

### FEATURES

- Up to 622Mbps operation
- Modulation current to 25mA
- PECL output enable
- Differential PECL inputs
- Single 5V power supply
- Available in a tiny 10-pin (3mm) MSOP

### DESCRIPTION

The SY88702 is a high-speed current switch for driving a semiconductor laser diode in optical transmission applications. The modulation current ( $I_{OUT}$ ) is controlled by the current ( $I_{RSET}$ ) through the external resistor  $R_{SET}$ . The output OUT is HIGH and no current flows through OUT when output enable is HIGH.

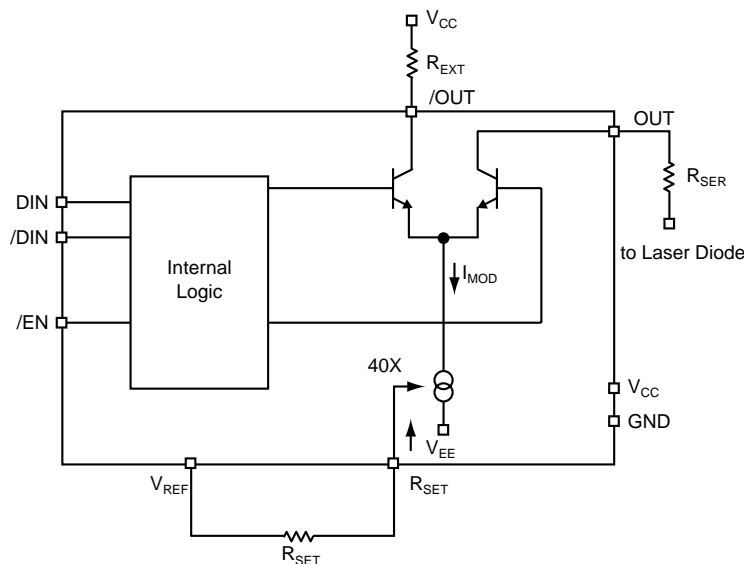
The device incorporates complementary open collector outputs with 25mA maximum current driving capability. The external resistor  $R_{EXT}$  must be placed between /OUT and  $V_{CC}$  to dissipate the worst case power.  $R_{SER}$  is recommended to compensate for laser diode matching issues.

The SY88702 utilizes the high performance bipolar ASSET™ technology.

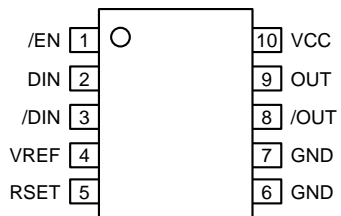
### APPLICATIONS

- 622Mbps SONET

### FUNCTIONAL BLOCK DIAGRAM



**PACKAGE/ORDERING INFORMATION**



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

**Ordering Information**

| Part Number  | Package Type | Operating Range | Package Marking |
|--------------|--------------|-----------------|-----------------|
| SY88702KC    | K10-1        | Commercial      | 702             |
| SY88702KCTR* | K10-1        | Commercial      | 702             |
| SY88702KI    | K10-1        | Industrial      | 702             |
| SY88702KITR* | K10-1        | Industrial      | 702             |

\*Tape and Reel

**PIN DESCRIPTION**

| Pin Number | Pin Name  | Pin Function   |
|------------|-----------|--|
| 1          | /EN       | 100k PECL compatible input with 75kΩ pull-down resistor. Modulation current goes to zero when deasserted high. |
| 2, 3       | DIN, /DIN | Differential 100k PECL compatible input with 75kΩ pull-down resistors.   |
| 4          | VREF      | Voltage reference for use with R <sub>SET</sub> .  |
| 5          | RSET      | An external resistor connected from here to V <sub>REF</sub> sets the reference current for I <sub>OUT</sub> . |
| 6, 7       | GND       | Device ground.   |
| 9, 8       | OUT, /OUT | Differential open collector current outputs.   |
| 10         | VCC       | Positive power supply.   |

**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    |

**Note 1.** L = LOW, H = HIGH, X = don't care.

**Note 2.** H = I<sub>OUT</sub> = 0mA.

### Absolute Maximum Ratings<sup>(Note 1)</sup>

Power Supply Voltage ( $V_{CC}$ ) ..... 0V to +7.0V  
 Input Voltage ( $V_{IN}$ ) ..... 0V to  $V_{CC}$   
 Output Current ( $I_{OUT}$ ) ..... 25mA  
 Power Dissipation ( $P_D$ ) ..... 250mW  
 Storage Temperature Range ( $T_S$ ) ..... -55°C to +125°C

### Operating Ratings<sup>(Notes 2,3,4)</sup>

Supply Voltage ( $V_{CC}$ ) ..... +4.5V to +5.5V  
 Ambient Temperature ( $T_A$ ), **Note 5** ..... -40°C to +85°C  
 Junction Temperature ( $T_J$ ), **Note 5** ..... -40°C to 100°C  
 Resistor to Dissipate Power ( $R_{EXT}$ ) ..... 10Ω to 50Ω  
 Laser Diode Serial Resistor ( $R_{SER}$ ) ..... 0Ω to 50Ω  
 Resistor to Adjust Current ( $R_{SET}$ ) ..... 1500Ω to 50,000Ω  
 Package Thermal Resistance  
 MSOP  
 ( $\theta_{JA}$ ) Still-Air ..... 113°C/W  
 ( $\psi_{JB}$ ) Still-Air ..... 74°C/W

## DC ELECTRICAL CHARACTERISTICS

GND = 0V;  $V_{CC} = 5V \pm 10\%$ ;  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$

| Symbol         | Parameter  | Condition                     | Min            | Typ  | Max            | Units |
|----------------|--|-------------------------------|----------------|------|----------------|-------|
| $V_{IH}$       | Input HIGH Voltage<br>( $D_{IN}$ , $/D_{IN}$ , $/EN$ ) |                               | $V_{CC}-1.165$ |      | $V_{CC}-0.880$ | V     |
| $V_{IL}$       | Input LOW Voltage<br>( $D_{IN}$ , $/D_{IN}$ , $/EN$ )  |                               | $V_{CC}-1.810$ |      | $V_{CC}-1.475$ | V     |
| $V_{REF}$      | Reference Voltage                                      |                               |                | 3.00 |                | V     |
| $I_{IL}$       | Input LOW Current<br>( $D_{IN}$ , $/D_{IN}$ , $/EN$ )  | $V_{IN} = V_{IL}(\text{min})$ | 0.5            |      |                | μA    |
| $I_{IH}$       | Input HIGH Current<br>( $D_{IN}$ , $/D_{IN}$ , $/EN$ ) |                               |                |      | 100            | μA    |
| $I_{CC}$       | Supply Current   | $I_{MOD} = 25\text{mA}$       |                | 16   | 25             | mA    |
| $I_{OUT\_OFF}$ | Output LOW Current<br>( $/EN = \text{HIGH}$ )          |                               |                |      | 500            | μA    |
| $I_{OUT}$      | Modulation Current                                     |                               | 5              | 15   | 25             | mA    |
| $A_{RSET}$     | $I_{OUT}/I_{RSET}$                                     |                               | 30             | 38   | 44             | —     |
| $V_{OUT}$      | Voltage at OUT, $/OUT$                                 |                               | $V_{CC}-2.3$   |      | $V_{CC}$       | V     |
| $C_{OUT}$      | Capacitance on OUT, $/OUT$                             |                               |                | 2.5  |                | pF    |

**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.

**Note 2.** The data sheet limits are not guaranteed if the device is operated beyond the operating ratings.

**Note 3.** The device is guaranteed to meet the DC specifications, shown in the table above, after thermal equilibrium has been established. The device is tested in a socket such that transverse airflow of  $\geq 500\text{lfpm}$  is maintained.

**Note 4.** The voltage drop across  $R_{EXT}$  and  $R_{SER}$  plus Laser Diode must not be greater than 2.3V.

**Note 5.** Commercial devices are guaranteed from 0°C to +85°C ambient temperature.

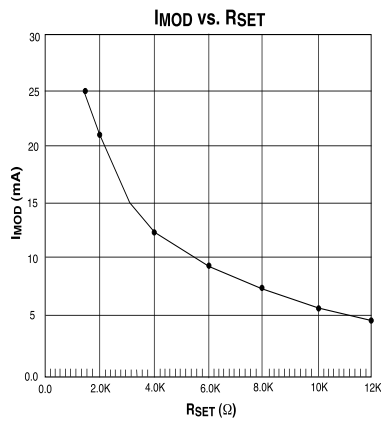
**AC ELECTRICAL CHARACTERISTICS(Note 1)**

GND = 0V;  $V_{CC} = 5V \pm 10\%$ ;  $T_A = -40^\circ C$  to  $+85^\circ C$

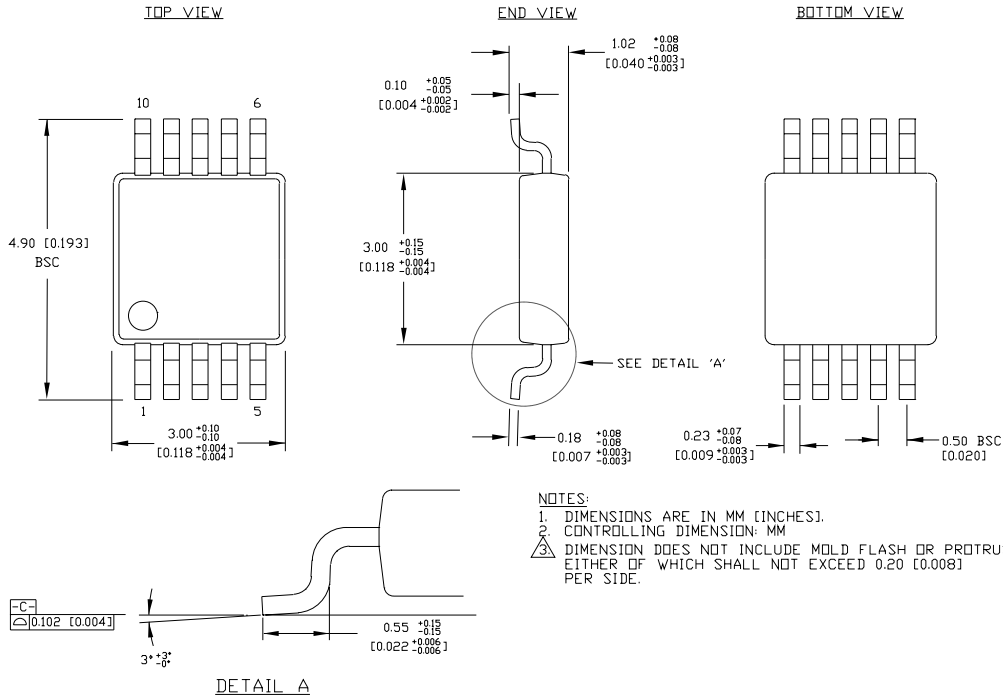
| Symbol                | Parameter                           | Condition               | Min | Typ | Max  | Units |
|-----------------------|-------------------------------------|-------------------------|-----|-----|------|-------|
| $t_{PHL}, t_{PLH} D$  | Propagation Delay<br>$D_{IN} - OUT$ | $I_{OUT} = 10mA$        |     |     | 1000 | ps    |
| $t_{PHL}, t_{PLH} EN$ | Propagation Delay<br>/EN - OUT      | $I_{OUT} = 10mA$        |     |     | 1000 | ps    |
| $t_r$<br>$t_f$        | Rise/Fall Time<br>(20% to 80%)      |                         |     |     | 400  | ps    |
| $I_{OR}$              | Output Current Ringing              | $I_{OUT} = 5$ to $25mA$ |     |     | 10   | %     |

**Note 1.**  $R_{EXT} = R_{SER} = 50\Omega \pm 1\%$ ;  $R_{SER}$  connected directly to  $V_{CC}$ .

**TYPICAL OPERATING CHARACTERISTICS**



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



Rev. 00

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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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