

Alcatel 1915 LMM

10 Gbit/s WDM digital Laser Module with integrated electro-absorption Modulator



Description

This Alcatel 1915 LMM contains an Alcatel DFB laser with monolithically integrated electro-absorption modulator (LMM). This chip provides much lower dispersion penalties than a directly modulated DFB, without the complexity of LiNbO3 external modulators. The Alcatel 1915 LMM is optimized for 10 Gbit/s TDM transmission systems.

- InGaAsP monolithically integrated DFB laser and modulator chip
- High frequency RF connector package with 50 Ohm RF impedance
- Low drive voltage ($< 2 V_{pp}$)
- Internal optical isolator
- High power available ($P_{AVE} > 2 \text{ dBm}$)
- Wavelength selection according to ITU-T G.692

Features

- 7-pin package with either GPO or K connector RF input
- Very low dispersion penalty over 80 Km for 10 Gbit/s operation

Applications

- STM-64 and OC-192 intermediate and long reach WDM transmission systems
- Terminals for submarine WDM transmission systems

Optical characteristics

Parameter	Condition	Symb	Min	Max	Unit
Threshold current	$CW, V_{bias} = 0 \text{ V}$	I_{th}	5	35	mA
Operating current	$CW, V_{bias} = 0 \text{ V}$	I_{op}	60	80	mA
Optical output power	$I_{OP}, V_{mod}, [1], [2]$	P_{AVE}	0		dBm
	$I_{OP}, V_{mod}, [1], [3]$	P_{AVE}	-3		dBm
Laser forward voltage	$CW, I_{OP}, V_{bias} = 0 \text{ V}$	V_f		2	V
Modulator bias voltage		V_{bias}	-2	0	V
Modulator drive voltage	See [1]	V_{mod}		2	V
Dynamic extinction ratio	$I_{OP}, [1], [2], [3]$	DER	10		dB
Emission wavelength		λ_m	See table 1		nm
Δ (emitted-target) wavelength	See [4]	$\Delta\lambda_e$	-0.1	+0.1	nm
Laser chip temperature range for tunability	See [4]	T_λ	20	30	$^\circ\text{C}$
Side mode suppression	See [1]	SMSR	35		dB
Cut off frequency	-3 dB, $V_{bias} = -1 \text{ V}$	S_{21}	10		GHz
RF return loss	DC to 7 GHz	S_{11}	10		dB
Dispersion penalty	See [1], [2], [3]	Δ_s		2	dB
Tracking error	$T_{submount} = 25 \text{ }^\circ\text{C}, T_{case} = 65 \text{ }^\circ\text{C}$ $I_f = 100 \text{ mA}, Q = 10 \log [P(65 \text{ }^\circ\text{C})/P(25 \text{ }^\circ\text{C})]$	TR	-0.5	0.5	dB
Rise time/ Fall time	See [1], 10 %, 90 %	T_r/T_f		45	ps
Wavelength drift vs Tcase		$\Delta\lambda/\Delta T_c$		0.5	pm / $^\circ\text{C}$
Monitor diode current	$I_{OP}, V_M = -5 \text{ V}$	I_m	0.2	1.5	mA
Dark current		I_d		0.1	μA
TEC current	$\Delta T = 45 \text{ }^\circ\text{C}, I_{OP} = 100 \text{ mA}, T_C = 65 \text{ }^\circ\text{C}, V_{bias} = -1 \text{ V}$	I_t		1.3	A
TEC voltage	$\Delta T = 45 \text{ }^\circ\text{C}, I_{OP} = 100 \text{ mA}, T_C = 65 \text{ }^\circ\text{C}, V_{bias} = -1 \text{ V}$	V_t		2.5	V
Thermistor resistance		R_{TH}	9.5	10.5	k

Notes : All limits start of life, $T_{Case} = 25 \text{ }^\circ\text{C}$, $T_{Submount} = 15 \text{ }^\circ\text{C}$ to $30 \text{ }^\circ\text{C}$, monitor bias = -5 V, unless otherwise stated.

[1] BER = 10^{-10} ; 9,953 Gbit/s modulation; $2^{23} - 1$ PRBS; NRZ line code

[2] 800 ps/nm dispersion, assuming fiber with an average dispersion of 18 ps/nm/km

[3] 1600 ps/nm dispersion, assuming fiber with an average dispersion of 18 ps/nm/km

[4] $T_{submount} = T_\lambda$. T_λ is chip temperature required to meet target wavelength (see table 1)

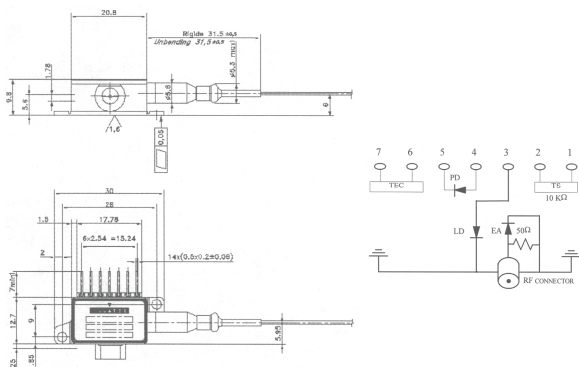
Optical power in the fiber shall not exceed the linear transmission regime.

Absolute maximum ratings

Parameter	Min	Max	Unit
Operating case temperature	0	65	$^\circ\text{C}$
Storage temperature	-40	85	$^\circ\text{C}$
Laser forward current		150	mA
Laser reverse voltage		2	V
Modulator forward voltage		1	V
Modulator reverse voltage		5	V
Photodiode forward current		1	mA
Photodiode reverse voltage		20	V
TEC voltage		2.8	V
TEC current		1.4	A
ESD applied on modulator		500	V
ESD applied on laser [1]		2000	V
Lead soldering time (at 260 $^\circ\text{C}$)		10	s
Package mounting screw torque		0.2	Nm

[1] Human body model Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only.

Mechanical details



September 99
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Customized versions are available for large quantities.

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Pin out

N°	Description
1	Thermistor
2	Thermistor
3	Laser DC bias (+)
4	Photodetector Anode (-)
5	Photodetector Cathode (+)
6	TEC (+)
7	TEC (-)

THz	Last letter #	Connector
1530,33	195,9	FB FC/PC
1531,11	195,8	FC FC/PC
1531,89	195,7	FD FC/PC
1532,68	195,6	FE FC/PC
1533,46	195,5	FF FC/PC
1534,25	195,4	FG FC/PC
1535,03	195,3	FH FC/PC
1535,82	195,2	FJ FC/PC
1536,61	195,1	FK FC/PC
1537,39	195	FL FC/PC
1538,18	194,9	FM FC/PC
1538,97	194,8	FN FC/PC
1539,76	194,7	FP FC/PC
1540,55	194,6	FQ FC/PC
1541,35	194,5	FR FC/PC
1542,14	194,4	FS FC/PC
1542,93	194,3	FT FC/PC
1543,73	194,2	FU FC/PC
1544,52	194,1	FV FC/PC
1545,32	194	FW FC/PC
1546,11	193,9	FX FC/PC
1546,91	193,8	FY FC/PC
1547,71	193,7	FZ FC/PC
1548,51	193,6	GA FC/PC
1549,31	193,5	GB FC/PC
1550,11	193,4	GC FC/PC
1550,91	193,3	GD FC/PC
1551,72	193,2	GE FC/PC
1552,52	193,1	GF FC/PC
1553,32	193	GG FC/PC
1554,13	192,9	GH FC/PC
1554,94	192,8	GJ FC/PC
1555,74	192,7	GK FC/PC
1556,55	192,6	GL FC/PC
1557,36	192,5	GM FC/PC
1558,17	192,4	GN FC/PC
1558,98	192,3	GP FC/PC
1559,79	192,2	GQ FC/PC
1560,60	192,1	GR FC/PC

Table 1, All wavelengths referenced to vacuum Tsubmount = 25 °C.

Ordering information

Alcatel 1915 LMM

Dispersion	Part number	RF connector Input Type	Pigtail connector
800 ps/nm	3CN 00315 ##	K type	FC/PC
800 ps/nm	3CN 00321 ##	GPO type	FC/PC
1600 ps/nm	3CN 00316 ##	K type	FC/PC
1600 ps/nm	3CN 00322 ##	GPO type	FC/PC

defines the wavelength according to the table 1 above

Standards

ITU-T G.652 optical fiber
 IEC 68-2 and MIL STD 883 environment



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