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PRELIMINARY

STEP-UP/STEP-DOWN PWM DC/DC CONVERTER with VOLTAGE DETECTOR RS5RM Series

Product News

■ OUTLINE

RS5R Series are compact DC/DC converter ICs with a voltage detector and are developed with CMOS process technology. The devices consist of a PWM 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 RS5RM 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 RS5R is fit for battery-operated equipment.
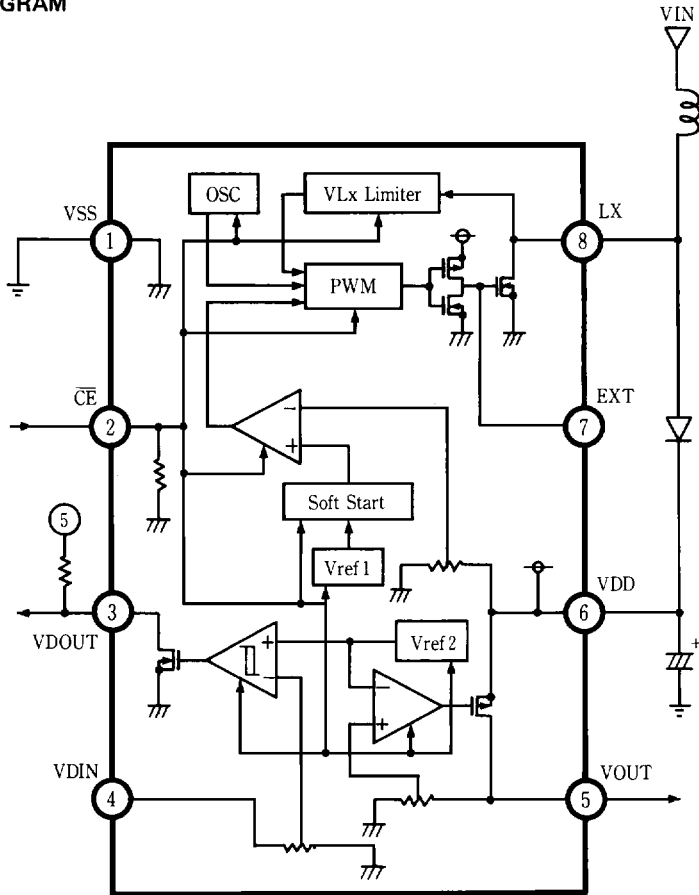
■ FEATURES

- Small invalid current . . . . TYP50μA (RS5RM3624; Vin = 3.0V, no Load)
- Standby mode . . . . Istb = MAX1.0μA
- Low voltage operation . . . . operating voltage Vin = 0.9 ~ 10V
- High accuracy of output voltage . . . . fixed output voltage, accuracy ± 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 conpensation 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.

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■ BLOCK DIAGRAM

■ DESCRIPTION

Pin No.	Symbol	Description
1	VSS	Ground
2	$\overline{CE}$	Chip Enable. Set the pin to VDD then the device become standby state.
3	VDOUT	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 = OV)

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	V$\overline{CE}$	−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

● RS5RM3624 (3.6V Output)

Vin = 4.0V, Ta = 25°C

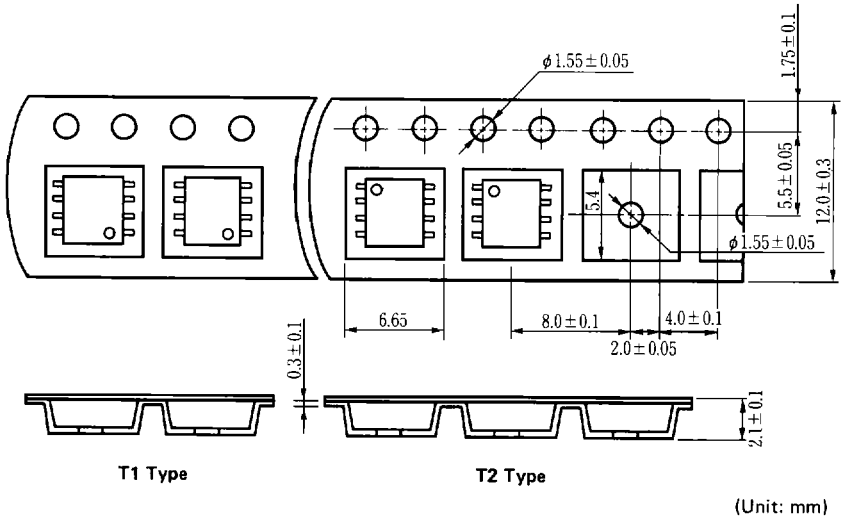| Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Input Voltage	Vin	No Load	0.9		10	V
Holding Voltage	Vinhd	No Load Vin = H → L			0.8	V
Output Voltage	Vout	Vin = 4.0V, Iout = 5mA	3.51	3.60	3.69	V
Input Voltage Stability	ΔVout/Vin	Iout = 1mA, Vin = 0.9V ~ 8V		10	100	mV
Load Stability	ΔVout/Iout	Vin = 1.8V, 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			50		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
$\overline{CE}$ "H" Input Voltage	VCEH		0.8 VDD		VDD	V
$\overline{CE}$ "L" Input Voltage	VCEL				0.2 VDD	V
$\overline{CE}$ "H" Input Current	ICEH	$\overline{CE}$ = 3.5V	0	0.5	1.0	μA
$\overline{CE}$ "L" Input Current	ICEL	$\overline{CE}$ = 0V	−0.5		0.5	μA
Consumption Current	Iin	Vin=3V (Step-up), No Load		50	100	μA
		Vin=8V (Step-down), No Load			10	μA
Standby Current	Istb	Vin = 3V, No Load			1	μA

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■ SELECTION GUIDE

You can define the output voltage, the detect voltage and the taping direction of RS5RM series.
The devices are defined by the following characters.

RS5RM X X X X X − X ← Type number
       ↑ ↑ ↑   ↑
      a b c d

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)

T1 Type   T2 Type

(Unit: mm)

■ PACKAGE DIMENSION (Unit: mm)

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