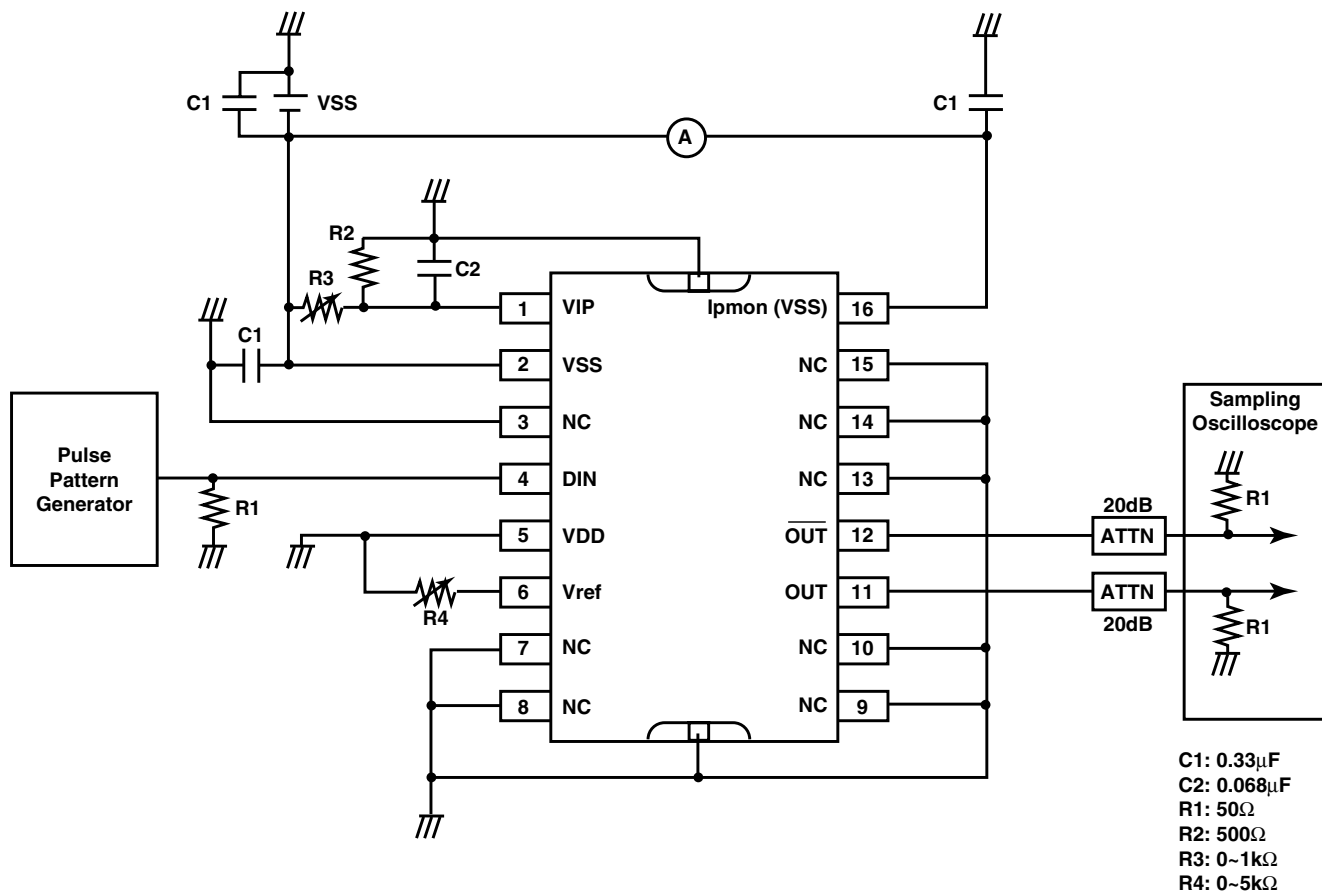
RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Supply Voltage	VSS		-5.46	-5.2	-4.94	V
HIGH Level Input Voltage	V _{IH}	V _{ref} = -1.3V	-1.0	-0.9	-	V
LOW Level Input Voltage	V _{IL}	V _{ref} = -1.3V	-	-1.7	-1.6	V
Peak Current Control Voltage	V _{IP}		VSS	-	VSS +1.1	V
Operating Temperature*			0	-	+85	°C

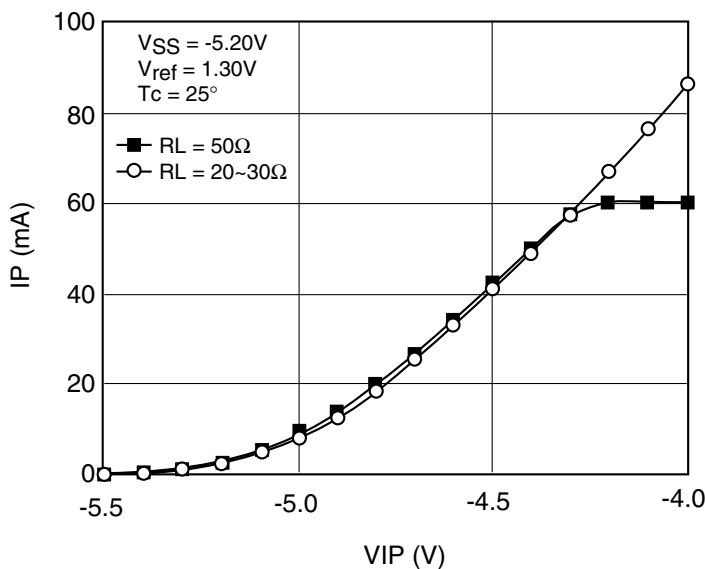
FMM3193VI Block Diagram



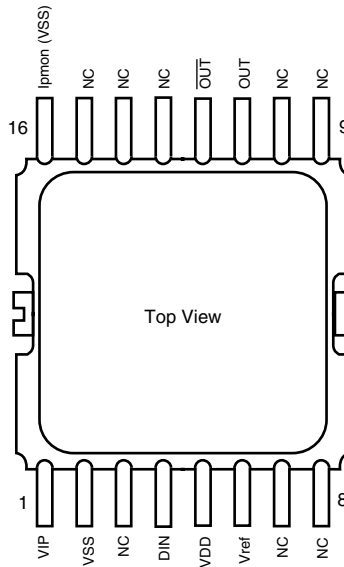
Test Circuit



Peak Current Control Voltage vs. Peak Current



FMM3193VI Pin Assignment



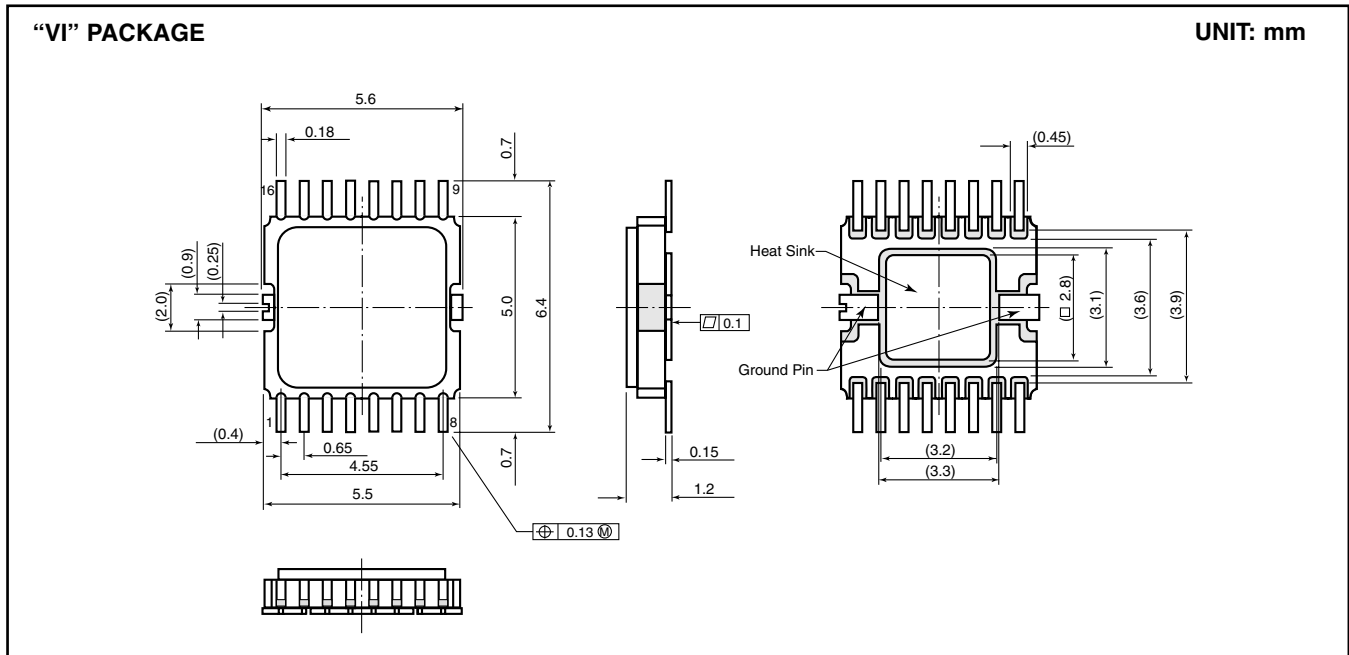
Pin Description

Pin Name	Pin No.	Description	Pin Name	Pin No.	Description
VIP	1	Peak Current Control Voltage	NC	9	No Connection
VSS	2	Supply Voltage	NC	10	No Connection
NC	3	No Connection	OUT	11	Output
DIN	4	Data Input	OUT	12	Complimentary Output
VDD	5	Ground	NC	13	No Connection
Vref	6	Reference Voltage	NC	14	No Connection
NC	7	No Connection	NC	15	No Connection
NC	8	No Connection	Ipmon(VSS)	16	Peak Current Monitor

Ground Pin - Ground\

Heat Sink - Ground

Note: NC pins should be connected to the ground.



For further information please contact:

**FUJITSU COMPOUND SEMICONDUCTOR, INC.
Americas & R.O.W.**

2355 Zanker Rd.
San Jose, CA 95131-1138, U.S.A.
Phone: (408) 232-9500
FAX: (408) 428-9111
www.fcsi.fujitsu.com

FME, QDD

Fujitsu Microelectronics Europe GmbH
Quantum Devices Division
Network House
Norreys Drive
Maidenhead, Berkshire SL6 4FJ
United Kingdom
TEL: +44 (0) 1628 504800
FAX: +44 (0) 1628 504888

**FUJITSU QUANTUM DEVICES
SINGAPORE PTE LTD.**

Hong Kong Branch

Rm. 1101, Ocean Centre, 5 Canton Rd. Tsim Sha Tsui,
Kowloon, Hong Kong
TEL: +852-23770226
FAX: +852-23763269

Fujitsu Limited reserves the right to change products and specifications without notice.
The information does not convey any license under rights of Fujitsu Limited or others.

© 2000 FUJITSU COMPOUND SEMICONDUCTOR, INC.
Printed in U.S.A. FCSI0200M200

CAUTION

Fujitsu Compound Semiconductor Products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not put this product into the mouth.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.

FUJITSU QUANTUM DEVICES LIMITED

Global Business Division
Global Sales Support Department
Shinjuku Daiichiseimei Building, 2-7-1 Nishishinjuku,
Shinjuku-ku, Tokyo, 163-0721, Japan
TEL: +81-3-5322-3356
FAX: +81-3-5322-3398