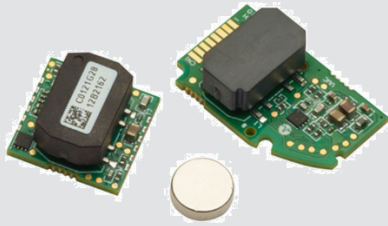


## Product Brief



### Key Features

- Patented Energy Harvesting technology
- 39-bit revolutions count
- Hollow shaft option supports outer diameter Ø60 mm to Ø90 mm
- Blind hollow shaft option supports typical outer diameter Ø35mm
- Synchronization over serial peripheral interface (SPI) at 2.5 MHz to 10 MHz clock rate
- Operating temperature range -40°C to 115°C
- Easy integration when paired to the Broadcom AR25 absolute single-turn (ST) encoder
- RoHS compliant

### Applications and Benefits

- MT integration with a user's single-turn solutions
- No battery or capacitor required for position detection during power failure
- Immediate position detection on power up
- Robust environment

# QP39 Series

## Energy Harvesting Multi-Turn Counter PCBA Solution

### Overview

The QP39 Series is an absolute multi-turn PCBA module produced based on the Broadcom proprietary Energy Harvesting (EH) technologies. The EH Multi-Turn (EHMT) offers batteryless and non-gear based solutions, eliminating the need for maintenance and contamination prevention.

The beauty of the EH effect is that the same amount of energy is generated independent of the rotation speed. The generated energy is sufficient to power the revolution tracking circuitry. Hence, revolution counts are ensured even in the absence of an external power supply.

The QP39 offers 39 bits of multi-turn (MT) resolution output with an industry-standard SPI communication protocol, providing great flexibility to interface with a single-turn host.

It is also designed to operate under the harsh industrial grade temperature of -40°C to 115°C.

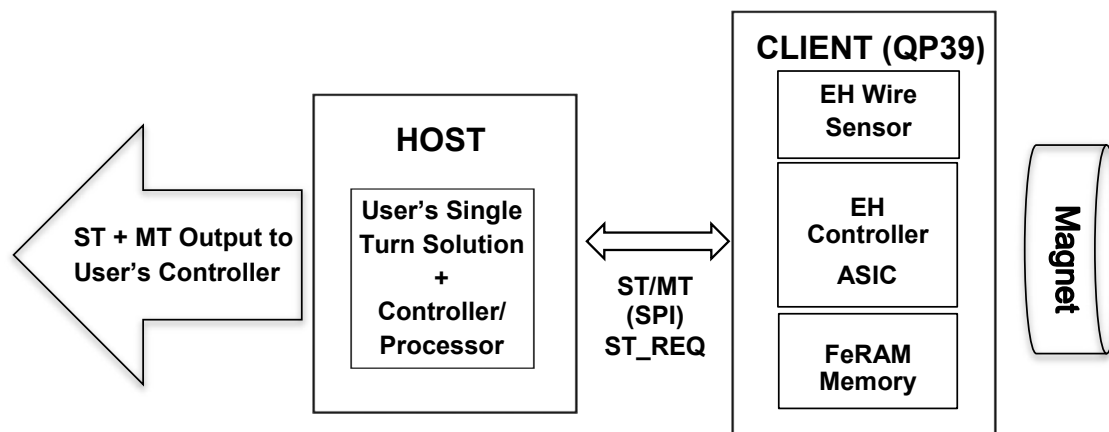
### Ordering Information

QP39-T254-S00	39-Bit EHMT PCBA, Through Hollow Shaft with SPI 4 Wires Protocol
QP39-B154-S00	39-Bit EHMT PCBA, Blind hollow Shaft with SPI 4 Wires Protocol

**NOTE:** This product is not specifically designed or manufactured for use in any specific devices. Customers are solely responsible for determining the suitability of the product for its intended application and solely liable for all loss, damage, expense, or liability in connection with such use.

## Block Diagram

Figure 1: QP39 Block Diagram



NOTE: Magnet(s) are supplied by the users based on Broadcom recommended specifications.

## Product Specifications

Typical Specification and Operating Conditions		
Parameters	Specifications	Remarks
Operating Temperature	-40°C to 115°C	PCBA Junction Temperature <125°C
MT Counter ASIC	4 Wires SPI up to 10 MHz	
Number of Revolutions/Turns	39 bits (up to 549,755,813,888 revolutions)	Energy Harvesting Counter
Operating Voltage, VDD	5V ± 10%	
SPI I/O Voltage, VDD_IO	3.3V ± 0.3V or 5V ± 10%	
Maximum Shaft Rotational Speed (rpm)	12k RPM 9k RPM	Blind Hollow Shaft Option Through Hollow Shaft Option (60 mm OD)
Motor Shaft Material	Non-ferromagnetic material	
Recommended Magnet Material	Samarium-cobalt	
Recommended Magnet Dimension	OD 8 mm, Thickness 2.5 mm	1 piece for blind hollow design 2 pieces for through hollow design
Maximum External Magnetic Field	20 mT	Magnetic shield is needed.

## Mechanical Dimensions

Figure 2: QP39-T254-S00 Screw-Mount Hollow Shaft PCBA Through Hollow Package Dimensions

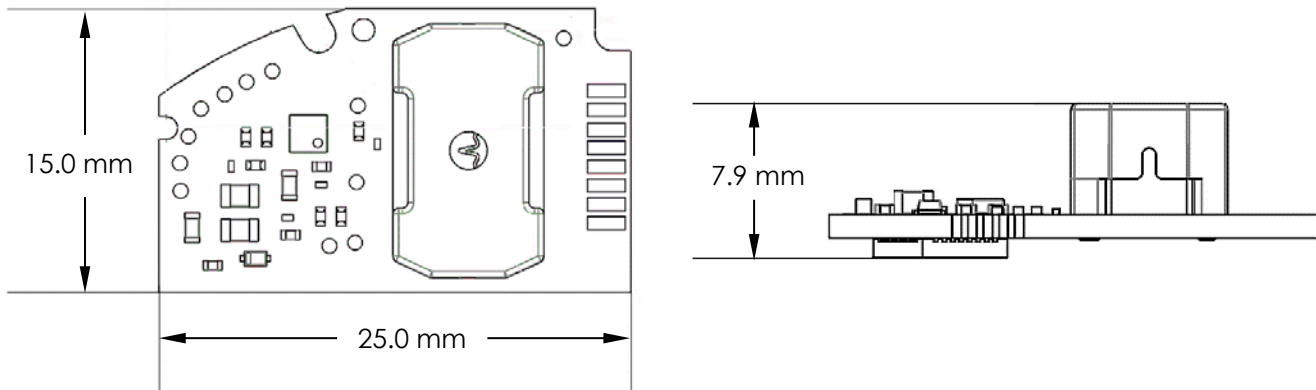


Figure 3: QP39-B154-S00 Surface-Mount (SMT) Blind Hollow Shaft PCBA Dimensions

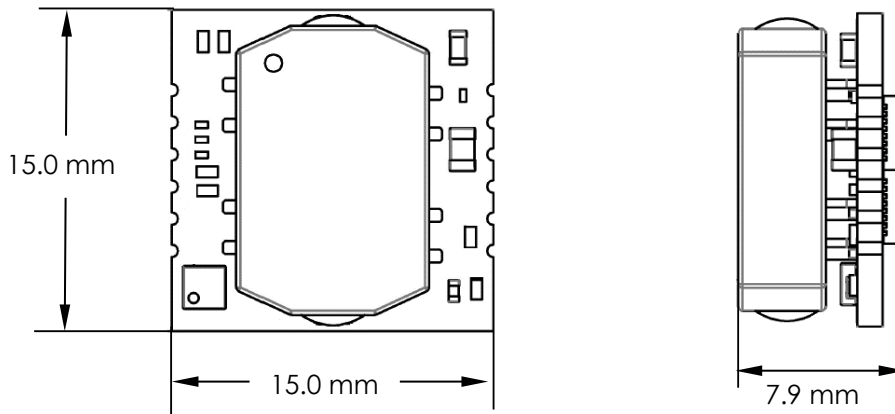


Figure 4: Examples of Blind Hollow Shaft Integration (a) and Through Hollow Shaft (b) Implementation

