



**THE DATASHEET OF  
SY88902KC-TR**



## FEATURES

- Up to 1.25Gbps operation
- 25mA peak drive current
- Separate modulation control
- Separate output enable for laser safety
- Differential inputs for data
- 75K $\Omega$  input pulldown resistor
- Single power supply
- Designed for use with SY88903 and SY88904
- Available in a tiny 10-pin (3mm) MSOP

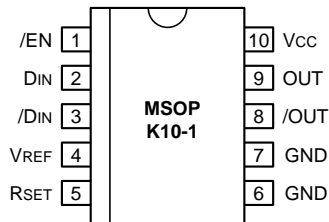
## DESCRIPTION

The SY88902 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 SY88902 utilizes the high performance bipolar ASSET™ technology.

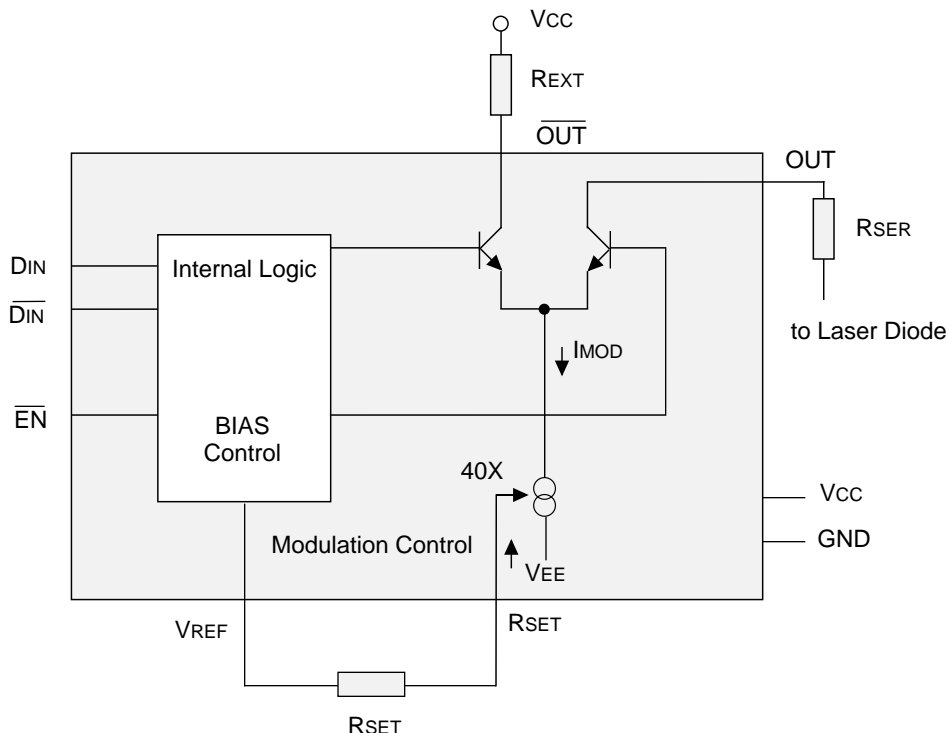
## PIN CONFIGURATIONS



## APPLICATIONS

- 1.25Gbps Gigabit Ethernet
- 531Mbps and 1062Mbps Fibre Channel
- 622Mbps SONET
- Gigabit Interface Converter

## BLOCK DIAGRAM



**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 = IOUT = 0mA

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

Symbol	Rating	Value	Unit
VCC	Power Supply Voltage	0 to +7.0	V
VI	Input Voltage	0 to VCC	V
IO	Output Current	25	mA
TA	Operating Temperature Range	0 to +85	°C
Tstore	Storage Temperature Range	-55 to +125	°C
Ptot	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.

**OPERATING CONDITIONS<sup>(1)</sup>**

Symbol	Rating	Value	Unit
VCC	Power Supply Voltage	+4.5 to +5.5	V
REXT	Resistor to Dissipate Power	10 to 50	$\Omega$
RSER	Laser Diode Serial Resistor	0 to 50	$\Omega$
RSET	Resistor to Adjust Current	1500 to 50,000	$\Omega$
$\Theta_{JA}$	Thermal Resistance of Package to Ambient <sup>(2)</sup>	206	°C/W
COUT	Capacitance on OUT + /OUT	2.5 typical	pf

**NOTES:**

1. The voltage drop across REXT and RSER plus Laser Diode should not be greater than 2V.
2. Still air without heatsink.

**DC ELECTRICAL CHARACTERISTICS**

GND = 0V; VCC = +5.0V ±10%; TA = 0°C to +85°C

Symbol	Parameter	TA = 0°C			TA = +25°C			TA = +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.

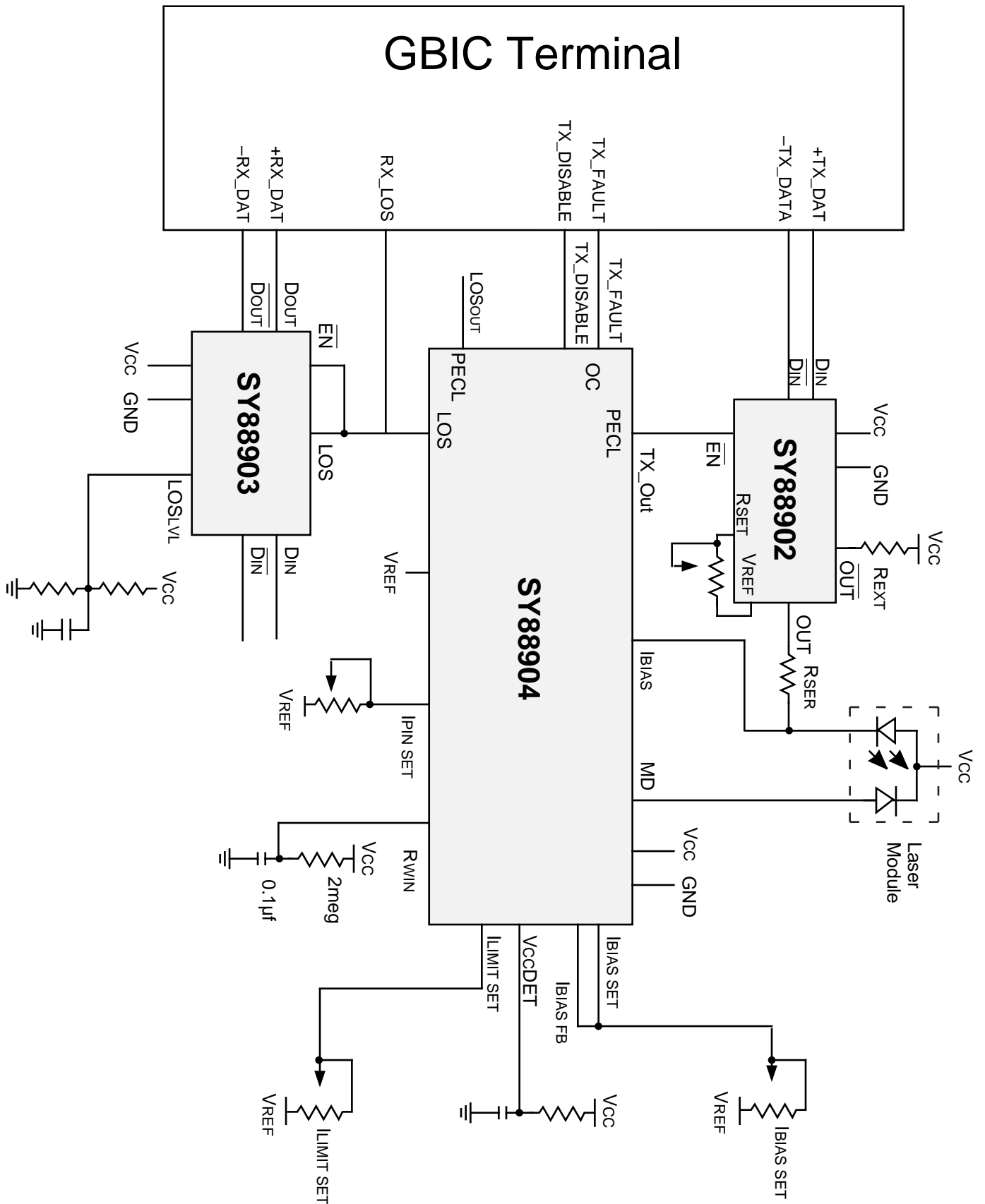
**AC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>**I<sub>MOD</sub> = 10mA; GND = 0V; VCC = +5V ±10%; TA = 0°C to +85°C

Symbol	Parameter	TA = 0°C			TA = +25°C			TA = +85°C			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
t <sub>pd D</sub>	Propagation Delay D <sub>IN</sub> - OUT	—	—	1000	—	500	1000	—	—	1000	ps	I <sub>MOD</sub> = 10mA
t <sub>pd EN</sub>	Propagation Delay /EN - OUT	—	—	1000	—	450	1000	—	—	1000	ps	I <sub>MOD</sub> = 10mA
t <sub>r</sub> t <sub>f</sub>	Rise/Fall Time (20% to 80%)	—	200	—	—	200	—	—	200	—	ps	
I <sub>OR</sub>	Output Current Ringing <sup>(2)</sup>	—	—	10	—	—	10	—	—	10	%	

**NOTES:**

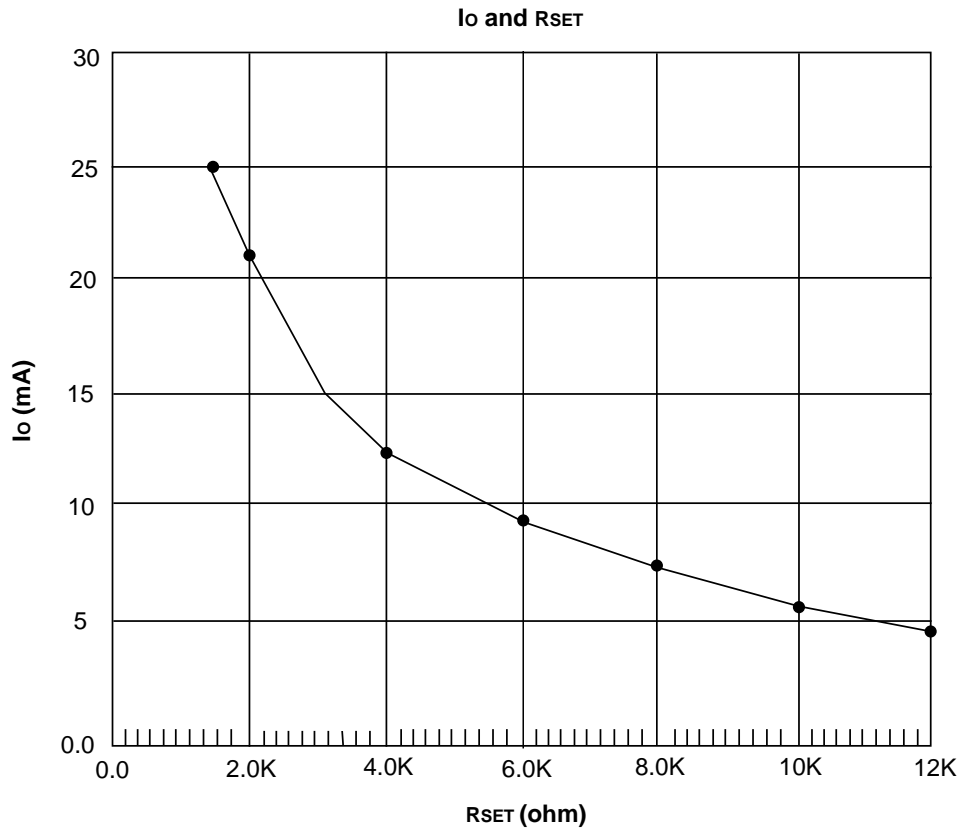
1. R<sub>EXT</sub> = R<sub>SER</sub> = 50Ω ±1%, R<sub>SER</sub> connects to V<sub>CC</sub> directly without Laser Diode.
2. I<sub>OH</sub> = 5 to 25mA

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





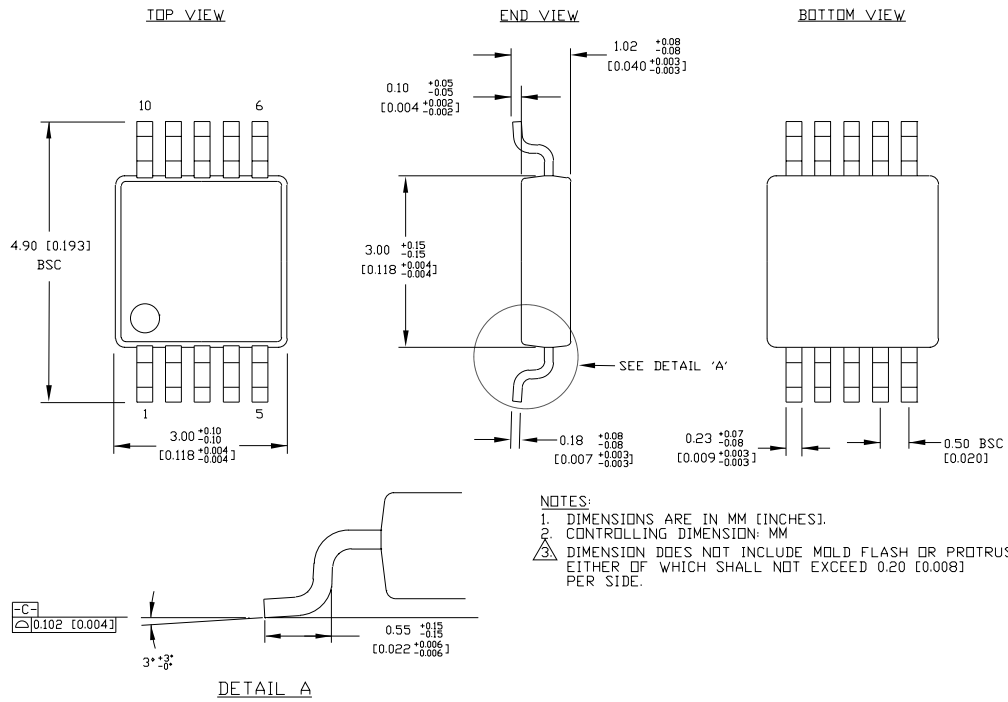
**PERFORMANCE CURVES**



**PRODUCT ORDERING CODE**

Ordering Code	Package Type	Operating Range
SY88902KC	K10-1	Commercial
SY88902KCTR	K10-1	Commercial

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



Rev. 00

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