

RS53319 2.85V to 16V Input, 20A Sync Step-Down Converter with Programmable Switching Frequency and Over Current Limit

Features

- Robust Constant On Time (RCOT™) Control with fast transient response
- Input Voltage Range: 2.85V to 16V with external bias, or 4V to 16V with internal bias
- Output Voltage Range: 0.6V to 5.5V for RS53319 and RS53319L, 0.9V to 5.5V for RS53319H. 90% max duty cycle
- 20A continuous output current
- Excellent load and line regulations with 0.5% voltage accuracy
- Differential Remote Sensing
- Mode Selection Between Pulse Skip and CCM at Light Load
- Programmable soft-start time
- 1.0µA Current into VIN Pin during Shutdown
- Programmable Switch Valley Current Limit
- Adjustable Switching Frequency: 600kHz, 800kHz, 1000kHz and 2.1MHz
- Non-latch OCP, UVP, UVLO and OTP. Latch-off OVP
- 3mm x 4mm 21-Pin QFN Package
- RoHS compliant and Green

- Computing, Servers, Storage, AI
- Point of Load (POL) Module
- Standard 12V Rail Supplies
- Gaming Consoles and Graphic Cards
- TV Power

Description

The RS53319 is a high-power density, fully integrated synchronous buck converter. It has a wide input voltage range, and can support up to 12A continuous output current at defined conditions. LDO is integrated internally, which is very suitable for single input supply condition. External bias is optional for maximizing the efficiency. A differential sensing scheme and an internal feedback reference voltage achieve ±1% tolerance over full temperature range and, in conjunction, they perform an excellent line and load regulation.

Switching frequency can be easily adjusted from 600kHz, 800kHz, 1000kHz, to 2.1MHz. The RS53319 uses patented Robust Constant On Time (RCOT™) control scheme with fast transient response. Pure MLCC output capacitors can be used to save space and cost.

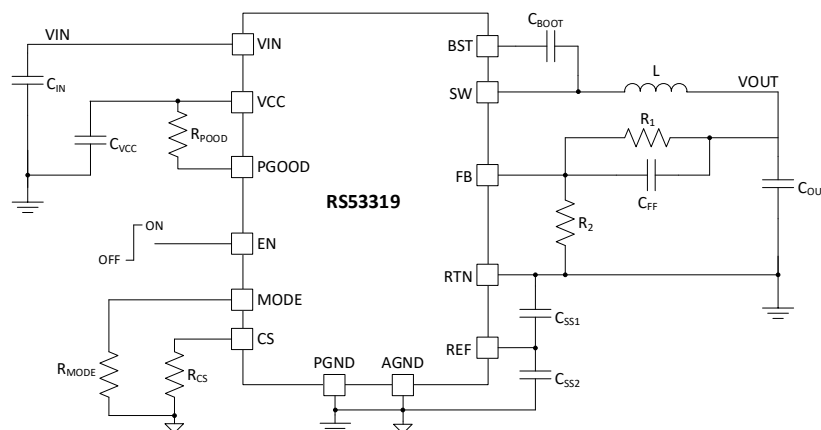
RS53319 has full protection features including OCP, NOCP, OVP, UVP and over temperature protection (OTP).

The RS53319 is available in a 3mm x 4mm 21-Pin QFN package.

Applications

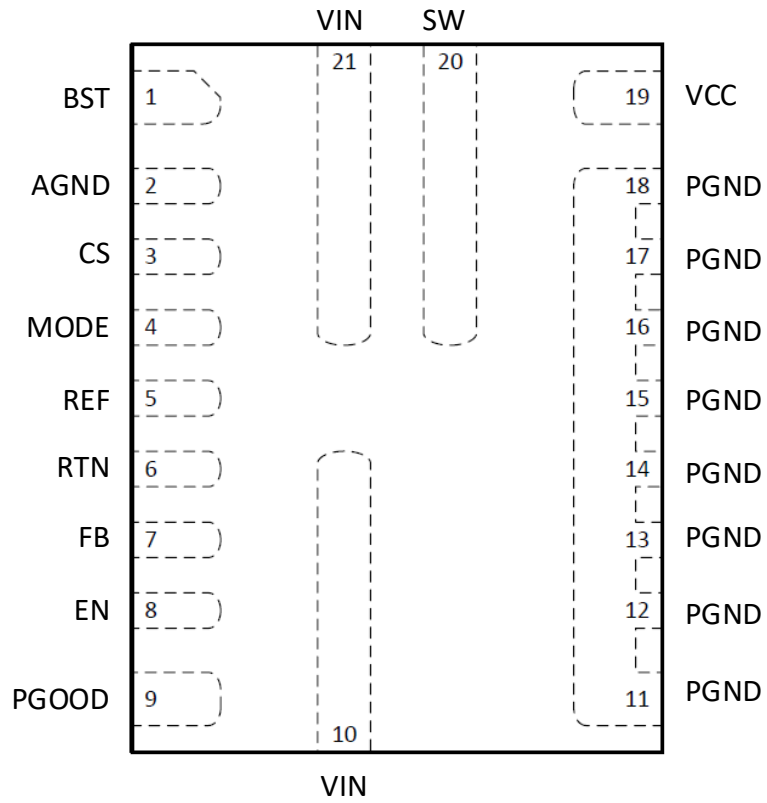
- Telecom/Datacom
- Base Station

Typical Application Circuit



Package Reference

Top View



QFN-21 (3x4mm)

Part Number and Order Information

Part Number	VCC	VREF	Package	MSL	Shipping Method	Package Marking
RS53319T	5V	0.6V	QFN-21	Level-1	500u Tape & Reel	R53319
RS53319R	5V	0.6V			5000u Tape & Reel	R53319
RS53319LT	3.3V	0.6V			500u Tape & Reel	R3319L
RS53319LR	3.3V	0.6V			5000u Tape & Reel	R3319L
RS53319HT	3.3V	0.9V			500u Tape & Reel	R3319H
RS53319HR	3.3V	0.9V			5000u Tape & Reel	R3319H

Top Marking

RSYYWW
PPPPPP
● LLLLLS

Line 1

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

Line 2

- PPPPPP: Truncated part number

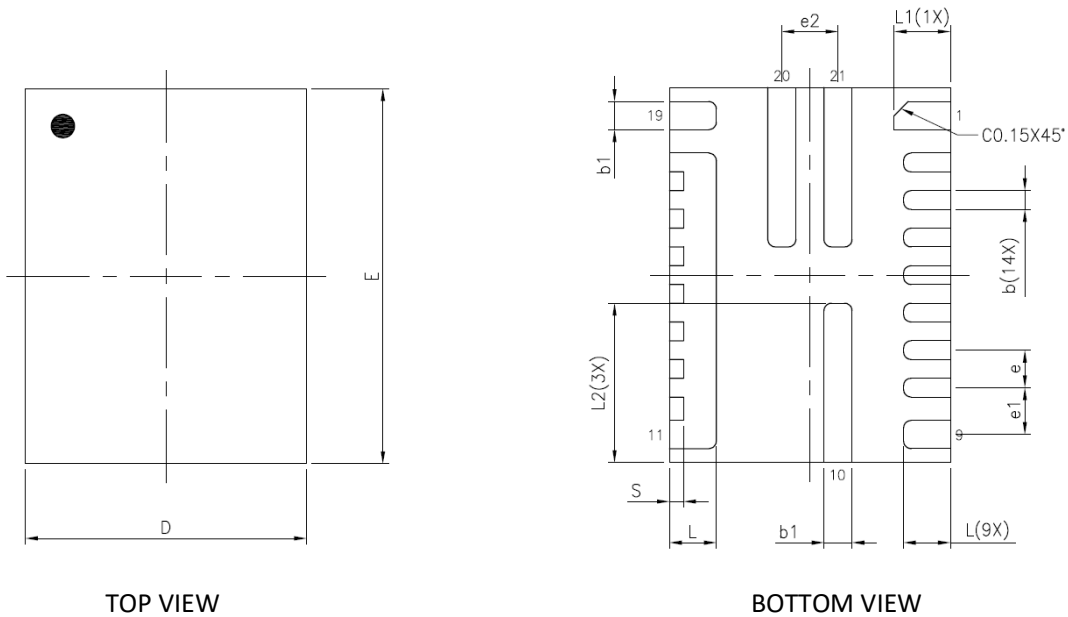
Line 3

- LLLLL: Lot code
- S: Assembly site code

Pin Description

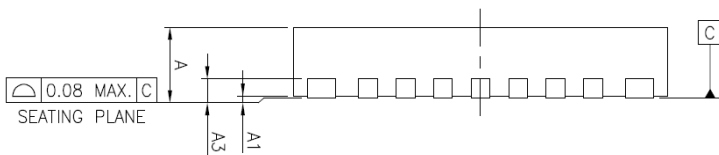
Pin Number	Name	Description
1	BST	Bootstrap connection. A capacitor connected between SW and BST is required to form a floating supply across the high-side switch driver. Use 0.1uF to 1uF value for boot capacitor.
2	AGND	Signal logic ground. A Kelvin connection to PGND is required.
3	CS	Current limit setting. Connect a resistor to AGND to set the inductor valley current limit trip point.
4	MODE	Operation mode selection. Connect a resistor to AGND to set switching frequency and DCM/FCCM operation.
5	REF	Connect a capacitor to PGND to set soft start time.
6	RTN	Output remote sense return.
7	FB	Output remote sense feedback. Use the external resistor divider from the output to AGND tapped to FB to set output voltage. Place the resistor divider close to FB in layout.
8	EN	Enable pin. Drive EN high to initiate VCC internal LDO and soft start. Do not float this pin.
9	PGOOD	Power good output with open drain.
10, 21	VIN	Supply voltage. Input to the power stage and internal LDO. Place input capacitor close to VIN pin in layout.
11~18	PGND	System Ground. Power ground of the power stage.
19	VCC	Internal 3.3V LDO for RS53319L and RS53319H, or 5V LDO output for RS53319. Use 1uF or larger value for VCC capacitor. Place VCC capacitor close to VCC pin in layout.
20	SW	Switch node of power stage. Use wide copper plane to connect SW pin to inductor.

PACKAGE DIMENSION



TOP VIEW

BOTTOM VIEW



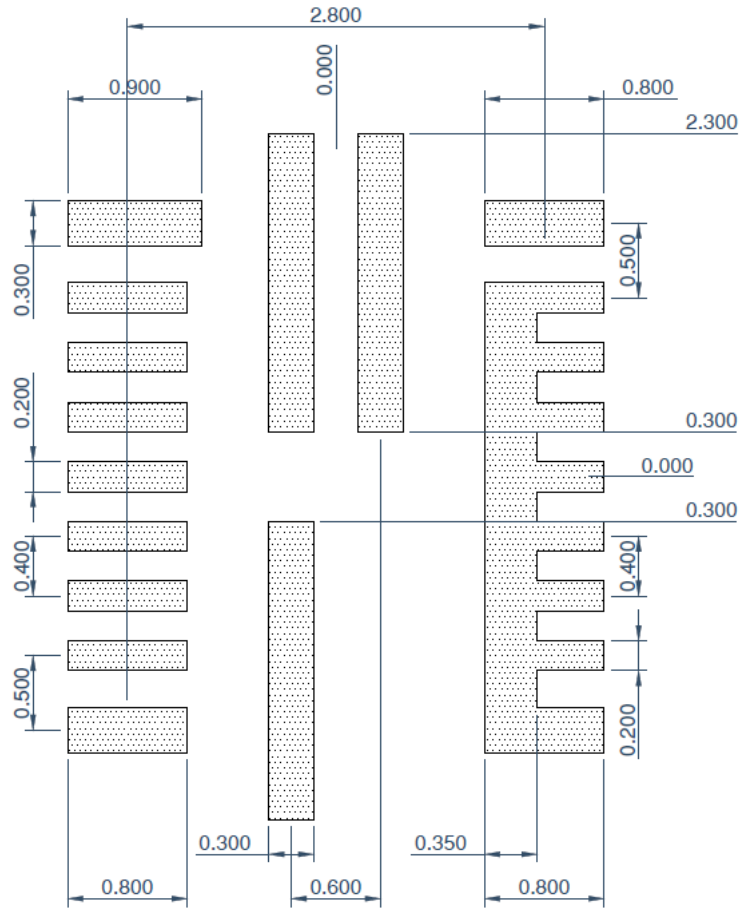
SIDE VIEW

JEDEC OUTLINE	N/A		
PKG CODE	WQFN(XM52)		
SYMBOLS	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
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	1.75
S	0.15 REF.		

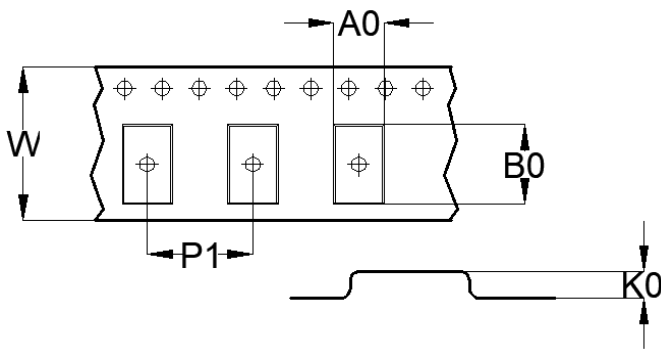
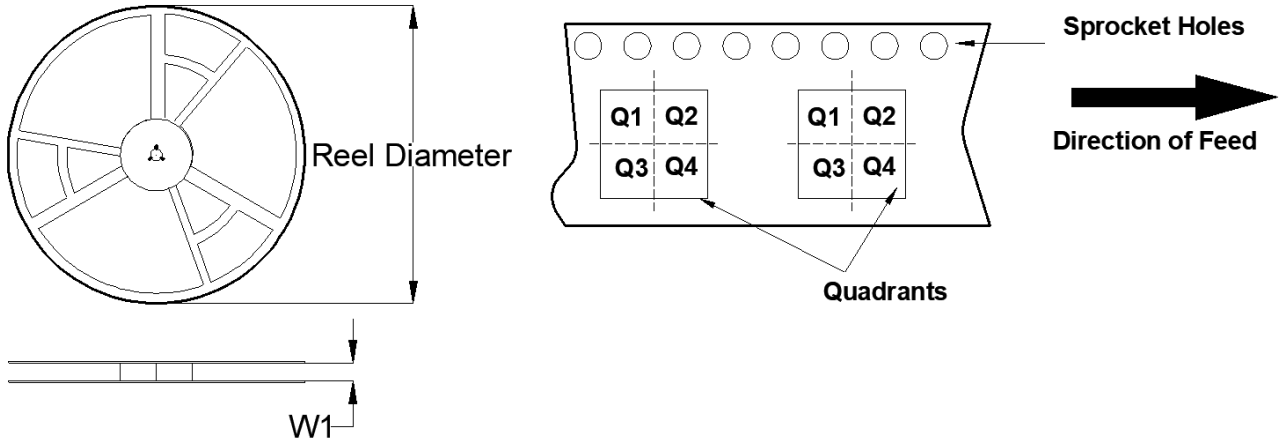
NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15mm AND 0.30mm FROM THE TERMINAL TIP. IF THE TERMINAL HAS THE OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMENSION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.
3. BILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.

RECOMMENDED LAND PATTERN



TAPE AND REEL INFORMATION

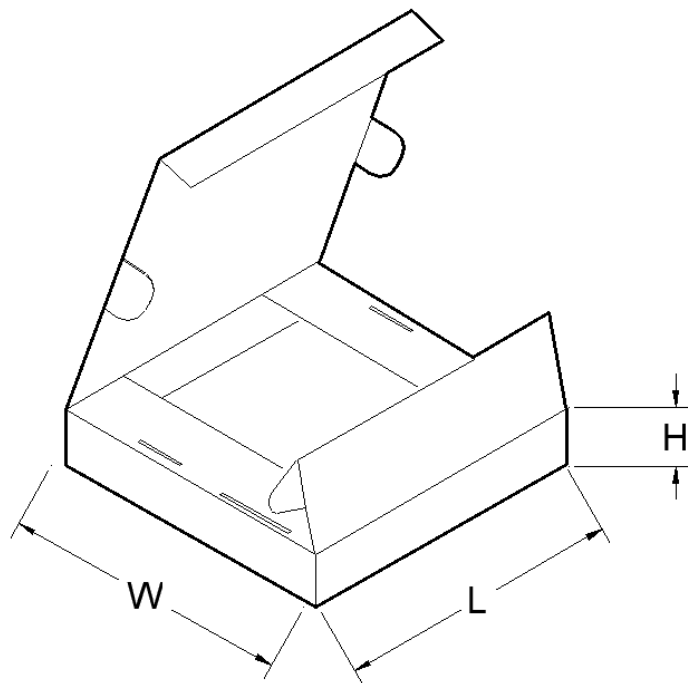


A0	Pocket width
B0	Pocket length
K0	Pocket thickness
W1	Reel Width
W	Inner width of the carrier tape
P1	Pitch between pocket centers

PKG type (mm)	Reel Diameter (mm)	Reel Width W1(mm)	A0(mm)	B0(mm)	K0(mm)	P1(mm)	W(mm)	Quad
3x4	330	12.8	3.4	4.4	1.10	8.00	12.0	Q1

Note: All the data is nominal

PIZZA BOX DIMENSION



PKG type (mm)	Units/box	Length(mm)	Width(mm)	Height(mm)
3x4	5000	355	340	50

Note: All the data is nominal