

# RTC Module Power switching function

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MD Sales & Marketing Dept.

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# Comparison of Power switching function

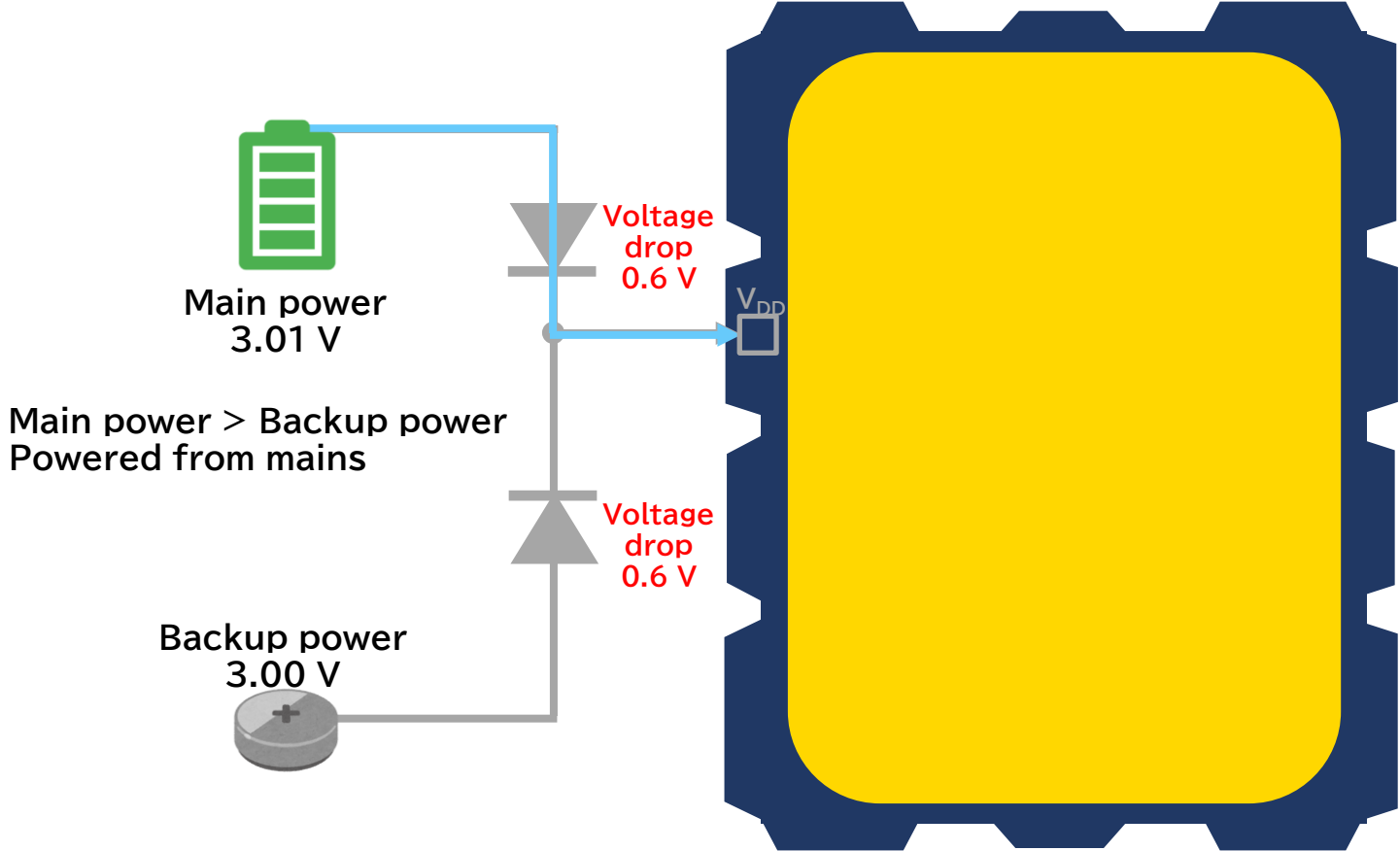
This is a comparison of Epson products that have a power switching function  
 There are differences in built-in parts and voltage monitoring depending on the product  
 From here, we will explain the differences in the configuration of power switching circuits

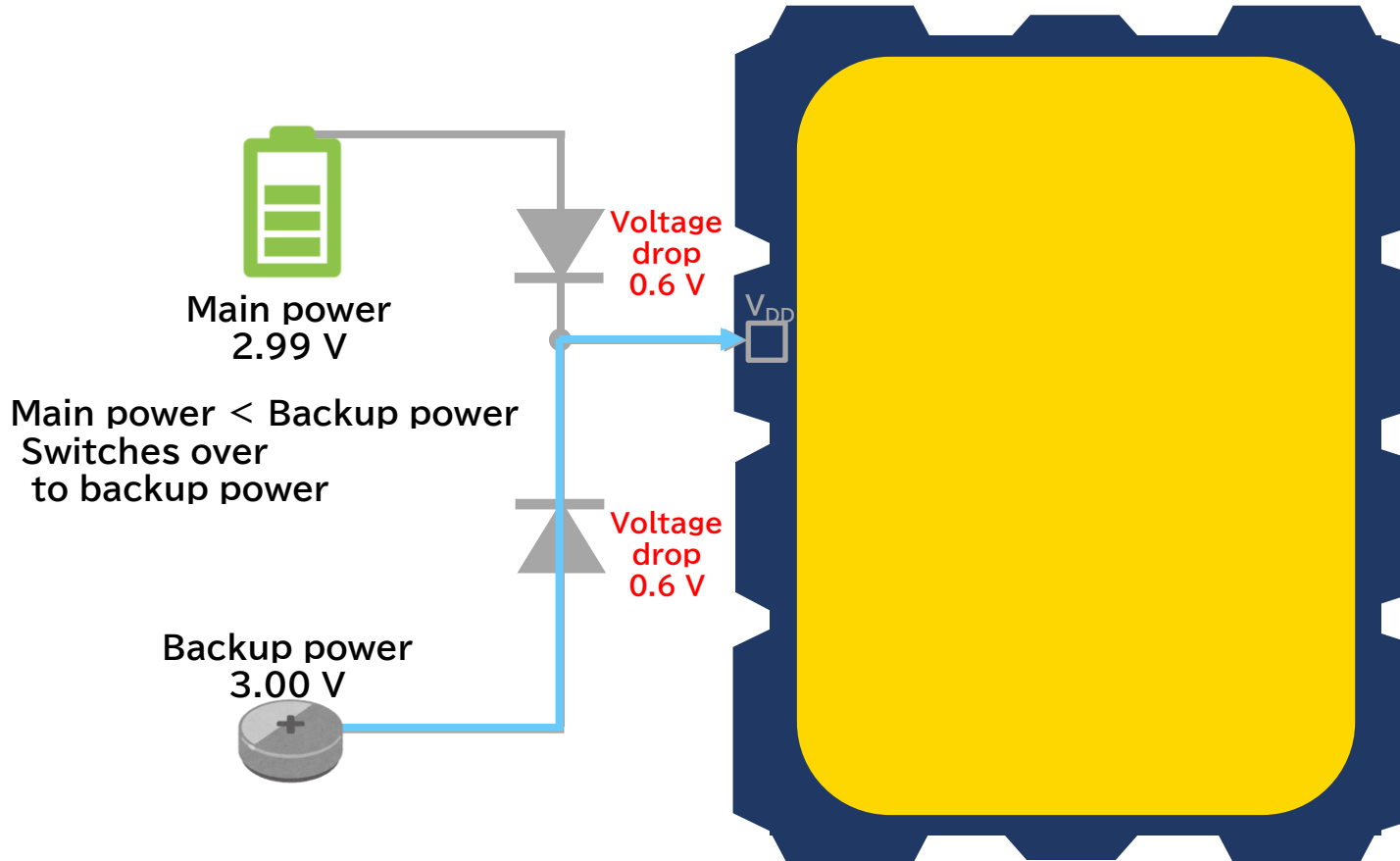
The video with commentary

		RX8130CE	RX8901CE RX4901CE	RX8111CE	RX4111CE	RX8900CE RA8900CE
When the backup battery is a primary battery	Switch voltage of $V_{BAT}$ from $V_{DD}$	Main power < 1.30 V	Main power < 1.45 V	Main power < 1.30 V	Main power < Backup power - Diode voltage drop	Main power < Backup power - Diode voltage drop
Backup power: Secondary battery full charge detection	Charge stop voltage	3 levels can be selected: 3.02V, 2.92V, 3.08V	-	-	-	-
Backup power: Detection of voltage drop in secondary battery	Recharge voltage	3 levels can be selected: 2.97V, 2.87V, 3.03V	-	-	-	-
Comparison of $V_{BAT}$ and $V_{DD}$	When $V_{DD} \leq V_{BAT}$ Charge stop	✓	✓	✓	-	-
Detection voltage of $V_{BAT}$ low	Low $V_{BAT}$ detection	✓	✓	✓	-	-
Diode	$V_{DD}$ side	Built-in	Built-in	Built-in	Built-in	Built-in
	$V_{BAT}$ side	Built-in	Built-in	Built-in	External	External

Note: Primary batteries are non-rechargeable batteries such as dry cell batteries and button batteries, while secondary batteries are rechargeable batteries such as lithium-ion batteries and NiCad batteries.

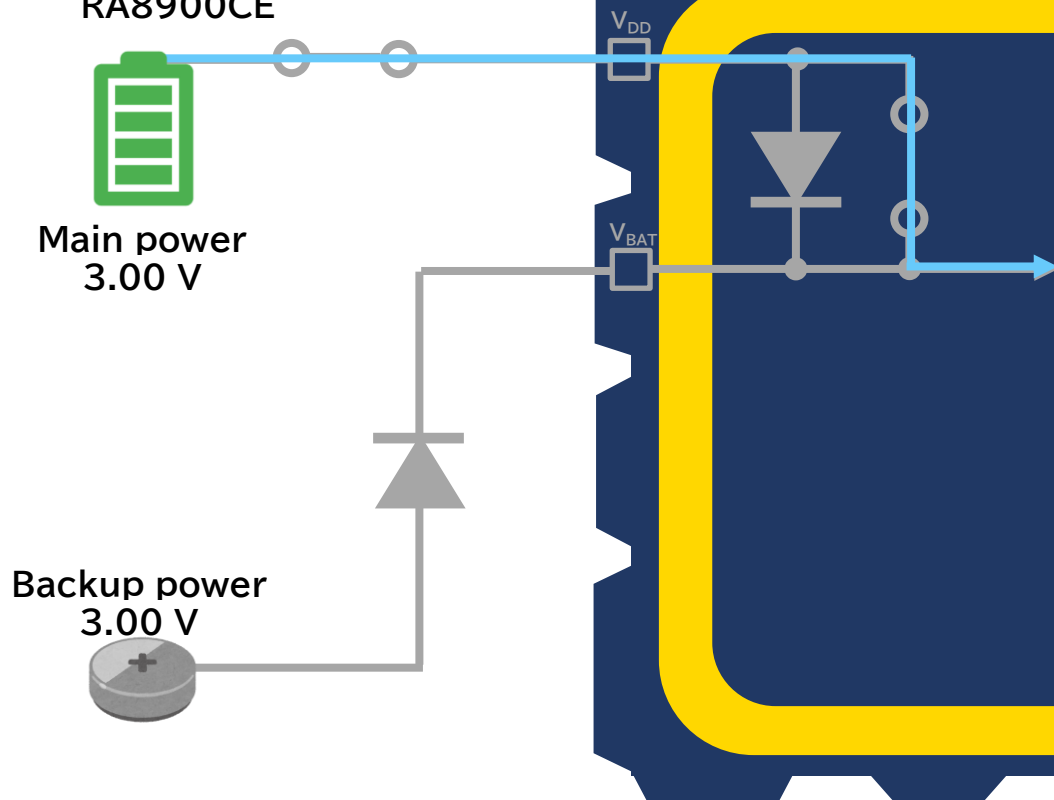
# Common power switching: Diode-OR circuit





# Power switching function

Targeted products  
RX4111CE / RX8900CE  
RA8900CE



Diode built-in only on the main power side

If the backup power source is a primary battery, an external diode is required to charge the primary battery and prevent fires, etc.

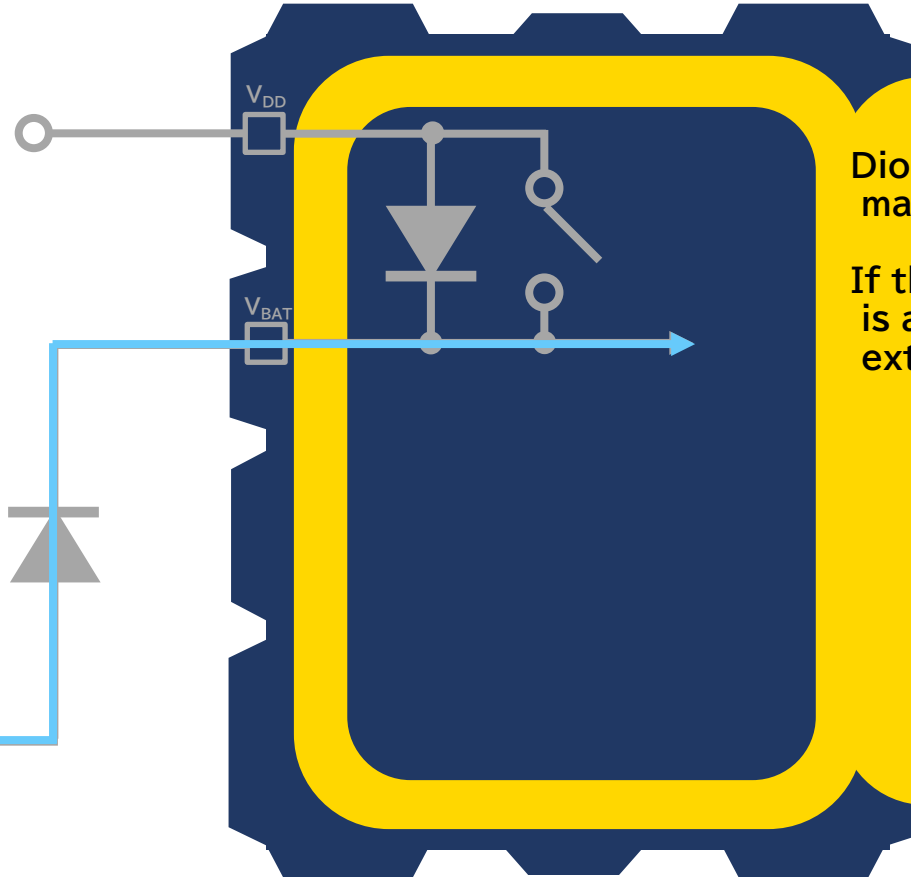
# Power switching function

Targeted products  
RX4111CE / RX8900CE  
RA8900CE



Main power  
3.00 V

Backup power  
3.00 V



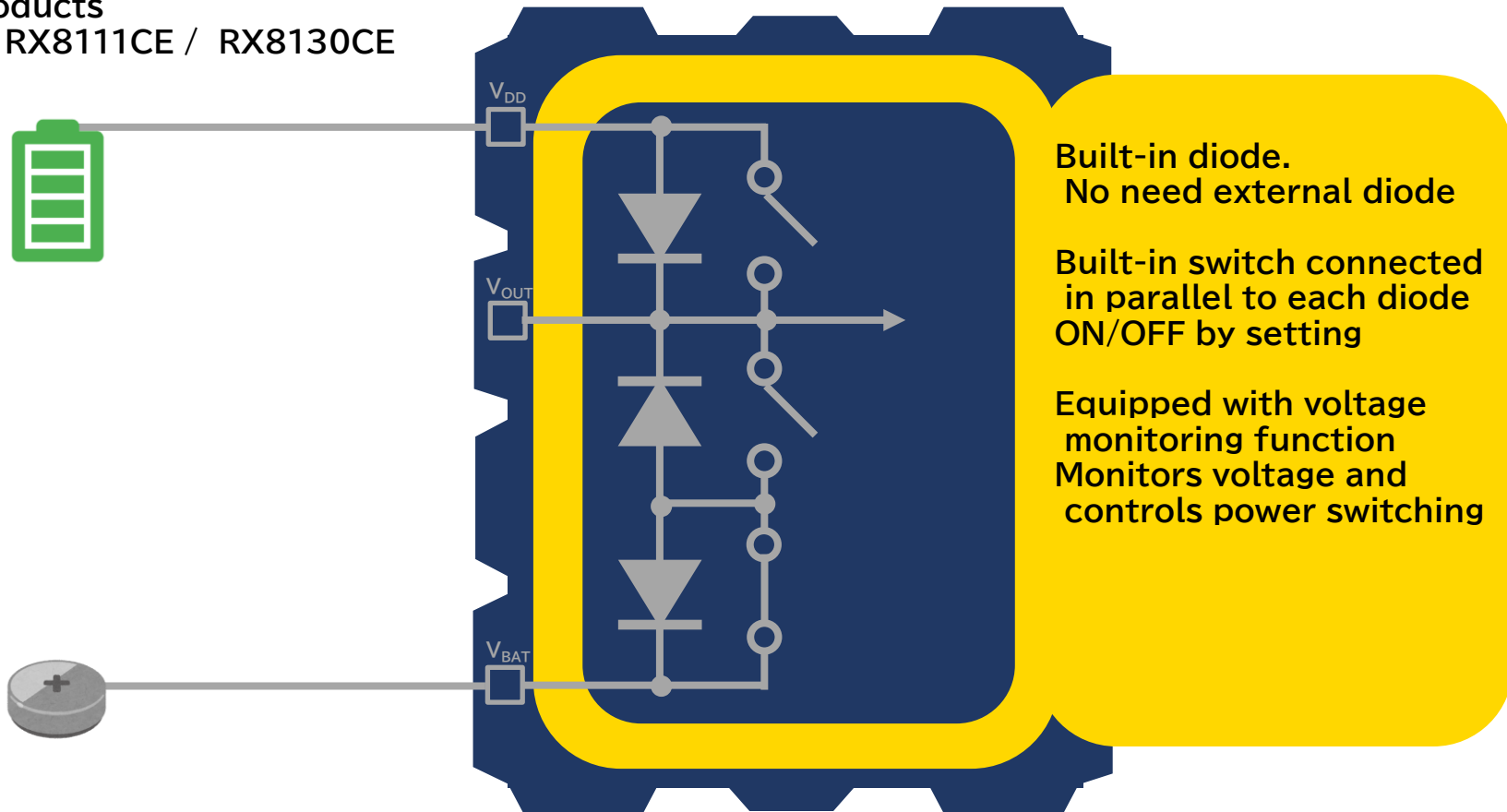
Diode built-in only on the main power side

If the backup power supply is a primary battery, external diode is required

# Power switching function

EPSON

Targeted products  
RX8901CE / RX8111CE / RX8130CE  
RX4901CE





# Power switching function

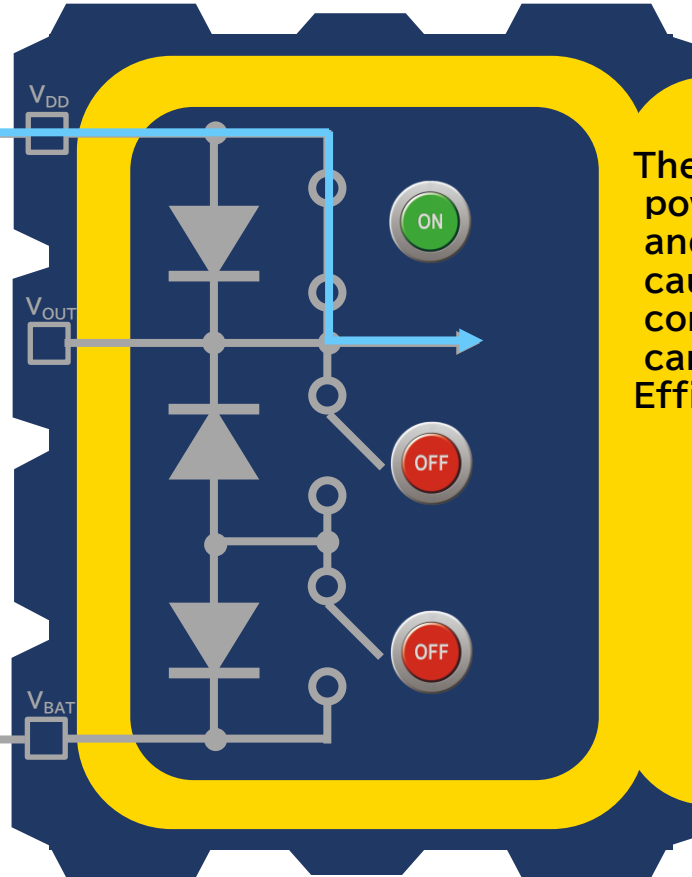
Targeted products  
RX8901CE / RA8111CE / RX8130CE  
RX4901CE



Main power  
3.00 V

Main power > 1.45 V \*1  
Powered from mains  
\*1: In case of RX8901CE

Backup power  
3.00 V



The switch on the main power side is turned on, and the voltage drop caused by the diode connected in parallel is cancelled  
Efficient power supply

# Power switching function

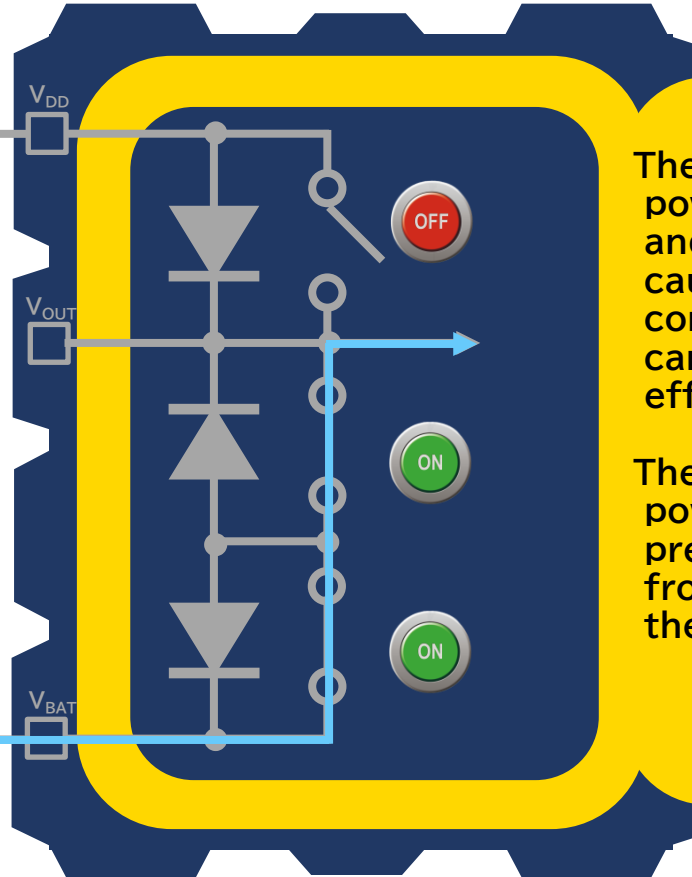
Targeted products  
RX8901CE / RA8111CE / RX8130CE  
RX4901CE



Main power  
1.44 V

Main power < 1.45 V \*1  
Switches over to backup power  
\*1: In case of RX8901CE

Backup power  
3.00 V

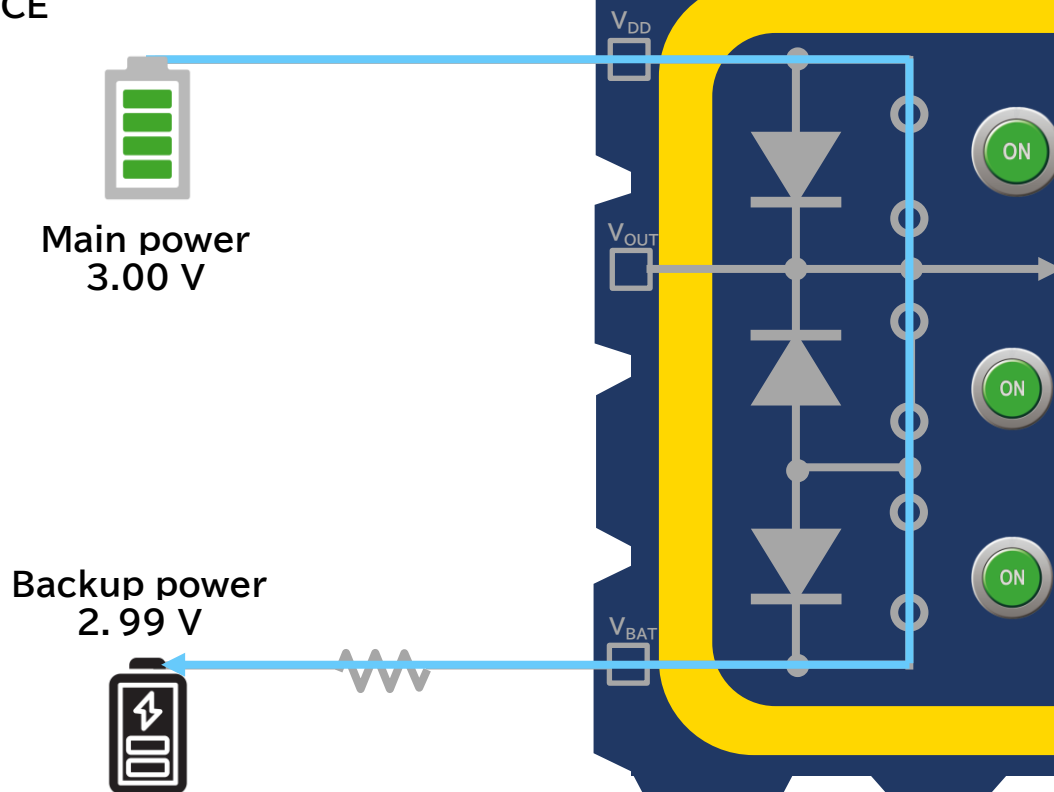


The switch on the backup power side is ON, and the voltage drop caused by the diode connected in parallel is cancelled, enabling efficient power supply

The switch on the main power side is OFF, preventing reverse current from the backup power to the main power

# Secondary Battery Charging

Targeted products  
RX8901CE / RA8111CE / RX8130CE  
RX4901CE



The switch on the main power side and the backup power side are ON

The backup power supply can be charged  
 $V_{DD} > V_{BAT}$  Recharge  
 $V_{DD} < V_{BAT}$  Charging stopped

RX8130CE allows you to select from three levels for recharge and charging stop voltage

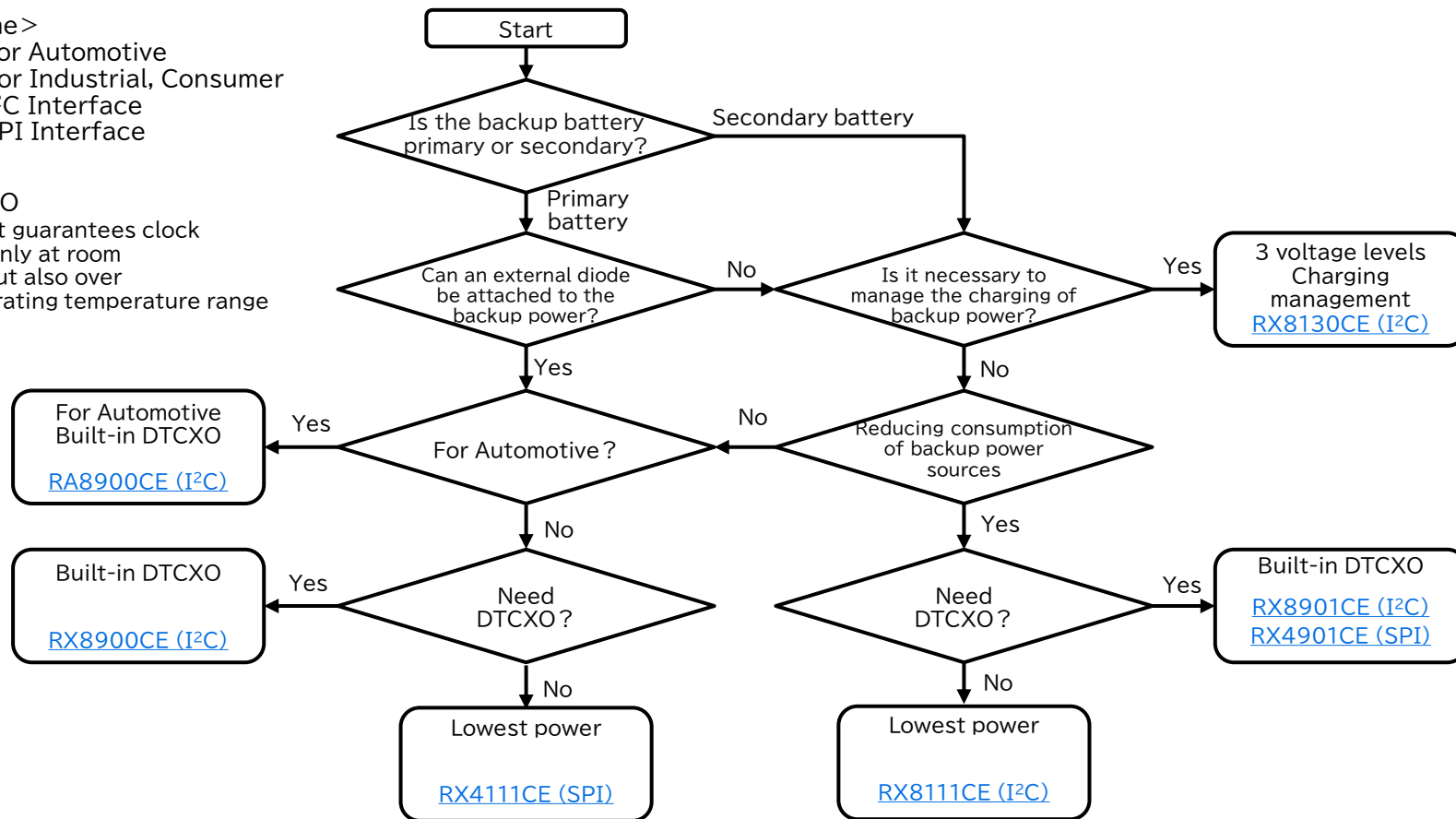
<Product name>

RA series For Automotive  
 RX series For Industrial, Consumer  
 8xxx series I<sup>2</sup>C Interface  
 4xxx series SPI Interface

<Feature>

Built-in DTCXO

A function that guarantees clock accuracy not only at room temperature but also over the entire operating temperature range



# RTC Module comparison table

Package size 3.2 x 2.5 mm

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Item	RX8901CE	RX4901CE	RA8000CE	RA4000CE	RX8804CE RA8804CE	RX8900CE RA8900CE	RX8111CE	RX4111CE	RX8130CE
DTCXO	✓	✓	✓	✓	✓	✓	-	-	-
Interface	I <sup>2</sup> C	SPI	I <sup>2</sup> C	SPI	I <sup>2</sup> C	I <sup>2</sup> C	I <sup>2</sup> C	SPI	I <sup>2</sup> C
Operating Temperature Max.	+105 °C	+105 °C	<b>+125 °C</b>	<b>+125 °C</b>	+105 °C	+85 °C	+105 °C	+105 °C	+85 °C
Backup current Typ. / 3 V	240 nA	240 nA	350 nA	350 nA	350 nA	700 nA	<b>100 nA</b>	<b>100 nA</b>	300 nA
Time stamp	<b>32 times (Max.)</b>	<b>32 times (Max.)</b>	2 times	2 times	1 time	-	8 times	8 times	-
EVIN pin	<b>2 or 3 pin</b>	0 or 1 or 2 pin	0 or 1 or 2 pin	0 or 1 or 2 pin	1 pin	-	1 pin	-	-
Power switching	✓	✓	-	-	-	✓ *Need external Diode for VBAT	✓	✓ *Need external Diode for VBAT	✓ Built-in backup battery charge control function
Reset output	-	-	✓ (optional)	✓ (optional)	-	-	-	-	✓
Automotive grade	-	-	Available	Available	Available RA8804CE	Available RA8900CE	-	-	-

Learn more about Epson's RTCs / Learn the basics of RTC modules, understand their main functions, and see application examples.

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