

# 42-DL313

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## *Optical Fiber Receiving IC*

## OPTICAL FIBER RECEIVING IC

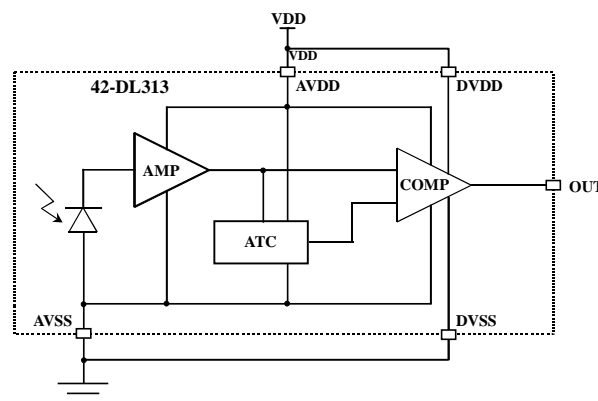
### GENERAL DESCRIPTION

42-DL313 receiver is designed for the application of high-speed optical fiber transmission. As an OEIC, 42-DL313 integrates photo sensor, ATC (Automatic Threshold Control) and signal processing circuit for high-speed application, and is fabricated by using CMOS technology. 42-DL313 is designed to operate by positive logic in which the output voltage is set to high level when optical flux is received.

### FEATURES

1. Low jitter ( $\Delta t_j$ : Typical 1ns)
2. High speed (Up to 13.2Mb/s, NRZ signal)
3. Built-in photo sensor and signal processing circuit.
4. Built-in ATC (Automatic Threshold Control) circuit used for stabilized output at a wide range of optical power level

### BLOCK DIAGRAM And APPLICATION CIRCUIT



### ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Item	Symbol	Rating	Unit
Supply Voltage	V <sub>DD</sub>	-0.5 to +7	V
Power dissipation	P	100	mW
Operating Temperature	T <sub>opr</sub>	-40 to +90	°C
Storage Temperature	T <sub>stg</sub>	-55 to +100	°C
High Level Output Current	I <sub>OH</sub>	-1	mA
Low Level Output Current	I <sub>OL</sub>	20	mA

### RECOMMENDED OPERATING CONDITIONS

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>DD</sub>	2.7	3.0	3.6	V
		4.75	5.0	5.25	V
Operating Temperature	T <sub>opr</sub>	-40	25	90	°C
High Level Output Current	I <sub>OH</sub>			-150	uA
Low Level Output Current	I <sub>OL</sub>			1.6	mA

### ELECTRICAL CHARACTERISTICS

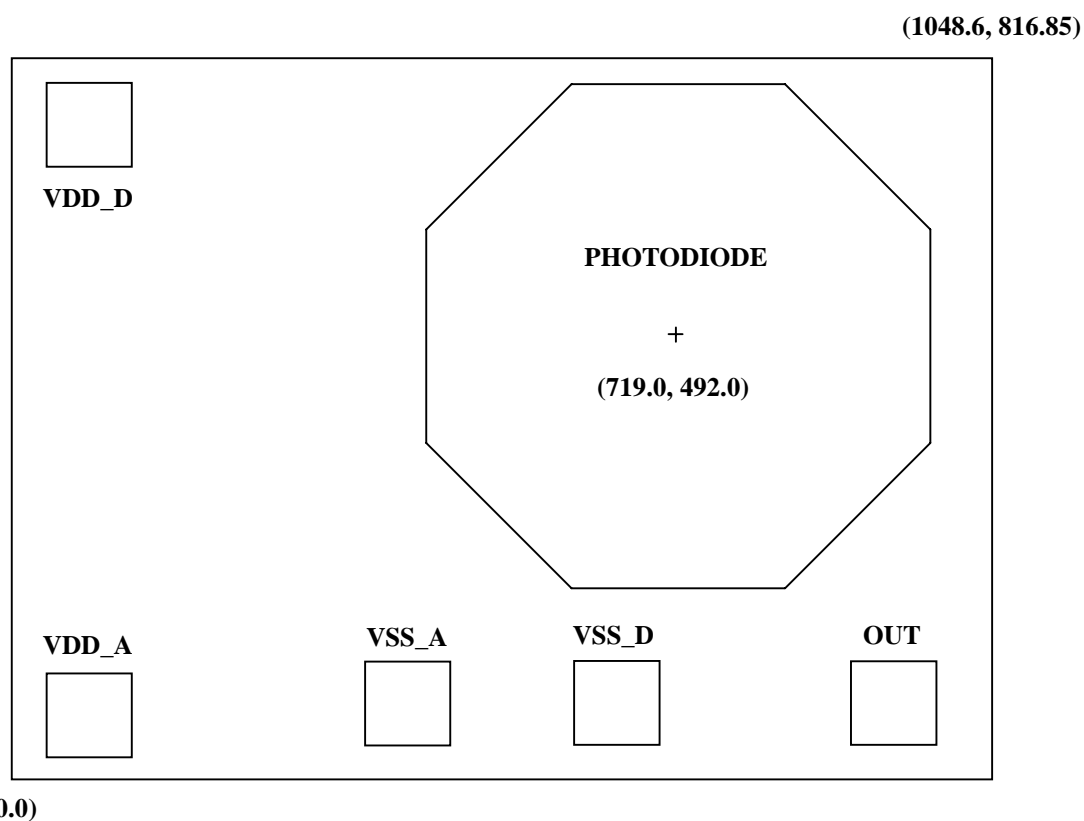
ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX	UNIT
Peak sensitivity wavelength	λ <sub>P</sub>	Room temperature (25°C)		700		nm
Maximum Input Optical Power for High level	P <sub>C,MAX</sub>	Input optical wavelength = 650nm	-17.5			dBm
Minimum Input Optical Power for High level	P <sub>C,MIN</sub>	V <sub>DD</sub> = 3V, Input optical wavelength = 650nm,			-27	dBm
		V <sub>DD</sub> = 5V, Input optical wavelength = 650nm,			-24.5	
Current Consumption	I <sub>DD</sub>	V <sub>DD</sub> =3V, no input		2		mA
		V <sub>DD</sub> =5V, no input		3		
High Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -0.15mA	2.4		V <sub>DD</sub>	V
Low Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> = -1.6mA	0		0.4	V
Rise Time	T <sub>r</sub>	V <sub>DD</sub> = 3V, C <sub>L</sub> = 10pF		7.5	10	ns
		V <sub>DD</sub> = 5V, C <sub>L</sub> = 10pF		5	6	
Fall Time	T <sub>f</sub>	V <sub>DD</sub> = 3V, C <sub>L</sub> = 10pF		7.5	10	ns
		V <sub>DD</sub> = 5V, C <sub>L</sub> = 10pF		5	6	
Pulse Width Distortion (note.1)	Δtw	Pulse frequency = 6.6MHz C <sub>L</sub> = 10pF	-7.5		7.5	ns
Jitter	Δt <sub>j</sub>	P <sub>C</sub> = -17.5dBm		1	5	ns
		P <sub>C</sub> = -27dBm, V <sub>DD</sub> = 3V		3	10	
Data Rate	F <sub>DATA</sub>	NRZ Code, Duty = 50%	0.1		13.2	Mb/s

Note.1 Between input of an optical fiber transmitting module and output of 42-DL313.

## PAD DESCRIPTIONS

Pad Name	Size ( $\mu\text{m}$ )	Center Coordinate ( $\mu\text{m}$ )	I/O	Description
VDD_A	100×100	(84.7, 75.0)	Power	Analog Power
VDD_D	100×100	(84.7, 743.15)	Power	Digital Power
VSS_A	100×100	(443.4, 87.4)	Ground	Analog Ground
VSS_D	100×100	(659.4, 87.4)	Ground	Digital Ground
OUT	100×100	(938.1, 87.4)	Output	TTL Output

## DIE CONFIGURATION (in $\mu\text{m}$ )



**Die Size:** 1048.6 $\mu\text{m}$ ×816.85 $\mu\text{m}$

**PD Size:** 250000 $\mu\text{m}^2$ ×1

**The Center Coordinates of PD:** (719.0 $\mu\text{m}$ , 492.0 $\mu\text{m}$ )

\* **Note:** SiTI reserves the right to alter the device geometry and manufacturing processes without prior notice. Though these alterations may result in geometrical changes, they will not affect die electrical characteristics and pad layouts in any sense.

## REQUIREMENTS FOR WAFER DELIVERY

- Material : Silicon with P-Substrate
- Diameter : 6 inches(≐15cm)
- Thickness : 12 mils(≐300um)
- Scribe Line Width : 110um
- Malfunctioned die : Marked with red ink or equivalent marking

## HANDLING RECOMMENDATION FOR STATIC ELECTRICITY PROTECTION

- (1) Avoid any circumstance that produce static electricity, e.g. rubbing against plastic, during moving, storing and processing 42-DL313.
- (2) Process 42-DL313 in a clean room with proper temperature and humidity.
- (3) Ground all working machines and workers wear anti-electrostatic ring to ground during processing.
- (4) Avoid contact 42-DL313 with bare hands .If unavoided, wear anti-electrostatic ring and use anti-electrostatic tool to pick it up.

## GUARANTED TEMPERATURE AND RETENTION CYCLE

- (1) The device/wafer 42-DL313 should be stored in the nitrogenous chest. The conditions suggested are as follows:
  - Temperature =  $23\pm 3^{\circ}\text{C}$
  - Relative Humidity =  $50\pm 10\%$
  - Minimum nitrogen inflow = 3 liters/minute
- (2) If the device/wafer, 42-DL313 is incidentally exposed to the air, use it for manufacturing as soon as possible.
- (3) Under the storage environment specified in item (1), six-month safe storage period is guaranteed.



The products listed herein are designed for ordinary electronic applications, such as electrical appliances, audio-visual equipment, communications devices and so on. Hence, it is advisable that the devices should not be used in medical instruments, surgical implants, aerospace machinery, nuclear power control systems, disaster/crime-prevention equipment and the like. Misusing those products may directly or indirectly endanger human life, or cause injury and property loss.

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