

**FEATURES**

- Single 3.3V or 5V power supply
- Up to 155Mbps operation
- Modulation current to 30mA
- PECL output enable
- Differential PECL inputs
- Available in a tiny 10-pin (3mm) MSOP

**APPLICATIONS**

- 155Mbps SONET

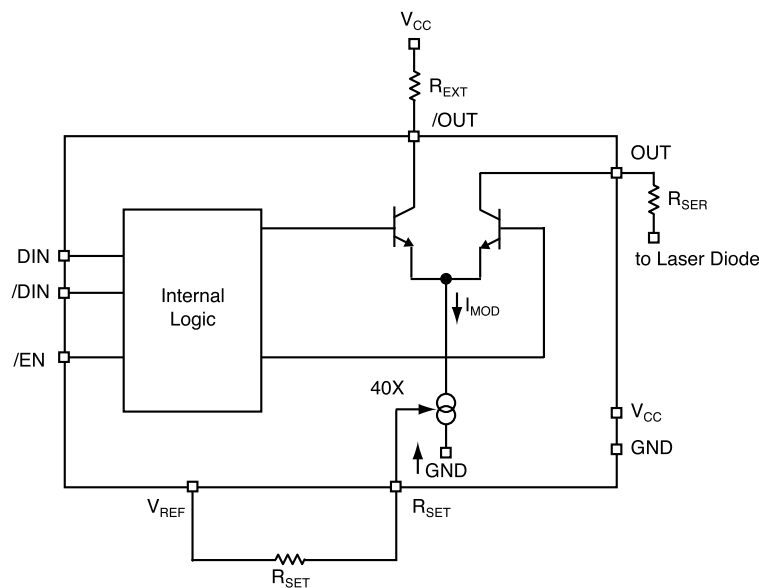
**DESCRIPTION**

The SY88822V 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 a 30mA 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. Pin 9 and pin 10 should be connected to achieve better performance.

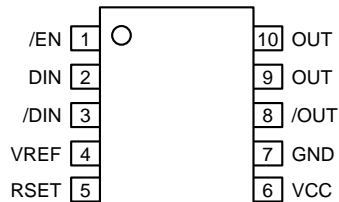
The SY88822V utilizes the high performance bipolar ASSET™ technology.

**FUNCTIONAL BLOCK DIAGRAM**



**PACKAGE/ORDERING INFORMATION**

**Ordering Information**



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

| Part Number                 | Package Type | Operating Range | Package Marking                      | Lead Finish    |
|-----------------------------|--------------|-----------------|--------------------------------------|----------------|
| SY88822VKC                  | K10-1        | Commercial      | 822V                                 | Sn-Pb          |
| SY88822VKCTR <sup>(1)</sup> | K10-1        | Commercial      | 822V                                 | Sn-Pb          |
| SY88822VKG                  | K10-1        | Industrial      | 822V with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY88822VKGTR <sup>(1)</sup> | K10-1        | Industrial      | 822V with Pb-Free bar-line indicator | Pb-Free NiPdAu |

**Note:**

1. Tape and Reel.

**PIN DESCRIPTION**

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

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

| D | /D | /EN | OUT (Note 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<sub>OUT</sub> = 0mA.

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

Power Supply Voltage ( $V_{CC}$ ) ..... 0V to +7.0V  
 Input Voltage ( $V_{IN}$ ) ..... 0V to  $V_{CC}$   
 Output Current ( $I_{OUT}$ ) ..... 30mA  
 Power Dissipation ( $P_D$ ) ..... 250mW  
 Lead Temperature (soldering, 20 sec.) ..... +260°C  
 Storage Temperature Range ( $T_S$ ) ..... -55°C to +125°C

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

Supply Voltage ( $V_{IN}$ ) ..... +3.0V to +3.6V  
 ..... or +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 ( $R_{SET}$ ), **Note 6**  
 ..... 700Ω to 20,000Ω  
 Package Thermal Resistance  
 MSOP  
 ( $\theta_{JA}$ ) Still-Air ..... 113°C/W  
 ( $\psi_{JB}$ ) Still-Air ..... 74°C/W

## DC ELECTRICAL CHARACTERISTICS<sup>(7)</sup>

GND = 0V;  $V_{CC} = 3.3V \pm 10\%$  or  $V_{CC} = 5.0V \pm 10\%$ ;  $T_A = -40^\circ C$  to  $+85^\circ C$

| 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                                      |                     | 1.7            | 2.0 | 2.3            | V     |
| $I_{IL}$       | Input LOW Current<br>( $D_{IN}$ , $/D_{IN}$ , $/EN$ )  | $V_I = V_{IL(min)}$ | 0.5            |     |                | μA    |
| $I_{IH}$       | Input HIGH Current<br>( $D_{IN}$ , $/D_{IN}$ , $/EN$ ) |                     |                |     | 100            | μA    |
| $I_{CC}$       | Supply Current   | $I_{MOD} = 25mA$    |                |     | 25             | mA    |
| $I_{OUT\_OFF}$ | Output LOW Current<br>( $/EN = HIGH$ )                 |                     |                | 450 | 1000           | μA    |
| $I_{OUT}$      | Modulation Current                                     |                     |                |     | 30             | mA    |
| $A_{RSET}$     | $I_{OUT}/I_{RSET}$                                     |                     | 30             | 38  | 44             | —     |
| $V_{OUT}$      | Voltage at OUT, $/OUT$                                 |                     | $V_{CC}-1.4$   |     | $V_{CC}$       | V     |
| $C_{OUT}$      | Capacitance on OUT, $/OUT$                             |                     |                | 2.5 |                | pF    |

**Notes:**

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.
2. The data sheet limits are not guaranteed if the device is operated beyond the operating ratings.
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  $\geq 500$  fpm is maintained.
4. The voltage drop across  $R_{EXT}$  and  $R_{SER}$  plus Laser Diode must not be greater than 1.4V.
5. Commercial devices are guaranteed from 0°C to +85°C ambient temperature.
6.  $R_{SET}$  minimum 430Ω.
7. Specification for packaged product only.

**AC ELECTRICAL CHARACTERISTICS(8, 9)**

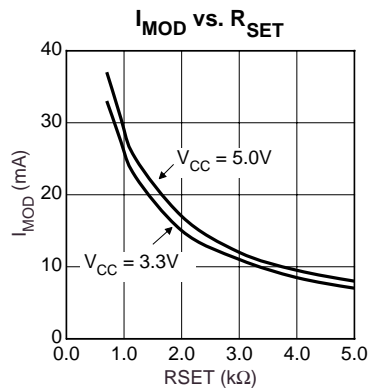
$I_{MOD} = 10\text{mA}$ ;  $GND = 0\text{V}$ ;  $V_{CC} = 3.3\text{V} \pm 10\%$  or  $V_{CC} = 5.0\text{V} \pm 10\%$ ;  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$

| Symbol                   | Parameter                                  | Condition                      | Min | Typ | Max  | Units |
|--------------------------|--|--------------------------------|-----|-----|------|-------|
| $t_{PHL}$ , $t_{PLH}$ D  | Propagation Delay<br>D <sub>IN</sub> – OUT | $I_{OUT} = 10\text{mA}$        |     |     | 1000 | ps    |
| $t_{PHL}$ , $t_{PLH}$ EN | Propagation Delay<br>/EN – OUT             | $I_{OUT} = 10\text{mA}$        |     |     | 1000 | ps    |
| $t_r$ , $t_f$            | Rise/Fall Time<br>(20% to 80%)             |                                |     |     | 1000 | ps    |
| $I_{OR}$                 | Output Current Ringing                     | $I_{OUT} = 5$ to $30\text{mA}$ |     |     | 10   | %     |

**Notes:**

- 8. Specification for packaged product only.
- 9.  $R_{EXT} = R_{SER} = 25\Omega \pm 1\%$ ;  $R_{SER}$  connected directly to  $V_{CC}$ .

**TYPICAL OPERATING CHARACTERISTICS**



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



Rev. 00

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