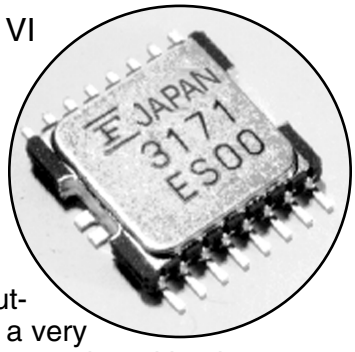
1.25Gb/s GaAs Laser Driver

FMM3171VI

DESCRIPTION

VI



The FMM3171VI is a laser driver IC for up to 1.2Gb/s optical transmission systems. The GaAs MES-FET IC process allows for high speed operation with low power consumption. There are two data inputs options; a complementary input or a single-ended input using a selectable D-F/F. The output duty ratio can be set by adjusting the input reference voltage (Vref). The differential mark-density monitor (Mmk) output proportional to the peak current output signal. The peak current and bias current output is disabled by the shutdown terminal, which is ECL compatible. Logic "high" causes the output to be disabled. The High speed turn-on and turn-off is accomplished by a very low compute time constant. The amount of peak current and bias current are monitored by the current flow at Ip and Ib terminal which must be connected to VSS. This FMM3171VI is an excellent choice use as a laser driver for OC-3/OC-12/OC-24 and STM1/STM4 transmitters.

FEATURES

- ECL Compatible Data Input
- Built in D-F/F (Optional)
- Complementary Data Input (Optional)
- Modulation Current: 0 to 70mA
- Bias Current: 0 to 70mA
- Output Shutdown Function
- Modulation Current and Bias Current Monitor
- Duty Ratio Monitor
- Duty Ratio Control
- Single Power Supply: -5.2V
- Separated Peak Current and Bias Current Outputs
- Small Package: SSOP-16

ABSOLUTE MAXIMUM RATINGS

(V_{DD} = 0V)

Parameter	Symbol	Ratings	Unit
Storage Temperature	T_{stg}	-40 to +125	°C
Operating Temperature*	T_{OP}	-40 to +85	°C
Supply Voltage	V_{SS}	-7.0 to 0	V
Input Voltage	D_{IN}, $\overline{D_{IN}}$, C_{IN}	V_{SS} to V_{DD}	V
Peak Current Control Voltage	V_{IP}	V_{SS} -2.0 to V_{SS} +2.1	V
Bias Current Control Voltage	V_{IB}	V_{SS} -2.0 to V_{SS} +2.1	V

(*) Lower limit temperature corresponds to the ambient temperature and higher limit temperature corresponds to the case (the bottom of the case) temperature.

RECOMMENDED OPERATING CONDITIONS

(V_{DD} = 0V)

Parameter	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Power Supply Voltage	V_{SS}		-5.72	-5.2	-4.94	V
Data & Clock Input	V_{IH}		-1.0	-0.9	-0.7	V
	V_{IL}		-1.9	-1.7	-1.6	V
Peak Current Control Voltage	V_{IP}		V_{SS}	-	V_{SS} +2.1	V
Bias Current Control Voltage	V_{IB}		V_{SS}	-	V_{SS} +2.1	V
Output Shutdown Control Voltage	V_{SD}	Output enable	-1.9	-1.7	-1.6	V
		Output disable (Shutdown)	-1.0	-0.9	-0.7	V
Selector Control Voltage	V_{SE}	D-F/F active	-	V_{DD}	-	V
		D-F/F inactive	-	Open	-	-

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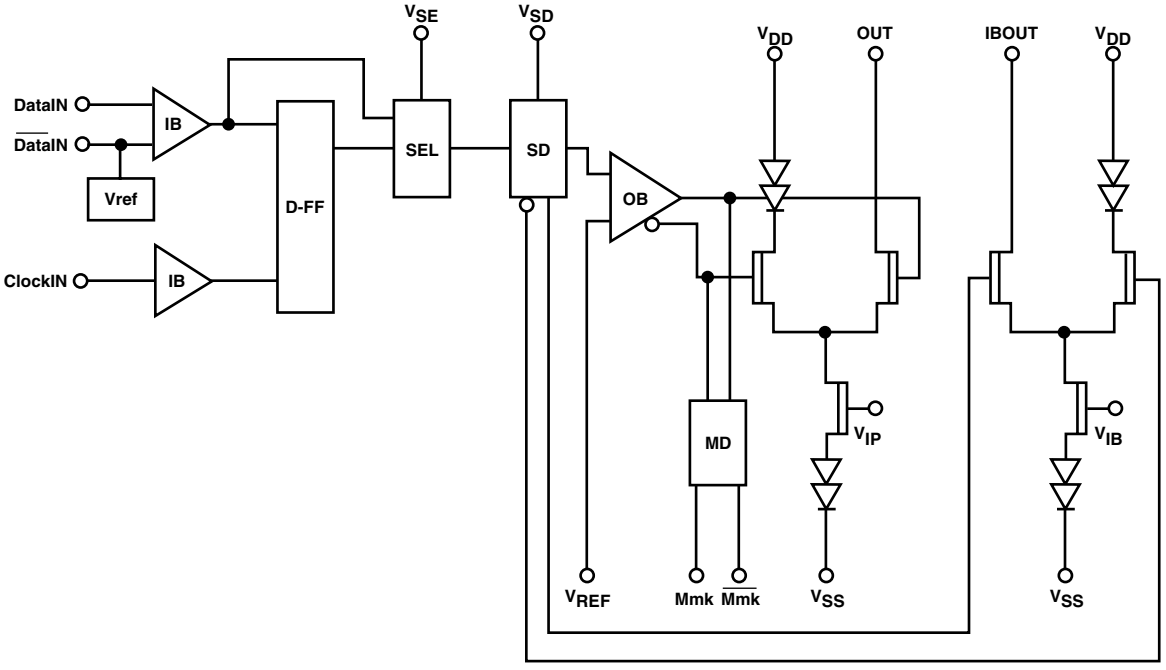
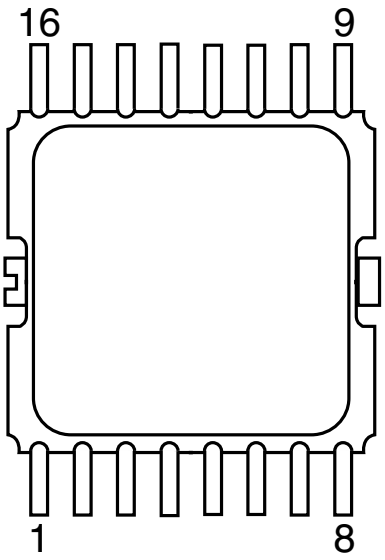
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Tc=25°C)

Parameter	Symbol	Test Conditions		Limit Min.	Limit Typ.	Limit Max.	Unit
Maximum Data Rate		NRZ		1.25	-	-	Gbps
Peak Current	IP	V_{IB}=Vss, V_{SD}="Low"	V_{IP}=Vss	-	1	2	mA
			V_{IP}=Vss+2.1V	60	70	-	mA
Bias Current	IB	V_{IP}=Vss, V_{SD}="Low"	V_{IB}=Vss	-	1	2	mA
			V_{IB}=Vss+2.1V	60	70	-	mA
Residual Output Current	Isd	V_{SD}="High", V_{IP}=V_{IB}=Vss+2.1V		-	2	4	mA
Output Rise Time	tr	RL=10Ω, IP=60mA, 20%-80%		-	-	250	psec.
Output Fall Time	tf			-	-	250	psec.
Mark-Density Monitor Output	VMmk	RL(for Mmk) =1kΩ/15nF to GND, NRZ, Mark density =50%	Input Duty	-	-	-	
			100%	-	-1.0	-	V
			50%	-	-0.5	-	V
			0%	-	GND	-	-
Power Supply Current	Iss	Vss=-5.2, IP=60mA, IB=30mA		-	160	180	mA

FMM3171VI Block Diagram



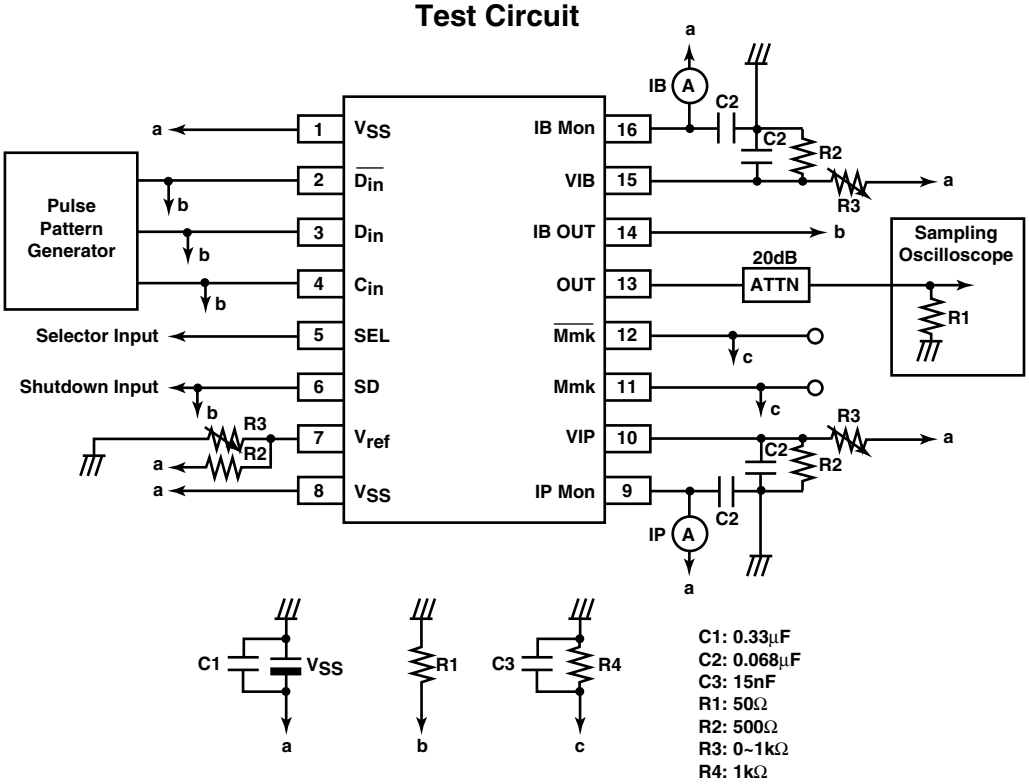


PIN DESCRIPTION FMM3171VI

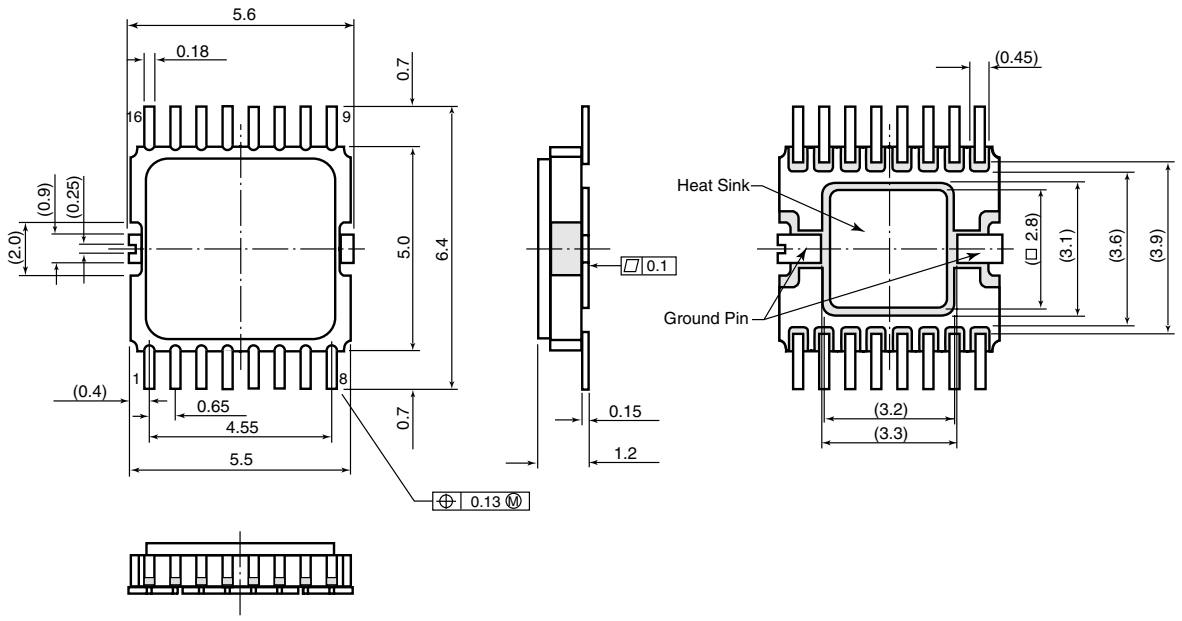
#	FUNCTION
1	$\underline{V_{SS}}$
2	$\overline{\text{DATA INPUT}}$
3	DATA INPUT
4	CLOCK INPUT
5	SELECTOR (V_{SE})
6	SHUT DOWN (V_{SD})
7	VREF(Duty Control)
8	V_{SS}
9	IP MON (VSS)
10	VIP
11	$\underline{\text{Mmk}}$(Duty Monitor)
12	$\overline{\text{Mmk}}$(Duty Monitor)
13	OUT
14	IBOUT
15	VIB
16	IB MON (V_{SS})

Note: VDD is connected to the back side of the package

Test Circuit



"VI" PACKAGE **UNIT: mm**



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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.**

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