

## FEATURES

- Up to 3.2Gbps operation
- Modulation current to 60mA
- Rise/Fall times <70PS
- Single 3.3V power supply
- Programmable laser modulation current
- Operating temperature range of  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Available in tiny 16-pin MLF™ package

## DESCRIPTION

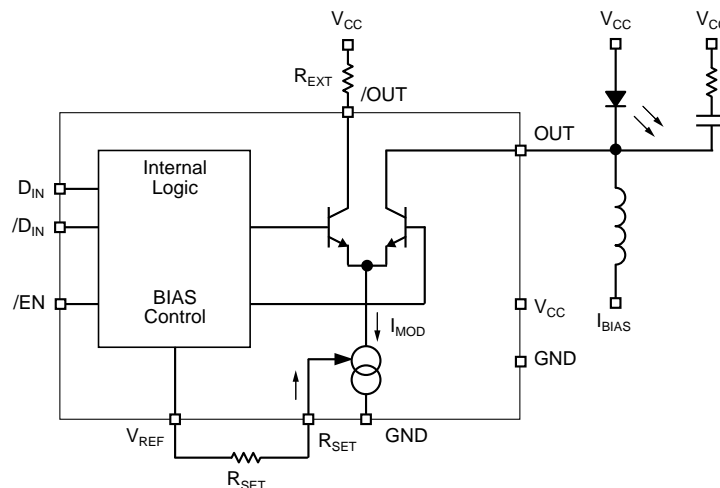
The SY88912L is the smallest laser driver with programmable modulation current for SONET/SDH applications up to 3.2Gbps. The device accepts either PECL or CML level data inputs. The SY88912L provides modulation current of up to 60mA for FP (Fabry-Perot) or DFB (Distributed Feedback) laser.

There is a 75k $\Omega$  pull-down resistor to  $V_{EE}$  at the input of /EN. An active low PECL enable signal shuts off modulation current.

## APPLICATIONS

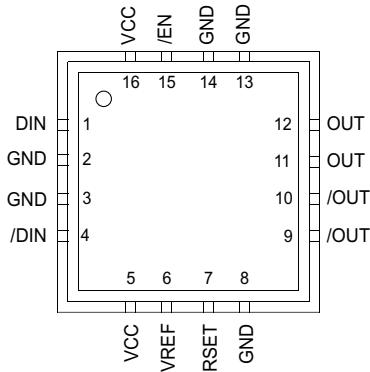
- Fiber optical module
- Transponder
- XAUI CWDM
- SONET/SDH transmission system
- Add-drop mux
- Metro area network
- 2.5Gbps optical transmitter

## BLOCK DIAGRAM



**PACKAGE/ORDERING INFORMATION**

**Ordering Information**



Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY88912LMI	MLF-16	Industrial	912L	Sn-Pb
SY88912LMITR <sup>(1)</sup>	MLF-16	Industrial	912L	Sn-Pb
SY88912LMG	MLF-16	Industrial	912L with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY88912LMGTR <sup>(1)</sup>	MLF-16	Industrial	912L with Pb-Free bar-line indicator	Pb-Free NiPdAu

**Note:**  
1. Tape and Reel.

**16-Pin MLF™ (MLF-16)**

**PIN NAMES**

Pin	Function
D <sub>IN</sub> , /D <sub>IN</sub>	NRZ differential data inputs.
/EN	PECL compatible active low input.
GND	Most negative power supply input.
OUT, /OUT	Open collector outputs from the modulation driver.
R <sub>SET</sub>	An external resistor between V <sub>REF</sub> and R <sub>SET</sub> defines the modulation current.
V <sub>CC</sub>	Most positive power supply input.
V <sub>REF</sub>	Voltage reference for use with R <sub>SET</sub> .

**TRUTH TABLE<sup>(1)</sup>**

D	/D	/EN	OUT <sup>(2)</sup>	/OUT
L	H	L	H	L
H	L	L	L	H
X	X	H	H	L

**Notes:**  
1. L = LOW, H = HIGH, X = don't care.  
2. I<sub>OUT</sub> ≤ I<sub>MOD\_OFF</sub> when /EN is HIGH.

**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

Symbol	Parameter	Value	Unit
$V_{CC}$	Power Supply Voltage	0 to +5.0	V
$V_{IN}$	Input Voltage	0 to $V_{CC}$	V
$I_{OUT}$	Output Current	65	mA
$T_{store}$	Storage Temperature	-55 to +125	°C
$T_A$	Operating Temperature	-40 to +85	°C
$P_D$	Power Dissipation	500	mW
$\theta_{JA}^{(2)}$	Package Thermal Resistance (Junction-to-Ambient)      -Still-Air	59	°C/W
$\Psi_{JB}$	Package Thermal Resistance (Junction-to-Board)	32.1	°C/W

**Note:**

1. Permanent device damage may occur if absolute maximum ratings are exceeded. This is a stress rating only and functional operation is not implied at conditions other than those detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.
2. JEDEC standard test boards with DIE attach pads soldered to PCB.

**OPERATING CONDITIONS**

Symbol	Parameter	Value	Unit
$V_{CC}$	Power Supply Voltage	+3.15 to +3.45	V
$R_{EXT}^{(1)}$	Resistor to Dissipate Power	5 (Min.)	$\Omega$
$R_{SET}$	Resistor to Set $I_{MOD}$	100 to 10,000	$\Omega$

**Note:**

1. Refer to  $V_{OUT}$  specification.

### DC ELECTRICAL CHARACTERISTICS

$V_{CC} = 3.15$  to  $3.45V$ ;  $GND = 0V$ ;  $T_A = -40^{\circ}C$  to  $+85^{\circ}C$

Symbol	Parameter	Min.	Typ. <sup>(2)</sup>	Max.	Unit	Condition
$I_{CC}$	Power Supply Current <sup>(1)</sup>	—	65	80	mA	$I_{MOD} = 60mA$
$I_{MOD}$	Modulation Current Range	10	—	60	mA	
$I_{MOD\ OFF}$	Modulation Off Current <sup>(2)</sup>	—	—	200	$\mu A$	$/EN = V_{IHEN}$
$V_{IDDIN}$	Input Differential Voltage, $D_{IN}, /D_{IN}$	200	—	1600	mV <sub>PP</sub>	<sup>(3)</sup>
$V_{IHDIN}$	Input HIGH Voltage, $D_{IN}, /D_{IN}$	$V_{CC} - 1.7$	—	$V_{CC} - 0.1$	V	
$V_{ILDIN}$	Input LOW Voltage, $D_{IN}, /D_{IN}$	$V_{CC} - 1.9$	—	$V_{CC} - 0.3$	V	
$V_{IHEN}$	Input HIGH Voltage, $/EN$	$V_{CC} - 1165$	—	$V_{CC} - 880$	mV	
$V_{ILEN}$	Input LOW Voltage, $/EN$	$V_{CC} - 1810$	—	$V_{CC} - 1475$	mV	
$V_{OUT}$	Output Voltage, $OUT, /OUT$	$V_{CC} - 1.5$	—	$V_{CC}$	V	<sup>(4)</sup>
$V_{REF}$	Reference Voltage <sup>1.5</sup>	1.7	1.9	V		

**Notes:**

1. Excluding  $I_{MOD}$ .  $I_{MOD} \leq 60mA$
2. Typical values are under  $V_{CC} = 3.3V$  and  $T_A = 25^{\circ}C$ .
3.  $V_{IDDIN}$  is the voltage required to guarantee a stable logic level. For a logic "1",  $D_{IN}$  must be  $V_{IDDIN}$  above  $/D_{IN}$ . For stable logic "0",  $D_{IN}$  must be  $V_{IDDIN}$  below  $/D_{IN}$ .
4.  $OUT$  and  $/OUT$  are current outputs. This specification defines the voltage range that the user must guarantee these pins remain within proper operation.

### AC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>

$V_{CC} = 3.15$  to  $3.45V$ ;  $GND = 0V$ ;  $T_A = -40^{\circ}C$  to  $+85^{\circ}C$

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
$D_J$	Jitter Generation <sup>(2),(3)</sup>	—	—	20	ps	peak-to-peak
$t_r, t_f$	Rise/Fall Times <sup>(2)</sup> (20% to 80%)	—	65	—	ps	

**Notes:**

1. AC characteristics are guaranteed by design and characterization.
2.  $I_{MOD} = 40mA$ ,  $25\Omega$  resistors each tied from  $OUT$  and  $/OUT$  to  $V_{CC}$ .
3.  $I_{MOD} = 40mA$ , 2.5Gbps, 0-1 pattern,  $BW = 12KHz$  to  $20MHz$ .

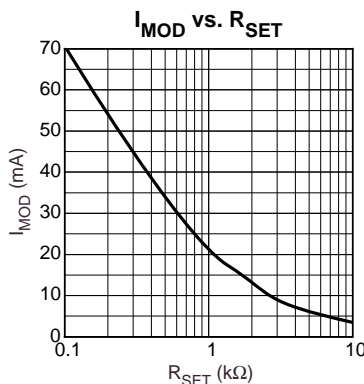
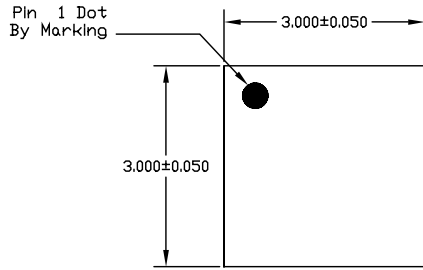
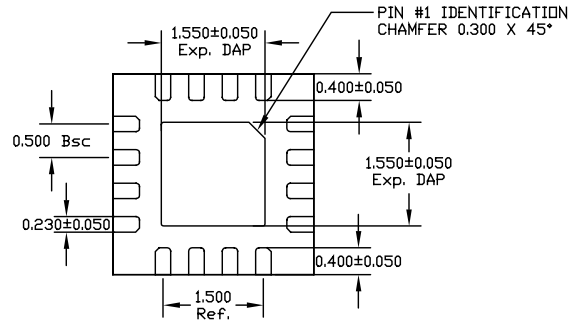


Figure 1.  $I_{MOD}$  vs.  $R_{SET}$

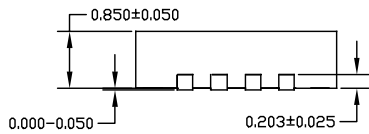
**16 LEAD EPAD-Micro LEADFRAME™ (MLF-16)**



TOP VIEW



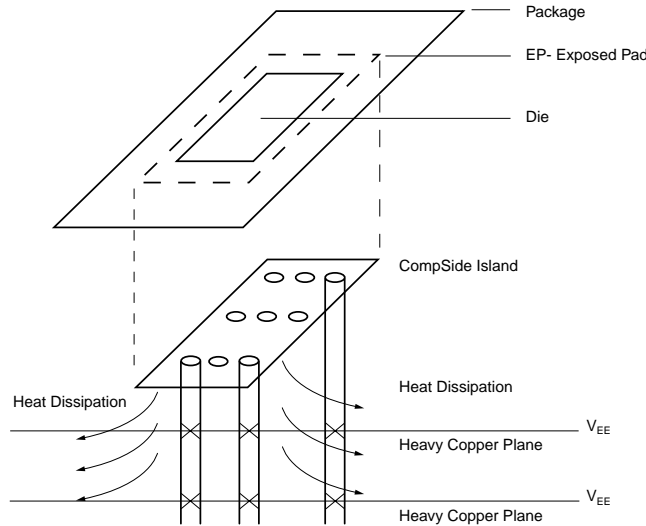
BOTTOM VIEW



SIDE VIEW

- NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
  2. MAX. PACKAGE WARPAGE IS 0.05 mm.
  3. MAXIMUM ALLOWABLE BURRS IS 0.076 mm IN ALL DIRECTIONS.
  4. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.

Rev. 01



PCB Thermal Consideration for 16-Pin MLF™ Package

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