AC5920 Series

1550 nm MQW-DFB 2.5Gbps Direct Modulation Laser

Features:

- Optimized for 2.5 Gbps Modulation Rates and 100km single mode fiber transmission
- Suitable to be used for DWDM ITU-T grid wavelength between 1546 and 1550 nm.
- Direct Modulated MQW DFB Laser
- Built-in TEC, Thermistor and Monitor PD
- Hermetic 14-Pin Butterfly Type Module
- 10mW Output Power
- Low Residual Chirp

Application:

- This MQW laser is intended for the application of 2.5 Gbps long haul. Transmission spans of 100km are possible without amplification.

Absolute Maximum Ratings (Tc=25°C)

Parameter	Symbol	Condition	Ratings	Unit
Storage Temperature	T_{stg}	-	-40 to + 70	°C
Operating Case Temperature	T_{op}	-	-20 to + 65	°C
Optical Output Power	Pf	CW	12.0	mW
Forward Current	I_F	CW	150	mA
Reverse Voltage	V_R	-	2	V
Photodiode Reverse Voltage	V_{DR}	-	20	V
Photodiode Forward Current	I_{DF}	-	10	mA
TEC Voltage	Vc	-	2.5	V
TEC Current	Ic	-	1.4	A
Lead Soldering Time	T_{sold}	<260°C	10	Sec
Environment Operating Humidity	X_{op}	T_{op}<30°C	95	%
Environment Storage Humidity	X_{st}	T_{st}<30°C	95	%

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Optical/Electrical Characteristics (T_L=T_{set}, Tc=25°C, BOL, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Laser Set Temperature	T_{set}	-	20	-	35	°C
Threshold Current	I_{th}	CW	3	-	40	mA
Forward Voltage	V_{FDC}	CW, I_F=30mA, pin 12-13	-	1.6	1.75	V
Series Resistance	Rs	CW, pin 12-13	22	25	28	Ω
Optical Output Power	P_f	CW	10.0	-	-	mW
Slope Efficiency	η	CW, Pf=10mW	0.14	-	-	mW/mA
Threshold Power	P_{th}	I_F=I_{th}, CW	-	-	150	μW
Tracking Error (Note 1)	TE	P_f=10mW, Tc=-20 to 65°C	-0.5	-	+0.5	dB
Monitor Current	Im	CW, Pf=10mW, V_{DR}=5V	0.10	-	1.0	mA
Photodiode Dark Current	I_D	V_{DR}=5V	-	2	100	nA
Photodiode Capacitance	C_t	V_{DR}=5V, F=1MHz	-	-	10	pF
Photodiode Cutoff	f_{cm}	V_{DR}=5V, 50Ω load	100	-	-	MHz
Peak Wavelength	λp	Note (2)	1546		1551	nm
Side Mode Suppression	Sr	Note (2)	33	35	-	dB
Spectral Width (-20dB)	-	Note (2)	-	-	0.5	nm
Rise Time (10%-90%)	t_r	Note (2)	-	0.1	0.125	nsec
Fall Time (10%-90%)	t_f	Note (2)	-	0.1	0.125	nsec
Cutoff Frequency	f_c	P_f=10mW, -3dB	4.0	-	-	GHz
In-Band Ripple (Window)	S_{21}	f=50 MHz ~ 3GHz	-	-	+/-1.5	dB
RF Return Loss	S_{11}	f=50 MHz ~ 2 GHz	8	-	-	dB
		f=2 GHz ~ 3 GHz	6	-	-	dB
		f=3 GHz ~ 5 GHz	3	-	-	dB
Optical Isolation	Is	Tc=-20 to 65°C	25	35	-	dB
Relative Intensity Noise	RIN	f=2.5 GHz P_f=10mW, ORL=24dB	-	-	-140	dB/Hz
Kinks (up to 2.4mW)	Kns	-	None			
Pulsation	-	-	None			
BER Performance	ER	Note (3)	No Floor			
Power Penalty	PP	Note (3)	-	-	1.5	dB

Note 1. TE=10*log{pf(Tcase)/Pf(Tc=25°)}dB, APC

Note 2. 2.5Gb/s NRZ, pseudo-random, Pb=0.2mW, Ppeak=2.0mW

Note 3. Bit rate = 2.48832 Gbps, PRBS=2^{23}-1, Dispersion=1,800 ps/nm(116km), Ppeak=10mW, Pbias=1.0mW (Extinction ratio=10dB), B.E.R.=1x10^{-10}
Decision point: Center of Back-to-Back at 10^{-9} Decision point: Center of Back-to-Back at 10^{-9},
Receiver: Standard receiver

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TEC and Thermistor Characteristics (T_L=T_{set}, Tc=25 °C, BOL, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
TEC Current	Ic	TL=Tset, Pf=10mW, Tc=65°C	-	-	1.0	A
TEC Voltage	Vc	TL=Tset, Pf=10mW, Tc=65°C	-	-	2.4	V
Cooler Power	P_{TEC}	TL=Tset, Pf=10mW, Tc=65°C	-	-	2.4	W
TEC Resistance	R_{TEC}	TL=Tset, Pf=10mW, Tc=65°C	2.0	2.4	3.2	Ω
Thermistor Resistance	R_{tr}	TL=15 to 35°C	7.7	-	12.6	kΩ
Thermistor B Constant	B	-	3,270	3,450	3,630	K

Fig. 1 Forward Current vs Output Power

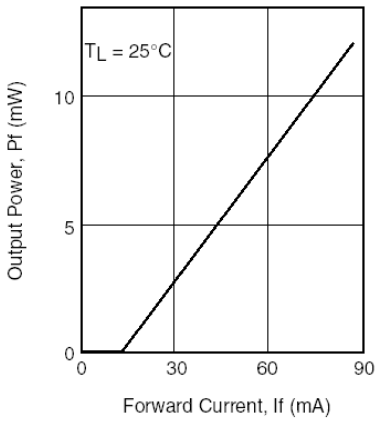

Fig. 2 Frequency Response

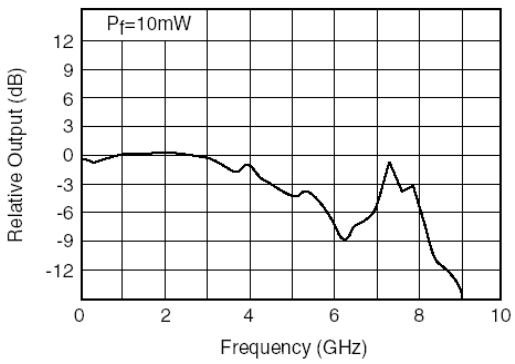

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Fig. 3 RF Return Loss

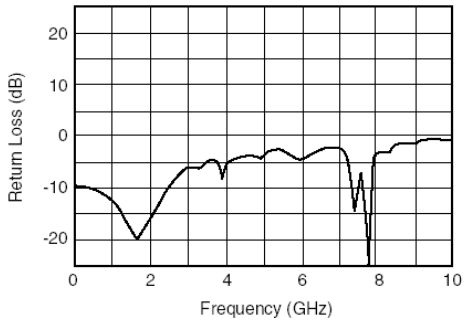


Fig. 4 Cooler Voltage -Current

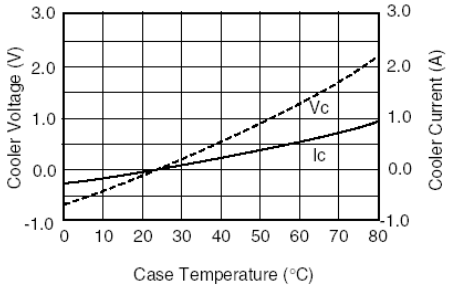


Fig. 5 Spectrum

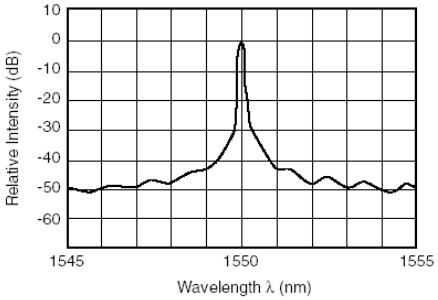


Fig. 6 Temperature Dependance of Wavelength (ACC)

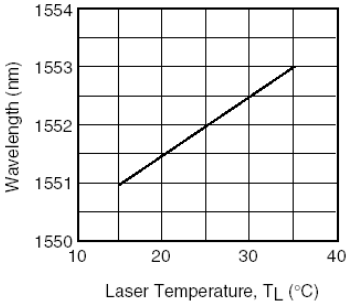
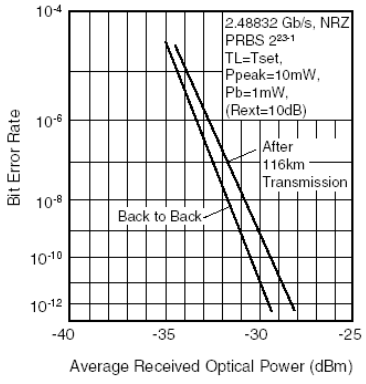


Fig. 7 Transmission Characteristics



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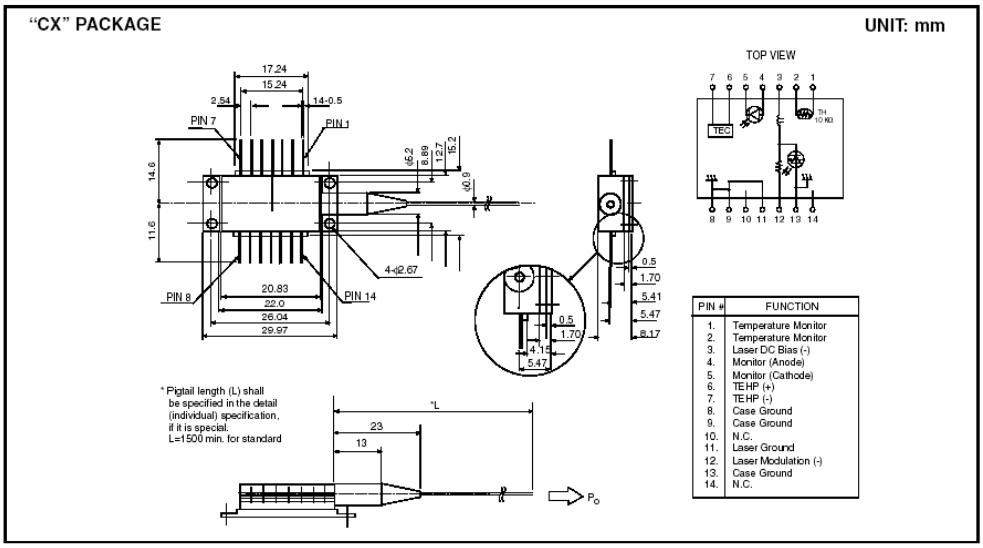

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