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# PXIe-6357

# Specifications

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# PXIe-6357 Specifications

## PXIe-6357 Specifications

These specifications apply to the PXIe-6357.

### Revision History

| Version    | Date changed | Description      |
|------------|--------------|------------------|
| 379192A-01 | July 2025    | Initial release. |

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### Definitions

***Warranted*** specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

***Characteristics*** describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- ***Typical*** specifications describe the performance met by a majority of models.
- ***Nominal*** describes an attribute that is based on design, conformance testing, or

supplemental testing.

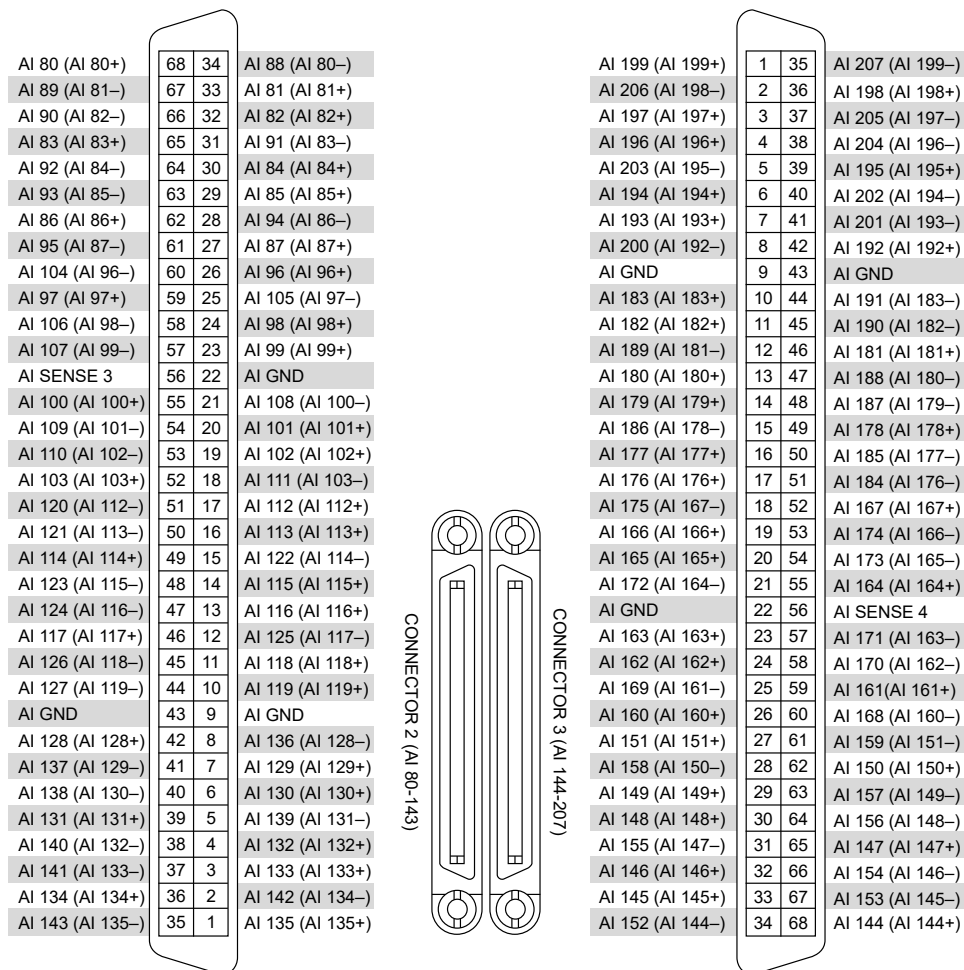
Specifications are **Typical** unless otherwise noted.

## Conditions

Specifications are valid at 25 °C unless otherwise noted.

## PXle-6357 Pinout

### Connector 2 and Connector 3



### Connector 0 and Connector 1



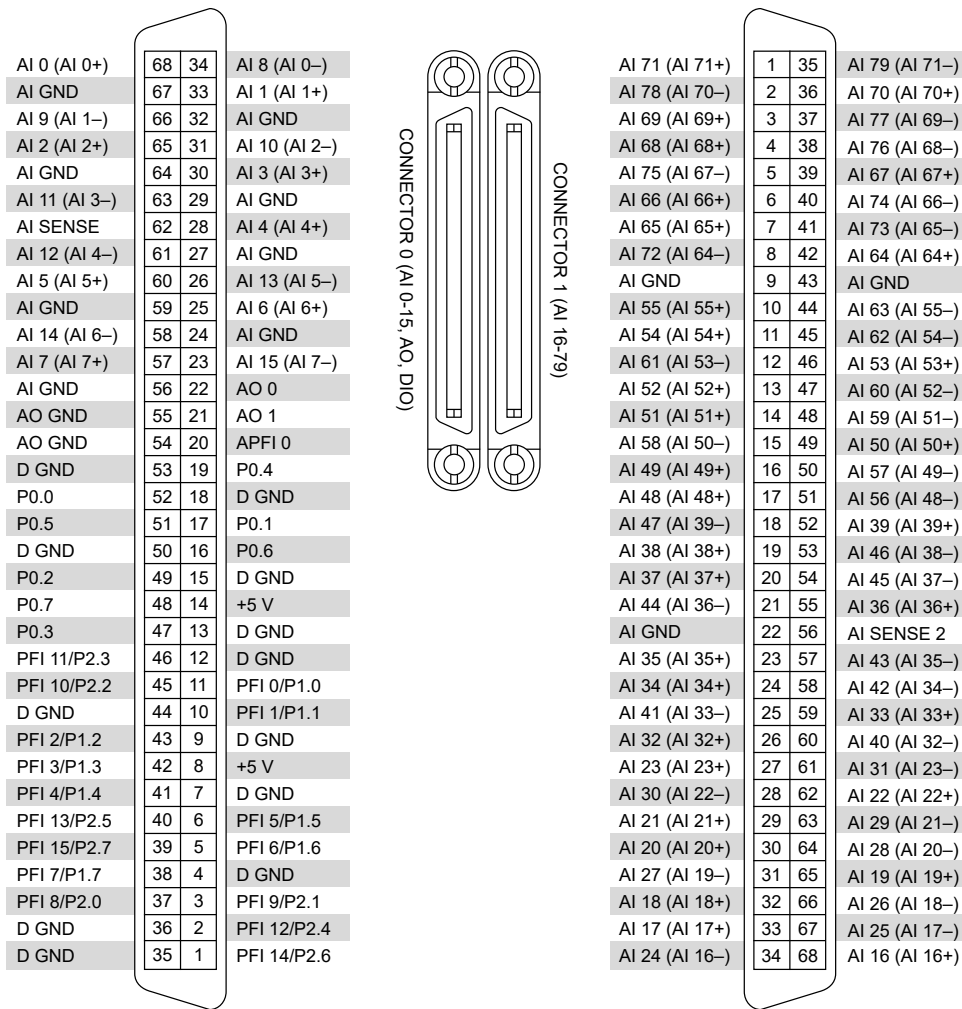


Table 1. Default Counter/Timer Terminals

| Counter/Timer Signal | Default PFI Terminal |
|----------------------|----------------------|
| CTR 0 SRC            | PFI 8                |
| CTR 0 GATE           | PFI 9                |
| CTR 0 AUX            | PFI 10               |
| CTR 0 OUT            | PFI 12               |
| CTR 0 A              | PFI 8                |
| CTR 0 Z              | PFI 9                |
| CTR 0 B              | PFI 10               |
| CTR 1 SRC            | PFI 3                |
| CTR 1 GATE           | PFI 4                |



| Counter/Timer Signal | Default PFI Terminal |
|----------------------|----------------------|
| CTR 1 AUX            | PFI 11               |
| CTR 1 OUT            | PFI 13               |
| CTR 1 A              | PFI 3                |
| CTR 1 Z              | PFI 4                |
| CTR 1 B              | PFI 11               |
| FREQ OUT             | PFI 14               |

Table 2. Signal Descriptions

| Signal      | Reference | Description                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AI GND      | —         | Analog Input Ground—These terminals are the reference point for single-ended AI measurements in RSE mode and the bias current return point for DIFF measurements. All ground references—AI GND, AO GND, and D GND—are connected on the device. Though AI GND, AO GND, and D GND are connected on the device, they are connected by small traces to reduce crosstalk between subsystems. Each ground has a slight difference in potential. |
| AI <0..207> | Varies    | Analog Input Channels—For single-ended measurements, each signal is an analog input voltage channel. In RSE mode, AI GND is the reference for these signals. In NRSE mode, the reference for each AI signal is an AI SENSE.                                                                                                                                                                                                               |

| Signal                                          | Reference | Description                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 |           | For differential measurements, AI 0 and AI 8 are the positive and negative inputs of differential analog input channel 0. Similarly, the following signal pairs also form differential input channels: AI <1,9>, AI <2,10>, and so on.                                                                                       |
| AI SENSE, AI SENSE 2,<br>AI SENSE 3, AI SENSE 4 | —         | Analog Input Sense—In NRSE mode, the reference for each AI <0..15> signal is AI SENSE; the reference for each AI <16..79> signal is AI SENSE 2; the reference for each AI <80..143> is AI SENSE 3; the reference for each AI <144..207> is AI SENSE 4.                                                                       |
| AO <0,1>                                        | AO GND    | Analog Output Channels—These terminals supply voltage output.                                                                                                                                                                                                                                                                |
| AO GND                                          | —         | Analog Output Ground—AO GND is the reference for AO. All ground references—AI GND, AO GND, and D GND—are connected on the device. Though AI GND, AO GND, and D GND are connected on the device, they are connected by small traces to reduce crosstalk between subsystems. Each ground has a slight difference in potential. |

| Signal     | Reference        | Description                                                                                                                                                                                                                                                                                                                                                                     |
|------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D GND      | —                | Digital Ground—D GND supplies the reference for port 0, port 1, port 2 digital channels, PFI, and +5 V. All ground references—AI GND, AO GND, and D GND—are connected on the device. Though AI GND, AO GND, and D GND are connected on the device, they are connected by small traces to reduce crosstalk between subsystems. Each ground has a slight difference in potential. |
| P0.<0..31> | D GND            | Port 0 Digital I/O Channels—You can configure each signal individually as an input or output.                                                                                                                                                                                                                                                                                   |
| APFI 0     | AO GND or AI GND | Analog Programmable Function Interface Channels—Each APFI signal can be used as AO external reference inputs for AO, or as an analog trigger input. APFI are referenced to AI GND when they are used as analog trigger inputs. APFI are referenced to AO GND when they are used as AO external offset or reference inputs.                                                      |
| +5 V       | D GND            | +5 V Power Source—These terminals provide a fused +5 V power source.                                                                                                                                                                                                                                                                                                            |

| Signal                                         | Reference | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PFI <0..7>/P1.<0..7>,<br>PFI <8..15>/P2.<0..7> | D GND     | <p>Programmable Function Interface or Digital I/O Channels—Each of these terminals can be individually configured as a PFI terminal or a digital I/O terminal.</p> <p>As an input, each PFI terminal can be used to supply an external source for AI, AO, DI, and DO timing signals or counter/timer inputs. As a PFI output, you can route many different internal AI, AO, DI, or DO timing signals to each PFI terminal. You can also route the counter/timer outputs to each PFI terminal. As a port 1 or port 2 digital I/O signal, you can individually configure each signal as an input or output.</p> |

## Analog Input

|                                  |                                      |
|----------------------------------|--------------------------------------|
| Number of channels               | 104 differential or 208 single-ended |
| ADC resolution                   | 16 bits                              |
| DNL                              | No missing codes guaranteed          |
| INL                              | Refer to AI Absolute Accuracy.       |
| <b>Sample rate</b>               |                                      |
| Single channel maximum           | 1.25 MS/s                            |
| Multichannel maximum (aggregate) | 1.00 MS/s                            |
| Minimum                          | No minimum                           |
| Timing resolution                | 10 ns                                |

|                                                                  |                                                                                    |
|------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Timing accuracy                                                  | 50 ppm of sample rate                                                              |
| Input coupling                                                   | DC                                                                                 |
| Input range                                                      | $\pm 0.1$ V, $\pm 0.2$ V, $\pm 0.5$ V, $\pm 1$ V, $\pm 2$ V, $\pm 5$ V, $\pm 10$ V |
| Maximum working voltage for analog inputs (signal + common mode) | $\pm 11$ V of AI GND                                                               |
| CMRR (DC to 60 Hz)                                               | 100 dB                                                                             |

Figure 1. CMRR

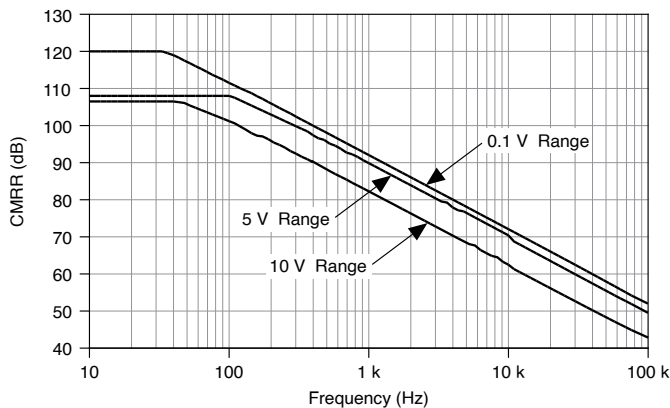


Table 3. Input impedance (Device On)

|               |                                        |
|---------------|----------------------------------------|
| AI+ to AI GND | >10 G $\Omega$ in parallel with 100 pF |
| AI- to AI GND | >10 G $\Omega$ in parallel with 100 pF |

Table 4. Input impedance (Device Off)

|               |              |
|---------------|--------------|
| AI+ to AI GND | 820 $\Omega$ |
| AI- to AI GND | 820 $\Omega$ |

Table 5. Crosstalk (at 100 kHz)

|                       |        |
|-----------------------|--------|
| Adjacent channels     | -75 dB |
| Non-adjacent channels | -88 dB |

|                                |              |
|--------------------------------|--------------|
| Input bias current             | $\pm 100$ pA |
| Small signal bandwidth (-3 dB) | 1.85 MHz     |

|                  |                                      |
|------------------|--------------------------------------|
| Input FIFO size  | 4,095 samples                        |
| Scan list memory | 4,095 entries                        |
| Data transfers   | DMA (scatter-gather), programmed I/O |

Table 6. Overvoltage protection for all analog input and sense channels

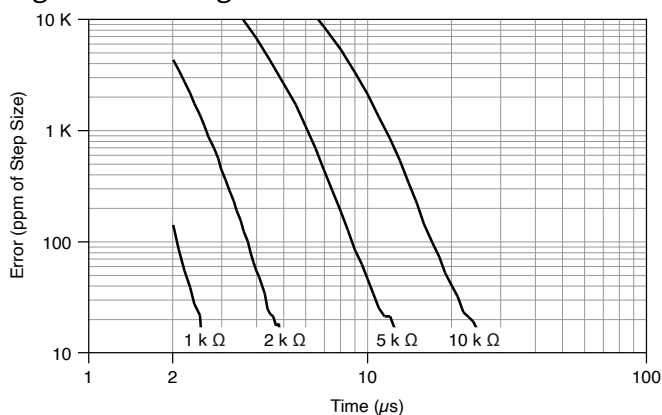
|                                            |                                  |
|--------------------------------------------|----------------------------------|
| Device on                                  | $\pm 25$ V for up to two AI pins |
| Device off                                 | $\pm 15$ V for up to two AI pins |
| Input current during overvoltage condition | $\pm 20$ mA maximum/AI pin       |

## Settling Time for Multichannel Measurements

| Range                                       | $\pm 60$ ppm of Step ( $\pm 4$ LSB for Full-Scale Step) | $\pm 15$ ppm of Step ( $\pm 1$ LSB for Full-Scale Step) |
|---------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|
| $\pm 10$ V, $\pm 5$ V, $\pm 2$ V, $\pm 1$ V | 1 $\mu$ s                                               | 1.5 $\mu$ s                                             |
| $\pm 0.5$ V                                 | 1.5 $\mu$ s                                             | 2 $\mu$ s                                               |
| $\pm 0.2$ V, $\pm 0.1$ V                    | 2 $\mu$ s                                               | 8 $\mu$ s                                               |

## Typical Performance Graph

Figure 2. Settling Time versus Time for Different Source Impedances



## AI Absolute Accuracy (Warranted)

Table 7. AI Absolute Accuracy

| Nominal Range Positive Full Scale | Nominal Range Negative Full Scale | Residual Gain Error (ppm of Reading) | Residual Offset Error (ppm of Range) | Offset Tempco (ppm of Range/°C) | Random Noise, $\sigma$ ( $\mu\text{Vrms}$ ) | Absolute Accuracy at Full Scale <sup>1</sup> ( $\mu\text{V}$ ) |
|-----------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|---------------------------------|---------------------------------------------|----------------------------------------------------------------|
| 10                                | -10                               | 48                                   | 13                                   | 21                              | 315                                         | 1660                                                           |
| 5                                 | -5                                | 55                                   | 13                                   | 21                              | 157                                         | 870                                                            |
| 2                                 | -2                                | 55                                   | 13                                   | 24                              | 64                                          | 350                                                            |
| 1                                 | -1                                | 65                                   | 17                                   | 27                              | 38                                          | 190                                                            |
| 0.5                               | -0.5                              | 68                                   | 17                                   | 34                              | 27                                          | 100                                                            |
| 0.2                               | -0.2                              | 95                                   | 27                                   | 55                              | 21                                          | 53                                                             |
| 0.1                               | -0.1                              | 108                                  | 45                                   | 90                              | 17                                          | 33                                                             |

|                  |                 |
|------------------|-----------------|
| Gain tempco      | 13 ppm/°C       |
| Reference tempco | 1 ppm/°C        |
| INL error        | 60 ppm of range |



**Note** Accuracies listed are valid for up to two years from the device external calibration.

### AI Absolute Accuracy Equation

$$\text{AbsoluteAccuracy} = \text{Reading} \cdot (\text{GainError}) + \text{Range} \cdot (\text{OffsetError}) + \text{NoiseUncertainty}$$

- $\text{GainError} = \text{ResidualGainError} + \text{GainTempco} \cdot (\text{TempChangeFromLastInternalCal}) + \text{ReferenceTempco} \cdot (\text{TempChangeFromLastExternalCal})$
- $\text{OffsetError} = \text{ResidualOffsetError} + \text{OffsetTempco} \cdot (\text{TempChangeFromLastInternalCal}) + \text{INLError}$
- $\text{NoiseUncertainty} = \frac{\text{Random Noise} \cdot 3}{\sqrt{10,000}}$

1. Refer to the AI Absolute Accuracy Example section.



for a coverage factor of  $3\sigma$  and averaging 10,000 points.

#### AI Absolute Accuracy Example

Absolute accuracy at full scale on the analog input channels is determined using the following assumptions:

- TempChangeFromLastExternalCal = 10 °C
- TempChangeFromLastInternalCal = 1 °C
- number\_of\_readings = 10,000
- Coveragefactor =  $3\sigma$

For example, on the 10 V range, the absolute accuracy at full scale is as follows:

- GainError = 48 ppm + 13 ppm · 1 + 1 ppm · 10 = 71 ppm
- OffsetError = 13 ppm + 21 ppm · 1 + 60 ppm = 94 ppm
- NoiseUncertainty = 
$$\frac{315\text{ }\mu\text{V} \cdot 3}{\sqrt{10,000}}$$
  
= 9.4  $\mu\text{V}$
- AbsoluteAccuracy = 10 V · (GainError) + 10 V · (OffsetError) + NoiseUncertainty = 1,660  $\mu\text{V}$

## Analog Triggers

|                     |                                                                                                     |
|---------------------|-----------------------------------------------------------------------------------------------------|
| Number of triggers  | 1                                                                                                   |
| Source              | AI <0..207>                                                                                         |
| Functions           | Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Convert Clock, Sample Clock Timebase |
| <b>Source level</b> |                                                                                                     |
| AI <0..207>         | $\pm$ Full scale                                                                                    |
| APFI 0              | $\pm$ 10 V                                                                                          |

|            |                                                |
|------------|------------------------------------------------|
| Resolution | 16 bits                                        |
| Modes      | Analog edge triggering, analog edge triggering |

|                          |                                               |
|--------------------------|-----------------------------------------------|
|                          | with hysteresis, and analog window triggering |
| <b>Bandwidth (-3 dB)</b> |                                               |
| AI <0..207>              | 3.4 MHz                                       |
| APFI 0                   | 3.9 MHz                                       |

|          |              |
|----------|--------------|
| Accuracy | ±1% of range |
|----------|--------------|

|                               |       |
|-------------------------------|-------|
| <b>APFI 0 characteristics</b> |       |
| Input impedance               | 10 kΩ |
| Coupling                      | DC    |
| Protection, power on          | ±30 V |
| Protection, power off         | ±15 V |

## Analog Output

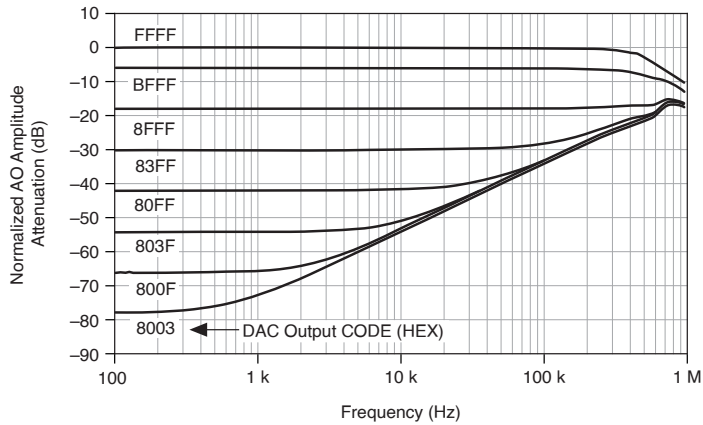
|                            |                                            |
|----------------------------|--------------------------------------------|
| Number of channels         | 2                                          |
| DAC resolution             | 16 bits                                    |
| DNL                        | ±1 LSB                                     |
| Monotonicity               | 16 bit guaranteed                          |
| <b>Maximum update rate</b> |                                            |
| 1 channel                  | 2.86 MS/s                                  |
| 2 channels                 | 2.00 MS/s                                  |
| Timing accuracy            | 50 ppm of sample rate                      |
| Timing resolution          | 10 ns                                      |
| Output range               | ±10 V, ±5 V, ±external reference on APFI 0 |
| Output coupling            | DC                                         |
| Output impedance           | 0.2 Ω                                      |
| Output current drive       | ±5 mA                                      |

|                                                        |                                                                                                                                                        |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overdrive protection                                   | $\pm 25$ V                                                                                                                                             |
| Overdrive current                                      | 26 mA                                                                                                                                                  |
| Power-on state                                         | $\pm 5$ mV                                                                                                                                             |
| Power-on/off glitch                                    | 1.5 V for 200 ms                                                                                                                                       |
| Output FIFO size                                       | 8,191 samples shared among channels used                                                                                                               |
| Data transfers                                         | DMA (scatter-gather), programmed I/O                                                                                                                   |
| AO waveform modes                                      | Non-periodic waveform, periodic waveform regeneration mode from onboard FIFO, periodic waveform regeneration from host buffer including dynamic update |
| Settling time, full-scale step, 15 ppm (1 LSB)         | 2 $\mu$ s                                                                                                                                              |
| Slew rate                                              | 20 V/ $\mu$ s                                                                                                                                          |
| Glitch energy at midscale transition, $\pm 10$ V range | 10 nV $\cdot$ s                                                                                                                                        |

## External Reference

|                               |               |
|-------------------------------|---------------|
| <b>APFI 0 characteristics</b> |               |
| Input impedance               | 10 k $\Omega$ |
| Coupling                      | DC            |
| Protection, device on         | $\pm 30$ V    |
| Protection, device off        | $\pm 15$ V    |
| Range                         | $\pm 11$ V    |
| Slew rate                     | 20 V/ $\mu$ s |

Figure 3. AO External Reference Bandwidth



## AO Absolute Accuracy (Warranted)

Absolute accuracy at full-scale numbers is valid immediately following self calibration and assumes the device is operating within 10 °C of the last external calibration.

Table 8. AO Absolute Accuracy

| Nominal Range<br>Positive Full Scale | Nominal Range<br>Negative Full Scale | Residual Gain<br>Error (ppm of<br>Reading) | Gain Tempco<br>(ppm/°C) | Absolute<br>Accuracy at Full<br>Scale (µV) |
|--------------------------------------|--------------------------------------|--------------------------------------------|-------------------------|--------------------------------------------|
| 10                                   | -10                                  | 63                                         | 17                      | 1890                                       |
| 5                                    | -5                                   | 70                                         | 8                       | 935                                        |

|                                      |    |
|--------------------------------------|----|
| Reference tempco (ppm/°C)            | 1  |
| Residual offset error (ppm of range) | 33 |
| Offset tempco (ppm of range/°C)      | 2  |
| INL Error (ppm of range)             | 64 |



**Note** Accuracies listed are valid for up to two years from the device external calibration.

### AO Absolute Accuracy Equation

- $\text{AbsoluteAccuracy} = \text{OutputValue} \cdot (\text{GainError}) + \text{Range} \cdot (\text{OffsetError})$
- $\text{GainError} = \text{ResidualGainError} + \text{GainTempco} \cdot (\text{TempChangeFromLastInternalCal})$



- + ReferenceTempco · (TempChangeFromLastExternalCal)
- OffsetError = ResidualOffsetError + OffsetTempco · (TempChangeFromLastInternalCal) + INLError

### AI Absolute Accuracy Example

Absolute accuracy at full scale on the analog input channels is determined using the following assumptions:

- TempChangeFromLastExternalCal = 10 °C
- TempChangeFromLastInternalCal = 1 °C
- number\_of\_readings = 10,000
- Coveragefactor = 3  $\sigma$

For example, on the 10 V range, the absolute accuracy at full scale is as follows:

- GainError = 48 ppm + 13 ppm · 1 + 1 ppm · 10 = 71 ppm
- OffsetError = 13 ppm + 21 ppm · 1 + 60 ppm = 94 ppm
- NoiseUncertainty = 
$$\frac{315 \mu V \cdot 3}{\sqrt{10,000}}$$
  
= 9.4  $\mu V$
- AbsoluteAccuracy = 10 V · (GainError) + 10 V · (OffsetError) + NoiseUncertainty = 1,660  $\mu V$

## Digital I/O/PFI

### Static Characteristics

|                          |                                                             |
|--------------------------|-------------------------------------------------------------|
| Number of channels       | 24 total, 8 (P0.<0..7>), 16 (PFI <0..7>/P1, PFI <8..15>/P2) |
| Ground reference         | D GND                                                       |
| Direction control        | Each terminal individually programmable as input or output  |
| Pull-down resistor       | 50 k $\Omega$ typical, 20 k $\Omega$ minimum                |
| Input voltage protection | $\pm 20$ V on up to two pins                                |



**Notice** Stresses beyond those listed under the ***Input voltage protection*** specification may cause permanent damage to the device.

## Waveform Characteristics (Port 0 Only)

|                                |                                                |
|--------------------------------|------------------------------------------------|
| Terminals used                 | Port 0 (P0.<0..7>)                             |
| Port/sample size               | Up to 8 bits                                   |
| Waveform generation (DO) FIFO  | 2,047 samples                                  |
| Waveform acquisition (DI) FIFO | 255 samples                                    |
| DI Sample Clock frequency      | 0 to 10 MHz, system and bus activity dependent |
| DO Sample Clock frequency      | 0 to 10 MHz, system and bus activity dependent |
| Data transfers                 | DMA (scatter-gather), programmed I/O           |
| Digital line filter settings   | 160 ns, 10.24 $\mu$ s, 5.12 ms, disable        |

## PFI/Port 1/Port 2 Functionality

|                          |                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------|
| Functionality            | Static digital input, static digital output, timing input, timing output                                            |
| Timing output sources    | Many AI, AO, counter, DI, DO timing signals                                                                         |
| Debounce filter settings | 90 ns, 5.12 $\mu$ s, 2.56 ms, custom interval, disable; programmable high and low transitions; selectable per input |

## Recommended Operating Conditions

|                                 |        |
|---------------------------------|--------|
| Input high voltage ( $V_{IH}$ ) |        |
| Minimum                         | 2.2 V  |
| Maximum                         | 5.25 V |
| Input low voltage ( $V_{IL}$ )  |        |
| Minimum                         | 0 V    |
| Maximum                         | 0.8 V  |



|                                                  |                |
|--------------------------------------------------|----------------|
| <b>Output high current (<math>I_{OH}</math>)</b> |                |
| P0.<0..7>                                        | -24 mA maximum |
| PFI <0..15>/P1/P2                                | -16 mA maximum |
| <b>Output low current (<math>I_{OL}</math>)</b>  |                |
| P0.<0..7>                                        | 24 mA maximum  |
| PFI <0..15>/P1/P2                                | 16 mA maximum  |

## Digital I/O Characteristics

|                                               |                     |
|-----------------------------------------------|---------------------|
| Positive-going threshold ( $V_{T+}$ )         | 2.2 V maximum       |
| Negative-going threshold ( $V_{T-}$ )         | 0.8 V minimum       |
| Delta VT hysteresis ( $V_{T+} - V_{T-}$ )     | 0.2 V minimum       |
| $I_{IL}$ input low current ( $V_{IN} = 0$ V)  | -10 $\mu$ A maximum |
| $I_{IH}$ input high current ( $V_{IN} = 5$ V) | 250 $\mu$ A maximum |

Figure 4. P0.<0..7>:  $I_{OH}$  versus  $V_{OH}$

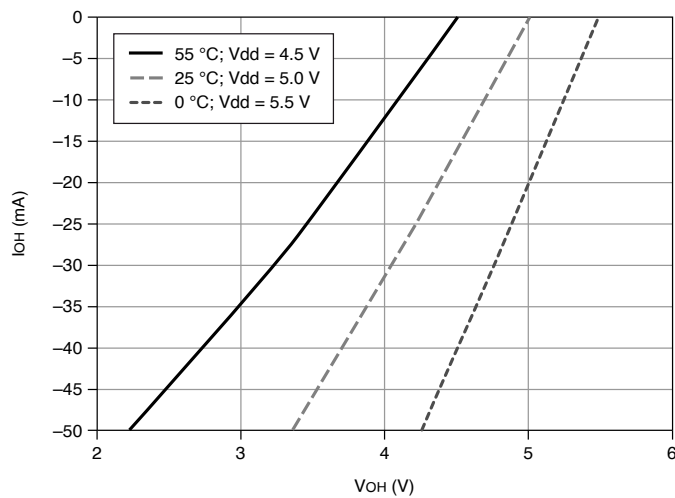
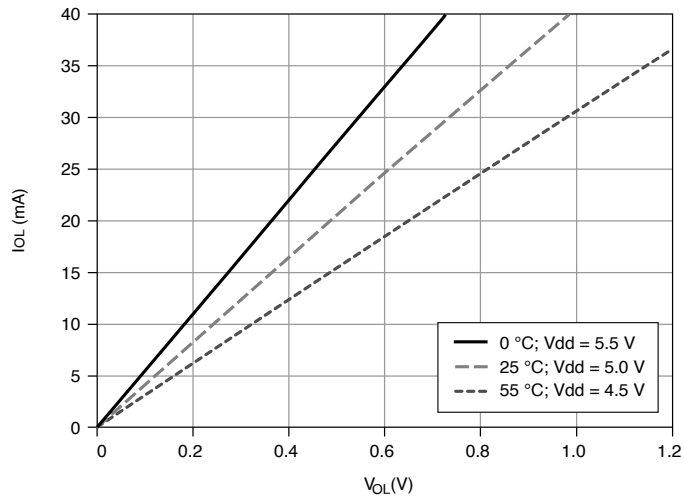
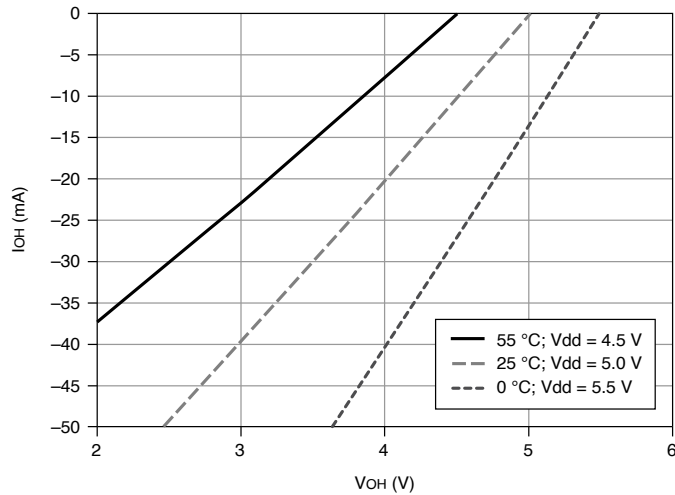
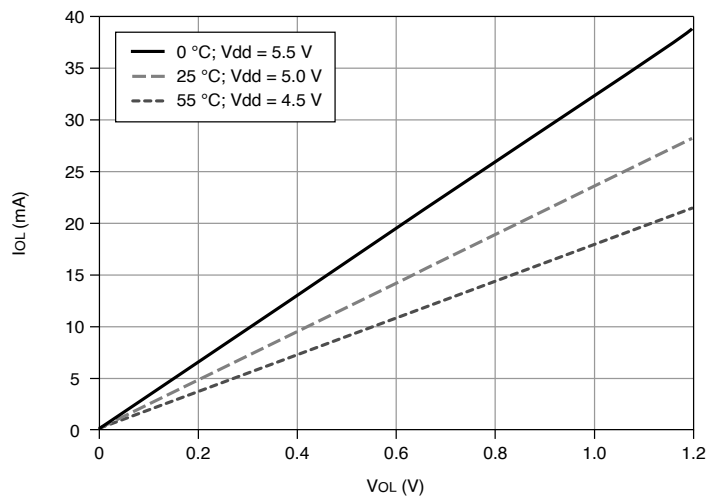


Figure 5. P0.<0..7>:  $I_{OL}$  versus  $V_{OL}$ Figure 6. PFI <0..15>/P1/P2:  $I_{OH}$  versus  $V_{OH}$ Figure 7. PFI <0..15>/P1/P2:  $I_{OL}$  versus  $V_{OL}$ 

## General-Purpose Counters

|                               |                                                                                           |
|-------------------------------|-------------------------------------------------------------------------------------------|
| Number of counter/timers      | 4                                                                                         |
| Resolution                    | 32 bits                                                                                   |
| Counter measurements          | Edge counting, pulse, pulse width, semi-period, period, two-edge separation               |
| Position measurements         | X1, X2, X4 quadrature encoding with Channel Z reloading; two-pulse encoding               |
| Output applications           | Pulse, pulse train with dynamic updates, frequency division, equivalent time sampling     |
| Internal base clocks          | 100 MHz, 20 MHz, 100 kHz                                                                  |
| External base clock frequency | 0 MHz to 25 MHz; 0 MHz to 100 MHz on PXIe_DSTAR <A,B>                                     |
| Base clock accuracy           | 50 ppm                                                                                    |
| Inputs                        | Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down, Sample Clock                                 |
| Routing options for inputs    | Any PFI, PXIe_DSTAR<A,B>, PXI_TRIG<0..7>, PXI_STAR, analog trigger, many internal signals |
| FIFO                          | 127 samples per counter                                                                   |
| Data transfers                | Dedicated scatter-gather DMA controller for each counter/timer, programmed I/O            |

## Frequency Generator

|                     |                         |
|---------------------|-------------------------|
| Number of channels  | 1                       |
| Base clocks         | 20 MHz, 10 MHz, 100 kHz |
| Divisors            | 1 to 16                 |
| Base clock accuracy | 50 ppm                  |

## Phase-Locked Loop (PLL)

|                |   |
|----------------|---|
| Number of PLLs | 1 |
|----------------|---|

|               |                                                                                                       |
|---------------|-------------------------------------------------------------------------------------------------------|
| Output of PLL | 100 MHz Timebase; other signals derived from 100 MHz Timebase including 20 MHz and 100 kHz Timebases. |
|---------------|-------------------------------------------------------------------------------------------------------|

Table 9. Reference Clock Locking Frequencies

| Reference Signal | PXI Express Locking Input Frequency (MHz) |
|------------------|-------------------------------------------|
| PXIe_DSTAR<A,B>  | 10, 20, 100                               |
| PXI_STAR         | 10, 20                                    |
| PXIe_CLK100      | 100                                       |
| PXI_TRIG <0..7>  | 10, 20                                    |
| PFI <0..15>      | 10, 20                                    |

## External Digital Triggers

|                                            |                                                                                                     |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Source                                     | Any PFI, PXIe_DSTAR<A,B>, PXI_TRIG<0..7>, PXI_STAR                                                  |
| Polarity                                   | Software-selectable for most signals                                                                |
| Analog input function                      | Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Convert Clock, Sample Clock Timebase |
| Analog output function                     | Start Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase                                   |
| Counter/timer functions                    | Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down, Sample Clock                                           |
| Digital waveform generation (DO) function  | Start Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase                                   |
| Digital waveform acquisition (DI) function | Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase                |

## Device-to-Device Trigger Bus

|              |                                            |
|--------------|--------------------------------------------|
| Input source | PXI_TRIG <0..7>, PXI_STAR, PXIe_DSTAR<A,B> |
|--------------|--------------------------------------------|

|                          |                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------|
| Output destination       | PXI_TRIG <0..7>, PXIe_DSTARC                                                                                        |
| Output selections        | 10 MHz Clock, frequency generator output, many internal signals                                                     |
| Debounce filter settings | 90 ns, 5.12 $\mu$ s, 2.56 ms, custom interval, disable; programmable high and low transitions; selectable per input |

## Current Limits

|                                          |           |
|------------------------------------------|-----------|
| +5 V terminal (connector 0)              | 1 A max   |
| P0/PFI/P1/P2 and +5 V terminals combined | 1.5 A max |

## Bus Interface

|                    |                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Form factor        | x1 PXI Express peripheral module, specification rev. 1.0 compliant                                                                |
| Slot compatibility | x1 and x4 PXI Express or PXI Express hybrid slots                                                                                 |
| DMA channels       | 8: analog input, analog output, digital input, digital output, counter/timer 0, counter/timer 1, counter/timer 2, counter/timer 3 |

Devices may be installed in PXI Express slots or PXI Express hybrid slots.

## Safety Voltages

Table 10. Rated Voltages

|                   |               |
|-------------------|---------------|
| AI+ or AI- to GND | $\pm 11$ V DC |
| AO to GND         | $\pm 10$ V DC |
| DIO-to-GND        | +5 V DC       |
| +5V pin to GND    | +5 V DC       |



**Caution** Any external sources must be limited to not exceed these



maximum rated voltages.



**Attention** Les sources externes doivent être limitées pour ne pas dépasser ces tensions nominales maximales.

## Current Ratings

|                                |                     |         |
|--------------------------------|---------------------|---------|
| DIO Maximum continuous current | Per channel         | ±10 mA  |
|                                | Sum of all channels | ±160 mA |
| AO Maximum continuous current  | Per channel         | 2 mA    |



### Caution

Any external sources must be limited to not exceed these maximum rated currents.



### Attention

Les sources externes doivent être limitées pour ne pas dépasser ces tensions nominales maximales.

## Measurement Category

This product is rated for Measurement Category I (or other non-MAINS circuits).



**Caution** Do not connect the product to signals or use for measurements within Measurement Categories II, III, or IV.



**Attention** Ne pas connecter le produit à des signaux dans les catégories de mesure II, III ou IV et ne pas l'utiliser pour effectuer des mesures dans ces



catégories.

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as **MAINS** voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.



**Note** Measurement Categories CAT I and CAT O are equivalent. These test and measurement circuits are for other circuits not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

## Environmental Guidelines



**Notice** Failure to follow the mounting instructions in the product documentation can cause temperature derating.



**Notice** This product is intended for use in indoor applications only.

## Environmental Characteristics

|                  |           |                                 |
|------------------|-----------|---------------------------------|
| Temperature      | Operating | 0 °C to 55 °C                   |
|                  | Storage   | -40 °C to 70 °C                 |
| Humidity         | Operating | 10% RH to 90% RH, noncondensing |
|                  | Storage   | 5% RH to 95% RH, noncondensing  |
| Pollution Degree |           | 2                               |
| Maximum altitude |           | 2000 m                          |



## Physical Characteristics

|                   |                                                      |
|-------------------|------------------------------------------------------|
| Device dimensions | 3U, one-slot, PXI Express/Compact PCI Express module |
| Weight            | 208 g (7.3 oz)                                       |
| I/O connectors    | 4 68-pin VHDCI                                       |



**Note** If you need to clean the module, wipe it with a dry towel.

## Power Requirements

Table 11. Power Specifications

|          |                        |                                         |
|----------|------------------------|-----------------------------------------|
| PXIe bus | Voltage/current rating | 0.48 A at 3.3 V DC<br>1.65 A at 12 V DC |
|          | Power rating           | 21.4 W                                  |

## Calibration

|                          |            |
|--------------------------|------------|
| Recommended warm-up time | 15 minutes |
| Calibration interval     | 2 years    |