FAQ for PCN-2405-001 and PCN-2405-002

This FAQ provides additional information about the changes described in:

- PCN-2405-001: Enhanced Security Features for Ti35/Ti60F225 & Ti35/Ti60F100S3F2 Devices
- PCN-2405-002: Discontinued Security Features for Titanium Ti60W64 Devices

Overview

What changes are being made?

PCN-2405-001: Titanium Ti35F225, Ti60F225, Ti35F100S3F2, and Ti60F100S3F2 devices (all speed grades and temperatures) with enhanced security (called "new devices" in this FAQ), have the power supply for the security fuse programming (VQPS) bonded out to a package pin. For previous versions of these devices (called "old devices" in this FAQ), the pin was a ground pin.

PCN-2405-002: For Titanium Ti60W64 devices (all speed grades and temperatures), security features are no longer supported for devices with a date code of 2416 or later. There is no pinout change compared to the older devices.

Why are these changes needed?

These changes allow security fuse programming to be disabled during normal FPGA operation, and provide better user control on when to enable/disable fuse programming using the VQPS supply.

Which FPGA device security features require fuse programming?

The security features that require fuse programming are:

- Encryption—Requires programming of the AES-256 key fuse
- Authentication—Requires programming of the RSA-4096 key fuse
- JTAG blocking—Requires programming of the JTAG disabling fuse

This FAQ uses the term "security features" to mean all three items.

What is the risk to older devices that do not have the VQPS supply bonded out or tied to ground?

The risk to older devices is low.

For devices that have JTAG disabled, the fuses will no longer be accessible, even if the VQPS supply is powered up internally.

In addition, Titanium devices do not allow the AES and RSA keys fuses to be programmed twice. Therefore, if fuses for the AES and RSA keys have already been blown, subsequent programming operations to same location to modify the AES and RSA keys will not be successful.

What are the related Efinity® software changes, and which version of the Efinity software has the changes?

In the software, one of the GND pins in Ti35F225, Ti60F225, Ti35F100S3F2, and Ti60F100S3F2 devices is renamed to VQPS_GND in the pinout, and security feature support is disabled for all Ti60W64 devices.

The changes are reflected in the Efinity software v2023.2.307.5.x and onwards.

Do users with older devices need to re-compile (synthesis, placement, routing, and bitstream generation) with Efinity v2023.2.307.5.x due to the changes?

No. It is not necessary to re-compile your design. The changes do not impact the functionality of the designs.

Can Efinity v2023.2.307.4.14 (or older) bitstreams be used to configure the new Ti35 and Ti60 devices?

Please refer to *Table 1: Bitstream Compatibility*

Can Efinity v2023.2.307.5.x (and onwards) bitstreams be used to configure the old Ti35 and Ti60 devices?

Please refer to *Table 1: Bitstream Compatibility*

Table 1: Bitstream Compatibility

Device	Device Identifier		Efinity Bitstream Generated From			
	Date Code	Enhanced Security Identifier in Lot Number	v2023.2.307.4.14 or Older		v2023.2.307.5.x and Newer	
			With Security	Without Security	With Security	Without Security
Ti60W64	Earlier than 2416	N/A	✓	✓	N/A	✓
	2416 and later	N/A	(1)	✓	N/A	✓
Ti35F100S3F2 Ti60F100S3F2	N/A	No	✓	✓	✓	✓
	N/A	Yes	✓	✓	✓	✓
Ti35F225 Ti60F225	N/A	No	✓	✓	✓	✓
	N/A	Yes	✓	✓	✓	✓

Note 1: Not supported for encrypted bitstreams. Signed bitstreams for authentication (but without encryption) are still supported.

Impact for Ti35F225, Ti60F225, Ti35F100S3F2 & Ti60F100S3F2 Users

What is the impact for existing designs?

Case	Impact	Notes
Not using security features	None	-
Using the security features but not doing fuse programming on the board (i.e., using third-party programming hardware)	None	Ensure the third-party programming hardware supports the changes.
Using the security features and doing fuse programming on the board	Changes needed	Need to control powering the VQPS pin up and down for fuse programming by using either: o A switch on the board. Board changes are required. o The Efinity SVF Player. Board changes are required and you need to set Windows environment variables.

For details on the VQPS power up and down requirements, refer to the "Fuse Programming Requirements" in the Ti35 Data Sheet and Ti60 Data Sheet.

For details on using the Efinity SVF Player to control power to the VQPS supply, refer to AN 057: Controlling VQPS with the Efinity SVF Player.

Which pins are changed from GND to VQPS?

Affected pins are:

- Pin G6 in Ti35F225 and Ti60F225
- Pin A5 in Ti35F100S3F2 and Ti60F100S3F2

These pins have been renamed from GND to VQPS_GND in the pinout to reflect the functions in both the new and old devices.

Can existing boards be used for the new devices?

Case	Use Existing Board?
Not using security features	Yes
Using the security features but not doing fuse programming on the board (i.e., using third-party programming hardware)	Yes
Using the security features and doing fuse programming on the board	No. Revise board to control powering the VQPS supply up and down for fuse programming.

Is it possible to design a board to support both old and new devices?

Yes.

- To support new devices, the board must be able to power up the VQPS_GND pin when required for fuse programming, and drive the pin to ground for the rest of the time.
- To support old devices, the board must drive the VQPS_GND pin to ground as usual.

Important: When the board is used with old devices, the VQPS_GND pin should never be powered up to the VQPS voltage level, otherwise the devices will be damaged.

What requirements should I follow when powering the VQPS supply up and down?

Refer to the "Fuse Programming Requirements" in the Ti35 Data Sheet and Ti60 Data Sheet for these requirements.

Can the VQPS supply be powered up permanently on the board?

No. Only power up the VQPS supply when performing fuse programming. Leaving VQPS powered up might allow unintended access to the fuse, although the likelihood is very low.

Does having the VQPS supply bonded out increase the power consumption of the devices?

No. Power consumption of the new devices is not expected to increase because of the VQPS supply. The VQPS_GND pin should be tied to ground when the FPGA is in normal operation.

Is there an automated way to power the VQPS supply up and down for fuse programming?

You can use the Efinity SVF Player with a circuitry on your board to power the VQPS supply up and power down automatically. For details, refer to AN 057: Controlling VQPS with the Efinity SVF Player.

When will the Efinity SVF Player support controlling the VQPS supply?

The Efinity SVF Player supports this feature in v2023.2.307 and later. You also need to include an environment variable to enable the support. For details, refer to AN 057: Controlling VQPS with the Efinity SVF Player.

Where can I find additional details on VQPS and the VQPS_GND pin?

In addition to PCN-2405-001, refer to these documents:

- Ti60 Data Sheet
- Ti35 Data Sheet
- Ti60 Pinout
- Ti35 Pinout
- AN 057: Controlling VQPS with the Efinity SVF Player

Impact for Ti60W64 Users

What is the impact for existing designs?

If you are not using the security features, there is no impact.

If you are using the security features, these features will no longer be supported. If security features are required, you should migrate your design to another Ti60 package that supports them.

Can the existing boards be used for the new devices?

Yes. Existing boards can be used with the new Ti60W64 devices because there is no pinout change between the old and new devices.

Is it possible to design a board to support both old and new devices?

Yes. There is no change to the device pinout, so boards should work for both the new and old devices.

Why is Ti60W64 no longer supporting security?

Ti60W64 is a small package and has limited pins available. Therefore, it does not have a pin that can be used for bonding out VQPS.