RS53428 2.85V to 26V, 12A Synchronous Buck Converter

Features

High-Performance Power Conversion

- Robust Constant-On-Time (RCOT) control for fast transient response
- Up to 12A continuous output current
- Wide input voltage range:
  - 2.85V to 26V with external bias
  - 4.2V to 26V with internal bias
- Output voltage range:
  - 0.5V to 5.5V (RS53428L)
  - 0.6V to 5.5V (RS53428H)
- ±1% output voltage accuracy
- Up to 90% maximum duty cycle
- Differential remote sensing
- Excellent line and load regulation

Flexible System Optimization

- Selectable switching frequency: 300kHz, 500kHz, 800kHz, or 1MHz
- Programmable valley current limit
- Programmable soft-start time
- Selectable pulse-skip or CCM operation at light load

Integrated Protection & Monitoring

- PGOOD output with active low clamping during power failure
- Overcurrent protection (OCP)
- Negative overcurrent protection (NOCP)
- Undervoltage protection (UVP)
- Undervoltage lockout (UVLO)
- Overtemperature protection (OTP)
- Overvoltage protection (OVP)

Package & Compliance

- Compact 3mm × 4mm TLGA package
- RoHS compliant and Green

Applications

- Server and Telecom Voltage Regulators
- Graphics Card Core Regulators
- Power Modules

Description

The RS53428 is a high-performance, fully integrated 15A synchronous buck converter designed for high-density point-of-load power applications. It supports a wide 2.85V to 26V input voltage range and integrates the high-side and low-side power MOSFETs, enabling a compact solution with minimal external components.

Reed's Robust Constant-On-Time (RCOT) control architecture provides fast transient response and excellent line and load regulation. Differential remote sensing improves output-voltage accuracy at the load by compensating for voltage drops across PCB traces. The RS53428 supports output voltages from 0.5V to 5.5V for the RS53428L and 0.6V to 5.5V for the RS53428H, with operation up to a 90% maximum duty cycle. An external bias supply supports operation from 2.85V to 4.2V, while the integrated LDO enables single-supply operation from 4.2V to 26V.

Selectable switching frequencies of 300kHz, 500kHz, 800kHz, and 1MHz allow designers to optimize efficiency, solution size, and transient performance. Additional flexibility is provided by programmable valley current limit, programmable soft-start, and selectable pulse-skip or CCM operation at light load.

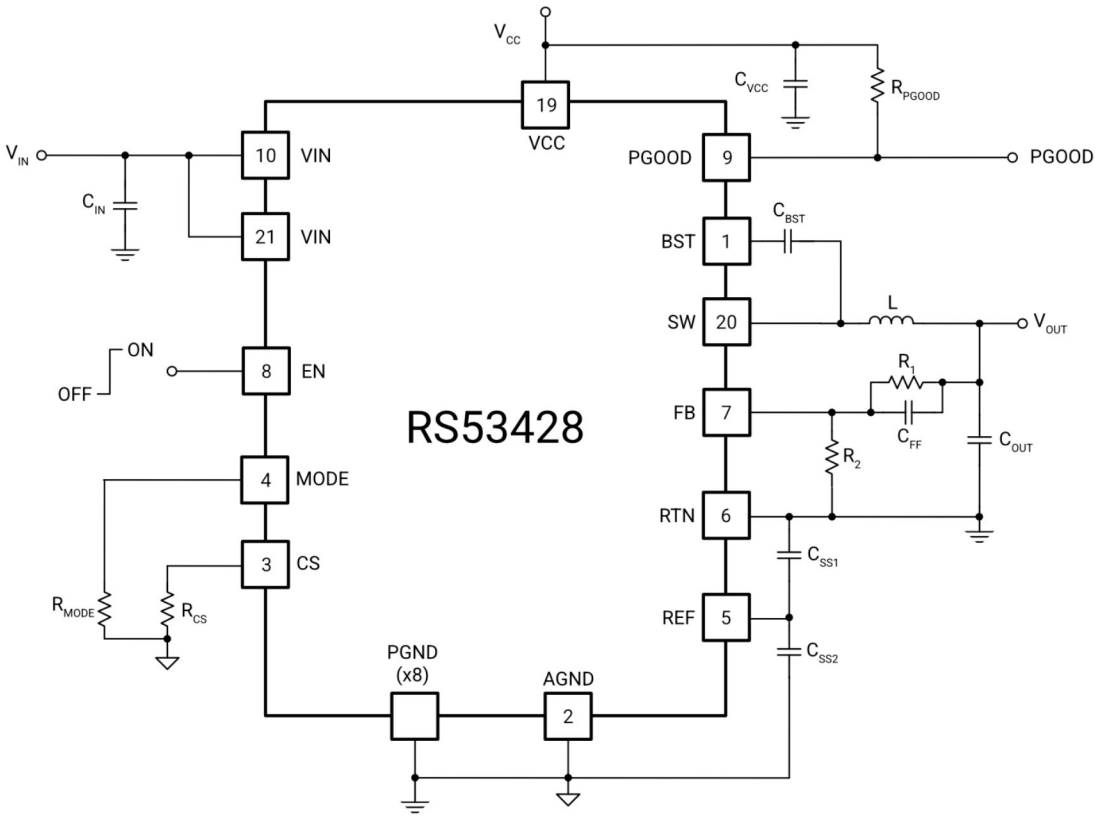
Integrated protection features include OCP, negative OCP, UVP, UVLO, OTP, and OVP. The RS53428 is offered in a compact 3mm × 4mm, 21-pin QFN package, making it well suited for computing, networking, graphics, and industrial power applications.

PART NUMBER	PACKAGE	SIZE
RS53428	QFN-21	3 ×4 mm



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Typical Application Schematic



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Ordering Information

PART NUMBER	VREF (V)	PACKAGE	SIZE	MSL RATING	SHIPPING METHOD	PACKAGE MARKING
RS53428LR	0.5	QFN-21	2 × 3mm	Level-1	5000u Tape & Reel	R3428L
RS53428HR	0.6	QFN-21	2 × 3mm	Level-1	5000u Tape & Reel	R3428H

Top Marking



Line 1

- RS: Prefix of Reed Semiconductor (RS is replaced by RE for engineering lots)
- YY: Year code
- WW: Week code

Line 2

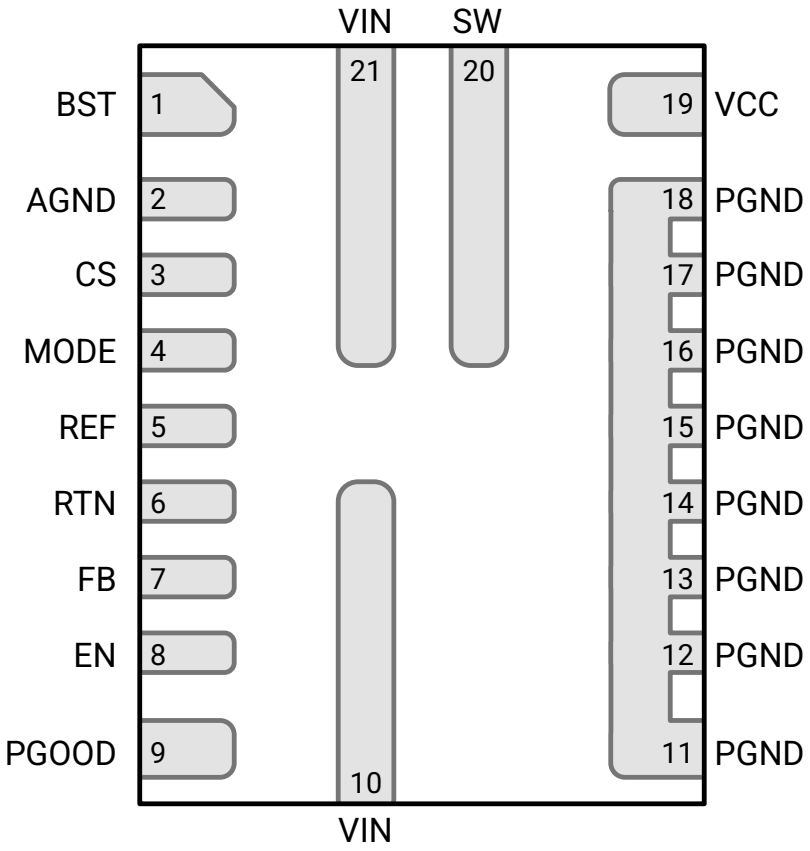
- PPPPPP: Truncated part number

Line 3

- LLLLL: Lot code
- S: Assembly site code

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Package Reference



QFN-21 (3 × 4mm)

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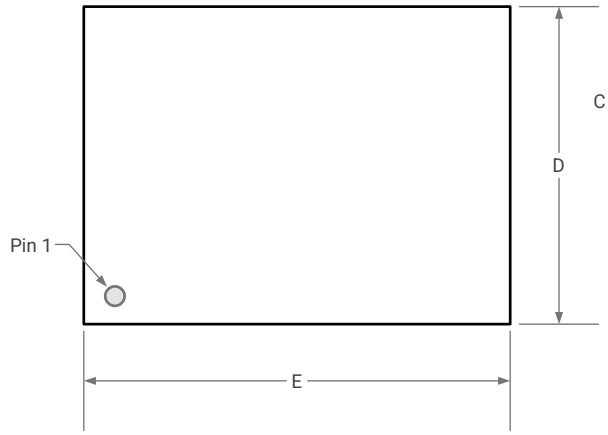
Pin Descriptions

PIN	NAME	TYPE	DESCRIPTION
1	BST	I	Bootstrap supply. Connect a 0.1μF to 1μF capacitor between BST and SW to provide the floating supply for the high-side gate driver.
2	AGND	G	Analog ground. Connect to PGND using a Kelvin connection.
3	CS	I	Current-limit setting input. Connect a resistor to AGND to set the inductor valley-current limit threshold.
4	MODE	I	Operating-mode selection input. Connect a resistor to AGND to set the switching frequency and DCM/FCCM operation.
5	REF	I	Soft-start programming input. Connect a capacitor to PGND to set the soft-start time.
6	RTN	I	Remote-sense return input.
7	FB	I	Output-voltage feedback input. Connect the external resistor divider from VOUT to AGND, with the midpoint connected to FB. Place the feedback divider close to the FB pin.
8	EN	I	Enable input. Drive EN high to enable the internal VCC LDO and initiate soft-start. Do not leave this pin floating.
9	PGOOD	O	Open-drain power-good output.
10, 21	VIN	P	Input supply for the power stage and internal LDO. Place the input bypass capacitors close to the VIN pins.
11—18	PGND	G	Power ground. Ground return for the power stage.
19	VCC	P	Internal LDO output. Connect a 1μF or larger bypass capacitor from VCC to PGND. Place the capacitor close to the VCC pin.
20	SW	P	Switching-node output. Connect to the inductor using a short, wide copper connection.

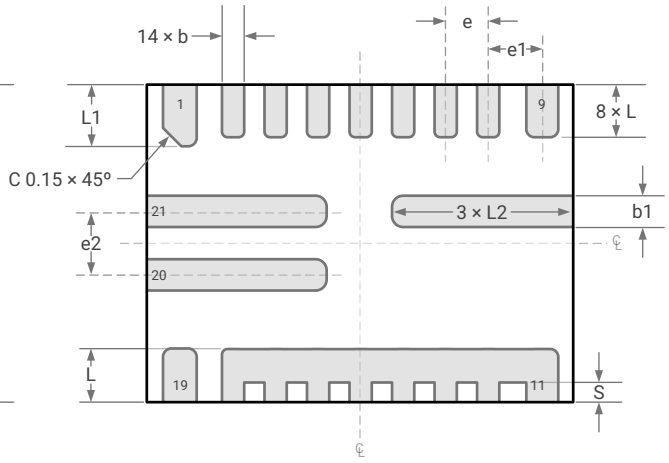
Type: I = Input, O = Output, I/O = Bidirectional, P = Power, G = Ground, — = No Connect.

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Package Dimensions



TOP VIEW



BOTTOM VIEW



SIDE VIEW

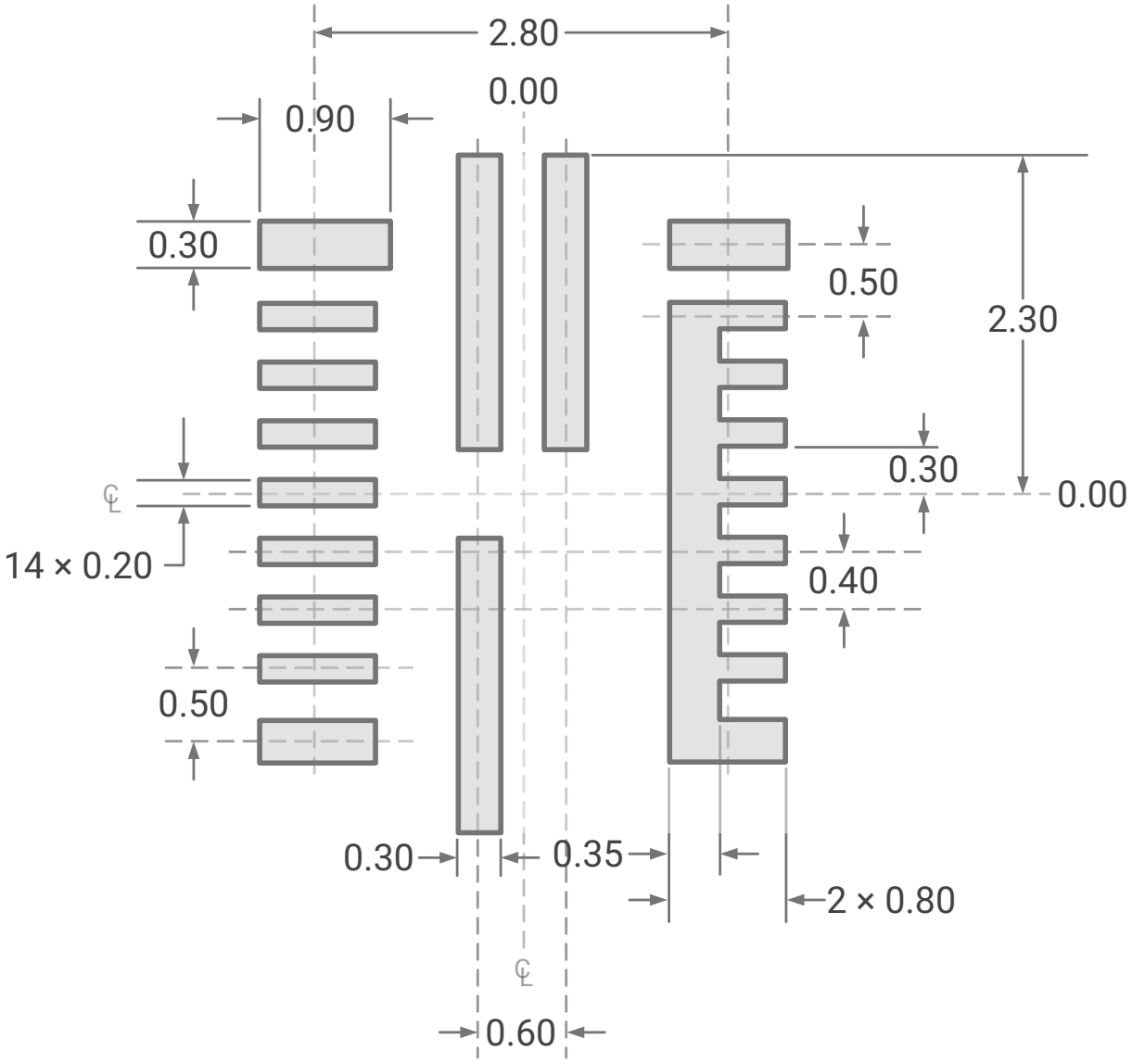
Notes

1. All dimensions are in millimeters.
2. Dimension b applies to the metallized terminal and is measured between 0.15mm and 0.30mm from the terminal tip. If the opposite end of the terminal includes an optional radius, dimension b shall not be measured within the radius area.
3. Drawing is not to scale

REF	MIN	NOM	MAX
A	0.70	0.75	0.8
A1	0.00	0.02	0.05
A3		0.203 Ref.	
b	0.15	0.20	0.25
b1	0.25	0.30	0.35
D	2.90	3.00	3.10
E	3.90	4.00	4.10
e		0.40 BSC	
e1		0.50 BSC	
e2		0.60 BSC	
L	0.45	0.50	0.55
L1	0.55	0.60	0.65
L2	1.65	1.70	1.55
S		0.15 Ref/	

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Recommended Land Pattern

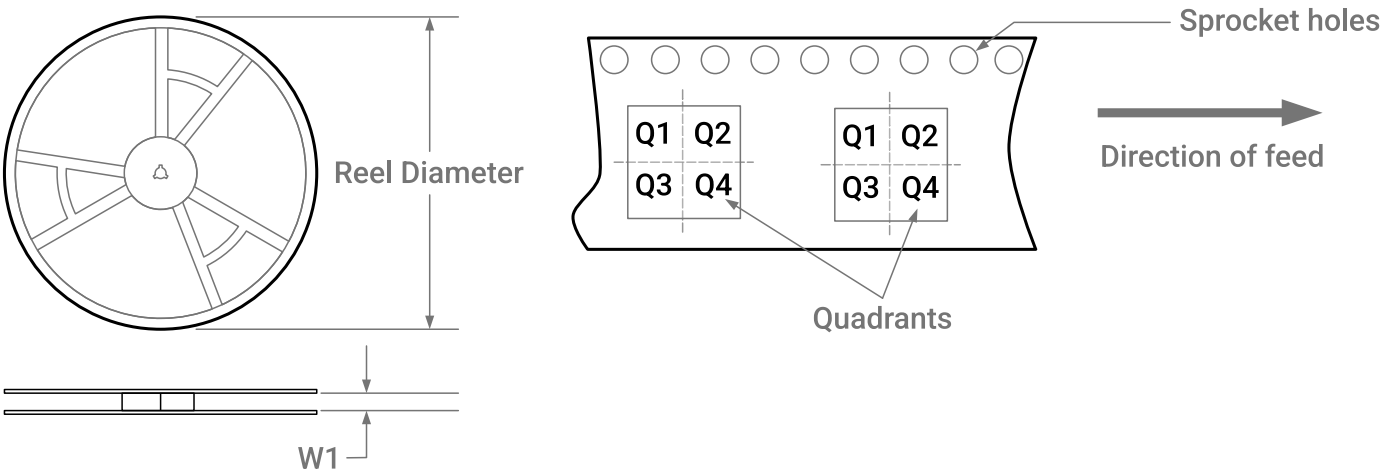


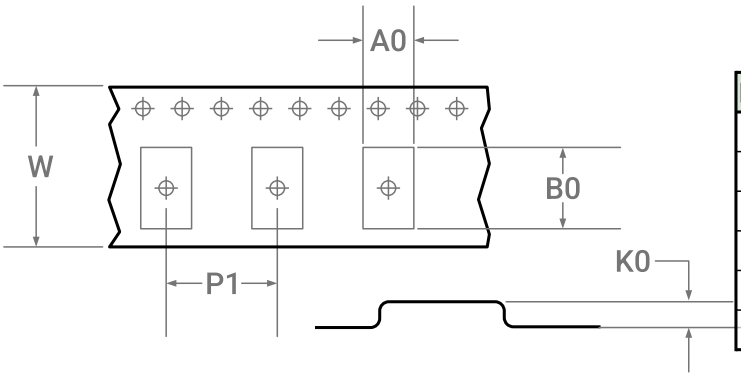
Note:

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

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Tape and Reel Information





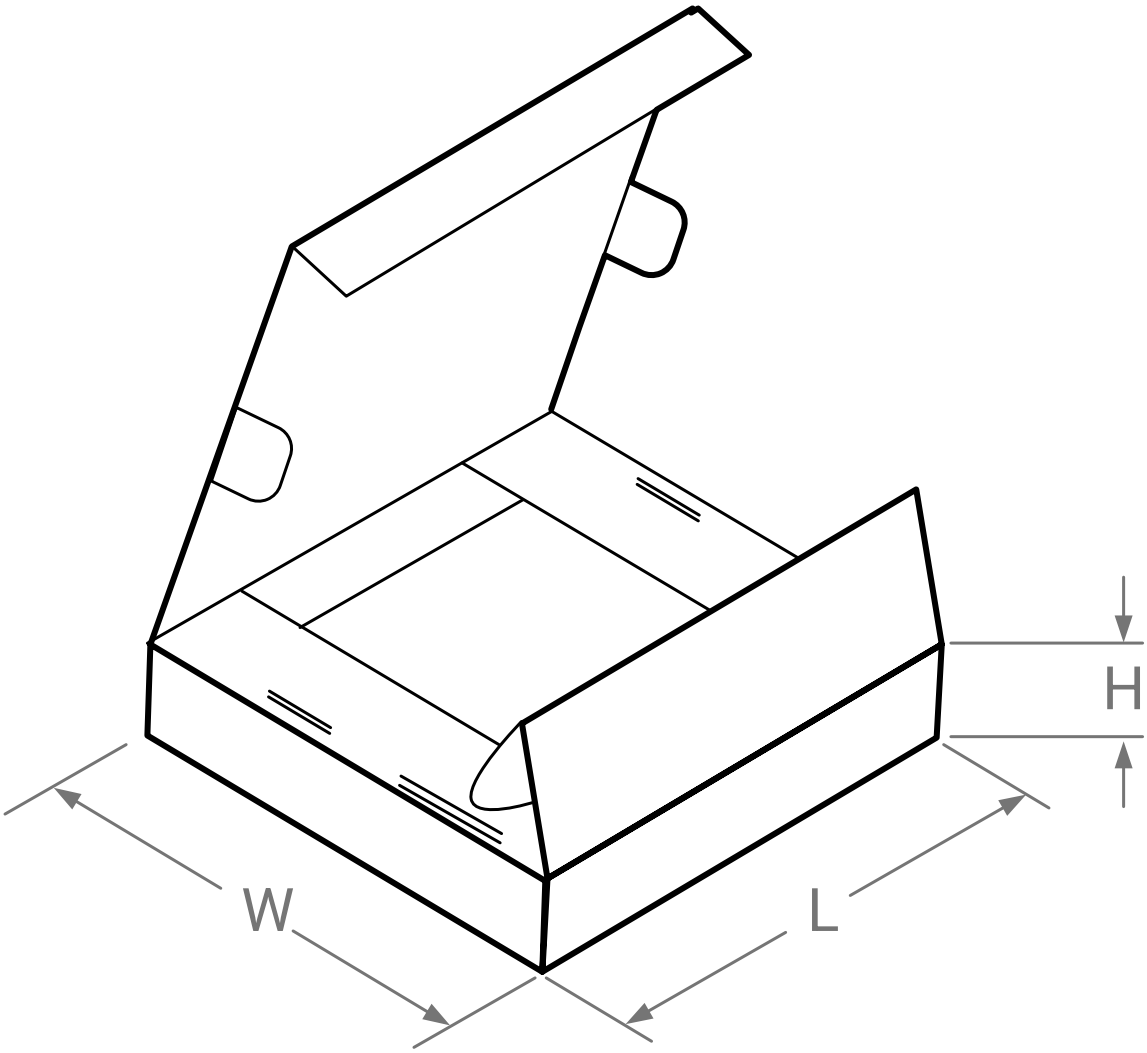
DIMENSION	DESCRIPTION
A0	Pocket width
B0	Pocket length
K0	Pocket depth
W1	Reel width
W	Carrier tape width
P1	Pocket pitch

PACKAGE SIZE	REEL DIAMETER	W1	A0	B0	K0	P1	W	QUADRANT
3 × 4	330	12.8	3.4	4.4	1.10	8.00	12.0	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
3 × 4	5000	355	340	50

Notes:

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

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