Ultrahigh-speed Optical Integration Device that Achieves 10× Speed DVD Playback Laser Coupler

SLK3001PE

To respond to the needs emerging from the growing market for DVD video systems and DVD-ROM drives for computers, Sony has now developed the SLK3001PE optical integration device (laser coupler), which forms the heart of the DVD playback optical pickup.
This device supports a 10× DVD playback speed, which is the industry's fastest speed, by incorporating a newly developed PDIC.
The SLK3001PE is the RF "module-less" product based on a pulsation laser that guarantees 70°C operation for the first time in the industry and provides a circularly polarized optical output.
By incorporated these and other technologies the SLK3001PE achieves simplification, miniaturization, and increased performance in the DVD playback optical pickup.

- **The industry's fastest DVD playback speed (10×) and a 100-MHz bandwidth**
- **RF module-less, 70°C guaranteed**
- **Circularly polarized optical output for high playability**
- **Three-stage gain switching function**
- **Miniature 16-pin ceramic package**

The Industry's Fastest DVD Playback Speed (10×) and a 100-MHz Bandwidth

The SLK3001PE includes an ultrahigh-speed PDIC fabricated using Sony's newly-developed ultrahigh-speed high integration density bipolar process P-42B*1, and achieves a 100-MHz bandwidth. This allows this product to support the industry's highest DVD playback speed of 10×, and to generate the tracking error signal, the focus error signal, and the RF signal required of optical pickups. (See figure 2.) This device can respond to a wide range of needs in applications from DVD video to high-speed DVD-ROM drivers for computers.

*1: See pages 8 to 13 in this issue for more information on the P-42B process.

V O I C E

The laser coupler is a hybrid optical integrated device implemented in an ultrafine fabrication technology. This device allows the optical pickup to have a surprisingly simple structure, and thus increases system reliability. This device is an ambitious creation for a DVD playback product. I hope it will be used in many DVD players. I strongly recommend it.

RF Module-less, 70°C Guaranteed

This device includes a pulsation laser with the industry's highest guaranteed temperature, 70°C. (See figure 1.) The SLK3001PE is the RF module-less product and achieves reduced noise, miniaturization, and increased reliability over a wide temperature range. Since this device is the RF module-less product, no special measures for reduction of undesired radiation are required. The SLK3001PE can implement simple and low-cost optical pickups. (See figure 3.)

Circularly Polarized Optical Output for High Playability

The SLK3001PE incorporates a newly-developed low-cost 1/4-wavelength plate, and achieves circularly polarized optical output. In addition, since the internal optical system is an unpolarized optical system, this device not affected by variations in disc birefringence and thus can easily implement a high playability optical pickup. At the same time it achieves an even higher level of stability with respect to the return light noise.

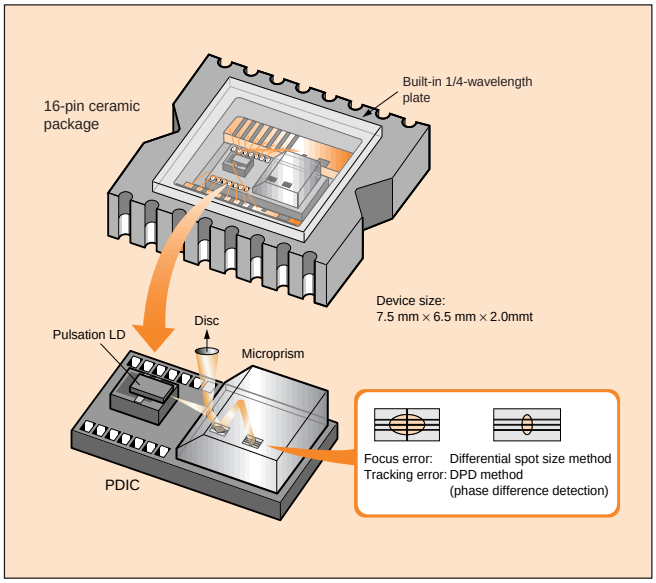
Three-stage Gain Switching Function

The PDIC used includes a three-stage gain switching function, and thus the SLK3001PE can handle the playback of three types of disc (single-layer DVD discs, dual-layer DVD discs, and super-audio CDs) while holding the laser output fixed. This allows the SLK3001PE to respond to a wide range of needs.

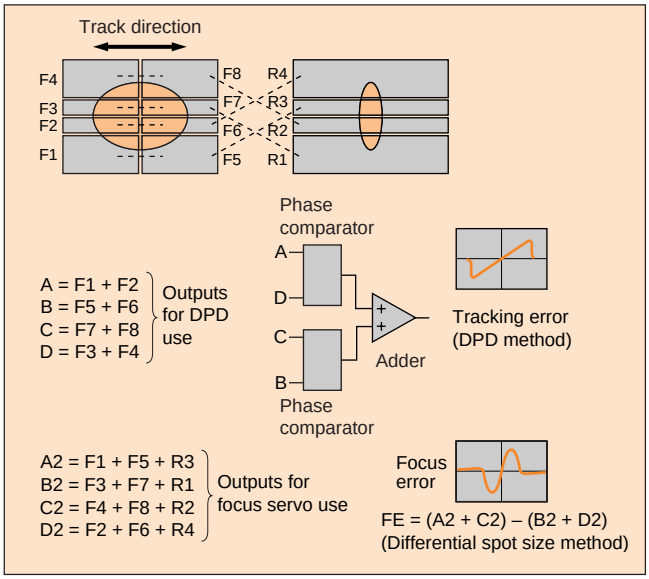
Miniature 16-pin Ceramic Package

The SLK3001PE achieves miniaturization and reduced cost by adopting a miniature thin-form ceramic package that is essentially the same size as Sony's CD laser couplers that have a proven track record as mass-produced products. (See figure 1.)

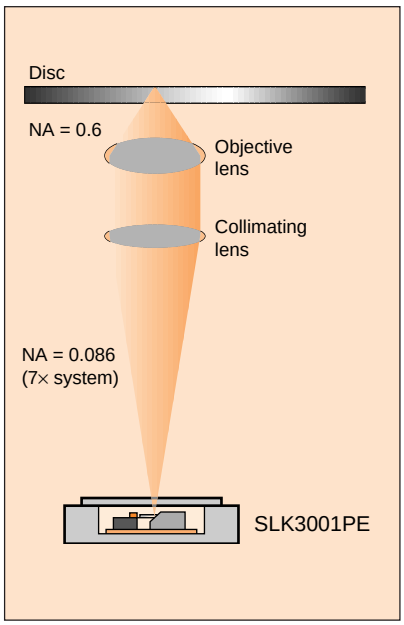
New Products



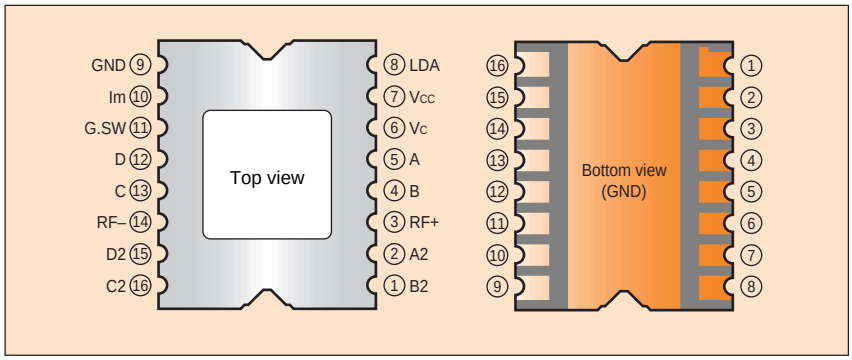
■ Figure 1 Device Structure



■ Figure 2 Servo Signal Calculation



■ Figure 3 Sample Optical Pickup Structure



■ Figure 4 Pin Configuration

■ Table 1 Main Specifications

Item	Symbol	Typical value	Unit
LD operating current	Iopo	75.0	mA
LD operating voltage	Vop	2.30	V
LD wavelength	λ	655	nm
Optical output	Po	1.2	mW
Relative intensity noise	RIN	Under-125	dB/Hz
Monitor PD current	Imon	0.1	mA
PDIC supply voltage	Vcc	5.0	V
	Vc	2.5	V
PDIC current consumption	Icc	20	mA
Frequency band	F	100	MHz
Operating temperature	Tc	–10 to +70	°C