RS31335 • RS31336 • RS31337 16V, 5.5A eFuse with True Reverse Current Protection

Features

Reverse Current Blocking & Power Path Protection

- True reverse-current blocking with integrated back-to-back MOSFETs
- Input reverse-polarity protection
- Low 23mΩ total on-resistance
- Wide 2.97V to 16V operating rangee

Fault Protection

- Programmable current limit (0.5A to 6A)
- Active current limiting or circuit-breaker operation
- Adjustable input overvoltage protection
- Programmable overcurrent blanking timer (ITIMER)
- Fast short-circuit protection
- Integrated overtemperature protection

Fast-trip short-circuit protection

- Intelligent System Control & Monitoring
- Integrated ILIM current monitor output

Control & System Integration

- Adjustable output slew rate (dV/dt)
- Adjustable input UVLO threshold
- ILIM current monitor output
- FLT or PG status output (device dependent)
- AUXOFF output for auxiliary power sequencing and power MUX control (RS31335

RS31335 Package & Compliance

- Compact 2mm × 2mm QFN-10 package
- RoHS compliant and Green

Applications

- USB PD protection
- PCI and PCIe cards
- Appliances and power tools
- Smartphones and tablets
- Industrial systems



Description

The RS31335/RS31336/RS31337 family integrates back-to-back MOSFETs to provide true reverse-current blocking, input reverse-polarity protection, and comprehensive fault protection for 2.97V to 16V power rails. These devices protect downstream circuits from overcurrent, short-circuit, overvoltage, reverse-current, and reverse-polarity events while minimizing power loss with a low 23mΩ on-resistance.

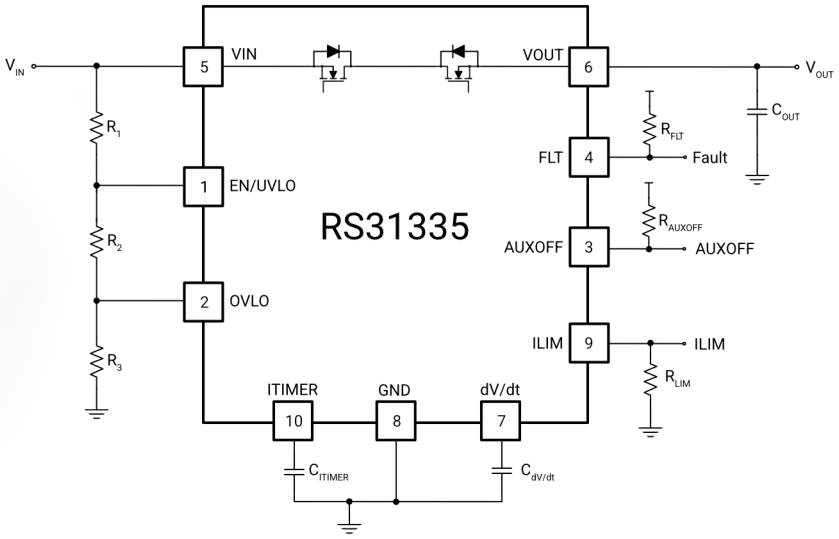
The output current limit is programmable from 0.5A to 6A using a single external resistor connected to the ILIM pin. A programmable overcurrent blanking timer allows brief load transients without nuisance shutdown, while fast short-circuit protection responds quickly to severe fault conditions.

The device supports both active current limiting and circuit-breaker operation, with configurable fault indication (FLT) or power-good (PG) output depending on the device option. Adjustable output slew rate and input UVLO simplify power sequencing and reduce inrush current during startup.

Available overvoltage protection options include an adjustable OVLO threshold or selectable fixed overvoltage clamp thresholds, allowing the devices to be optimized for a wide range of applications including USB PD, servers, industrial equipment, and consumer electronics.

The family is offered in a compact 10-pin, 2mm × 2mm QFN package.

Typical Application Circuit



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Device Comparison Table

PART NUMBER	OVERVOLTAGE PROTECTION	OVERCURRENT RESPONSE	AUXOFF or PG	FAULT or PGTH	FAULT REPONSE
RS31335A	Adjustable OVLO	Current Limit	AUXOFF	Fault	Latch-off
RS31335B	Adjustable OVLO	Current Limit	AUXOFF	Fault	Auto-retry
RS31336A	Selectable OVC	Current Limit	PG	PGTH	Latch-off
RS31336B	Selectable OVC	Current Limit	PG	PGTH	Auto-retry
RS31337A	Adjustable OVLO	Circuit Breaker	PG	PGTH	Latch-off
RS313327	Adjustable OVLO	Circuit Breaker	PG	PGTH	Auto-retry

Note: OVC = Overvoltage Clamp, OVLO = Overvoltage Lock-out

Ordering Information

PART NUMBER	PACKAGE	SIZE	MSL RATING	SHIPPING METHOD	PACKAGE MARKING
RS31335AR	QFN - 10	2 × 2	Level - 2	3000u Tape & Reel	335A
RS31335BR	QFN - 10	2 × 2	Level - 2	3000u Tape & Reel	335B
RS31336AR	QFN - 10	2 × 2	Level - 2	3000u Tape & Reel	336A
RS31336BR	QFN - 10	2 × 2	Level - 2	3000u Tape & Reel	336B
RS31337AR	QFN - 10	2 × 2	Level - 2	3000u Tape & Reel	337A
RS31337BR	QFN - 10	2 × 2	Level - 2	3000u Tape & Reel	337B

Top Marking



Line 1

- R: Prefix of Reed Semiconductor (RS replaced by RE for engineering lot)
- Y: Year code
- W: Week code
- S: Assembly site code

Line 2

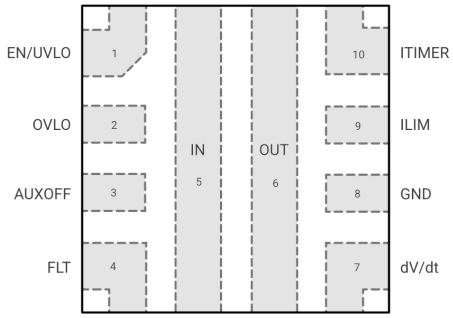
- PPPP; Truncated part number

Line 3

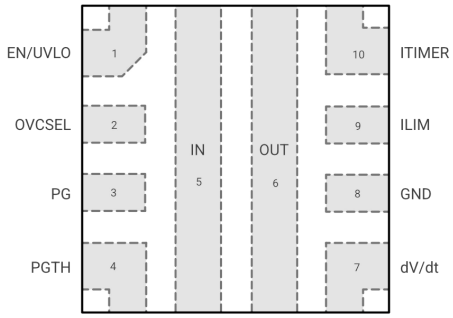
- LLL: Lot code

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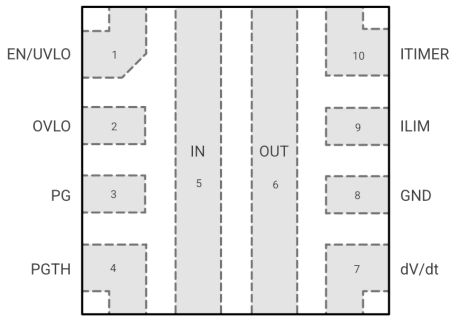
Package Reference



Top View - RS31335



Top View - RS31336



Top View - RS31337

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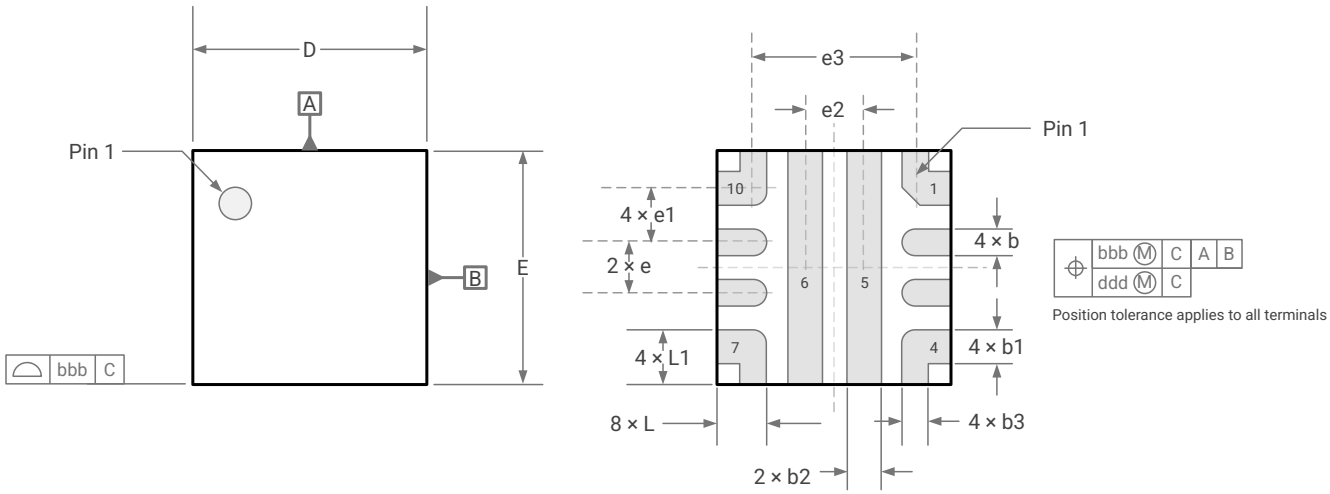
Pin Descriptions

PIN	NAME	TYPE	DESCRIPTION
1	EN/UVLO	I	Active-high enable and UVLO input. Pull high to enable the device and pull low to disable it. Connect to a resistor divider from VIN to GND to set the input UVLO threshold. Do not leave this pin floating.
2	OVLO	I	RS313305/RS31337: Input overvoltage lockout input. Connect to a resistor divider from VIN to GND to set the OVLO threshold. This pin also functions as an active-low enable input. Do not leave this pin floating.
	OVCSEL	I	RS31336: Output overvoltage clamp threshold select input. Selects the fixed output clamp threshold.
3	PG	O	RS31336/RS31337: Power Good output. Open-drain output that asserts high (with an external pull-up) when the internal MOSFET is fully enhanced and the PGTH input exceeds the programmed threshold.
	AUXOFF	O	RS31335: Auxiliary supply enable output. Open-drain output that asserts high after the primary channel has completed startup, allowing an auxiliary eFuse to be enabled for priority power MUX operation.
4	FLT	O	RS31335: Fault output. Open-drain output pulled low when a fault condition is detected.
	PGTH	I	RS31336/RS31337: Power Good threshold input. Sets the output voltage threshold for PG assertion.
5	IN	P	Input supply voltage. Connect to the protected power source.
6	OUT	P	Protected output voltage. Connect to the load.
7	dV/dt	I	Output slew-rate control. Connect a capacitor from this pin to GND to program the output voltage rise time during turn-on.
8	GND	G	Device ground. Connect directly to the system ground plane.
9	ILIM	I	Current-limit set and current-monitor output. Connect a resistor from ILIM to GND to program the output current limit. The ILIM voltage provides an analog indication of output current. Do not leave this pin floating.
10	ITIMER	I	Overcurrent blanking timer. Connect a capacitor from ITIMER to GND to set the transient overcurrent blanking time, allowing temporary load transients above the programmed current limit but below the fast-trip threshold. Leave the pin open for the fastest Overcurrent response.

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

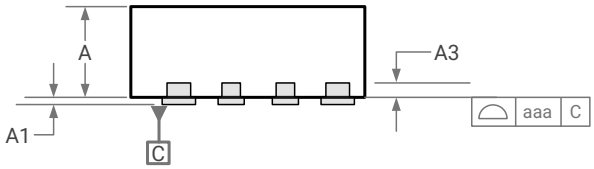
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Package Dimensions



TOP VIEW

BOTTOM VIEW



SIDE VIEW

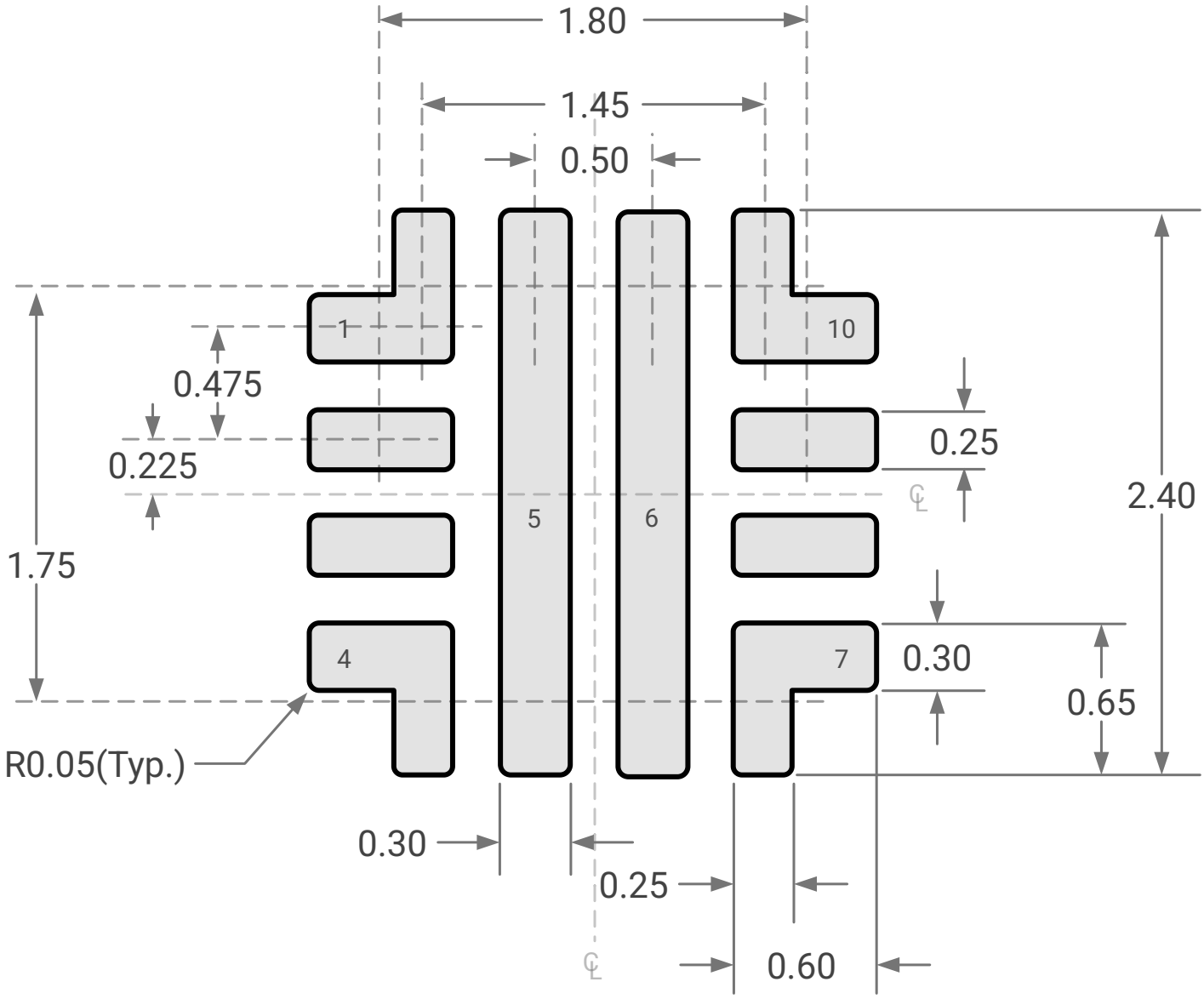
Notes

1. All dimensions are in millimeters.
2. Dimension b is measured 0.15 mm to 0.30 mm from the terminal tip. If an end radius is present, exclude the radius from the measurement.
3. Coplanarity applies to the exposed pad and all terminals.
4. Drawing is not to scale.

REF	MIN	NOM	MAX
A	0.750	0.850	0.950
A1	—	—	0.050
A3		0.023 Ref.	
D	1.900	2.000	2.100
E	1.900	2.000	2.100
b	0.200	0.250	0.300
b1	0.250	0.300	0.350
b2	0.250	0.300	0.350
b3	0.200	0.250	0.300
e		0.450 BSC	
e1		0.475 BSC	
e2		0.500 Ref.	
e3		1.450 Ref.	
L	0.300	0.400	0.500
L1	0.400	0.450	0.500
Geometric Tolerances			
aaa		0.08	
bbb		0.10	
ddd		0.05	

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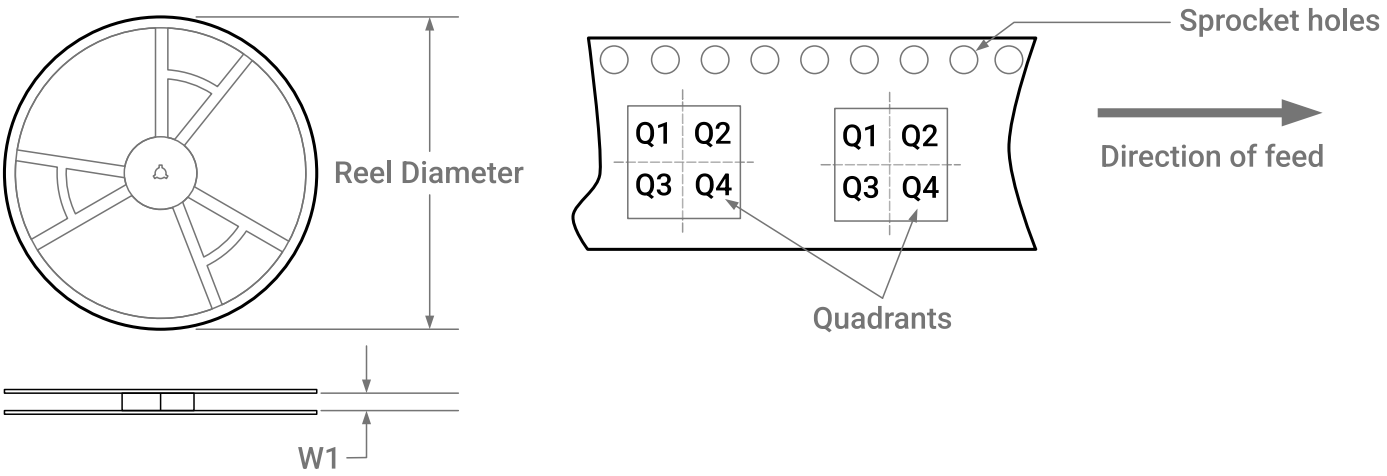
Recommended Land Pattern

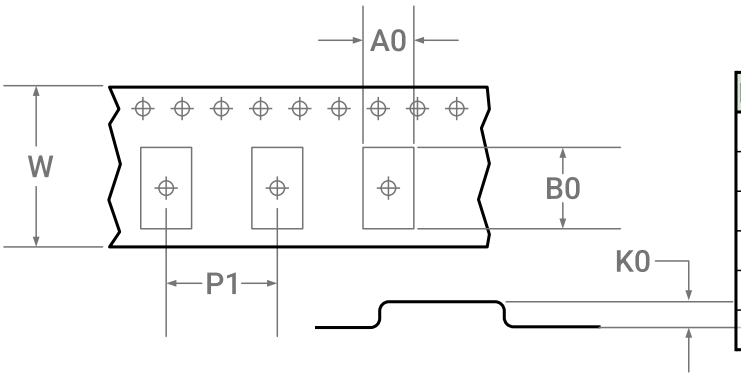


Note: All measurements are nominal

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Tape and Reel Information





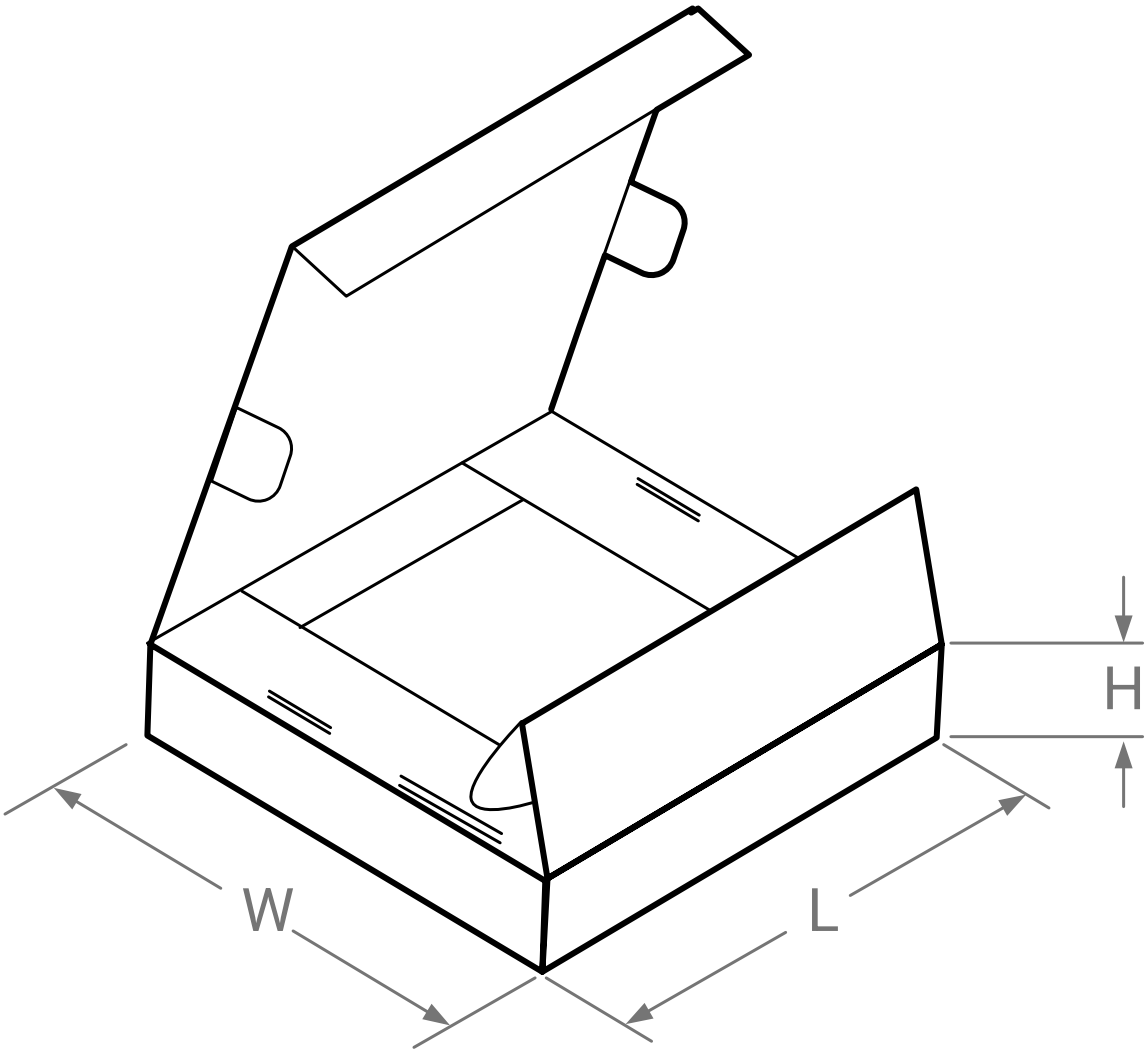
DIMENSION	DESCRIPTION
A0	Pocket width
B0	Pocket length
K0	Pocket depth
W1	Reel width
W	Carrier tape width
P1	Pocket pitch

PACKAGE SIZE	REEL DIAMETER	W1	A0	B0	K0	P1	W	QUADRANT
2 × 2	178	9.5	2.2	2.2	1.1	4.0	8.0	Q2

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
2 × 2	3000	205	200	25

Notes:

1. All measrements are in millimeters;
2. All mesaurements are nominal.

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