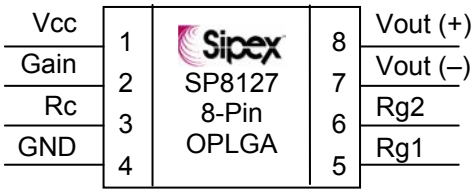
High Speed Differential APC Amplifier

FEATURES

- Dual wavelength 650 and 780nm
- 100 MHz Bandwidth
- 300 V/µs Slew Rate
- 5 ns Setting Time
- 10 mV Differential Output Offset Voltage
- 25 mV/°C Output Offset Voltage Drift
- -6/+6 dB External Gain Adjust
- Small 8-pin OPLGA package



APPLICATION

- CD-R, and CD-RW
- DVD+/-R, DVD+/-RW, and DVD-RAM

GENERAL DESCRIPTION

The SP8127 is a high-speed, differential output APC amplifier that integrates the photodiode and adjustable gain block on one chip. Independent gain control allows individual adjustment for 780mn and 650nm wavelength operation, as found in CD/DVD optical storage drives. This allows the user to control the laser power of the system in high-speed DVD+/-RW, DVD-RAM and CD-RW systems. The wide 2V output swing also allows better system performance, through improved dynamic range.

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ABSOLUTE MAXIMUM RATINGS

These are stress ratings only and functional operation of the device at these ratings or any other above those indicated in the operation sections of the specifications below is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

Supply Voltage (Vcc)……..6.0V
Reference Voltage (Vs) …… 6.0V
Output Voltage (Vout)…….…… Vcc
Junction Temperature (Tj)……120 °C
Storage Temperature……...-40°C to +100°C
Soldering Temperature……+235°C

RECOMMENDED OPERATING CONDITIONS

Supply Voltage (Vcc)……...4.5V to 5.5V
Operating temperature……-20C to +85°C
CD Wavelength……..……780nm
DVD Wavelength……..…….650nm

THERMAL SPECIFICATIONS

8-pin OPLGA (3 x 3.5mm) Package Thermal Resistance…… 75 °C/W

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ELECTRICAL/OPTICAL SPECIFICATIONS

Unless otherwise noted: Vcc = 5V, output load: R_L = 1kΩ, C_L = 20pF, gain 0 dB, ambient temperature -20C ≤Ta ≤ +85 ^oC

Parameter	Condition	Min.	Typ.	Max	Unit
Supply Current	Ta = 25 ^oC, no signal, no load		15		mA
	-20 ≤Ta ≤ +85 ^oC, no signal, no load			20	
Output Common Mode Voltage	No signal	Vcc/2.2	Vcc/2	Vcc/1.8	V
Output Offset Voltage	Gain = 0dB, no signal	-10		10	mV
	Gain = +6dB, no signal	-20		20	
Output Offset Voltage Drift	Gain = 0dB, no signal	-25		25	μV/^{o}C
	Gain = + 6dB, no signal	-50		50	
Power Supply Rejection Ratio (PSRR) *	Gain = 0dB, 4.5V ≤ Vcc ≤ 5.5V	55	76		dB
Output Sensitivity	Gain = 0dB	4560	5700	6840	V/W
Input Optical Power required to produce a 2V differential output swing	***0.28mm*** laser beam diameter, uniform density, Gain = 0dB		263		μW
Photo Detector Active Area			0.098		mm^2
Output Settling Time	Gain = -6dB, 2Vpp step		5	7	ns
	Gain = 0dB, 2Vpp step		6	9	
Full Scale Output Voltage Swing	Differential voltage = (V+) – (V-)	2			V p-p
Bandwidth	Gain = -6dB, -3dB level	80	100		MHz
	Gain = 0dB, -3dB level	60	80		
Gain Adjust Range		-6		+6	dB

*) PSRR = 20log (ΔVcc/ΔVout)

**) Gain Linearity = (Gain2 – Gain 1)/Gain 1, where Gain = Vout/Pin. This test is done with current injection at the wafer level.

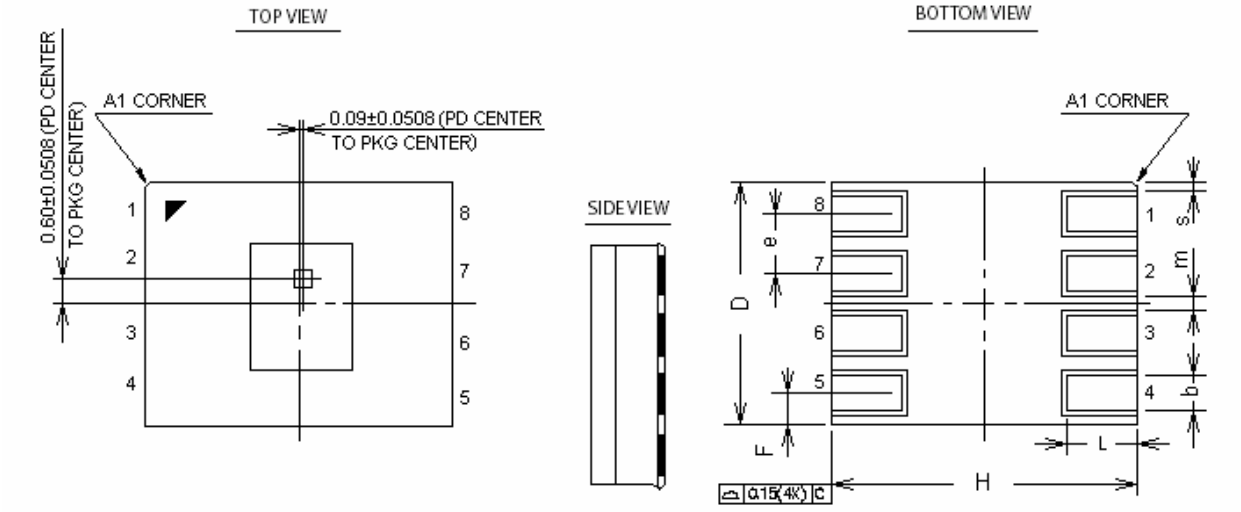
PIN ASSIGNMENTS

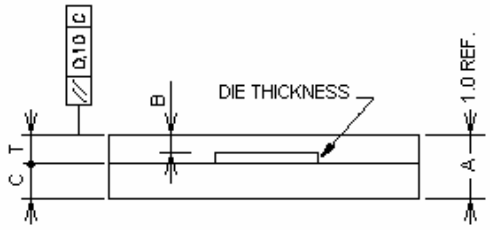
Pin #	Pin Name	Pin Function
1	Vcc	Supply Voltage. Bypass to GND with ceramic capacitor 0.1μF
2	Gain	Gain Switch Input. Low level selects Rg1, high level selects Rg2
3	Rc	Common connection point for Rg1 and Rg2
4	GND	Power Ground
5	Rg1	Gain Adjust 1
6	Rg2	Gain Adjust 2
7	Vout (–)	Output Voltage Negative Swing
8	Vout(+)	Output Voltage Positive Swing

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OPLGA 8-pin PACKAGE DIMENSIONS





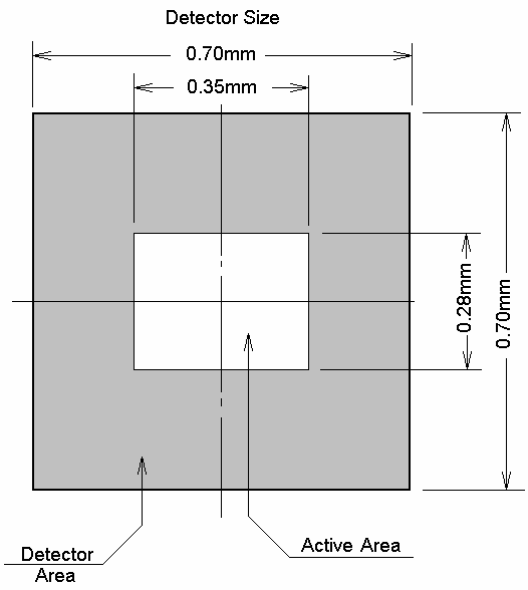
NOTE: DIE THICKNESS 0.2mm (8MIL)

SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.30	0.40	0.50
C	—	0.56	—
D	2.90	3.00	3.10
B	0.19		0.32
H	3.40	3.50	3.60
e	—	0.75	—
F	0.28	0.38	0.48
L	0.50	0.60	0.70
T	—	0.45	—
s	0.075	—	—
m	0.10	—	—

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PHOTO DETECTOR PATTERN



ORDERING INFORMATION

Part number	Temperature range	Package Type
SP8127DG	-20C + 85^{0}C	8-pin OPLGA

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