

CXA2680ER

Sony developed the CXA2680ER as a dedicated laser driver IC that increases the number of channels to five to support increased bit depth recording strategies. The CXA2680ER also adds a DVD modulator amplitude switching function to the CXA2640ER for use in dual drive systems and features high linear velocity to follow the actuators used in conventional CD-R/RW drives.

- CD system total maximum drive current: 370 mA
- DVD system total maximum drive current: 320 mA
- Rise/fall time: 1 ns
- Support for strategy in all 5 channels
- Read channel low noise: 1.5 nA/ $\sqrt{\text{Hz}}$
- High-frequency modulator frequency accuracy: $< \pm 10\%$
- Built-in DVD modulator amplitude switching function
- Support for a variety of timing signals

■ Achieving both Higher Output and Higher Speed

While both an increased output transient waveform speed and an increased maximum output drive current are required to achieve increased linear velocities, increasing the maximum output drive current required increasing the size of the output transistors. However, increasing the size of the output transistors leads to delays in the output transient waveform. Despite this tradeoff relationship, the CXA2680ER achieves both of the following output current performance levels.

- CD system total maximum drive current: 370 mA (figure 1)
($V_{CC} = 5\text{ V}$, $V_{OP} = 2.5\text{ V}$, $T = 150\text{ }^\circ\text{C}$)
- DVD system total maximum drive current: 320 mA (figure 2)
($V_{CC} = 5\text{ V}$, $V_{OP} = 3\text{ V}$, $T = 150\text{ }^\circ\text{C}$)

Thus this device can supply the required maximum output drive current even under severe operating conditions for both CD and DVD. Furthermore, in the CXA2680ER, Sony optimized the output

transient waveforms to have both higher speed and a minimal amount of overshoot by including a built-in waveform shaping circuit. This allows this device to support $\times 8$ -speed DVD recording.

■ Read Channel Low Noise

Sony's painstaking low-noise design efforts to achieve the signal-to-noise ratio required for higher linear speeds achieved a noise level of 1.5 nA/ $\sqrt{\text{Hz}}$ (at 20 MHz, 35 mA, 20 mA p-p).

■ High-Frequency Modulator Frequency Accuracy

In high-frequency modulator, which is used to reduce noise during playback, interference between the return light from the disc and the laser beam due to variations in frequency causes noise to be aggravated. The CXA2680ER cancels frequency variations depending on the internal resistance caused by VCO that has the emitter junction multivibrator, thus allowing noise to reduce.

■ DVD System Modulator Amplitude Switching Function

This function allows applications to set a modulator amplitude value that is optimal for the DVD media used.

■ Support for a Variety of Timing Signals

The CXA2680ER provides both differential inputs (LVDS/LVPECL) for higher speeds and single-ended inputs (3.3 V CMOS/TTL).

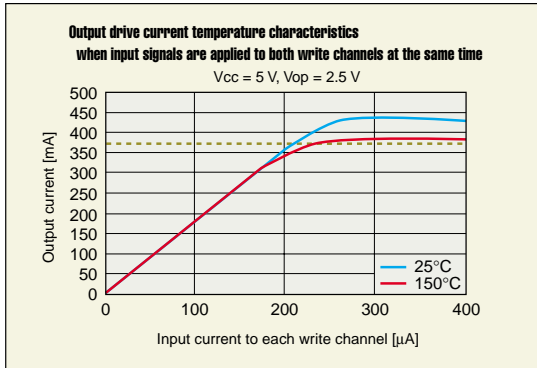
■ Small Package with Improved Heat Dissipation

The CXA2680ER is provided in a 32-pin VQFN (4.8 \times 4.8 mm) miniature package that can contribute to pickup miniaturization through reductions in the mounting area.

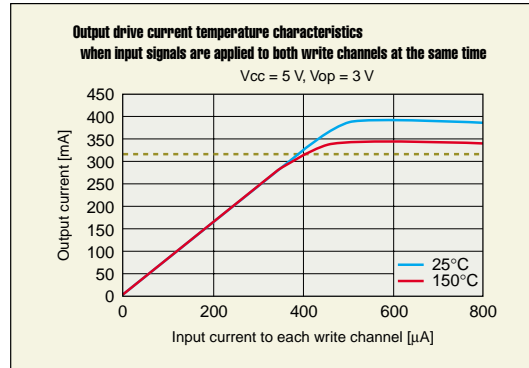
Not only is the package size noteworthy, but this package can also increase the efficiency with which heat is dissipated, since it allows the heat sink to be connected with silicon grease to the die pads, which are exposed at the package surface. Since this prevents heat from escaping through the PWB to the laser diode, PWBs using this device are easy on the laser diode. This also allows the IC to be connected at the rear surface.

V O I C E

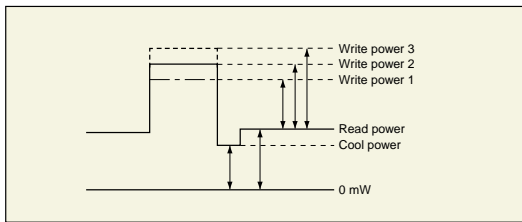
It's been five years since I first started designing laser driver ICs, and by now I have a good idea of what is required in laser driver ICs. I strongly recommend that you look into the CXA2680ER, which was developed based on this accumulated know-how.



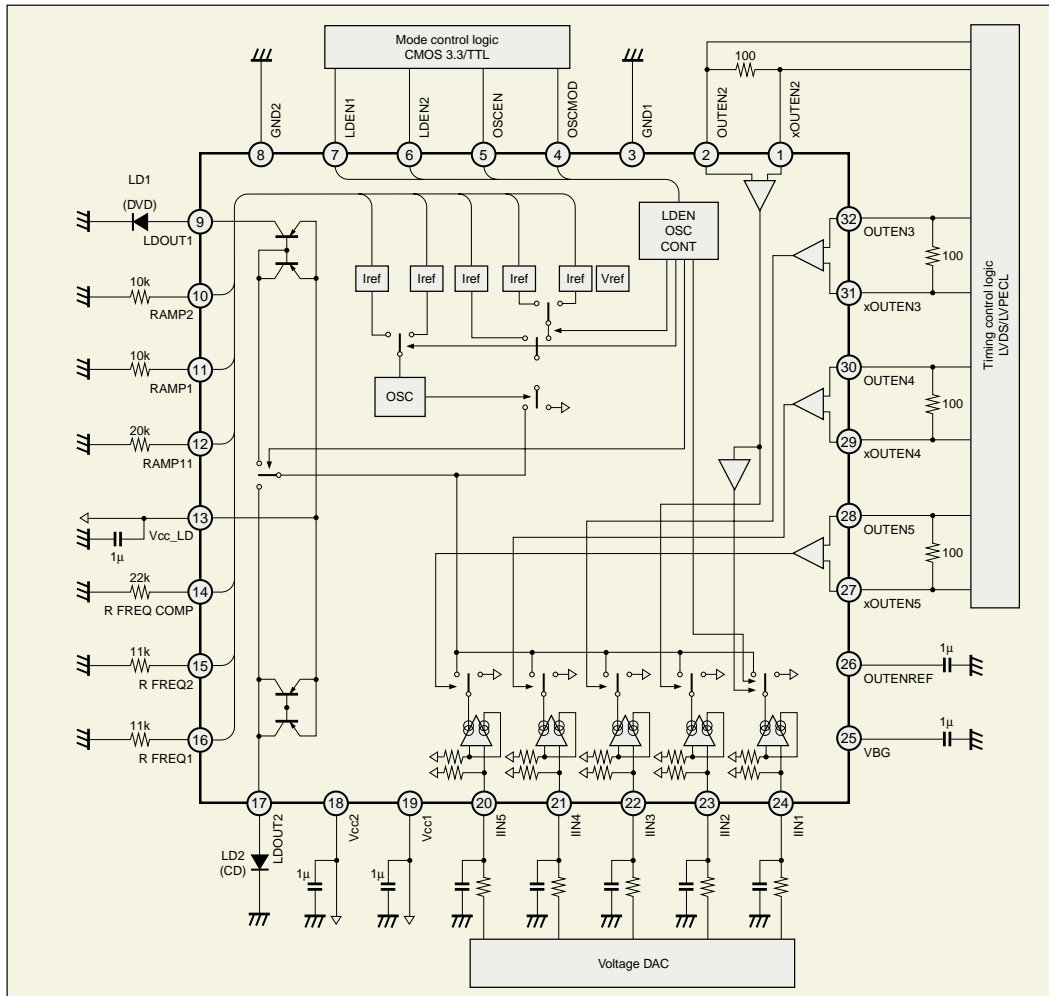
■ **Figure 1 CD Output Drive Current Temperature Characteristics**



■ **Figure 2 DVD Output Drive Current Temperature Characteristics**



■ **Figure 3 Sample 5-Value Recording Waveform**



■ **Figure 4 Application Circuit Example**