



# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

MAX9483/MAX9484

## General Description

The MAX9483/MAX9484 high-performance, multimode, laser-diode drivers (LDDs) are designed for CD and DVD combination pickup heads. The drivers consist of three input channels, an RF oscillator, and two precision current-amplifier outputs to drive the CD and DVD laser diodes. The MAX9483/MAX9484 support multiple CD and DVD read/write standards, such as CD-R/RW, DVD-R, DVD+R, DVD-RW, DVD+RW, and DVD-RAM by choosing the writing control signals and input currents on these input channels. The peak total output current is 400mA with a current gain of 100 at each channel. External resistors set the oscillation frequency and output swing. The MAX9484 features an extra resistor input allowing the oscillation frequencies of the two outputs to be set separately. Additionally, the MAX9484 allows the writing control signals to be received in low-voltage differential signal (LVDS) mode or single-ended mode to provide reliable high-speed writing.

The MAX9483 is offered in 16-pin QSOP and 4mm x 4mm 16-pin thin QFN packages. The MAX9484 is offered in a 4mm x 4mm 20-pin thin QFN package. Both devices are specified for 4.5V to 5.5V supply and 0°C to +70°C temperature range.

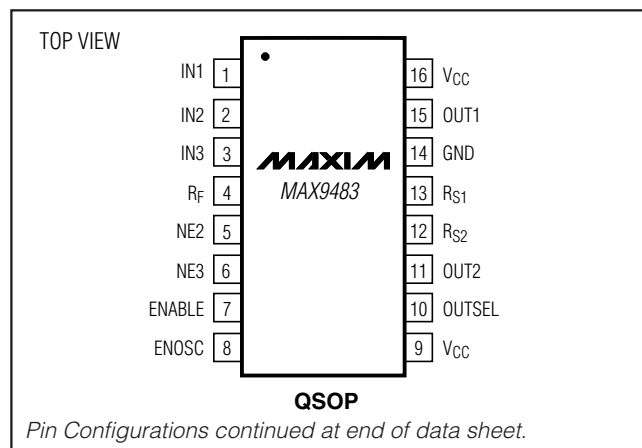
## Applications

Laser Diode Driver for CD-RW and DVD  
Combos: CD-R/RW, DVD-R, DVD+R, DVD-RW,  
DVD+RW, DVD-RAM  
DVD Video Recorders  
High-Power and High-Speed Laser-Writable  
Device Drivers

## Features

- ◆ Dual Output Ports with Three Controlled-Current Channels
- ◆ Support Various Laser-Diode Driver Standards  
CD-R/RW, DVD-R, DVD+R, DVD-RW, DVD+RW,  
DVD-RAM, and DVD Video
- ◆ MAX9483 is Pin and Function Compatible  
with ATMEL T0806
- ◆ Independent Frequency Setting for the  
Two Output Ports (MAX9484)
- ◆ Accepts Differential (LVDS) or Single-Ended  
Inputs for Writing Data (MAX9484)
- ◆ Enable Control
- ◆ High-Current Swing Up to 270mA for the Reading  
Current
- ◆ High 400mA Total Peak Writing Current
- ◆ Adjustable Modulation Frequency from 100MHz  
to 600MHz
- ◆ Fast Output-Current Pulse Rise and Fall Time  
1.0ns (typ)
- ◆ 4.5V to 5.5V Single-Supply Voltage
- ◆ No External Reference Clock Required
- ◆ 0°C to +70°C Commercial Temperature Range

## Pin Configurations



## Ordering Information

| PART        | TEMP RANGE   | PIN-PACKAGE |
|-------------|--------------|-------------|
| MAX9483CEE  | 0°C to +70°C | 16 QSOP     |
| MAX9483CTE* | 0°C to +70°C | 16 Thin QFN |
| MAX9484CTP  | 0°C to +70°C | 20 Thin QFN |

\*Future product—contact factory for availability.



# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## ABSOLUTE MAXIMUM RATINGS

V<sub>CC</sub>, V<sub>CCO</sub> to GND .....-0.3V to +6.0V  
 I<sub>N</sub>, R<sub>F</sub>, R<sub>S</sub> to GND.....-0.3V to (V<sub>CC</sub> + 0.3V)  
 ENABLE, ENOSC, NE2<sub>-</sub>, NE3<sub>-</sub>,  
 OUTSEL to GND.....-0.3V to (V<sub>CC</sub> + 0.3V)  
 Output Voltage at OUT1, OUT2.....-0.3V to (V<sub>CC</sub> - 1V)  
 Continuous Power Dissipation (T<sub>A</sub> = +70°C)  
 QSOP (derate 8.3mW/°C above +70°C).....667mW  
 TQFN (derate 16.9mW/°C above +70°C).....1349mW

Junction Temperature .....+150°C  
 Storage Temperature Range .....-65°C to +150°C  
 ESD Rating (Human Body Model) .....≥ ±2.0kV  
 Lead Temperature (soldering, 10s) .....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## DC ELECTRICAL CHARACTERISTICS

(V<sub>CC</sub> = V<sub>CCO</sub> = +4.5V to +5.5V, R<sub>L</sub> = 6.8Ω, ENABLE = high, NE2 = NE3 = high (MAX9483), NE2<sub>-</sub> = NE3<sub>-</sub> = differential high (MAX9484), ENOSC = low, T<sub>A</sub> = 0°C to +70°C, unless otherwise noted. Typical values are at V<sub>CC</sub> = V<sub>CCO</sub> = +5V, T<sub>A</sub> = +25°C.)  
 (Notes 1, 2, 4)

| PARAMETER                                                                    | SYMBOL           | CONDITIONS                                                                                                                                                |         | MIN                       | TYP  | MAX                       | UNITS |
|------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------------------|------|---------------------------|-------|
| POWER SUPPLY                                                                 |                  |                                                                                                                                                           |         |                           |      |                           |       |
| Write-Mode Supply Current                                                    | I <sub>CC1</sub> | I <sub>IN1</sub> = I <sub>IN2</sub> = I <sub>IN3</sub> = 500μA,<br>NE2 = NE3 = low                                                                        | MAX9483 | 181                       | 200  | mA                        |       |
|                                                                              |                  |                                                                                                                                                           | MAX9484 | 182                       | 210  |                           |       |
| Read-Mode Supply Current                                                     | I <sub>CC2</sub> | Oscillator enabled,<br>I <sub>IN1</sub> = I <sub>IN2</sub> = I <sub>IN3</sub> = 500μA,<br>ENOSC = high, R <sub>S</sub> = 8.2kΩ,<br>R <sub>F</sub> = 6.8kΩ | MAX9483 | 91                        | 100  | mA                        |       |
|                                                                              |                  |                                                                                                                                                           | MAX9484 | 92                        | 105  |                           |       |
|                                                                              |                  | Oscillator disabled,<br>I <sub>IN1</sub> = I <sub>IN2</sub> = I <sub>IN3</sub> = 500μA                                                                    | MAX9483 | 82                        | 95   |                           |       |
|                                                                              |                  |                                                                                                                                                           | MAX9484 | 83                        | 95   |                           |       |
| Supply Current                                                               | I <sub>CC3</sub> | Input disabled,<br>I <sub>IN1</sub> = I <sub>IN2</sub> = I <sub>IN3</sub> = 0                                                                             | MAX9483 | 14                        | 20   | mA                        |       |
|                                                                              |                  |                                                                                                                                                           | MAX9484 | 14                        | 20   |                           |       |
| Power-Down Supply Current                                                    | I <sub>CC4</sub> | ENABLE = NE2 = NE3 = low,<br>I <sub>IN1</sub> = I <sub>IN2</sub> = I <sub>IN3</sub> = 0                                                                   | MAX9483 | 0.96                      | 2.0  | mA                        |       |
|                                                                              |                  |                                                                                                                                                           | MAX9484 | 1.2                       | 2.0  |                           |       |
| DIGITAL INPUTS FOR WRITE CHANNEL CONTROL (NE2, NE3) (MAX9483)                |                  |                                                                                                                                                           |         |                           |      |                           |       |
| High-Level Input Voltage                                                     | V <sub>IH1</sub> |                                                                                                                                                           |         | 2.0                       |      |                           | V     |
| Low-Level Input Voltage                                                      | V <sub>IL1</sub> |                                                                                                                                                           |         |                           |      | 0.8                       | V     |
| Input Current                                                                | I <sub>IN1</sub> | V <sub>IN</sub> = high or low                                                                                                                             |         | -20                       |      | +20                       | μA    |
| LVDS DIGITAL INPUTS FOR WRITE CHANNEL CONTROL (NE2_, NE3_) (MAX9484)         |                  |                                                                                                                                                           |         |                           |      |                           |       |
| Differential Input High Threshold                                            | V <sub>TH</sub>  |                                                                                                                                                           |         |                           |      | 50                        | mV    |
| Differential Input Low Threshold                                             | V <sub>TL</sub>  |                                                                                                                                                           |         | -50                       |      |                           | mV    |
| SINGLE-ENDED DIGITAL INPUTS FOR WRITE CHANNEL CONTROL (NE2+, NE3+) (MAX9484) |                  |                                                                                                                                                           |         |                           |      |                           |       |
| Reference Voltage                                                            | V <sub>REF</sub> |                                                                                                                                                           |         | 1.10                      | 1.25 | 1.40                      | V     |
| High-Level Input Voltage                                                     | V <sub>IH2</sub> |                                                                                                                                                           |         | V <sub>REF</sub> +<br>300 |      |                           | mV    |
| Low-Level Input Voltage                                                      | V <sub>IL2</sub> |                                                                                                                                                           |         |                           |      | V <sub>REF</sub> -<br>300 | mV    |
| Input Current                                                                | I <sub>IN2</sub> | V <sub>IN</sub> = high or low                                                                                                                             |         | -20                       |      | +20                       | μA    |

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

MAX9483/MAX9484

## DC ELECTRICAL CHARACTERISTICS (continued)

( $V_{CC} = V_{CCO} = +4.5V$  to  $+5.5V$ ,  $R_L = 6.8\Omega$ ,  $ENABLE = high$ ,  $NE2 = NE3 = high$  (MAX9483),  $NE2_+ = NE3_+ = differential high$  (MAX9484),  $ENOSC = low$ ,  $T_A = 0^\circ C$  to  $+70^\circ C$ , unless otherwise noted. Typical values are at  $V_{CC} = V_{CCO} = +5V$ ,  $T_A = +25^\circ C$ .) (Notes 1, 2, 4)

| PARAMETER                                                         | SYMBOL       | CONDITIONS                                                         | MIN | TYP  | MAX | UNITS           |
|-------------------------------------------------------------------|--------------|--------------------------------------------------------------------|-----|------|-----|-----------------|
| <b>DIGITAL INPUTS FOR CONTROL SIGNALS (ENABLE, OUTSEL, ENOSC)</b> |              |                                                                    |     |      |     |                 |
| High-Level Input Voltage                                          | $V_{IH3}$    |                                                                    | 2.0 |      |     | V               |
| Low-Level Input Voltage                                           | $V_{IL3}$    |                                                                    |     |      | 0.8 | V               |
| Input Current                                                     | $I_{IN3}$    | $V_{IN} = high or low$                                             | -10 |      | +10 | $\mu A$         |
| <b>ANALOG INPUTS (IN1, IN2, IN3)</b>                              |              |                                                                    |     |      |     |                 |
| Current Channel Input Current Range                               | $I_{CIN}$    | Current flowing into IN1, IN2, or IN3                              | 0   |      | 4.0 | mA              |
| Current Channel Input Impedance                                   | $R_{IN}$     | $IN_+ to GND$                                                      | 165 | 200  | 235 | $\Omega$        |
| <b>OUTPUTS (OUT1 and OUT2)</b>                                    |              |                                                                    |     |      |     |                 |
| Maximum Total Output Current                                      | $I_{OUT}$    |                                                                    | 320 | 400  |     | mA              |
| Maximum Output Current per Channel                                | $I_{OUT}$    | Read current IN1                                                   | 210 | 273  |     | mA              |
|                                                                   |              | Write current IN2, IN3                                             | 250 | 347  |     |                 |
| Best-Fit Current Gain                                             | $A_I$        | Any channel (Note 3)                                               |     | 100  |     | I/I             |
| Best-Fit Current Offset                                           | $I_{OFFSET}$ | Any channel (Note 3)                                               | -4  |      | +4  | mA              |
| Output Current Linearity                                          |              | Any channel (Note 3)                                               | -3  |      | +3  | %               |
| Output Off Current                                                | $I_{OFF1}$   | $ENABLE = low$                                                     |     | 0.2  | 1   | mA              |
|                                                                   | $I_{OFF2}$   | $NE2 = NE3 = high, I_{IN1} = 0\mu A, I_{IN2} = I_{IN3} = 500\mu A$ |     | 0.22 | 1.5 |                 |
|                                                                   | $I_{OFF3}$   | $NE2 = NE3 = low, I_{IN1} = I_{IN2} = I_{IN3} = 0\mu A$            |     | 0.14 | 5   |                 |
| Read-Mode Output Supply Sensitivity                               |              | $I_{OUT} = 40mA$                                                   | -2  |      | +2  | %/V             |
| Write-Mode Output Supply Sensitivity                              |              | $I_{OUT} = 80mA$                                                   | -2  |      | +2  | %/V             |
| Read-Mode Output Temperature Sensitivity                          |              | $I_{OUT} = 40mA$                                                   |     | 15   |     | ppm/ $^\circ C$ |
| Write-Mode Output Temperature Sensitivity                         |              | $I_{OUT} = 80mA$                                                   |     | 16   |     | ppm/ $^\circ C$ |
| Output Noise                                                      |              | $I_{OUT} = 40mA, ENOSC = low$                                      |     | 3    |     | nA/ $\sqrt{Hz}$ |

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## AC ELECTRICAL CHARACTERISTICS

( $V_{CC} = V_{CCO} = +4.5V$  to  $+5.5V$ ,  $I_{OUT} = 40mA$  (read) +  $40mA$ ,  $R_L = 6.8\Omega$ ,  $ENABLE = high$ ,  $NE2 = NE3 = high$  (MAX9483),  $NE2\_ = NE3\_ = differential high$  (MAX9484),  $ENOSC = low$ ,  $T_A = 0^\circ C$  to  $+70^\circ C$ , unless otherwise noted. Typical values are at  $V_{CC} = V_{CCO} = +5V$ ,  $T_A = +25^\circ C$ .) (Notes 1, 4)

| PARAMETER                          | SYMBOL     | CONDITIONS                                                                        | MIN | TYP | MAX | UNITS           |
|------------------------------------|------------|-----------------------------------------------------------------------------------|-----|-----|-----|-----------------|
| <b>OSCILLATOR</b>                  |            |                                                                                   |     |     |     |                 |
| Oscillator Frequency               | $f_{OSC}$  | $R_{F\_} = 7.5k\Omega$ (Note 2), $I_{OUT} = 40mA$ (read)                          | 255 | 300 | 350 | MHz             |
| Oscillator Temperature Coefficient |            | $R_{F\_} = 7.5k\Omega$                                                            |     | 10  |     | ppm/ $^\circ C$ |
| <b>OUTPUT TIMING</b>               |            |                                                                                   |     |     |     |                 |
| Write Rise Time                    | $t_r$      | $I_{OUT} = 40mA$ (read) + $40mA$ (10% to 90%)                                     |     | 0.9 | 1.6 | ns              |
| Write Fall Time                    | $t_f$      | $I_{OUT} = 40mA$ (read) + $40mA$ (90% to 10%)                                     |     | 1.0 | 1.6 | ns              |
| Output-Current Overshoot           | OCO        |                                                                                   |     | 5   |     | %               |
| Output ON Propagation Delay        | $t_{ON}$   | NE 50% high-low to $I_{OUT}$ at 50% of final value                                |     | 1.0 | 2.0 | ns              |
| Output OFF Propagation Delay       | $t_{OFF}$  | NE 50% low-high to $I_{OUT}$ at 50% of final value                                |     | 1.0 | 2.0 | ns              |
| Output Disable Time                | $t_{DIS}$  | ENABLE 50% high-low to $I_{OUT}$ at 50% of final value at $I_{OUT} = 40mA$ (read) |     | 60  | 100 | ns              |
| Output Enable Time                 | $t_{EN}$   | ENABLE 50% low-high to $I_{OUT}$ at 50% of final value at $I_{OUT} = 40mA$ (read) |     | 60  | 100 | ns              |
| Oscillator Disable Time            | $t_{DISO}$ | ENOSC 50% high-low to $I_{OUT}$ at 50% of final value at $I_{OUT} = 40mA$ (read)  |     | 4   | 10  | ns              |
| Oscillator Enable Time             | $t_{EHO}$  | ENOSC 50% high-low to $I_{OUT}$ at 50% of final value at $I_{OUT} = 40mA$ (read)  |     | 25  | 50  | ns              |
| Channel-Select Delay               | $t_{ODH}$  | OUTSEL 50% low-high to $I_{OUT}$ at 50% of final value measured at OUT1           |     | 2.9 | 10  | ns              |
|                                    | $t_{ODL}$  | OUTSEL 50% high-low to $I_{OUT}$ at 50% of final value measured at OUT2           |     | 2.9 | 10  |                 |

**Note 1:** Current into a pin is defined as positive. Current out of a pin is defined as negative. All voltages are referenced to ground except  $V_{TH}$ .

**Note 2:** Maximum and minimum limits over temperature are guaranteed by design and characterization. Devices are production tested at  $T_A = +25^\circ C$ .

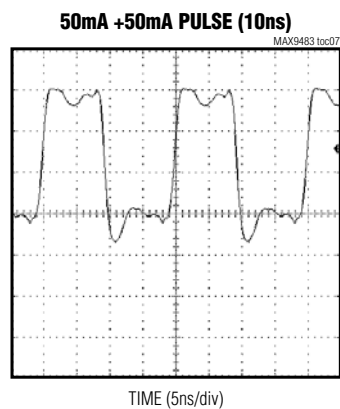
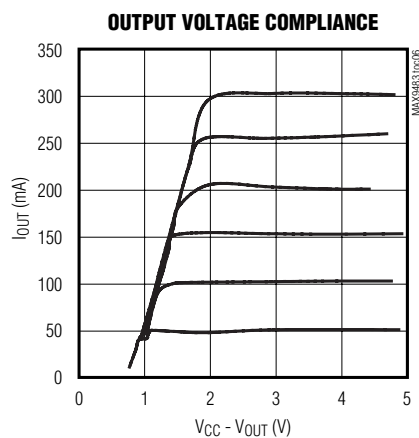
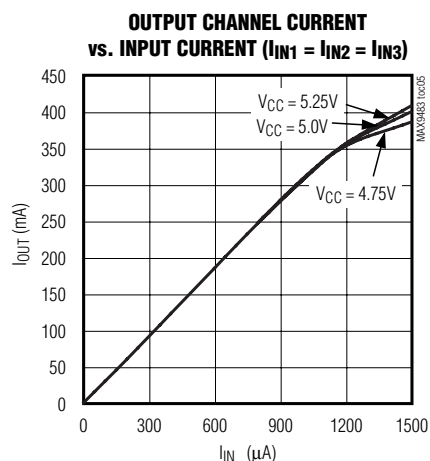
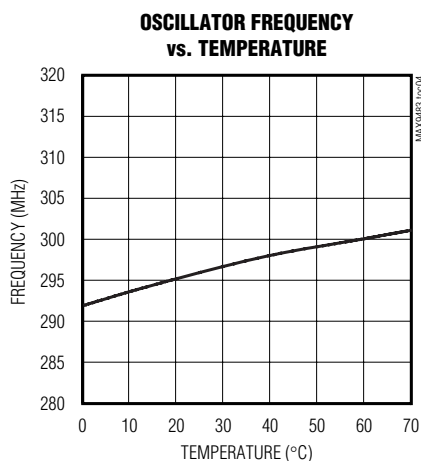
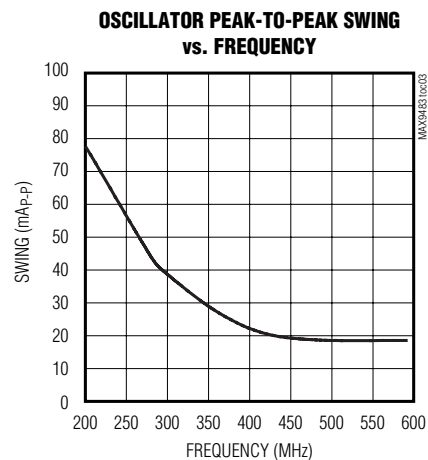
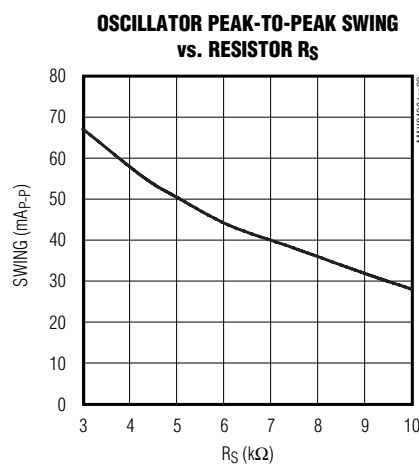
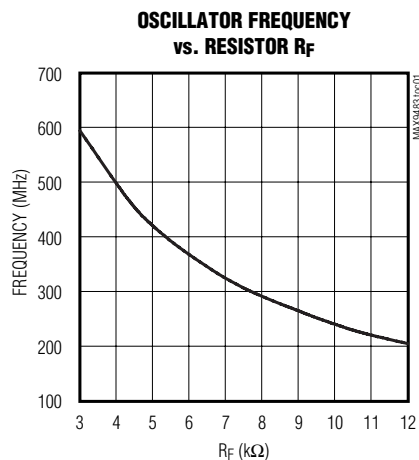
**Note 3:** Linearity of the amplifier is calculated using a best-fit method at three operating points of  $I_{OUT}$  at 20mA, 40mA, and 60mA.  $I_{OUT} = (I_{IN} \times GAIN) + I_{OFFSET}$ .

**Note 4:** Guaranteed by design and characterization. Limit set at  $\pm 6$  sigma.

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## Typical Operating Characteristics

( $V_{CC} = V_{CCO\_} = +5V$ ,  $T_A = +25^\circ C$ , unless otherwise noted.)



# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## Pin Description

| PIN     |      |         | NAME              | FUNCTION                                                                                                                                          |
|---------|------|---------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| MAX9483 |      | MAX9484 |                   |                                                                                                                                                   |
| QSOP    | TQFN | TQFN    |                   |                                                                                                                                                   |
| 1       | 15   | 18      | IN1               | Channel 1 Input Current (Read Channel)                                                                                                            |
| 2       | 16   | 19      | IN2               | Channel 2 Input Current (Write Channel)                                                                                                           |
| 3       | 1    | 20      | IN3               | Channel 3 Input Current (Write Channel)                                                                                                           |
| 4       | 2    | —       | R <sub>F</sub>    | Oscillator Frequency-Setting Resistor. Connect an external resistor to GND to set the frequency of the oscillator for both outputs OUT1 and OUT2. |
| 5       | 3    | —       | NE2               | Channel 2 Active-Low Digital Control Input                                                                                                        |
| 6       | 4    | —       | NE3               | Channel 3 Active-Low Digital Control Input                                                                                                        |
| 7       | 5    | 8       | ENABLE            | LVTTTL Output-Current Enable                                                                                                                      |
| 8       | 6    | 9       | ENOSC             | LVTTTL Oscillator Enable                                                                                                                          |
| 9, 16   | 14   | 17      | V <sub>CC</sub>   | +5V Power Supply. Bypass to GND with 0.1μF and 0.01μF capacitors with the 0.01μF capacitor as close to the pin as possible.                       |
| 10      | 8    | 11      | OUTSEL            | LVTTTL Output Select. Drive high to select output 1; pull low to select output 2.                                                                 |
| 11      | 9    | 12      | OUT2              | Output Current 2                                                                                                                                  |
| 12      | 10   | 13      | R <sub>S2</sub>   | Output 2 Oscillator Current Swing-Setting Resistor. Connect an external resistor to GND to set the swing current of output port 2.                |
| 13      | 11   | 14      | R <sub>S1</sub>   | Output 1 Oscillator Current Swing-Setting Resistor. Connect an external resistor to GND to set the swing current of output port 1.                |
| 14      | —    | —       | GND               | Ground                                                                                                                                            |
| 15      | 12   | 15      | OUT1              | Output Current 1                                                                                                                                  |
| —       | —    | 1       | R <sub>F1</sub>   | Output 1 Oscillator Frequency-Setting Resistor. Connect an external resistor to GND to set the frequency of the oscillator for OUT1.              |
| —       | —    | 2       | R <sub>F2</sub>   | Output 2 Oscillator Frequency-Setting Resistor. Connect an external resistor to GND to set the frequency of the oscillator for OUT2.              |
| —       | —    | 3       | NE2+              | Noninverting Channel 2 LVDS or Single-Ended Digital Control Input                                                                                 |
| —       | —    | 4       | NE2-              | Inverting Channel 2 LVDS or Reference for Single-Ended Digital Control Input                                                                      |
| —       | —    | 6       | NE3+              | Noninverting Channel 3 LVDS or Single-Ended Control Digital Input                                                                                 |
| —       | —    | 7       | NE3-              | Inverting Channel 3 LVDS or Reference for Single-Ended Control Digital Input                                                                      |
| —       | 7    | 10      | V <sub>CCO2</sub> | +5V Power Supply for Output 2. Bypass to GND with 0.1μF and 0.01μF capacitors with the 0.01μF capacitor as close to pin as possible.              |
| —       | 13   | 16      | V <sub>CCO1</sub> | +5V Power Supply for Output 2. Bypass to GND with 0.1μF and 0.01μF capacitors with the 0.01μF capacitor as close to the pin as possible.          |
| —       | —    | 5       | REF               | Reference Voltage for Single-Ended Input. Connect a 0.1μF decoupling capacitor to ground.                                                         |
| —       | EP   | EP      | EP                | Exposed Pad. Connect to ground.                                                                                                                   |

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

MAX9483/MAX9484

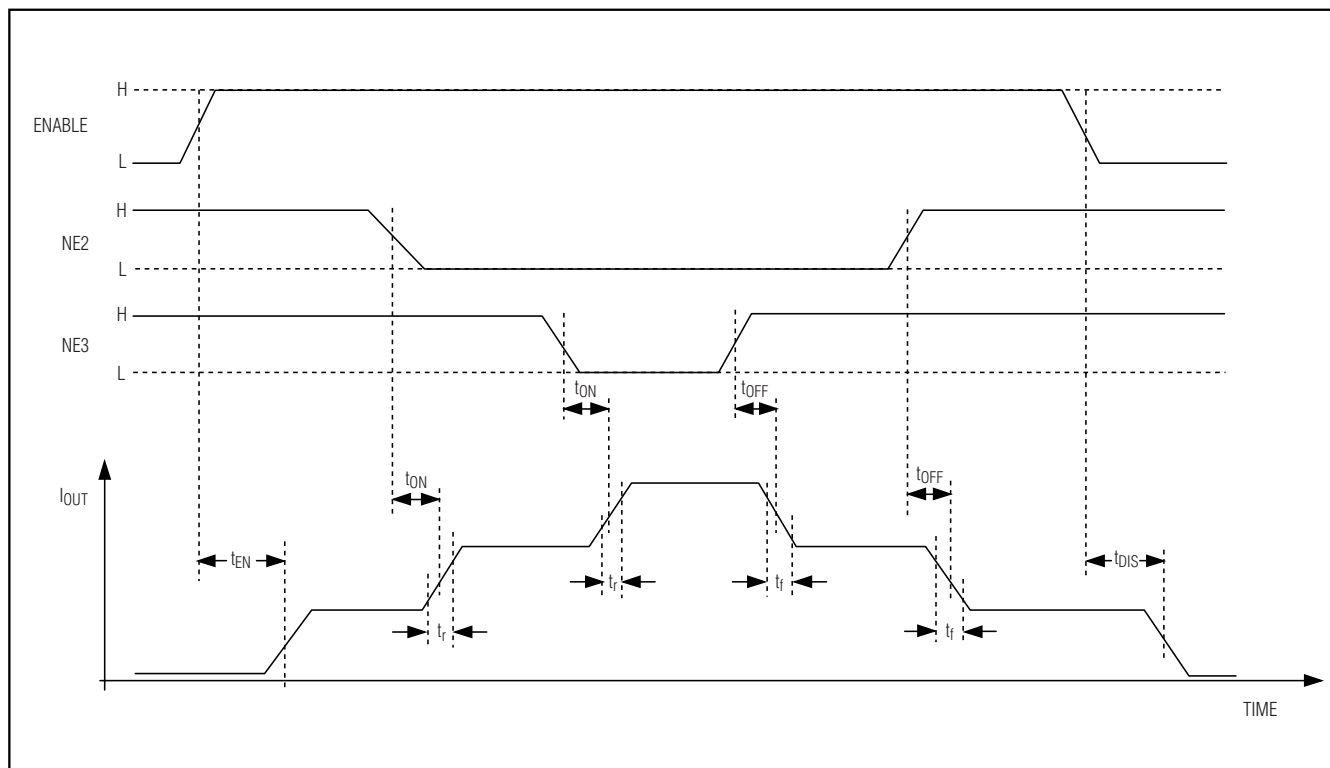


Figure 1. Timing Diagram of Output vs. Control Signals

## Detailed Description

### Read Channel and Write Channels

The MAX9483/MAX9484 high-performance multimode LDDs are designed for CD and DVD combination pick-up heads. The drivers have three current channels. Each channel has a current input  $IN_{\_}$  ( $\_ = 1, 2, \text{ or } 3$ ) and a channel control signal (ENABLE, NE2, or NE3).  $IN_1$  supplies the reference for the read channel, which provides the read current or the offset current to the lasers. The other two channels are the write channels. The currents of these two channels are superimposed on the read current that serves as the offset current for the laser in write mode. The offset current significantly reduces the laser output ramp-up time. When ENABLE is low, all three channels are disabled. Driving ENABLE high enables the read channel and leaves the other two write channels to be controlled by NE2 and NE3 (see Figure 1). By selecting the input currents at  $IN_2$  and

$IN_3$ , as well as the signal timing of NE2 and NE3, the drivers can generate various current waveforms for different CD/DVD writing standards. All three channels have a current gain of 100. The maximum total current each output can provide is 400mA.

### RF Oscillator

To reduce the laser-mode hopping noise in read mode, modulate the read current with an oscillator with a 100MHz to 600MHz frequency. An external resistor,  $R_F$ , determines the oscillator frequency selection. For the MAX9484, two external resistors,  $R_{F1}$  and  $R_{F2}$ , are used to select the oscillator frequency for CD and DVD lasers separately. The swing amplitude of the oscillator current is set by two external resistors,  $R_{S1}$  and  $R_{S2}$ , one for CD and one for DVD. The oscillator is enabled when both ENABLE and ENOSC are driven high.

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## Applications Information

### LVDS Inputs for MAX9484

The MAX9484 input control signals, NE2<sub>-</sub> and NE3<sub>-</sub>, are compatible with LVDS or single-ended inputs. The LVDS inputs allow the driver to handle higher data writing rates. When using single-ended input signals, such as LVTTTL or SSTL\_2, connect NE2<sub>-</sub> and NE3<sub>-</sub> to REF.

### Laser Safety and IEC 825

Using the MAX9483/MAX9484 laser drivers alone does not ensure that a transmitter design is compliant with IEC 825. The entire transmitter circuit and component selections must be considered. Customers must determine the level of fault tolerance required by their application. Note that Maxim products are not designed or authorized for use as components in systems intended for surgical implantation into the body, for applications intended to support or sustain life, or for any other application where the failure of a Maxim product could create a situation where personal injury or death may occur.

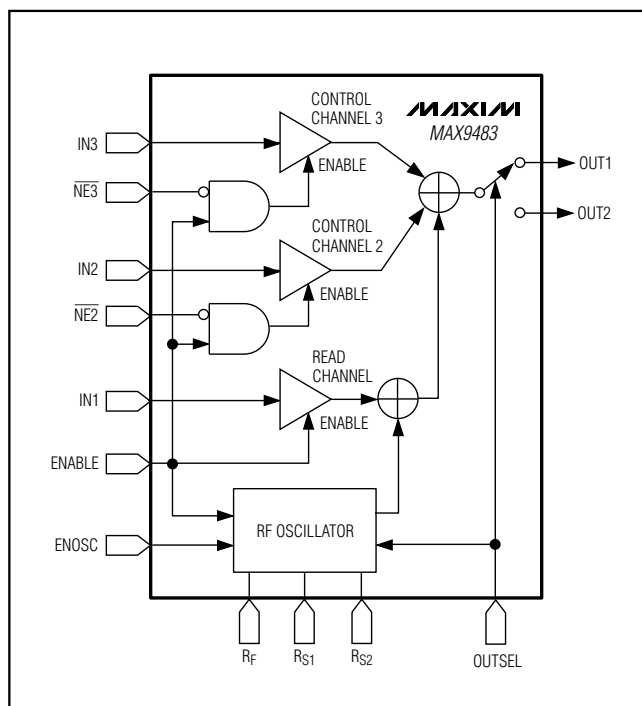


Figure 2. MAX9483 Functional Diagram

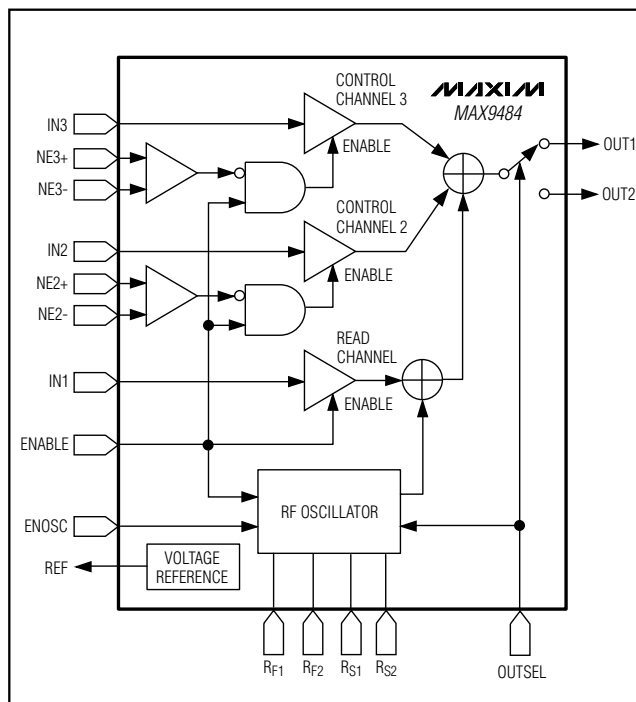


Figure 3. MAX9484 Functional Diagram



# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

MAX9483/MAX9484

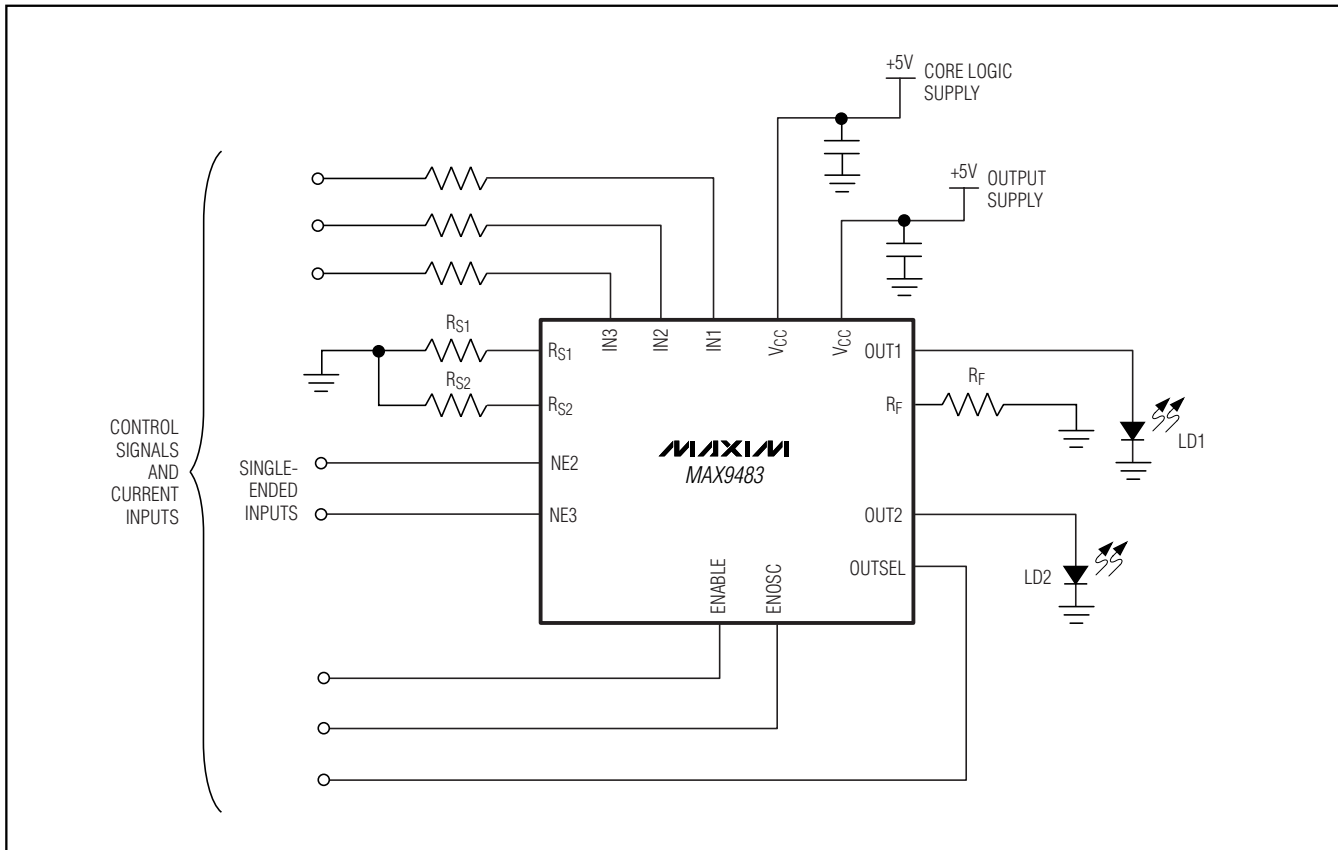


Figure 4. MAX9483 Typical Operating Circuit

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

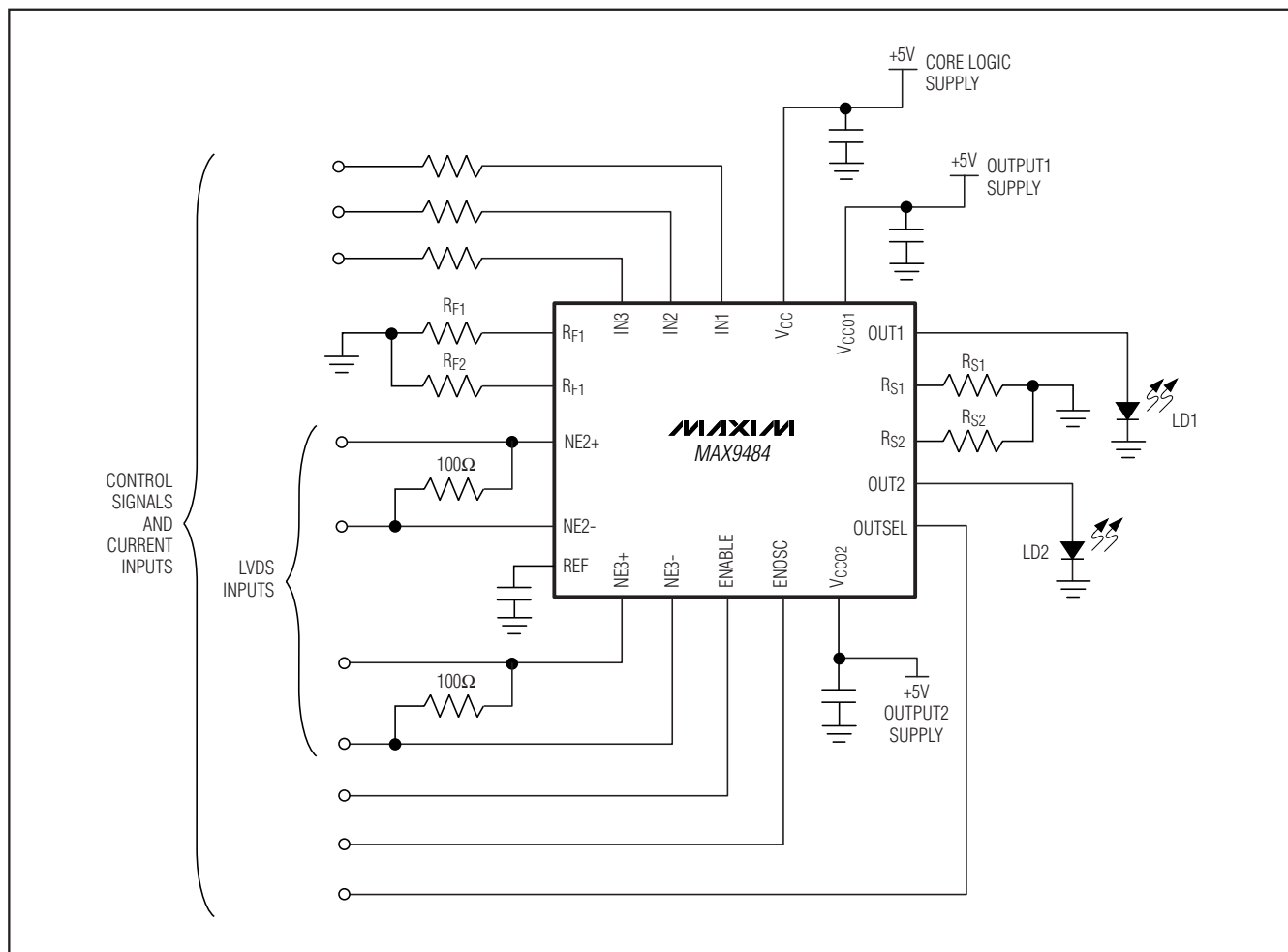


Figure 5. MAX9484 Typical Operating Circuit with LVDS Inputs

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

**MAX9483/MAX9484**

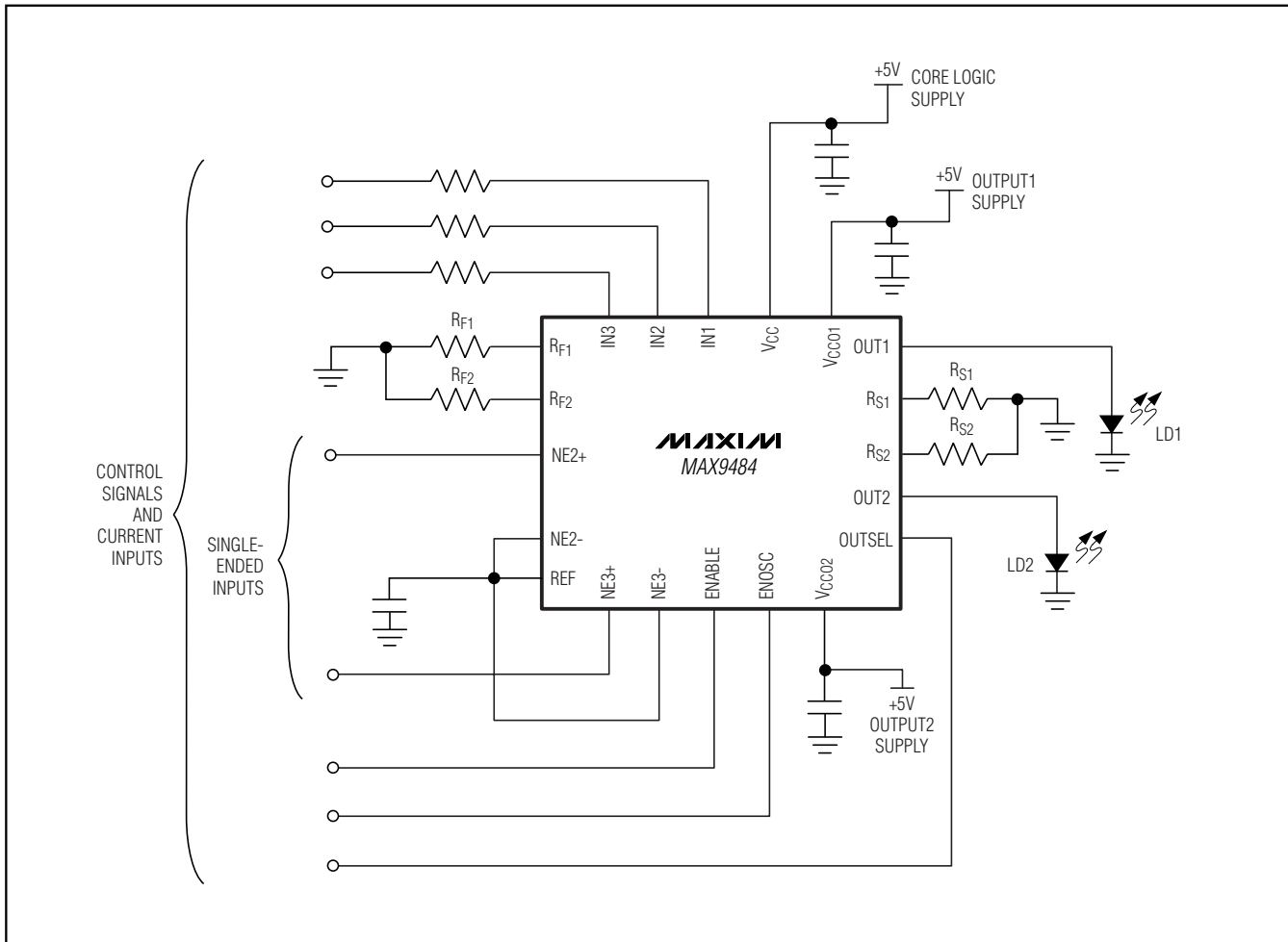
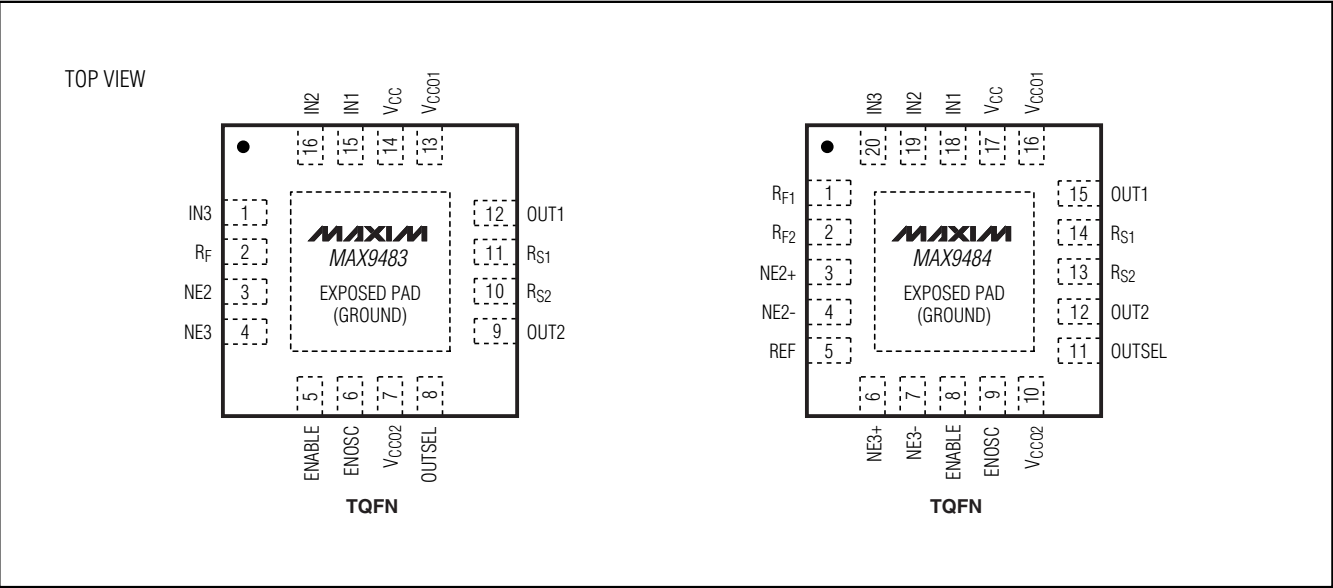


Figure 6. MAX9484 Typical Operation Circuit with Single-Ended Inputs

# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## Pin Configurations (continued)



## Chip Information

TRANSISTOR COUNT: 1399

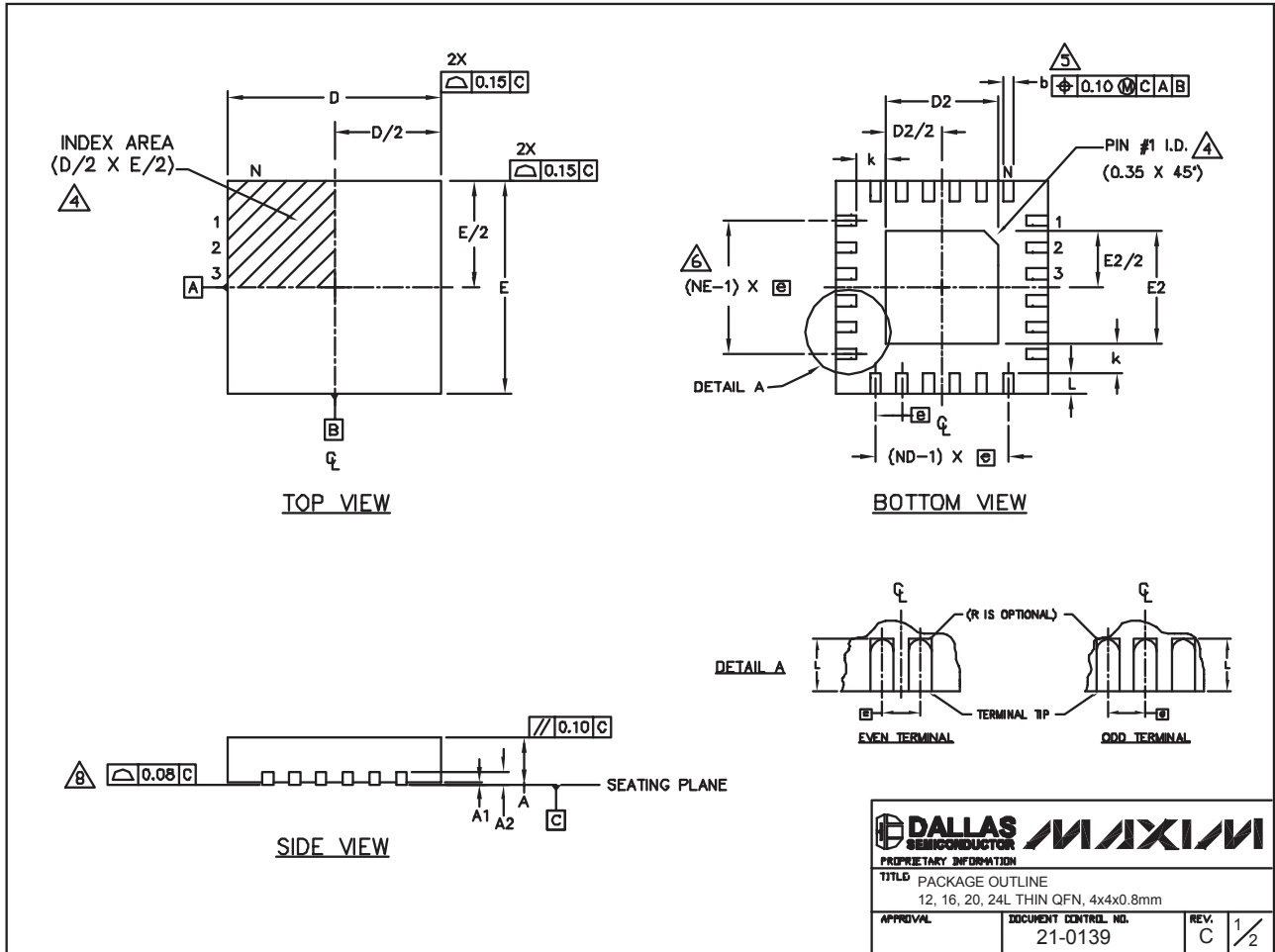
# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## Package Information

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to [www.maxim-ic.com/packages](http://www.maxim-ic.com/packages).)

MAX9483/MAX9484

24L QFN THIN EPS



# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## Package Information (continued)

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to [www.maxim-ic.com/packages](http://www.maxim-ic.com/packages).)

| COMMON DIMENSIONS |           |      |      |           |      |      |           |      |      |           |      |      |
|-------------------|-----------|------|------|-----------|------|------|-----------|------|------|-----------|------|------|
| PKG               | 12L 4x4   |      |      | 16L 4x4   |      |      | 20L 4x4   |      |      | 24L 4x4   |      |      |
| REF.              | MIN.      | NOM. | MAX. | MIN.      | NOM. | MAX. | MIN.      | NOM. | MAX. | MIN.      | NOM. | MAX. |
| A                 | 0.70      | 0.75 | 0.80 | 0.70      | 0.75 | 0.80 | 0.70      | 0.75 | 0.80 | 0.70      | 0.75 | 0.80 |
| AL                | 0.0       | 0.02 | 0.05 | 0.0       | 0.02 | 0.05 | 0.0       | 0.02 | 0.05 | 0.0       | 0.02 | 0.05 |
| A2                | 0.20 REF  |      |      | 0.20 REF  |      |      | 0.20 REF  |      |      | 0.20 REF  |      |      |
| b                 | 0.25      | 0.30 | 0.35 | 0.25      | 0.30 | 0.35 | 0.20      | 0.25 | 0.30 | 0.18      | 0.23 | 0.30 |
| D                 | 3.90      | 4.00 | 4.10 | 3.90      | 4.00 | 4.10 | 3.90      | 4.00 | 4.10 | 3.90      | 4.00 | 4.10 |
| E                 | 3.90      | 4.00 | 4.10 | 3.90      | 4.00 | 4.10 | 3.90      | 4.00 | 4.10 | 3.90      | 4.00 | 4.10 |
| e                 | 0.80 BSC. |      |      | 0.65 BSC. |      |      | 0.50 BSC. |      |      | 0.50 BSC. |      |      |
| k                 | 0.25      | —    | —    | 0.25      | —    | —    | 0.25      | —    | —    | 0.25      | —    | —    |
| L                 | 0.45      | 0.55 | 0.65 | 0.45      | 0.55 | 0.65 | 0.45      | 0.55 | 0.65 | 0.30      | 0.40 | 0.50 |
| N                 | 12        |      |      | 16        |      |      | 20        |      |      | 24        |      |      |
| ND                | 3         |      |      | 4         |      |      | 5         |      |      | 6         |      |      |
| NE                | 3         |      |      | 4         |      |      | 5         |      |      | 6         |      |      |
| JeDEC Var.        | WGGB      |      |      | WGGC      |      |      | WGGD-1    |      |      | WGGD-2    |      |      |

| EXPOSED PAD VARIATIONS |      |      |      |      |      |      |                    |
|------------------------|------|------|------|------|------|------|--------------------|
| PKG. CODES             | D2   |      |      | E2   |      |      | DOWN BONDS ALLOWED |
|                        | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |                    |
| T1244-2                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | NO                 |
| T1244-3                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | YES                |
| T1244-4                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | NO                 |
| T1644-2                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | NO                 |
| T1644-3                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | YES                |
| T1644-4                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | NO                 |
| T2044-1                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | NO                 |
| T2044-2                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | YES                |
| T2044-3                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | NO                 |
| T2444-1                | 2.45 | 2.60 | 2.63 | 2.45 | 2.60 | 2.63 | NO                 |
| T2444-2                | 1.95 | 2.10 | 2.25 | 1.95 | 2.10 | 2.25 | YES                |
| T2444-3                | 2.45 | 2.60 | 2.63 | 2.45 | 2.60 | 2.63 | YES                |
| T2444-4                | 2.45 | 2.60 | 2.63 | 2.45 | 2.60 | 2.63 | NO                 |

### NOTES:

- DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
- ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.
- N IS THE TOTAL NUMBER OF TERMINALS.

△ THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JEDEC 95-1 SPP-012. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.


△ DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.25 mm AND 0.30 mm FROM TERMINAL TIP.

△ ND AND NE REFER TO THE NUMBER OF TERMINALS ON EACH D AND E SIDE RESPECTIVELY.

7. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.

△ COPLANARITY APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.

9. DRAWING CONFORMS TO JEDEC MO220, EXCEPT FOR T2444-1, T2444-3 AND T2444-4.

|                                                                                       |                                        |
|---------------------------------------------------------------------------------------|----------------------------------------|
|  |                                        |
| <b>PROPRIETARY INFORMATION</b>                                                        |                                        |
| <b>TITLE</b> PACKAGE OUTLINE<br>12, 16, 20, 24L THIN QFN, 4x4x0.8mm                   |                                        |
| <b>APPROVAL</b>                                                                       | <b>DOCUMENT CONTROL NO.</b><br>21-0139 |
| <b>REV.</b><br>C                                                                      | <b>2/2</b>                             |

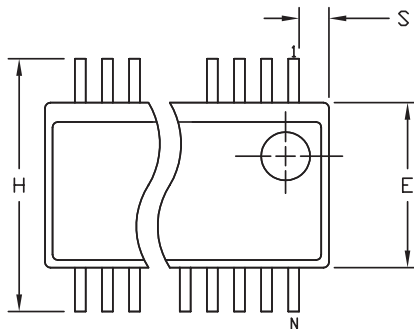
# Dual-Output, Multimode CD-RW/DVD Laser-Diode Drivers

## Package Information (continued)

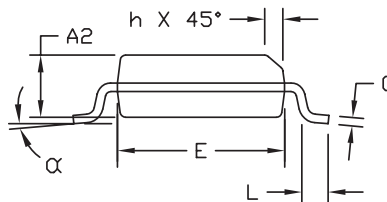
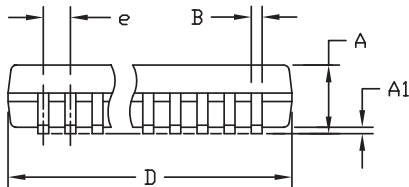
(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to [www.maxim-ic.com/packages](http://www.maxim-ic.com/packages).)

MAX9483/MAX9484

QSOP-EPs



| DIM | INCHES         |       | MILLIMETERS |       |
|-----|----------------|-------|-------------|-------|
|     | MIN            | MAX   | MIN         | MAX   |
| A   | .061           | .068  | 1.55        | 1.73  |
| A1  | .004           | .0098 | 0.102       | 0.249 |
| A2  | .055           | .061  | 1.40        | 1.55  |
| B   | .008           | .012  | 0.20        | 0.30  |
| C   | .0075          | .0098 | 0.191       | 0.249 |
| D   | SEE VARIATIONS |       |             |       |
| E   | .150           | .157  | 3.81        | 3.99  |
| e   | .025 BSC       |       | 0.635 BSC   |       |
| H   | .230           | .244  | 5.84        | 6.20  |
| h   | .010           | .016  | 0.25        | 0.41  |
| L   | .016           | .035  | 0.41        | 0.89  |
| N   | SEE VARIATIONS |       |             |       |
| α   | 0°             | 8°    | 0°          | 8°    |




### VARIATIONS:

|   | INCHES |       | MILLIMETERS |       | N  |    |
|---|--------|-------|-------------|-------|----|----|
|   | MIN.   | MAX.  | MIN.        | MAX.  |    |    |
| D | .189   | .196  | 4.80        | 4.98  | 16 | AB |
| S | .0020  | .0070 | 0.05        | 0.18  |    |    |
| D | .337   | .344  | 8.56        | 8.74  | 20 | AD |
| S | .0500  | .0550 | 1.270       | 1.397 |    |    |
| D | .337   | .344  | 8.56        | 8.74  | 24 | AE |
| S | .0250  | .0300 | 0.635       | 0.762 |    |    |
| D | .386   | .393  | 9.80        | 9.98  | 28 | AF |
| S | .0250  | .0300 | 0.635       | 0.762 |    |    |

### NOTES:

- 1). D & E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
- 2). MOLD FLASH OR PROTRUSIONS NOT TO EXCEED .006" PER SIDE.
- 3). CONTROLLING DIMENSIONS: INCHES.
- 4). MEETS JEDEC MO137.

|                                                                                                                      |                                 |                                                                                       |     |
|----------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------|-----|
|  <b>DALLAS</b><br>SEMICONDUCTOR |                                 |  |     |
| PROPRIETARY INFORMATION                                                                                              |                                 |                                                                                       |     |
| TITLE:<br>PACKAGE OUTLINE, QSOP .150", .025" LEAD PITCH                                                              |                                 |                                                                                       |     |
| APPROVAL                                                                                                             | DOCUMENT CONTROL NO.<br>21-0055 | REV.<br>E                                                                             | 1/1 |

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15