

RS7501 • RS7502 80V Half-Bridge GaN Gate Driver with Integrated Bootstrap Diode

Features

High-Performance GaN Gate Drive

- 80V half-bridge GaN gate driver
- 16ns typical propagation delay
- 1.5ns typical propagation-delay matching
- Fast rise and fall times
- 0.3Ω/0.6Ω pull-down/pull-up resistance

Flexible Gate-Drive Control

- Independent high-side and low-side CMOS-compatible inputs
- Separate turn-on and turn-off outputs for independent drive-strength optimization

Protection & Integration

- Integrated bootstrap diode
- VDD and bootstrap-supply undervoltage lockout (UVLO)
- Strong pull-down maintains gate low during power-off conditions

Package & Compliance

- RS7501: 12-pin WLCSP, 1.6mm × 1.6mm
- RS7502: 14-pin QFN, 2.5mm × 2.5mm
- RoHS compliant and Green

Applications

- Half-bridge and full-bridge converters
- Synchronous buck converters
- Active-clamp forward converters
- High-frequency DC-DC converters

Description

The RS7501 and RS7502 are 80V half-bridge gate drivers optimized for driving GaN FETs in high-frequency DC-DC power converters. The devices provide independent high-side and low-side CMOS-compatible inputs with fast 16ns typical propagation delay and 1.5ns typical propagation-delay matching for precise switching control.

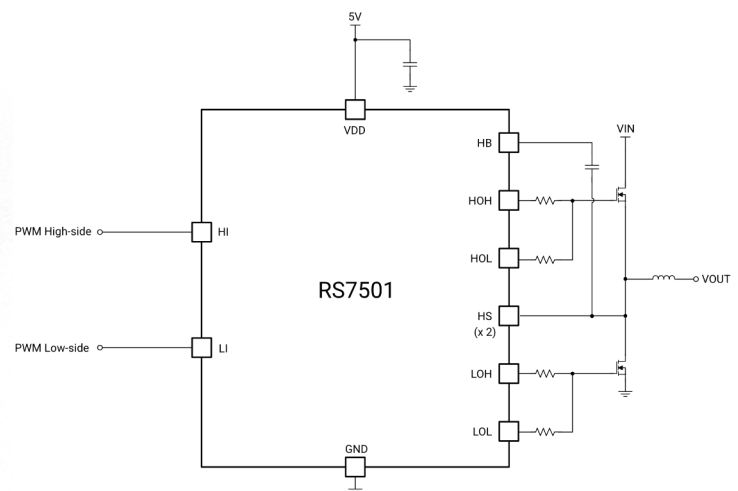
Separate turn-on and turn-off gate-drive outputs allow the source and sink paths to be optimized independently, providing greater control over switching transitions. A strong pull-down path helps maintain the GaN FETs in the off state during power-off conditions, reducing the risk of unintended turn-on.

An integrated bootstrap diode simplifies the high-side gate-drive supply, while undervoltage lockout (UVLO) protection is provided for both the VDD and bootstrap supplies.

The RS7501 is offered in a compact 1.6mm × 1.6mm, 12-pin WLCSP package, while the RS7502 is available in a 2.5mm × 2.5mm, 14-pin QFN package, providing flexible implementation options for space-constrained, high-frequency power designs.

PART NUMBER	PACKAGE	SIZE
RS7501	WLCSP-12	1.6 × 1.6mm
RS7502	QFN-14	2.5 × 2.5mm

Typical Application Schematic



Ordering Information

PART NUMBER	PACKAGE	SIZE	MSL RATING	SHIPPING METHOD	PACKAGE MARKING
RS7501	WLCSP-12	1.6 × 1.6mm	Level-1	3000u Tape & Reel	RS7501
RS7502	QFN-14	2.5 × 2.5mm	Level-1	3000u Tape & Reel	R7502

Top Marking (RS7501)



Line 1

- R: Prefix of Reed Semiconductor (R is replaced by E for engineering lots)
- YY: Year code
- WW: Week code
- S: Assembly site code

Line 2

- PPPPP: Truncated part number

Line 3

- LLLLL: Lot code

Top Marking (RS7502)



Line 1

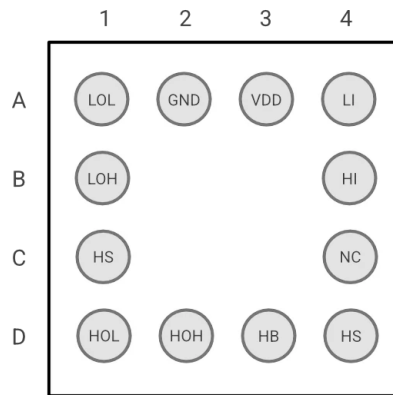
- R: Prefix of Reed Semiconductor (R is replaced by E for engineering lots)
- Y: Year code
- WW: Week code
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Line 2

- PPPPP: Truncated part number

Line 3

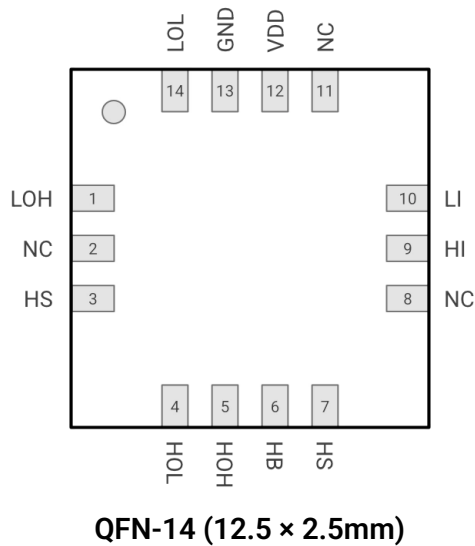
- LLLL: Lot code

Package Reference (RS7501)

WLCSP-12 (1.6 × 1.6mm)
Pin Descriptions

PIN	NAME	TYPE	DESCRIPTION
A1	LOL	O	Low-side gate-driver sink output. Connect to the gate of the low-side FET through a resistor to set the turn-off speed.
A2	GND	G	Ground. Reference ground for all signals.
A3	VDD	P	Supply voltage input. Connect to a 5V supply and bypass to GND with at least a 1µF MLCC capacitor.
A4	LI	I	Low-side gate-driver PWM input.
B1	LOH	O	Low-side gate-driver source output. Connect to the gate of the low-side FET through a resistor to set the turn-on speed.
B3	HI	I	High-side gate-driver PWM input.
C1, D4	HS	P	Switch-node and high-side gate-driver return. Connect to the source of the high-side FET and drain of the low-side FET.
C4	NC	—	No internal connection.
D1	HOL	O	High-side gate-driver sink output. Connect to the gate of the high-side FET through a resistor to set the turn-off speed.
D2	HOH	O	High-side gate-driver source output. Connect to the gate of the high-side FET through a resistor to set the turn-on speed.
D3	HB	P	High-side bootstrap supply. Connect a bootstrap capacitor between HB and HS. Place the capacitor close to the HB and HS pins.

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

Package Reference (RS7502)

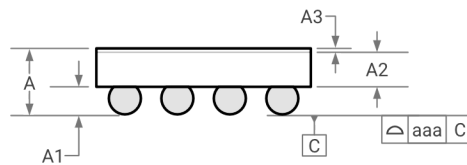


Pin Descriptions

PIN	NAME	TYPE	DESCRIPTION
1	LOH	O	Low-side gate-driver source output. Connect to the gate of the low-side FET through a resistor to set the turn-on speed.
2, 8, 11	NC	—	No internal connection.
3, 7	HS	P	Switch-node and high-side gate-driver return. Connect to the source of the high-side FET and drain of the low-side FET.
4	HOL	O	High-side gate-driver sink output. Connect to the gate of the high-side FET through a resistor to set the turn-off speed.
5	HOH	O	High-side gate-driver source output. Connect to the gate of the high-side FET through a resistor to set the turn-on speed.
6	HB	P	High-side bootstrap supply. Connect a bootstrap capacitor between HB and HS. Place the capacitor close to the HB and HS pins.
9	HI	I	High-side gate-driver PWM input.
10	LI	I	Low-side gate-driver PWM input.
12	VDD	P	Supply voltage input. Connect to a 5V supply and bypass to GND with at least a 1µF MLCC capacitor.
13	GND	G	Ground. Reference ground for all signals.
14	LOL	O	Low-side gate-driver source output. Connect to the gate of the low-side FET through a resistor to set the turn-on speed.

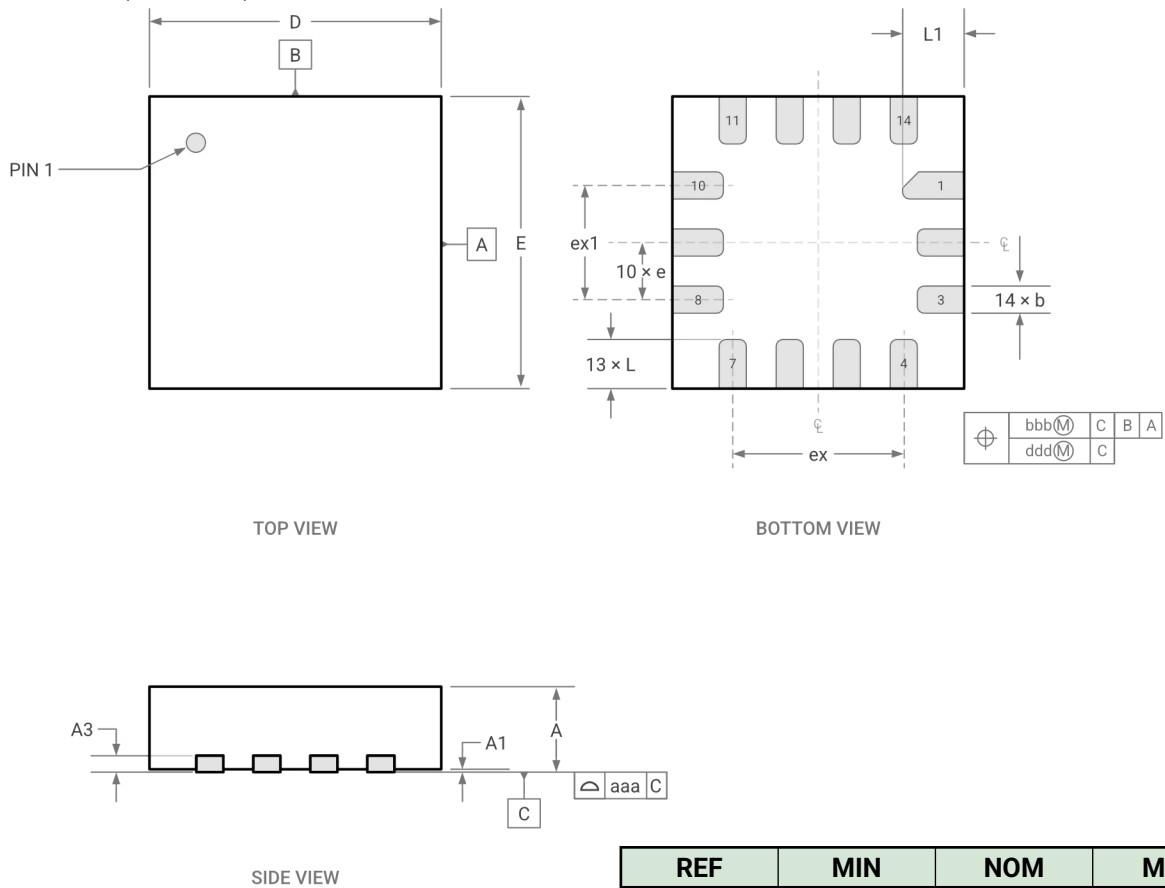
Type: I = Input, O = Output, I/O = Bidirectional, P = Power, G = Ground, — = No Connect.

A diagram of a square cross-section of a beam. The top width is labeled D with a dimension line. The right height is labeled E with a dimension line. A small square labeled B is centered on the top edge. A small square labeled A is on the right edge. An arrow labeled $PIN\ A1$ points to the left edge of the square.



REF	MIN	NOM	MAX
A	—	—	0.50
A1	0.17	0.185	0.20
A2	0.225	0.250	0.275
A3	—	0.025	—
D	1.58	1.60	1.62
E	1.58	1.60	1.62
ø	0.225	0.265	0.305
e	0.40 BSC		
ex	1.20 BSC		
Geometric Tolerancing			
aaa	0.05		
bbb	0.15		

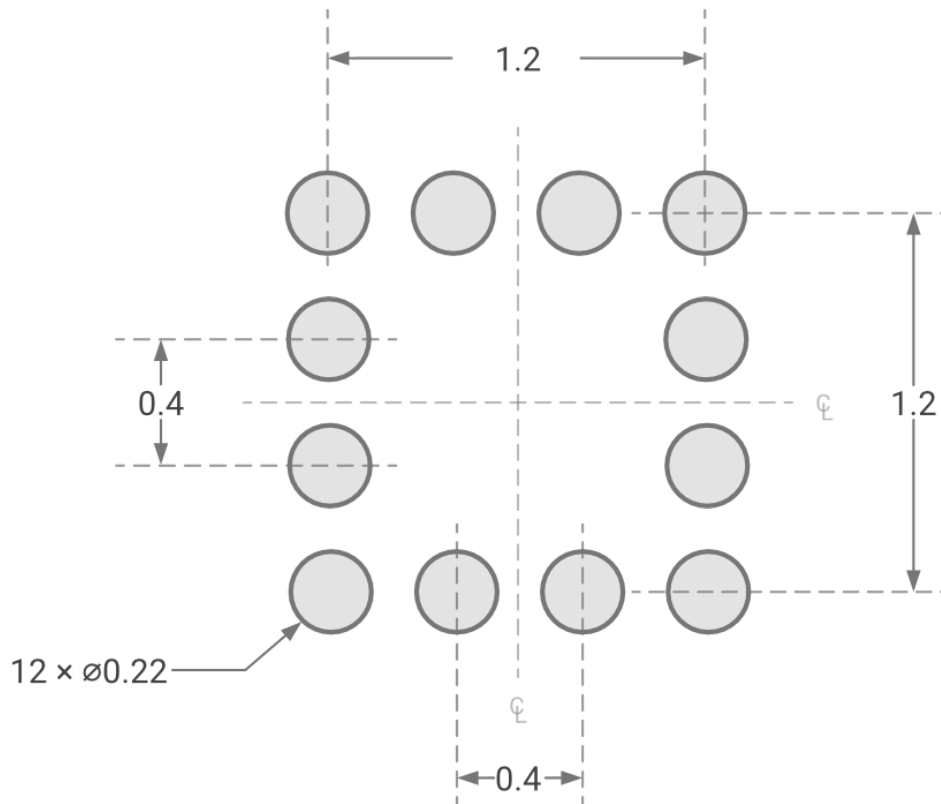
1. All dimensions are in millimeters.
2. Drawing is not to scale.

Package Dimensions (RS7502)

Notes

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

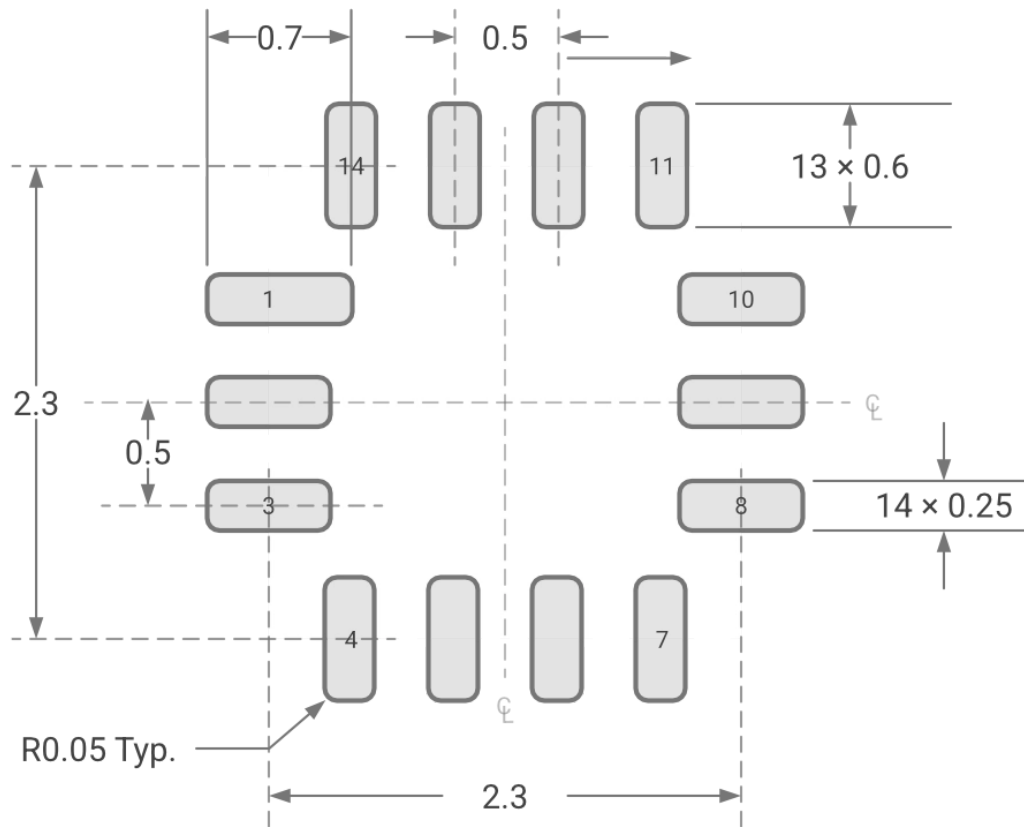
REF	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	—	—	0.05
A3	0.152 Ref.		
D	2.40	2.50	2.60
E	2.40	2.50	2.60
b	0.20	0.25	0.30
L	0.35	0.40	0.45
L1	0.45	0.50	0.55
e	0.50 BSC		
ex	1.50 BSC		
ex1	1.00 BSC		
Geometric Tolerancing			
aaa	0.08		
bbb	0.10		
ddd	0.05		

Recommended Land Pattern (RS7501)



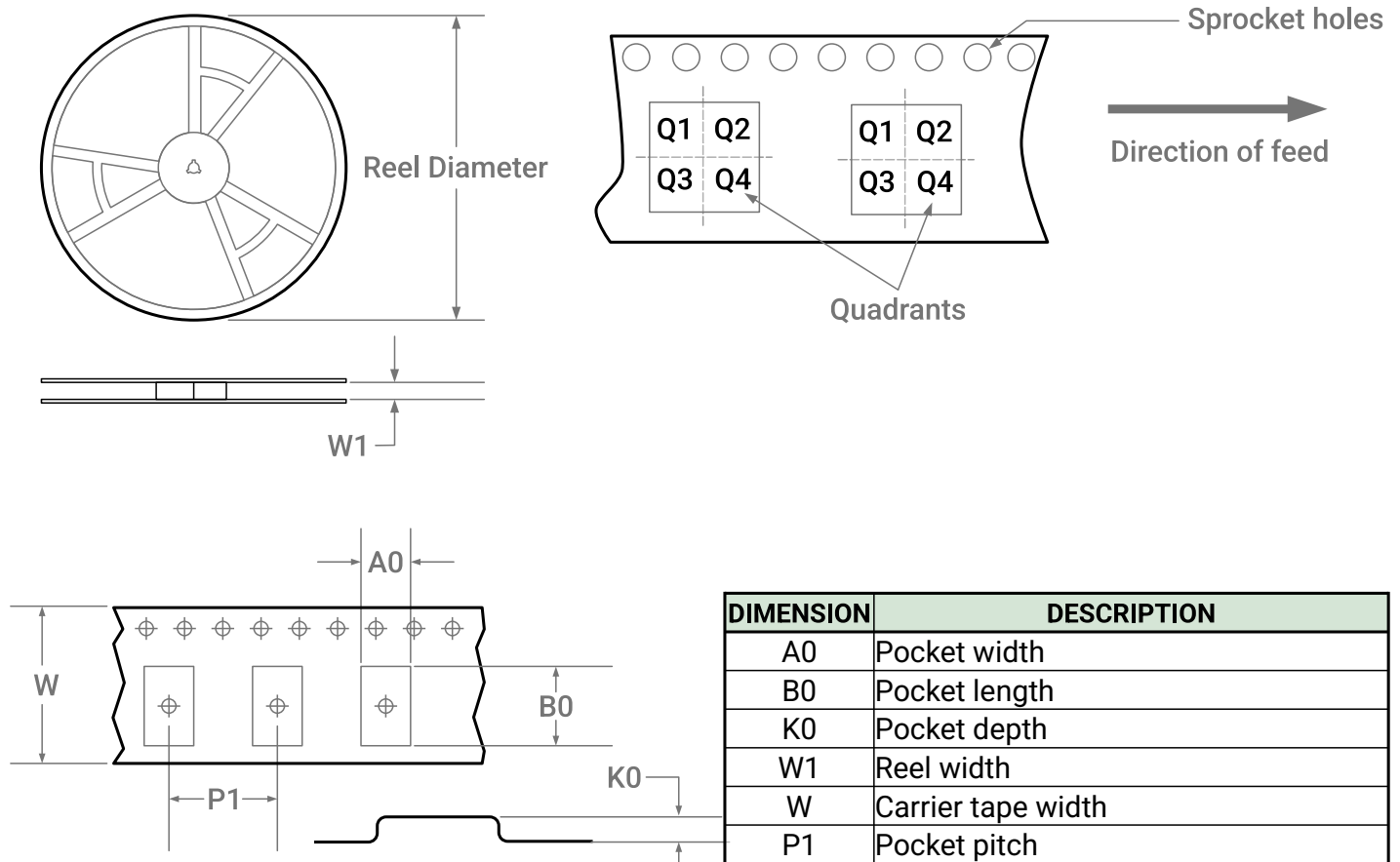
Notes:

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

Recommended Land Pattern (RS7502)

Notes:

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

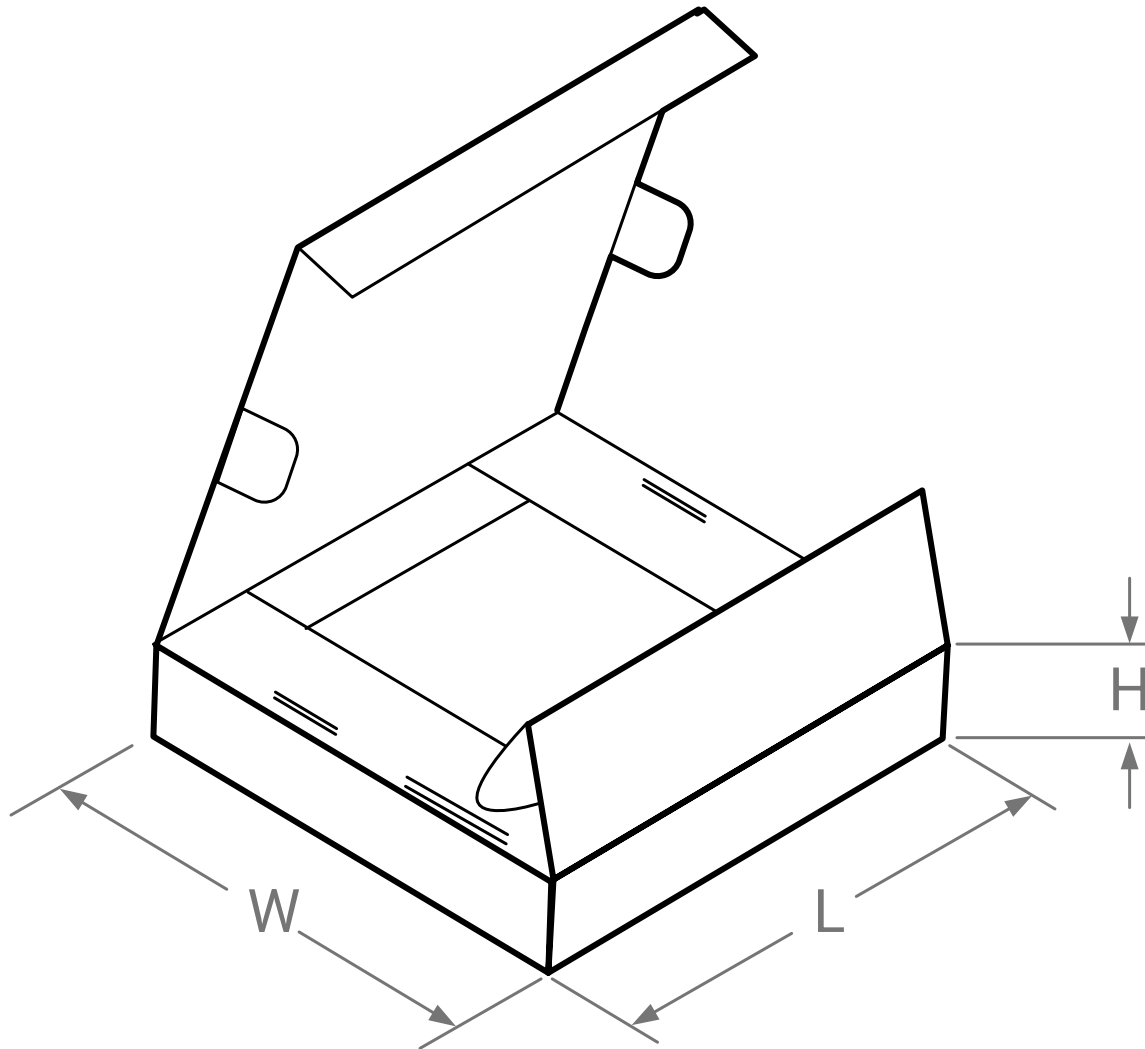
Tape and Reel Information



PACKAGE SIZE	REEL DIAMETER	W1	A0	B0	K0	P1	W	QUADRANT
1.6 × 1.6	178	8	1.78	1.78	0.69	4.0	8.0	Q1
2.5 × 2.5	178	8	2.7	2.7	1.00	4.0	8.0	Q2

Note:

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

Pizza Box Dimensions


PACKAGE SIZE	UNITS / BOX	LENGTH	WIDTH	HEIGHT
1.6 × 1.6	3000	205	200	25
2.5 × 2.5	3000	205	200	25

Notes:

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