

FEATURES

- Up to 1.25Gbps operation
- 75mA peak drive current
- Separate modulation control
- Separate output enable for laser safety
- Differential inputs for data
- 75KΩ input pulldown resistor
- Single power supply
- Available in 16-pin SOIC package

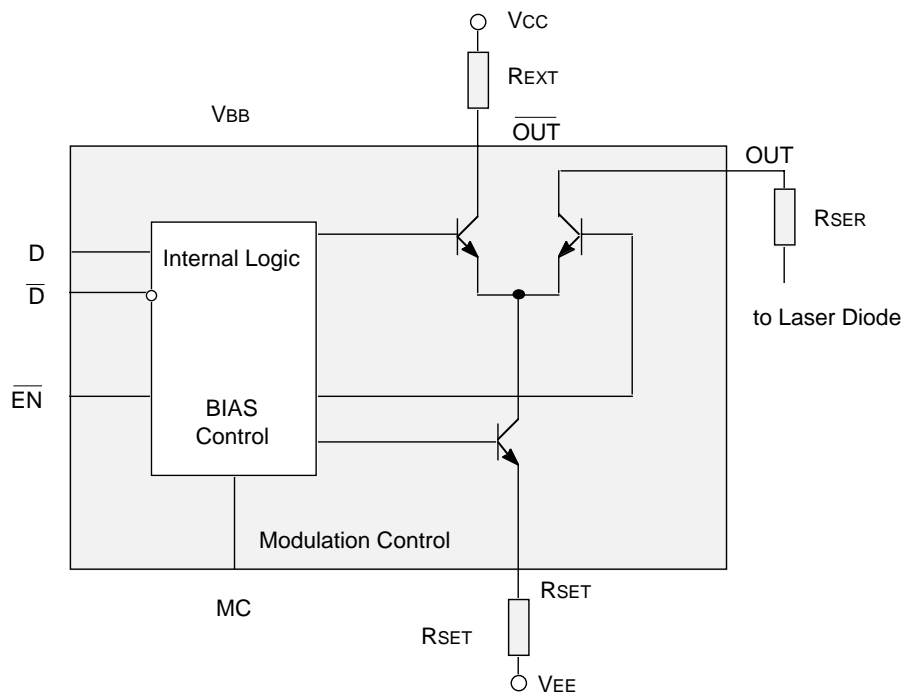
DESCRIPTION

The SY100EL1003 is a high speed current source for driving a semiconductor laser diode in optical transmission applications. The output current modulation is DC – voltage controlled. The modulation current is disabled when output enable is HIGH.

The device incorporates complementary open collector outputs with a capability of driving peak current of 75mA. The laser driver current is adjustable by selection of RSET. The resistor REXT must be placed between $\overline{\text{OUT}}$ and VCC to dissipate the worst case power. RSER is recommended to fix laser diode matching issues.

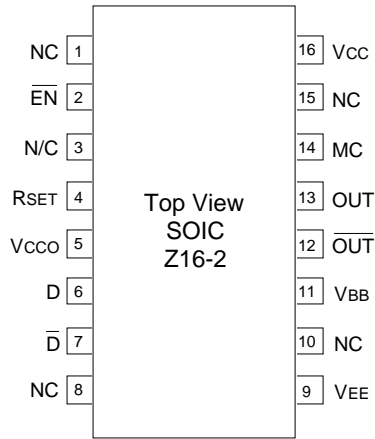
The SY100EL1003 utilizes the high performance bipolar ASSET technology.

BLOCK DIAGRAM



PACKAGE/ORDERING INFORMATION

Ordering Information⁽¹⁾



16-Pin Narrow SOIC (Z16-2)

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|-----------------------------------|--------------|-----------------|---|----------------|
| SY100EL1003ZC | Z16-2 | Commercial | SY100EL1003ZC | Sn-Pb |
| SY100EL1003ZCTR ⁽²⁾ | Z16-2 | Commercial | SY100EL1003ZC | Sn-Pb |
| SY100EL1003ZI | Z16-2 | Industrial | SY100EL1003ZI | Sn-Pb |
| SY100EL1003ZITR ⁽²⁾ | Z16-2 | Industrial | SY100EL1003ZI | Sn-Pb |
| SY100EL1003ZG ⁽³⁾ | Z16-2 | Industrial | SY100EL1003ZG with Pb-Free bar-line indicator | Pb-Free NiPdAu |
| SY100EL1003ZGTR ^(2, 3) | Z16-2 | Industrial | SY100EL1003ZG with Pb-Free bar-line indicator | Pb-Free NiPdAu |

Notes:

1. Contact factory for die availability. Dice are guaranteed at T_A = 25°C, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

PIN NAMES

| Pin | Function |
|------------------|---|
| Vcc, Vcco | Separate positive power supply pins help to isolate sensitive circuitry from noise generating function. +5V for PECL operation or ground for ECL operation. |
| VEE | Most negative power supply input. Ground for PECL operation or -5V for ECL operation. |
| VBB | This pin provides a reference voltage for use in single ended applications or when the input signal is AC coupled into the device. |
| D, \bar{D} | These differential ECL/PECL 100K compatible inputs receive NRZ data. |
| \bar{EN} | This ECL/PECL 100K compatible input enables Laser Driver - modulation current transitions to zero when asserted HIGH. |
| OUT, \bar{OUT} | Open collector outputs from the modulation buffer drive these differential current outputs. |
| MC | An external voltage sets the main value of modulation current I _o . |
| RSET | An external resistor sets the source current for modulation I _{mod} . |
| NC | These pins are not connected. |

TRUTH TABLE⁽¹⁾

| D | \bar{D} | \bar{EN} | OUT | \bar{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

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

| Symbol | Rating | Value | Unit |
|-------------------|---|-------------|------|
| VEE | Power Supply Voltage (V _{cc} = 0V) | 0 to -7.0 | V |
| V _{IN} | Input Voltage (V _{cc} = 0V) | 0 to -6.0 | V |
| I _{OUT} | Output Current | 75 | mA |
| T _{LEAD} | Lead Temperature (soldering, 20sec.) | +260° | °C |
| T _A | Operating Temperature Range | -40 to +85° | °C |
| P _{tot} | Power Dissipation | 500 | 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⁽¹⁾

| Symbol | Rating | Value | Unit |
|--------|-----------------------------|----------------|------|
| VEE | Power Supply Voltage | -4.75 to -5.25 | V |
| RSET | Resistor to Adjust Current | 10 to 100 | Ω |
| REXT | Resistor to Dissipate Power | 10 to 50 | Ω |
| RSER | Laser Diode Serial Resistor | 0 to 50 | Ω |

Note:

1. The voltage drop across REXT and RSER should not be greater than 2V.

DC ELECTRICAL CHARACTERISTICS⁽¹⁾

VCC = VCCO = 0V; VEE = -5.0V ± 5%

| Symbol | Parameter | TA = -40°C | | | TA = 0°C | | | TA = +25°C | | | TA = +85°C | | | Unit |
|-------------------|---|-----------------|------|-----------------|-----------------|------|-----------------|-----------------|------|-----------------|-----------------|------|-----------------|---------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| V _{IH} | Input HIGH Voltage (D, $\overline{\text{EN}}$) | -1165 | — | -880 | -1165 | — | -880 | -1165 | — | -880 | -1165 | — | -880 | mV |
| V _{IL} | Input LOW Voltage (D, $\overline{\text{EN}}$) | -1810 | — | -1475 | -1810 | — | -1475 | -1810 | — | -1475 | -1810 | — | -1475 | mV |
| V _{Imod} | Input Voltage (Modulation Control) | V _{EE} | — | V _{CC} | V _{EE} | — | V _{CC} | V _{EE} | — | V _{CC} | V _{EE} | — | V _{CC} | V |
| V _{BB} | Output Reference Voltage | -1380 | — | -1260 | -1380 | — | -1260 | -1380 | — | -1260 | -1380 | — | -1260 | mV |
| I _{IH} | Input HIGH Current (D, $\overline{\text{EN}}$) | — | — | 150 | — | — | 150 | — | — | 150 | — | — | 150 | μA |
| I _{Imod} | Input Current (Modulation Control) | — | — | 150 | — | — | 150 | — | — | 150 | — | — | 150 | μA |
| I _{IL} | Input LOW Current ⁽²⁾ (D, $\overline{\text{EN}}$) | 0.5 | — | — | 0.5 | — | — | 0.5 | — | — | 0.5 | — | — | μA |
| I _{CC} | Supply Current ⁽³⁾ | 8 | 14 | 25 | 8 | 14 | 25 | 8 | 14 | 25 | 8 | 14 | 25 | mA |
| I _{OH} | Output HIGH Current ⁽⁴⁾ ($\overline{\text{EN}}$ LOW) ⁽⁵⁾ | 60 | 64 | 68 | 60 | 64 | 68 | 60 | 64 | 68 | 60 | 64 | 68 | mA 5 |
| I _{OL} | Output LOW Current ($\overline{\text{EN}}$ HIGH) | — | — | 500 | — | — | 500 | — | — | 500 | — | — | 500 | μA |
| I _{OR} | Output Current Ringing ⁽⁶⁾ | — | — | 10 | — | — | 10 | — | — | 10 | — | — | 10 | % |
| I _{omod} | Laser Diode Modulation Current Range | 5 | — | 60 | 5 | — | 60 | 5 | — | 60 | 5 | — | 60 | mA |

Notes:

1. R_{SET} = 10Ω ± 1%
2. V_I = V_{IL}(Min.)
3. V_{Imod} = V_{CC}
4. V_{Imod} = -3.5V
5. V_{Lmod} = -0.8V
6. I_{OH} = 5 to 60mA

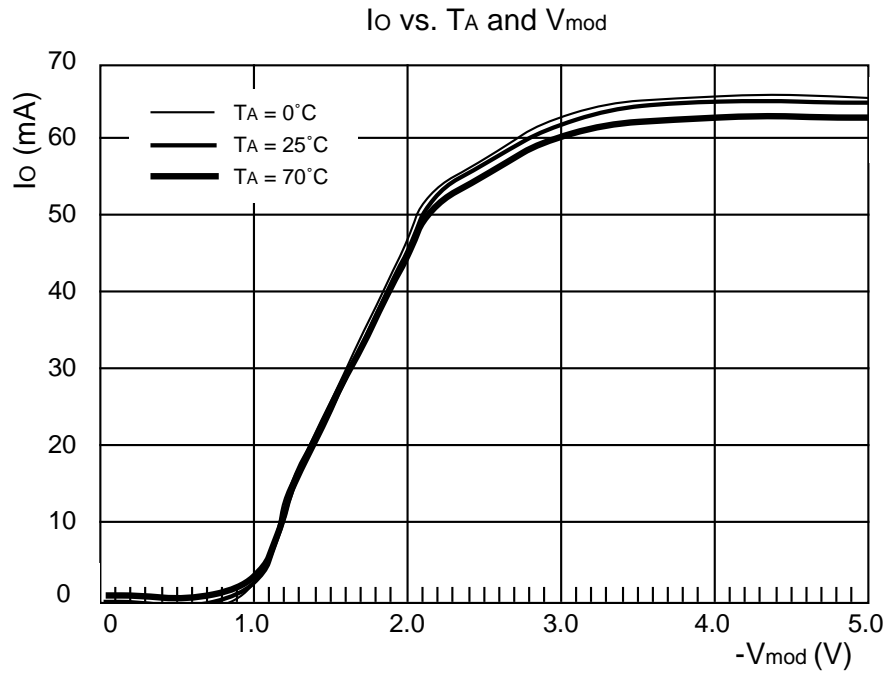
AC ELECTRICAL CHARACTERISTICS⁽¹⁾V_{Imod} = -1.5V; VCC = VCCO = 0V; VEE = -5V ± 5%

| Symbol | Parameter | TA = -40°C | | | TA = 0°C | | | TA = +25°C | | | TA = +85°C | | | Unit |
|--|--|------------|------|------|----------|------|------|------------|------|------|------------|------|------|------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| t _{pd} D | Propagation Delay D - OUT | — | — | 1000 | — | — | 1000 | — | — | 1000 | — | — | 1000 | ps |
| t _{pd} $\overline{\text{EN}}$ | Propagation Delay $\overline{\text{EN}}$ - OUT | — | — | 1000 | — | — | 1000 | — | — | 1000 | — | — | 1000 | ps |
| t _r t _f | Rise/Fall Time (20% to 80%) | — | — | 400 | — | — | 400 | — | — | 400 | — | — | 400 | ps |

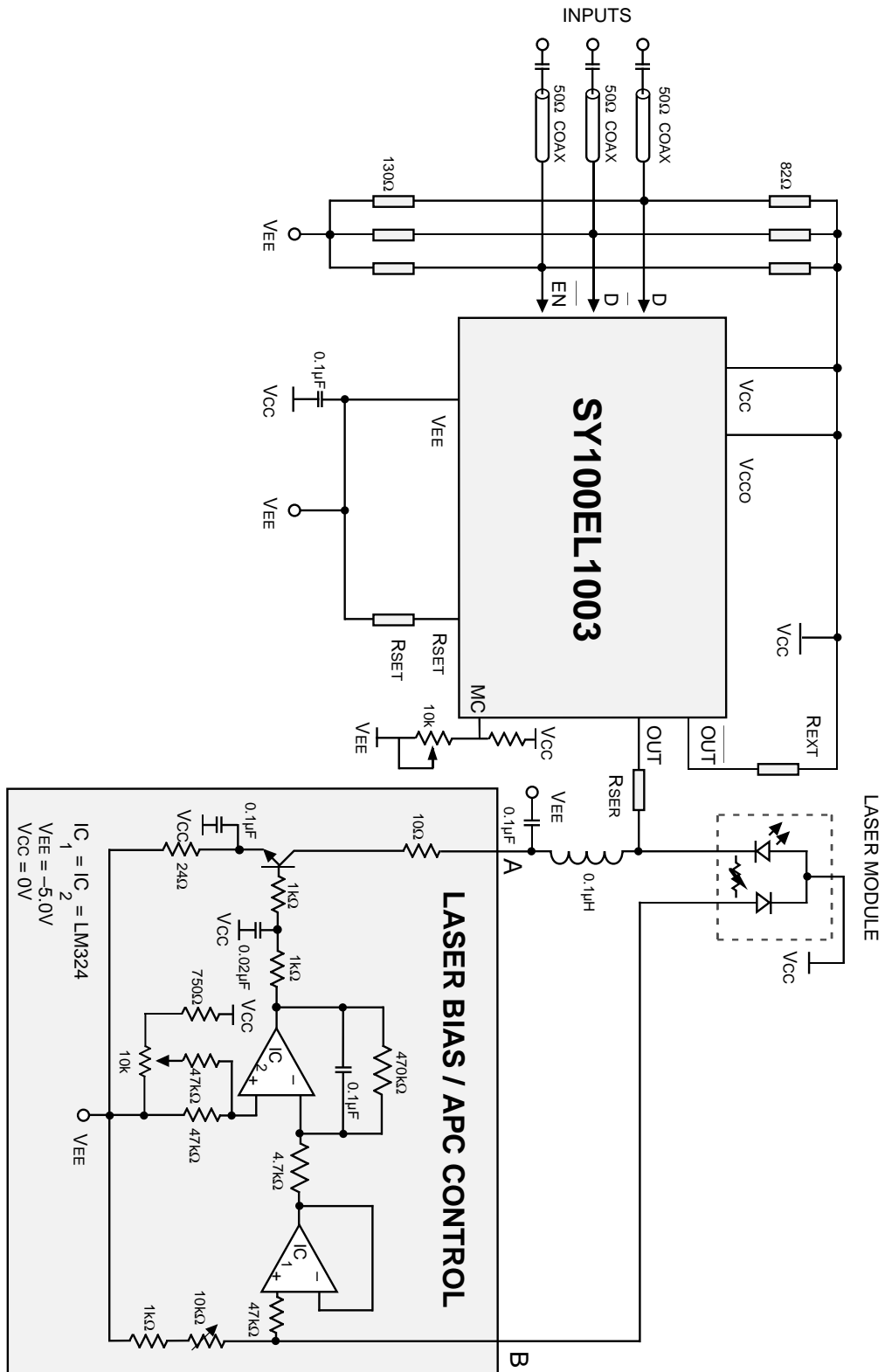
Note:

1. R_{SET} = 10Ω ± 1%, R_{EXT} = R_{SER} = 50Ω ± 1%

PERFORMANCE CURVES



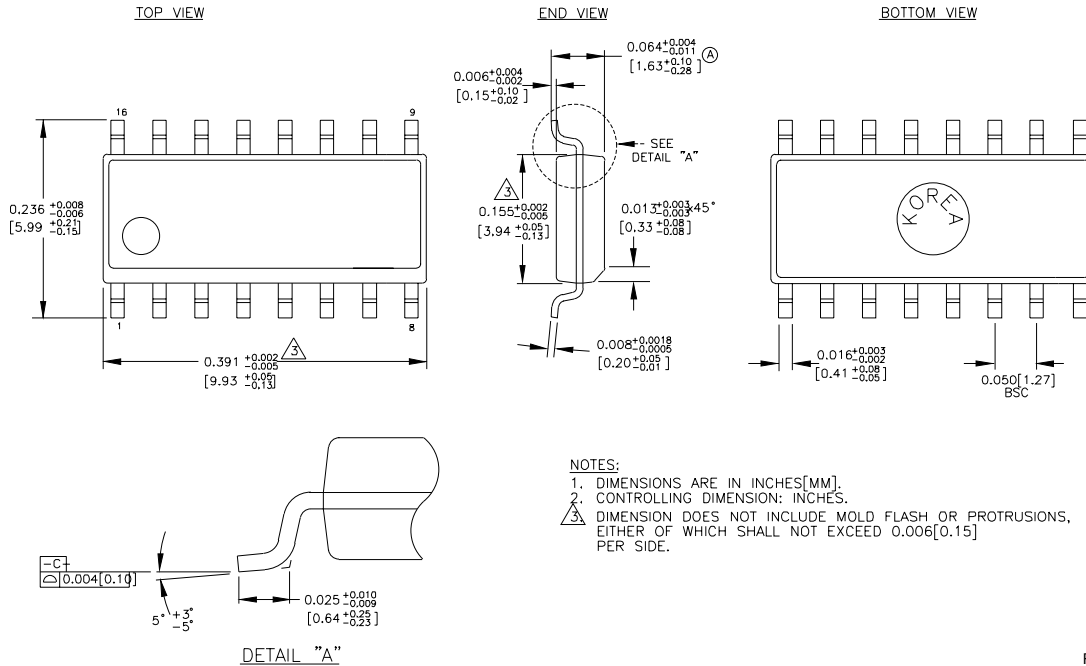
APPLICATION EXAMPLE



NOTES:

1. Split 100K ECL terminations are 82Ω and 130Ω to VCC and VEE respectively.
2. Recommended power supply bypass capacitors are 0.1µF with optional 10µF Tantalum in parallel.
3. It is required to use high frequency design techniques for board layout. A double sided or multilayer board is recommended in conjunction with a low impedance ground plane and properly terminated transmission lines for all signal paths.
4. V88 voltage pin may be used as reference for single ended input applications.

16-PIN SOIC .150" WIDE (Z16-2)



Rev. 02

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>

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Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.