

### GENERAL DESCRIPTION

The ICG-1020S and ICG-1021S dual-axis MEMS angular rate sensors are designed for optical image stabilization (OIS) applications in smartphone camera modules and other mobile devices.

The ICG-1020S provides small 2.3x2.3mm<sup>2</sup> package with 0.65mm thickness where the ICG-1021S offers the same performance in an extremely thin package with 0.5mm package height.

Both ICG-1020S and ICG-1021S support up to 32 kHz ODR for backward compatibility to other InvenSense dedicated OIS gyroscope products. This device provides extremely low RMS noise as well as noise density.

The high-resolution gyros support a programmable full-scale range of  $\pm 46.5$  dps to  $\pm 374$  degrees/sec, fast sample rate at up to 32 KHz, low phase delay including a fast 20 MHz SPI interface, very low rate noise at 4 mdps/VHz, and extremely low power consumption at 2.5 mA. Precise sensitivity control allows a calibration-less strategy for gyroscope to save production cost and time by eliminating the shake table.

### ORDERING INFORMATION

PART	AXES	TEMP RANGE	PACKAGE
ICG-1020S+	X,Y	-40°C to +85°C	12-Pin LGA
ICG-1021S+	X,Y	-40°C to +85°C	12-Pin LGA

†Denotes RoHS and Green-Compliant Package

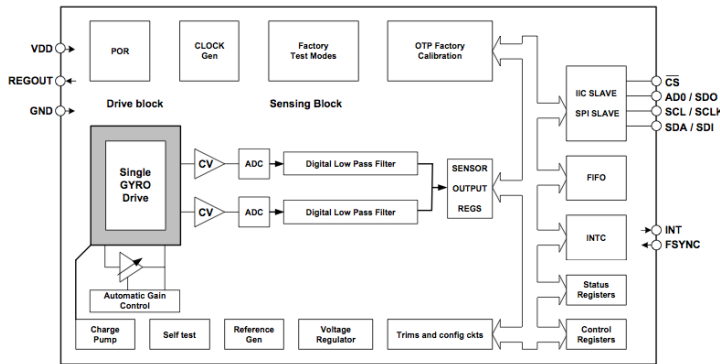
### APPLICATIONS

- Smart Phone Camera Modules
- Digital Still Camera and Video Cameras
- High Resolution / Low Noise Applications

### FEATURES

- ICG-1020S: Small 2.3 x 2.3 x 0.65 mm LGA Package
- ICG-1021S: Thin 2.3 x 2.3 x 0.5 mm LGA Package
- Very Low 4 mdps/VHz Rate Noise
- Resistant to 36kHz to 40kHz ultrasonic wash frequencies
- Drop-in replacement for IDG-2030U
- Extremely tight sensitivity eliminates OIS dynamic calibration
- DLPF with 40, 80, 160, 250 and 500 Hz settings
- Programmable high-pass filters at 0.05 to 10 Hz to remove offset drift due to temperature & PCB warp
- Independent ODR v. LPF selection for the most optimized performance
- Narrow FSR Range from  $\pm 46.5$  dps to  $\pm 374$  dps
- High Resolution at up to 700 LSB/(°/s)
- Fast Start Up Time; Sleep to Ready at 25 ms
- SPI (3 & 4 Wire) Interface
- Fast 20 MHz SPI Interface
- Temperature sensor for offset temp compensation
- Wide 1.71 V to 3.6 V Supply Voltage Range
- Low 5 mW Active Power & 6µA Sleep Mode
- Self-test allows quick gyro functionality check
- High 10,000g Shock Survivability

### BLOCK DIAGRAM



### TYPICAL OPERATING CIRCUIT (TOP VIEW)

