

STEP-UP/STEP-DOWN VFM DC/DC CONVERTER with VOLTAGE DETECTOR RS5RJ Series

■ OUTLINE

RS5RJ Series are compact DC/DC converter ICs with a voltage detector and are developed with CMOS process technology. The devices consist of a VFM type DC/DC converter, a series regulator and a voltage detector. As external components, a coil, a diode, and a capacitor are available for making the output constant. When the input voltage is sufficiently high, they work as series regulators. When the input voltage falls down, they work as step-up DC/DC converters. The RS5RJ series include a voltage detector and the output voltage can be detected. The chip enable can switch off the DC/DC converter and the voltage detector, and can save consumption current at standby state. The RS5RJ is fit for battery-operated equipment.

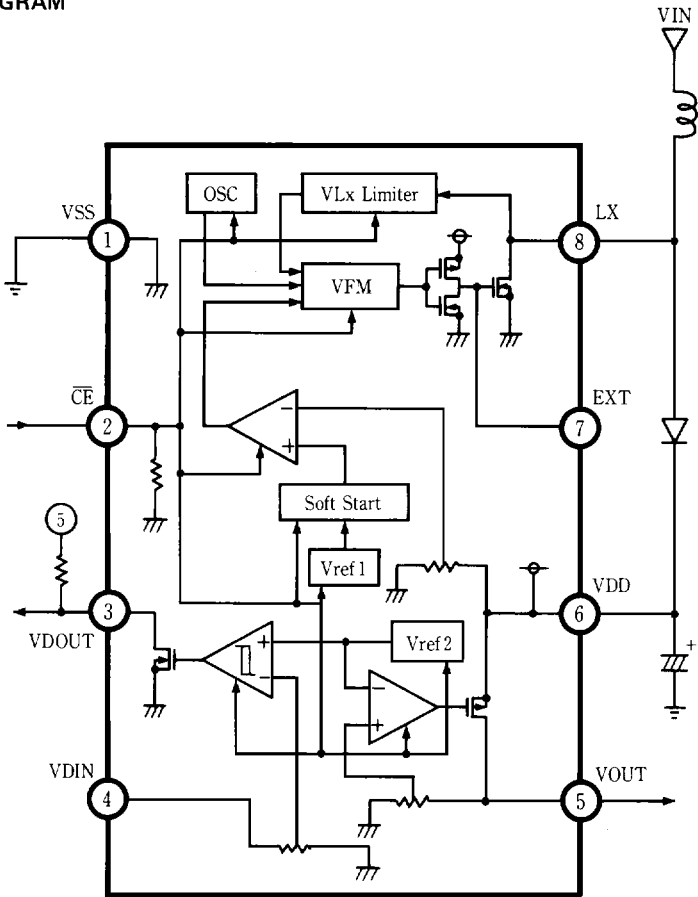
■ FEATURES

- Small invalid current TYP15 μ A (RS5RJ3624; V_{in} = 3.0V, no Load)
- Standby mode I_{stb} = MAX1.0 μ A
- Low voltage operation operating voltage V_{in} = 0.9 ~ 10V
- High accuracy of output voltage fixed output voltage, accuracy \pm 2.5%
- Variety of output voltage level
- Output voltage is in the neighborhood of battery voltage due to the step-up/step-down function (Ex. getting 3V output using 3V-battery)
- Soft start and driver proof circuit
- Phase compensation circuit
- Large current can be get by connecting a driving transistor externally.
- Small package 8 pin SOP

■ APPLICATION

- Camera, Video camera, Hand-held audio system.
- Book type personal computer, Word processor, small size office automation equipment.
- Pocket bell, Code-less telephone, Hand-held telephone.

■ BLOCK DIAGRAM



■ DESCRIPTION

Pin No.	Symbol	Description
1	VSS	Ground
2	CE	Chip Enable. Set the pin to VDD then the device become standby state.
3	VDO	Output for voltage detector (NMOS open drain output)
4	VDIN	Input for voltage detector
5	VOUT	Output for voltage regulator
6	VDD	Output for step-up voltage. Power supply for the device.
7	EXT	Driving output for external transistor
8	LX	Output for switching

■ ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, Vss = 0V)

Parameter	Symbol	Rating	Unit	
Power Supply Voltage	VDD	-0.3 ~ 12	V	
Output Voltage LX Pin	VLX	-0.3 ~ 12	V	
	EXT Pin	VEXT	-0.3 ~ VDD + 0.3	V
	VOUT Pin	VOUT	-0.3 ~ VDD + 0.3	V
	VDOUT Pin	VDOUT	-0.3 ~ 12	V
Input Voltage	VCE	-0.3 ~ VDD + 0.3	V	
Output Current LX Pin	ILX	250	mA	
Power Consumption	Pd	300	mW	
Operating Temperature	Topr	-30 ~ +80	°C	
Storage Temperature	Tstg	-40 ~ +125	°C	
Soldering Condition	Tsolder	260°C 10sec		

■ ELECTRICAL CHARACTERISTICS

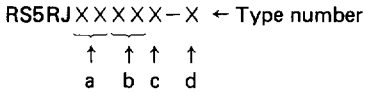
● RS5RJ3624 (3.6V Output)

Vin = 4.0V, Ta = 25°C

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Input Voltage	Vin	No Load	0.9		10	V
Holding Voltage	Vinhd	No Load Vin = H → L			0.8	V
Output Voltage	Vout	Vin = 4.0V, Iout = 5mA	3.51	3.60	3.69	V
Input Voltage Stability	$\Delta V_{out}/V_{in}$	Iout = 1mA, Vin = 0.9V ~ 8V		10	100	mV
Load Stability	$\Delta V_{out}/I_{out}$	Vin = 1.8V, Iout = 1 ~ 30mA		10	100	mV
Step-up Output Voltage	Vdd	Vin = 1.8V, Iout = 5mA	3.99	4.10	4.21	V
Max. Oscillating Frequency	fosc			100		kHz
Duty Ratio	DfMAX			80		%
Lx Switch on Voltage	VOL1	ILX = 50mA			0.5	V
Lx Switch Leakage Current	Ileak				2.0	μA
Detect Voltage	Vdet		2.3	2.4	2.5	V
Detect Voltage Hysteresis	Vhys			120	240	mV
VD Output on Voltage	VdOL	IOL = 5mA			0.5	V
CE "H" Input Voltage	VCEH		0.8 VDD		VDD	V
CE "L" Input Voltage	VCEL				0.2 VDD	V
CE "H" Input Current	ICEH	CE = 3.5V	0	0.5	1.0	μA
CE "L" Input Current	ICEL	CE = 0V	-0.5		0.5	μA
Consumption Current	Iin	Vin = 3V (Step-up), No Load		15	30	μA
		Vin = 8V (Step-down), No Load			10	μA
Standby Current	Istb	Vin = 3V, No Load			1	μA

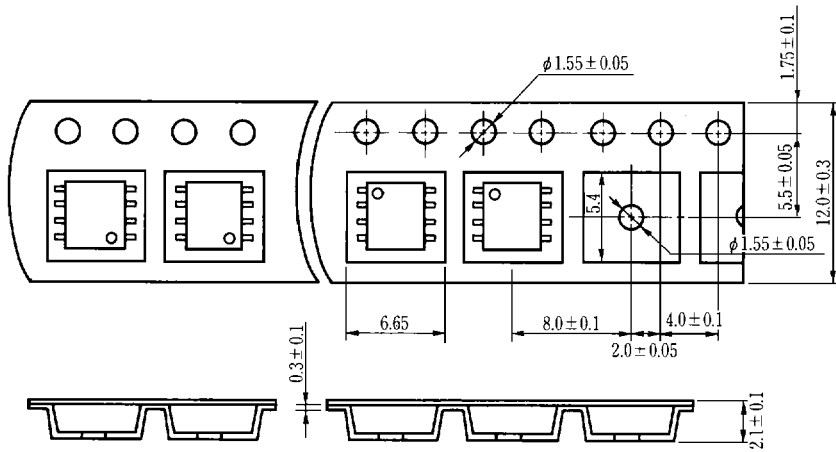
■ SELECTION GUIDE

You can define the output voltage, the detect voltage and the taping direction of RS5RJ series. The devices are defined by the following characters.



Number	Meaning
a	Defines output voltage (Vout). ● The range for Vout is 2.0V to 6.0V in units of 0.1V, with an accuracy of ±2.5%.
b	Defines detect voltage (-Vdet). ● The range for -Vdet is 2.0V to 6.0V in the units of 0.1V, with an accuracy of ±2.5%.
c	Defines version.
d	Defines taping direction with T1 and T2. (See below)

Note) Taping Information (1000 pieces/reel)



(Unit: mm)

■ PACKAGE DIMENSION (Unit: mm)

