RS53201 • RS53202 — 5.5V, 550mA Buck Converters with 60nA I_Q

Features

Ultra-Low-Power Operation

- 48nA typical operating I_Q
- 3nA typical shutdown current
- Power-save mode with PFM operation at light load
- 100% duty-cycle operation at low V_{IN}

Power Conversion

- 2.15V to 5.5V input voltage range
- Up to 550mA output current
- Eight selectable output voltages from 1.2V to 3.3V
- 1.2MHz switching frequency

Flexible System Integration

- Automatic PFM/PWM mode transition
- Output discharge function

Package & Integration

- Ultra-compact 1.55mm × 0.86mm, 8-ball WLCSP package
- RoHS compliant and Green

Applications

- Smart meters, smart thermostats
- Smart watch
- Asset tracking devices
- Wearable electronics
- Medical sensor patches and patient monitors
- Energy harvesting

Description

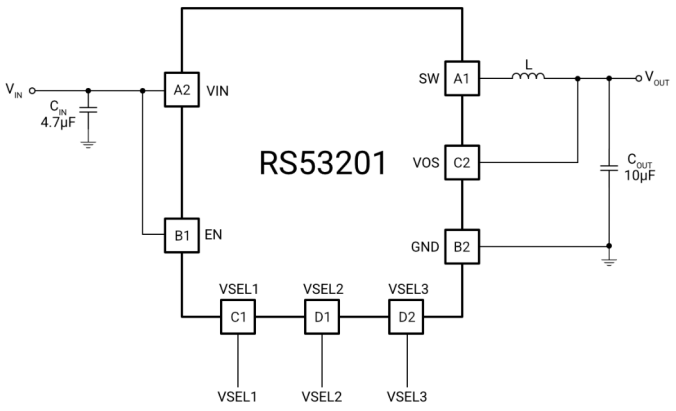
The RS53201 and RS53202 are ultra-low-power, high-efficiency 550mA synchronous buck converters designed for battery-powered and energy-conscious applications. Operating from a 2.15V to 5.5V input range, the devices achieve an ultra-low 48nA typical operating I_Q and only 3nA typical shutdown current, helping extend battery life in systems that spend significant time in standby or light-load operation.

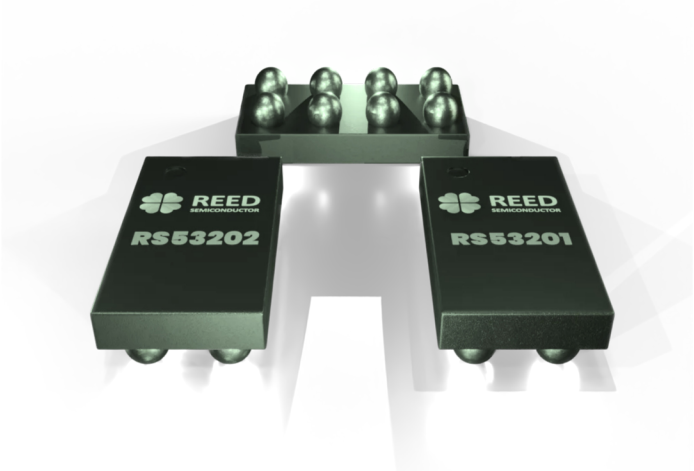
The devices automatically transition between PFM and PWM operation to maintain high efficiency across a wide load range. At light loads, PFM operation minimizes power consumption, while PWM operation provides a 1.2MHz switching frequency at higher loads. 100% duty-cycle operation supports low-dropout operation as the input voltage approaches the regulated output voltage, helping maximize usable battery capacity.

Eight output-voltage options from 1.2V to 3.3V can be selected through the VSEL pins, reducing external components and simplifying power-rail configuration. An integrated output discharge function provides controlled output-voltage discharge when the converter is disabled.

The RS53201 and RS53202 are offered in an ultra-compact 1.55mm × 0.86mm, 8-ball WLCSP package, making them well suited for smart meters, asset trackers, wearable electronics, medical sensor patches, energy-harvesting systems, and other space-constrained, battery-powered applications.

Typical Application Schematic





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Ordering Information

PART NUMBER	VOUT RANGE (V)	PACKAGE	SIZE	MSL RATING	SHIPPING METHOD	PACKAGE MARKING
RS53201R	1.2 — 3.3	WLCSP-8	1.55 × 0.86mm	Level-1	3000u Tape & Reel	R53201
RS53202R	1.3 — 3.1	WLCSP-8	1.55 × 0.86mm	Level-1	3000u Tape & Reel	R53201

See Output Voltage Options for details

Top Marking



Line 1

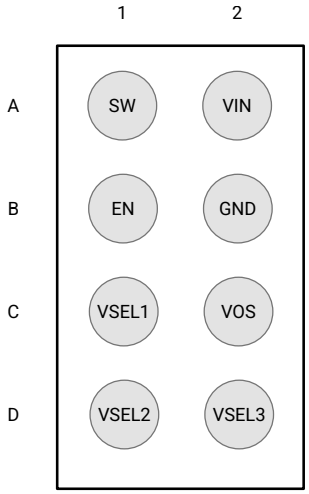
- R: Prefix of Reed Semiconductor (R is replaced by E for engineering lots)
- PPPPP: Truncated part number

Line 2

- Y: Year code
- W: Week code
- LLL: Lot code

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Package Reference



WLCSP-8 (1.55 × 0.86mm)

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Pin Descriptions

PIN	NAME	TYPE	DESCRIPTION
A1	SW	P	Switch node. Connect to the inductor.
A2	VIN	P	Power input. Place a 4.7µF or larger ceramic input capacitor close to VIN and GND.
B1	EN	I	Enable input. Drive high to enable the device and low to disable the device. Do not leave floating.
B2	GND	G	Ground. Connect to the input and output capacitor ground returns with a low-impedance path.
C1, D1, D2	VSELx	I	Output-voltage selection inputs. Configure these pins to select the output voltage. Do not leave floating. VSEL settings may be changed during operation. See Table 1
C2	VOS	i	Output-voltage sense input. Connect directly to VOUT with a short trace.

Type: I = Input, O = Output, I/O = Bidirectional, P = Power, G = Ground, — = No Connect.

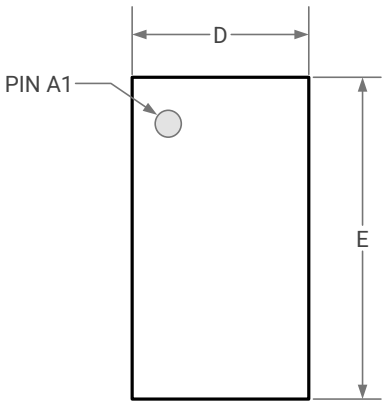
Table 1. VSEL Output Voltage Options

V_{OUT} (V)		VSEL		
RS53201	RS53202	VSEL3	VSEL2	VSEL1
1.2	1.3	0	0	0
1.5	1.4	0	0	1
1.8	1.6	0	1	0
2.1	1.7	0	1	1
2.5	1.9	1	0	0
2.8	2.0	1	0	1
3.0	2.9	1	1	0
3.3	3.1	1	1	1

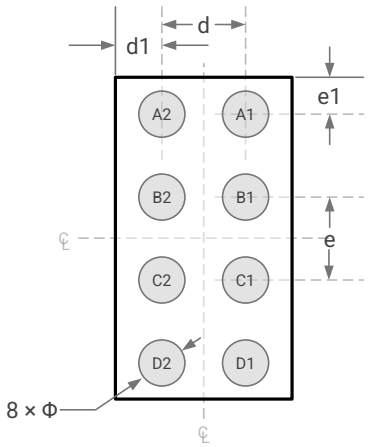
Note: 0 = GND, 1= VOS.

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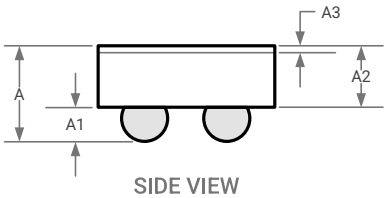
Package Dimensions



TOP VIEW



BOTTOM VIEW



SIDE VIEW

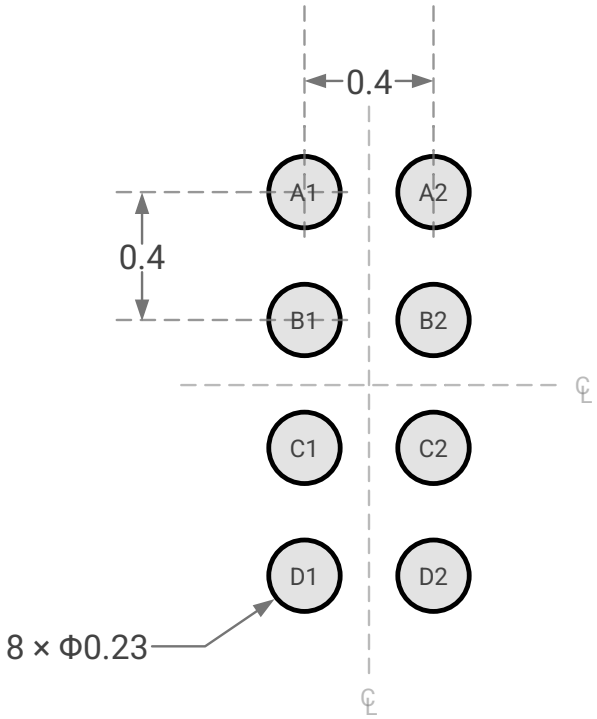
REF	MIN	NOM	MAX
A	0.4180	0.4650	0.5120
A1	0.1560	0.1830	0.2100
A2	0.2400	0.2570	0.2740
A3	0.0220	0.0250	0.0280
Φ	0.2090	0.2320	0.2550
D	0.8325	0.8575	0.8825
E	1.5225	1.5475	1.5725
d		0.4000	
d1		0.2288	
e		0.4000	
e1		0.1738	

Notes

1. All dimensions are in millimeters.
2. Drawing is not to scale.

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Recommended Land Pattern

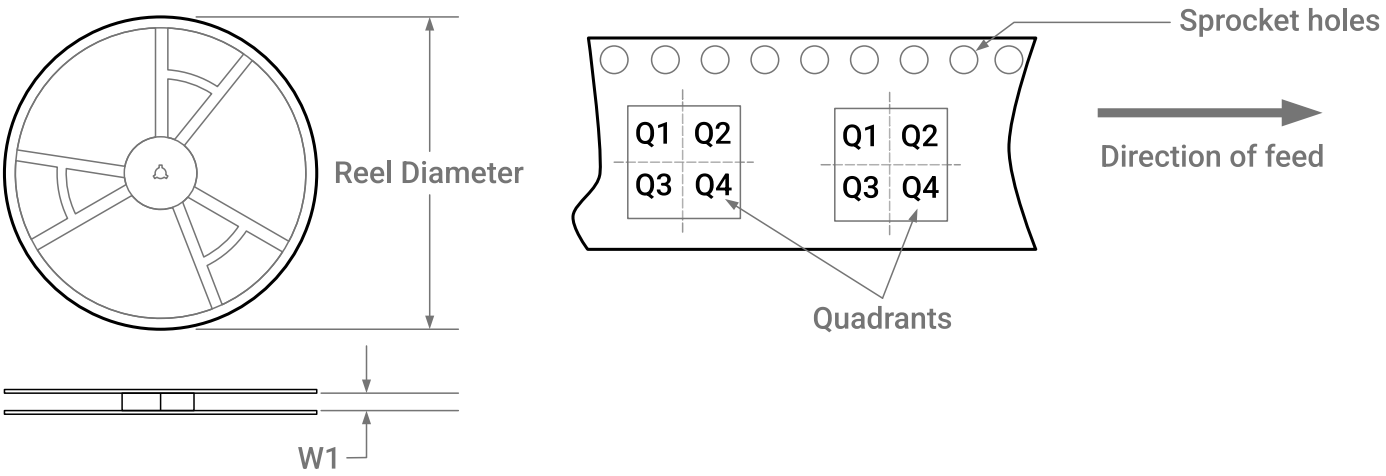


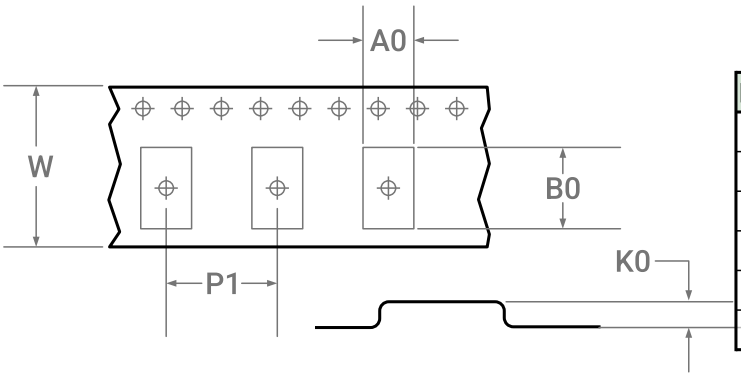
Note:

1. All dimensions are in millimeters.
2. Drawing is not to scale.

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Tape and Reel Information





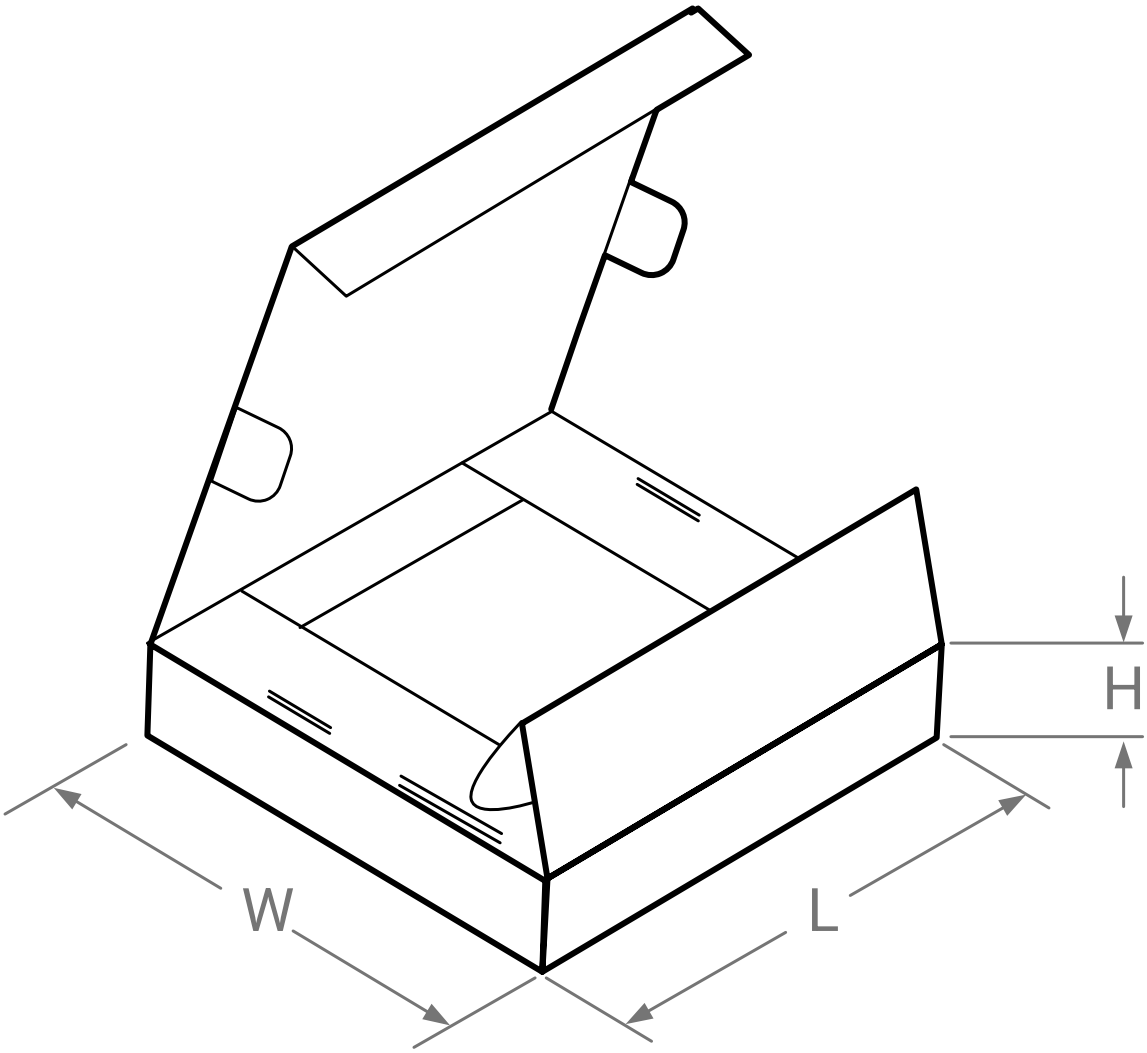
DIMENSION	DESCRIPTION
A0	Pocket width
B0	Pocket length
K0	Pocket depth
W1	Reel width
W	Carrier tape width
P1	Pocket pitch

PACKAGE SIZE	REEL DIAMETER	W1	A0	B0	K0	P1	W	QUADRANT
1.55 × 0.86	179	9	0.96	1.65	0.57	4.0	8.0	Q1

Note:
1. All dimensions are nominal
2. All dimensions are in millimeters (mm)

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Pizza Box Dimensions



PACKAGE SIZE	UNITS / BOX	LENGTH	WIDTH	HEIGHT
1.55 × 0.86	3000	205	200	28

Notes:

1. All measurements are in millimeters;
2. All measurements are nominal.

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