

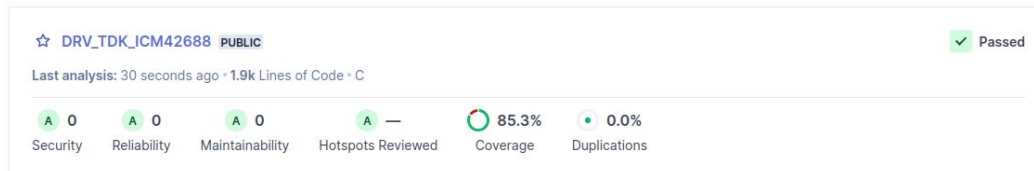
TDK ICM-42688 :: 6-axis IMU

The [TDK ICM-42688](#) is a 6-axis MEMS motion tracking device that combines a 3-axis gyroscope and a 3-axis accelerometer. It has a configurable host interface that supports serial I3C, I2C and SPI communication (default). The device has a 2 kB FIFO and 2 programmable interrupts with ultra-low power wake-on-motion support to minimise system power consumption.

The ICM-42688-P supports a highly accurate external clock input that helps reduce system-level sensitivity errors, improve orientation measurement from gyroscope data, and reduce Output Data Rate (ODR) sensitivity to temperature and device drift.

The software is architected with long-term maintainability, portability across MCU platforms, and adherence to high software quality standards as core design principles.

- ✔ Layered architecture with clear HAL abstraction
- ✔ Conforms to ISO C99 standard
- ✔ Portable across multiple MCU platforms
- ✔ Supports both RTOS and bare-metal environments
- ✔ CMake build system for scalable integration
- ✔ Seamless integration with GCC toolchain
- ✔ Statically analyzed for MISRA, CERT, and CWE compliance



Initialization Interface

```
icm42688_result_t icm42688_init( icm42688_handle_t*, ... )
```

Configuration Interface

```
icm42688_result_t icm42688_set_config( icm42688_handle_t*, ... )
icm42688_result_t icm42688_set_power_mode( icm42688_handle_t*, ... )
icm42688_result_t icm42688_set_mode( icm42688_handle_t*, ... )
icm42688_result_t icm42688_calibrate_accel( icm42688_handle_t*, ... )
icm42688_result_t icm42688_calibrate_gyro( icm42688_handle_t*, ... )
```

Data Retrieval Interface

```
icm42688_result_t icm42688_get_device_info( icm42688_handle_t*, ... )
icm42688_result_t icm42688_get_config( icm42688_handle_t*, ... )
icm42688_result_t icm42688_read_imu( icm42688_handle_t*, ... )
icm42688_result_t icm42688_read_accel( icm42688_handle_t*, ... )
icm42688_result_t icm42688_read_gyro( icm42688_handle_t*, ... )
icm42688_result_t icm42688_read_temp( icm42688_handle_t*, ... )
```

Self-Test Interface

```
icm42688_result_t icm42688_accel_self_test( icm42688_handle_t* )
icm42688_result_t icm42688_gyro_self_test( icm42688_handle_t* )
```

Communication Interface:

SPI