

FEATURES

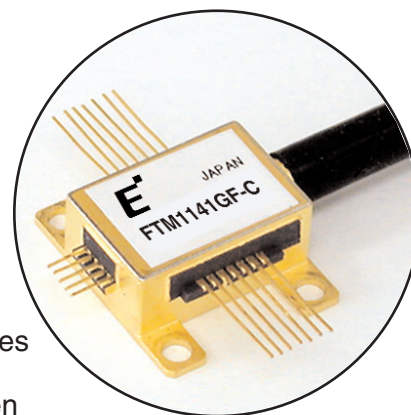
- Driver integrated 10Gb/s MI-DFB module for 1600ps/nm optical transmission
- MI-DFB-LD (Modulator Integrated DFB Laser Diode) is installed
- Modulator driver IC is installed
- Built-in optical isolator, PIN-Photo diode for monitor, thermistor and thermo-electric cooler
- 1600ps/nm (80km)

DESCRIPTION

The FTM1141GF-C 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-C 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 80km SONET/SDH applications and single channel drop links in DWDM systems.



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

Parameter	Symbol	Condition	Limits		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	V
Modulator (Mod) Modulation Control Voltage	V _m		-6.5	V _{ss} +1.2 (max0)	V
Mod Bias Control Voltage	V _b		-6.5	V _{ss} +2.4 (max0)	V
Cross Point Control Voltage	V _{x1} , (V _{x2})		V _{ss} -4.8 (min-6.5)	V _{ss} +2.4 (max0)	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	-		-	1	mA
Photodiode Reverse Voltage	V _{DR}		-	10	V
TEC Voltage	V _c	Cooling	-	2.5	V
		Heating	-1.0	-	
TEC Current	I _c	Cooling	-	1.5	A
		Heating	-0.5	-	
Thermistor Temperature	T _{th}	ATC operation	0	+75	°C
Lead Soldering Time	-	260°C MAX	-	10	sec

OPTICAL SPECIFICATIONS (T_{LD}=25°C, T_{op}=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}	P _f =P _{op}	40	70	100	mA
Optical Output Power	P _{op}	Note (2a)	+1.0	-	+3.5	dBm
Forward Voltage	V _F	CW, I _F =I _{op}	-	1.4	2.2	V
Extinction Ratio	R _{ext}	P _f =P _{op} , Note (2a)	9.0	-	-	dB
Peak Wavelength	W _p	P _f =P _{op} , Note (2a)	1530	-	1565	nm
Side Mode Suppression Ratio	SSR	I _F =P _{op} , 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	130KHz to 10GHz	6	-	-	dB
Dispersion Penalty	dP	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 _D R=5V	100	-	1500	μA
Monitor Dark Current	I _d	V _D R=5V	-	2	100	nA
Monitor Diode Capacitance	C _t	V _D R=5V, f=1MHz	-	5	15	pF

TEC & THERMISTOR CHARACTERISTICS

Parameter	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
TEC Current	I _c	Note (4)	-	-	1.0	A
TEC Voltage	V _c	Note (4)	-	-	2.0	V
TEC Power Consumption	P _c	Note (4)	-	-	2.0	W
Thermistor Resistance	R _{th}	T _{LD} =25°C	-	10	-	kΩ
Thermistor B Constant	B	25/75°C	3270	3450	3630	K

DRIVER IC CHARACTERISTICS

Parameter	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Driver IC Supply Voltage	V _{ss}		-5.5	-5.2	-4.9	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	Din, DinB	Differential (AC Coupled)	0.5	-	1.0	V _{pp}

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

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

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

1600ps/nm

(c) Dispersion Penalty

Bit Error Rate=10⁻¹²

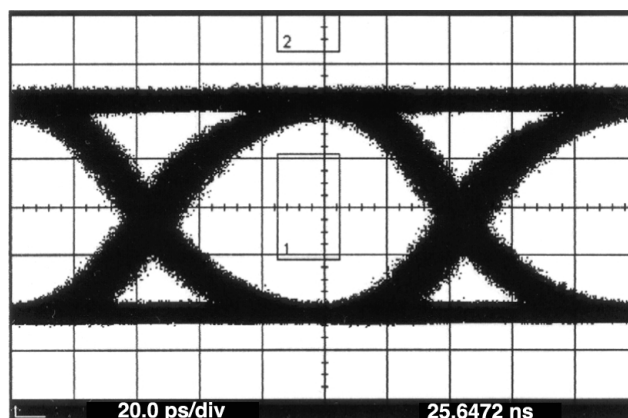
Note (3): Eudyna Test System

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

Note (4): Eudyna Test System

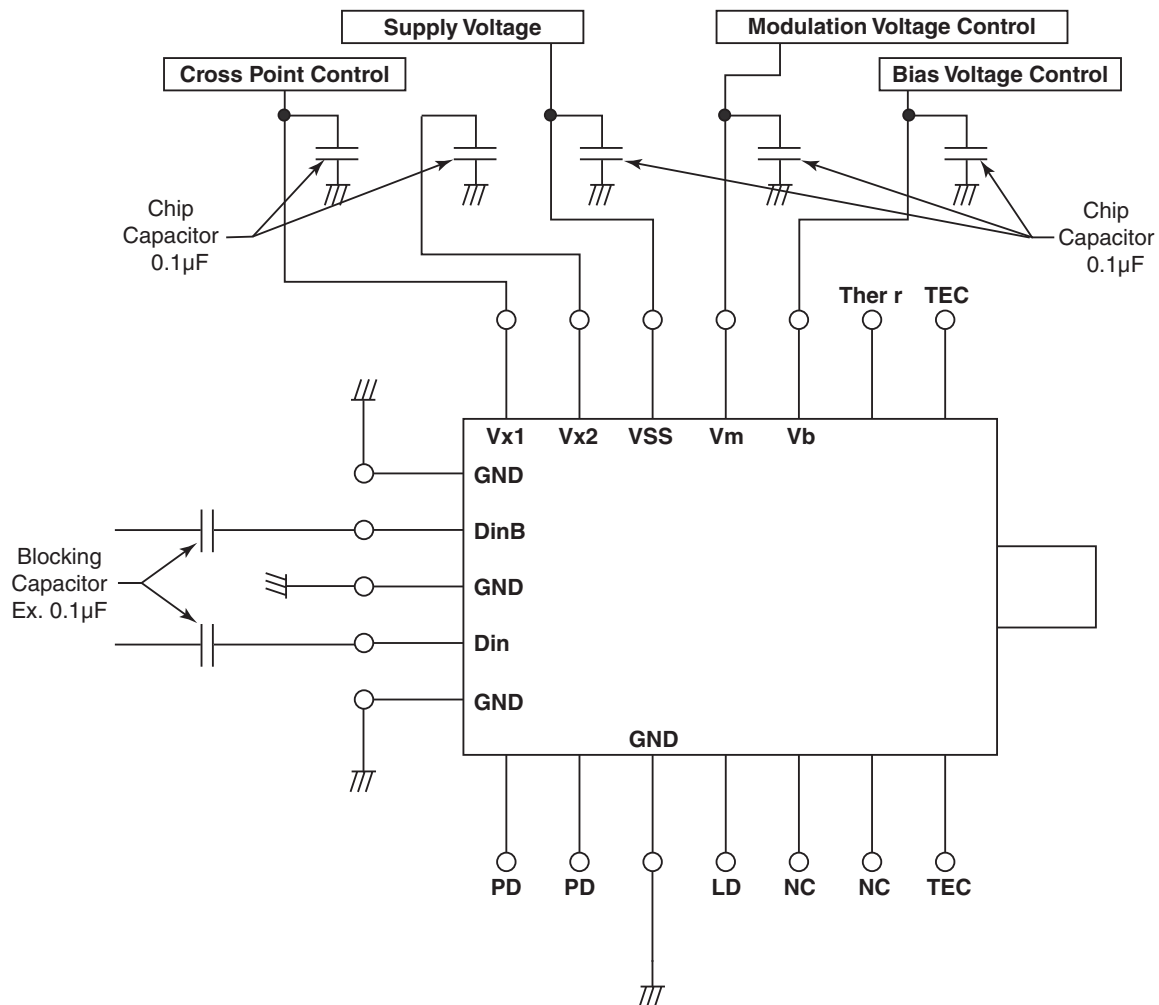
Operating Case Temperature: T_{op}=+75°C
Laser Temperature: 25°C
Optical Output Power: P_f=Pop, Note (2a)

Typical Output Waveform
Back to Back (with Filter)



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

Typical Application for Driver IC

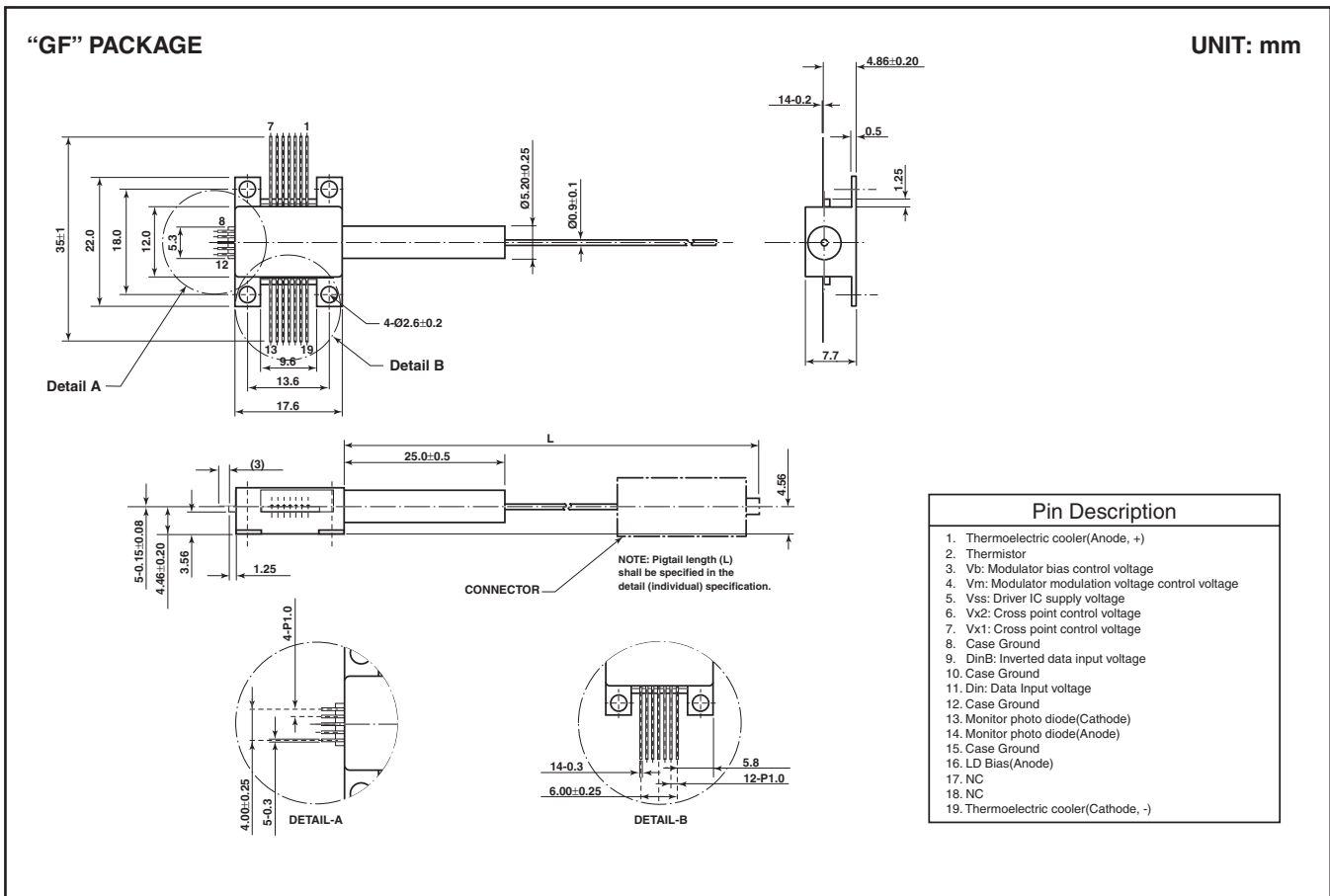


For stable operation:

- 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-C



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

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- 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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