



Technology(H.K.) Ltd.

General Description

The RC900E and RC908D chipset is designed for digital proportional radio controlled toy applications with 4 analog and 4 digital channels. RC900E is the encoder, and RC908D is the decoder.

RC900E has an 8-bit ADC accurately converting the speed and steering inputs into digital signals. The encoder assembles these digitized inputs and signals from the digital channels for transmission.

RC908D decodes the received data for the Proportional-Integral-Derivative (PID) controller, which also uses signals from the feedback state of the motors for system control. The outputs of RC908D are pulse-width modulated for motor driving.

Together RC900E and RC908D can support a wide variety of toy applications with simple design and low BOM cost.

Ordering Information

| Part # | Package | Operating Temperature Range |
|---------|----------|-----------------------------|
| RC900ES | SOP20 | -25 °C to +65 °C |
| RC900EC | Die Form | |
| RC908DF | PQFP44 | |
| RC908DC | Die Form | |

Key Features

RC900E

- 3.3V±0.3V operating voltage.
- 8-channel inputs: 4 analog and 4 digital channels.
- Built-in 8-bit ADC providing high accuracy in converting the speed and steering inputs to digital signals.
- Built-in low battery detector.

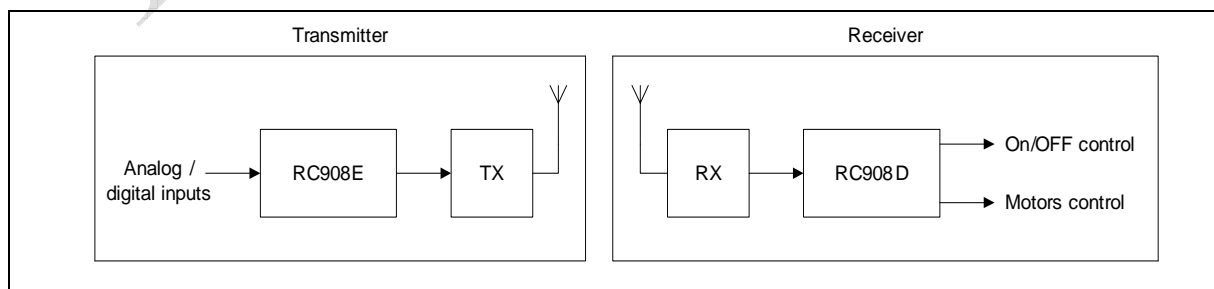
RC908D

- 3.3V±0.3V operating voltage.
- Built-in PID controller for efficient and optimal system control with adjustable PID parameters (Kp, Ki and Kd) for 2 servo controls.
- At least 64 steps motor speed control providing continuous acceleration and deceleration.
- At least 64 steps of steering control providing smooth and accurate left or right turn.
- Built-in 8-bit ADC providing accurate feedback of motor state to PID controller.
- 4-channel digital outputs and 4-channel (8-pin) PWM outputs.
- Adjustable PWM period for various motor sizes.
- Automatic power-down function when not receive any valid data over 600ms.
- Internal overload protection to meet safety specification.

Application

- Remote controller
- Remote control toy application such as car, boat, plane, helicopter and robotic etc.
- Remote control mechanical joint

Application Diagram





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Electrical Characteristics

Absolute Maximum Ratings

Under no circumstances the absolute maximum ratings given below should be violated. Stresses exceeding one or more of the limiting values may cause permanent damage to the device.

| Parameter | Symbol | Value | Unit |
|----------------------|--------|-------------|------|
| Analog Power Supply | AVDD | 3.6 | V |
| Digital Power Supply | DVDD | 3.6 | V |
| Ambient Temperature | Ta | -25 to +65 | °C |
| Storage Temperature | Tstg | -40 to +125 | °C |

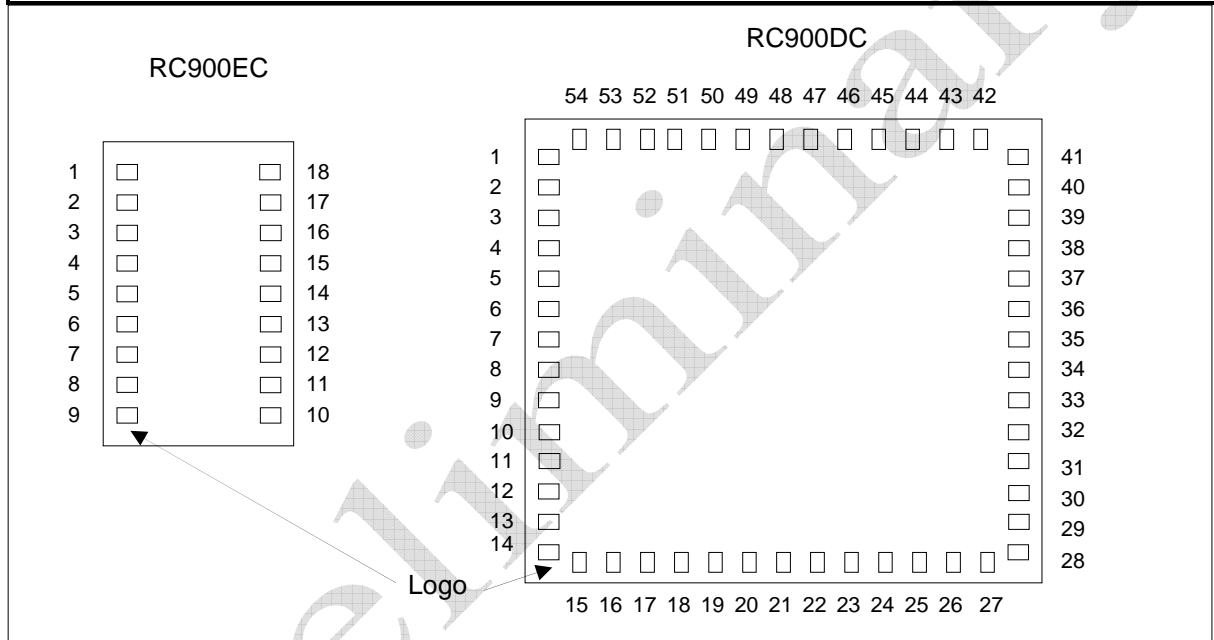
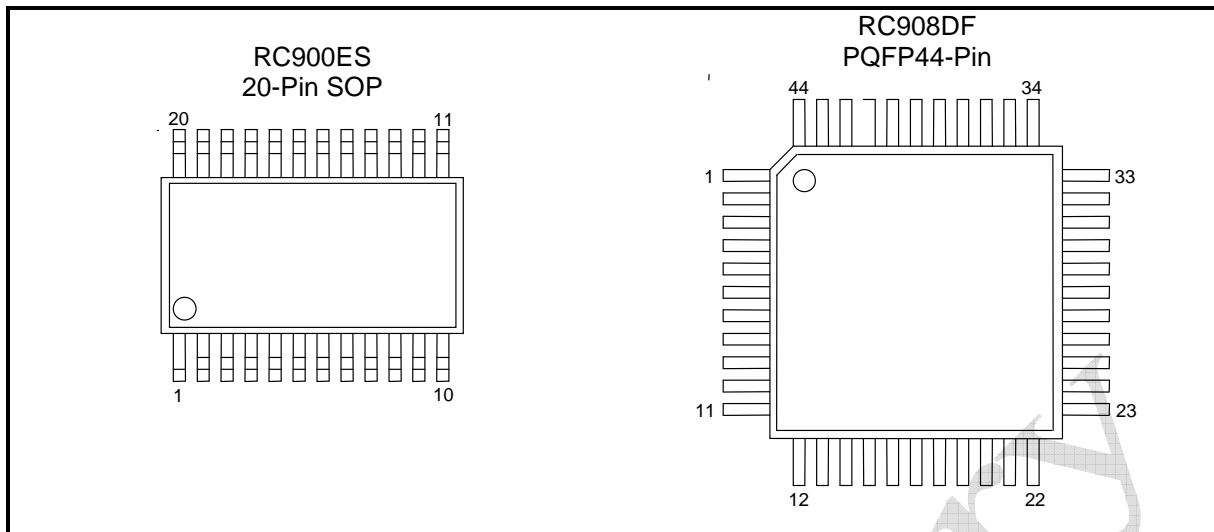
Recommended Operating Conditions

| Parameter | Symbol | MIN | TYP | MAX | Unit |
|-----------------------------|------------------|-----|-----|------|------|
| Operation Voltage (analog) | AVDD | 3 | 3.3 | 3.6 | V |
| Operation Voltage (digital) | DVDD | 3 | 3.3 | 3.6 | V |
| Input Voltage (analog) | V _{anl} | 0 | | 2.1 | V |
| Input Voltage (digital) | V _I | 0 | | DVDD | V |

DC Characteristics

| Parameter | Symbol | MIN | TYP | MAX | Unit |
|---|------------------|------------|-----|------------|------|
| Input Low Current | I _{IL} | -1 | | 1 | μA |
| Input High Current | I _{IH} | -1 | | 1 | μA |
| Tri-state Leakage Current | I _{OZ} | -10 | | 10 | μA |
| Input Low Voltage | V _{IL} | | | 0.3 * DVDD | V |
| Input High Voltage | V _{IH} | 0.7 * DVDD | | | V |
| Output Low Voltage (I _{OL} = 6 mA) | V _{OL} | | | 0.4 | V |
| Output High Voltage (I _{OH} = 6 mA) | V _{OH} | 2.3 | | | V |
| Input capacitance | C _{IN} | | 3 | | pF |
| Output capacitance | C _{OUT} | | 3 | | pF |

Pin Configuration



Pin Description

Pin Description of RC900E

| Pin | | Name | I/O | Description |
|-----|-----|---------|-----|---|
| SOP | Die | | | |
| 1 | 1 | RST | I | Reset (Low Active) |
| 2 | 2 | DVIN0 | I | Digital channel input, internally pulled down. (Low Active) |
| 3 | 3 | DVIN1 | I | Digital channel input, internally pulled down. (Low Active) |
| 4 | - | NC | - | NC |
| 5 | 4 | SERVO0 | I | Analog input (0<=AVIN<=VREF) for Servo 0 |
| 6 | 5 | DRIVER0 | I | Analog input (0<=AVIN<=VREF) for Driver 0 |
| 7 | 6 | SERVO1 | I | Analog input (0<=AVIN<=VREF) for Servo 1 |
| 8 | 7 | DRIVER1 | I | Analog input (0<=AVIN<=VREF) for Driver 1 |
| 9 | 8 | VREF | O | Reference output voltage of 2.06V as supply of four external variable resistors |



RC900E / RC908D Datasheet v0.1
Digital Proportional Remote Controller
4 Analog Channels and 4 Digital Channels

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| | | | | |
|----|----|-----------|---|---|
| 10 | 9 | VSS | - | Ground (-) |
| 11 | 10 | OUT_TO_RF | O | Encoded output (VL=0V, VH=2V, Maximum driving current 4mA) |
| 12 | 11 | OUT_CAP | I | External 330pF capacitor connection |
| 13 | 12 | LED_DRV | O | Low battery indication (open drain, maximum drain current is 6mA) |
| 14 | 13 | PWR_IN | I | Low battery detect comparator input |
| 15 | 14 | XO | O | 8MHz crystal oscillator output |
| 16 | 15 | XI | I | 8MHz crystal oscillator input |
| 17 | - | NC | - | NC |
| 18 | 16 | DVIN2 | I | Digital channel input, internally pulled down. (Low Active) |
| 19 | 17 | DVIN3 | I | Digital channel input, internally pulled down. (Low Active) |
| 20 | 18 | VCC | - | Power supply (+) |

Preliminary