

**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

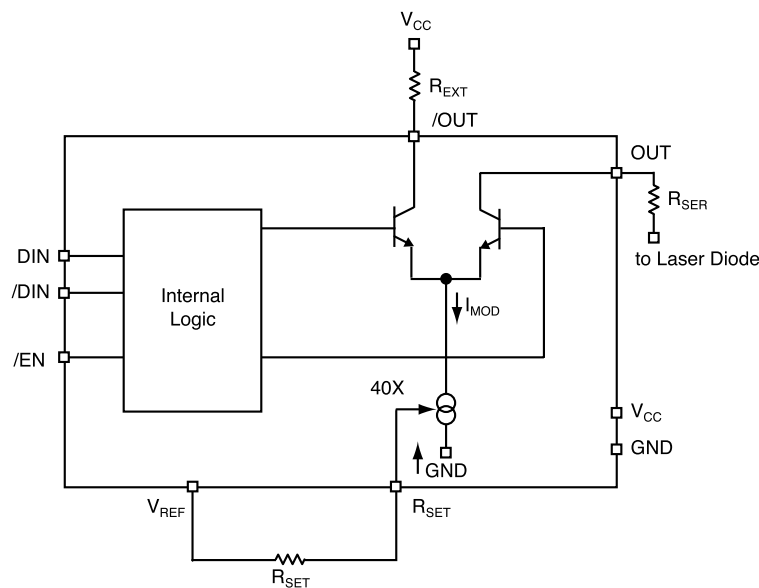
**DESCRIPTION**

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.

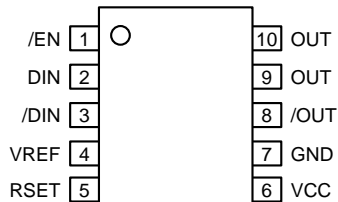
The SY88822V utilizes the high performance bipolar ASSET™ technology.

**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  $V_{CC} = 5.0V \pm 10\%$ ;  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$

Symbol	Parameter	Condition	Min	Typ	Max	Units
$V_{IH}$	Input HIGH Voltage ( $D_{IN}$ , $/D_{IN}$ , $/EN$ )		$V_{CC}-1.165$		$V_{CC}-0.880$	V
$V_{IL}$	Input LOW Voltage ( $D_{IN}$ , $/D_{IN}$ , $/EN$ )		$V_{CC}-1.810$		$V_{CC}-1.475$	V
$V_{REF}$	Reference Voltage		1.7	2.0	2.3	V
$I_{IL}$	Input LOW Current ( $D_{IN}$ , $/D_{IN}$ , $/EN$ )	$V_I = V_{IL(min)}$	0.5			μA
$I_{IH}$	Input HIGH Current ( $D_{IN}$ , $/D_{IN}$ , $/EN$ )				100	μA
$I_{CC}$	Supply Current	$I_{MOD} = 25\text{mA}$			25	mA
$I_{OUT\_OFF}$	Output LOW Current ( $/EN = \text{HIGH}$ )			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  $\geq 500\text{fpm}$  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)**

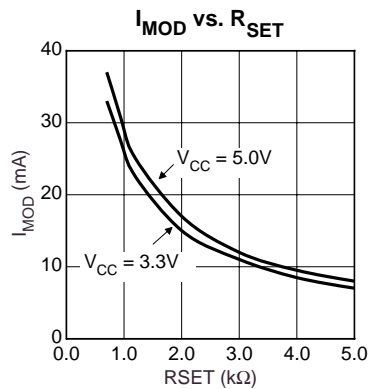
$I_{MOD} = 10\text{mA}$ ;  $GND = 0\text{V}$ ;  $V_{CC} = 3.3\text{V} \pm 10\%$  or  $V_{CC} = 5.0\text{V} \pm 10\%$ ;  $T_A = -40^\circ\text{C}$  to  $+85^\circ\text{C}$

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

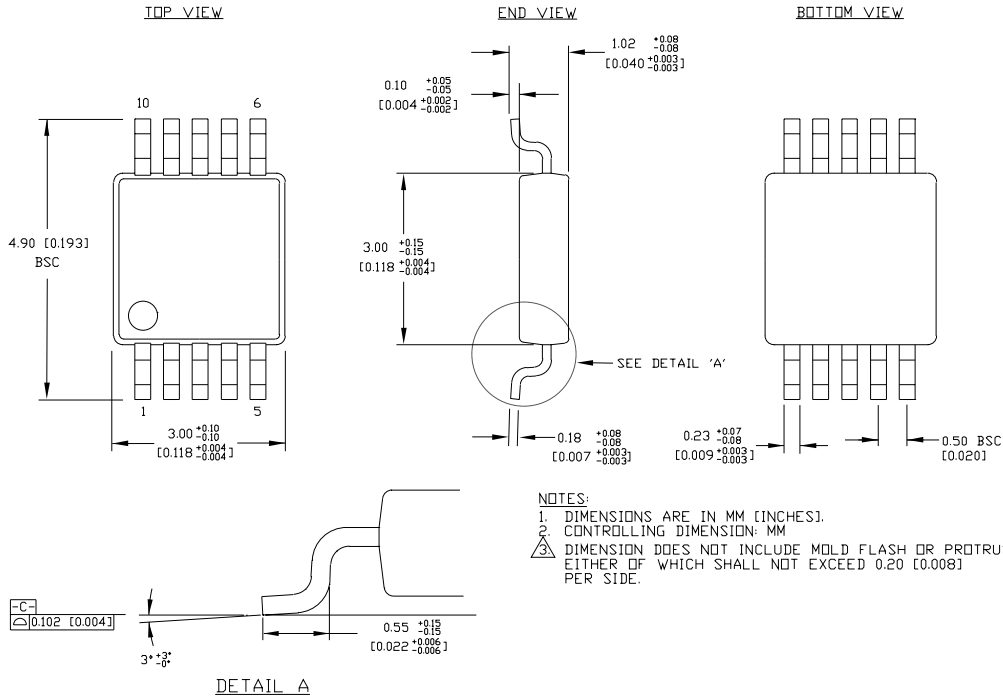
**Notes:**

- 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

**MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA**

TEL + 1 (408) 944-0800 FAX + 1 (408) 474-1000 WEB <http://www.micrel.com>

The information furnished by Micrel in this datasheet is believed to be accurate and reliable. However, no responsibility is assumed by Micrel for its use. Micrel reserves the right to change circuitry and specifications at any time without notification to the customer.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is at Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.

© 2005 Micrel, Incorporated.