Renesas RX13T MCU is an optimized single motor control solution to drive vector control/field oriented control (FOC) of the Permanent Magnet Synchronous Motor (Brushless DC Motor). RX13T has best-in-class built-in FPU (Floating Point Unit) at 32MHz and various built-in peripheral functions, such as the Programmable Gain Amp (PGA) with 6 level adjustable gain and Data Flash to help reduce board space and overall components needed. RX13T is available in small 32pin and 48pin QFP/QFN packages.

**Features**

- 32-bit RX MCUs, 32MHz, RXv1 core, up to 128KB Flash
- Low Power RXv1 Signature Core at 107.96 CoreMark
- Built in functions
  - FPU
  - PGA 3 channels with 6 level adjustable gain
  - Inverter Control Timer MTU3 operating at the same high-speed frequency as the CPU
- Vcc: 2.7 ~ 5.5V, High noise immunity at 5V

**Benefits**

- Reduce external components with On-chip peripheral functions
  - Data Flash up to 4KB
  - 3 channel PGA
  - 3 channel comparator
  - High speed on-chip oscillator (HOCO, accuracy of ±1.0%)
- Built-in FPU improve software readability and reduce code size
- Robust Protection Circuit stops the motor upon abnormal voltage detection
- Jump-start evaluation with CPU card consisting onboard emulators
- Evaluate motor-related application simply with CPU card and Motor RSSK (RTK0EMX270S00020B)
- Low pin count & small packages available
  - 32 pin LQFP/HWQFN, and 48 pin LFQFP/HWQFN

**Applications**

- Pump
- Fan Motor
- Small Motor in Robotics
- Low-end Motor Control
- Home Appliances
  - Refrigerator
  - Vacuum Cleaner
RX13T MCU GROUP

Block Diagram

RXv1 core 32-bit CPU with FPU

RX13T

Memory
- Code flash (128KB)
- SRAM 12KB
- Data flash (4KB)

Timers
- Multifunction timer pulse unit (MTU3c)
- Compare match timer

Safety Functions
- Register write protection unit
- Clock frequency accuracy measurement circuit

Analog
- 12-bit A/D converter 1 unit (3ch)
- 3ch simultaneous S&H
- Programmable gain amp (3ch)
- 8-bit D/A converter for CMP
- Comparator x 3ch

System, Power Management
- Interrupt controller
- 16 level 6pin + NMI
- On-chip oscillators
- Power-on reset
- Voltage detection circuit

Connectivity
- SCIg x 2ch, SCIh x 1ch
- I2C x 1ch

Security & Encryption
- Code protect (Flash Access Limited)
- Unique ID

Development Environment

Evaluation System for BLDC Motor
- Start Motor Control Development easily with the Evaluation System for BLDC Motor and RX13T CPU Card

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<td>MP</td>
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Renesas Motor Workbench 2.0
- Renesas Motor Workbench can display the waveform of internal microcomputer variables in real time and can automatically extract vector control parameters.

For more information about the Renesas RX MCU family, please visit: www.renesas.com/RX

Ordering References

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