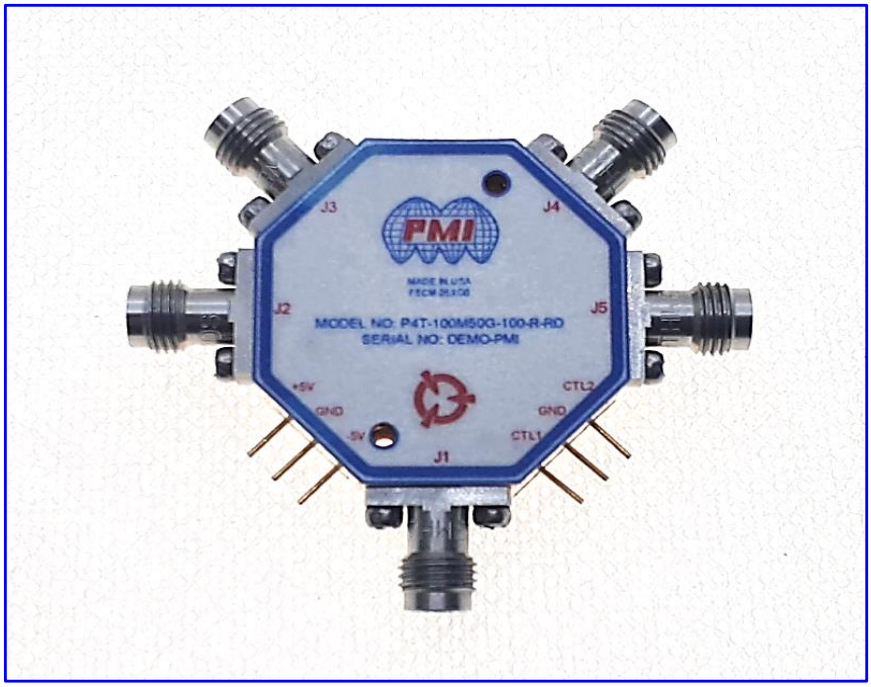
Typical Characteristics
ON
P4T-100M50G-100-R-RD

PMI MODEL P4T-100M50G-100-R-RD IS A REFLECTIVE, SINGLE POLE FOUR THROW PIN DIODE SWITCH THAT OPERATES OVER THE 100 MHz TO 50 GHz FREQUENCY RANGE. IT FEATURES LOW INSERTION LOSS AND HIGH ISOLATION IN A SLIMLINE PACKAGE. THIS MODEL ALSO INCORPORATES A TTL COMPATIBLE DRIVER FOR EASE OF SYSTEM INTEGRATION.



November 5, 2020

Designed By:

Dr. Ashok Gorwara

Tested and Reported By:

Alfredo Lopez

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Typical Characteristics ON P4T-100M50G-100-R-RD

Technical specifications

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	1	ORIGINAL RELEASE	09/26/16	

DESCRIPTION

PMI MODEL P4T-100M50G-100-R-RD IS A REFLECTIVE, SINGLE POLE FOUR THROW PIN DIODE SWITCH THAT OPERATES OVER THE 100 MHz TO 50 GHz FREQUENCY RANGE. IT FEATURES LOW INSERTION LOSS AND HIGH ISOLATION IN A SLIMLINE PACKAGE. THIS MODEL ALSO INCORPORATES A TTL COMPATIBLE DRIVER FOR EASE OF SYSTEM INTEGRATION.

MECHANICAL OUTLINE

SPECIFICATIONS

- FREQUENCY: — 100 MHz TO 50 GHz
- INSERTION LOSS: — 5.0 dB (100MHz TO 18 GHz) Max.
  7.0 dB (18 TO 40 GHz) Max.
  10.0 dB (40 TO 50 GHz) Max.
- VSWR Input/ Output: — 2.0:1 (100 MHz TO 10 GHz) Typ.
  2.2:1 (10 TO 18 GHz) Typ.
  2.5:1 (18 TO 30 GHz) Typ.
  3.0:1 (30 TO 50 GHz) Typ.
- ISOLATION: — 80 dB (100 MHz TO 1 GHz) Min.
  85 dB (1 TO 18 GHz) Min.
  70 dB (18 TO 40 GHz) Min.
  70 dB (40 TO 50 GHz) Min.
- AMPLITUDE BALANCE: — ± 1.0 dB (100 MHz 18 GHZ) Max.
  ± 1.5 dB (18 TO 40 GHZ) Max.
  ± 1.5 dB (40 TO 50 GHZ) Max.

SPECIFICATIONS

- PHASE BALANCE: — ± 10° (100 MHz 18 GHZ) Typ.
  ± 15° (18 TO 40 GHZ) Typ.
  ± 15° (40 TO 50 GHZ) Typ
- INPUT POWER: — +20 dBm CW (100 MHz TO 40 GHz) Max.
  "Theoretically it can handle +20 dBm up to 50 GHz"
- SWITCHING SPEED: — 50 ns Max.
- VIDEO TRANSIENTS: — 1 V, Peak to Peak Typ.
- CONTROL SIGNAL: — SEE TTL LOGIC TABLE
- DC VOLTAGE: — +5 V @ 200 mA MAX
  -5 V @ 200 mA MAX
- RF CONNECTORS: — 2.4 mm FEMALE
- SIZE: — 1.25" X 1.25" X 0.40"
- FINISH: — GOLD PLATED

TTL LOGIC CONTROL TABLE

CTL 2	CTL 1	FUNCTION
0	0	J1 TO J2
0	1	J1 TO J3
1	0	J1 TO J4
1	1	J1 TO J5

ENVIRONMENTAL RATINGS

- TEMPERATURE: — -40 °C TO +85 °C (OPERATING)
  -65 °C TO +125 °C (STORAGE)
- HUMIDITY: — MIL-STD-202, METHOD 103B COND. B
- SHOCK: — MIL-STD-202, METHOD 213B COND. B
- VIBRATION: — MIL-STD-202, METHOD 204D COND. B
- ALTITUDE: — MIL-STD-202, METHOD 105C COND. B
- TEMPERATURE CYCLE: — MIL-STD-202, METHOD 107D COND. A

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

ALL DIMENSIONS ARE IN INCHES
TOLERANCES:
X.XX ±0.020
X.XXX ±0.010

PMI CONFIDENTIAL AND PROPRIETARY

PLANAR MONOLITHICS INDUSTRIES, INC.
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WEB: www.pmi-rf.com, EMAIL: sales@pmi-rf.com
ISO 9001 CERTIFIED

APPROVALS	DATE
DRAWN AFC	11/05/20
CHECKED	
ISSUED	

TITLE: PRODUCT FEATURE
P4T-100M50G-100-R-RD

SIZE	FSCM NO.	DWG NO.	REV.
A	05XQ0	27031060	A1

SCALE N:S SHEET 1 OF 2

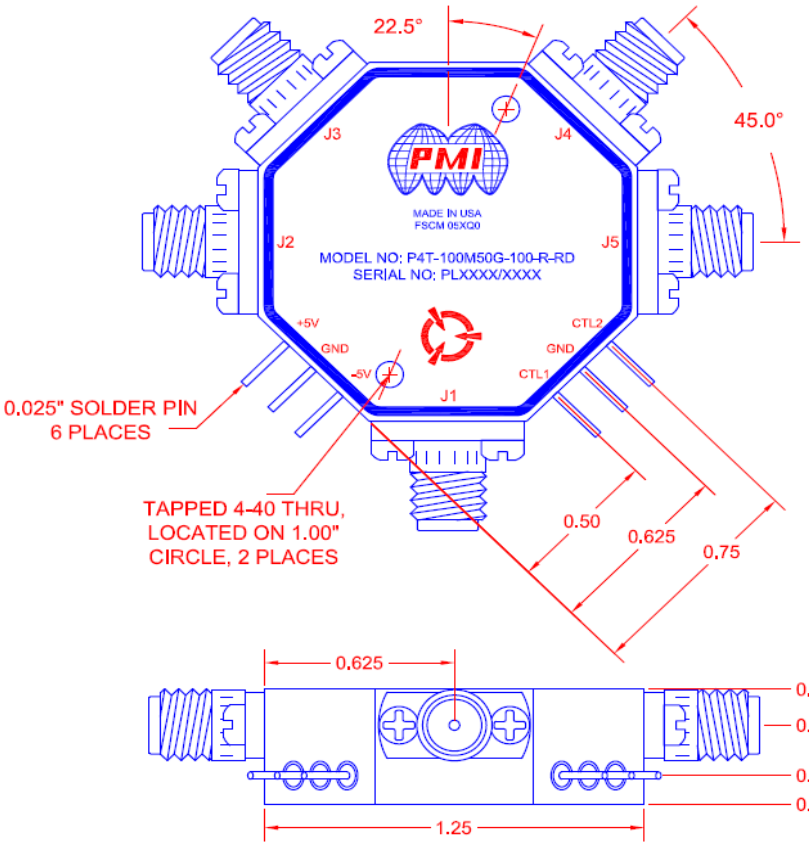
Typical Characteristics ON P4T-100M50G-100-R-RD

Mechanical Outline

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	1	ORIGINAL RELEASE	09/26/16	

DESCRIPTION

PMI MODEL P4T-100M50G-100-R-RD IS A REFLECTIVE, SINGLE POLE FOUR THROW PIN DIODE SWITCH THAT OPERATES OVER THE 100 MHz TO 50 GHz FREQUENCY RANGE. IT FEATURES LOW INSERTION LOSS AND HIGH ISOLATION IN A SLIMLINE PACKAGE. THIS MODEL ALSO INCORPORATES A TTL COMPATIBLE DRIVER FOR EASE OF SYSTEM INTEGRATION.



MECHANICAL OUTLINE

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TOLERANCES:
X.XX ±0.020
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		PRODUCT FEATURE P4T-100M50G-100-R-RD		
ALC	11/03/20			
		SIZE 05XQ0	27031060	REV. A1
		SCALE N;S	SHEET 2 OF 2	

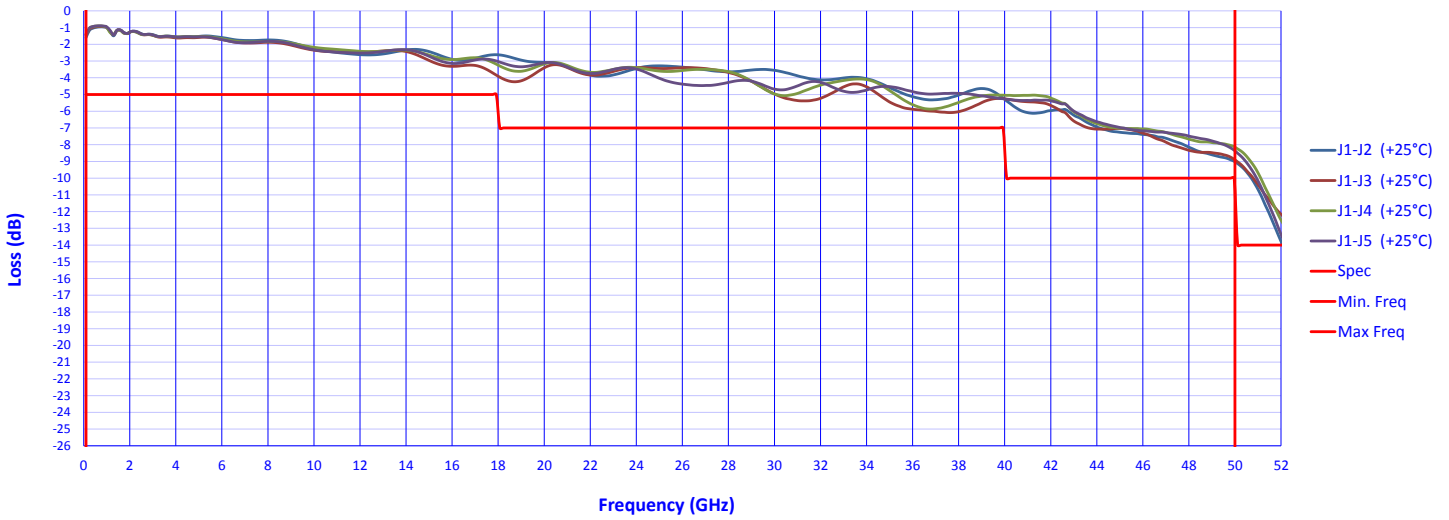
Typical Characteristics ON P4T-100M50G-100-R-RD

Technical Specifications

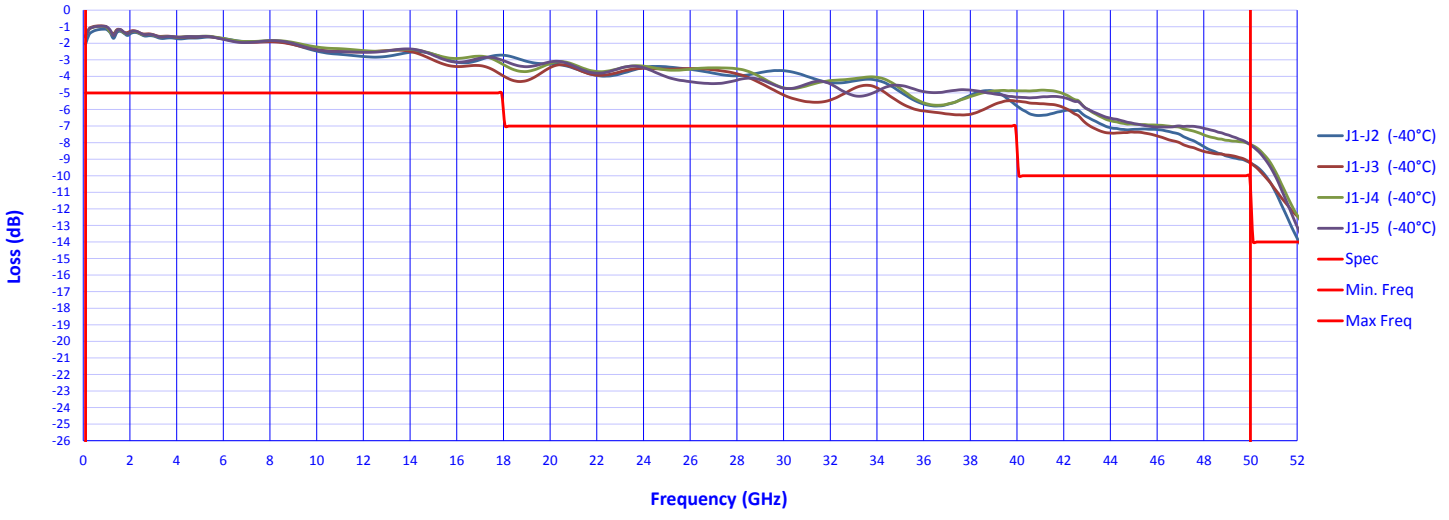
TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	TEST RESULTS			QA
			+25°C	-40°C	+85°C	QC
1	Frequency Range:	100 MHz to 50 GHz	100 MHz to 50 GHz	100 MHz to 50 GHz	100 MHz to 50 GHz	
2	Insertion Loss:	5.0 dB (100MHz to 18GHz) Max. 7.0 dB (18 to 40GHz) Max. 10.0 dB (40 to 50GHz) Max.	3.96 dB	4.03 dB	4.03 dB	
			6.08 dB	6.33 dB	6.33 dB	
			9.13 dB	9.35 dB	9.37 dB	
			See Graphs	See Graphs	See Graphs	
3	VSWR Input	2.0:1 (100MHz to 10GHz) Typ. 2.2:1 (10 to 18GHz) Typ. 2.5:1 (18 to 30GHz) Typ. 3.0:1 (30 to 50GHz) Typ.	1.67 :1	1.82 :1	1.72 :1	
			2.04 :1	2.04 :1	2 :1	
			2.48 :1	2.48 :1	2.48 :1	
			2.98 :1	3.02 :1	3.03 :1	
			See Graphs	See Graphs	See Graphs	
4	VSWR Output	2.0:1 (100MHz to 10GHz) Typ. 2.2:1 (10 to 18GHz) Typ. 2.5:1 (18 to 30GHz) Typ. 3.0:1 (30 to 50GHz) Typ.	1.78 :1	1.91 :1	1.78 :1	
			2.32 :1	2.28 :1	2.28 :1	
			2.46 :1	2.42 :1	2.42 :1	
			2.69 :1	2.71 :1	2.61 :1	
			See Graphs	See Graphs	See Graphs	
5	Isolation:	80 dB (100MHz to 1GHz) Min. 85 dB (1 to 18GHz) Min. 70 dB (18 to 40GHz) Min. 70 dB (40 to 50GHz) Min.	86.49 dB	83.81 dB	82.43 dB	
			90.04 dB	90.26 dB	85.54 dB	
			80.63 dB	78.94 dB	78.91 dB	
			74.18 dB	73.25 dB	72.62 dB	
			See Graphs	See Graphs	See Graphs	
6	Insertion Loss Flatness (Variation from a Best Fit Straight Line)	± 1 dB (100MHz to 18GHz) Max ± 1.2 dB (18 to 40GHz) Max. ± 2.0 dB (40 to 50GHz) Max.	0.66 dB (±)	0.65 dB (±)	0.67 dB (±)	
			1.13 dB (±)	1.13 dB (±)	1.13 dB (±)	
			1.47 dB (±)	1.68 dB (±)	1.48 dB (±)	
			See Graphs	See Graphs	See Graphs	
7	Amplitude Balance	± 1.0 dB (100MHz to 18GHz) Max. ± 1.5 dB (18 to 40GHz) Max. ± 1.5 dB (40 to 50GHz) Max.	0.76 dB (±)	0.91 dB (±)	0.78 dB (±)	
			0.94 dB (±)	1.3 dB (±)	0.98 dB (±)	
			0.73 dB (±)	1.02 dB (±)	0.78 dB (±)	
			See Graphs	See Graphs	See Graphs	
8	Phase Balance	± 10° (100MHz to 18GHz) Typ. ± 15° (18 to 40GHz) Typ. ± 15° (40 to 50GHz) Typ.	9.42 ° (±)	10.25 ° (±)	10.13 ° (±)	
			17.01 ° (±)	15.21 ° (±)	16.56 ° (±)	
			15.94 ° (±)	12.51 ° (±)	17.78 ° (±)	
			See Graphs	See Graphs	See Graphs	
9	Switching Speed	50 ns Max.	Rise Time = 3.30 ns	Rise Time = 3.30 ns	Rise Time = 3.30 ns	
			Fall Time = 7.80 ns	Fall Time = 7.80 ns	Fall Time = 7.80 ns	
			Speed ON = 34.40 ns	Speed ON = 34.40 ns	Speed ON = 34.40 ns	
			Speed OFF = 37.70 ns	Speed OFF = 37.70 ns	Speed OFF = 37.70 ns	
			See Graphs	See Graphs	See Graphs	
10	Input Power:	+20 dBm CW Max. (100 MHz to 40 GHz) "Theoretically it can handle + 20dBm up to 50GHz"	Pass +20dBm 100 MHz to 40GHz (See Graph)	Pass +20dBm 100 MHz to 40GHz (See Graph)	Pass +20dBm 100 MHz to 40GHz (See Graph)	
11	Video Transients	1V Peak to Peak Typ.	7.20 mV Max.	7.20 mV Max.	7.20 mV Max.	
			690 mV Min.	690 mV Min.	690 mV Min.	
			See Plots	See Plots	See Plots	
12	DC Supply:	+5 VDC @ 200 mA Max. -5 VDC @ 200 mA Max.	+5 VDC @ 128 mA -5 VDC @ 70 mA	+5 VDC @ 116 mA -5 VDC @ 70mA	+5 VDC @ 145mA -5 VDC @ 75 mA	

Typical Characteristics
ON
P4T-100M50G-100-R-RD

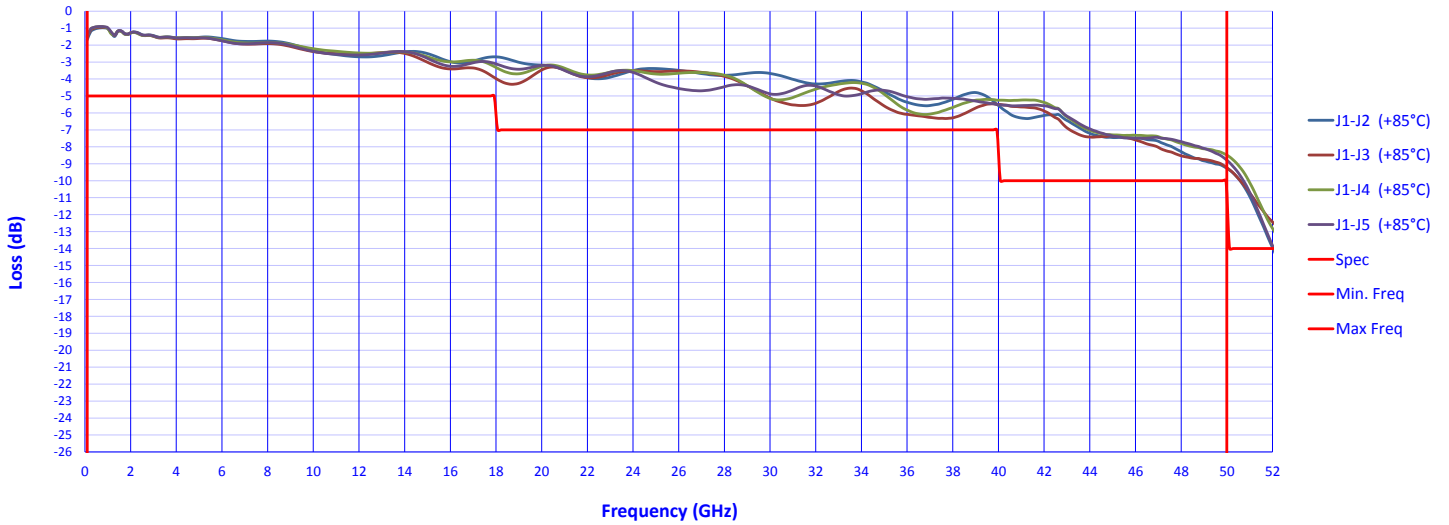
Insertion Loss (+25°C)



Insertion Loss (-40°C)



Insertion Loss (+85°C)



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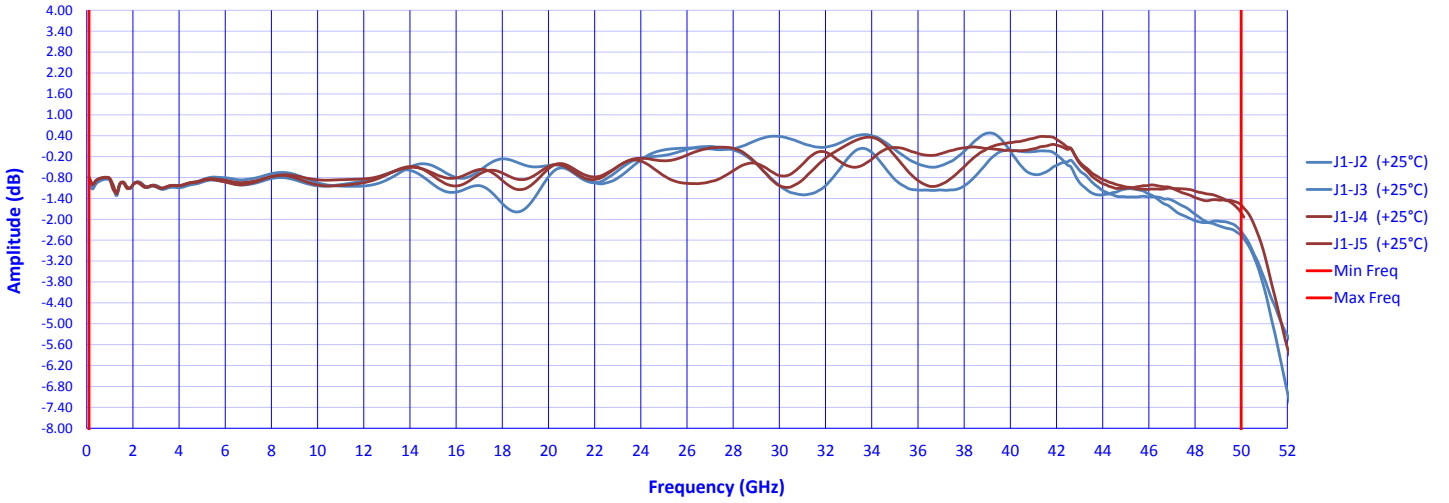
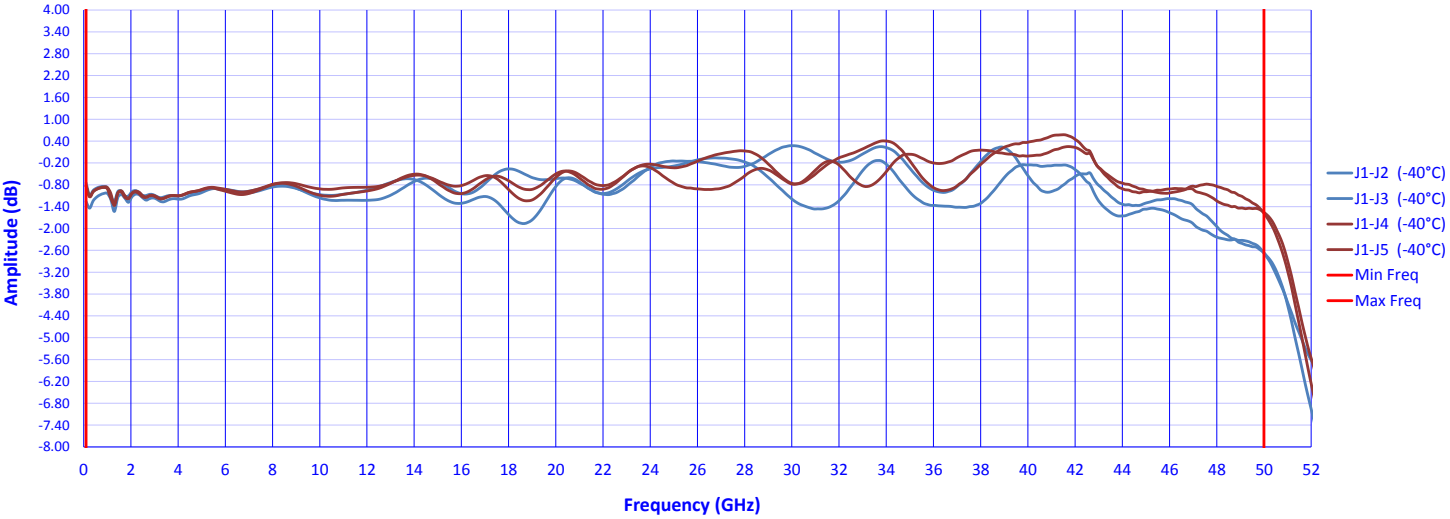
Typical Characteristics ON P4T-100M50G-100-R-RD

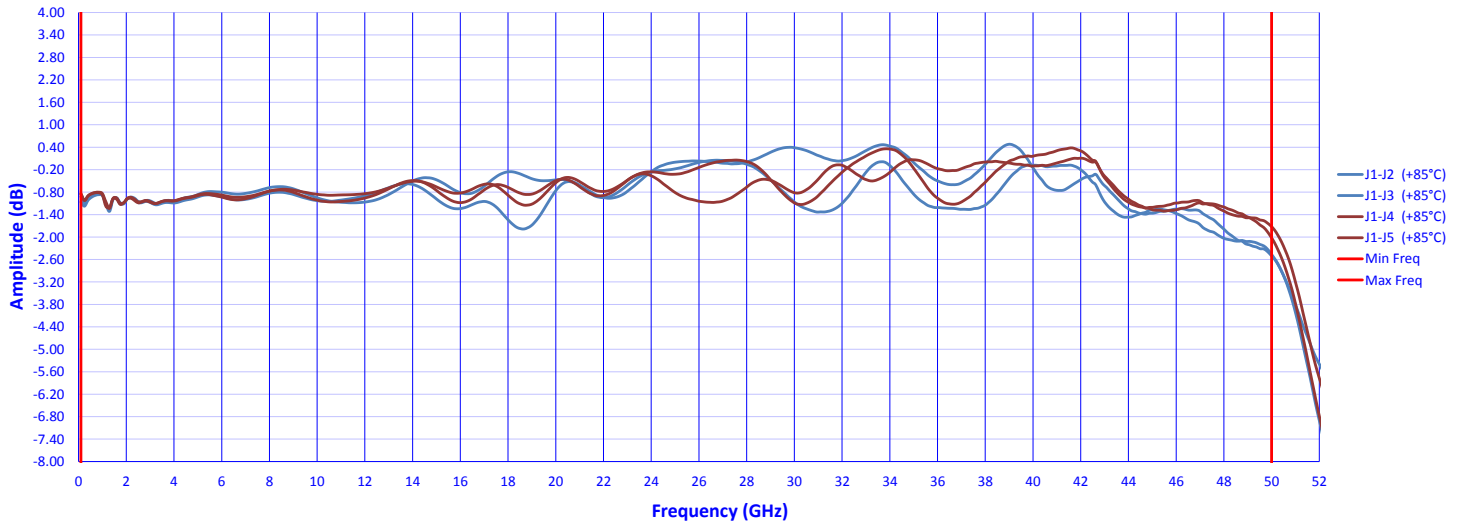
Insertion Loss Flatness (Variation from a Best Fit Straight Line) +25°C



Insertion Loss Flatness (Variation from a Best Fit Straight Line) -40°C



Insertion Loss Flatness (Variation from a Best Fit Straight Line) +85°C



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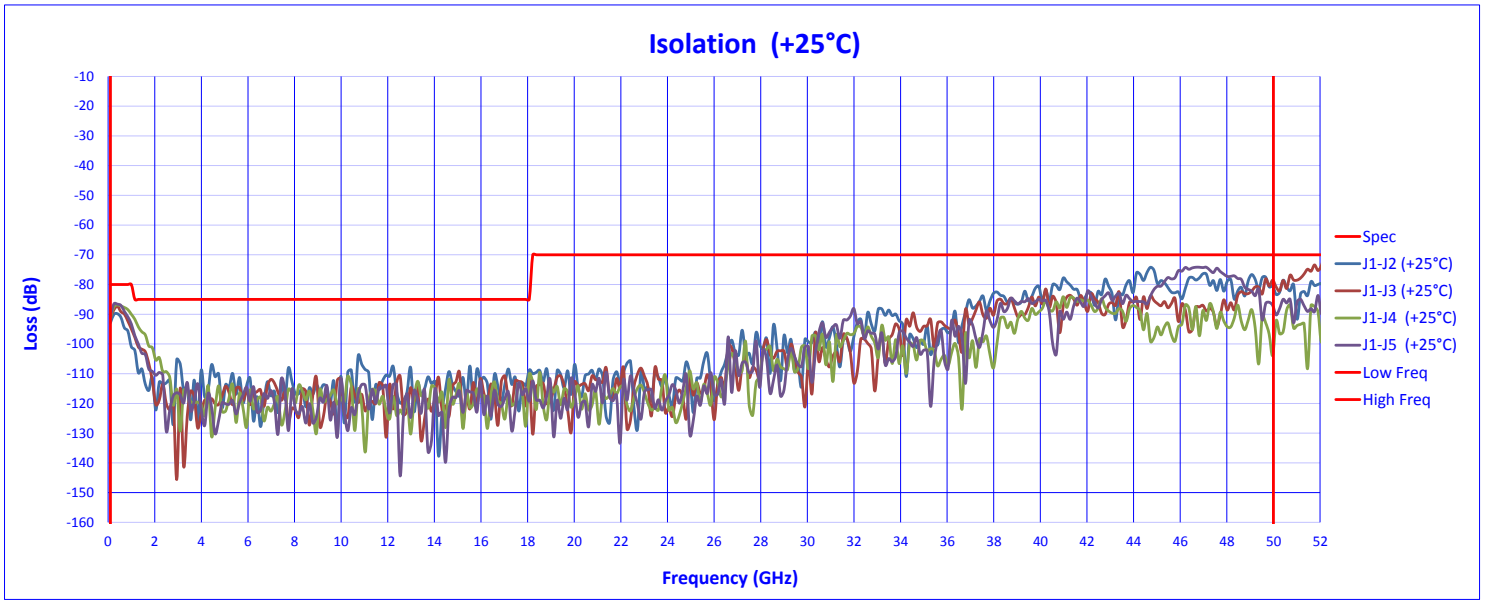

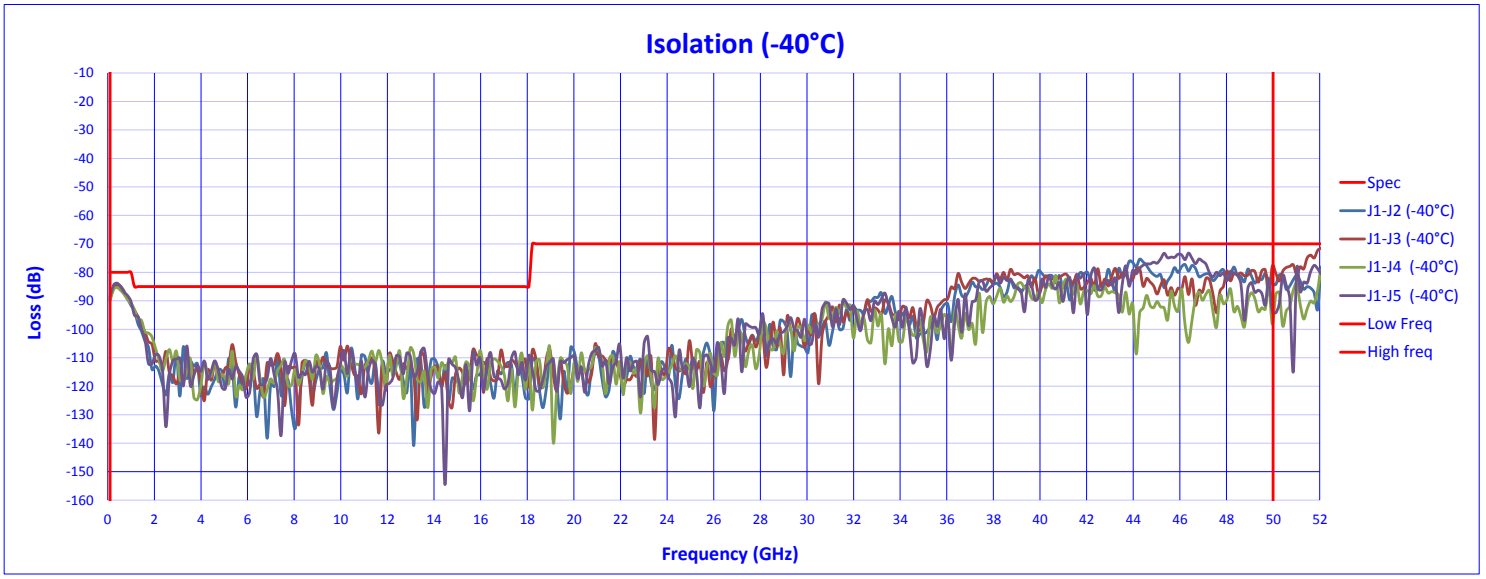

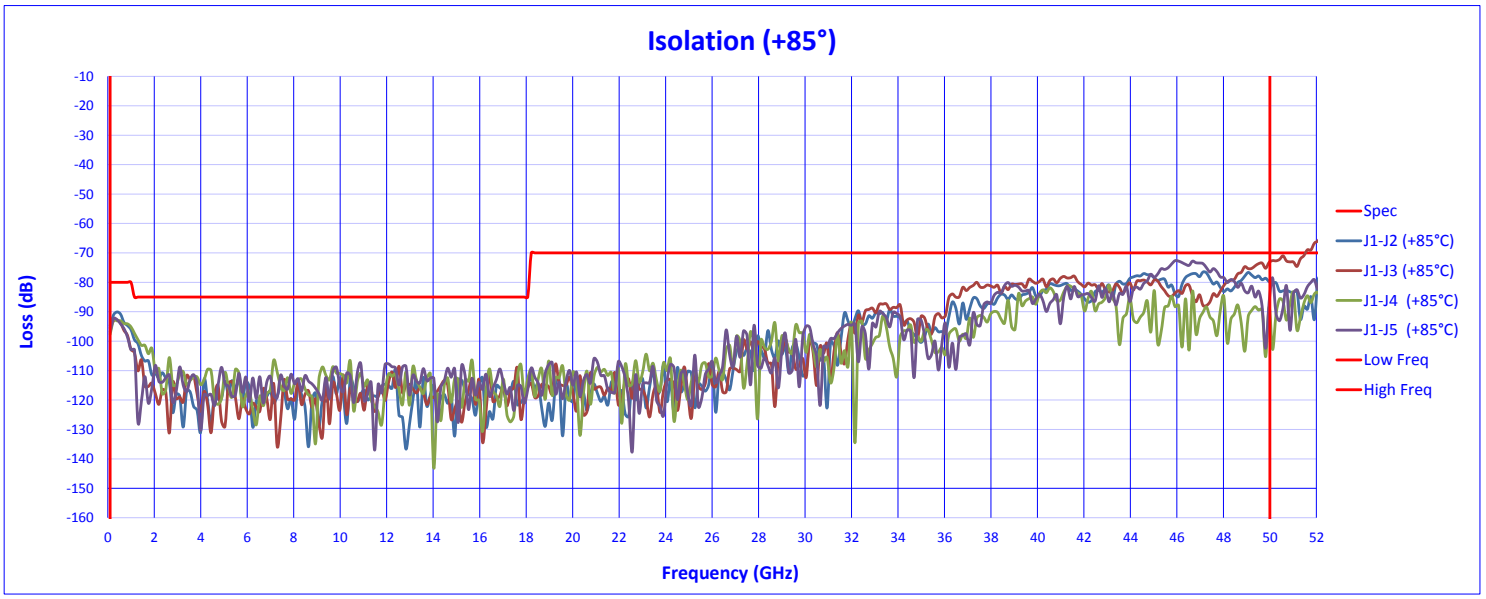

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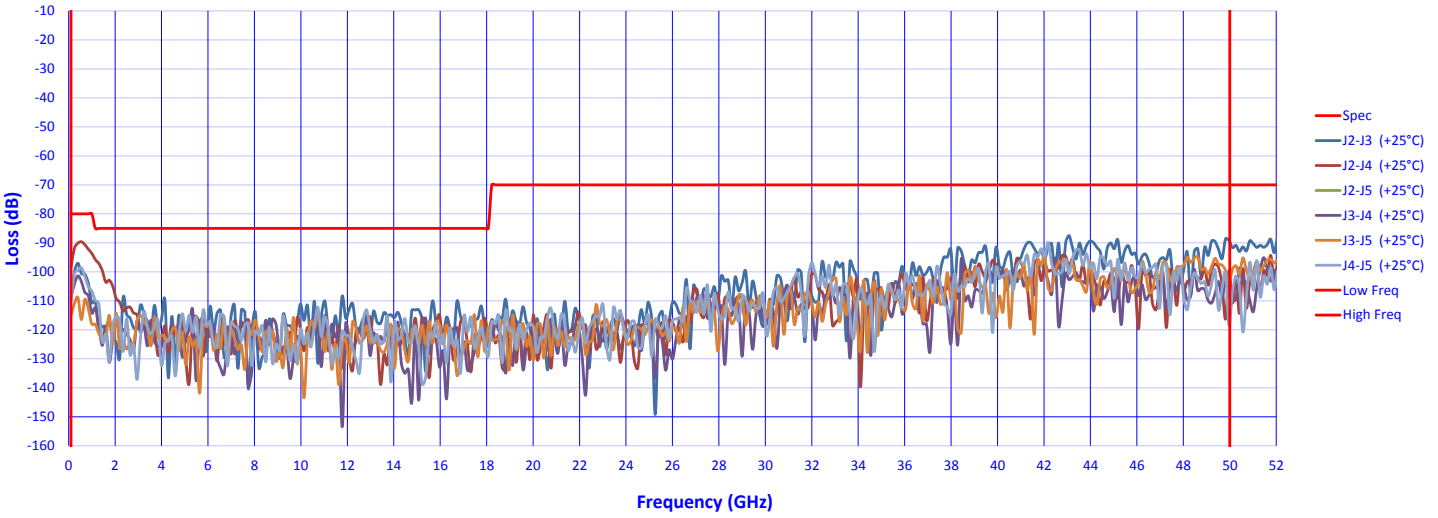
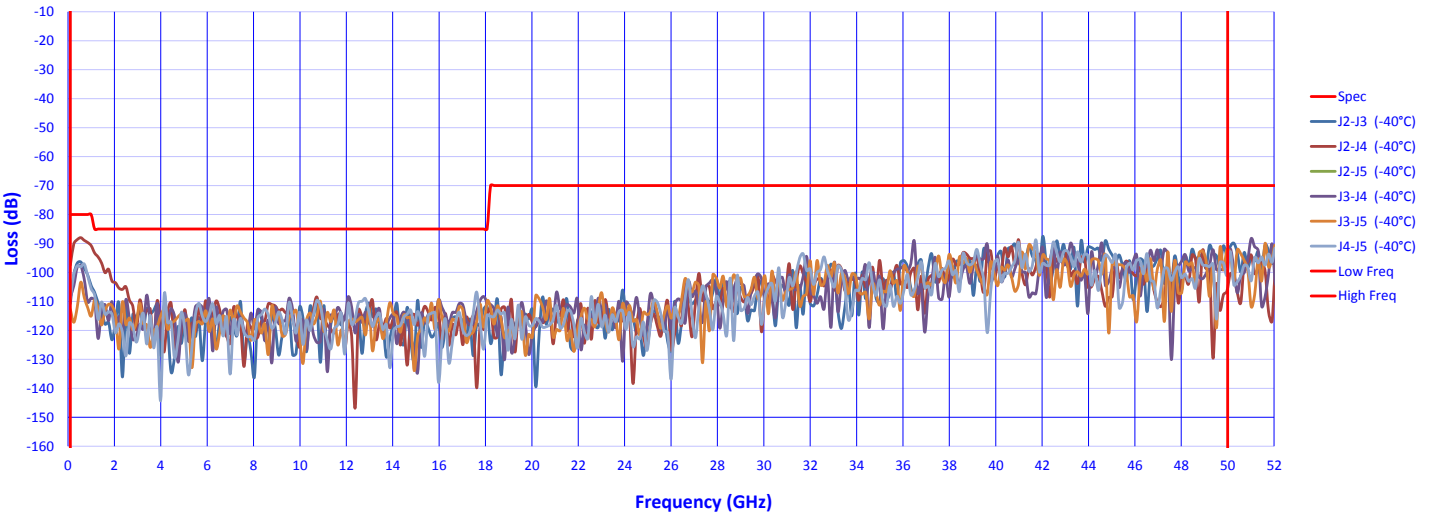
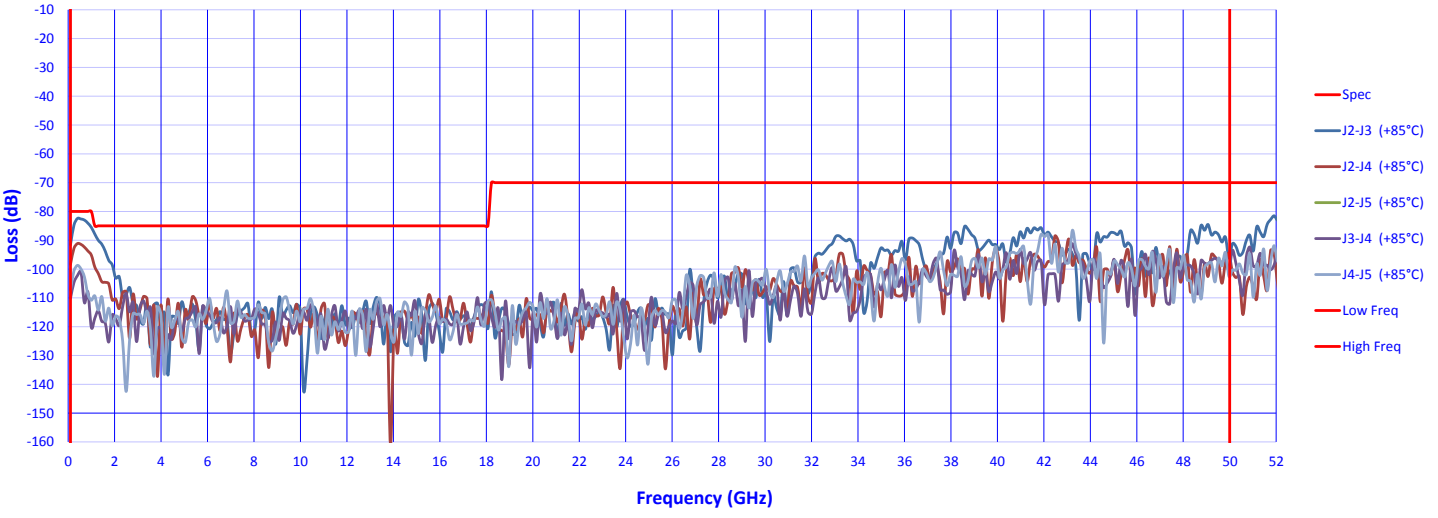
Port to Port Isolation (+25°C)



Port to Port Isolation (-40°C)



Port to Port Isolation (+85°C)



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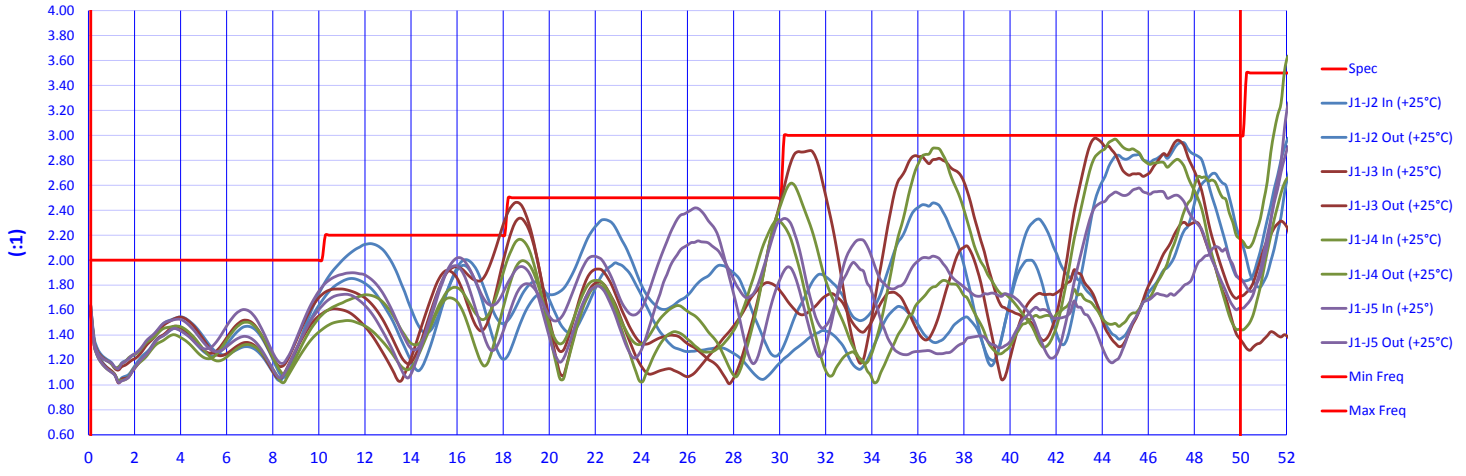

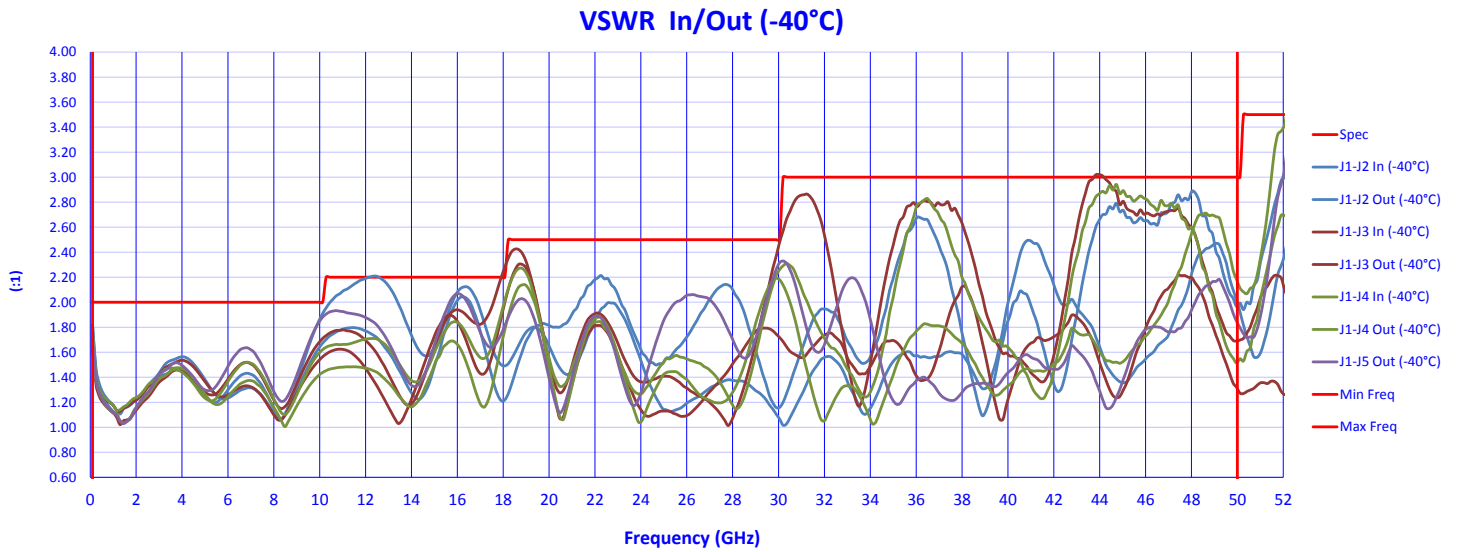

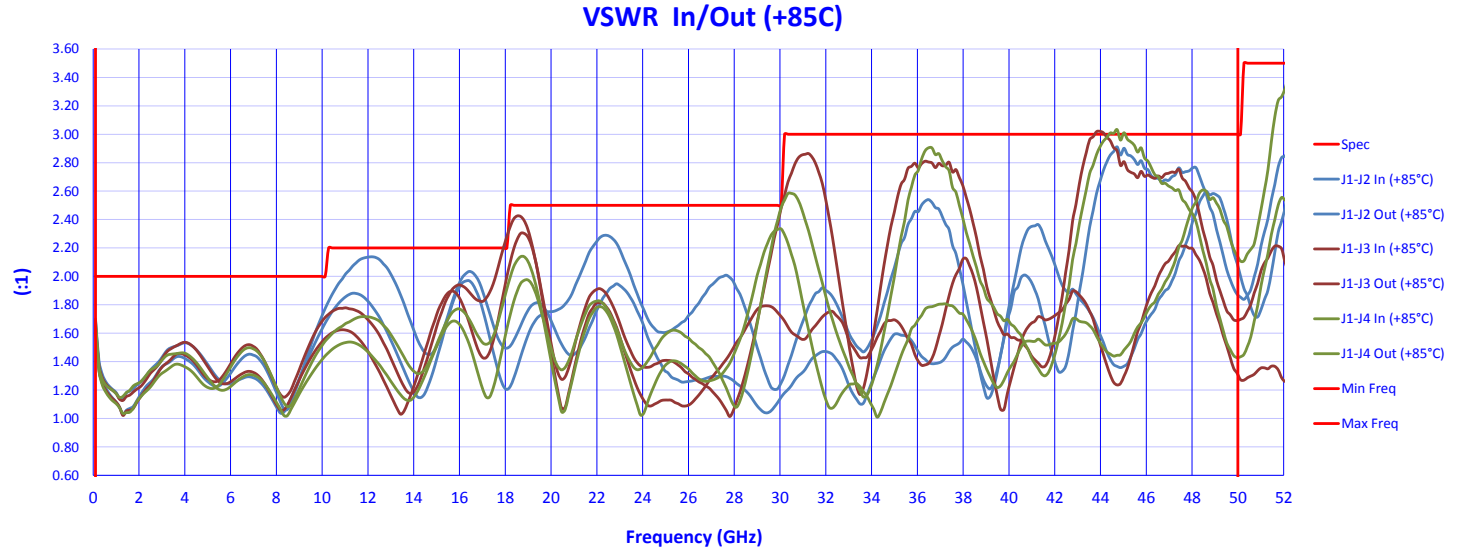

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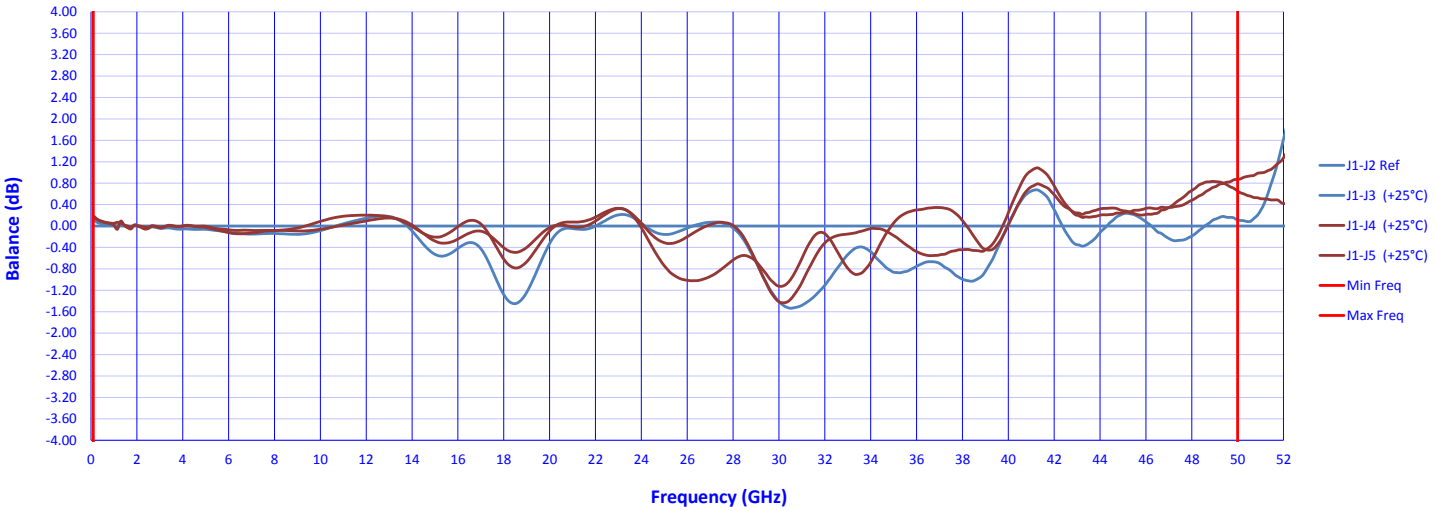

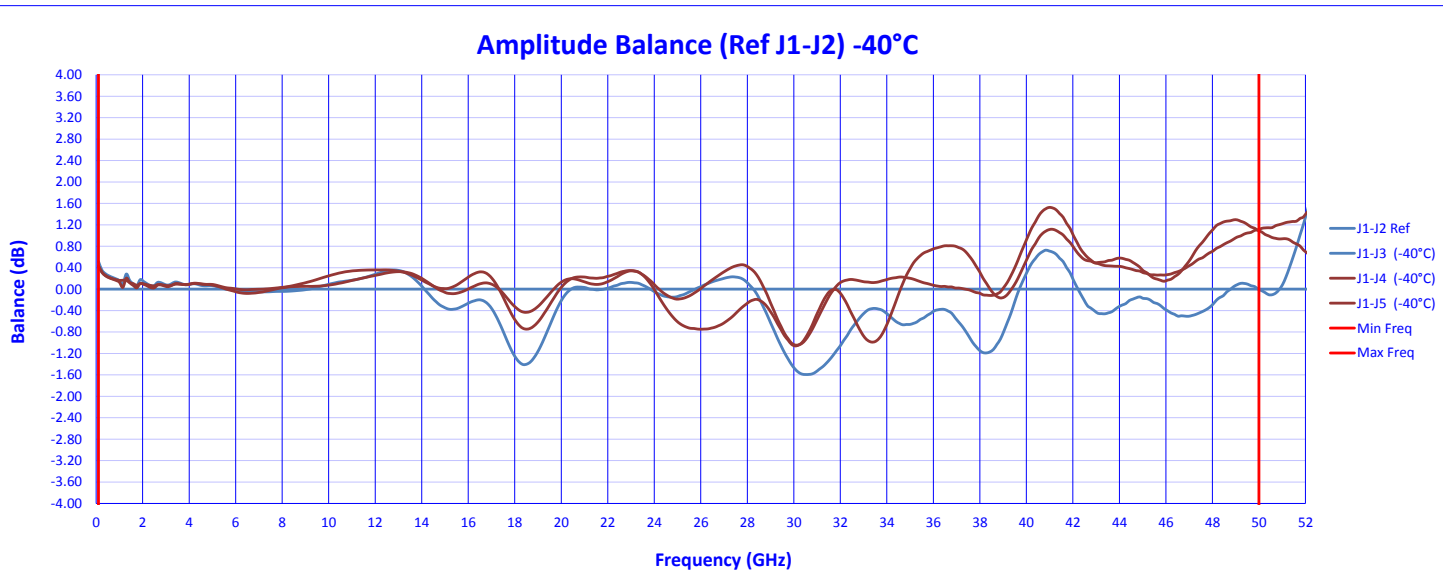

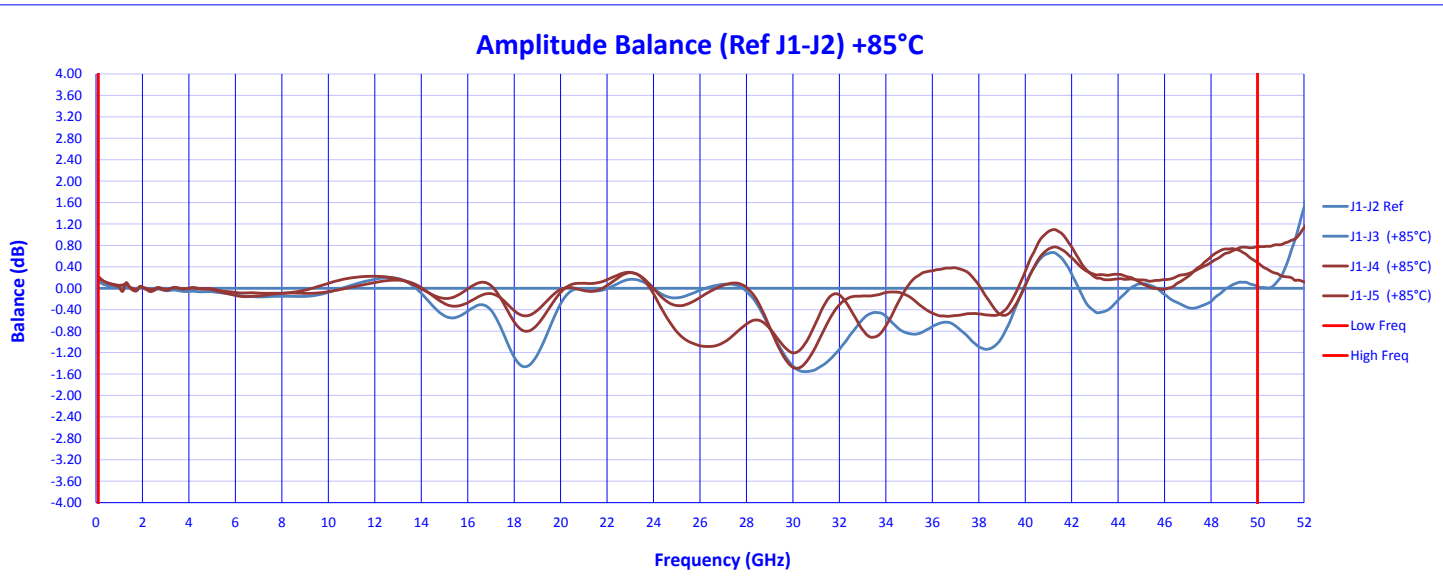

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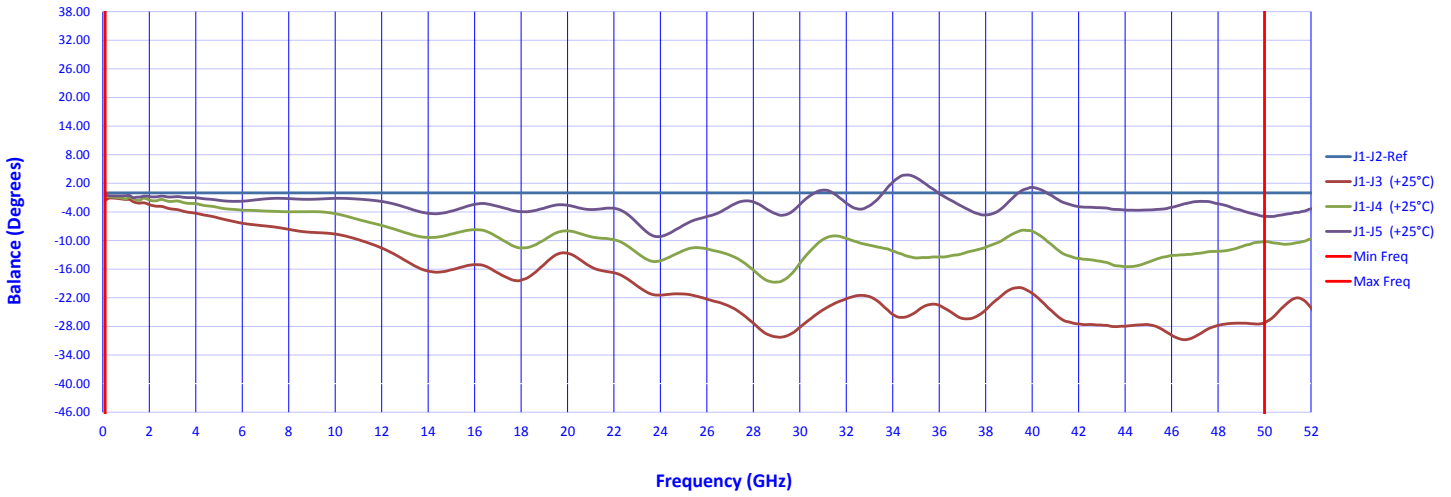
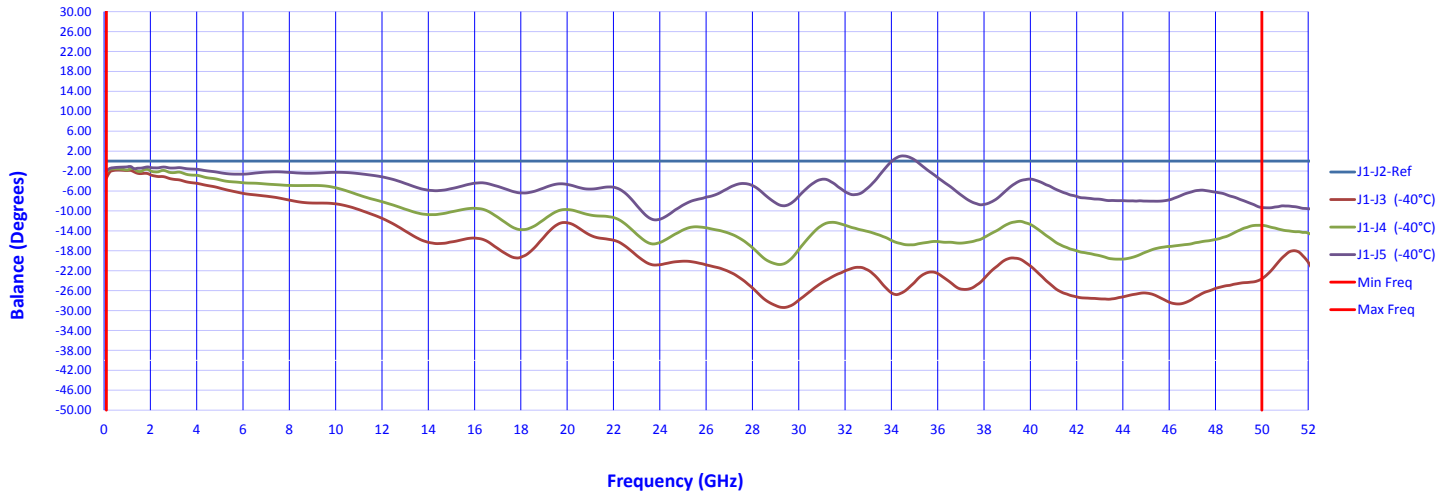
Typical Characteristics ON P4T-100M50G-100-R-RD

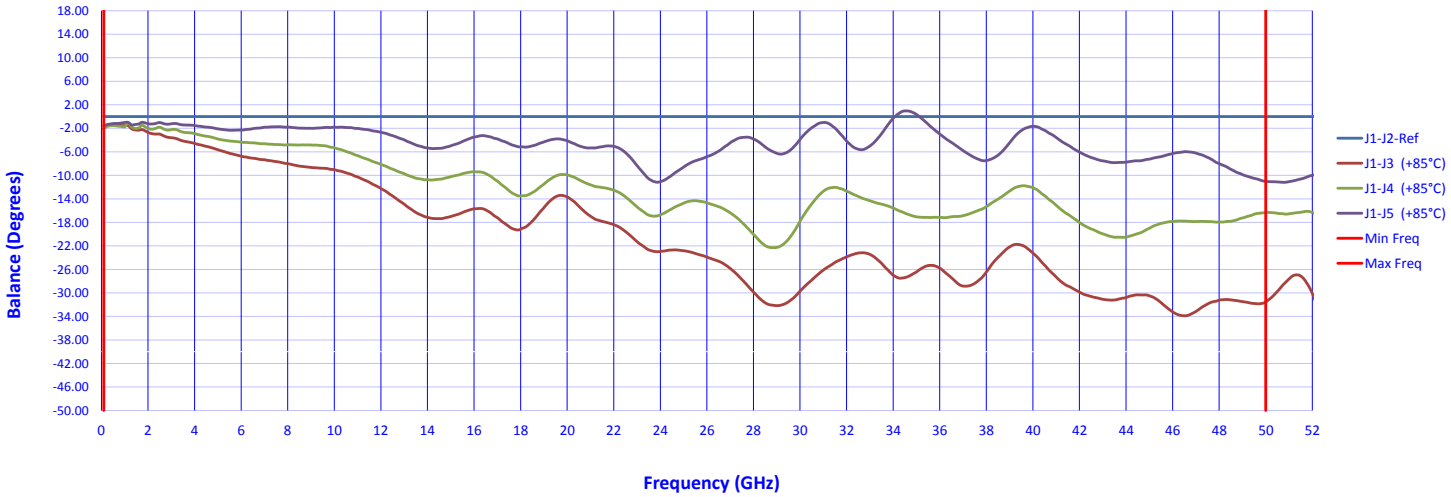
Phase Balance (+25°C)



Phase Balance (-40°C)



Phase Balance (+85°C)



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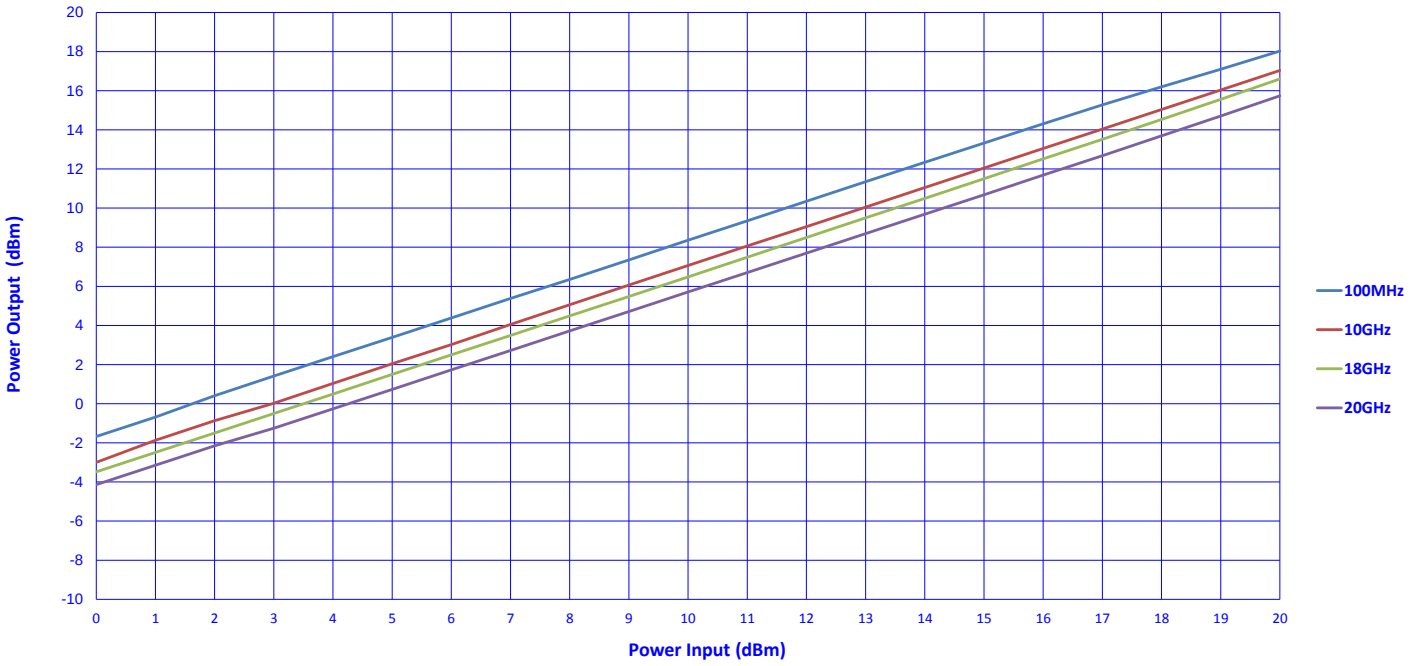

High Power Test Data 100MHz to 20 GHz (CW)															
100MHz				10GHz				18GHz				20GHz			
Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)	Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)	Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)	Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)
0	-1.675	1.675	0.116	0	-2.998	2.998	0.000	0	-3.482	3.482	0.000	0	-4.136	4.136	0.000
1	-0.686	1.686	0.105	1	-1.868	2.868	0.130	1	-2.488	3.488	0.006	1	-3.143	4.143	0.007
2	0.407	1.594	0.198	2	-0.871	2.871	0.127	2	-1.496	3.496	0.014	2	-2.152	4.152	0.017
3	1.411	1.589	0.202	3	0.027	2.973	0.025	3	-0.499	3.499	0.017	3	-1.252	4.252	0.117
4	2.403	1.597	0.194	4	1.039	2.961	0.037	4	0.495	3.505	0.023	4	-0.261	4.261	0.126
5	3.390	1.610	0.181	5	2.046	2.954	0.044	5	1.497	3.503	0.021	5	0.734	4.266	0.130
6	4.382	1.619	0.173	6	3.022	2.978	0.020	6	2.496	3.504	0.022	6	1.731	4.269	0.133
7	5.381	1.619	0.172	7	4.054	2.946	0.052	7	3.490	3.510	0.028	7	2.725	4.275	0.140
8	6.354	1.646	0.145	8	5.059	2.941	0.057	8	4.490	3.510	0.028	8	3.720	4.280	0.144
9	7.353	1.647	0.144	9	6.067	2.933	0.065	9	5.485	3.515	0.033	9	4.715	4.285	0.150
10	8.354	1.646	0.145	10	7.069	2.931	0.067	10	6.485	3.515	0.033	10	5.710	4.290	0.154
11	9.353	1.647	0.144	11	8.065	2.935	0.063	11	7.490	3.510	0.028	11	6.706	4.294	0.159
12	10.349	1.651	0.140	12	9.050	2.950	0.048	12	8.493	3.507	0.025	12	7.699	4.301	0.166
13	11.348	1.652	0.139	13	10.051	2.949	0.049	13	9.505	3.495	0.013	13	8.694	4.307	0.171
14	12.341	1.659	0.132	14	11.050	2.950	0.048	14	10.497	3.503	0.021	14	9.684	4.316	0.181
15	13.326	1.674	0.117	15	12.049	2.951	0.047	15	11.505	3.495	0.013	15	10.680	4.320	0.185
16	14.310	1.690	0.101	16	13.045	2.955	0.043	16	12.515	3.485	0.003	16	11.683	4.317	0.182
17	15.277	1.723	0.068	17	14.039	2.961	0.037	17	13.520	3.480	0.002	17	12.681	4.319	0.184
18	16.202	1.798	0.007	18	15.037	2.963	0.035	18	14.529	3.471	0.011	18	13.691	4.309	0.173
19	17.098	1.902	0.111	19	16.041	2.959	0.039	19	15.563	3.437	0.045	19	14.709	4.291	0.156
20	18.027	1.973	0.182	20	17.036	2.964	0.034	20	16.601	3.399	0.083	20	15.740	4.260	0.124

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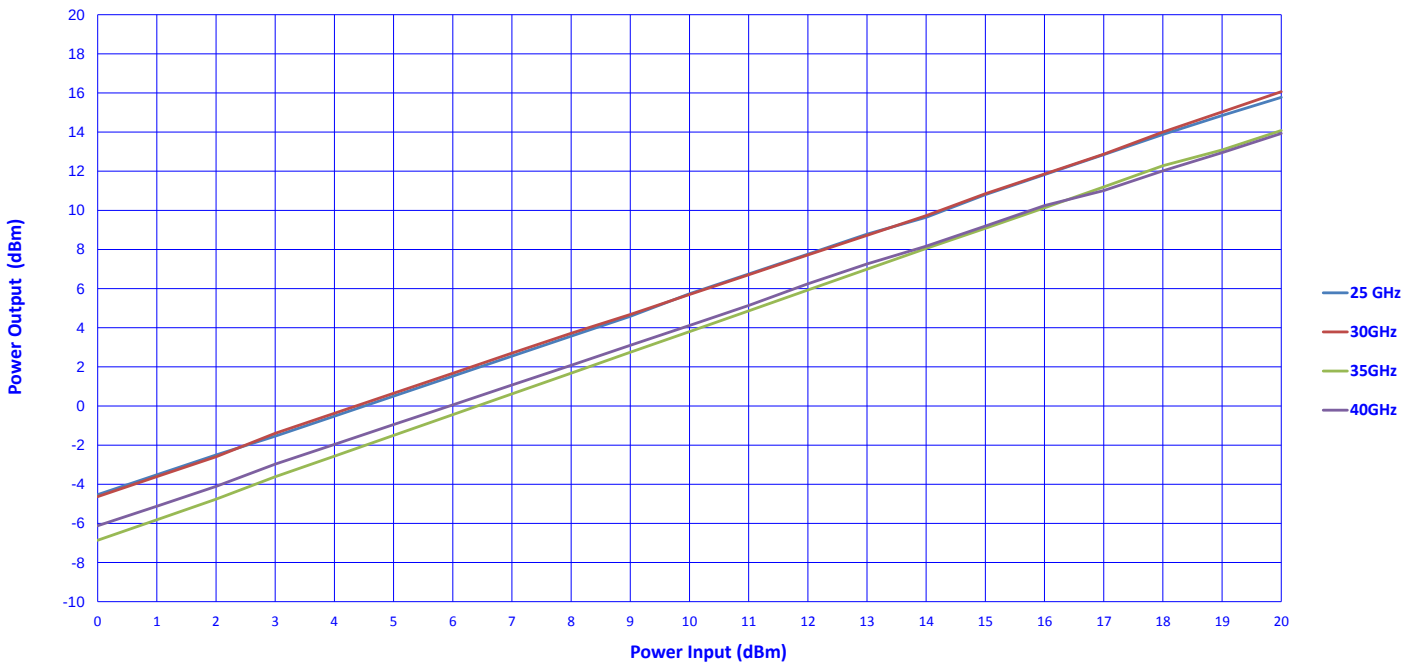
Typical Characteristics
ON
P4T-100M50G-100-R-RD



High Power Test Data 25 to 40 GHz (CW)															
25 GHz				30GHz				35GHz				40GHz			
Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)	Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)	Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)	Pin (dBm)	Pout (dBm)	Loss	Compression (dBm)
0	-4.530	4.530	0.000	0	-4.630	4.630	0.000	0	-6.860	6.860	0.000	0	-6.119	6.119	0.000
1	-3.515	4.515	0.015	1	-3.610	4.610	0.020	1	-5.814	6.814	0.046	1	-5.119	6.119	0.000
2	-2.499	4.499	0.031	2	-2.597	4.597	0.033	2	-4.763	6.763	0.097	2	-4.112	6.112	0.007
3	-1.539	4.539	0.009	3	-1.394	4.394	0.236	3	-3.615	6.615	0.245	3	-2.973	5.973	0.146
4	-0.520	4.520	0.010	4	-0.373	4.373	0.257	4	-2.560	6.560	0.300	4	-1.962	5.962	0.158
5	0.501	4.499	0.031	5	0.651	4.349	0.281	5	-1.502	6.502	0.358	5	-0.946	5.946	0.173
6	1.528	4.472	0.058	6	1.675	4.325	0.305	6	-0.444	6.444	0.416	6	0.061	5.939	0.180
7	2.550	4.450	0.080	7	2.700	4.300	0.330	7	0.618	6.382	0.478	7	1.069	5.931	0.188
8	3.570	4.430	0.100	8	3.719	4.281	0.349	8	1.679	6.321	0.539	8	2.082	5.919	0.201
9	4.588	4.413	0.118	9	4.680	4.320	0.310	9	2.745	6.255	0.605	9	3.102	5.898	0.221
10	5.738	4.262	0.268	10	5.703	4.297	0.333	10	3.802	6.198	0.662	10	4.119	5.881	0.238
11	6.747	4.253	0.277	11	6.710	4.290	0.340	11	4.866	6.134	0.726	11	5.138	5.862	0.257
12	7.763	4.237	0.293	12	7.725	4.275	0.355	12	5.929	6.071	0.789	12	6.247	5.753	0.366
13	8.785	4.216	0.315	13	8.721	4.279	0.351	13	6.988	6.012	0.848	13	7.262	5.738	0.381
14	9.643	4.357	0.173	14	9.729	4.271	0.359	14	8.056	5.945	0.916	14	8.170	5.830	0.289
15	10.806	4.194	0.336	15	10.847	4.153	0.477	15	9.079	5.921	0.939	15	9.200	5.800	0.319
16	11.823	4.177	0.353	16	11.861	4.139	0.491	16	10.128	5.872	0.988	16	10.242	5.758	0.361
17	12.847	4.153	0.377	17	12.874	4.126	0.504	17	11.195	5.805	1.055	17	11.015	5.985	0.134
18	13.880	4.120	0.410	18	14.000	4.000	0.630	18	12.277	5.723	1.137	18	12.015	5.985	0.134
19	14.849	4.151	0.379	19	15.030	3.970	0.660	19	13.087	5.913	0.947	19	12.952	6.048	0.071
20	15.776	4.224	0.306	20	16.065	3.935	0.695	20	14.081	5.919	0.941	20	13.931	6.069	0.050

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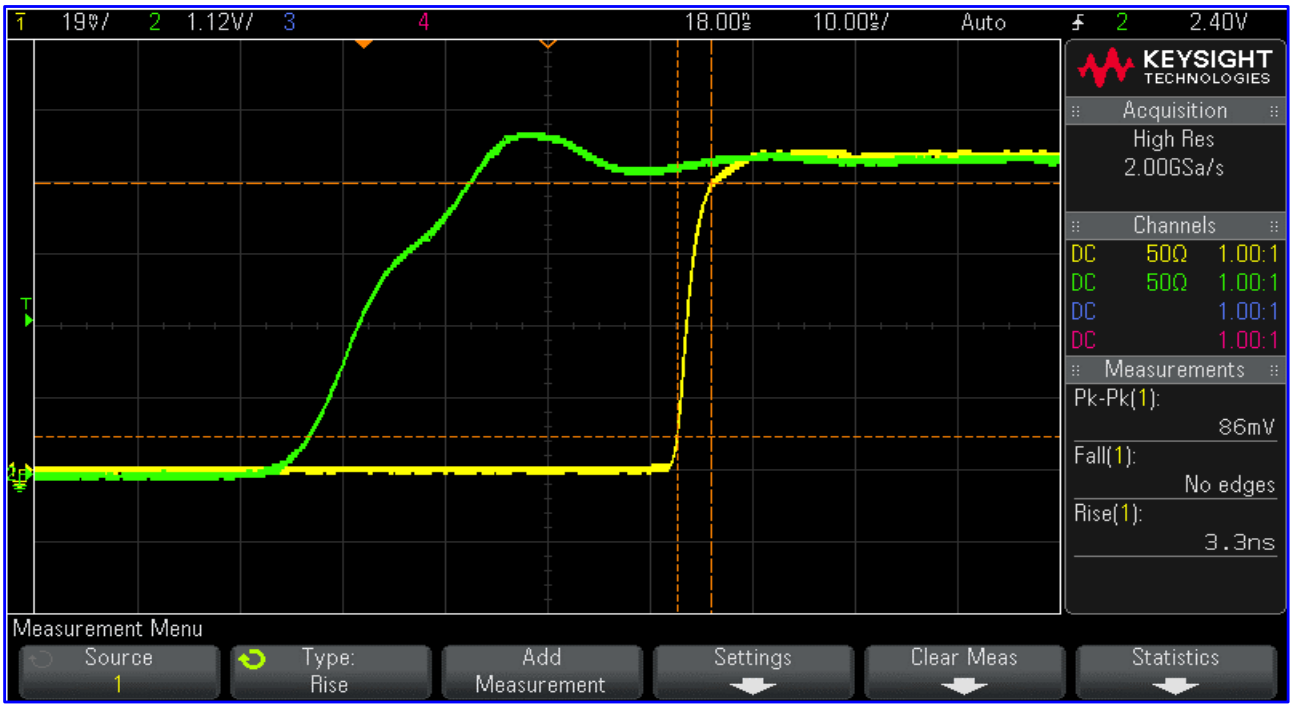
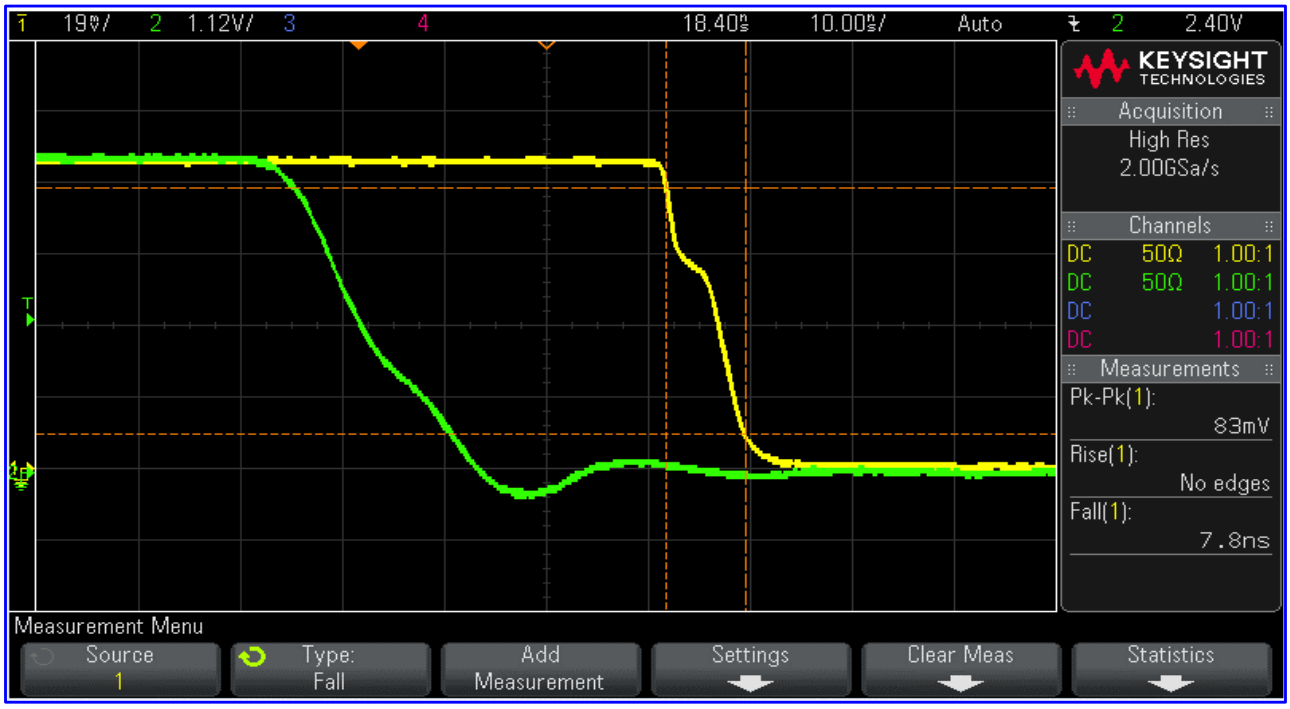
Typical Characteristics ON P4T-100M50G-100-R-RD

Rise Time
10 ns Per Div.
Measured Value (3.3 ns)



Fall Time
10 ns Per Div.
Measured Value (7.8 ns)



Green Trace = TTL Signal
Yellow Trace = RF Signal

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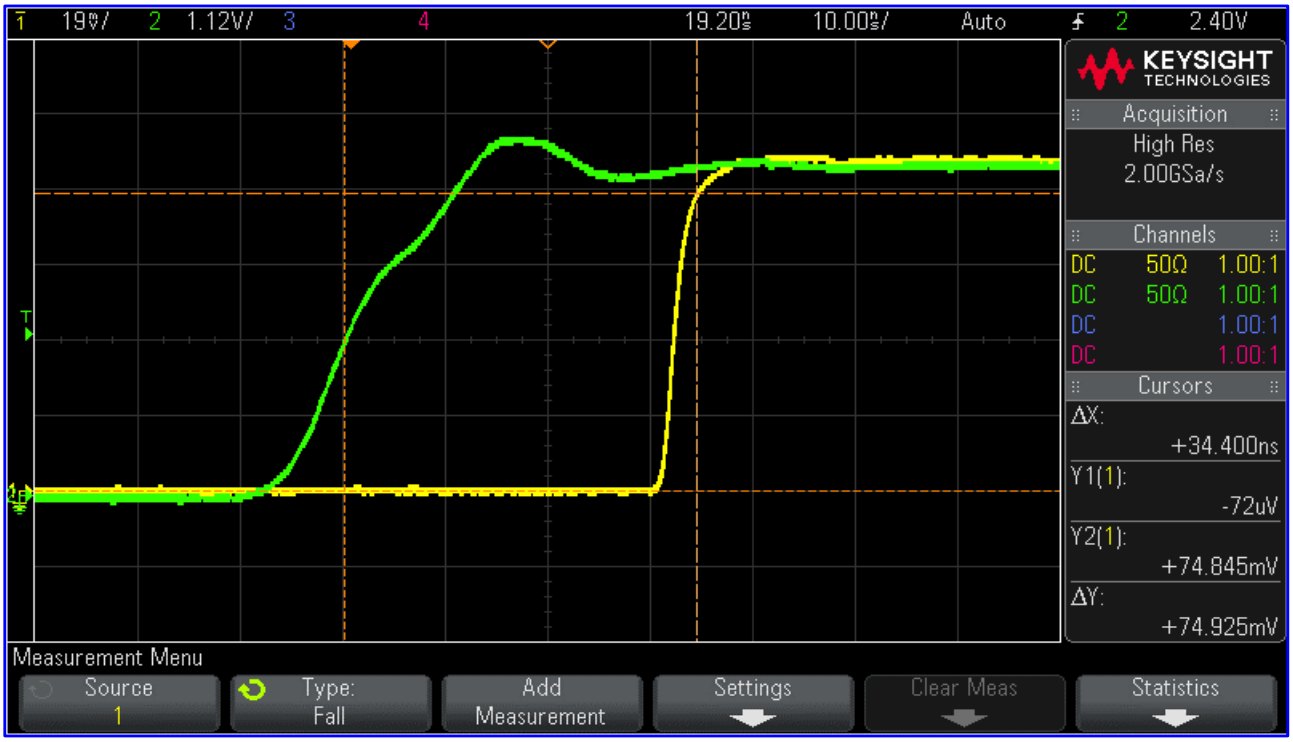
Typical Characteristics
ON
P4T-100M50G-100-R-RD

Switching Speed ON

10 ns Per Div.

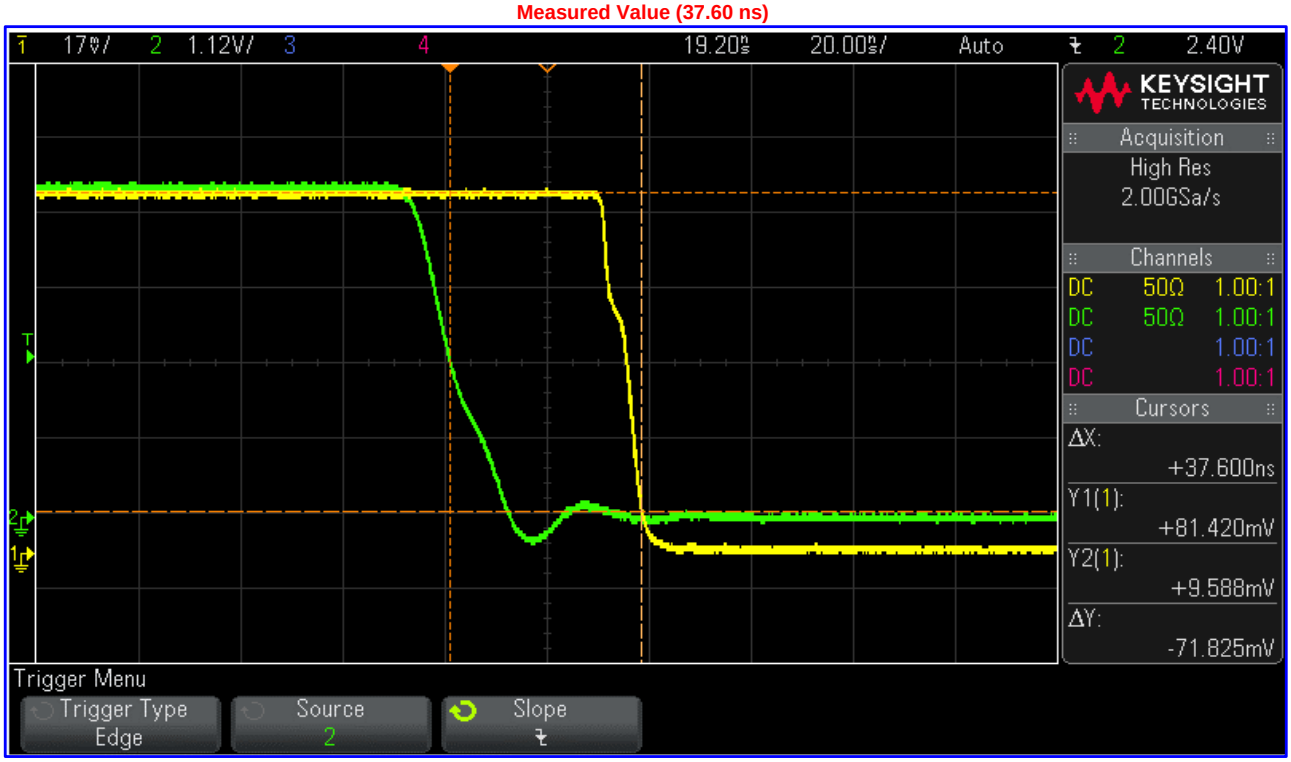
Measured Value (34.40ns)



Switching Speed OFF

20 ns Per Div.

Measured Value (37.60 ns)



Green Trace = TTL Signal

Yellow Trace = RF Signal

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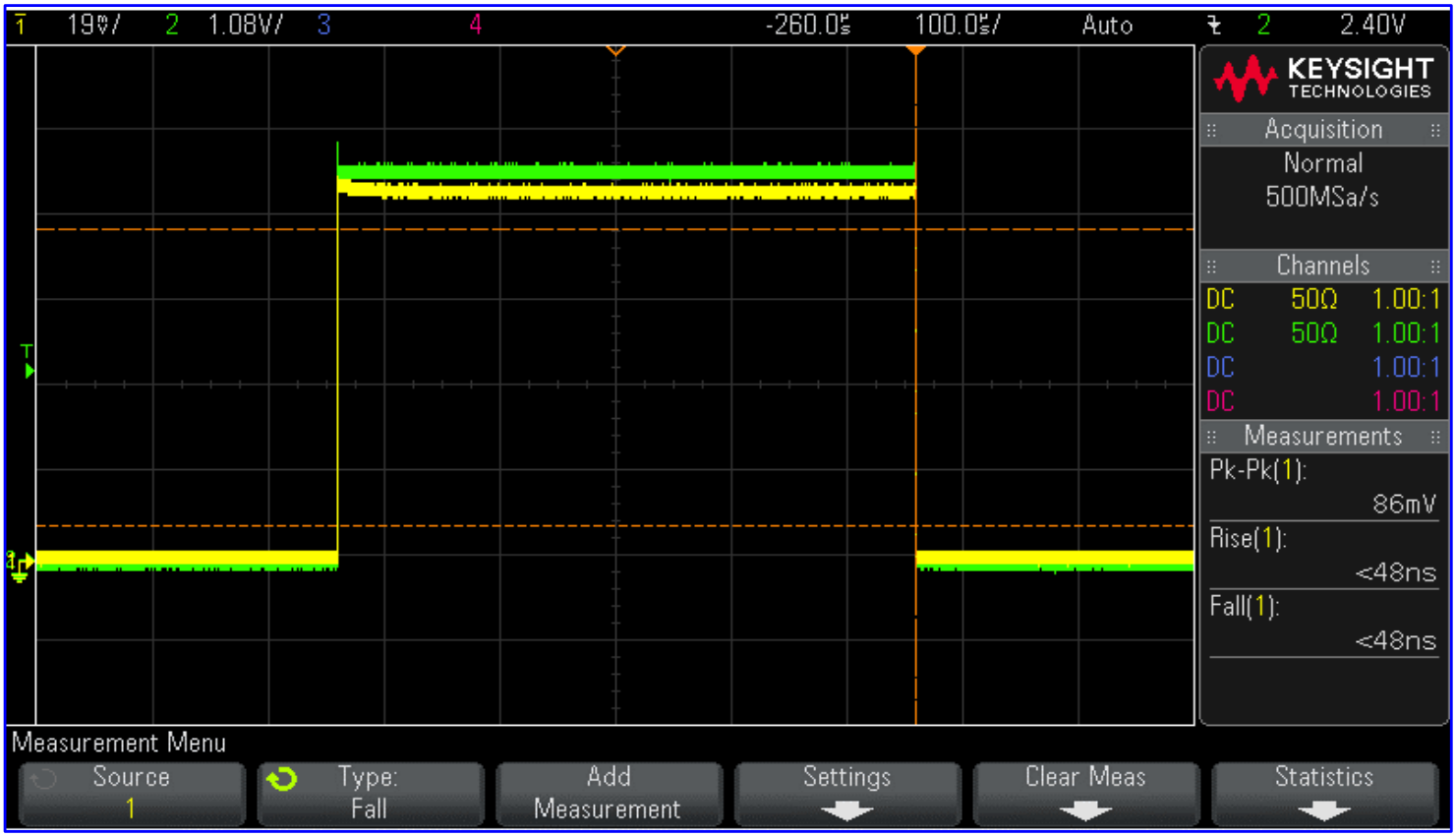
Typical Characteristics
ON
P4T-100M50G-100-R-RD

Full Pulse
10 µs Per Div.



Green Trace = TTL Signal
Yellow Trace = RF Signal

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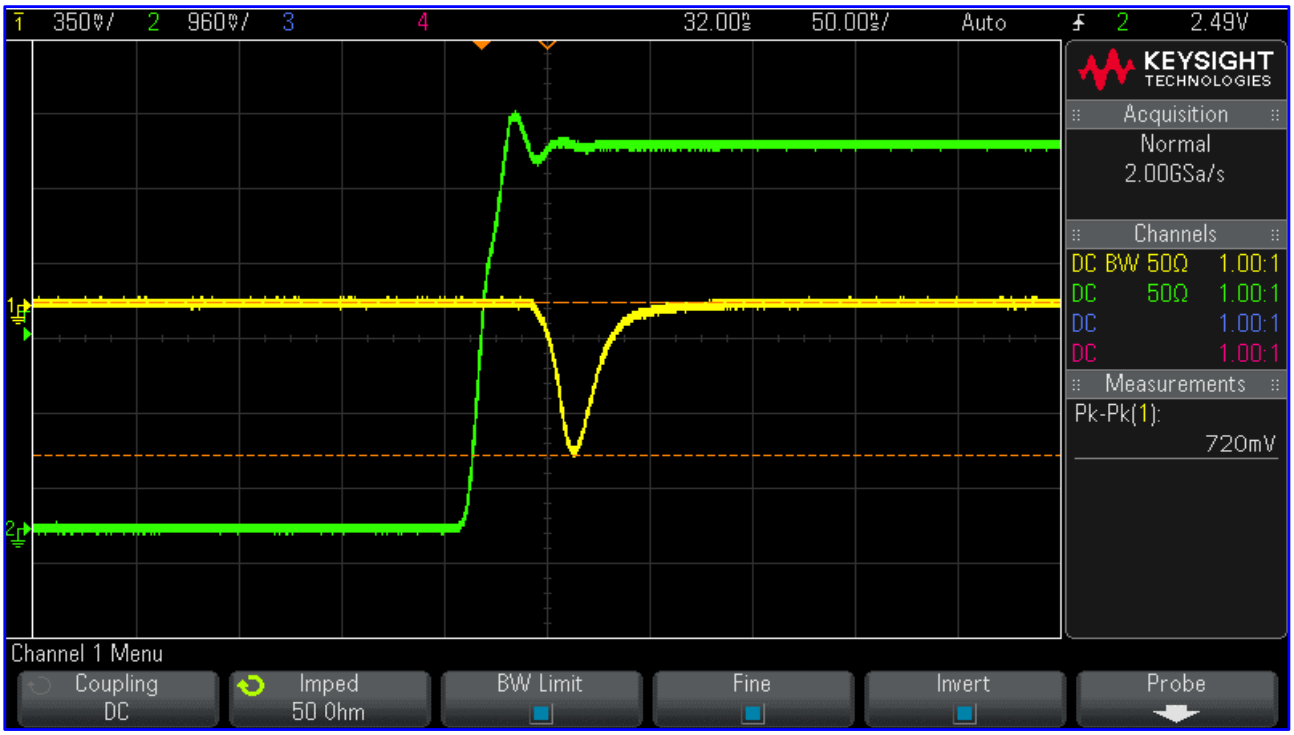
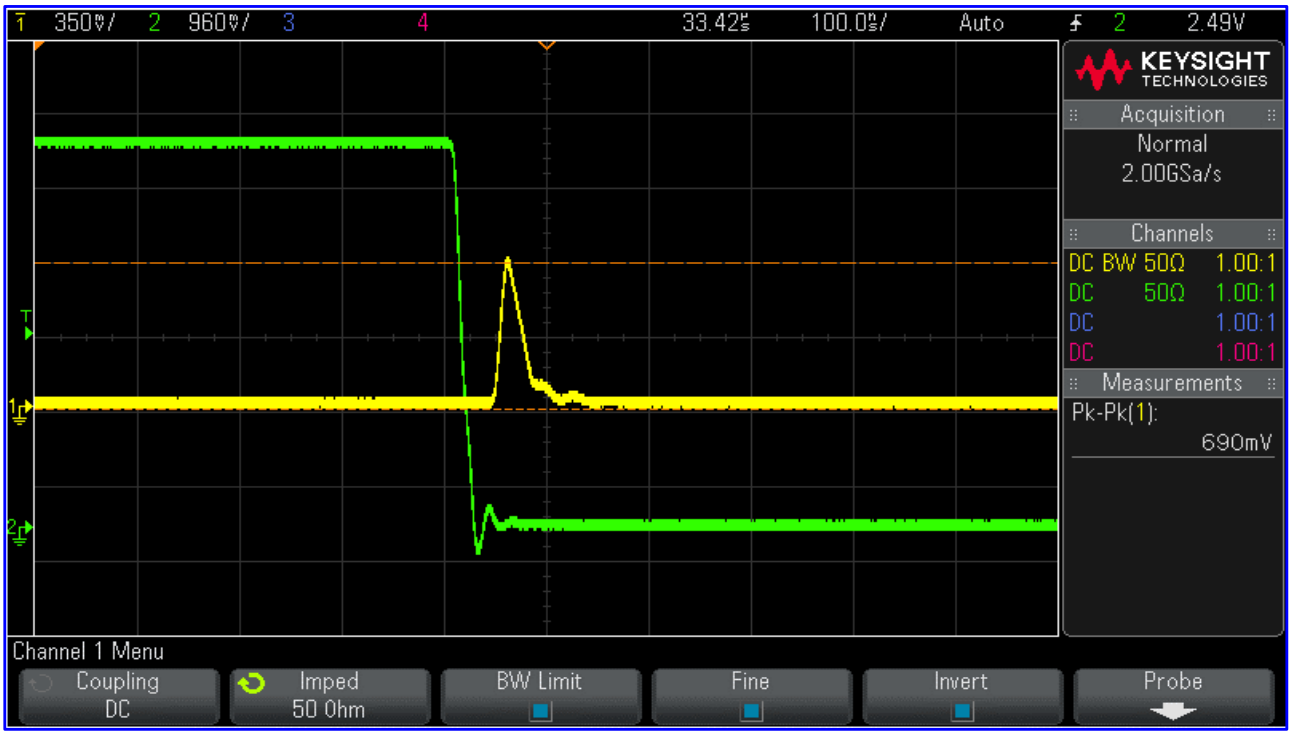
Typical Characteristics
ON
P4T-100M50G-100-R-RD

Output Video Transients
BW = 350MHz, 50Ω
Measured Value (720 mV P-P)



Output Video Transients
BW = 350MHz, 50Ω
Measured Value (690 mV P-P)



Green Trace = TTL Signal
Yellow Trace = RF Signal

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