



## Typical Characteristics For DTA-0R5G18G-60-CD-1

PMI MODEL NUMBER DTA-0R5G18G-60-CD-1 IS A NON-REFLECTIVE 10 BIT PROGRAMMABLE 60 DB PIN DIODE ATTENUATOR WITH STEP RESOLUTION AS LOW AS 0.06 DB OVER THE FREQUENCY RANGE OF 0.5 TO 18.0 GHZ. THIS MODEL IS OFFERED IN A SLIM LINE HOUSING MEASURING ONLY 0.5" HIGH.



March 19, 2018  
Designed by: PMI Engineering  
Tested and Reported by: Kevin Mansfield



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# Typical Characteristics For DTA-0R5G18G-60-CD-1

### DESCRIPTION:

PMI MODEL NUMBER DTA-0R5G18G-60-CD-1 IS A NON-REFLECTIVE 10 BIT PROGRAMMABLE 60 dB PIN DIODE ATTENUATOR WITH STEP RESOLUTION AS LOW AS 0.06 dB OVER THE FREQUENCY RANGE OF 0.5 TO 18.0 GHz. THIS MODEL IS OFFERED IN A SLIM LINE HOUSING MEASURING ONLY 0.5" HEIGHT.

### SPECIFICATIONS:

- FREQUENCY: \_\_\_\_\_ 0.5 GHz TO 18.0 GHz
- MEAN ATTENUATION RANGE: \_\_\_\_\_ 60 dB
- INSERTION LOSS: \_\_\_\_\_ 4.8 dB MAX
- VSWR: \_\_\_\_\_ 2.0 :1 MAX
- FLATNESS UP TO:
  - 20 dB \_\_\_\_\_ ±1.0 dB TYP
  - 40 dB \_\_\_\_\_ ±1.25 dB TYP
  - 60 dB \_\_\_\_\_ ±3.0 dB TYP
- ACCURACY OF ATTENUATION:
  - 0 dB TO 20 dB \_\_\_\_\_ ±1.0 dB TYP
  - 20 dB TO 40 dB \_\_\_\_\_ ±1.5 dB TYP
  - 40 dB TO 60 dB \_\_\_\_\_ ±2.0 dB TYP
- MINIMUM ATTENUATION STEP: \_\_\_\_\_ 0.06 dB
- OPERATING POWER: \_\_\_\_\_ 15dBm TYP
- SURVIVAL POWER: \_\_\_\_\_ 1W Average from -65°C TO +25°C
- SWITCHING TIME:
  - ON TIME \_\_\_\_\_ 1.0 us MAX
  - OFF TIME \_\_\_\_\_ 0.5 us MAX
- DC POWER SUPPLY: \_\_\_\_\_ +15V @ 150 mA MAX
- CONNECTORS: \_\_\_\_\_ 2 SMA & 15 PIN Micro-D-Female Shipped with Mating Micro-D Male
- WEIGHT: \_\_\_\_\_ 3.0 oz (85 gm) Approximate
- FINISH: \_\_\_\_\_ PAINTED BLUE
  
- LOGIC INPUT:
  - LOGIC "0" (BIT OFF) \_\_\_\_\_ -0.3 to +0.8V
  - LOGIC "1" (BIT ON) \_\_\_\_\_ +2.0 to +5.0V

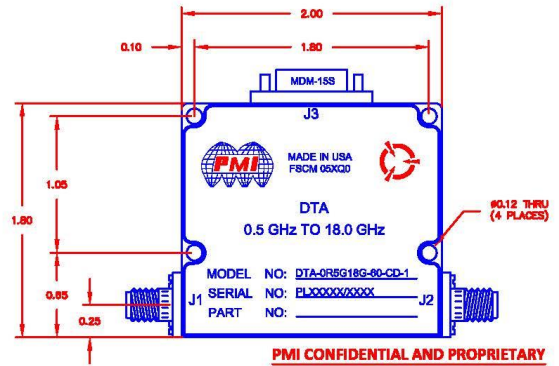
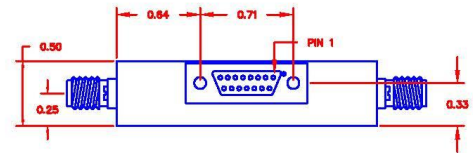
### ENVIRONMENTAL RATINGS:

- TEMPERATURE: \_\_\_\_\_ -40°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

| PIN NO: | J3 PIN FUNCTIONS |
|---------|------------------|
| 1       | 2dB              |
| 2       | 1dB              |
| 3       | 0.5dB            |
| 4       | 0.25dB           |
| 5       | GND              |
| 6       | 0.13 dB          |
| 7       | 0.06 dB (LSB)    |
| 8       | GND              |
| 9       | Not Used         |
| 10      | Not Used         |
| 11      | +12VDC           |
| 12      | 32dB (MSB)       |
| 13      | 16dB             |
| 14      | 8dB              |
| 15      | 4dB              |

| REVISIONS |      |                  |          |          |
|-----------|------|------------------|----------|----------|
| ZONE      | REV. | DESCRIPTION      | DATE     | APPROVED |
|           | A1   | ORIGINAL RELEASE | 10/15/12 |          |
|           | A2   | ECN # 13-0080    | 07/09/13 |          |
|           | A3   | ECN # 17-0071    | 04/13/17 |          |
|           | A4   | ECN # 17-0252    | 11/16/17 |          |



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 ISO 9001 CERTIFIED



ALL DIMENSIONS ARE IN INCHES  
 TOLERANCES:  
 XXX ±0.020  
 XXXX ±0.010

| APPROVALS |           | DATE     | TITLE                                  |          |              |      |
|-----------|-----------|----------|--|----------|--------------|------|
| DRAWN     | <i>jk</i> | 10/15/12 | PRODUCT FEATURE<br>DTA-0R5G18G-60-CD-1 |          |              |      |
| CHECKED   |           |          | SIZE                                   | FORM NO. | DWG NO.      | REV. |
| ISSUED    |           |          | A                                      | 05XQ0    | 27017781     | A4   |
|           |           |          | SCALE                                  | N:S      | SHEET 1 OF 1 |      |



# Typical Characteristics For DTA-0R5G18G-60-CD-1

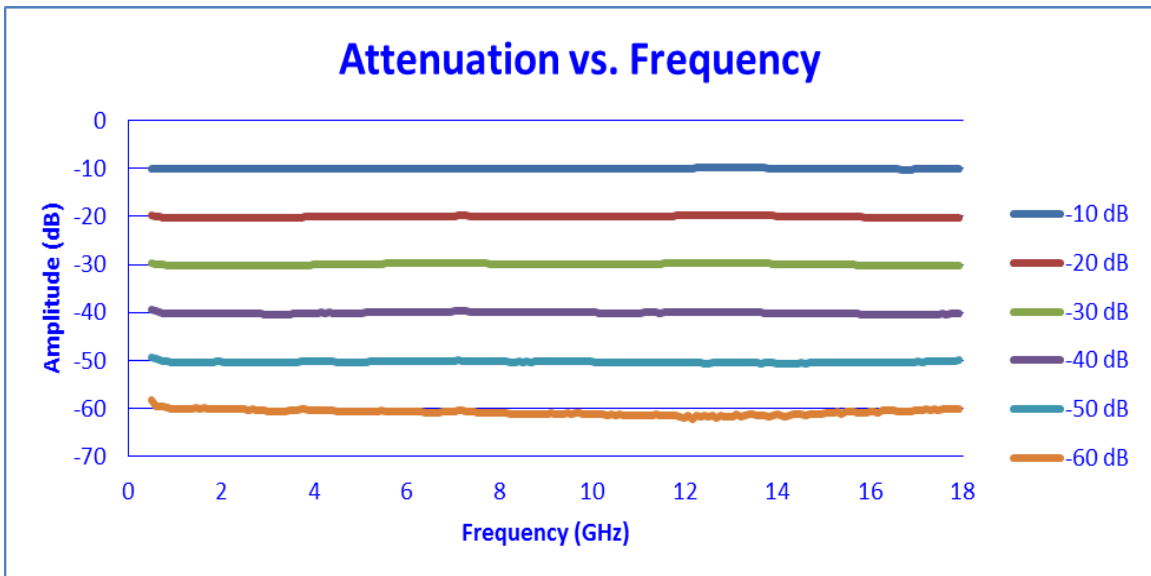
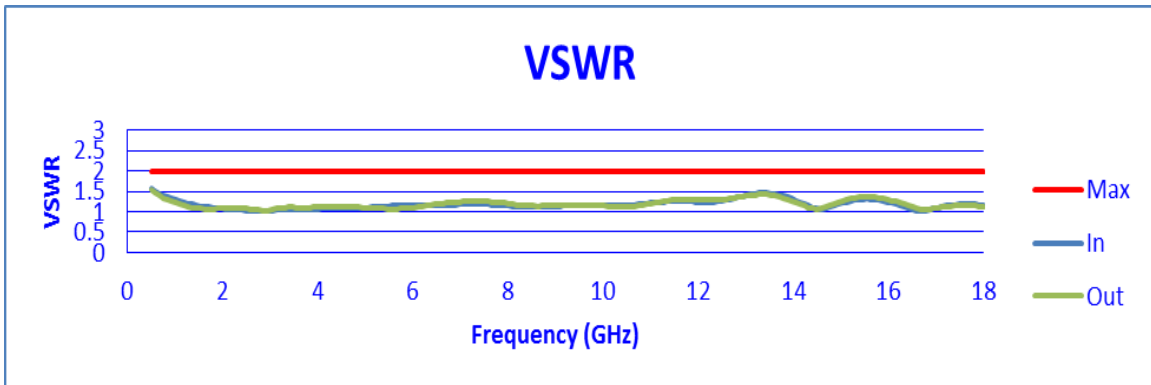
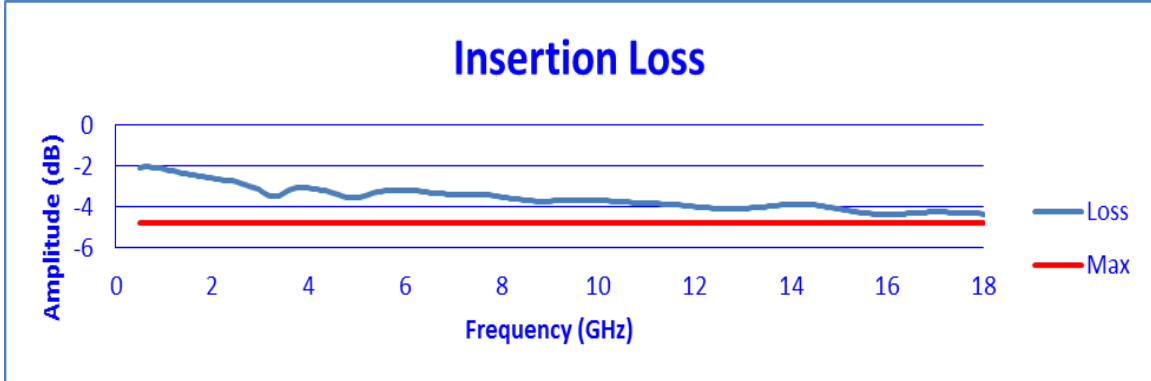
| TEST. ITEM NO | PARAMETERS                              | SPECIFIED VALUE  | PASS/FAIL                               | QA QC |
|---------------|---|------------------|---|-------|
| 1             | Frequency Range:                        | 0.5 GHz – 18 GHz | 0.5 GHz – 18 GHz                        |       |
| 2             | Insertion Loss:                         | 4.8 dB Max.      | 4.4 dB<br>See Plot                      |       |
| 3             | VSWR:                                   | 2.0:1 Max.       | 1.6:1<br>See Plot                       |       |
| 4             | Flatness to 20 dB:                      | ± 1.0 dB Typ.    | 0.37 dB<br>See Plot                     |       |
| 6             | Flatness to 40 dB:                      | ± 1.25 dB Typ.   | 0.51 dB<br>See Plot                     |       |
| 7             | Flatness to 60 dB:                      | ± 3.0 dB Typ.    | 1.97 dB<br>See Plot                     |       |
| 8             | Accuracy of Attenuation<br>0 to 20 dB:  | ± 1.0 dB Typ.    | 0.07 dB<br>See Plot                     |       |
| 9             | Accuracy of Attenuation<br>20 to 40 dB: | ± 1.5 dB Typ.    | 0.06 dB<br>See Plot                     |       |
| 10            | Accuracy of Attenuation<br>40 to 60 dB: | ± 2.0 dB Typ.    | 0.16 dB<br>See Plot                     |       |
| 11            | Switching Speed:                        | 1.0 us Max.      | < 1.0 us<br>See Typical Characteristics |       |
| 12            | DC Supply:                              | +15VDC @ 155 mA  | 110 mA                                  |       |

| Programed Attenuation | Attenuation | Accuracy of Attenuation | Flatness dB |
|-----------------------|-------------|-------------------------|-------------|
| dB                    | dB          | dB                      | ±dB         |
| 0.0625                | 0.09        | -0.03                   | 0.02        |
| 0.125                 | 0.15        | -0.03                   | 0.04        |
| 0.25                  | 0.29        | -0.04                   | 0.06        |
| 0.50                  | 0.52        | -0.02                   | 0.08        |
| 1.00                  | 1.03        | -0.03                   | 0.10        |
| 2.00                  | 2.03        | -0.03                   | 0.13        |
| 4.00                  | 4.01        | -0.01                   | 0.14        |
| 8.00                  | 8.01        | -0.01                   | 0.16        |
| 16.00                 | 15.99       | 0.03                    | 0.27        |
| 32.00                 | 31.97       | 0.03                    | 0.41        |
| 62.00                 | 61.82       | 0.18                    | 1.99        |
| 63.94                 | 63.66       | 0.28                    | 2.33        |

| Programed Attenuation | Attenuation | Accuracy of Attenuation | Flatness dB |
|-----------------------|-------------|-------------------------|-------------|
| dB                    | dB          | dB                      | ±dB         |
| 5.00                  | 4.97        | 0.03                    | 0.14        |
| 10.00                 | 10.01       | -0.01                   | 0.18        |
| 15.00                 | 14.93       | 0.07                    | 0.25        |
| 20.00                 | 19.97       | 0.03                    | 0.31        |
| 25.00                 | 24.93       | 0.07                    | 0.37        |
| 30.00                 | 29.96       | 0.04                    | 0.37        |
| 35.00                 | 34.94       | 0.06                    | 0.47        |
| 40.00                 | 39.97       | 0.03                    | 0.51        |
| 45.00                 | 44.95       | 0.05                    | 0.60        |
| 50.00                 | 49.93       | 0.07                    | 0.72        |
| 55.00                 | 54.92       | 0.08                    | 1.23        |
| 60.00                 | 60.16       | -0.16                   | 1.97        |

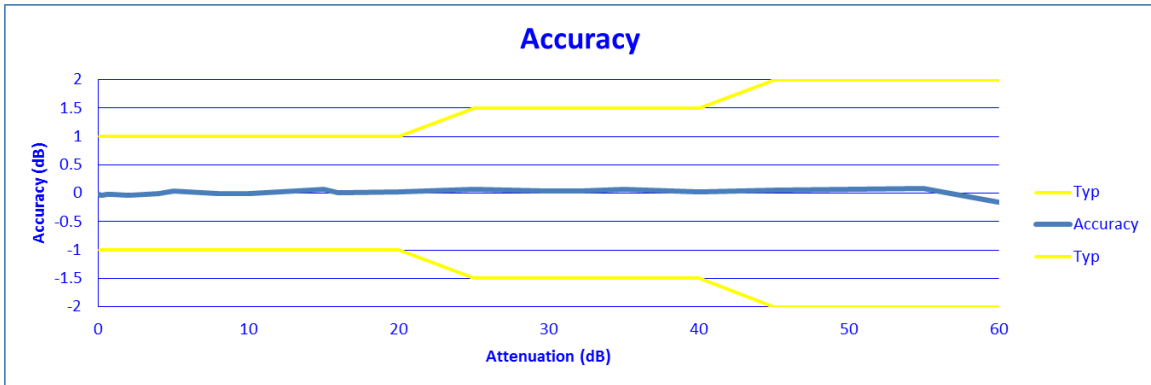
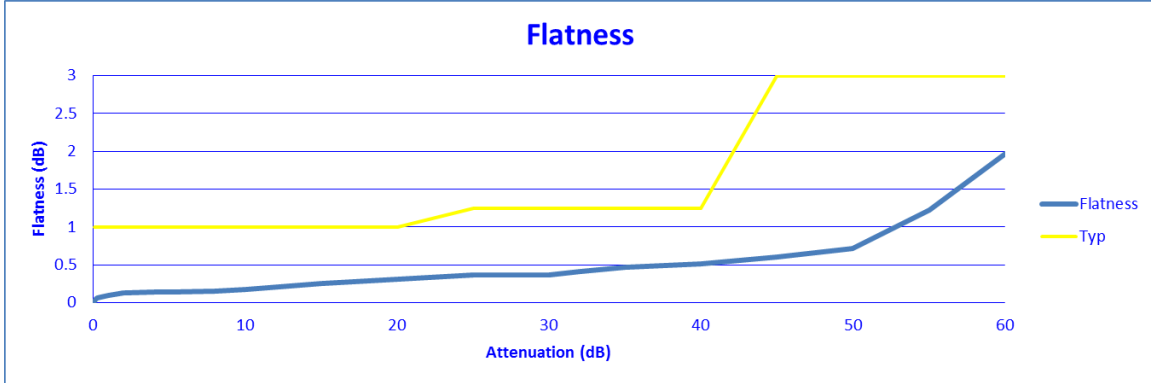


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## Switching Speed

First the full scale pulse is shown in Figure 1. Channel 1 is the TTL signal from the Waveform Generator (Yellow). Channel 2 is the SDLVA output (Green).

The voltage difference from the SDLVA is  $1.17 \text{ V} / 32 \text{ dB} = 36.6 \text{ mV} / \text{dB}$  (same as SDLVA alone with 32 dB difference in input power level from the signal generator).

The TTL signal has been inverted to show rising and falling edges matching the rising and falling edges of the SDLVA output. The SDLVA output high corresponds to 0 dB attenuation and the SDLVA output low corresponds to 32 dB attenuation.

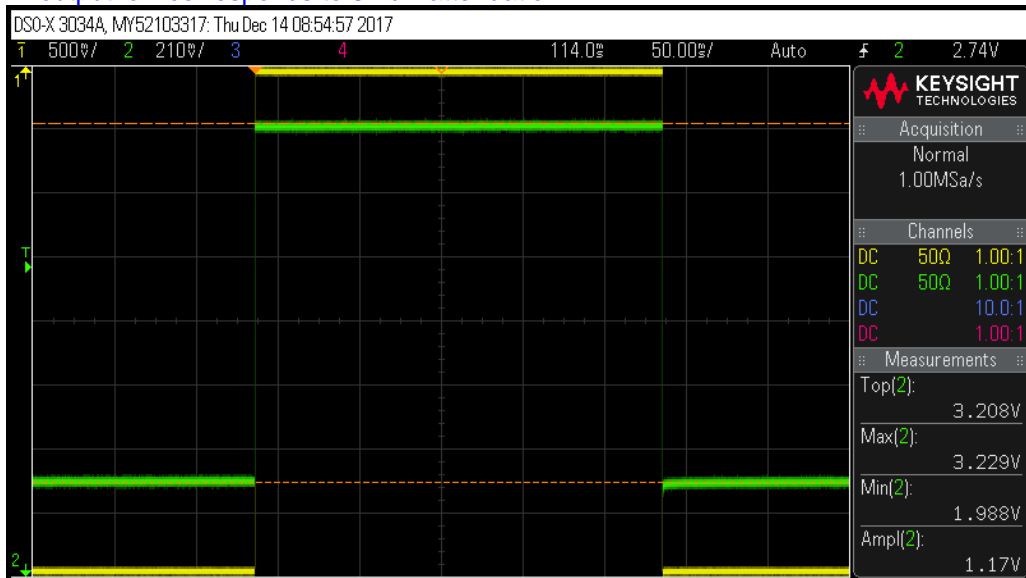


Figure 1: Full Scale Pulse centered on 0 dB attenuation (Yellow Trace: TTL, Green Trace: RF) Next, the full scale pulse is shown in Figure 2 with the scope centered on 32 dB attenuation.

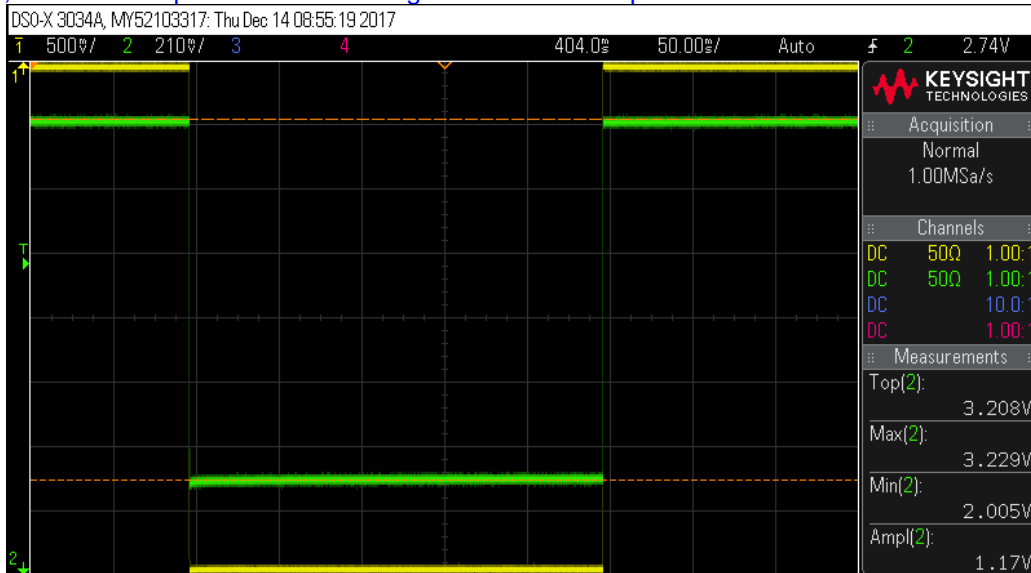


Figure 2: Full Scale Pulse centered on 32 dB attenuation (Yellow Trace: TTL, Green Trace: RF)



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Next, for clarity, multiple pulses are shown in Figure 3.

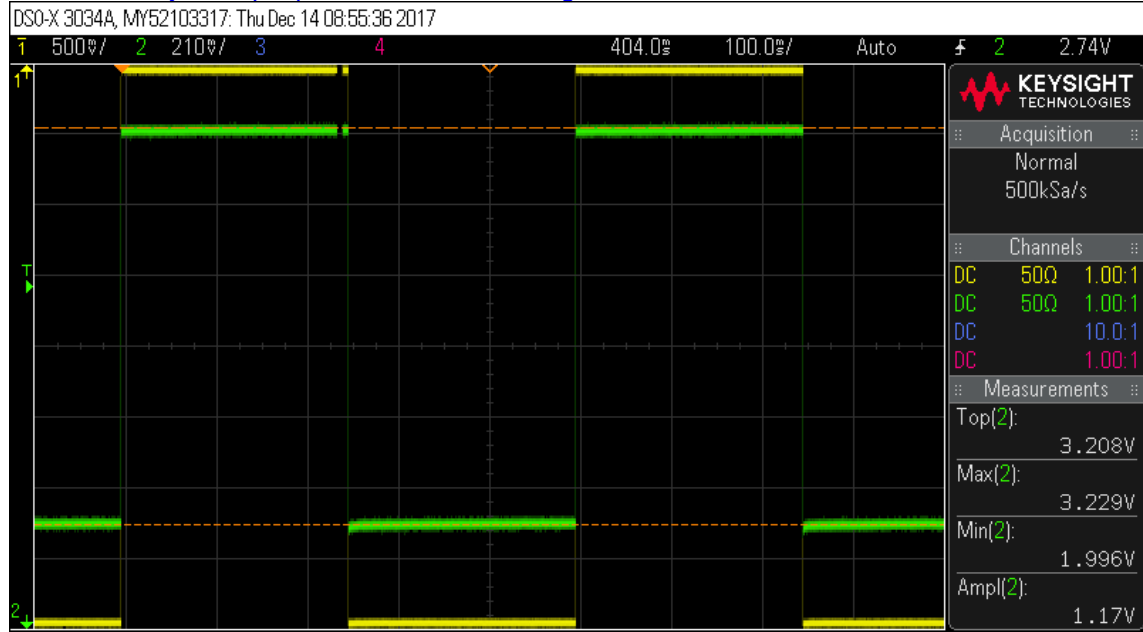


Figure 3: Multiple Pulses (Yellow Trace: TTL, Green Trace: RF)

Figure 4 shows the switching speed off (from 32 dB attenuation to 0 dB attenuation. The result is an off switching speed of 308.5 ns (50% TTL to 90% RF).

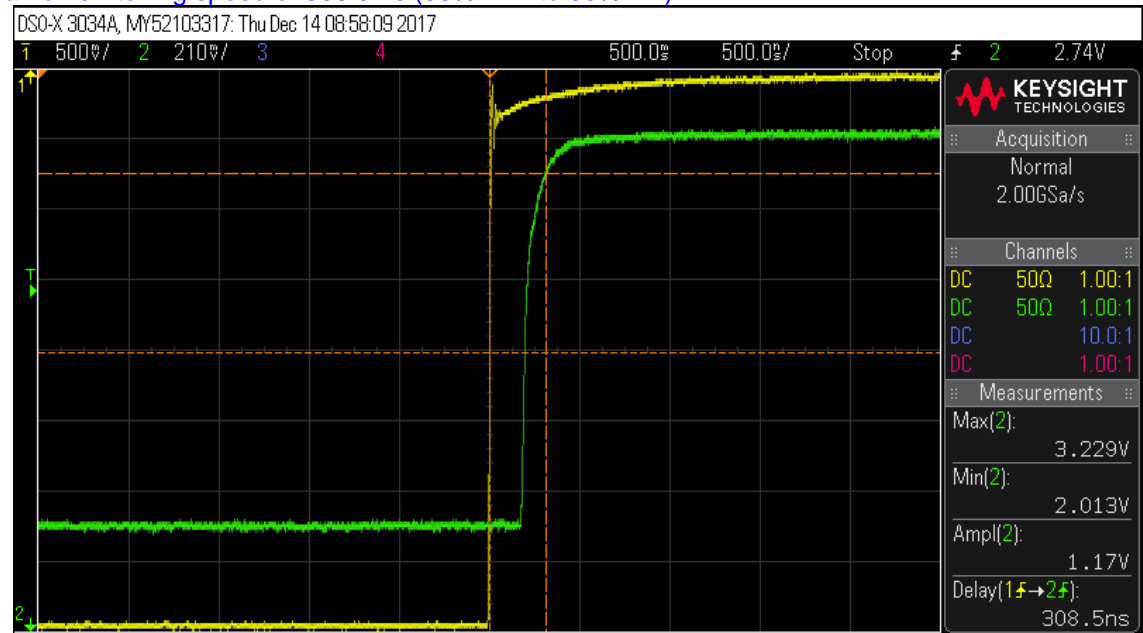


Figure 4: Off Switching Speed (308.5 ns) (Yellow Trace: TTL, Green Trace: RF)





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Figure 5 shows the On Switching Speed (from 0 dB attenuation to 32 dB attenuation). The result is an On Switching Speed of 452 ns (50% TTL to 10% RF)

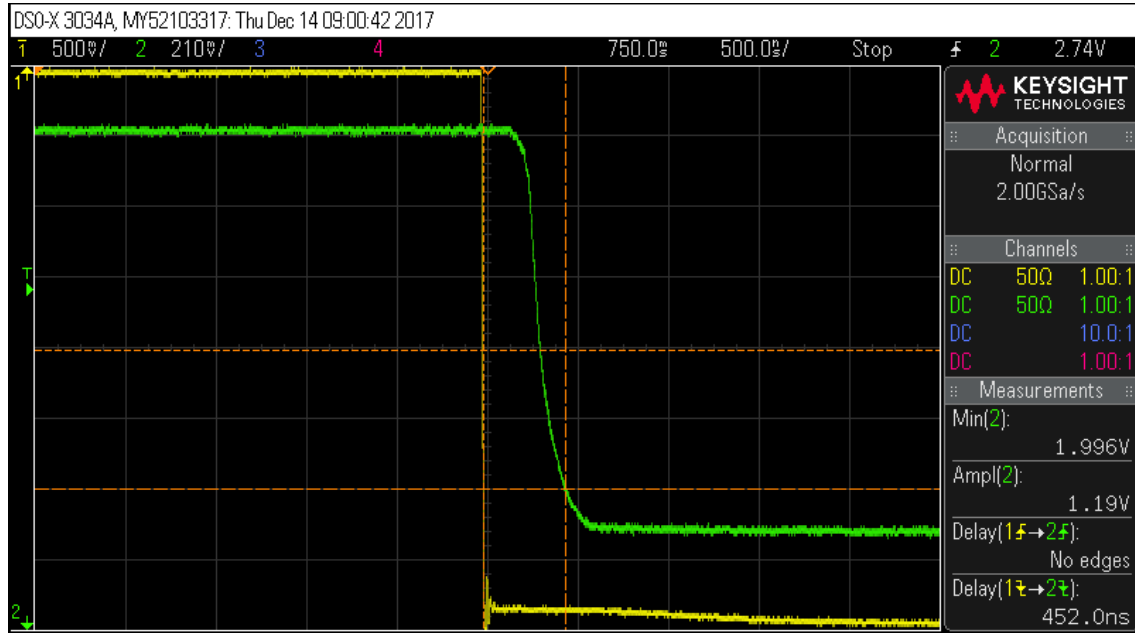
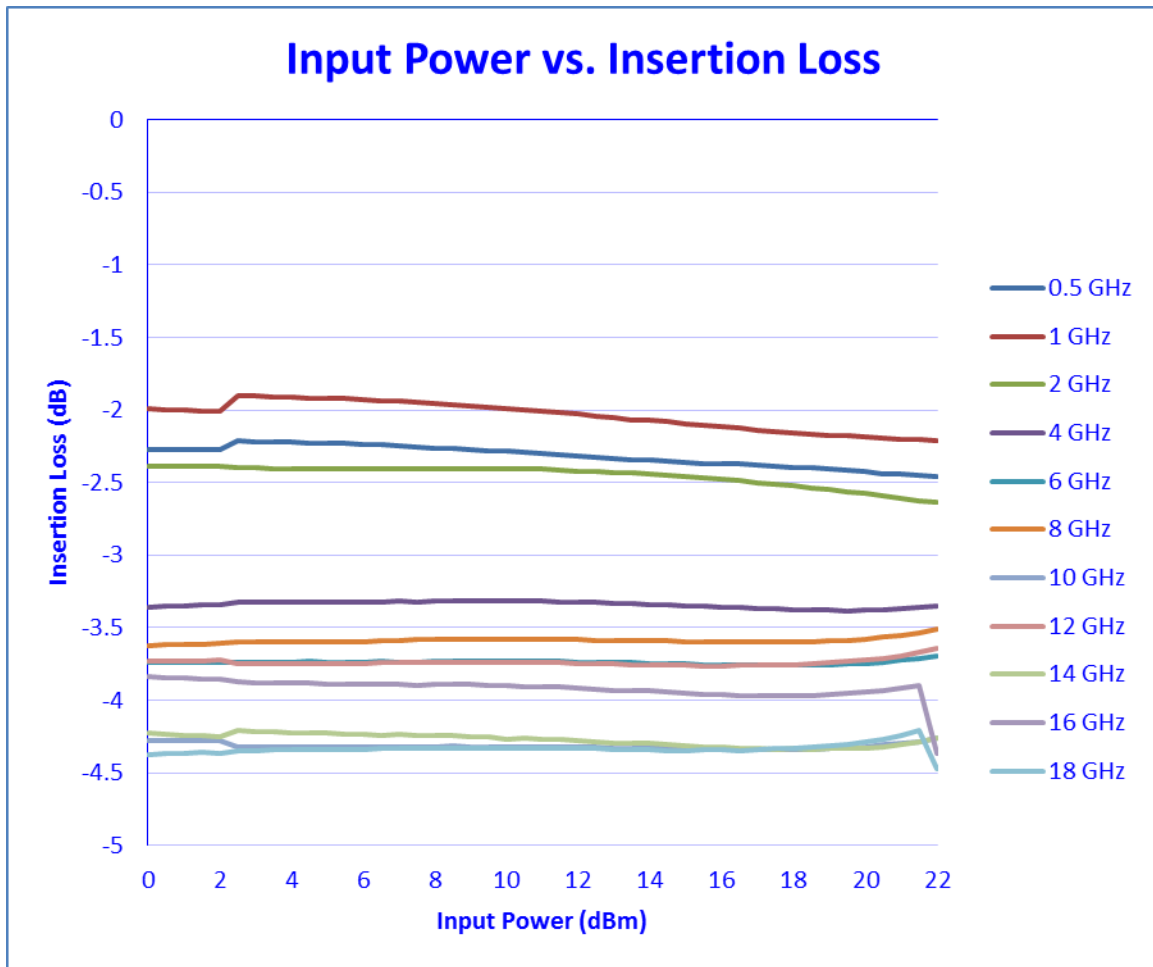


Figure 5: On Switching Speed (452 ns) (Yellow Trace: TTL, Green Trace: RF)



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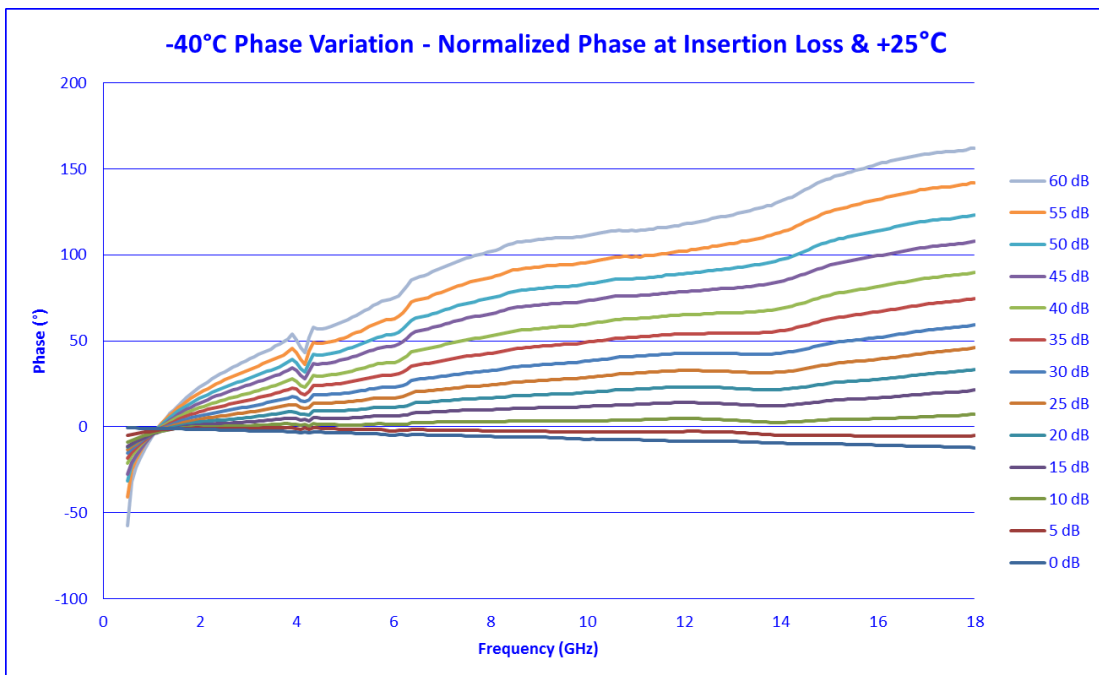
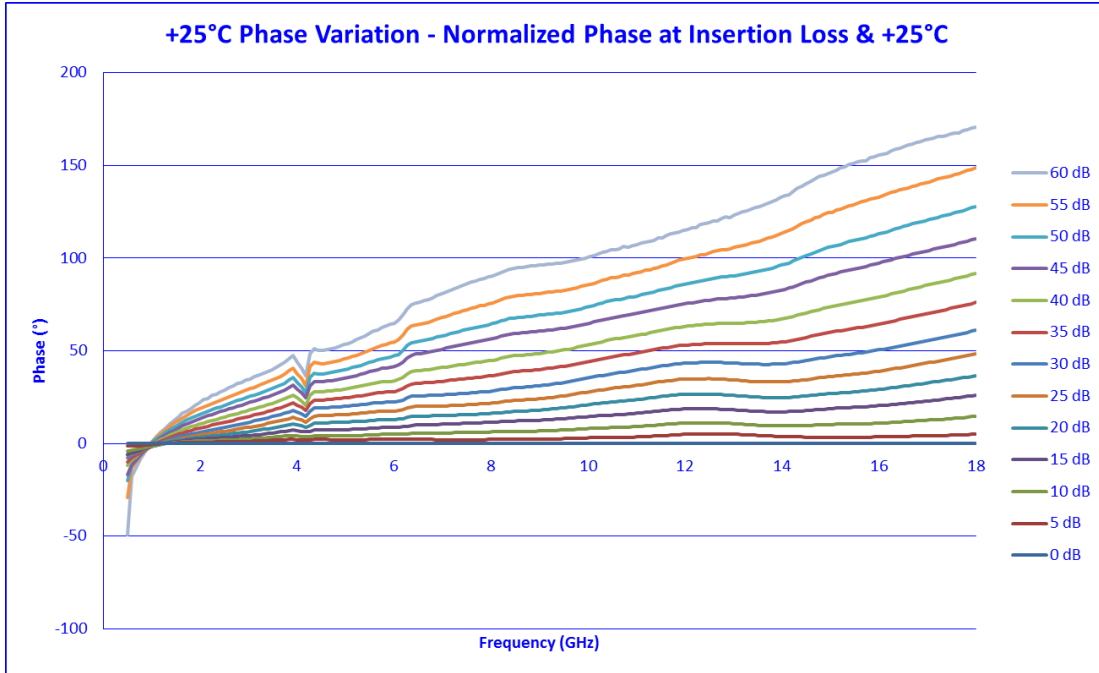
## Power Handling





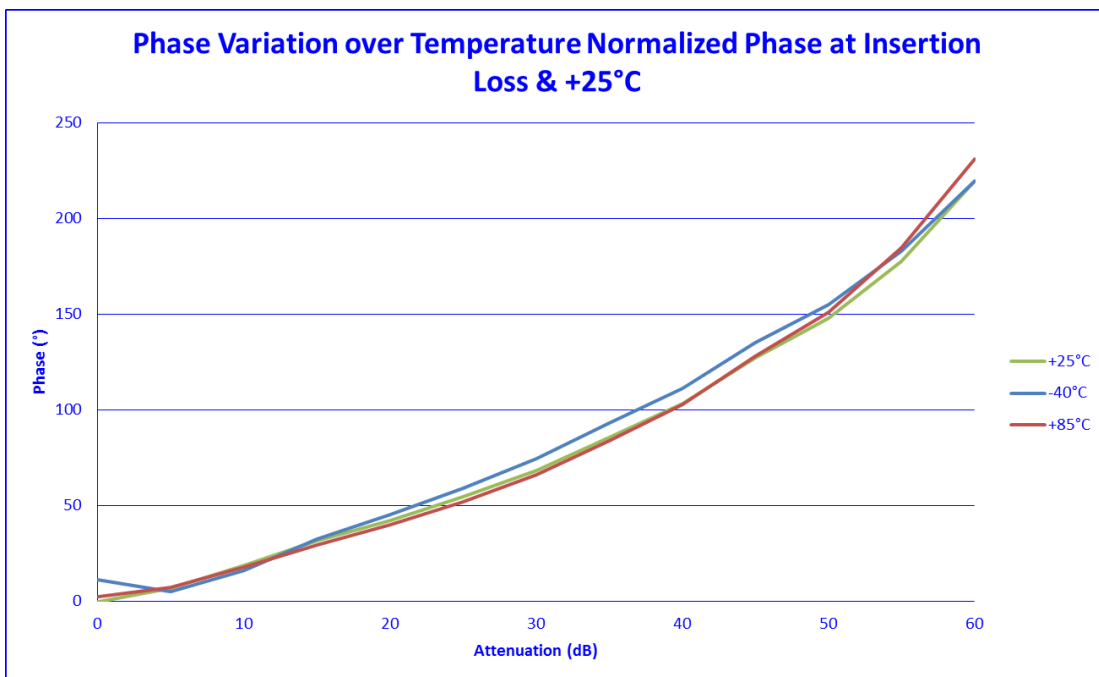
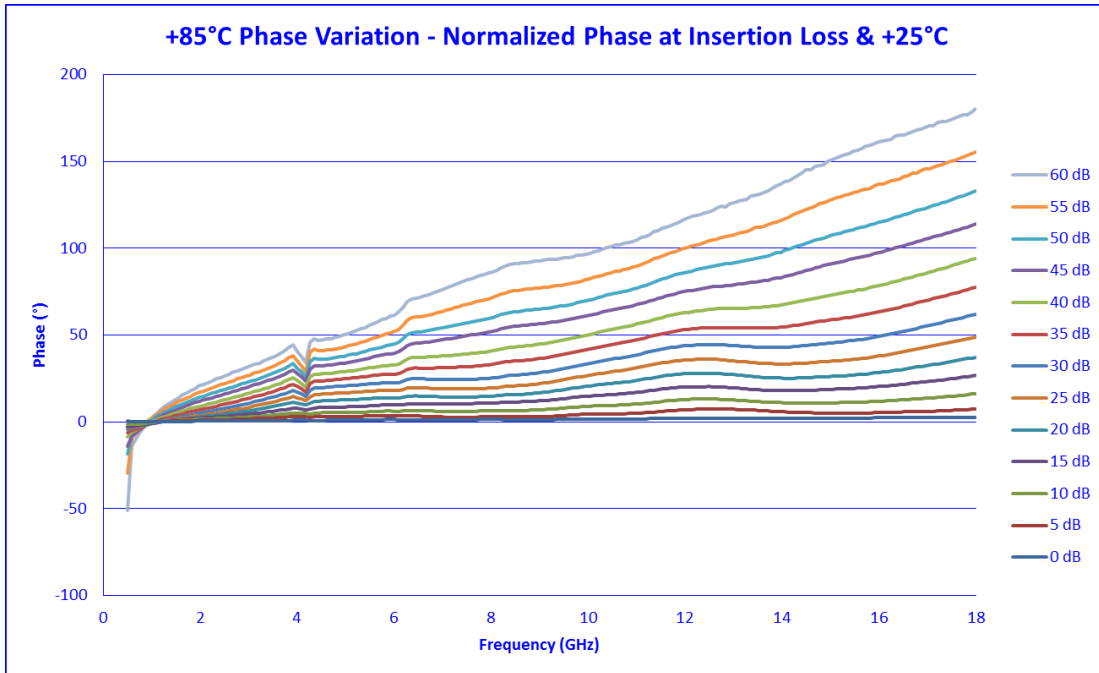
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## Phase Data



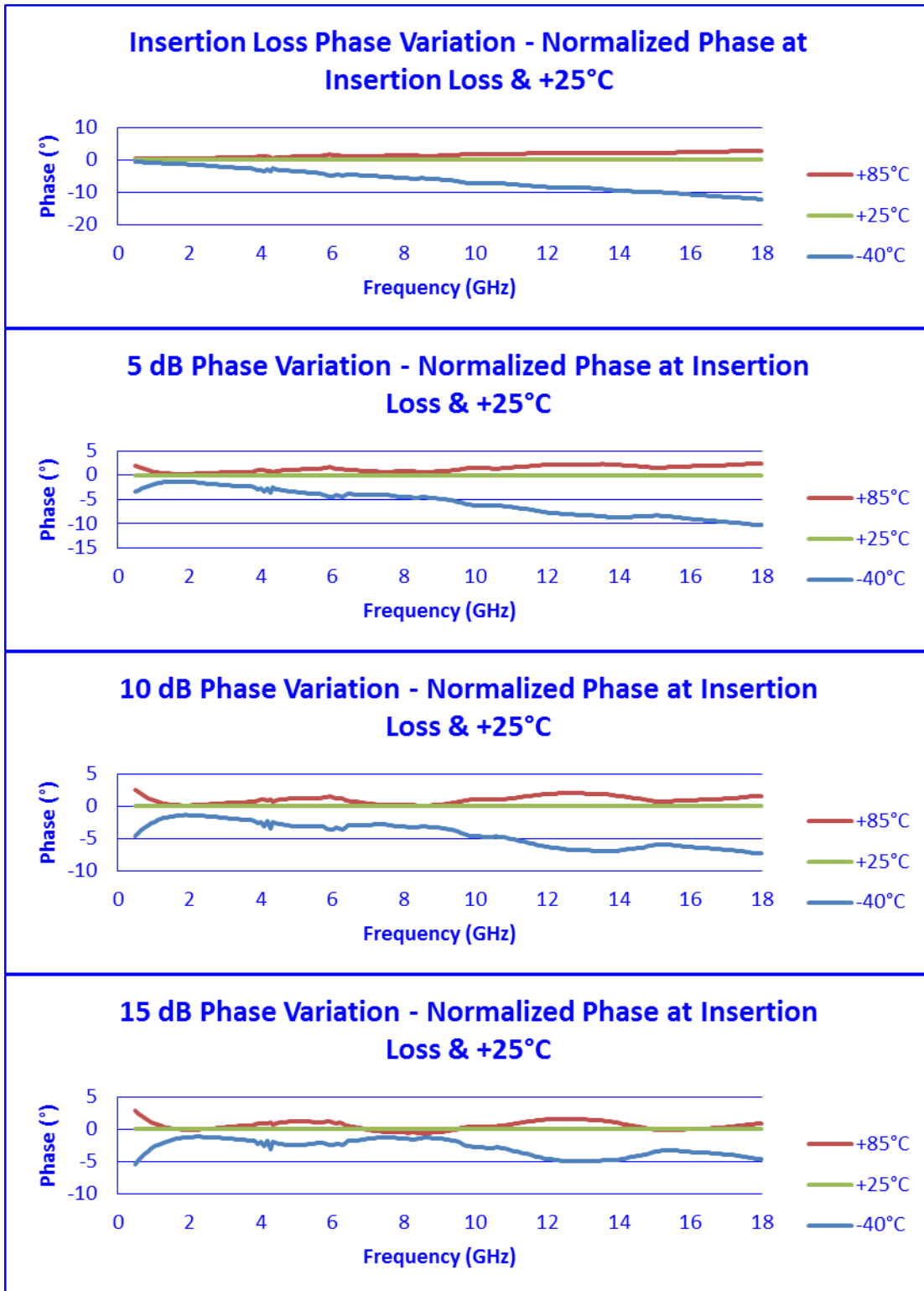


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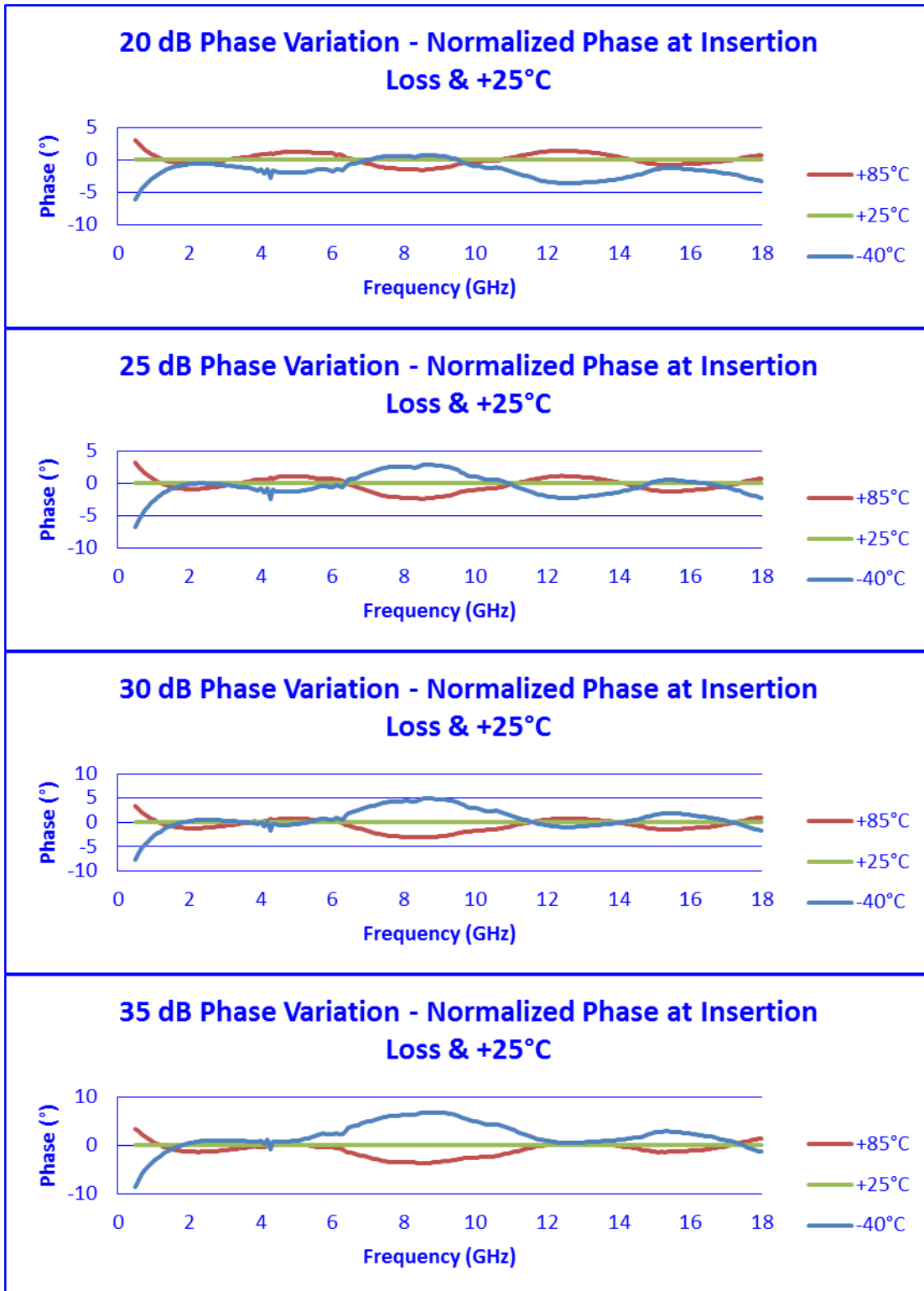


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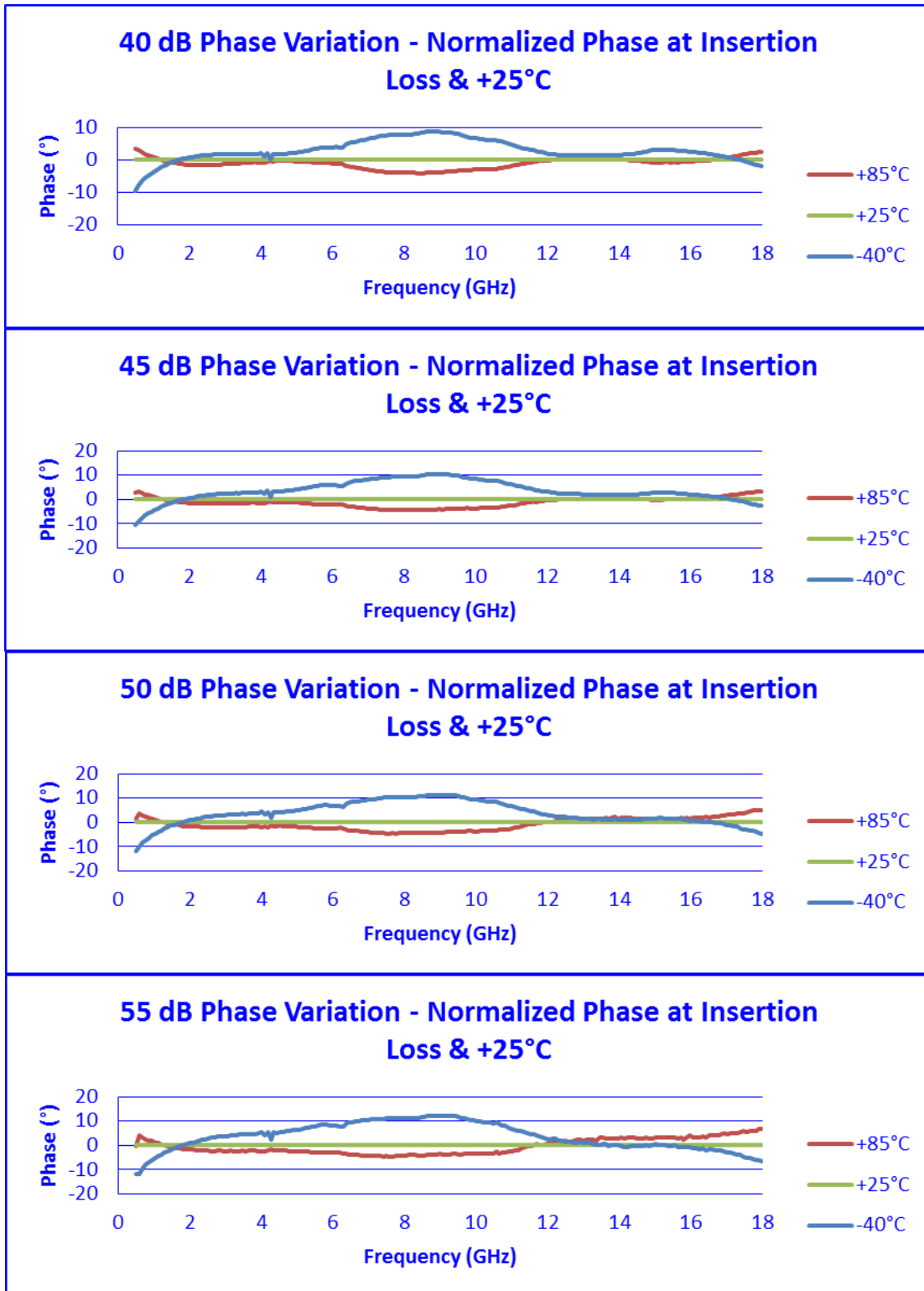
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