

RS31380 4.5V to 16V, 50A Stackable eFuse with PMBus

Features

Power Path & Performance

- The RS31380 supports a wide input voltage range: 4.5V to 16V
- 50A continuous output current
- Integrated 0.8mΩ power MOSFET
- Programmable soft-start and inrush current control

Scalability

- Standalone or parallel operation with the [RS31386](#)
- Smart eFuse controller architecture

Protection & Control

- Programmable overcurrent and short-circuit protection
- Input OVP, SCP, OCP, OTP
- Configurable fault response: no action, latch, or auto-retry

Monitoring & Telemetry

- PMBus™/I2C 1.3 compliant
- +/-1.5% reporting accuracy for VIN, VOUT, IOUT, PIN, POUT and temperature
- Integrated current sensing output

System Integration

- Standalone operation or parallel operation with (RS31386)
- Programmable TON_DELAY and TOFF_DELAY
- Fault signal output (GOK) and fault indicator (FLT_TYPE) outputs

Package

- LGA-45, 5x7mm
- RoHS Compliant

Applications

- Server and AUX supplies
- PCI and PCIe cards
- Disk Drives
- Router and Networking
- Laptops

Description

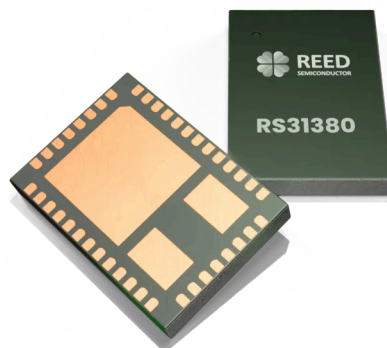
The RS31380 is a fully integrated 50A hot-swap controller with an integrated 0.8mΩ power MOSFET, designed to provide inrush current control, circuit protection, and power monitoring for high-availability systems. Operating from a 4.5V to 16V input, it enables safe board insertion while minimizing external component count and PCB area. The device supports standalone operation or can be configured for parallel operation with the [RS31386](#) to support higher current applications.

An integrated PMBus interface enables comprehensive system configuration, telemetry, and fault management. The RS31380 monitors and reports input voltage (VIN), input current (IIN), output voltage (VOUT), output current (IOUT), input energy (EIN), input power (PIN), output power (POUT), junction temperature, and fault status, simplifying system diagnostics and predictive maintenance.

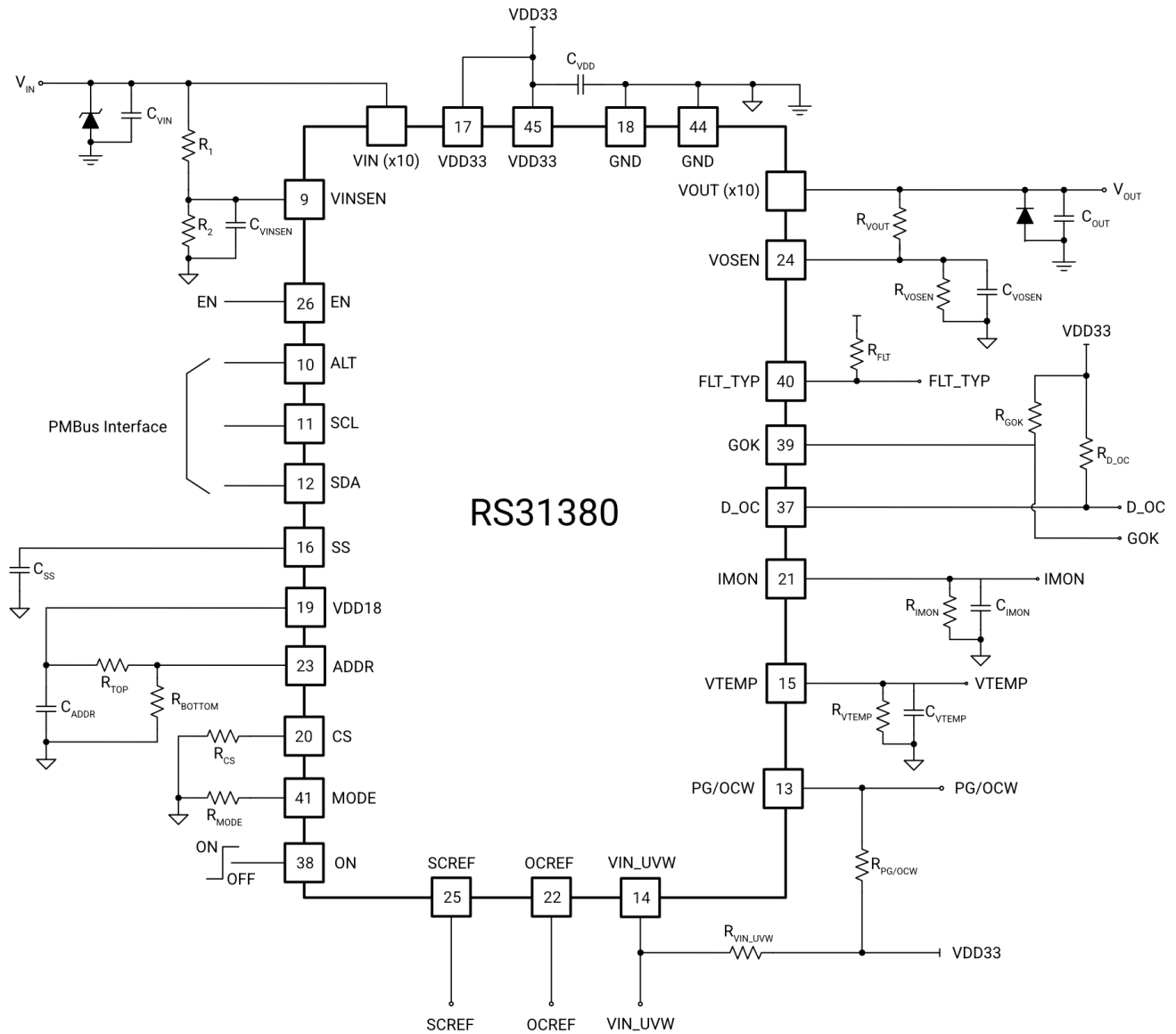
Programmable inrush control, adjustable soft-start, insertion delay, overcurrent limit, and short-circuit current limit provide flexible power sequencing and startup control.

Comprehensive protection features—including input overvoltage protection (VIN OVP), overcurrent protection (OCP), short-circuit protection (SCP), and overtemperature protection (OTP)—support configurable fault responses including no action, auto-retry, hiccup, or latch-off. Dedicated GOK and FLT_TYPE outputs provide immediate hardware fault indication in addition to PMBus reporting.

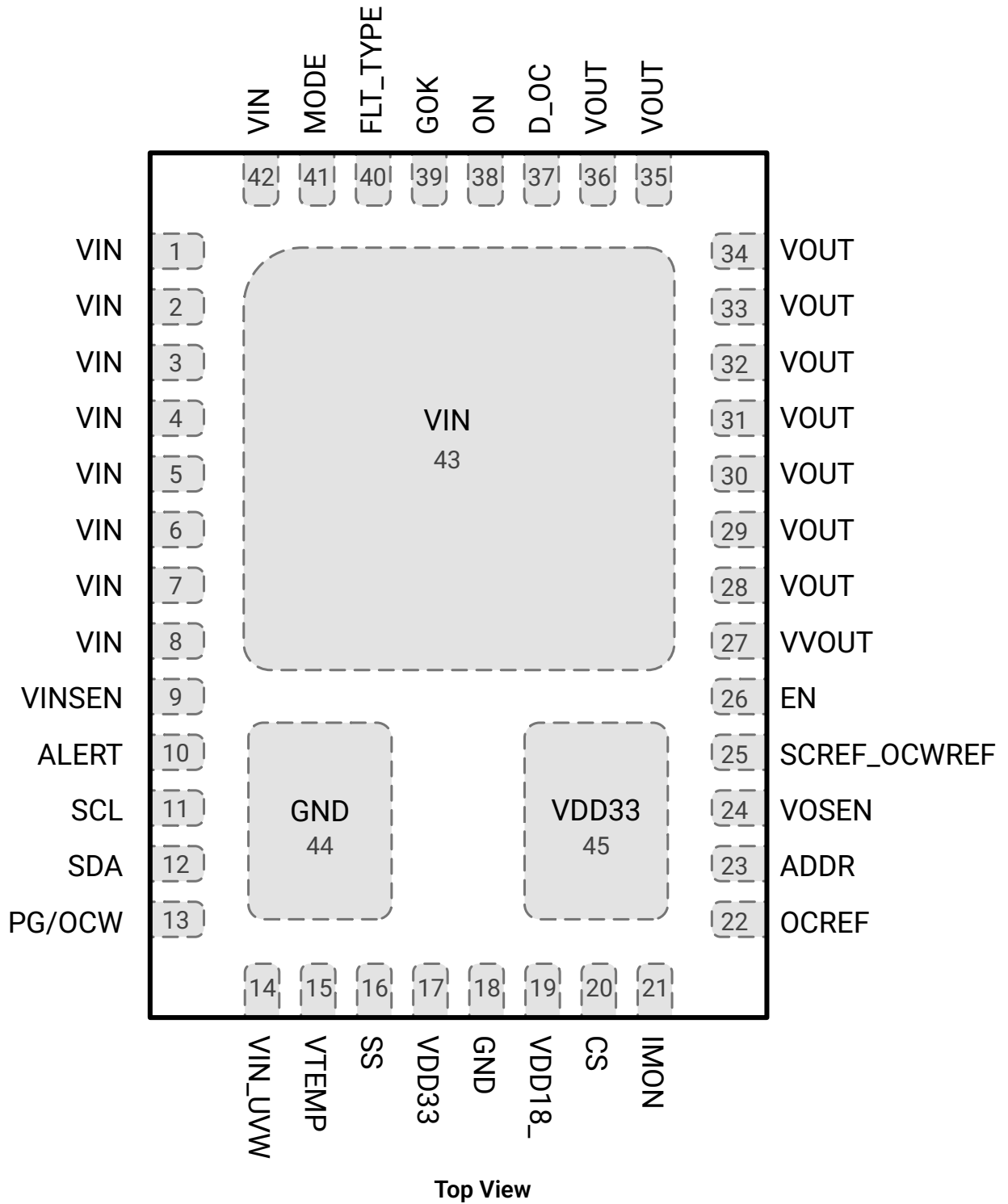
The RS31380 is optimized for AI accelerators, servers, networking equipment, storage systems, telecommunications, and other high-performance computing applications requiring intelligent hot-swap protection, accurate power monitoring, and robust system reliability.



Typical Application Circuit

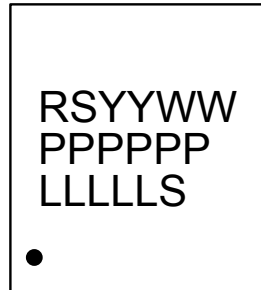


Package Reference



Orderable Options

PART NUMBER	PACKAGE	SIZE	MSL RATING	SHIPPING METHOD	PACKAGE MARKING
RS31380	LGA - 45	5 × 7	Level - 3	3000u Tape & Reel	R31380

Top Marking

Line 1

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

Line 2

- PPPPPP; Truncated part number

Line 3

- LLLLL: Lot code
- S: Assembly site code

Note: To improve clarity, this datasheet explicitly identifies all configurable ordering options. Earlier part numbers that omitted default option designators remain valid and fully supported.

Pin Descriptions

PIN	NAME	TYPE	DESCRIPTION
1 –8, 42, 43	VIN	P	Power input. Connect to the input supply with appropriate input bypass capacitors.
9	VINSEN	I	Input voltage sense input for PMBus telemetry. Connect to VIN through a resistor divider to monitor the input voltage using the internal ADC.
10	ALERT	O	PMBus ALERT output. Open-drain, active-low interrupt indicating a PMBus alert condition.
11	SCL	I	PMBus serial clock input.
12	SDA	I/O	PMBus bidirectional serial data pin.
13	PG/OCW	O	Open-drain status output configurable as either Power Good (PG) or Overcurrent Warning (OCW). • PG: Asserts high when soft-start is complete and VOUT exceeds the Power Good threshold. • OCW: Asserts low when the sensed output current exceeds the programmed warning threshold.
14	VIN_UVW	O	Open-drain, active-low input undervoltage warning output. Asserts low when VIN falls below the programmed warning threshold.
15	VTEMP	O	Temperature sense input for parallel operation. Connect VTEMP pins of all slave eFuses together. A 49.9kΩ resistor and 1nF capacitor to AGND allow the RS31380 to report the highest junction temperature among all phases
16	SS	I	Soft-start timing pin. Connect a capacitor from SS to GND to program the output soft-start time.
17, 45	VDD33	P	Internal 3.3V LDO output. Bypass to GND with a 1μF (minimum) capacitor placed close to the pin.
18, 44	GND	G	Ground reference.
19	VDD18	P	Internal 1.8V LDO output for the digital core. Bypass to GND with a 1μF (minimum) capacitor placed close to the pin.
20	CS	O	Current sense output. The CS voltage (VCS) is compared with OCREF to determine the overcurrent limit and is also used to generate the D_OC indication. Connect a resistor from CS to GND to program VCS.
21	IMON	O	Analog current monitor output proportional to the load current. Connect a resistor and 10nF–100nF capacitor from IMON to AGND to generate the output current monitor voltage.
22	OCREF	O	Overcurrent limit reference output. The internal DAC generates OCREF, which is compared with CS to determine the programmed overcurrent limit.
23	ADDR	I	PMBus address select input. Connect a resistor divider from VDD18 to AGND to program the 4-bit PMBus slave address.
24	VOSEN	I	Output voltage sense input for PMBus telemetry. Connect to VOUT through a resistor divider to monitor the output voltage using the internal ADC.
25	SCREF_OCWREF	O	Short-circuit current limit and overcurrent warning reference output. The internal DAC sets the short-circuit current limit and OC warning threshold. When SS exceeds 250mV and ON is high, the output transitions to the OCW reference level.

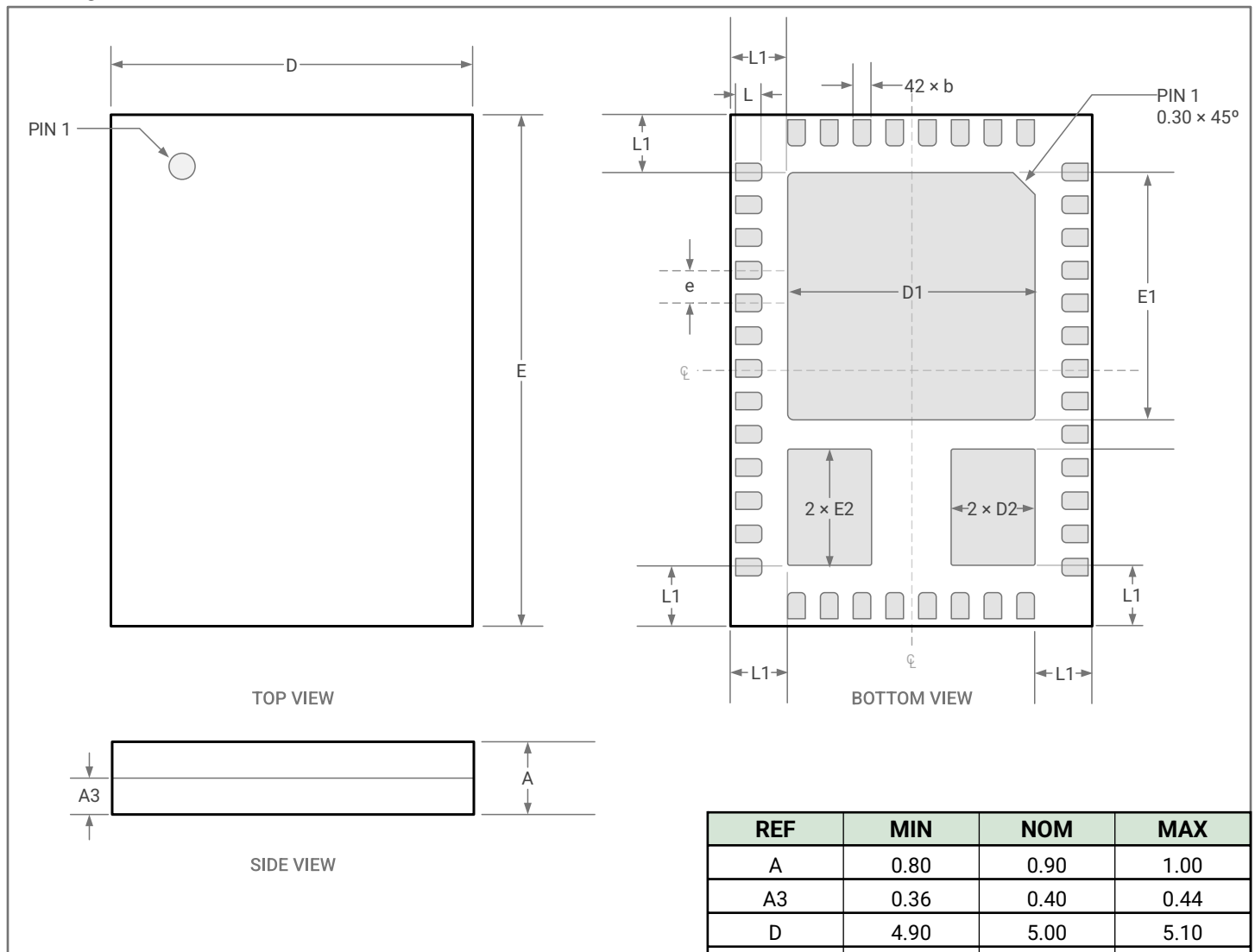
Type: I = Input, O = Output, I/O = Bidirectional, P = Power, G = Ground, – = No Connect.

Pin Descriptions Continued

PIN	NAME	TYPE	DESCRIPTION
25	SCREF_OCWREF	O	Short-circuit current limit and overcurrent warning reference output. The internal DAC sets the short-circuit current limit and OC warning threshold. When SS exceeds 250mV and ON is high, the output transitions to the OCW reference level.
26	EN	I	Device enable input. Drive high to enable the eFuse and low to disable it.
27 – 36	VOUT	P	Protected power output.
37	D_OC	O	Open-drain digital overcurrent indication. Asserts low when the CS voltage exceeds the OCWREF threshold.
38	ON	I	Power MOSFET gate control output. Drives the external eFuse MOSFET gate above 2V to turn the device on.
39	GOK	O	Open-drain Power Good/Fault status output.
40	FLT_TYPE	O	Fault type indication output. Identifies the fault condition following a protection event.
41	MODE	I	Mode select input. Connect a 120kΩ ±1% resistor from MODE to GND.

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

Package Dimensions

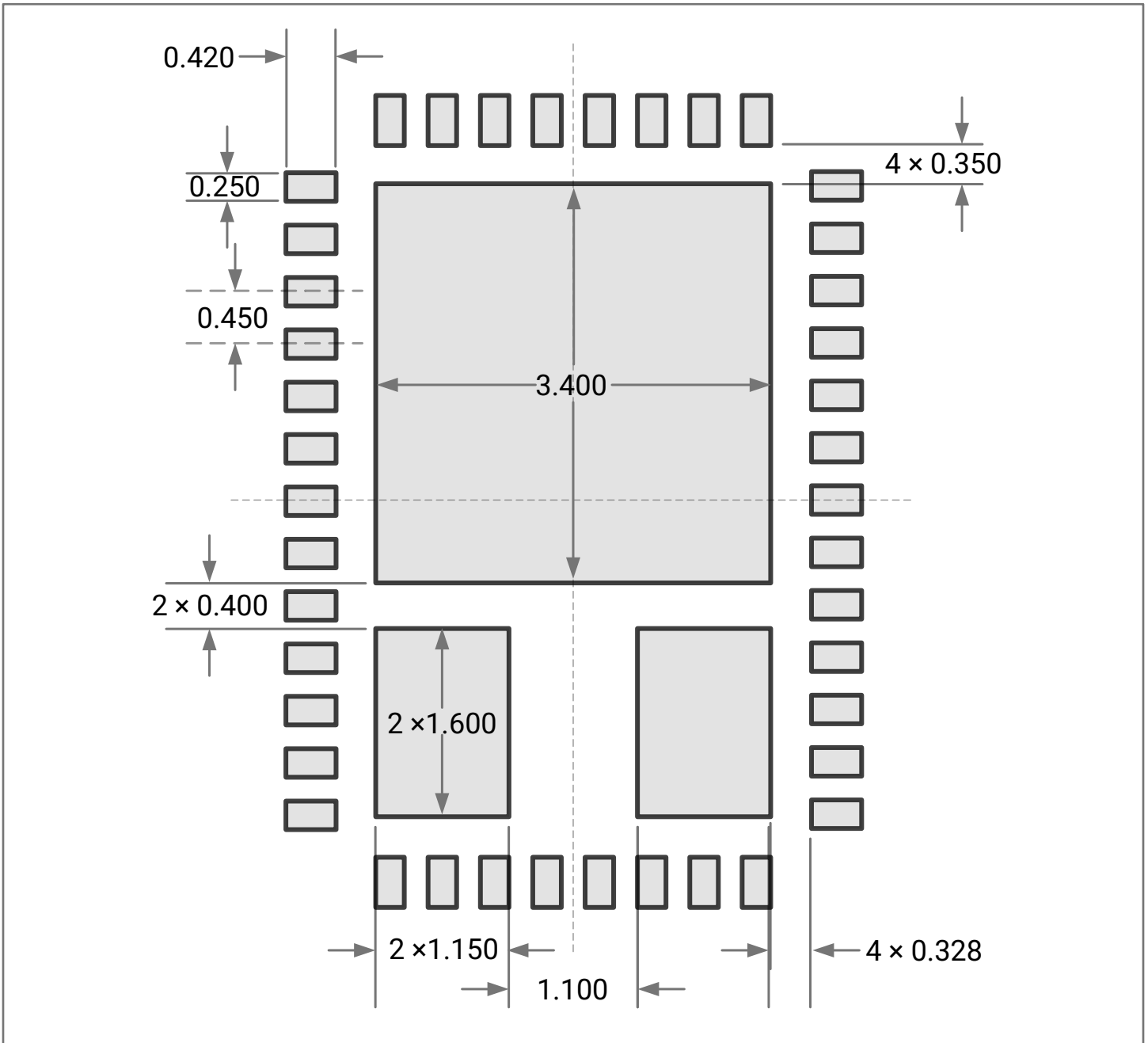


Notes

1. All dimensions are in millimeters.
2. Lead coplanarity shall be 0.1 millimeter max.
3. Drawing is not to scale.

REF	MIN	NOM	MAX
A	0.80	0.90	1.00
A3	0.36	0.40	0.44
D	4.90	5.00	5.10
E	6.90	7.00	7.10
D1	3.30	3.40	3.50
E1	3.30	3.40	3.50
D2	—	1.15	—
E2	—	1.60	—
L	0.375 BSC		
e	0.450 BSC		
b	0.250 BSC		
L1	0.800 BSC		

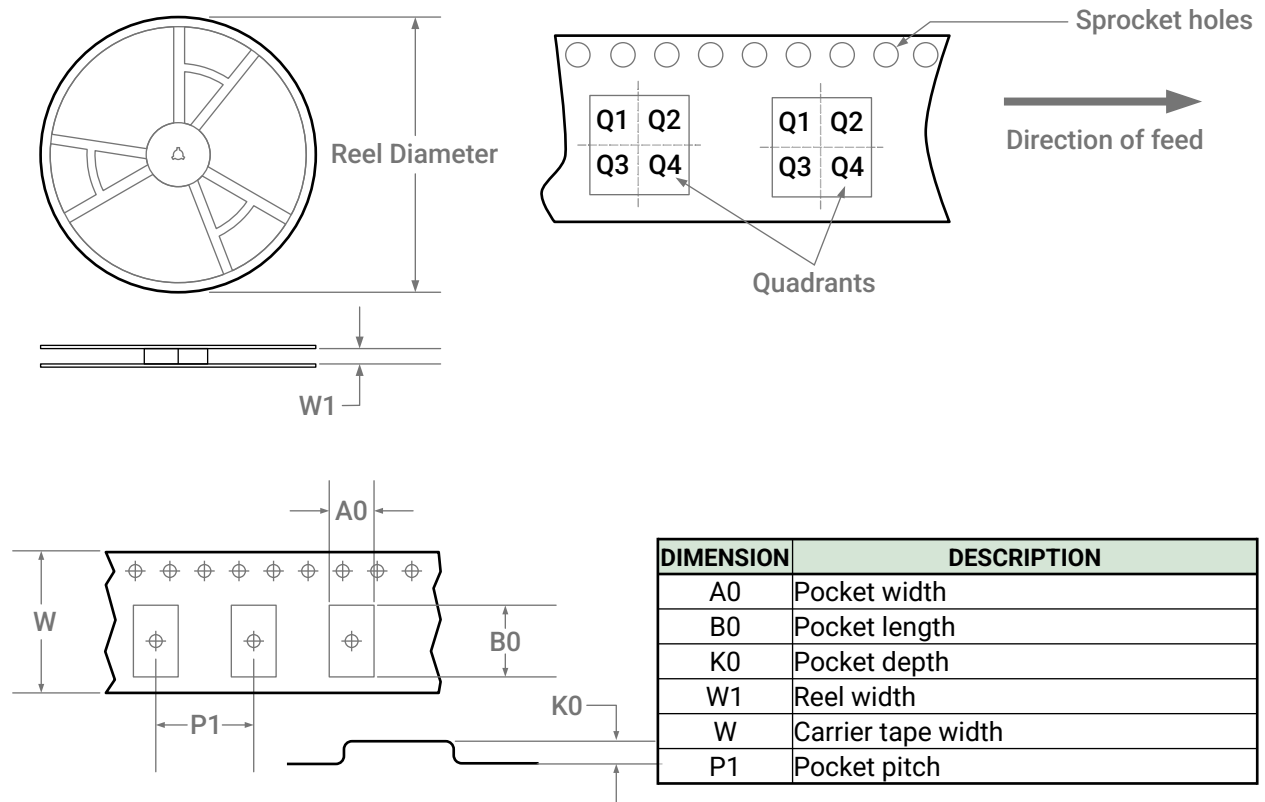
Recommended Land Pattern



Notes:

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2. Drawing is not to scale.

Tape and Reel Information

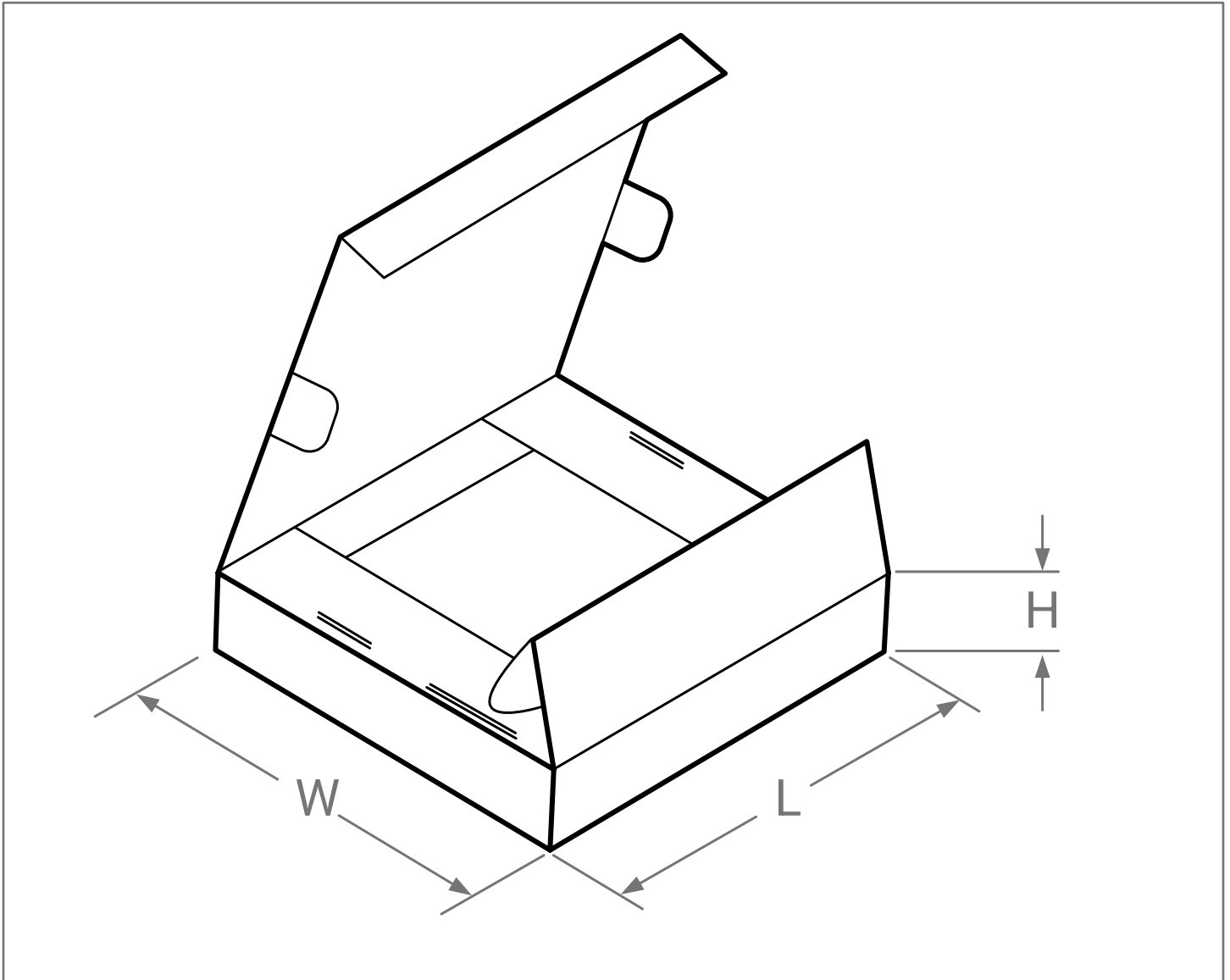


DEVICE SIZE	REEL DIAMETER	W1	A0	B0	K0	P1	W	QUAD
5 × 7	330	16.4	5.3	7.3	1.30	8.0	16.0	Q1

Notes:

1. All dimensions are in millimeters
2. All dimensions are nominal

Reel and Carrier Pattern



DEVICE SIZE	UNITS/BOX	L	W	H
5 × 7	3000	358	340	50