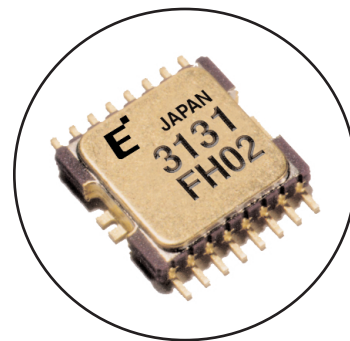


2.5Gb/s GaAs Laser Driver with Re-Timing Function FMM3131VI

FEATURES

- Operation Speed Up to 10.7Gb/s, NRZ
- Output Modulation Current: 60mA (typ., 25Ω Load)
- Power Supply Voltage: +3.3V
- Duty Ratio Adjustable
- Output Shutdown Control
- Internal Input 50Ω Termination
- Modulation Current Monitor/Bias Current Monitor
- 5.6mm x 6.4mm 16-pin Hermetically Sealed Ceramic Package



DESCRIPTION

The FMM3131VI is a 10.7Gb/s laser driver with re-timing function. A D-FF is built in, and the re-timing and bypass mode are selectable using a selector(SEL) signal. The peak modulation currents are 70mA (Min.) with 25Ω load, and the bias current is available up to 70mA (Min.) the FMM3131VI also has a duty control circuit and an output shutdown switch.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Supply Voltage	V _{DD}	0 to 7.0	V
Output Termination Voltage	V _{TT}	0.0 to 7.0	V
Input Voltage	V _{IN}	-1.0 to 3.0	V
Power Supply Current	I _{SS}	250	mA
Modulation Current Control Voltage	V _{IP}	-1.0 to 5.0	V
Bias Current Control Voltage	V _{IB}	-1.0 to 5.0	V
Duty Control Voltage	V _{DUT}	-1.0 to 5.0	V
Output Shut Down Control Voltage	V _{SD}	-1.0 to 5.0	V
Output Voltage	V _{out}	0.0 to 6.0	V
Storage Temperature	T _{stg}	-55 to 125	°C

FMM3131VI ————— 2.5Gb/s GaAs Laser Driver with Re-Timing Function

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Supply Voltage	V _{DD}		3.13	3.3	3.47	V
Output Termination Voltage	V _{TT}		4.75	5.0	5.25	V
Input Data Swing	V _{IND}	Differential Input (AC coupled)	0.15	-	1.0	V _{pp}
Input Data Swing	V _{INS}	Single-ended Input (AC coupled)	0.3	-	1.0	V _{pp}
Modulation Current Control Voltage	V _{IP}		0	-	1.0	V
Bias Current Control Voltage	V _{IB}		0	-	0.8	V
Output Shut Down Control Voltage	V _{SDH}		1.6	1.8	2.0	V
	V _{SDL}		0	0.6	0.8	V
Duty Control Voltage	V _{DUT}		0.6	1.2	1.8	V
Case Temperature	T _C		-5	-	+85	°C

Note (a) Power on sequence: (1) V_{DD}, (2) V_{TT}, (3) V_{DUT}, V_{SD} (4) V_{IB}, V_{IP}
 (b) For operation with single-ended data input, a capacitor should be connected between Complimentary input and V_{SS}
 (c) External capacitors are necessary at data input terminals(Din, DinB) for DC blocking

2.5Gb/s GaAs Laser Driver with _____ FMM3131VI

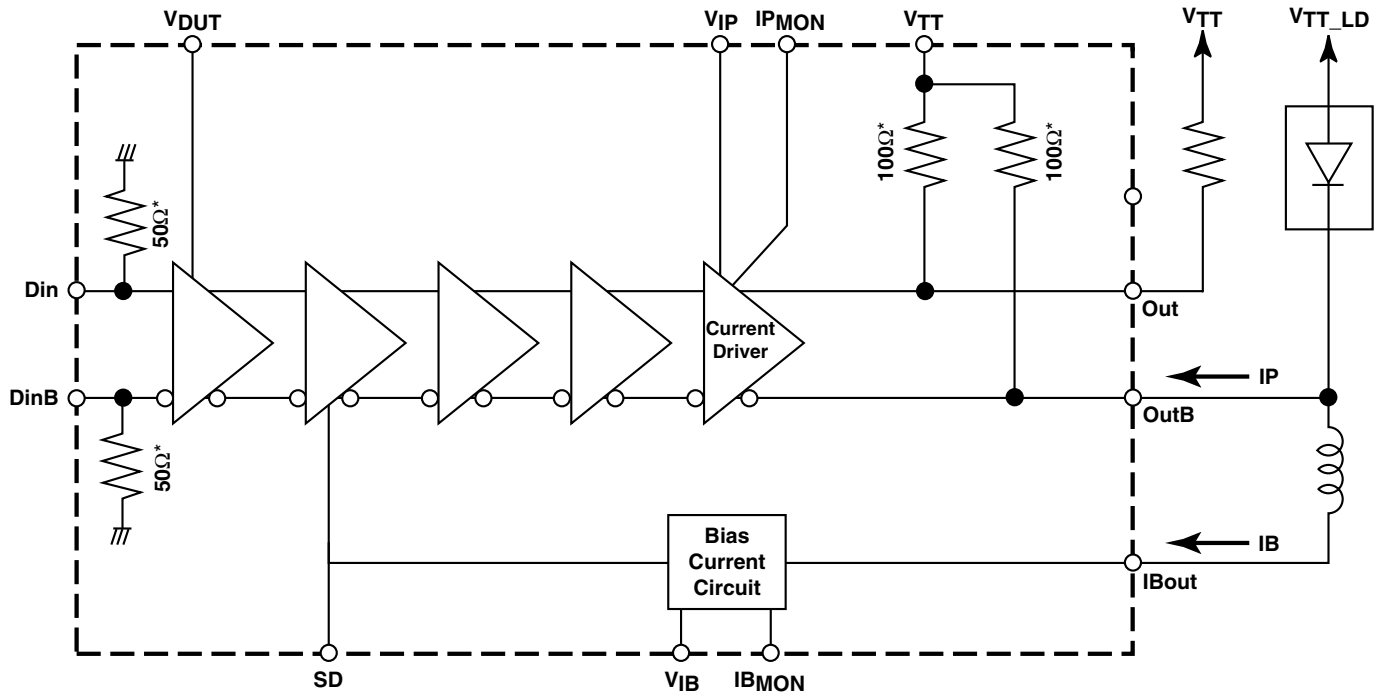
Re-Timing Function

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

Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Maximum Data Rate	fb	NRZ	10.7	-	-	Gb/s
Power Supply Current	I _{DD}	V _{IP} =0.0V, V _{IB} =0.0V	60	100	125	mA
Maximum Modulation Current	I _P MAX	V _{IP} =1.0V, V _{IB} =V _{SS} , V _{SD} ="L"	40	60	-	mA
Minimum Modulation Current	I _P MIN	V _{IP} =0.0V, V _{IB} =0.0V, V _{SD} ="L"	-	2.0	8.0	mA
Maximum Bias Current	I _B MAX	V _{IB} =0.8V, V _{IP} =0.0V, V _{SD} ="L"	40	60	-	mA
Minimum Bias Current	I _B MIN	V _{IB} =0.0V, V _{IP} =0.0V, V _{SD} ="L"	-	4.0	12.5	mA
Modulation Current Leakage (Shutdown)	I _P sd	V _{IB} =1.0V, V _{SD} ="H"	-	4.0	7.0	mA
Bias Current Leakage (Shutdown)	I _B sd	V _{IB} =0.8V, V _{SD} ="H"	-	2.0	3.0	mA
Rise Time	T _r	fb=2.5Gbps, 1,0,1,0...Alternative Pattern, 20 to 80%, V _{IP} =1.0V, V _{SD} ="L"	-	25	35	ps
Fall Time	T _f		-	25	35	ps
Crossing Adjustment Range	CRSmin	fb=10.7Gbps, NRZ, PRBS=2 ³¹ -1, Din/DinB=0.5Vpp, Input Crossing Point: 50%, V _{IP} =1.0V, V _{SD} ="L"	-	-	40	%
	CRSmax		60	-	-	%
Jitter RMS	Jitter	fb=10.7Gbps, NRZ, PRBS=2 ³¹ -1, Din/DinB=0.5Vpp, Input Crossing Point: 50%, Output Crossing Point: 50%, V _{IP} =1.0V, V _{SD} ="L"	-	2.5	3.5	ps

FMM3131VI ————— 2.5Gb/s GaAs Laser Driver with Re-Timing Function

FMM3131VI Block Diagram



FUNCTION

Truth Table of Data I/O

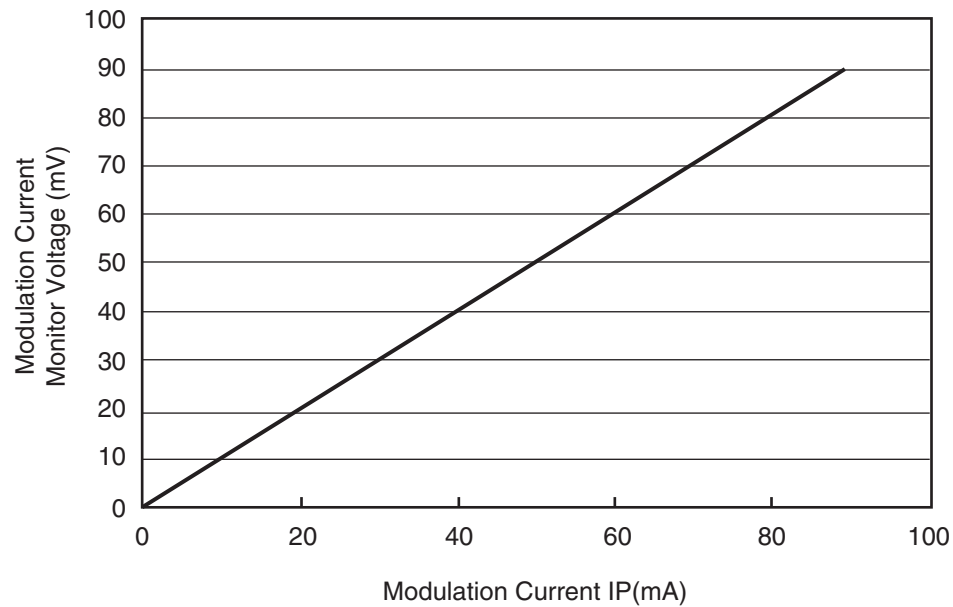
Din	DinB	Out	OutB
L	H	L (Modulation Current: On)	H (Modulation Current: Off)
H	L	H (Modulation Current: Off)	L (Modulation Current: On)

Truth Table of Shut Down function

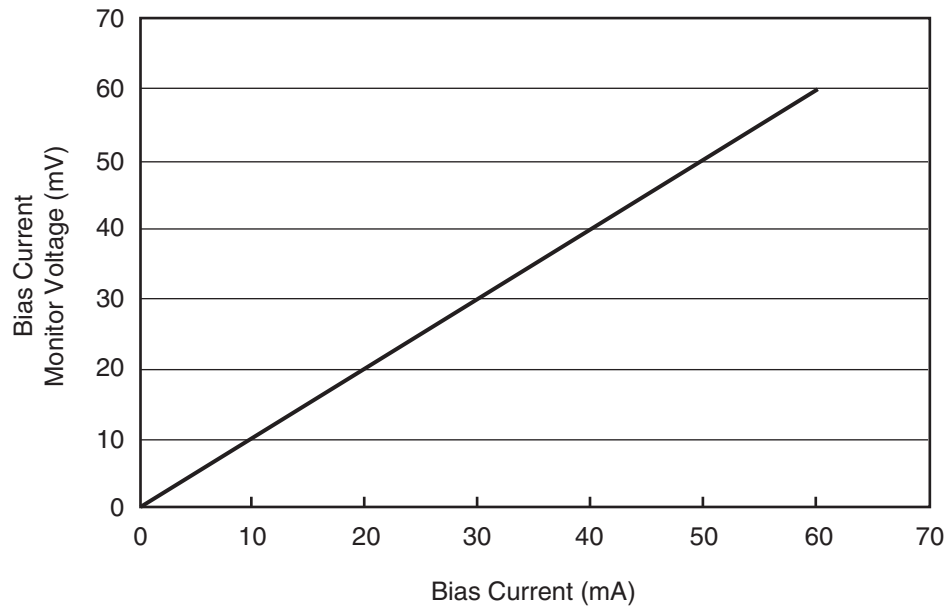
VSD	Modulation Current at OutB	Bias Current
L (Open)	Enable (Modulation Current: On)	Enable (Bias Current: On)
H	Disable (Modulation Current: Off)	Disable (Bias Current: Off)

2.5Gb/s GaAs Laser Driver with *FMM3131VI* Re-Timing Function

Modulation Current Monitor



Bias Current Monitor

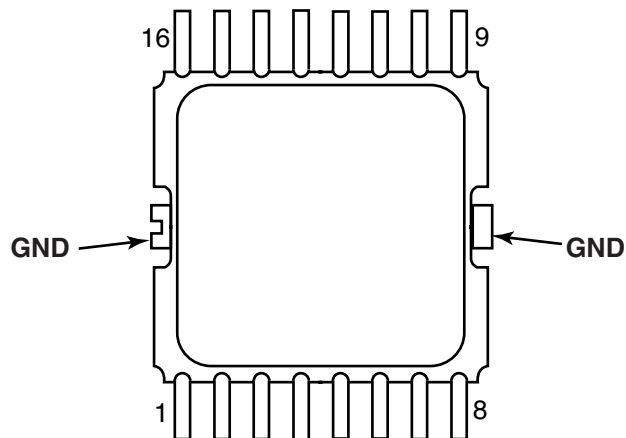


FMM3131VI ————— 2.5Gb/s GaAs Laser Driver with Re-Timing Function

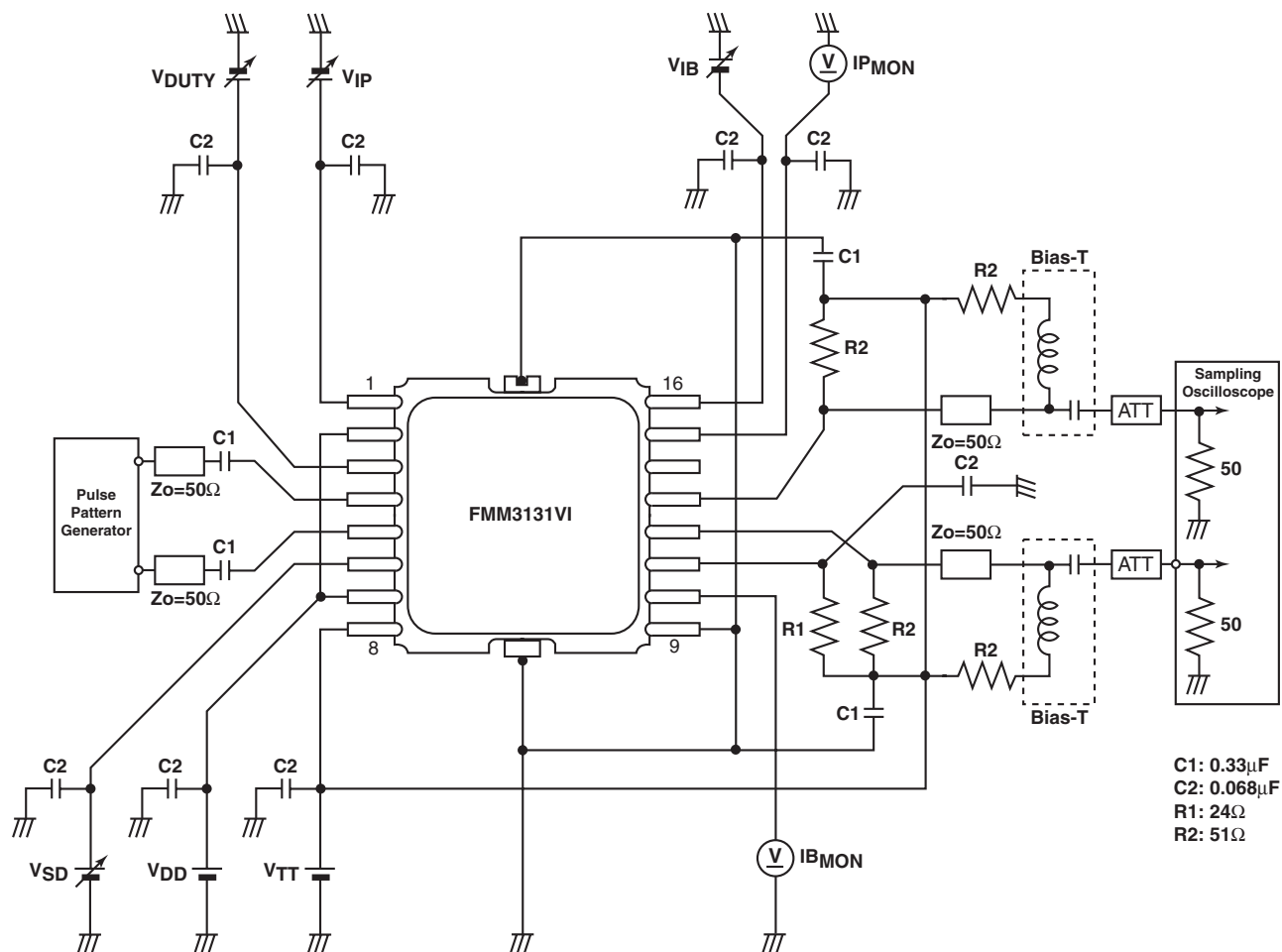
FMM3131VI Pin Assignment

Pin Description

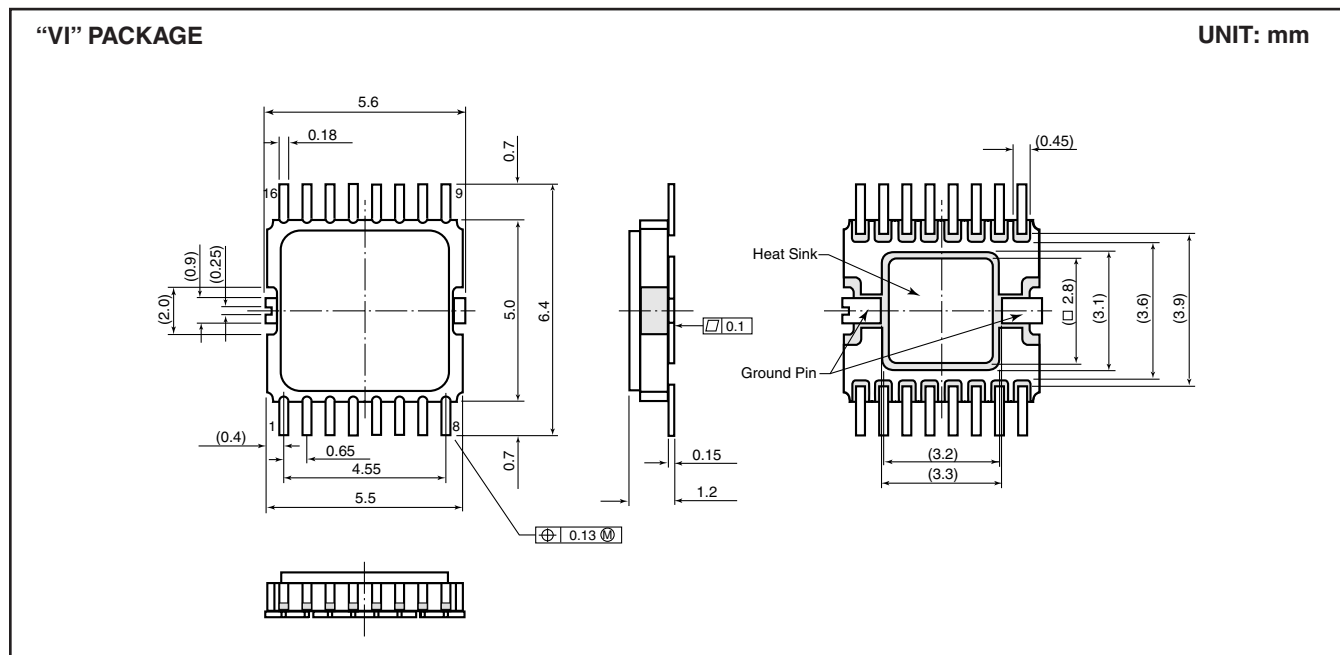
Symbol	Pin No.	I/O	Function
V_{IP}	1	I	Modulation Current Control Voltage
V_{DD}	2	-	Supply Voltage
V_{DUT}	3	I	Duty Control(Cross Point Control)
Din	4	I	Data Input
DinB	5	I	Complementary Data Input
SD	6	I	Shut Down Control
V_{DD}	7	-	Supply Voltage
V_{TT}	8	-	Termination Voltage
GND	9	-	GND
IB_{mon}	10	O	Bias Current Monitor Output Voltage
IB_{out}	11	O	Bias Current Output
OutB	12	O	Complementary Data Output
Out	13	O	Data Output
NC	14	-	NC
IP_{mon}	15	O	Modulation Current Monitor Output Voltage
V_{IB}	16	I	Bias Current Control Voltage
GND	Heat Sink		GND



Test Circuit



FMM3131VI ————— 2.5Gb/s GaAs Laser Driver with Re-Timing Function



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