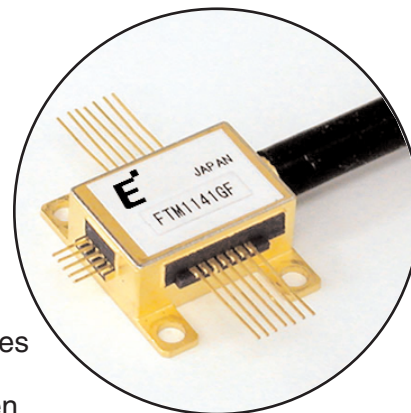


FEATURES

- Driver integrated 10Gb/s MI-DFB module for 800ps/nm optical transmission
- MI-DFB-LD (Modulator Integrated DFB Laser Diode) is included
- Modulator driver IC is included
- Built-in optical isolator, PIN-Photo diode for monitor, thermistor and thermo-electric cooler
- 800ps/nm (40km)



DESCRIPTION

The FTM1141GF was developed to reduce the size and technical complexity of 10Gb/s optical board designs. This product, which includes a driver and modulator integrated laser in one package, eliminates the customer concerns regarding how to handle the RF interfacing between these two components on his board. By co-packaging these components a solution has also been achieved that offers greatly reduced board space. This reduction in space is critical for next generation transponder applications. The FTM1141GF has been designed with a differential co-planar electrical interface which allows for easy interfacing to RF lines on PC boards. The package and pinout are part of a multi-source agreement. This product is designed for 40km SONET/SDM applications and single channel drop links in DWDM systems.

ABSOLUTE MAXIMUM RATINGS (Top=25°C, Unless otherwise specified)

Parameter	Symbol	Condition	Rating		Unit
			Min.	Max.	
Storage Temperature	T _{stg}		-40	85	°C
Operating Case Temperature	T _{op} (T _c)		0	75	°C
Optical Output Power	P _f	CW	-	5	mW
Laser Forward Current	I _f	CW	-	150	mA
Laser Reverse Voltage	V _R	CW	-	2	V
Power Supply Voltage	V _{SS}		-6.5	0.3	V
Modulator (Mod) modulation Control Voltage	V _m		-6.5	V _{SS} +1.2 (max0.3)	V
Mod Bias Control Voltage	V _b		-6.5	V _{SS} +2.4 (max0.3)	V
Cross Point Control Voltage	V _{x1} , (V _{x2})		V _{SS} -4.8 (min-6.5)	V _{SS} +2.4 (max0.3)	V
Data Input Voltage	D _{in} , D _{inB}	Differential (AC-coupled)	-	1.6	V _{pp}
ESD Tolerance	V _{esd}	Note (1-1)	-	50	V
ESD Tolerance	V _{esd}	Note (1-2)	-	200	V
Photodiode Forward Current	I _{DF}		-	1	mA
Photodiode Reverse Voltage	V _{DR}		-	10	V
TEC Voltage	V _c	Cooling	-	2.5	V
		Heating	-2.5	-	
TEC Current	I _c	Cooling	-	1.5	A
		Heating	-0.9	-	
Thermistor Temperature	T _{th}	ATC operation	0	+75	°C
Lead Soldering Time		260°C MAX	-	10	sec

OPTICAL SPECIFICATIONS (TLD=25°C, Tc=0 to 75°C and BOL, unless otherwise specified)
LASER DIODE AND MODULATOR CHARACTERISTICS

Parameter	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Threshold Current	I _{th}	CW	-	-	25	mA
Operating Current	I _{op}	Pf=Pop	40	70	100	mA
Optical Output Power	Pop	Note (2a)	-1	-	+2	dBm
Forward Voltage	V _F	CW	-	-	2.2	V
Extinction Ratio	R _{ext}	Pf=Pop, Note (2a)	8.2	-	-	dB
Peak Wavelength	W _p	Pf=Pop, Note (2a)	1530	-	1565	nm
Side Mode Suppression Ratio	SSR	Pf=Pop, CW	35	-	-	dB
Optical Rise Time	t _r	Note (3), 20% to 80%	-	-	30	psec
Optical Fall Time	t _f	Note (3), 20% to 80%	-	-	30	psec
Optical Isolation	I _s		25	-	-	dB
Tracking Error	TE	Note (2a)	-0.5	-	+0.5	dB
Input Return Loss	S ₁₁	130MHz to 10GHz, Tc=25°C	6	10	-	dB
Dispersion Penalty	d _P	Note (2)	-	-	2.0	dB
Eye Pattern Mask	Msk	Note (2a), 500 counts		Error Free		

MONITOR DIODE CHARACTERISTICS

Parameter	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Monitor Current	I _m	I _F =I _{op} , V _{DR} =5V	100	-	1500	μA
Monitor Dark Current	I _d	V _{DR} =5V	-	2	100	nA
Monitor Diode Capacitance	C _t	V _{DR} =5V, f=1MHz	-	5	15	pF

TEC & THERMISTOR CHARACTERISTICS

Parameter	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
TEC Current	I _c	Note (4)	-	-	1.4	A
TEC Voltage	V _c	Note (4)	-	-	2.5	V
TEC Power Consumption	P _c	Note (4)	-	-	3.5	W
Thermistor Resistance	R _{th}	TLD=25°C	-	10	-	kΩ
Thermistor B Constant	B		3270	3450	4000	K

DRIVER IC CHARACTERISTICS

Parameter	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Driver IC Supply Voltage	V _{SS}		-5.5	-5.2	-5.0	V
Driver IC Supply Current	I _{SS}		-	-	285	mA
Modulator (Mod) Modulation Control Voltage	V _m		V _{SS}	-	V _{SS} +1.0	V
Mod Bias Control Voltage	V _b		V _{SS}	-	V _{SS} +2.2	V
Cross Point (XP) Control Voltage	V _{x1} , (V _{x2})	X _p =50%	V _{SS} +0.8	-	V _{SS} +2.2	V
Data Input Voltage	D _{in} , D _{inB}	Differential (AC Coupled)	0.5	-	1.0	V _{pp}

Note (1-1): Pin No. 3,4,5,6,7,9,11

Note (1-2): Pin No. 1,2,8,10,12-19

Note (2): Eudyna Test System

(a) Drive Condition

Bit Rate: 9.95328 Gb/s
 Word Pattern: PRBS=2³¹-1
 Mark Density: 50%
 Laser Bias Current: I_{op}
 Laser Temperature(TLD): 25°C
 Eye Pattern Mask: ITU-T Eye mask for STM-64

(b) Fiber Dispersion

800ps/nm

(c) Dispersion Penalty

Bit Error Rate=10⁻¹²

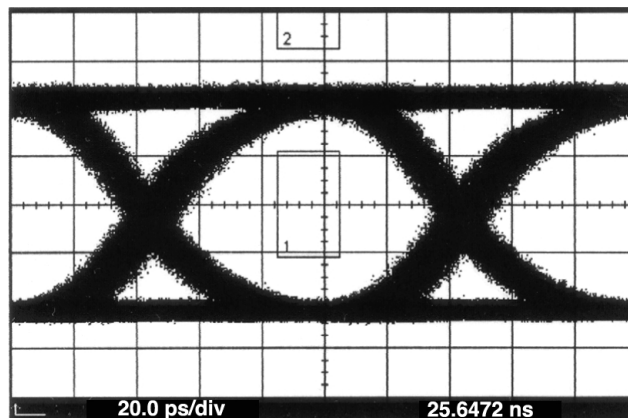
Note (3): Eudyna Test System

V_b, V_m, V_{x1}(V_{x2}) is set to make Pop and Rext within the specification

Note (4): Eudyna Test System

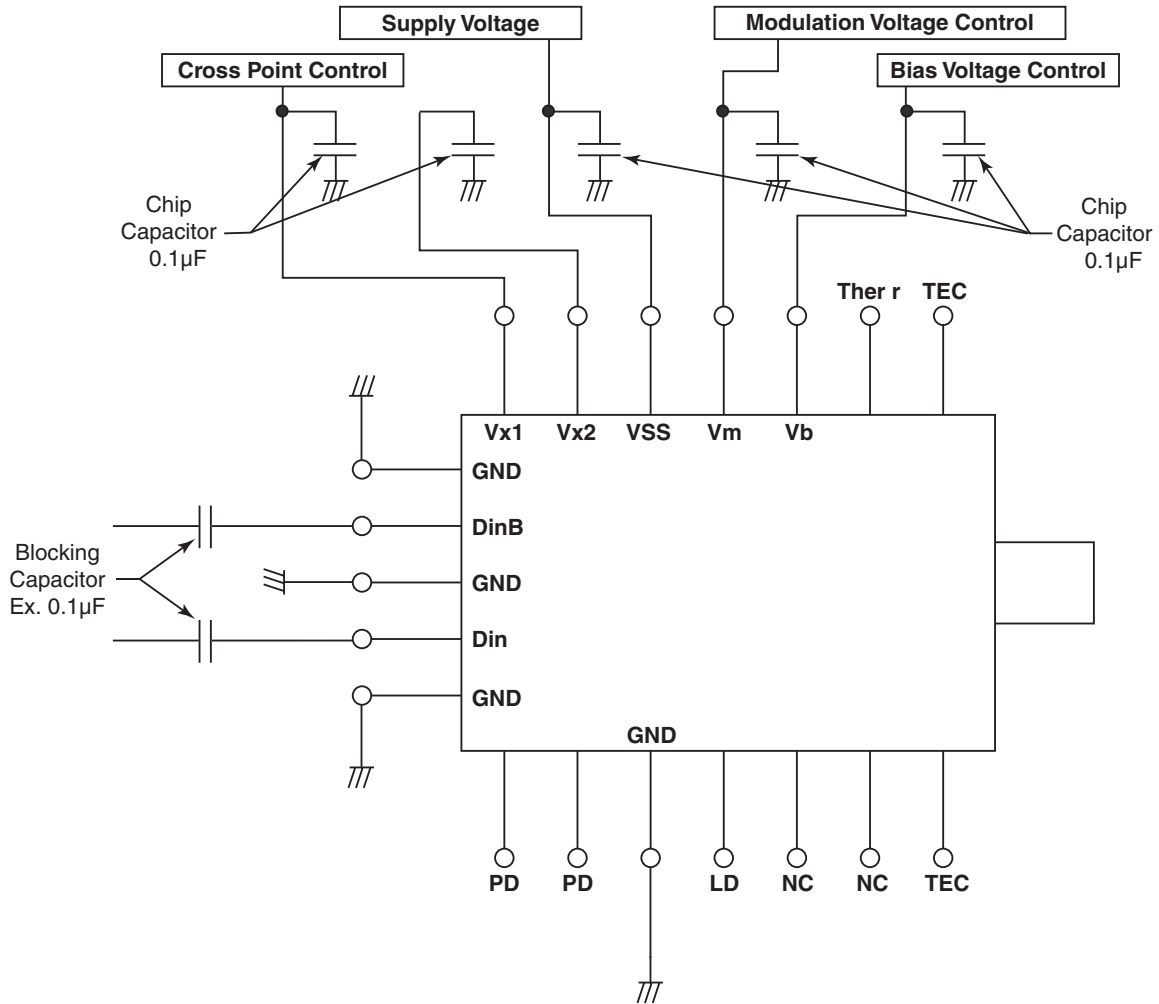
Operating Case Temperature: T_c=+75°C
 Laser Temperature: 25°C
 Optical Output Power: P_f=Pop, Note (2a)

Typical Output Waveform
Back to Back (with Filter)



9.95328Gb/s, NRZ, PRBS=2³¹-1, TLD=TC=25°C

Typical Application for Driver IC

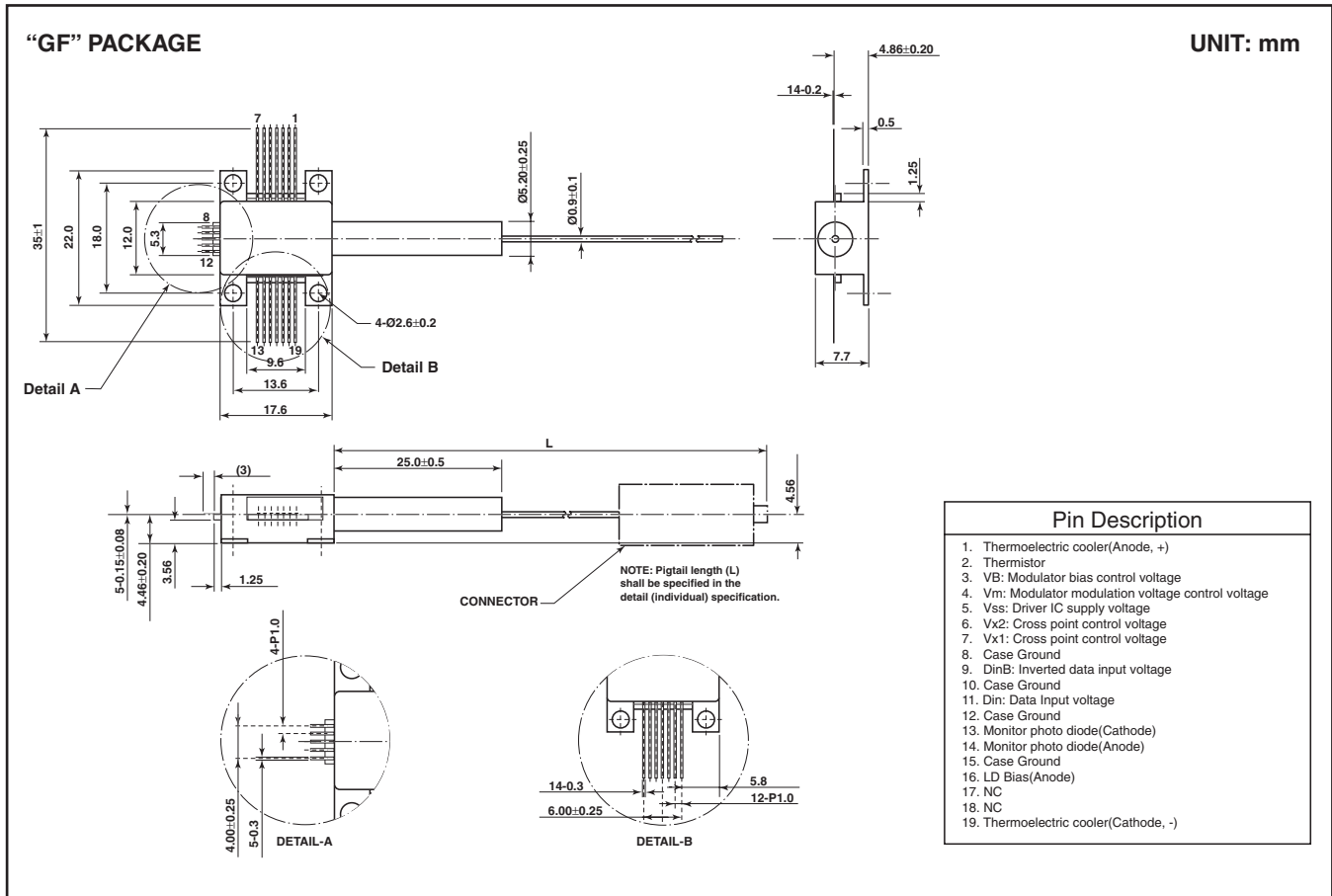


For stable operation:

- 8-1. To prevent a dependence of "Cross point" on the supply voltage VSS,
 - (1) Use an external voltage source of -3.8V for "Vx2", or
 - (2) Control the voltage of "Vx1", so that the voltage difference "Vx1-Vx2" remain constant.
- 8-2. To prevent a dependence of "Modulation control voltage" on the supply voltage VSS, control the voltage of "Vm", so that the difference "Vm-VSS" remain constant.
- 8-3. To prevent a dependence of "Bias control voltage" on the supply voltage VSS, control the voltage of "Vb", so that the difference "Vb-VSS" remain constant.

Driver Integrated 10Gb/s MI-DFB LD Module

FTM1141GF



For further information please contact:

Eudyna Devices USA Inc.

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

Eudyna Devices Europe Ltd.

Network House
Norreys Drive
Maidenhead, Berkshire SL6 4FJ
United Kingdom
TEL: +44 (0) 1628 504800
FAX: +44 (0) 1628 504888

Eudyna Devices Asia Pte Ltd.

Hong Kong Branch
Rm. 1101, Ocean Centre, 5 Canton Rd.
Tsim Sha Tsui, Kowloon, Hong Kong
TEL: +852-2377-0227
FAX: +852-2377-3921

Eudyna Devices Inc.

Sales Division
1, Kanai-cho, Sakae-ku
Yokohama, 244-0845, Japan
TEL: +81-45-853-8156
FAX: +81-45-853-8170

CAUTION

Eudyna Devices Inc. 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.

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

© 2004 Eudyna Devices USA Inc.
Printed in U.S.A.