R6xxxx Serial

Six-channel incremental encoder chip

Data Sheet

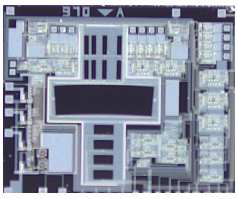
Description:

R6xxxx series is a high performance, low cost, six-channel incremental encoder chip. It integrates precision grating phase array internally. With a high collimated light source and code wheel, it can sense rotary information of the servo motor. If a good parallel light source is used, the chip can be easily installed with a large tolerance.

R6xxxx series is designed with optical center as 14.5mm and 11.2mm, standard CPR for 1250, and 2500. In this way, clients' installation is simple and will be convenient for mass production.

The index (Z) signal of the device provides 1 pulse (1T) width, 0.5 pulse (0.5T) width, and 1/4 pulse (1/4T) width.

The A/B signal of device has two times interpolation function, which makes it easy to obtain 5000CPR, simplifying complex process and improving production efficiency.



Features:

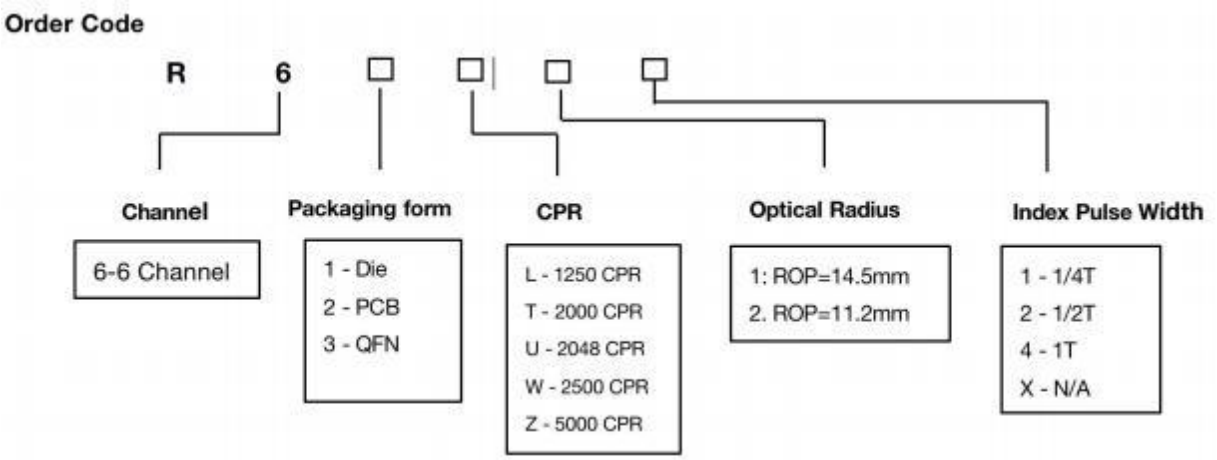
- Photodetector Array
- Pulse: 1024—5000PPR
- Low Cost
- -40 ^{O}C-- +105 ^{O}C Operating Temperature
- No Signal Adjustment Required
- Optional Z Pulse Width
- TTL Compatible
- Single 5V Supply

Applications:

Servo Motor

Note: Not recommended for use in safety critical application. Eg. ABS braking system.

Model information



Absolute Maximum Ratings

Storage Temperature	Ts		**-40 °C ---- +105 °C**
Operating Temperature	TA		**-40 °C ---- +105 °C**
Supply Voltage	Vcc		-0.5V ---- 7V
Load Capacitance	CL		<100pF
Response Frequency	f		500KHz

Recommended Operating Conditions

Operating Temperature	T		**-40 °C ---- 105 °C**
Supply Voltage	Vcc	Ripple voltage<100mV	4.5V ---- 5.5V
Output Voltage	Vo		-0.5v ---- Vcc
Output Current per Channel	Iout		-0.1mA----3.5mA

Electrical Characteristics

Electrical Characteristics over Recommended Operating Range,Typical at 25⁰ C

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Received optical power	P_{RL}	200		2000	μW	
Wavelength	λw	630		860	nm	
Supply Current	I_{cc}		55	65	mA	
Low Level Output Voltage	V_{OL}		0.4	0.5	V	*2kΩ Pull-up inside*
High Level Output Voltage	V_{OH}	4	4.8		V	*2kΩ Pull-up inside*
A/B Rise Time	t_r		100		ns	*2kΩ Pull-up inside*, CL=8PF
A/B Fall Time	t_f		50		ns	*2kΩ Pull-up inside*, CL=8PF

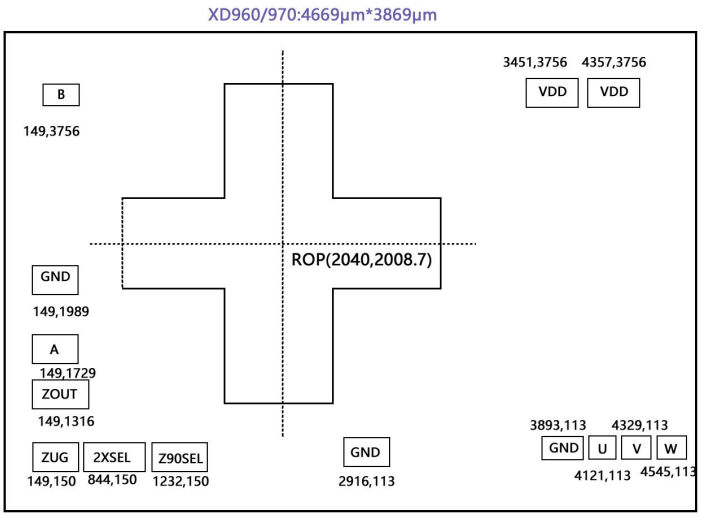
Die information

R6xxx six-channel series die size and other information is as follows.

Dimensions 4669μm x 3869μm

Optical center (A,B code channel center) position (2040,2008.7)

Below are the coordinates of bonding pads for dies.



Pin Definitions and Functions

（Clockwise direction）

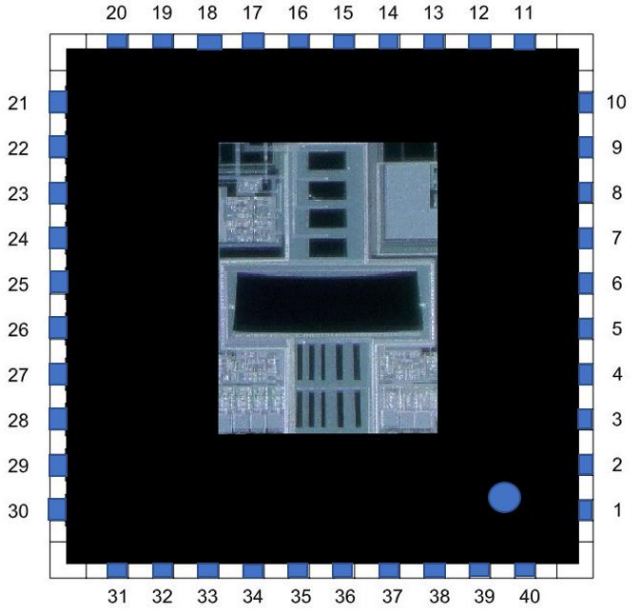
Pin Name	Function	Input/Output
VDD	Power supply +，5V	Power Supply
W	W Channel Output	Output
V	V Channel Output	Output
U	U Channel Output	Output
GND	Ground	Power Supply
Z90SEL	Index 1/4T output selection，enable for grounding	Input
2XSEL	2x interpolation selection, grounding indicates double frequency	Input
ZUG	Index ungated signal output	Output
ZOUT	Index gated signal output	Output
A	A Channel Output, 2kΩ Pull-up inside	Output
B	B Channel Output, 2kΩ Pull-up inside	Output

Note: both VDD chips need to be connected

Index Gated Signal Selection

2XSEL	Z90SEL	ZOUT	**ZOUT Logical Relationship**
High	**Low**	1/4T	**ZOUT=**(/A)*(/B)*ZUG
High	**High**	1/2T	ZOUT=(/B)*ZUG
Low	**Low**	1T	ZOUT=(/A)**ZUG
Low	**High**	1/2T	ZOUT=(/A)*(/B)*ZUG

QFN Packaging Information



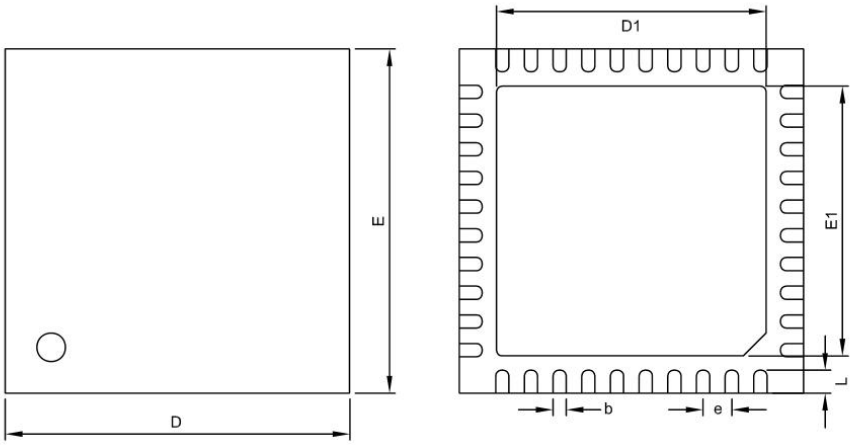
QFN The pin's arrangement is shown on the left. The pin's definition is as follows:

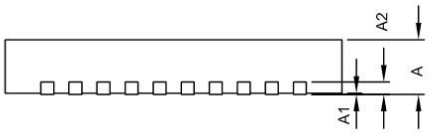
2: B
6: GND
7: A
8: ZOUT
11: ZUG
12: 2XSEL
13: Z90SEL
16: GND
17: GND
18: U
19: V
20: W
31: VDD
32: VDD

QFN optical center position of chip:

The AB center is the optical center, which is consistent with the mechanical center of QFN chip.

Mechanical dimensions:





Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.90	1.00	0.0315	0.0354	0.0394
A1	0.00	---	0.05	0.0000	---	0.0020
A2	0.19	0.20	0.21	0.0075	0.0079	0.0083
D	5.95	6.00	6.05	0.2343	0.2362	0.2382
E	5.95	6.00	6.05	0.2343	0.2362	0.2382
D1	4.55	4.65	4.75	0.1791	0.1831	0.1870
E1	4.55	4.65	4.75	0.1791	0.1831	0.1870
b	0.18	0.23	0.28	0.0071	0.0091	0.0110
e	0.50 BSC			0.0197 BSC		
L	0.35	0.40	0.45	0.0138	0.0157	0.0177

Design guidance of Code Wheel

For further code wheel design documents, please contact our sales.