NXP Communicator

FS56

Automotive Dual Buck Regulator and Controller with Voltage Monitors and Watchdog Timer

Communicator Finalization Date: Jun 2021

Communicator Created: May 2021

Global Full Market Launch Date: Jun 2021

FS56 Product Summary

The FS5600 Power Management IC for Automotive features a battery connected DC-DC buck controller with external FET and a battery connected DC-DC buck controller with internal FET. In addition, it offers functional safety features such as independent voltage monitors, windowed watchdog timer, I/O monitoring via ERRMON and FCCU and built-in-self test. The FS5600 is offered in QM, ASIL B and Enhanced ASIL B versions.

The FS5600 offers highly configurable General Purpose Input/Outputs for seamless operation with PF PMICs as PF8x, PF7x and PF5x families. The FS5600 presents an optimized architecture for automotive with low-power modes and EMC minimizing as spread spectrum, frequency tuning and synchronization.
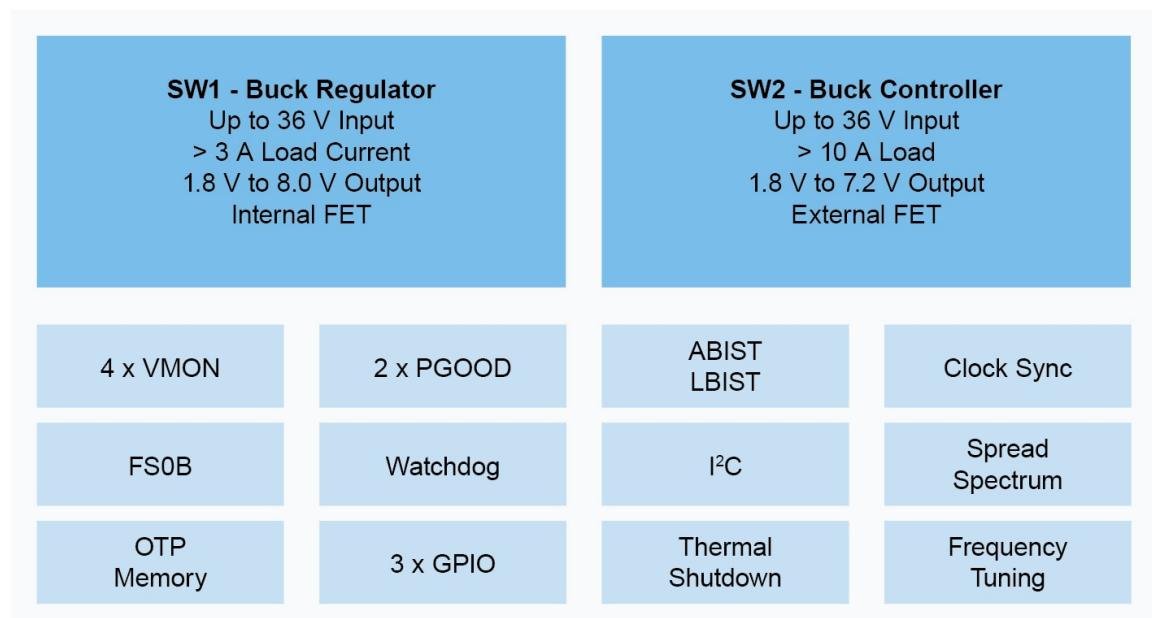
Functional Block Diagram FS56

Figure 1

FS56 Features

General

- Two high-efficiency programmable buck converters
- Low power mode with high efficiency PFM mode
- Safety features to fit ASIL B
- Highly configurable GPIOs for seamless operation with PF PMICS
- Programmable power up and power down sequences
- High-speed I2C interface support

Safety features to fit ASIL B Safety level

- 2 internal and up to 4 external voltage monitors
- ERRMON and FCCU monitoring
- Two PGOOD and One FS0B outputs
- Programmable Fault Error Counter
- Windowed watchdog timer - simple or challenger
- I2C CRC and write protection mechanism
- Analog-built-in self-test and Logical-built-in self-test

Programmability

- Supplies, sequencing and specific functions can be programmed by One Time programmable (OTP) memory
- Standard Predefined OTP supporting popular configurations can be found in data sheet under "ordering information" chapter
- Custom OTP can be provided for production. Please contact your NXP sales channel (NXP or your distributor)

Target Applications

FS5600 is a general-purpose dual channels High Voltage Buck Converters that can be used widely in many applications

- Telematics/V2X
- Infotainment/Cluster
- ADAS
- Gateway
- Vision, Sensor fusion

Part Attributes

Feature	QM Version	ASIL B Version	Enhanced ASIL B Version
SW1 – Integrated FET buck converter	Yes	Yes	Yes
SW2 – External FET buck controller	Yes	Yes	Yes
GPOs for system sequence control	Yes	Yes	Yes
PGOOD1 and PGOOD2 output	Yes	Yes	Yes
Windowed Watchdog Timer	No	Yes (Simple)	Yes (Challenger)
4 External Voltage Monitors (VMON)	No	Yes	Yes
ERRMON Monitoring (mux-ed with VMON)	No	Yes	Yes
FCCU Monitoring (mux-ed with VMON)	No	Yes	Yes
FS0B output	No	Yes	Yes
ABIST	No	Yes	Yes
LBIST	No	No	Yes
I^2C CRC	No	Yes	Yes

Device options for Automotive

Part Number	Target Market	Safety Grade	OTP ID
MFS5600AMMA0ES	Automotive	QM	A0-Non-programmed
MFS5600AMBA0ES	Automotive	ASIL B	A0-Non-programmed
MFS5600AMEA0ES	Automotive	Enhanced ASIL B	A0-Non-programmed
MFS5600AMMA7ES	Automotive	QM	A7 – SW1 = 5.0V, SW2 = 3.3V MFS5600A7ES-OTP-Report
MFS5600AMMA8ES	Automotive	QM	A8 – SW1 = 3.3V, SW2 = 5.0V MFS5600A8ES-OTP-Report

Device options for Industrial

Part Number	Target Market	Safety Grade	OTP ID
MFS5600AVNA0EP	Industrial	QM	A0-Non-programmed

For complete specifications go the the datasheet and OTP ocnfiguration reports

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SafeAssure Functional Safety Program

When it comes to functional safety, NXP stands for industry-leading quality and reliability. Our SafeAssure program simplifies system-level safety requirements in accordance with ISO 26262.
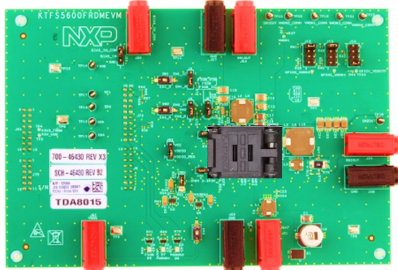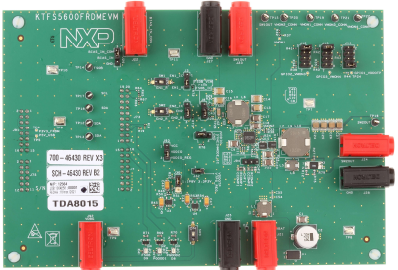*Read more*

BYLink System Power Platform with multi-LV PMICS

Learn how NXP's low-voltage PMIC family may be combined to act as a single integrated solution, due to auto-sync and embedded sequencer features.
Go to the training

Development tools and Ecosystem

The FS56 family is supported by 2 evaluation boards.

Evaluation Board	Description	Image
KITFS5600SKTEVM	The KITFS5600SKTEVM is a socketed evaluation board featuring the FS5600 dual DC-DC converter. The kit integrates all hardware needed to OTP program the FS5600. It integrates a communication bridge based on the FRDM-K82F freedom board to interface with the FS5600 GUI software interface and fully configure and control the FS5600.	
KITFS5600FRDMEVM	The KITFS5600FRDMEVM is the customer evaluation board featuring the FS5600 dual DC-DC converter. The kit integrates all hardware needed to fully evaluate the FS5600. It integrates a communication bridge based on the FRDM-K82F freedom board to interface with the FS5600 GUI software interface and fully configure and control the FS5600.	

Tools Support

NXP GUI for Automotive PMIC Families Software GUI for NXP's Automotive PMIC products. This application enables users to evaluate the functionality, configure the OTP settings, program the OTP and calculate the thermal efficiency for specific use cases.

- Downloadable GUI Interface available at PMIC-GUI-SW

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The extended ECCN for our 5A002 devices is both a.1.a and a.1.b since we have both symmetric and asymmetric algorithms in all of our encrypted products.

PN	COO	ECCN	US HTS	CCATS #
MFS5600AMMA0ES	Tianjin	EAR99	854239	NA
MFS5600AMBA0ES	Tianjin	EAR99	854239	NA
MFS5600AMEA0ES	Tianjin	EAR99	854239	NA
MFS5600AVMA0EP	Tianjin	EAR99	854239	NA
MFS5600AMMA7ES	Tianjin	EAR99	854239	NA
MFS5600AMMA8ES	Tianjin	EAR99	854239	NA
KITFS5600SKTEVM	USA	EAR99	847330	NA
KITFS5600FRDMEVM	MEX	5A992C	847150	NA

Available Documentation

Include direct links to high value assets as well as links to NXP.com, disty extranet and channel launch repository.

Distributor extranet: https//:www.nxp.com/Distynet

NXP.com: www.nxp.com/FS5600
Datasheets and OTP reports AVAILABLE on documentation tab

Evaluation board pages

Tool Part	Description
www.nxp.com/KITFS5600SKTEVM	FS56 Socketed Evaluation Board
www.nxp.com/KITFS5600FRDMEVM	FS5600 Evaluation Board

*Please note that the Channel Launch Repository is for marketing assets like high res block diagram and board photography. This same information is also posted to the "product" launch folder on the distributor extranet for others outside of marketing who may need it.

How to Reach Us

Home Page:
www.nxp.com

Web Support:
www.nxp.com/support

USA/Europe or Locations Not Listed:
NXP Semiconductors
Technical Information Center, EL516
2100 East Elliot Road
Tempe, Arizona 85284
+1-800-521-6274 or +1-480-768-2130
www.nxp.com/support

Europe, Middle East and Africa:
NXP Halbleiter Deutschland GmbH
Technical Information Center
Schatzbogen 7
81829 Muenchen, Germany
+44 1296 380 456 (English)
+46 8 52200080 (English)
+49 89 92103 559 (German)
+33 1 69 35 48 48 (French)
www.nxp.com/support

Japan:
NXP Semiconductors Japan Ltd..
Headquarters
ARCO Tower 15F
1-8-1, Shimo-Meguro, Meguro-ku,
Tokyo 153-0064, Japan
0120 191014
+81 3 5437 9125
support.japan@nxp.com

Asia/Pacific:
NXP Semiconductors Hong Kong Ltd
Technical Information Center
2 Dai King Street
Tai Po Industrial Estate,
Tai Po, N.T., Hong Kong
+800 2666 8080
support.asia@nxp.com

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