

**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  $I_{MOD}$ , is DC current controlled by  $I_{RSET}$ , current through the resistor  $R_{SET}$ . The output  $OUT$  is HIGH when output enable is HIGH.

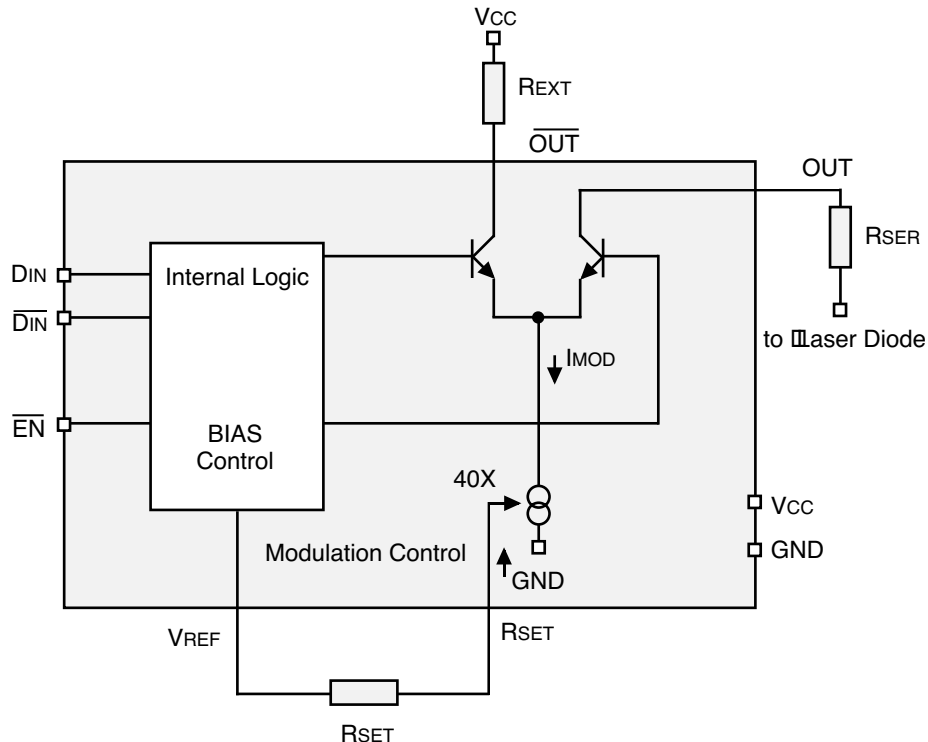
The device incorporates complementary open collector outputs with a capability of driving peak current of 25mA. The resistor  $R_{EXT}$  must be placed between  $\overline{OUT}$  and  $V_{CC}$  to dissipate the worst case power.  $R_{SER}$  is recommended to compensate for laser diode matching issues.

The SY88922 utilizes the high performance bipolar ASSET™ technology.

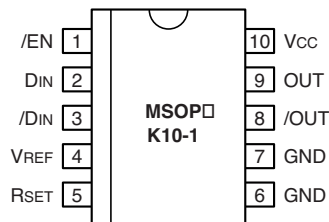
**APPLICATIONS**

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

**BLOCK DIAGRAM**



**PACKAGE/ORDERING INFORMATION**



**10-Pin MSOP (K10-1)**

**Ordering Information**

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY88922KC	K10-1	Commercial	922	Sn-Pb
SY88922KCTR <sup>(1)</sup>	K10-1	Commercial	922	Sn-Pb
SY88922KG	K10-1	Commercial	922 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY88922KGTR <sup>(1)</sup>	K10-1	Commercial	922 with Pb-Free bar-line indicator	Pb-Free NiPdAu

**Note:**

- 1. Tape and Reel.

**PIN NAMES**

Pin	Function
VCC	Most positive power supply input, +5V for PECL operation.
GND	Ground
DIN, /DIN	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.
VREF	Voltage reference for use with RSET.
RSET	An external resistor sets up the source current for modulation $I_{mod}$ .

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

D	$\bar{D}$	/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. H =  $I_{OUT} = 0mA$

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

Symbol	Rating	Value	Unit
V <sub>CC</sub>	Power Supply Voltage	0 to +7.0	V
V <sub>I</sub>	Input Voltage	0 to V <sub>CC</sub>	V
I <sub>O</sub>	Output Current	25	mA
T <sub>A</sub>	Operating Temperature Range	0 to +85	°C
T <sub>store</sub>	Storage Temperature Range	-55 to +125	°C
T <sub>J</sub>	Maximum Operating Junction Temperature	+125	°C
P <sub>tot</sub>	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<sup>(1)</sup>**

Symbol	Rating	Value	Unit
V <sub>CC</sub>	Power Supply Voltage	+4.5 to +5.5	V
R <sub>EXT</sub>	Resistor to Dissipate Power	10 to 50	Ω
R <sub>SER</sub>	Laser Diode Serial Resistor	0 to 50	Ω
R <sub>SET</sub>	Resistor to Adjust Current	1500 to 50,000	Ω
θ <sub>JA</sub>	Thermal Resistance of Package to Ambient <sup>(2)</sup>	113	°C/W
C <sub>OUT</sub>	Capacitance on OUT + /OUT	2.5 typical	pf

**Notes:**

1. The voltage drop across R<sub>EXT</sub> and R<sub>SER</sub> plus Laser Diode should not be greater than 2V.
2. Still air without heatsink.

**DC ELECTRICAL CHARACTERISTICS**

GND = 0V; V<sub>CC</sub> = +5.0V ±10%; T<sub>A</sub> = 0°C to + 85°C

Symbol	Parameter	T <sub>A</sub> = 0°C			T <sub>A</sub> = +25°C			T <sub>A</sub> = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
V <sub>IH</sub>	Input HIGH Voltage (D <sub>IN</sub> , /D <sub>IN</sub> , /EN)	V <sub>CC</sub> -1165	—	V <sub>CC</sub> -880	V <sub>CC</sub> -1165	—	V <sub>CC</sub> -880	V <sub>CC</sub> -1165	—	V <sub>CC</sub> -880	mV
V <sub>IL</sub>	Input LOW Voltage (D <sub>IN</sub> , /D <sub>IN</sub> , /EN)	V <sub>CC</sub> -1810	—	V <sub>CC</sub> -1475	V <sub>CC</sub> -1810	—	V <sub>CC</sub> -1475	V <sub>CC</sub> -1810	—	V <sub>CC</sub> -1475	mV
V <sub>REF</sub>	Reference Voltage	—	3.12	—	—	3.00	—	—	2.80	—	V
I <sub>IL</sub>	Input LOW Current <sup>(1)</sup> (D <sub>IN</sub> , /D <sub>IN</sub> , /EN)	0.5	—	—	0.5	—	—	0.5	—	—	μA
I <sub>IH</sub>	Input HIGH Current (D <sub>IN</sub> , /D <sub>IN</sub> , /EN)	—	—	100	—	—	100	—	—	100	μA
I <sub>CC</sub>	Supply Current <sup>(2)</sup>	—	16	25	—	16	25	—	16	25	mA
I <sub>OL</sub>	Output LOW Current (/EN = HIGH)	—	—	500	—	—	500	—	—	500	μA
I <sub>OUT</sub>	Modulation Current	5	15	25	5	15	25	5	15	25	mA
I <sub>RSET</sub>	Modulation Control	0.125	—	0.625	0.125	—	0.625	0.125	—	0.625	mA
A <sub>RSET</sub>	=I <sub>OUT</sub> /I <sub>RSET</sub>	30	38	44	30	38	44	30	38	44	—

**Notes:**

1. V<sub>I</sub> = V<sub>IL</sub>(Min.)
2. I<sub>MOD</sub> = 25mA.

### AC ELECTRICAL CHARACTERISTICS(1)

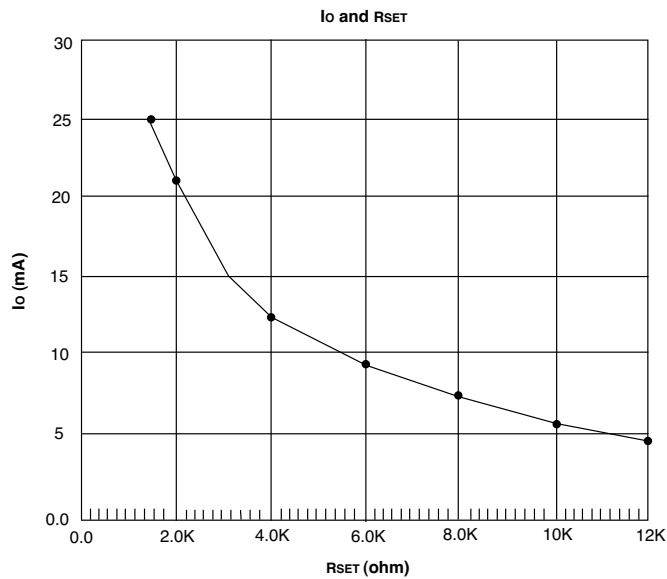
I<sub>MOD</sub> = 10mA; GND = 0V; V<sub>CC</sub> = +5V ±10%; T<sub>A</sub> = 0°C to + 85°C.

Symbol	Parameter	T <sub>A</sub> = 0°C			T <sub>A</sub> = +25°C			T <sub>A</sub> = +85°C			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
t <sub>pd</sub> D	Propagation Delay D <sub>IN</sub> - OUT	—	—	1000	—	500	1000	—	—	1000	ps	
t <sub>pd</sub> EN	Propagation Delay /EN - OUT	—	—	1000	—	450	1000	—	—	1000	ps	
t <sub>r</sub> t <sub>f</sub>	Rise/Fall Time (20% to 80%)	—	—	160	—	110	160	—	—	160	ps	Load = 25Ω
I <sub>OR</sub>	Output Current Ringing <sup>(2)</sup>	—	—	10	—	—	10	—	—	10	%	

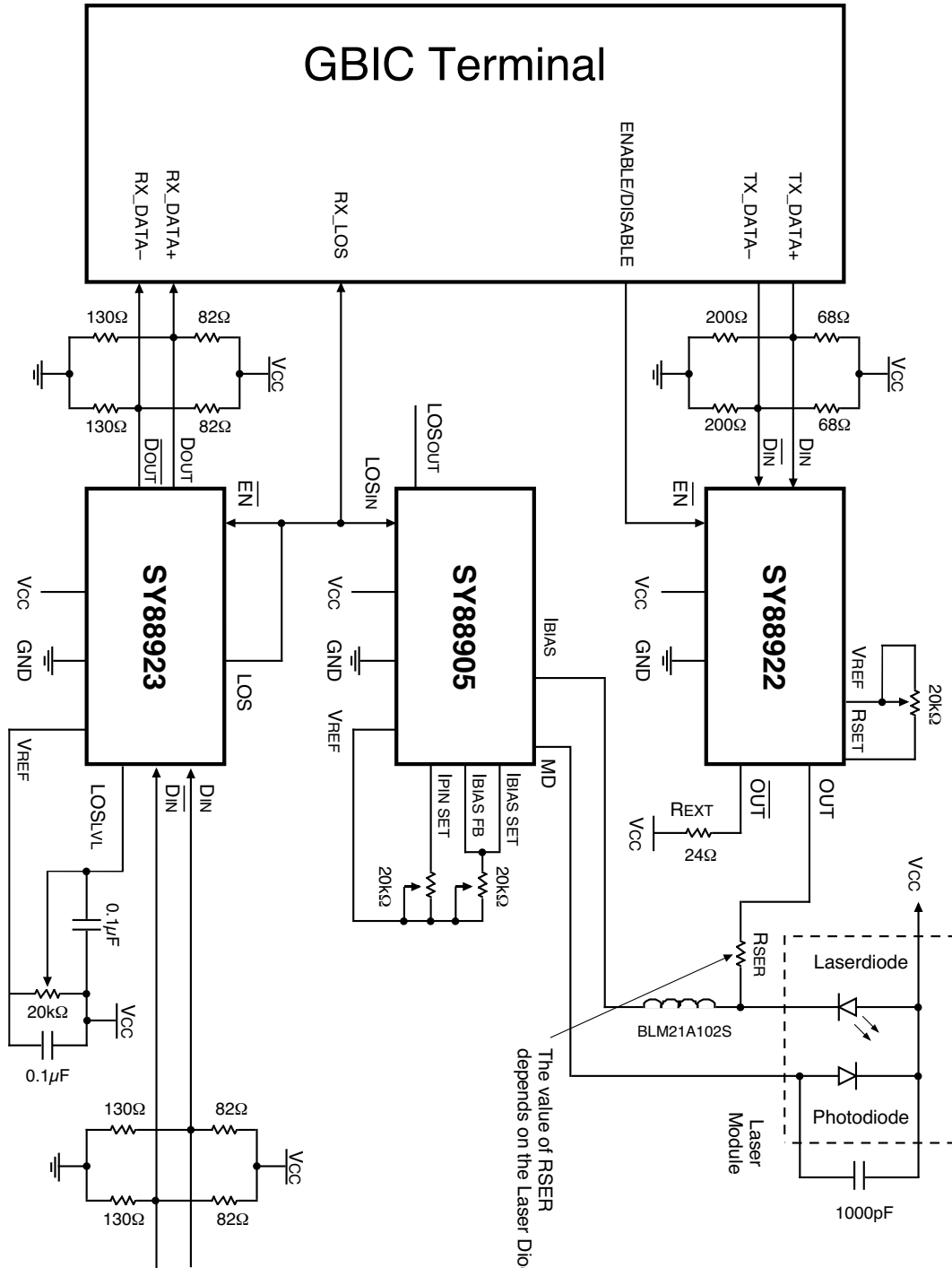
**Notes:**

1. R<sub>EXT</sub> = R<sub>SER</sub> = 25Ω ±1%, R<sub>SER</sub> connects to V<sub>CC</sub> directly without Laser Diode.
2. I<sub>OH</sub> = 5 to 25mA

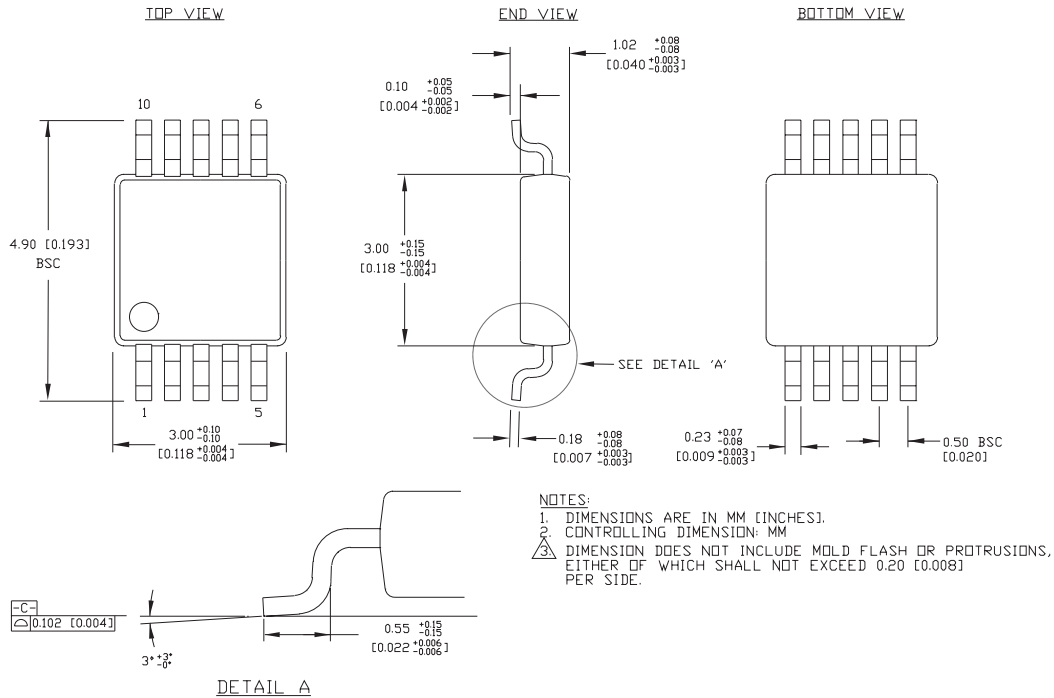
### PERFORMANCE CURVES



**APPLICATION EXAMPLE FOR 3-CHIP SET SOLUTION**



**10 LEAD MSOP (K10-1)**



Rev. 00

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