

# Alcatel 1916 LMM

## 2.5 Gbit/s digital Laser Module with integrated electro-absorption Modulator

### Description

This Alcatel 1916 LMM contains an Alcatel DFB laser with monolithically integrated electro-absorption modulator (ILM). This chip provides much lower dispersion penalties than a directly modulated DFB, without the complexity of LiNbO3 external modulators. The Alcatel 1916 LMM is optimized for ultra long-haul transmission systems using non-dispersion shifted and optical fiber amplifiers.

### Features

- Industry-standard 14-pin butterfly package

- Very low dispersion penalty over 750km for 2.5 Gbit/s operation
- InGaAsP monolithically integrated DFB laser and modulator chip
- High frequency butterfly package with 50 Ω RF impedance matching and DC bias RF filtering
- Low drive voltage ( $\leq 2$  Vpp)
- Internal optical isolator
- High power available

### Applications

- STM-16 and OC-48 ultra long-haul transmission systems
- Terminals for submarine transmission systems



## Optical characteristics

Parameter	Symb.	Conditions	Min	Typical	Max	Units
Threshold current	$I_{th}$	CW, $V_{bias} = 0$ V	5	17	35	mA
Operating current	$I_{op}$	CW, $V_{bias} = 0$ V	50	80	100	mA
Optical output power	$P_{AVF}$	$I_{op}$ , $V_{mod}$ , [1]	0			dBm
Laser forward voltage	$V_F$	CW, $I_{op}$ , $V_{bias} = 0$ V			2	V
Modulator bias voltage	$V_{bias}$	See [1]	- 2	- 1	0	V
Modulator drive voltage	$V_{mod}$	See [1]		1	2	V
Dynamic extinction ratio	DER	See [1]		10		dB
Emission wavelength	$\lambda_m$		1530		1570	nm
Side mode suppression	SMSR	@ $I_{op}$	35			dB
Cut off frequency	S21	- 3 dB	4			GHz
RF return loss	S11	DC to 3 GHz	10	11		dB
Dispersion penalty	$\Delta s$	See [1], [2]			2	dB
Tracking error	TR	$T_{submount} = 25$ °C, $T_{case} = 70$ °C $I_f = 100$ mA, $Q = 10 \log [P(70$ °C)/ $P(25$ °C)]	- 0.5		0.5	dB
Rise time / Fall time	$T_r/T_f$	[1], 10%, 90%		70	125	ps
Optical return loss	ORL	$T_c = - 5$ to 70 °C	25			dB
Monitor diode current	$I_m$	$I_{op}$ , $V_M = - 5$ V	0.2	0.5	1.5	mA
Dark current	$I_d$				0.1	$\mu$ A
TEC current	$I_t$	$\Delta T = 45$ °C, $I_{op} = 120$ mA, $T_c = 70$ °C, $V_{bias} = - 1$ V		1	1.2	A
TEC voltage	$V_t$	$\Delta T = 45$ °C, $I_{op} = 120$ mA, $T_c = 70$ °C, $V_{bias} = - 1$ V		1.6	2.4	V
Thermistor resistance	$R_{TH}$		9.5		10.5	K $\Omega$

Notes : All limits start of life,  $T_{case} = 25$  °C,  $T_{submount} = 25$  °C, monitor bias = - 5 V, unless otherwise stated.

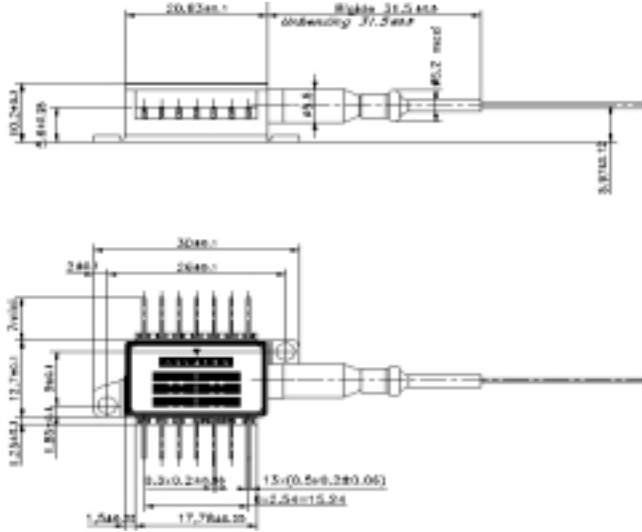
[1] BER =  $10^{-10}$ ; 2.488 Gbit/s modulation; 2<sup>23</sup>-1 PRBS; NZR line code; DER $\geq$ 10dB [2] 7200 ps/nm dispersion, assuming fiber with an average dispersion of 18 ps/nm/km

## Absolute maximum ratings

Parameters	Min	Max	Unit
Operating case temperature	- 5	70	°C
Storage temperature	-40	85	°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°C)		10	s
Packing 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



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Customized versions are available for large quantities.

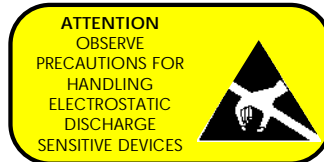
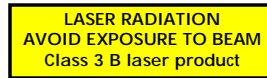
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## Pin out

N°	Description
1	Thermistor
2	Thermistor
3	Laser DC bias (+)
4	Photodetector Anode (-)
5	Photodetector Cathode (+)
6	TEC (+)
7	TEC (-)
8	Case Ground
9	Case Ground
10	Not Connected
11	Laser / modulator ground
12	Modulator Anode/50Ω RF input
13	Laser / modulator ground
14	Not Connected

## Standards

ITU-T G.691  
IEC 68-2 and MIL STD 883 environment



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## Ordering information

Alcatel 1916 LMM

Application	Part number	Connector
12800 ps/nm	3CN00397AA	FC/PC
7200 ps/nm	3CN00149AA	FC/PC
4000 ps/nm	3CN00307AA	FC/PC

