



3.3V, 4.25Gbps SONET/SDH Laser Driver with Output Disable

General Description

The SY88932L is the smallest available laser driver with a programmable modulation current up to 60mA for Fabry-Perot (FP) or distribution feedback (DFB) lasers. The device is suitable for SOENT/SDH applications with data rates up to 4.25Gbps. The SY88932L accepts either CML level or AC-coupled PECL inputs, and incorporates an active low TTL /EN function which shuts off the modulation current when HIGH.

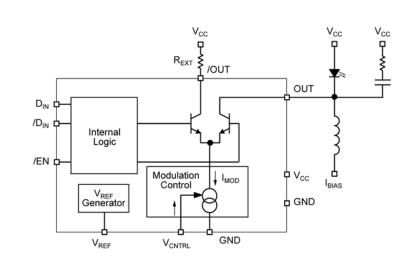
Datasheets and support documentation can be found on Micrel's web site at www.micrel.com.

Features

- Up to 4.25Gbps operation
- Modulation current to 60mA
- Rise/fall times 65ps typical
- Input 50Ω internally terminated to VCC
- TTL /EN with internal $75k\Omega$ pull-down
- Designed for use with MIC3000 optical transceiver management IC
- Voltage programmable laser modulation current
- Single 3.3V power supply
- Operating temperature range of -40°C to +85°C
- Available in tiny 16-pin QFN package

Applications

- Fiber optical module
- Transponder
- XAUI CWDM
- SONET/ SDH transmission system
- Add-drop MUX
- Metro area network
- 4.25Gbps optical transmitter



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Block Diagram

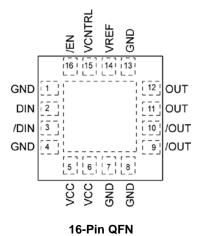
Ordering Information

Part Number	Package Type	Operating Range	Package Marking	Lead Finish	
SY88932LMI	QFN-16	Industrial	932L	Sn-Pb	
SY88932LMITR ⁽¹⁾	QFN-16	Industrial	932L	Sn-Pb	
SY88932LMG	QFN-16	Industrial	932L with Pb-Free bar-line indicator	Pb-Free NiPdAu	
SY88932LMGTR ⁽¹⁾	QFN-16	Industrial	932L with Pb-Free bar-line indicator	Pb-Free NiPdAu	

Note:

1. Tape and Reel.

Pin Configuration



Pin Number	Pin Name	Pin Function
2, 3	DIN, /DIN	NRZ differential data (inputs), CML terminated interface with 50Ω to V _{CC} .
1, 4, 7, 8, 13	GND	Ground.
5, 6	VCC	Positive power supply.
9, 10, 11, 12	OUT, /OUT	Open collector (outputs) from the modulation driver.
14	VREF	Voltage reference, nominally 1.25V with respect to ground.
15	VCNTRL	Voltage control of I_{MOD} . 5k Ω input impedance. See "Typical Operating Characteristics."
16	/EN	Enable: TTL-compatible active low input with $75k\Omega$ pull-down resistor.

Pin Description

Truth Table^(1,2)

D	/D	/EN	OUT ⁽³⁾	/OUT
L	Н	L	Н	L
Н	L	L	L	Н
X	Х	Н	Н	L

Notes:

1. Truth table parameters are given for voltage rather than optical outputs. Hence, a voltage HIGH and OUT means no modulation current is flowing through OUT, and a voltage LOW on OUT means modulation current is flowing through OUT. A voltage LOW implies an optical HIGH, and vice versa.

2. L = LOW, H = HIGH, X = don't care.

3. $I_{OUT} \leq I_{MOD_OFF}$ when /EN is HIGH.

Absolute Maximum Ratings⁽¹⁾

Supply Voltage (V _{CC})	-0.5V to +4.0V
CML Input Voltage (VIN)	$V_{\rm CC}$ –1.0V to $V_{\rm CC}$ +0.5V
TTL Control Input Voltage (VIN)	0V to V _{CC}
Lead Temperature (soldering, 20se	c.)
Storage Temperature (T _s)	65°C to +150°C

Operating Ratings⁽²⁾

Supply Voltage (V _{CC})	+3.0V to +3.6V
Ambient Temperature (T _A)	–40°C to +85°C
Junction Temperature (T _J) Junction Thermal Resistance ⁽³⁾	–40°C to +120°C
Junction Thermal Resistance ⁽³⁾	
QFN	
(θ _{JA}) Still-Air	61°C/W
(ψ _{JB}) Still-Air	

DC Electrical Characteristics

 V_{CC} = 3.0V to 3.6V; GND = 0V; T_A = -40°C to +85°C, Typical values at V_{CC} = 3.3V, T_A = 25°C.

Symbol	Parameter	Condition	Min	Тур	Max	Units
Icc	Power Supply Current	Note 4		57	80	mA
I _{MOD}	Modulation Current Range		10		60	mA
I _{MOD_OFF}	Modulation Off Current	/EN = V _{IHEN}			200	μA
V _{IR}	CML Input Voltage Range		V _{CC} -0.8		V _{CC} +0.4	V
V _{ID}	CML Input Differential Voltage (D _{IN} , /D _{IN})	Note 5	400	800	1600	mV _{PP}
V _{IHEN}	TTL Input HIGH Voltage (/EN)		2.0			V
VILEN	TTL Input LOW Voltage (/EN)				0.8	V
Vout	Voltage (OUT, /OUT)	Note 6	V _{cc} -1.5		Vcc	V
V_{REF}	Reference Voltage	Note 7	1.2	1.25	1.3	V

Notes:

1. Permanent device damage may occur is 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 datasheet. Exposed to Absolute Maximum Ratings conditions for extended periods may affect device reliability.

- 2. The device is not guaranteed to function outside its operating rating.
- 3. Thermal resistance numbers are 4-layer PCB. Thermal performance assumes exposed pad is soldered (or equivalent) to the same potential as the ground pins on the PCB.
- 4. Excluding I_{MOD} I_{MOD} set to 60mA with 25 Ω load to V_{CC} on OUT, /OUT. Inputs floating.
- 5. V_{ID} is the voltage required to guarantee a stable logic level. For logic "1", D_{IN} must be V_{ID}/2 above /D_{IN}. For stable logic "0", D_{IN} must be V_{ID}/2 below /D_{IN}.
- 6. OUT and /OUT are current outputs. This specification defines the voltage range that the user must guarantee these pins remain within for proper operation.
- 7. V_{REF} intended to source/sink \leq |5mA|.

AC Electrical Characteristics⁽⁸⁾

Symbol	Parameter	Condition	Min	Тур	Max	Units
t _{r,} t _f	Output Rise/Fall Times (20% to 80%)	Note 9		65	100	ps
DJ	Deterministic Jitter	Note 9, 10		20		pspp

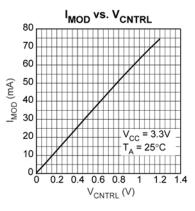
Notes:

8. AC characteristics are guaranteed by design and characterization.

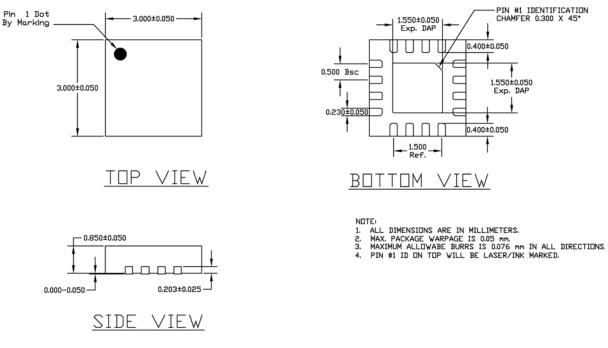
9. $I_{MOD} = 60 \text{mA}.$

10. Deterministic jitter measured using K28.5 pattern of 2.486Gbps, V_{ID} = 1600mV_{PP}.

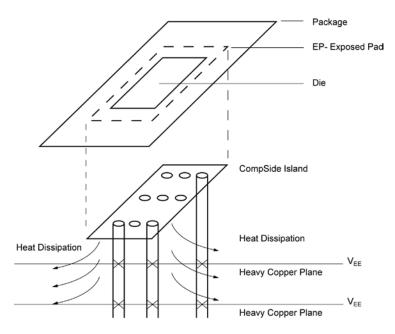
Typical Operating Characteristics



Package Information



16-Pin QFN



PCB Thermal Consideration for 16-Pin QFN Package

Package Notes:

- 1. Package meets Level 2 qualifications.
- 2. All parts are dry-packaged before shipment.
- 3. Exposed pads must be soldered to a ground for proper thermal management.

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