PMI MODEL: DFD-2G18G-5512 IS A DIGITAL FREQUENCY DISCRIMINATOR (DFD) OPERATING OVER THE 2.0 TO 18.0 GHz FREQUENCY RANGE. THIS DFD OFFERS A DYNAMIC RANGE OF -50 TO +15 dBm WITH A MAXIMUM INPUT POWER OF +17 dBm CW. THIS UNIT MEASURES 5.98” x 5.79” x 1.28” AND IS OUTFITTED WITH AN SMA FEMALE CONNECTOR FOR ITS RF INPUT PORT. THIS MODEL INCORPORATES CONDUCTION COOLING AND THE ABILITY TO BE MOUNTED VIA SCREW HOLES LOCATED ON THE UNDERSIDE OF THE UNIT OR VIA THE WEDGE LOCKS LOCATED ON THE TOP OF THE UNIT.

November 11, 2020

Designed By: Engineering PMI

Tested and Reported By:
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Jason Peacher
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TYPICAL CHARACTERISTICS ON DFD-2G18G-5512

Outline Drawing

SPECIFICATIONS

- **DESCRIPTION:**
  - PMI Model: DFD-2G18G-5512 is a digital frequency discriminator (DFD) operating over the 2.0 to 16.0 GHz frequency range. This DFD offers a dynamic range of -50 to -15 dBm with a maximum input power of ±17 dBm CW. This unit measures 5.93" x 5.79" x 1.29" (152 mm x 147 mm x 32.5 mm) and is outfitted with an SMA female connector for its RF input port. This model incorporates conduction cooling and the ability to be mounted via screw holes located on the underside of the unit or via the wedge locks located on the top of the unit.

- **CALIBRATION/TEST PIN OUT TABLE**
  - For factory use only.

- **POWER/CONTROL PIN OUT TABLE**
  - For factory use only.

- **ENVIROMENTAL RATINGS**
  - **TEMPERATURE:**
    - -40°C to +80°C (Operating)
    - -55°C to +85°C (Storage)
  - **HUMIDITY:**
    - MIL-STD-202: METHOD 105B COND. B
  - **SHOCK:**
  - **VIBRATION:**
    - MIL-STD-202: METHOD 204D COND. B
  - **ALTITUDE:**
    - MIL-STD-202: METHOD 106C COND. A
  - **TEMPERATURE CYCLE:**
    - MIL-STD-202: METHOD 107G COND. A

**NOTE:** Specifications may vary over operating temperature.

**NOTE:** The active specifications are subject to change by omission.

**PMI CONFIDENTIAL AND PROPRIETARY**

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ISO 9001 CERTIFIED
DESCRIPTION

PMI MODEL: DFD-2G18G-5512 IS A DIGITAL FREQUENCY DISCRIMINATOR (DFD) OPERATING OVER THE 2.0 TO 18.0 GHz FREQUENCY RANGE. THIS DFD OFFERS A DYNAMIC RANGE OF -50 TO +15 dBm WITH A MAXIMUM INPUT POWER OF +17 dBm CW. THIS UNIT MEASURES 152 mm x 147 mm x 32.5 mm AND IS OUTFITTED WITH AN SMA FEMALE CONNECTOR FOR ITS RF INPUT PORT. THIS MODEL INCORPORATES CONDUCTION COOLING AND THE ABILITY TO BE MOUNTED VIA SCREW HOLES LOCATED ON THE UNDERSIDE OF THE UNIT OR VIA THE WEDGE LOCKS LOCATED ON THE TOP OF THE UNIT.

MECHANICAL OUTLINE

[Diagram showing the mechanical dimensions of the DFD-2G18G-5512 unit, including the height of 152.00 mm (5.98 inches) and the width of 147.00 mm (5.79 inches).]
<table>
<thead>
<tr>
<th>TEST. ITEM NO</th>
<th>PARAMETERS</th>
<th>SPECIFIED VALUE</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Frequency Range:</td>
<td>2.0 to 18.0 GHz</td>
<td>2.0 to 18.0 GHz (See Data and Graphs)</td>
</tr>
<tr>
<td>2</td>
<td>Unambiguous Bandwidth:</td>
<td>16.0 GHz MINIMUM</td>
<td>16.0 GHz - Pass (See Graphs)</td>
</tr>
<tr>
<td>3</td>
<td>VSWR:</td>
<td>2.5:1 TYPICAL</td>
<td>3.1:1 MAX (See Graph)</td>
</tr>
<tr>
<td>4</td>
<td>Dynamic Range:</td>
<td>-50 TO +15 dBm</td>
<td>-50 TO +15 dBm (See Graphs)</td>
</tr>
<tr>
<td>5</td>
<td>Mean Frequency Resolution:</td>
<td>1 MHz Nominal</td>
<td>1 MHz (See Graphs)</td>
</tr>
<tr>
<td>6</td>
<td>Frequency Accuracy:</td>
<td>4.5 MHz (AVERAGE) TYPICAL</td>
<td>+2.45 / -5.52 MHz (See Data and Graphs)</td>
</tr>
<tr>
<td>7</td>
<td>Peak Frequency Error:</td>
<td>15 MHz MAXIMUM</td>
<td>+4 / -8 MHz (See Plots)</td>
</tr>
<tr>
<td>8</td>
<td>Maximum RF Input Power:</td>
<td>+17 dBm CW</td>
<td>+17 dBm CW After 5 Minutes - No Damage</td>
</tr>
<tr>
<td>9</td>
<td>Throughput Time:</td>
<td>LESS THAN 350 ns TYPICAL</td>
<td>280 to 400 ns (See Data and Graphs)</td>
</tr>
<tr>
<td>10</td>
<td>Recovery Time (after high power pulse input):</td>
<td>100 ns MAXIMUM</td>
<td>90ns</td>
</tr>
<tr>
<td>11</td>
<td>Shadow Time:</td>
<td>50 ns TYPICAL</td>
<td>50ns</td>
</tr>
<tr>
<td>12</td>
<td>Minimum Pulse Width:</td>
<td>100 ns TYPICAL</td>
<td>50ns</td>
</tr>
<tr>
<td>13</td>
<td>Power:</td>
<td>-5 VDC @ 100 mA Typical</td>
<td>-5 vdc @ 30 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+5 VDC @ 1.5 A Typical</td>
<td>+5 vdc @ 1480 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+12 VDC @ 800 mA Typical</td>
<td>+12 vdc @ 840 mA</td>
</tr>
</tbody>
</table>
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

FREQUENCY INPUT (-50dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 25°C

FREQUENCY INPUT (-50dBm) VS PEAK FREQUENCY ACCURACY AT 25°C
TYPICAL CHARACTERISTICS ON DFD-2G18G-5512

FREQUENCY INPUT (-40dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 25° C

FREQUENCY INPUT (-40dBm) VS PEAK FREQUENCY ACCURACY AT 25° C
FREQUENCY INPUT (-20dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 25°C

FREQUENCY INPUT (-20dBm) VS PEAK FREQUENCY ACCURACY AT 25°C
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

FREQUENCY INPUT (-10dBm) VS FREQUENCY ACCURACY
(AVERAGE) AT 25°C

FREQUENCY INPUT (-10dBm) VS PEAK FREQUENCY
ACCURACY AT 25°C
TYPICAL CHARACTERISTICS ON DFD-2G18G-5512

FREQUENCY INPUT (+10dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 25° C

FREQUENCY INPUT (+10dBm) VS PEAK FREQUENCY ACCURACY AT 25° C
TYPICAL CHARACTERISTICS ON DFD-2G18G-5512

FREQUENCY INPUT (+15dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 25° C

FREQUENCY INPUT (+15dBm) VS PEAK FREQUENCY ACCURACY AT 25° C
FREQUENCY INPUT (-40dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 60° C

FREQUENCY INPUT (-40dBm) VS PEAK FREQUENCY ACCURACY AT 60° C
FREQUENCY INPUT (-30dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 60° C

FREQUENCY INPUT (-30dBm) VS PEAK FREQUENCY ACCURACY AT 60° C
TYPICAL CHARACTERISTICS ON DFD-2G18G-5512

FREQUENCY INPUT (-20dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 60° C

FREQUENCY INPUT (-20dBm) VS PEAK FREQUENCY ACCURACY AT 60° C
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

FREQUENCY INPUT (-10dBm) VS FREQUENCY ACCURACY
(AVERAGE) AT 60° C

FREQUENCY INPUT (-10dBm) VS PEAK FREQUENCY ACCURACY AT 60° C
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

FREQUENCY INPUT (+10dB) VS FREQUENCY ACCURACY
(AVERAGE) AT 60° C

FREQUENCY INPUT (+10dB) VS PEAK FREQUENCY
ACCURACY AT 60° C
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

FREQUENCY INPUT (+15dBm) VS FREQUENCY ACCURACY (AVERAGE) AT 60° C

FREQUENCY INPUT (+15dBm) VS PEAK FREQUENCY ACCURACY AT 60° C
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

Typical Throughput Time

![Throughput Time Chart]

-40°C
+25°C
+60°C

Throughput Time (ns)

Frequency (MHz)
Typical Single Tone Test

50ns Pulse Width
50ns per Div.

RF IN (Signal Generator) = 10.0 GHz

Hexadecimal Result = 1FD4
Binary Result = 111111010100
Decimal Result = 8148
Decimal Result + 1850 = RF Input Frequency

DFD Output (14 Bits TLL) = 9.998 GHz
**Typical Single Tone Test**

100ns Pulse Width  
50ns per Div.

- 50 MHz Clock Signal
- 100ns RF Pulse (10% DC)
- Bad Data Flag ("1" = Bad Data / "0" = Good Data)

**RF IN (Signal Generator) = 10.0 GHz**

**Hexadecimal Result = 1FD4**  
**Binary Result = 111111010100**  
**Decimal Result = 8148**  
Decimal Result + 1850 = RF Input Frequency  

**DFD Output (14 Bits TLL) = 9.998 GHz**
Typical Two Tone Test
RF Pulse on Top of CW

10GHz / +15dBm RF IN / 100ns Pulse Width
on top of
3GHz / -15dBm RF IN / CW
50ns per Div.

50 MHz Clock Signal
100ns RF Pulse (10% DC)
Bad Data Flag ("1" = Bad Data / "0" = Good Data)

14 Bits TTL

Hexadecimal Result

RF IN (Signal Generator) = 10.0 GHz (Pulse)
RF IN (Signal Generator) = 3.0 GHz (CW)

Hexadecimal Number = 1FD5 / 047D
Binary Number = 111111010101 / 10001111101
Decimal Number = 8149 / 1149
Decimal Number + 1850 = Input Frequency

DFD Output (14 Bits TLL) = 9.999 GHz / 2.999 GHz
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

Typical Two Tone Test
RF Pulse on Top of CW

10GHz / +15dBm RF IN / 200ns Pulse Width
on top of
3GHz / -15dBm RF IN / CW
100ns per Div.

50 MHz Clock Signal
200ns RF Pulse (10% DC)
Bad Data Flag ("1" = Bad Data / "0" = Good Data)
14 Bits TTL

Hexadecimal Result

RF IN (Signal Generator) = 10.0 GHz (Pulse)
RF IN (Signal Generator) = 3.0 GHz (CW)

Hexadecimal Number = 1FD5 / 047D
Binary Number = 111111010101 / 100011111101
Decimal Number = 8149 / 1149
Decimal Number + 1850 = Input Frequency

DFD Output (14 Bits TLL) = 9.999 GHz / 2.999 GHz
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512

Typical Return Loss

<table>
<thead>
<tr>
<th>Marker</th>
<th>Freq[MHz]</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
<td>18000</td>
<td>14078</td>
<td></td>
</tr>
<tr>
<td>S11[dB]</td>
<td>-12</td>
<td>-8.81</td>
<td>-5.83</td>
<td></td>
</tr>
</tbody>
</table>
Dedicated PMI ATE used to test PMI Model DFD-2G18G-5512
TYPICAL CHARACTERISTICS
ON
DFD-2G18G-5512