

# Extended security features in TPS546x24S and TP5M8S6C24

# Why Extended Security?

- Digitally controlled power solutions using interfaces are becoming increasingly popular.
- Recent global events have elevated concerns on threats to digitally-controlled devices
- Malicious remote actors can now gain root access to intra-board digital busses.
- Power designers now need the ability to limit the programmability of digitally configured and controlled power supplies in order to mitigate the potential threat.
- Extended Security provides new manufacturer-specific commands that extend the security capabilities of PMBus 1.3

# Security commands & settings

## Commands

- EXT\_WRITE\_PROTECT (MFR\_Specific\_43) (Command Code FBh)
- PASSKEY (MFR\_Specific\_42) (Command Code FAh)

## Security Settings

1. Open
2. Write-protected
3. Passkey-protected
4. Hardware-locked
5. Double-locked

# EXT\_WRITE\_PROTECT



15	14	13	12	11	10	9	8
RW	RW	RW	RW	RW	RW	RW	RW
HWP	WP	TRIM	VOUT	VOF	WN	ITF	MAR
7	6	5	4	3	2	1	0
RW	RW	RW	RW	RW	RW	RW	RW
OP	CFG	VIN	SEQ	DAT	BOT	PSK	STR



\*R/W = Read/Write

# PASSKEY

Figure 7-94. (FAh) MFR\_SPECIFIC\_42 (PASSKEY) Register Map

15	14	13	12	11	10	9	8
RW	RW	RW	RW	RW	RW	RW	RW
PASSKEY							
7	6	5	4	3	2	1	0
RW	RW	RW	RW	RW	RW	RW	RW
PASSKEY							

LEGEND: R/W = Read/Write; R = Read only

PSK Read value	State
0000h	PASSKEY is Unlocked
000Fh	PASSKEY is Locked and no invalid writes have been made
001Fh	PASSKEY is Locked and one invalid write has been made
002Fh	PASSKEY is Locked and two invalid writes have been made
00FFh	PASSKEY is Locked and three or more invalid writes have been made

# Security Setting

1. **Open**
2. Write-protected
3. Passkey-protected
4. Hardware-locked
5. Double-locked

# GUI PLACEHOLDER

# Security Setting

1. **Open**
2. Write-protected
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# Security Setting

1. Open
2. **Write-protected**
3. Passkey-protected
4. Hardware-locked
5. Double-locked

# Example:

## Write-protecting access to Vout & Vin commands

15	14	13	12	11	10	9	8
0	0	0	1	0	0	0	1
HWP	WP	TRIM	VOUT	VOF	WN	ITF	MAR

7	6	5	4	3	2	1	0
0	0	1	0	0	0	0	0
OP	CFG	VIN	SEQ	DAT	BOT	PSK	STR

EXT\_WRITE\_PROTECT Register Map



0001 0000 0010 0000



1020h

# GUI PLACEHOLDER

# Security Setting

1. Open
2. **Write-protected**
3. Passkey-protected
4. Hardware-locked
5. Double-locked

# Security Setting

1. Open
2. Write-protected
- 3. Passkey-protected**
4. Hardware-locked
5. Double-locked

# GUI PLACEHOLDER

# Security Setting

1. Open
2. Write-protected
3. Passkey-protected
4. **Hardware-locked**
5. Double-locked

# Example:

## Hardware-Locking write access to Vout & Vin commands

15	14	13	12	11	10	9	8
1	0	0	1	0	0	0	1
HWP	WP	TRIM	VOUT	VOF	WN	ITF	MAR

7	6	5	4	3	2	1	0
0	0	1	0	0	0	0	0
OP	CFG	VIN	SEQ	DAT	BOT	PSK	STR

EXT\_WRITE\_PROTECT Register Map



1001 0000 0010 0000



9120h

# Security Setting

1. Open
2. Write-protected
3. Passkey-protected
4. **Hardware-locked**
5. Double-locked

# Security Setting

1. Open
2. Write-protected
3. Passkey-protected
4. Hardware-locked
5. **Double-locked**

# Example:

## Double-Locking write access to Vout & Vin commands

15	14	13	12	11	10	9	8
1	0	0	1	0	0	0	1
HWP	WP	TRIM	VOUT	VOF	WN	ITF	MAR

7	6	5	4	3	2	1	0
0	0	1	0	0	0	1	1
OP	CFG	VIN	SEQ	DAT	BOT	PSK	STR

EXT\_WRITE\_PROTECT Register Map



1001 0000 0010 0000



9123h

# Security Setting

1. Open
2. Write-protected
3. Passkey-protected
4. Hardware-locked
5. **Double-locked**

# Extended Security features summary

## Commands

- EXT\_WRITE\_PROTECT – write-locks commands & commands groups
- PASSKEY – protects EXT\_WRITE\_PROTECT & NVM store

## Security Settings

1. Open – All write-accessible.
2. Write-protected – Select commands are write-locked
3. Passkey-protected – Write-locked commands are passkey-protected
4. Hardware-locked – Write-locked commands are permanently locked
5. Double-locked – Write-locked commands, passkey, and NVM are permanently locked

# TPS546D24S & TPS546B24S & TPS546A24S

2.95V to 16V Input, Stack x4, 40/20/10A, SWIFT™ Synchronous Buck Converter with PMBus®

Newly Released!

## Features

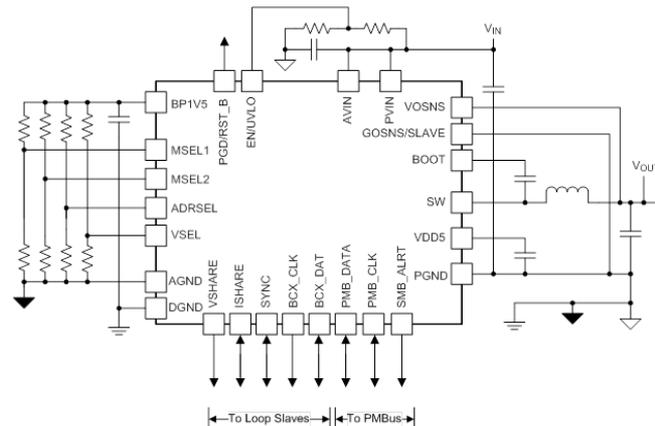
- Integrated 4.5mΩ/0.9mΩ High & Low Side MOSFETs (D24S)
- Integrated 5.0mΩ/1.6mΩ High & Low Side MOSFETs (B24S/A24S)
- 4V to 16V input voltage; 2.95V to 16V with 4V or greater external bias voltage on AVIN pin
- Internally Selectable Compensation - Average CM Control
- TPS546B24S & TPS546A24S Input Voltage max = 18V
- 2x, 3x, 4x Stackable with Current Sharing up to 160A with a Single Address per Output
- Extensive PMBus Command Set with V, I, & T Telemetry
- 0.6V to 5.5V Output with <1% Error: -40°C to 150°C T<sub>J</sub>
- 0.2V to 5.5V Output via PMBus
- Differential Remote Sensing
- AVS and Margining Capabilities through PMBus
- MSEL pins to Pin-Strap in Stand-alone Analog Mode
- 275kHz – 1.5MHz; 225kHz – 1.5MHz thru PMBus
- **Drop-in Compatible with TPS546D24A, TPS546B24A, & TPS546A24A**
- **Additional Write Protection and Password features**
- 5mm x 7mm x 1.5mm QFN Package for all 3 devices

## Applications

- Data Center Switches, Rack Server
- Active Antenna System, Remote Radio & Baseband Unit
- Automated Test Equipment, Medical Scanner, Radar

## Benefits

- Over 90% efficiency 12VIN, 1Vout, 500kHz from 15-25A (D24A)
- Over 90% efficiency 12VIN, 1Vout, 500kHz from 6-12A (B24A)
- Fast Load and Line Transient with Fewer Components
- Fixed Frequency Operation with Synchronization
- System Characterization and Health Monitoring, +/-10% Iout, +/-2% Vout & +/-5°C Internal Die Temperature
- Powers Low Voltage Processors or 3.3V & 5V Bus Rails
- Fsw, SS, OCP, & Vout Selectable without PMBus



# TPSM8S6C24

Newly Released!

## 4.25V to 16V, Single 35A, 4xStackable Synchronous Step-Down module with PMBus & Telemetry and Extended Security

### Features

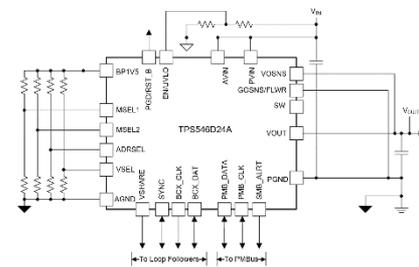
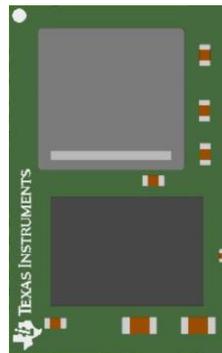
- Independent Single 35A output
- 4x stackable to 140A (C24A) and 100A (B24A)
- VIN Min of 2.95V with Split Rail Support
- Output Voltage Range 0.5V To 3.6V(C24A)
- Output Voltage Range 0.5V To 5.5V(B24A)
- <1% VOUT Error
- PMBus Programmable Vout down to 0.25V
- Fsync In/Out and FSW: 325kHz To 1.1MHz Adjustable Via PMBus
- PMBus 1.3 functionalities
- AVS, Margining, & Telemetry (VIN, VOUT, IOU, TJ)
- Fault reporting
- Selectable internal compensation
- Adjustable Default Output Voltage At Startup
- **Additional Write Protection and Password features**
- Package: 16mm x 11mm x 4.3mm Open Frame
- Standard: -40°C - 125°C Operating Range

### Applications

- Test & Measurement, Medical, Aerospace & Defense
- Telecommunication & Networking Equipment

### Benefits

- Multi load with single module
- Flexible scaling for high current requirement
- FSync to isolate switching noise in a system at a common frequency
- Low height profile for fitting under heatsinks
- PMBUS for adjusting IC parameters digitally in system



# Thank you for watching!

For more information, click the link below to visit the product folders for

- TPS546D24S
- TPS546B24S
- TPS546A24S
- TPSM8S6C24

The screenshot shows the Texas Instruments website product page for the TPS546D24S. The page features a navigation bar with the TI logo and 'TEXAS INSTRUMENTS' text, a search bar, and user/region information (Charles, English, Ship to: USD). Below the navigation bar, there are tabs for 'Products', 'Applications', 'Design & development', 'Quality & reliability', 'Support & training', and 'About TI'. The breadcrumb trail reads: Home / Power management / DC/DC switching regulators / Step-down (buck) regulators / Buck converters (integrated switch). The product title is 'TPS546D24S' with a 'NEW' badge and a green 'ACTIVE' status. The description is '2.95-V to 16-V, stackable 40-A synchronous SWIFT™ step-down PMBus® converter with extended security'. There is a red 'Order now' button and a 'Notifications' bell icon. Below the description, there are links for 'DATA SHEET' and a specific datasheet link: 'TPS546D24S 2.95-V to 16-V, 40-A, Up to 4 × Stackable, Synchronous SWIFT Step-Down Converter with PMBus and Extended Write Protection datasheet'. A navigation bar below the main content has tabs for 'Product details', 'Technical documentation', 'Design & development', 'Ordering & quality', and 'Support & training'. The 'Product details' section is active, showing a table with parameters and a circuit diagram image.

TEXAS INSTRUMENTS

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Home / Power management / DC/DC switching regulators / Step-down (buck) regulators / Buck converters (integrated switch)

NEW

TPS546D24S ACTIVE

2.95-V to 16-V, stackable 40-A synchronous SWIFT™ step-down PMBus® converter with extended security

Order now

Notifications

DATA SHEET TPS546D24S 2.95-V to 16-V, 40-A, Up to 4 × Stackable, Synchronous SWIFT Step-Down Converter with PMBus and Extended Write Protection datasheet PDF | HTML

Product details Technical documentation Design & development Ordering & quality Support & training

Product details

Parameters	Package   Pins   Size	Features	Description
Vin (min) (V)			2.95
Vin (max) (V)			16
Vout (min) (V)			0.25
Vout (max) (V)			5.5
Iout (max) (A)			40