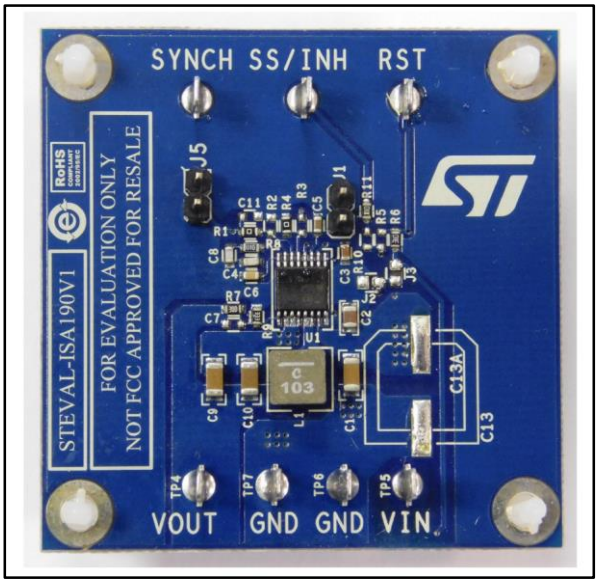
STEVAL-ISA190V1

38 V, 1.5 A synchronous step-down switching regulator evaluation board based on A6986F

Data brief



Features

- AECQ100 qualification
- 1.5 A DC output current
- 4 V to 38 V operating input voltage
- Low consumption mode or low noise mode
- Programmable I_{SKIP} current
- 30 µA I_Q at light load (LCM V_{IN} = 12 V and V_{OUT} = 3.3 V)
- 8 µA $I_{Q\text{-}SHTDWN}$
- Adjustable f_{SW} (250 kHz - 2 MHz)
- Output voltage adjustable from 0.85 V to V_{IN}
- Embedded output voltage supervisor
- Synchronization
- Adjustable soft-start time
- Internal current limiting
- Overvoltage protection
- Output voltage sequencing
- Peak current mode architecture
- $R_{DS(on)HS}$ = 180 mΩ; $R_{DS(on)LS}$ = 150 mΩ
- Thermal shutdown
- RoHS compliant

Description

The STEVAL-ISA190V1 is a product evaluation board based on ST's synchronous step-down switching regulator A6986F.

The device is capable of delivering up to 1.5 A and its 100% duty cycle capability to withstand the cold crank event along with its wide input operating voltage range make A6986F the ideal choice for battery powered automotive systems.

Synchronous rectification improves efficiency at full load as well as application compactness, while high-frequency switching (programmable up to 2 MHz) lowers power passive costs and size while remaining outside of the AM band.

The device can operate in low consumption mode (LCM) with quiescent current as low as 30 µA at V_{IN} = 12 V and V_{OUT} = 3.3 V, hence assuring high efficiency at light loads, as required in typical car body applications that remain active while the car is parked. A low noise mode (LNM) can alternatively be selected to meet the forced PWM mode requirement under all loading conditions for infotainment applications.

The default evaluation board settings are 6 V output voltage configured in LCM, 500 kHz switching frequency, high level I_{SKIP} current and the switchover feature disabled. These configurations can easily be changed by the user to evaluate different application scenarios.

1 Schematic diagram

Figure 1: STEVAL-ISA190V1 circuit schematic

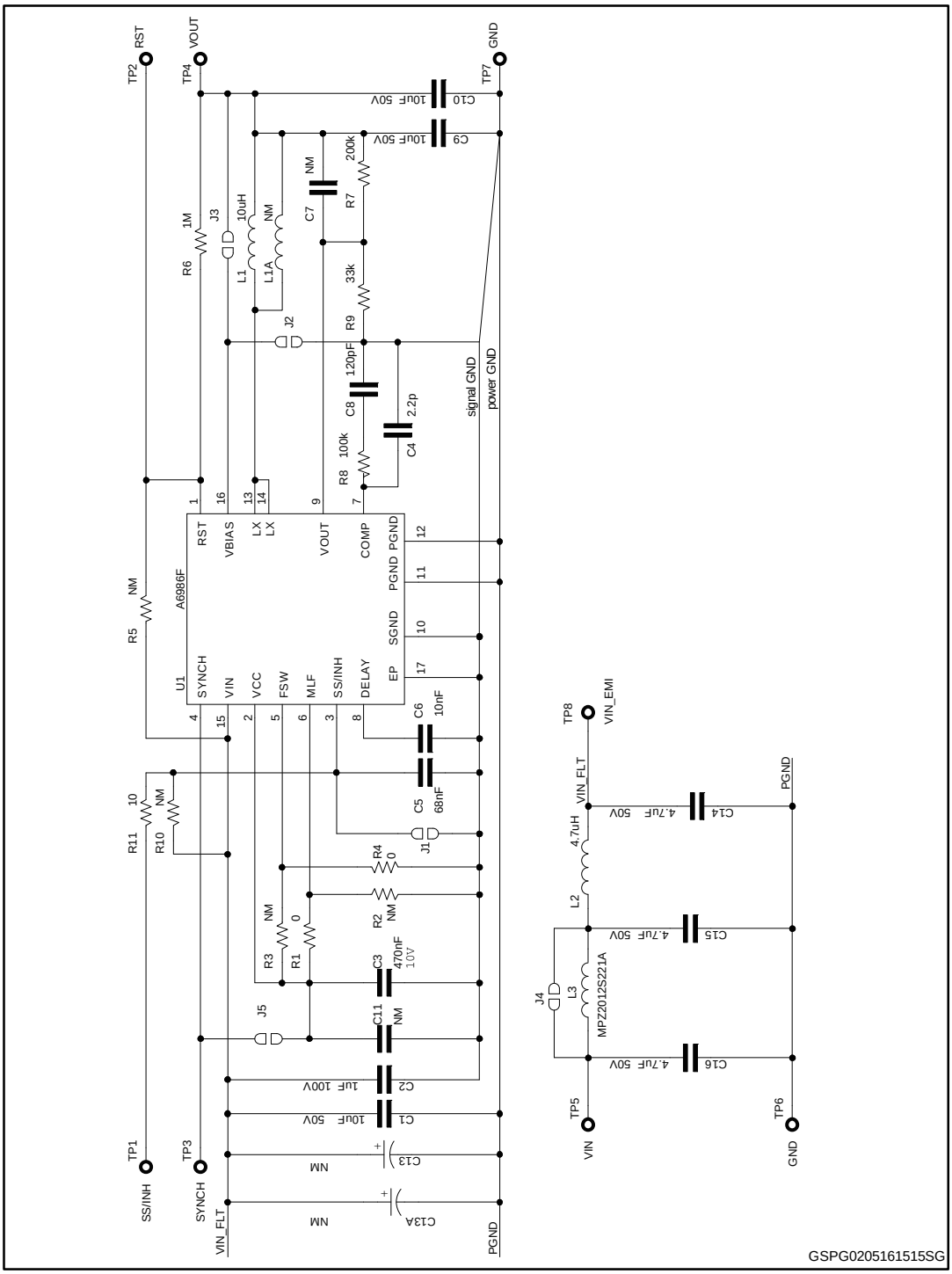


Table 1: BOM details

Reference	Description	Part number	Manufacturer
C1, C9, C10	10 µF 50 V X5R 10%	CGA5L3X5R1H106K	TDK
C2	1 µF 100 V X7S 10%	C2012X7S2A105K	TDK
C3	470 nF 10 V X7R 10%		
C4	2.2 pF 10 V X7R 10%		
C5	68 nF 10 V X7R 10%		
C6	10 nF 10 V X7R 10%		
C7, C11, C13, C13A	NOT MOUNTED		
C8	120 pF 10 V X7R 10%		
C14, C15, C16	4.7 µF 50 V X5R 10%	CGA5L3X5R1H475K	TDK
L1	10 µH	XAL5050-103MEC	Coilcraft
L2	4.7 µH	XAL4030-472MEC	Coilcraft
L3	EMC BEAD	MPZ2012S221A	TDK
R2, R3, R5, R9, R10	NOT MOUNTED		
R1, R4, R7	0R		
R6	1 Meg 1%		
R8	100k 1%		
R11	10R 1%		
J1	SS/INH control	OPEN	
J5	I_{SKIP} set to High Level	OPEN	
J2	Switchover Disabled	CLOSED	
J3		OPEN	
J4		OPEN	
U1	A6986F		STMicroelectronics

2 Revision history

Table 2: Document revision history

Date	Version	Changes
04-May-2016	1	Initial release.

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