SDH/SONET 2.5Gbps LASER DIODE DRIVER

SY88922

FEATURES

- **Up to 2.5Gbps operation**
- **25mA peak drive current**
- **Separate modulation control**
- **Separate output enable for laser safety**
- **Differential inputs for data**
- **75KΩ input pulldown resistor**
- **Designed for use with SY88923, SY88904 or SY88905**
- **Available in a tiny 10-pin (3mm) MSOP**

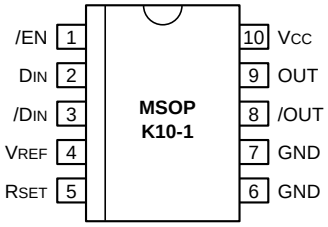
DESCRIPTION

The SY88922 is a high-speed current switch for driving a semiconductor laser diode in optical transmission applications. The output current, or modulation current IMOD, is DC current controlled by IRSET, current through the resistor RSET. The output OUT is HIGH when output enable is HIGH.

The device incorporates complementary open collector outputs with a capability of driving peak current of 25mA. The resistor REXT must be placed between /OUT and VCC to dissipate the worst case power. RSER is recommended to compensate for laser diode matching issues.

The SY88922 utilizes the high performance bipolar ASSET™ technology.

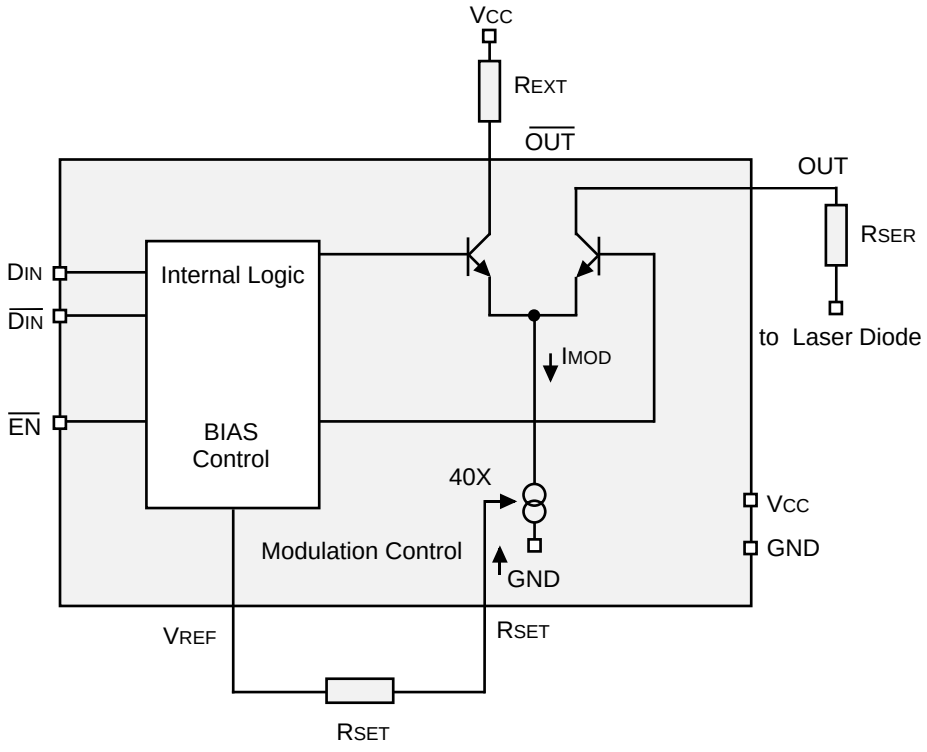
PIN CONFIGURATIONS



APPLICATIONS

- **1.25Gbps Gigabit Ethernet**
- **531Mbps and 1062Mbps Fibre Channel**
- **622Mbps SONET**
- **Gigabit Interface Converter**
- **2.5Gb/s SDH/SONET**

BLOCK DIAGRAM



Rev.: B Amendment: /1
Issue Date: July 2000

PIN NAMES

Pin	Function
V_{CC}	Most positive power supply input, +5V for PECL operation.
GND	Ground
D_{IN}, /D_{IN}	These differential PECL 100K compatible inputs receive NRZ data.
/EN	This PECL 100K compatible input enables Laser Driver. Modulation current goes to zero when asserted HIGH.
OUT, /OUT	Open collector outputs from the modulation buffer drive these differential current outputs.
V_{REF}	Voltage reference for use with R_{SET}.
R_{SET}	An external resistor sets up the source current for modulation I_{mod}.

TRUTH TABLE(1)

D	$\overline{D}$	/EN	OUT(2)	/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. H = I_{OUT} = 0mA

ABSOLUTE MAXIMUM RATINGS(1)

Symbol	Rating	Value	Unit
V_{CC}	Power Supply Voltage	0 to +7.0	V
V_I	Input Voltage	0 to V_{CC}	V
I_O	Output Current	25	mA
T_A	Operating Temperature Range	0 to +85	°C
T_{store}	Storage Temperature Range	–55 to +125	°C
P_{tot}	Power Dissipation	250	mW

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.

OPERATIONING CONDITIONS(1)

Symbol	Rating	Value	Unit
V_{CC}	Power Supply Voltage	+4.5 to +5.5	V
R_{EXT}	Resistor to Dissipate Power	10 to 50	Ω
R_{SER}	Laser Diode Serial Resistor	0 to 50	Ω
R_{SET}	Resistor to Adjust Current	1500 to 50,000	Ω
ΘJA	Thermal Resistance of Package to Ambient(2)	113	°C/W
C_{OUT}	Capacitance on OUT + /OUT	2.5 typical	pf

NOTES:

1. The voltage drop across R_{EXT} and R_{SER} plus Laser Diode should not be greater than 2V.
2. Still air without heatsink.

DC ELECTRICAL CHARACTERISTICS

GND = 0V; V_{CC} = +5.0V ±10%; T_A = 0°C to + 85°C

Symbol	Parameter	T_A = 0°C			T_A = +25°C			T_A = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{IH}	Input HIGH Voltage (D_{IN}, /D_{IN}, /EN)	V_{CC}–1165	—	V_{CC}–880	V_{CC}–1165	—	V_{CC}–880	V_{CC}–1165	—	V_{CC}–880	mV
V_{IL}	Input LOW Voltage (D_{IN}, /D_{IN}, /EN)	V_{CC}–1810	—	V_{CC}–1475	V_{CC}–1810	—	V_{CC}–1475	V_{CC}–1810	—	V_{CC}–1475	mV
V_{REF}	Reference Voltage	—	3.12	—	—	3.00	—	—	2.80	—	V
I_{IL}	Input LOW Current[1] (D_{IN}, /D_{IN}, /EN)	0.5	—	—	0.5	—	—	0.5	—	—	uA
I_{IH}	Input HIGH Current (D_{IN}, /D_{IN}, /EN)	—	—	100	—	—	100	—	—	100	uA
I_{CC}	Supply Current[2]	—	16	25	—	16	25	—	16	25	mA
I_{OL}	Output LOW Current (/EN = HIGH)	—	—	500	—	—	500	—	—	500	uA
I_{OUT}	Modulation Current	5	15	25	5	15	25	5	15	25	mA
I_{RSET}	Modulation Control	0.125	—	0.625	0.125	—	0.625	0.125	—	0.625	mA
A_{RSET}	=I_{OUT}/I_{RSET}	30	38	44	30	38	44	30	38	44	—

NOTES:
1. V_I = V_{IL}(Min.)
2. I_{MOD} = 25mA.

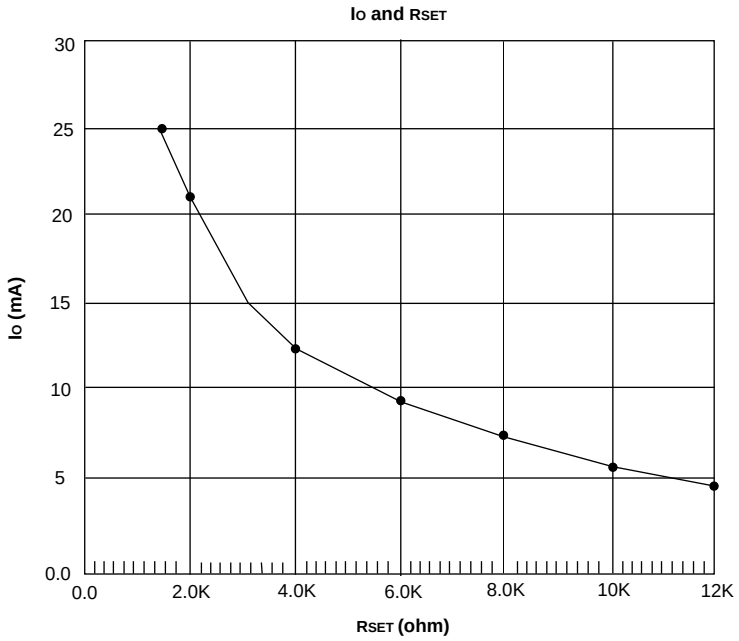
AC ELECTRICAL CHARACTERISTICS[1]

I_{MOD} =10mA; GND = 0V; V_{CC} = +5V ±10%; T_A = 0°C to + 85°C

Symbol	Parameter	T_A = 0°C			T_A = +25°C			T_A = +85°C			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
t_{pd} D	Propagation Delay D_{IN} - OUT	—	—	1000	—	500	1000	—	—	1000	ps	
t_{pd} EN	Propagation Delay /EN - OUT	—	—	1000	—	450	1000	—	—	1000	ps	
t_r t_f	Rise/Fall Time (20% to 80%)	—	—	160	—	110	160	—	—	160	ps	Load = 25Ω
I_{OR}	Output Current Ringing[2]	—	—	10	—	—	10	—	—	10	%	

NOTES:
1. R_{EXT} = R_{SER} = 25Ω ±1%, R_{SER} connects to V_{CC} directly without Laser Diode.
2. I_{OH} = 5 to 25mA

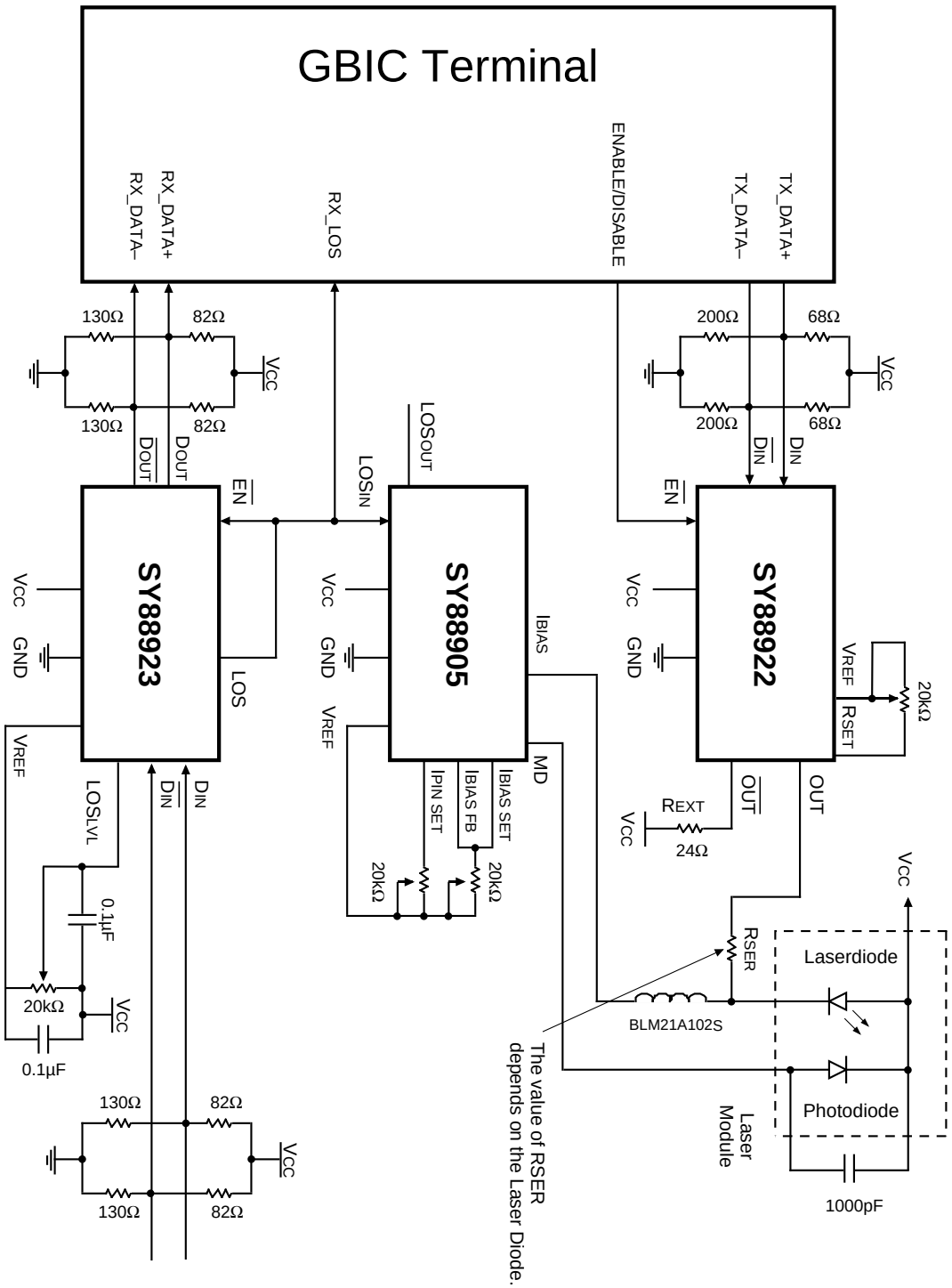
PERFORMANCE CURVES



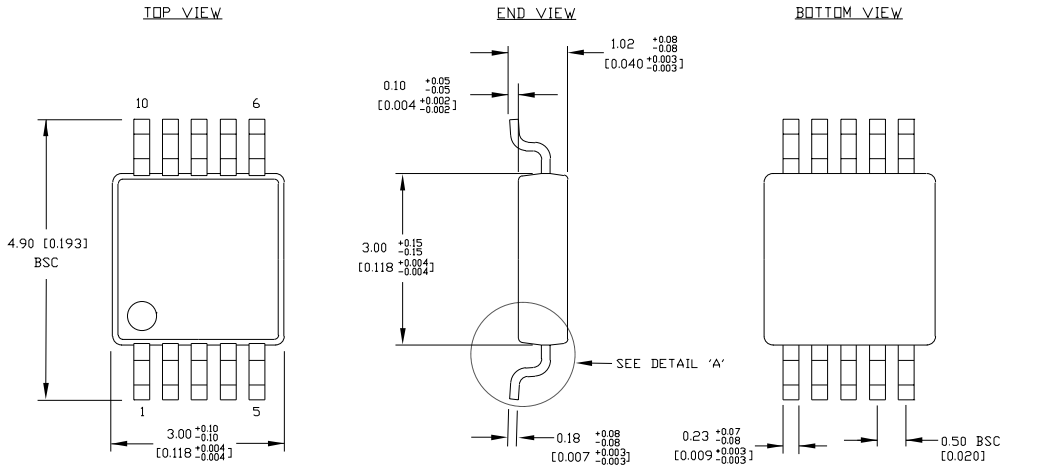
PRODUCT ORDERING CODE

Ordering Code	Package Type	Operating Range
SY88922KC	K10-1	Commercial
SY88922KCTR	K10-1	Commercial

APPLICATION EXAMPLE FOR 3-CHIP SET SOLUTION



10 LEAD MSOP (K10-1)



NOTES:
1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.20 [0.008] PER SIDE.

Rev. 00

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