# TYPICAL CHARACTERISTICS
# ON
# PDVAN-8018-120-8

**Planar Monolithics Industries Model Number PDVAN-8018-120-8 is an 8-Bit programmable 120 dB pin diode attenuator with a step resolution of 1.0 dB over the frequency range of 8.0 GHz to 18 GHz.**


**October 22, 2021**

**Tested By: E. Kretz**



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# TYPICAL CHARACTERISTICS ON PDVAN-8018-120-8

## Product Outline Drawing with Specifications

| ZONE | REV. | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|---|
| | A1 | ORIGINAL RELEASE | 5/3/2021 | |
| | A2 | UPDATED POWER SUPPLY / PINOUT | 5/3/2021 | |
| | A3 | ECN # 21-0170 | 10/26/2021 | |

DESCRIPTION:
PLANAR MONOLITHICS INDUSTRIES MODEL NUMBER PDVAN-8018-120-8 IS AN 8-BIT PROGRAMMABLE 120 dB PIN DIODE ATTENUATOR WITH A STEP RESOLUTION OF 1.0 dB OVER THE FREQUENCY RANCE OF 8.0 GHz TO 18 GHz.

SPECIFICATIONS @ 25°C:

- FREQUENCY: ..... 8.0 TO 18.0 GHz
- MEAN ATTENUATION RANGE: ..... 120dB
- LSB: ..... 1.0dB
- INSERTION LOSS: ..... 8dB TYP, 8.5dB MAX
- VSWR: ..... 2.0:1 MAX at 0dB Attenuation
- POWER RATING: ..... +20dBm CW MIN (Operating)
  +30dBm CW MAX (Survival)
- ATTENUATION FLATNESS:
  - @ 10dB ..... ± 0.8dB
  - @ 20dB ..... ± 1.1dB
  - @ 40dB ..... ± 1.5dB
  - @ 60dB ..... ± 1.6dB
  - @ 80dB ..... ± 2.5dB
  - @ 100dB ..... ± 3.2dB
- ATTENUATION ACCURACY:
  - @ 0 to 50dB ..... ± 1.0dB
  - @ 50 to 60dB ..... ± 1.5dB
  - @ 60 to 80dB ..... ± 2.0dB
  - @ 80 to 120dB ..... ± 2.5dB
- SWITCHING TIME: ..... 3 usec MAX
- DIGITAL CONTROL: ..... 8 BIT Binary TTL
- INPUT TRACKING: ..... MONOTONIC
- POWER SUPPLY: ..... +5.3V MIN, +6V MAX @ 700 mA MAX
- PWR/CTL CONNECTORS: ..... 15 PIN Micro-D-Female (MATING CONNECTOR SUPPLIED)
- RF CONNECTORS: ..... SMA - FEMALE
- FINISH: ..... BLUE EPOXY POLIMIDE COATING IAW MIL-C-22750, TYPE I OVER EPOXY POLIMIDE PRIMER IAW MIL-P-23377, TYPE I, CLASS 1 OR 3. (MOUNTING SURFACE GOLD PLATED)
- SIZE: ..... 4.00" x 1.80" x 0.50"

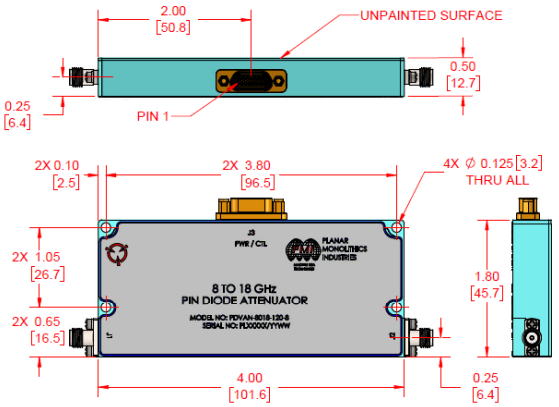
ENVIRONMENTAL RATINGS:

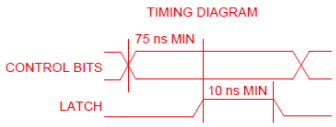
- TEMPERATURE: ..... -55°C TO 85°C (OPERATING)
  -65°C TO +125°C (STORAGE)
- HUMIDITY: ..... MIL-STD-202F, METHOD 103B COND. B
- SHOCK: ..... MIL-STD-202F, METHOD 213B COND. B
- VIBRATION: ..... MIL-STD-202F, METHOD 204D COND. B
- ALTITUDE: ..... MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE: ..... MIL-STD-202F, METHOD 107

NOTE: THE ABOVE SPECIFICATIONS ARE SUBJECT TO CHANGE OR REVISION SPECIFICATIONS WILL VARY OVER OPERATING TEMPERATURE

| PIN NO. | J3 PIN FUNCTION |
|---|---|
| 1 | GND |
| 2 | LATCHING STROBE |
| 4 | GND |
| 5 | 0.5 dB (LSB) |
| 6 | 1.0 dB |
| 7 | 2.0 dB |
| 8 | 4.0 dB |
| 9 | 8.0 dB |
| 10 | 16.0 dB |
| 11 | 32.0 dB |
| 12 | 64.0 dB (MSB) |
| 13 | +VDC |
| 14 | +VDC |
| 15 | N/C |

- LOGIC INPUT:
  LOGIC "0" (BIT OFF): ..... -0.3 TO +0.8V
  LOGIC "1" (BIT ON): ..... +2.0 TO +5.0V




PMI CONFIDENTIAL AND PROPRIETARY

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ISO 9001 CERTIFIED

| APPROVALS | DATE |
|---|---|
| DRAWN: DPD | 5/3/2021 |
| REDRAWN | |
| ISSUED | |

TITLE: PRODUCT FEATURE
PDVAN-8018-120-8
8-18 GHz, 120dB 8-BIT Attenuator

| SIZE | FSCM NO. | DWG NO. | REV. |
|---|---|---|---|
| B | 05XQ0 | 27041560 | A3 |

SCALE 1:1 SHEET 1 OF 1



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**TYPICAL CHARACTERISTICS**
**ON**
**PDVAN-8018-120-8**

## Tabulated Data +25C

| Test Item No: | Parameters | Specified Value | Measured Value | QA QC |
|---|---|---|---|---|
| 1 | Frequency Range: | 8 GHz to 18 GHz | **8 GHz to 18 GHz** | |
| 2 | Insertion Loss: | 8.5 dB MAX | **7.9 dB See Plot** | |
| 3 | VSWR: | 2.0:1 MAX at 0 dB Attenuation | **IN: 1.7:1 OUT: 1.7:1 See Plot** | |
| 4 | Flatness to 10 dB: | ±0.8 dB | **±0.48 dB See Plot** | |
| 5 | Flatness to 20 dB: | ±1.1 dB | **±0.58 dB See Plot** | |
| 6 | Flatness to 40 dB: | ±1.5 dB | **±0.9 dB See Plot** | |
| 7 | Flatness to 60 dB: | ±1.6 dB | **±1.33 dB See Plot** | |
| 8 | Flatness to 80 dB: | ±2.5 dB | **±1.88 dB See Plot** | |
| 9 | Flatness to 100 dB: | ±3.2 dB | **±2.96 dB See Plot** | |
| 10 | Accuracy of Attenuation: 0 to 50 dB | ±1.0 dB | **±0.91 dB See Plot** | |
| 11 | Accuracy of Attenuation: 50 to 60 dB | ±1.5 dB | **±0.63 dB See Plot** | |
| 12 | Accuracy of Attenuation: 60 to 80 dB | ±2.0 dB | **±1.2 dB See Plot** | |
| 13 | Accuracy of Attenuation: 80 to 120 dB | ±2.5 dB | **±1.38 dB See Plot** | |
| 14 | Switching Speed: | 3 usec MAX | **1.1 usec** | |
| 15 | DC Supply: | +5.3V to +6V @ 700 mA Max | **677 mA** | |



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## TYPICAL CHARACTERISTICS ON PDVAN-8018-120-8

| Programmed Attenuation | Measured Average | Accuracy | Flatness (±) |
|---|---|---|---|
| 0.5 | 0.49 | -0.01 | 0.04 |
| 1 | 0.93 | -0.07 | 0.08 |
| 2 | 1.72 | -0.28 | 0.14 |
| 4 | 3.62 | -0.38 | 0.26 |
| 8 | 7.34 | -0.66 | 0.42 |
| 16 | 15.07 | -0.93 | 0.58 |
| 32 | 31.37 | -0.63 | 0.76 |
| 64 | 64.64 | 0.64 | 1.47 |
| 100 | 101.38 | 1.38 | 1.78 |
| 120 | 121.25 | 1.25 | 4.67 |

| Programmed Attenuation | Measured Average | Accuracy | Flatness (±) |
|---|---|---|---|
| 10 | 9.22 | -0.78 | 0.48 |
| 20 | 19.16 | -0.84 | 0.56 |
| 30 | 29.19 | -0.81 | 0.71 |
| 40 | 39.68 | -0.32 | 0.90 |
| 50 | 49.84 | -0.16 | 1.14 |
| 60 | 60.63 | 0.63 | 1.33 |
| 70 | 70.74 | 0.74 | 1.47 |
| 80 | 81.20 | 1.20 | 1.88 |
| 90 | 90.88 | 0.88 | 2.96 |
| 110 | 111.18 | 1.18 | 2.47 |



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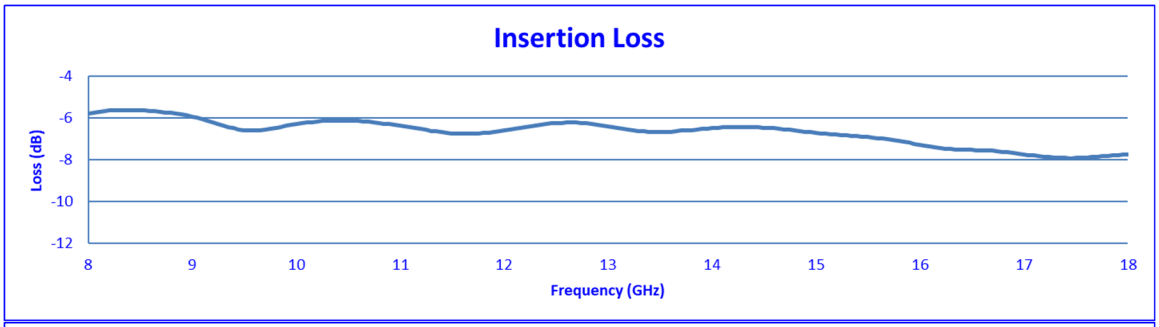


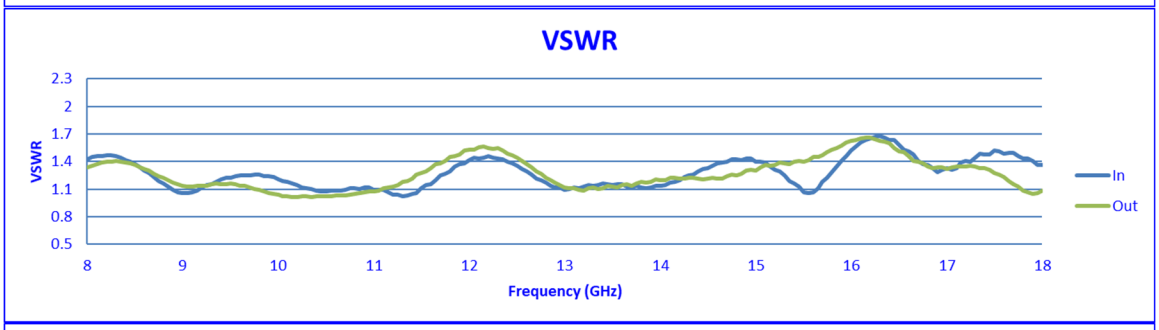


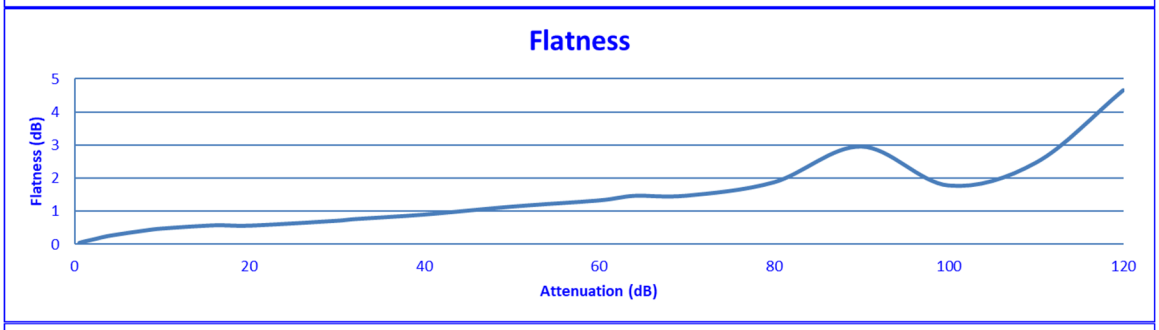


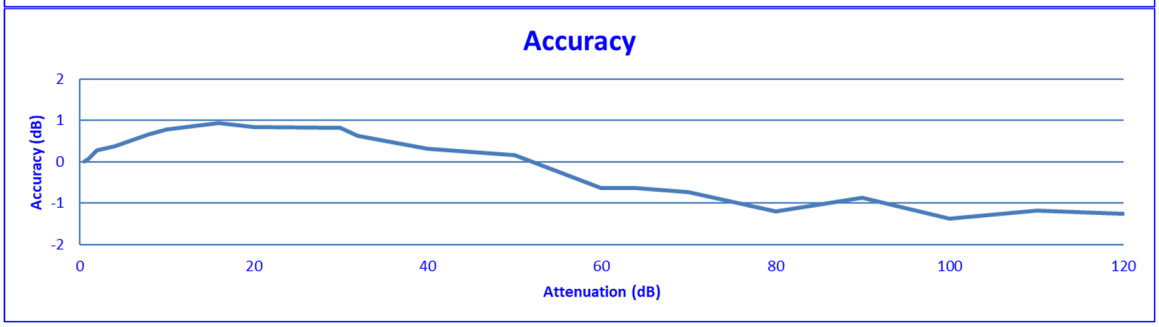




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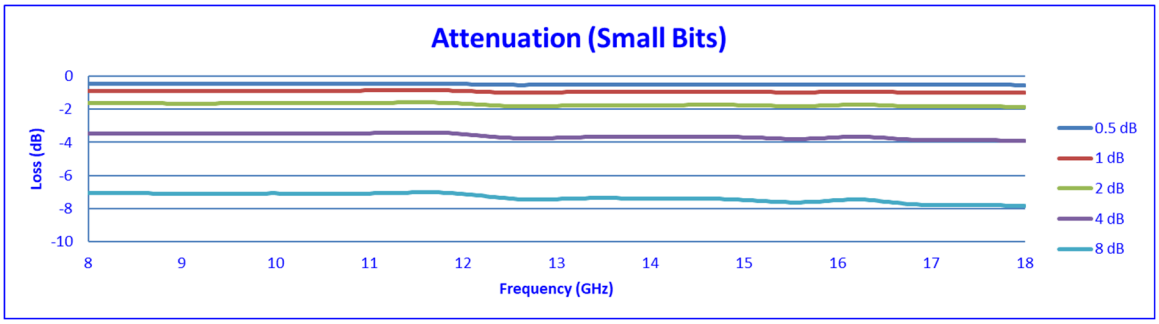


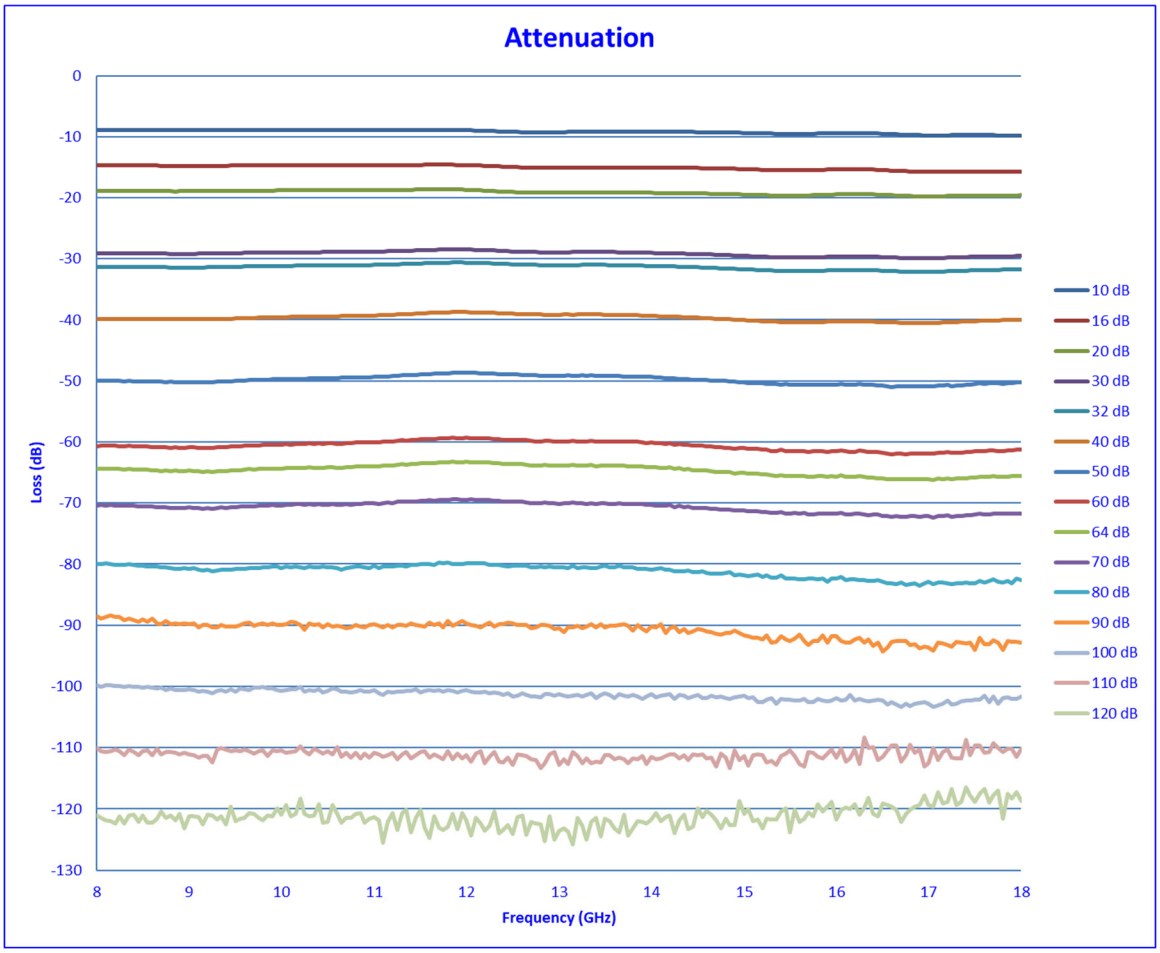




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**TYPICAL CHARACTERISTICS**
**ON**
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## Tabulated Data +85C

| Test Item No: | Parameters | Measured Value | QA QC |
|---|---|---|---|
| 1 | Frequency Range: | **8 GHz to 18 GHz** | |
| 2 | Insertion Loss: | **8.3 dB See Plot** | |
| 3 | VSWR: | **IN: 1.6:1 OUT: 1.6:1 See Plot** | |
| 4 | Flatness to 10 dB: | **±0.48 dB See Plot** | |
| 5 | Flatness to 20 dB: | **±0.61 dB See Plot** | |
| 6 | Flatness to 40 dB: | **±1.26 dB See Plot** | |
| 7 | Flatness to 60 dB: | **±1.9 dB See Plot** | |
| 8 | Flatness to 80 dB: | **±3.45 dB See Plot** | |
| 9 | Flatness to 100 dB: | **±4.74 dB See Plot** | |
| 10 | Accuracy of Attenuation: 0 to 50 dB | **±2.11 dB See Plot** | |
| 11 | Accuracy of Attenuation: 50 to 60 dB | **±3.74 dB See Plot** | |
| 12 | Accuracy of Attenuation: 60 to 80 dB | **±5.95 dB See Plot** | |
| 13 | Accuracy of Attenuation: 80 to 120 dB | **±7.67 dB See Plot** | |
| 14 | Switching Speed: | **1.1 usec** | |
| 15 | DC Supply: | **677 mA** | |



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## TYPICAL CHARACTERISTICS ON PDVAN-8018-120-8

| Programmed Attenuation | Measured Average | Accuracy | Flatness (±) |
|---|---|---|---|
| 0.5 | 0.40 | -0.10 | 0.03 |
| 1 | 0.78 | -0.22 | 0.06 |
| 2 | 1.49 | -0.51 | 0.11 |
| 4 | 3.27 | -0.73 | 0.22 |
| 8 | 6.92 | -1.08 | 0.39 |
| 16 | 14.64 | -1.36 | 0.59 |
| 32 | 31.93 | -0.07 | 1.00 |
| 64 | 68.11 | 4.11 | 2.14 |
| 100 | 107.03 | 7.03 | 4.74 |
| 120 | 127.67 | 7.67 | 12.95 |

| Programmed Attenuation | Measured Average | Accuracy | Flatness (±) |
|---|---|---|---|
| 10 | 8.86 | -1.14 | 0.48 |
| 20 | 18.71 | -1.29 | 0.61 |
| 30 | 29.67 | -0.33 | 0.90 |
| 40 | 40.99 | 0.99 | 1.26 |
| 50 | 52.11 | 2.11 | 1.63 |
| 60 | 63.74 | 3.74 | 1.90 |
| 70 | 74.69 | 4.69 | 2.41 |
| 80 | 85.95 | 5.95 | 3.45 |
| 90 | 96.32 | 6.32 | 4.25 |
| 110 | 117.14 | 7.14 | 3.87 |



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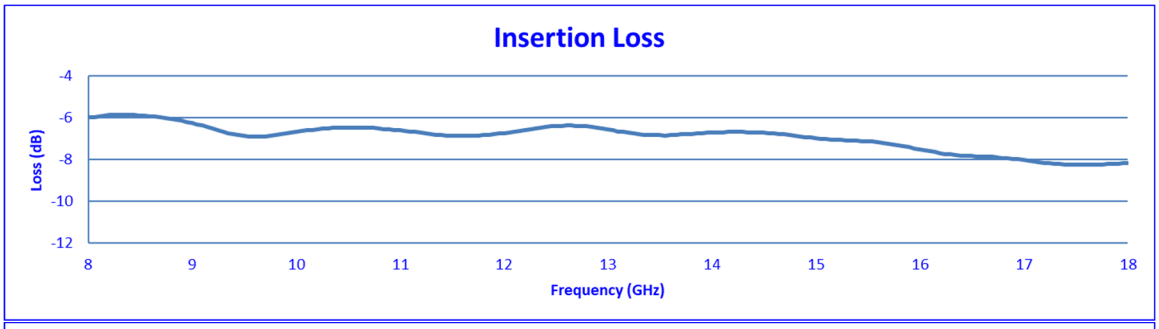


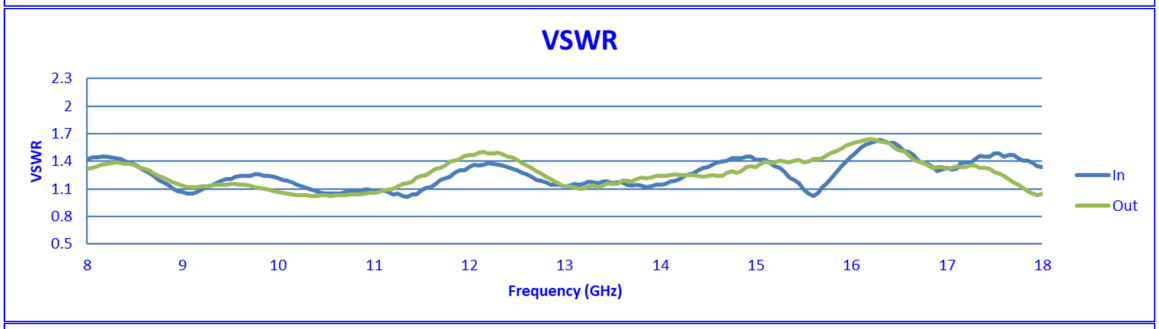


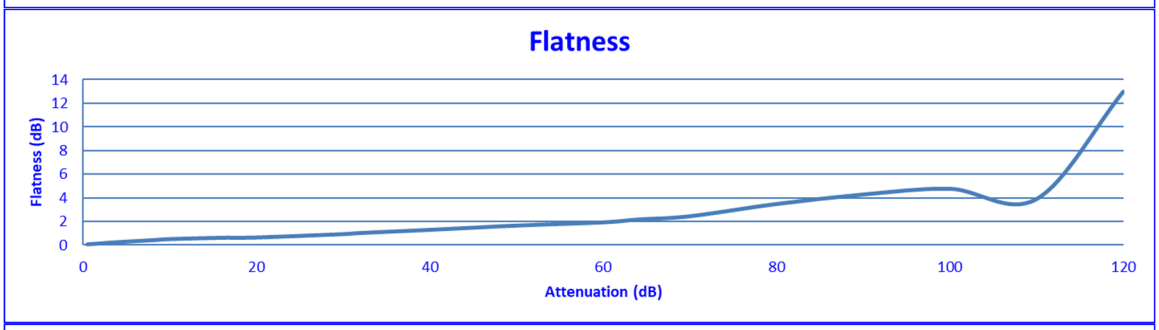


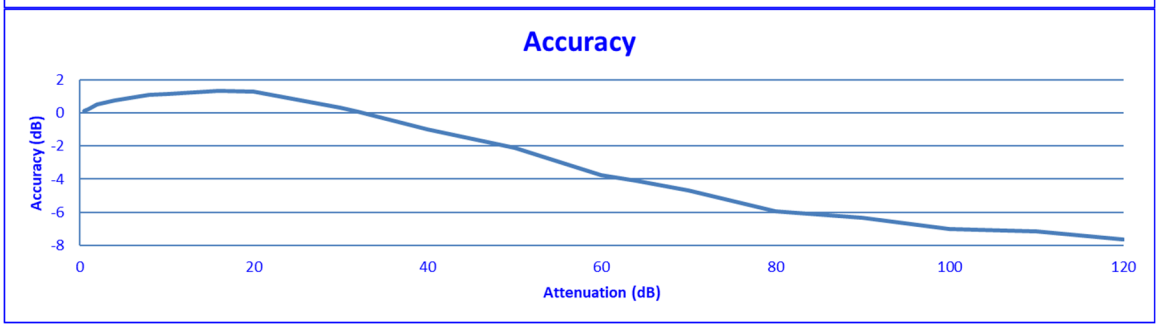




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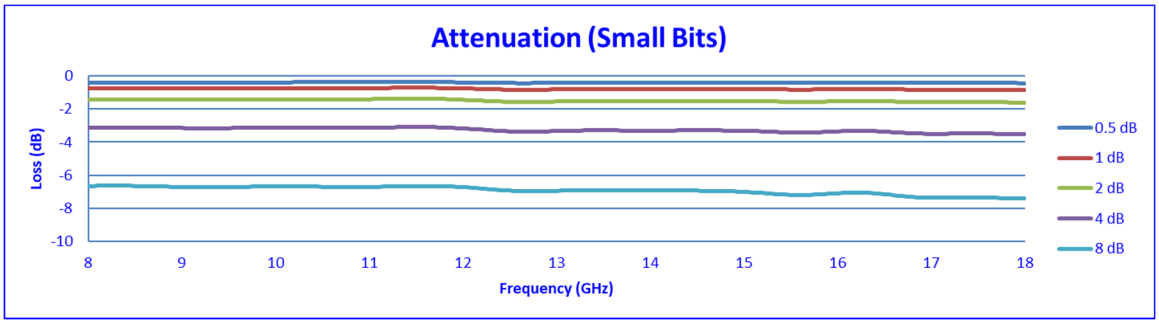


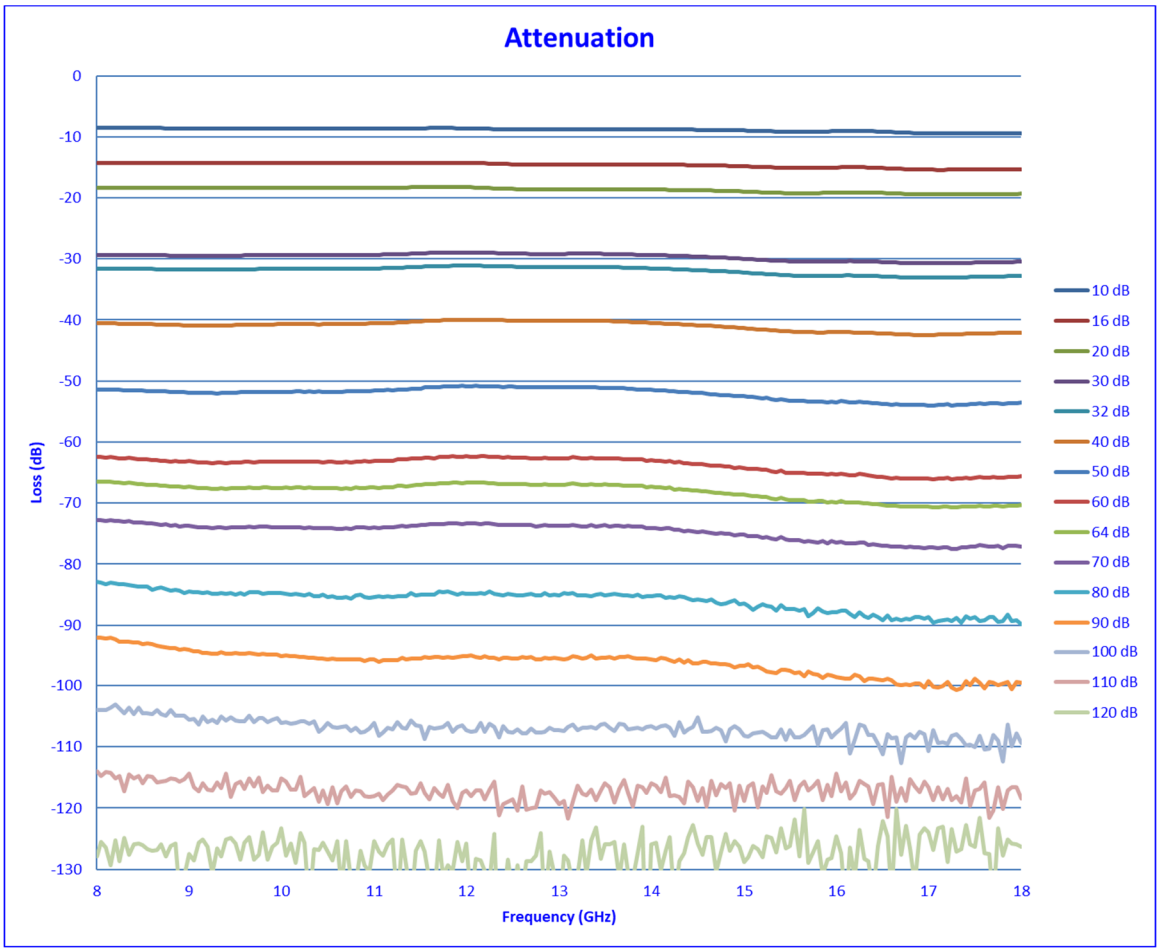




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**TYPICAL CHARACTERISTICS**
**ON**
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## Tabulated Data -55C

| Test Item No: | Parameters | Measured Value | QA QC |
|---|---|---|---|
| 1 | Frequency Range: | **8 GHz to 18 GHz** | |
| 2 | Insertion Loss: | **7.8 dB See Plot** | |
| 3 | VSWR: | **IN: 1.7:1 OUT: 1.7:1 See Plot** | |
| 4 | Flatness to 10 dB: | **±0.53 dB See Plot** | |
| 5 | Flatness to 20 dB: | **±0.55 dB See Plot** | |
| 6 | Flatness to 40 dB: | **±2.36 dB See Plot** | |
| 7 | Flatness to 60 dB: | **±3.57 dB See Plot** | |
| 8 | Flatness to 80 dB: | **±3.82 dB See Plot** | |
| 9 | Flatness to 100 dB: | **±4.31 dB See Plot** | |
| 11 | Accuracy of Attenuation: 0 to 50 dB | **±3.4 dB See Plot** | |
| 12 | Accuracy of Attenuation: 50 to 60 dB | **±0.85 dB See Plot** | |
| 13 | Accuracy of Attenuation: 60 to 80 dB | **±2.11 dB See Plot** | |
| 14 | Accuracy of Attenuation: 80 to 120 dB | **±6.26 dB See Plot** | |
| 15 | Switching Speed: | **1.1 usec** | |
| 16 | DC Supply: | **677 mA** | |



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## TYPICAL CHARACTERISTICS ON PDVAN-8018-120-8

| Programmed Attenuation | Measured Average | Accuracy | Flatness (±) |
|---|---|---|---|
| 0.5 | 0.89 | 0.39 | 0.08 |
| 1 | 1.67 | 0.67 | 0.15 |
| 2 | 2.91 | 0.91 | 0.26 |
| 4 | 5.57 | 1.57 | 0.42 |
| 8 | 10.13 | 2.13 | 0.53 |
| 16 | 18.85 | 2.85 | 0.51 |
| 32 | 34.65 | 2.65 | 1.60 |
| 64 | 63.55 | -0.45 | 3.51 |
| 100 | 95.71 | -4.29 | 4.31 |
| 120 | 113.74 | -6.26 | 6.61 |

| Programmed Attenuation | Measured Average | Accuracy | Flatness (±) |
|---|---|---|---|
| 10 | 12.14 | 2.14 | 0.53 |
| 20 | 23.40 | 3.40 | 0.55 |
| 30 | 32.69 | 2.69 | 1.43 |
| 40 | 42.03 | 2.03 | 2.36 |
| 50 | 50.85 | 0.85 | 3.07 |
| 60 | 60.14 | 0.14 | 3.57 |
| 70 | 68.80 | -1.20 | 3.82 |
| 80 | 77.89 | -2.11 | 3.42 |
| 90 | 86.51 | -3.49 | 3.13 |
| 110 | 104.52 | -5.48 | 5.66 |



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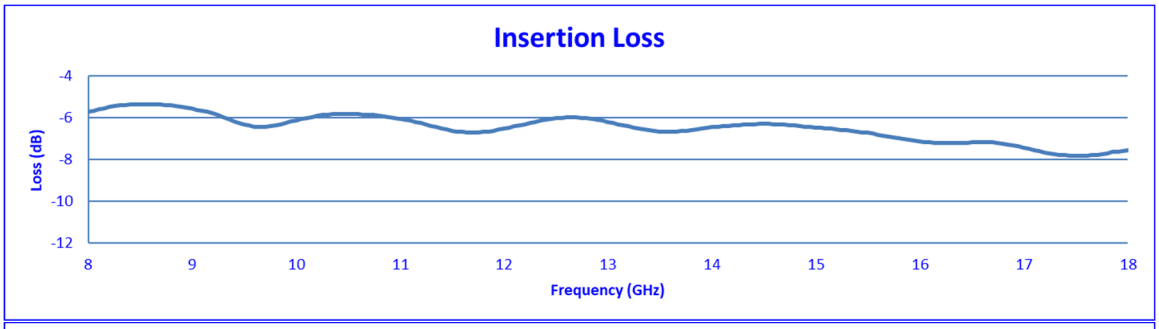


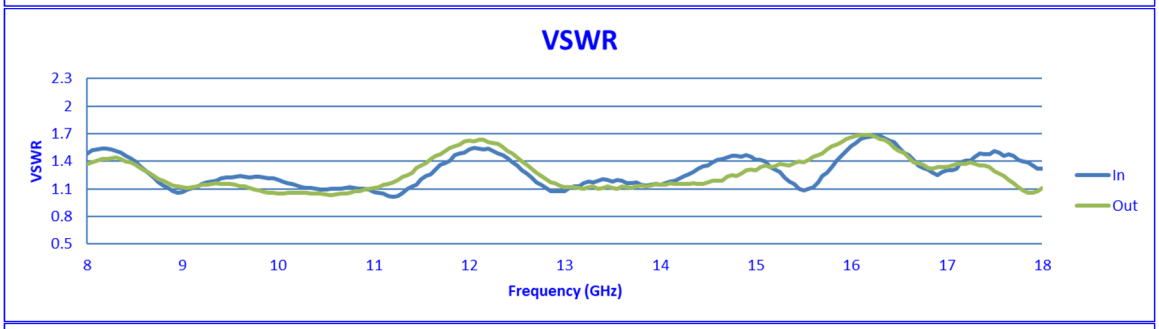


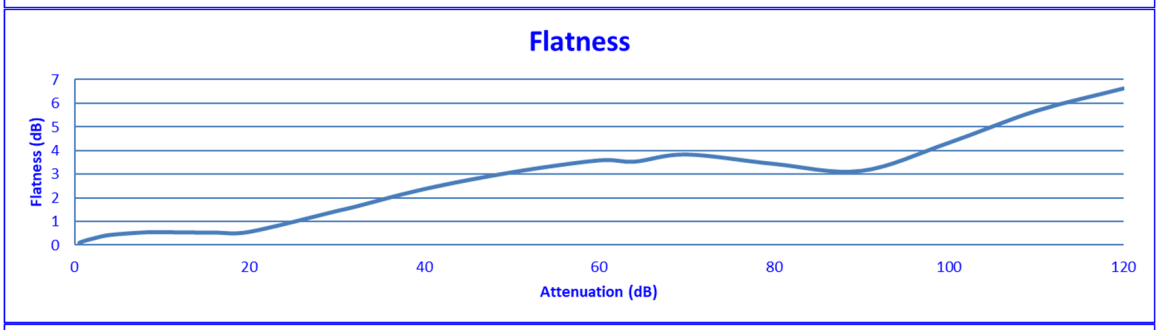


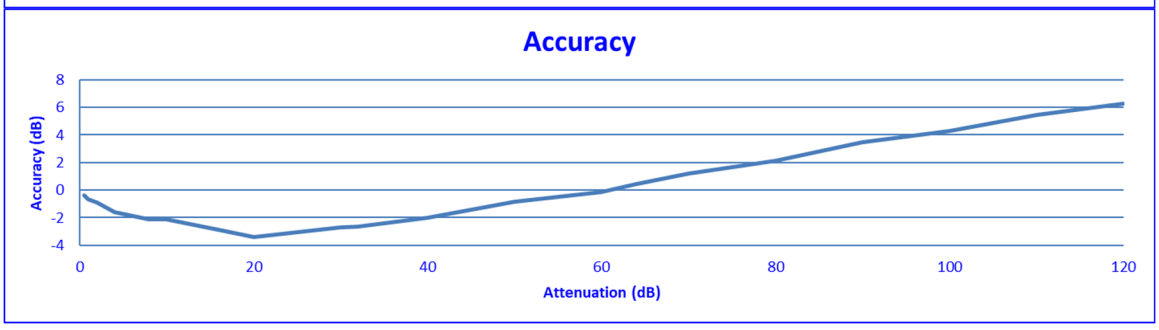




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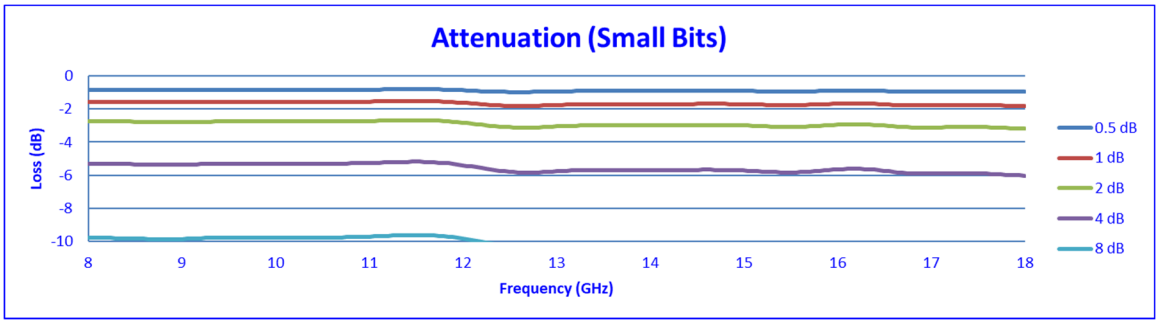


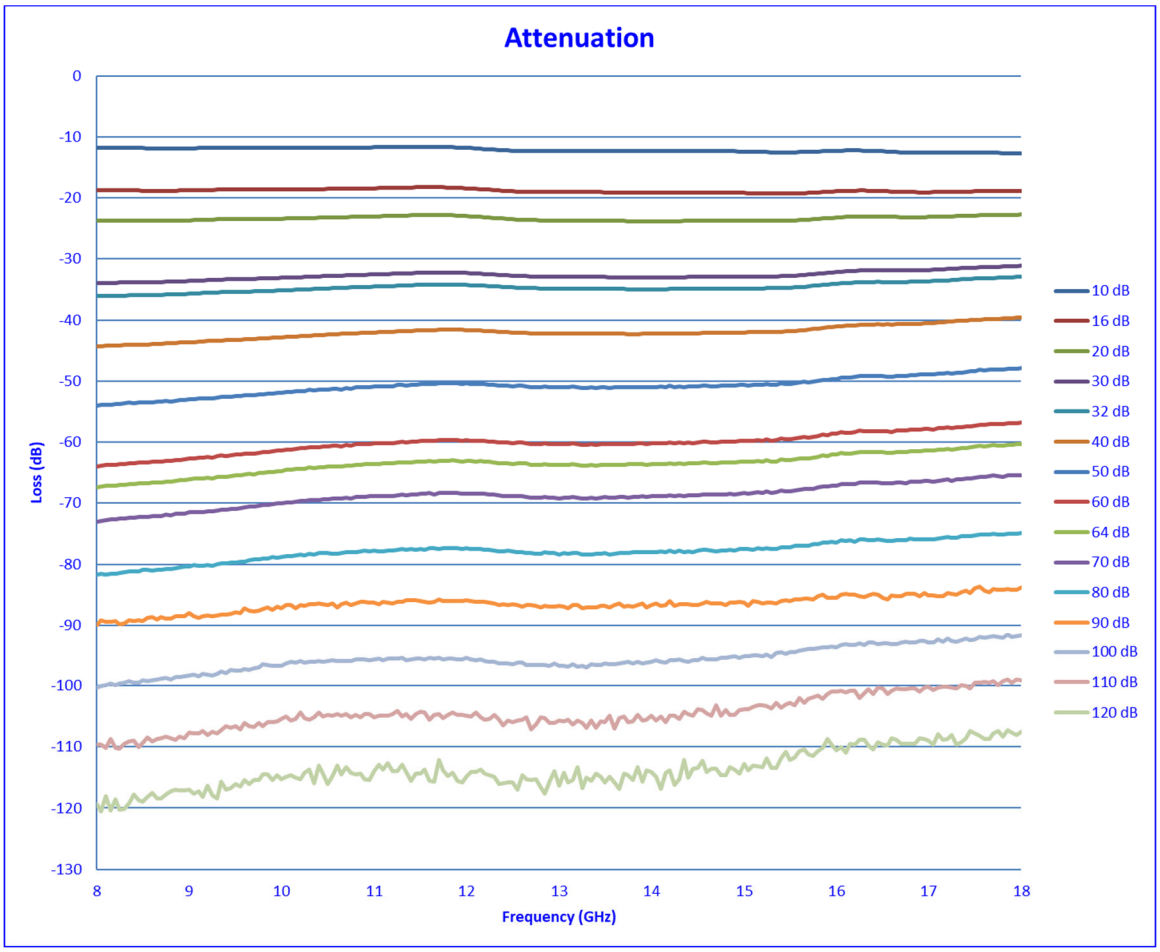




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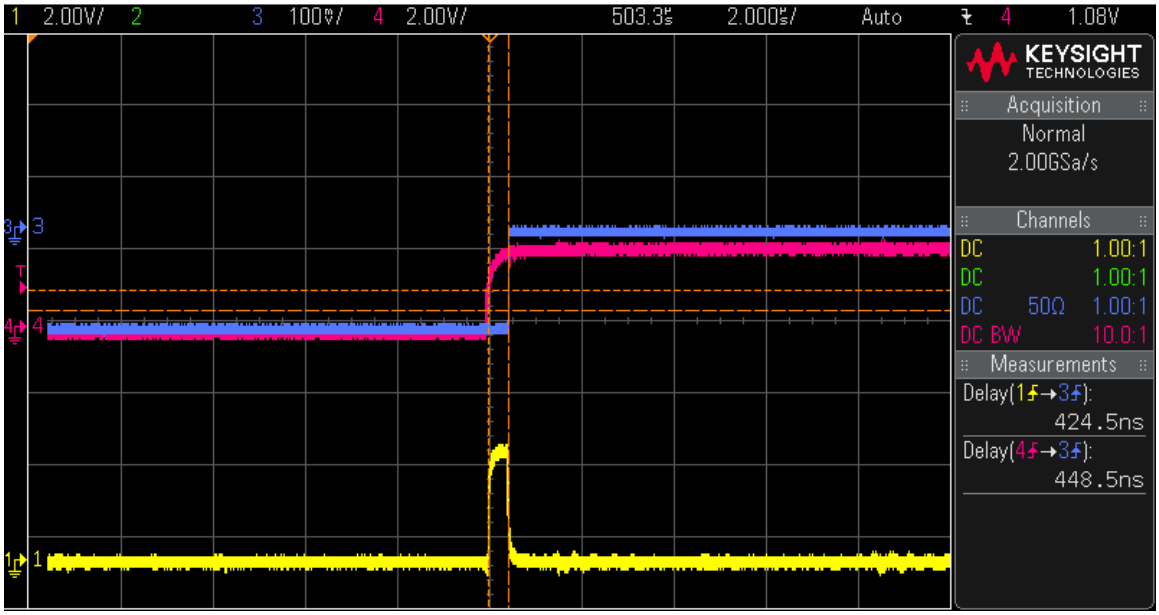
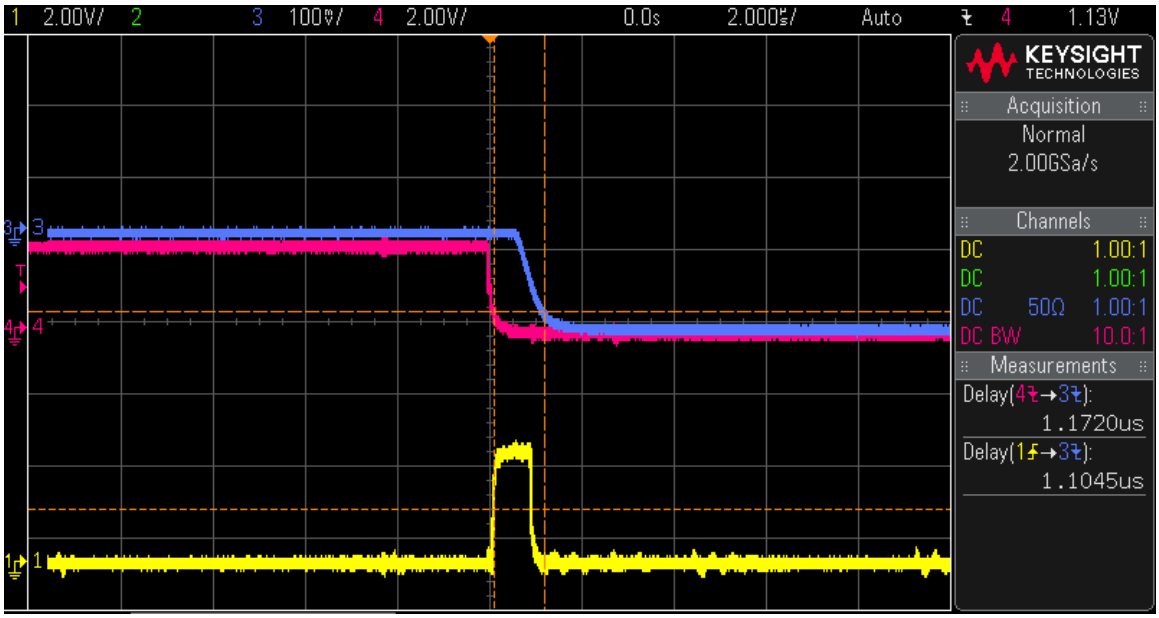
# TYPICAL CHARACTERISTICS ON PDVAN-8018-120-8

## Switching Speed




**Red = Control Bits**
**Blue = RF**
**Yellow = Latch**

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