Extended security features in TPS546x24S and TPSM8S6C24

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
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:

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

Newly Released!

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

Features

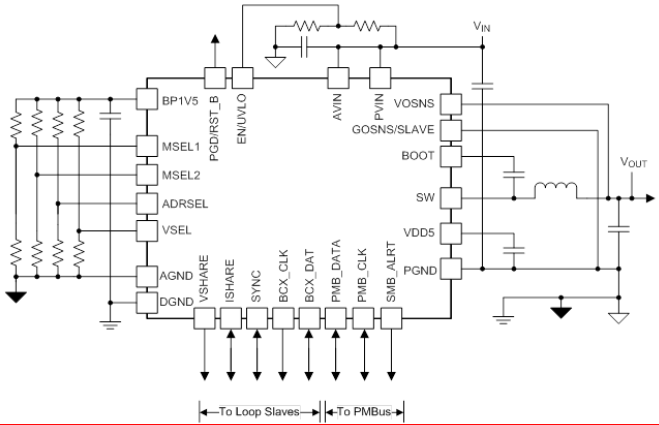
- Integrated 4.5mΩ/0.9mΩ High & Low Side MOSFETs (D24S)
- Integrated 5.0mΩ/1.6mΩ High & Low Side MOSFETs (B24S/A24S)
- 4V to 16V input voltage; 2.95V to 16V with 4V or greater external bias voltage on AVIN pin
- Internally Selectable Compensation - Average CM Control
- TPS546B24S & TPS546A24S Input Voltage 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 Tj
- 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



TEXAS INSTRUMENTS

TPSM8S6C24

Newly Released!

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

Features

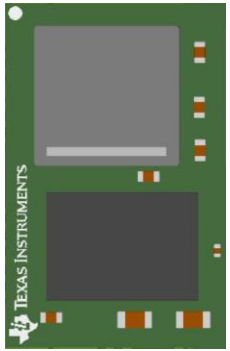
- Independent Single 35A output
- 4x stackable to 140A (C24A) and 100A (B24A)
- VIN Min of 2.95V with Split Rail Support
- Output Voltage Range 0.5V To 3.6V(C24A)
- Output Voltage Range 0.5V To 5.5V(B24A)
- <1% VOUT Error
- PMBus Programmable Vout down to 0.25V
- Fsync In/Out and FSW: 325kHz To 1.1MHz Adjustable Via PMBus
- PMBus 1.3 functionalities
- AVS, Margining, & Telemetry (VIN, VOUT, IOUT, 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

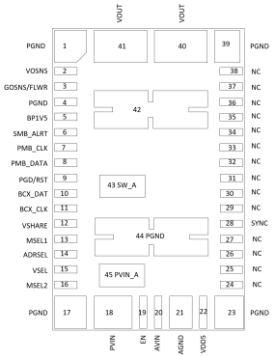
Benefits

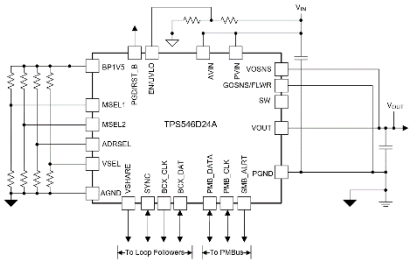
- Multi load with single module
- Flexible scaling for high current requirement
- FSync to isolate switching noise in a system at a common frequency
- Low height profile for fitting under heatsinks
- PMBUS for adjusting IC parameters digitally in system

Applications

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







TEXAS INSTRUMENTS

Thank you for watching!

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

- TPS546D24S
- TPS546B24S
- TPS546A24S
- TPSM8S6C24