



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

PMI MODEL: LM-50M4G-16-1W-SFF IS A HIGH POWER LIMITER OPERATING IN THE FREQUENCY RANGE 50 MHz TO 4 GHz, (USABLE TO 11 GHz) WITH 1W (+30 dBm) OF CW POWER HANDLING (USABLE TO 4W), AND 32W PEAK POWER (+45dBm), PULSE WIDTH 1 μ Sec, Duty Cycle 0.1%. THIS COMPACT HOUSING IS FITTED WITH SMA FEMALE CONNECTORS.



April 17, 2020

Designed By: Engineering PMI

Tested and Reported By:

Alfredo Lopez



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

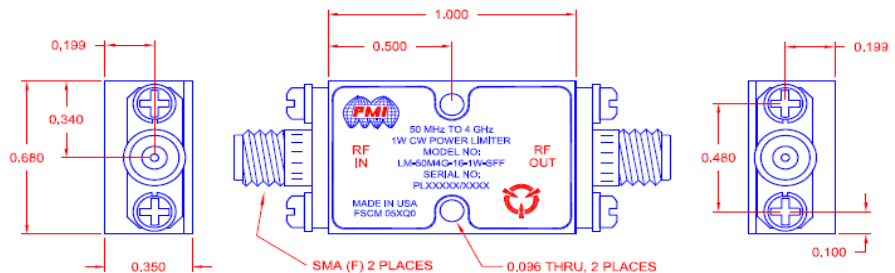
Outline Drawing

DESCRIPTION

PMI MODEL: LM-50M4G-16-1W-SFF IS A HIGH POWER LIMITER OPERATING IN THE FREQUENCY RANGE 50 MHz TO 4 GHz, (USABLE TO 11 GHz) WITH 1W (+30 dBm) OF CW POWER HANDLING (USABLE TO 4W), AND 32W PEAK POWER (+45dBm), PULSE WIDTH 1 μ Sec, Duty Cycle 0.1%. THIS COMPACT HOUSING IS FITTED WITH SMA FEMALE CONNECTORS.

SPECIFICATIONS

- FREQUENCY RANGE: 50 MHz to 4 GHz (Usable to 11GHz)
- POWER HANDLING: 1W (+30 dBm), CW (Usable to 4W Max.)
32W Peak (+45dBm), Pulse Width 1 μ s, Duty Cycle 0.1%
- INSERTION LOSS: 1.7 dB Max.
- VSWR (IN/OUT): 1.80:1 Max.
- FLAT LEAKAGE POWER: +22 dBm Typ.,
- RECOVERY TIME: 50 ns Max.
- CONNECTORS: SMA FEMALE
- PACKAGE SIZE: 1.00" x 0.68" x 0.35"
- PACKAGE FINISH: BLUE PAINT



ENVIRONMENTAL RATINGS

- TEMPERATURE: -40 °C TO +85 °C (OPERATING)
-55 °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

PMI CONFIDENTIAL AND PROPRIETARY

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ISO 9001 CERTIFIED



				TITLE PRODUCT FEATURE LM-50M4G-16-1W-SFF 50 MHz to 4 GHz 1W CW Power Limiter			
APPROVALS		DATE					
DRAWN NJA		4/4/18					
CHECKED				REV. A		A1	
ISSUED				SCALE N:S		SHEET 1 OF 1	



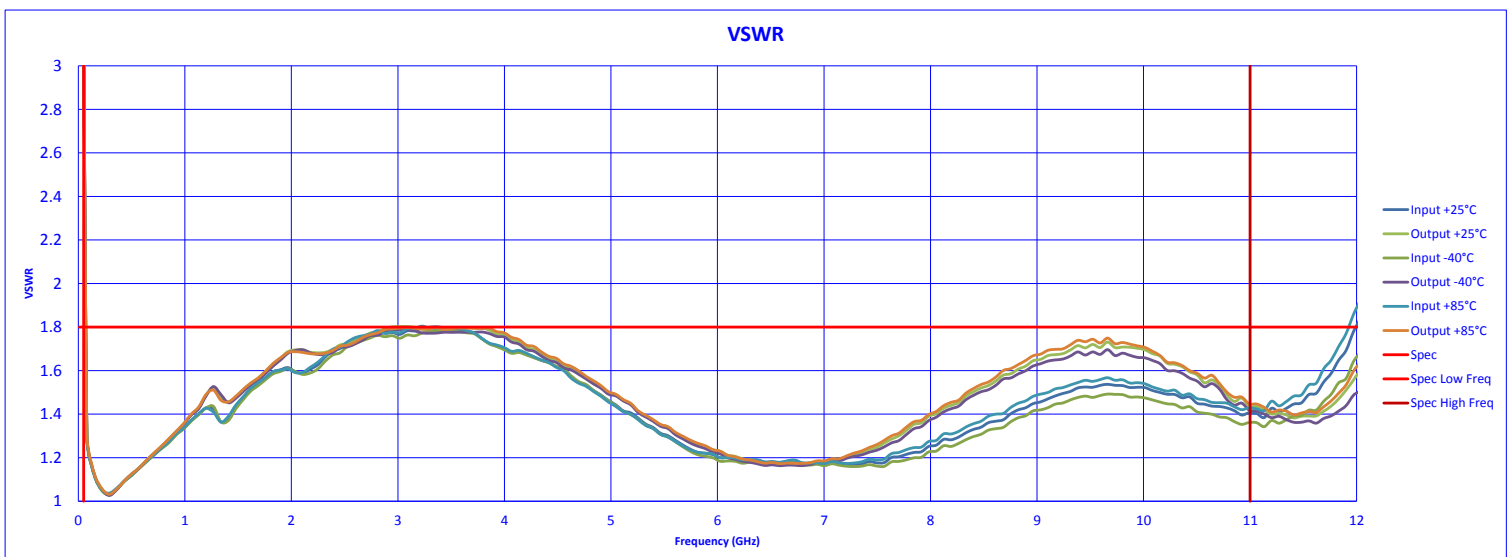
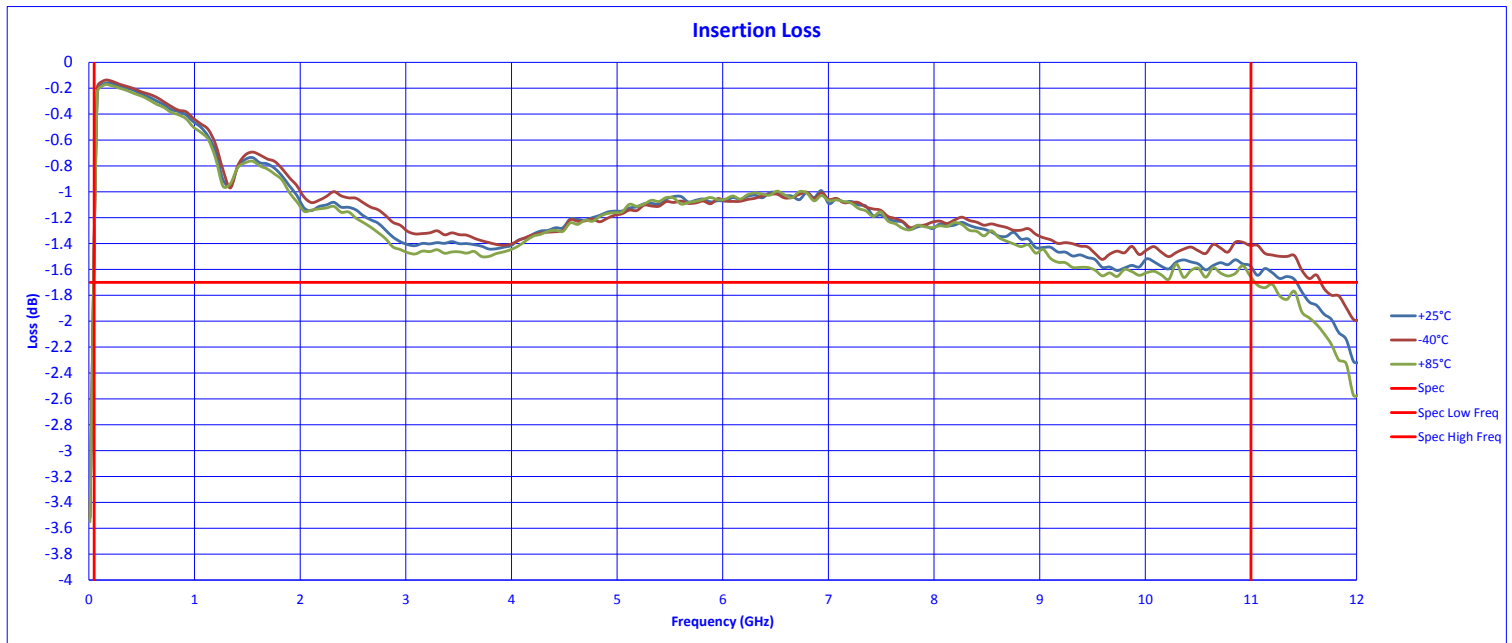
Typical Characteristics **ON** **LM-50M4G-16-1W-SFF (Usable to 11GHz)**

Technical Specifications

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	Test Results			QA QC
			+25°C	-40°C	+85°C	
1	Frequency Range:	50MHz to 4 GHz (Usable to 11GHz)	Spec 50 MHz to 4 GHz Test 50MHz to 11 GHz	Spec 50MHz to 4 GHz Test 50MHz to 11 GHz	Spec 50MHz to 4 GHz Test 50MHz to 11 GHz	
2	Power Handling	1W (+30 dBm), CW (Usable to 4W Max)	Pass See Graphs	Pass See Graphs	Pass See Graphs	
		32W Peak (+45dBm) Pulse Width 1us, 0.1% Duty Cycle	Pass See Plots	Pass See Plots	Pass See Plots	
3	Insertion Loss	1.7 dB Max.	1.44 dB = 50MHz to 4 GHz See Graph	1.41 dB = 50MHz to 4 GHz See Graph	1.5 dB = 50MHz to 4 GHz See Graph	
			1.65 dB = 50MHz to 11 GHz See Graph	1.52 dB = 50MHz to 11 GHz See Graph	1.72 dB = 50MHz to 11 GHz See Graph	
4	VSWR (in/out)	1.8:1 Max.	1.8 :1 = 50MHz to 4 GHz See Graph 1.8 :1 = 50MHz to 11 GHz See Graph	1.79 :1 = 50MHz to 4 GHz See Graph 1.79 :1 = 50MHz to 11 GHz See Graph	1.8 :1 = 50MHz to 4 GHz See Graph 1.8 :1 = 50MHz to 11 GHz See Graph	
5	Flat Leakage Power	+22 dBm Typ.	23.27 dBm = 1 Watt See Graphs 30.2 dBm = 4 Watts See Graphs	23.62 dBm = 1 Watt See Graphs 29.4 dBm = 4 Watts See Graphs	23.42 dBm = 1 Watt See Graphs 29.5 dBm = 4 Watts See Graphs	
6	Recovery Time	50 ns Max.	11.01 ns See Plots	11.01 ns See Plots	11.01 ns See Plots	



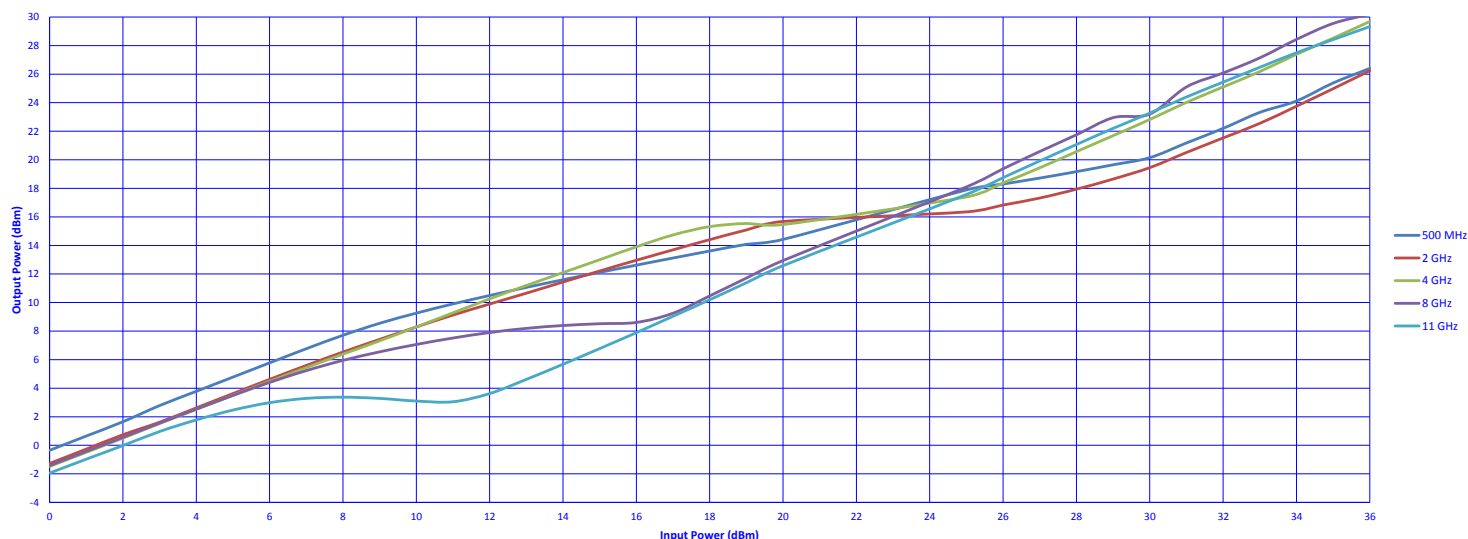
Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)





Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

High Power Test +25°C

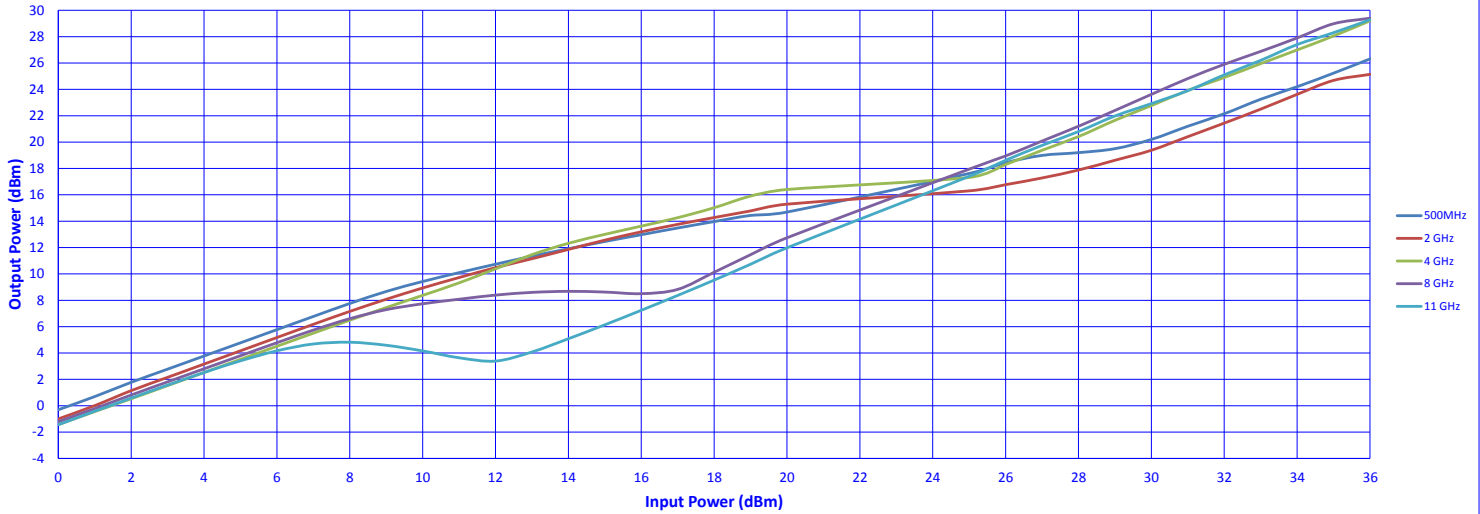


High Power Test														
500 MHz			2 GHz			4 GHz			8 GHz			11 GHz		
Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss
0	-0.35	0.35	0	-1.27	1.27	0	-1.48	1.48	0	-1.42	1.42	0	-1.95	1.95
1	0.65	0.35	1	-0.27	1.27	1	-0.49	1.49	1	-0.43	1.43	1	-0.97	1.97
2	1.65	0.35	2	0.74	1.26	2	0.50	1.50	2	0.56	1.44	2	-0.02	2.02
3	2.78	0.22	3	1.62	1.38	3	1.53	1.47	3	1.55	1.45	3	0.97	2.03
4	3.78	0.22	4	2.62	1.38	4	2.52	1.48	4	2.53	1.47	4	1.78	2.22
5	4.78	0.22	5	3.62	1.38	5	3.50	1.50	5	3.49	1.51	5	2.47	2.53
6	5.78	0.22	6	4.62	1.38	6	4.48	1.52	6	4.40	1.60	6	2.99	3.01
7	6.77	0.23	7	5.60	1.41	7	5.44	1.56	7	5.23	1.77	7	3.29	3.71
8	7.71	0.29	8	6.53	1.47	8	6.38	1.62	8	5.95	2.05	8	3.37	4.63
9	8.55	0.45	9	7.42	1.58	9	7.32	1.68	9	6.55	2.45	9	3.29	5.72
10	9.26	0.74	10	8.29	1.71	10	8.29	1.71	10	7.06	2.94	10	3.10	6.90
11	9.90	1.10	11	9.13	1.87	11	9.28	1.72	11	7.51	3.49	11	3.05	7.95
12	10.49	1.51	12	9.90	2.10	12	10.26	1.74	12	7.90	4.10	12	3.63	8.37
13	11.06	1.94	13	10.66	2.35	13	11.20	1.80	13	8.19	4.81	13	4.62	8.38
14	11.60	2.40	14	11.44	2.56	14	12.10	1.90	14	8.39	5.61	14	5.68	8.32
15	12.11	2.89	15	12.21	2.79	15	13.00	2.00	15	8.52	6.48	15	6.78	8.22
16	12.62	3.38	16	12.96	3.04	16	13.90	2.10	16	8.61	7.39	16	7.89	8.11
17	13.12	3.88	17	13.69	3.31	17	14.74	2.26	17	9.25	7.75	17	9.04	7.96
18	13.61	4.39	18	14.41	3.59	18	15.32	2.68	18	10.46	7.54	18	10.20	7.81
19	14.08	4.92	19	15.08	3.92	19	15.54	3.46	19	11.71	7.29	19	11.39	7.61
20	14.42	5.58	20	15.68	4.32	20	15.47	4.54	20	12.94	7.06	20	12.58	7.42
25	17.89	7.11	25	16.35	8.65	25	17.40	7.60	25	18.10	6.90	25	17.57	7.43
26	18.30	7.70	26	16.83	9.17	26	18.38	7.62	26	19.37	6.63	26	18.75	7.25
27	18.72	8.28	27	17.32	9.68	27	19.44	7.56	27	20.58	6.42	27	19.92	7.08
28	19.17	8.83	28	17.94	10.06	28	20.57	7.43	28	21.75	6.25	28	21.07	6.93
29	19.65	9.35	29	18.65	10.35	29	21.69	7.31	29	22.95	6.05	29	22.20	6.80
30	20.15	9.85	30	19.45	10.55	30	22.82	7.18	30	23.20	6.80	30	23.27	6.73
31	21.18	9.82	31	20.51	10.49	31	24.02	6.98	31	25.10	5.90	31	24.40	6.60
32	22.20	9.80	32	21.53	10.47	32	25.10	6.90	32	26.08	5.92	32	25.44	6.56
33	23.32	9.68	33	22.55	10.45	33	26.18	6.82	33	27.14	5.86	33	26.48	6.52
34	24.12	9.88	34	23.75	10.25	34	27.39	6.61	34	28.43	5.57	34	27.50	6.50
35	25.38	9.62	35	24.98	10.02	35	28.52	6.48	35	29.55	5.45	35	28.42	6.58
36	26.40	9.60	36	26.24	9.76	36	29.69	6.31	36	30.20	5.80	36	29.33	6.67
DO NOT EXCEED														
														1Watt
														1.25Watts
														1.6Watts
														2Watts
														2.5Watts
														3Watts
														4Watts



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

High Power Test -40°C

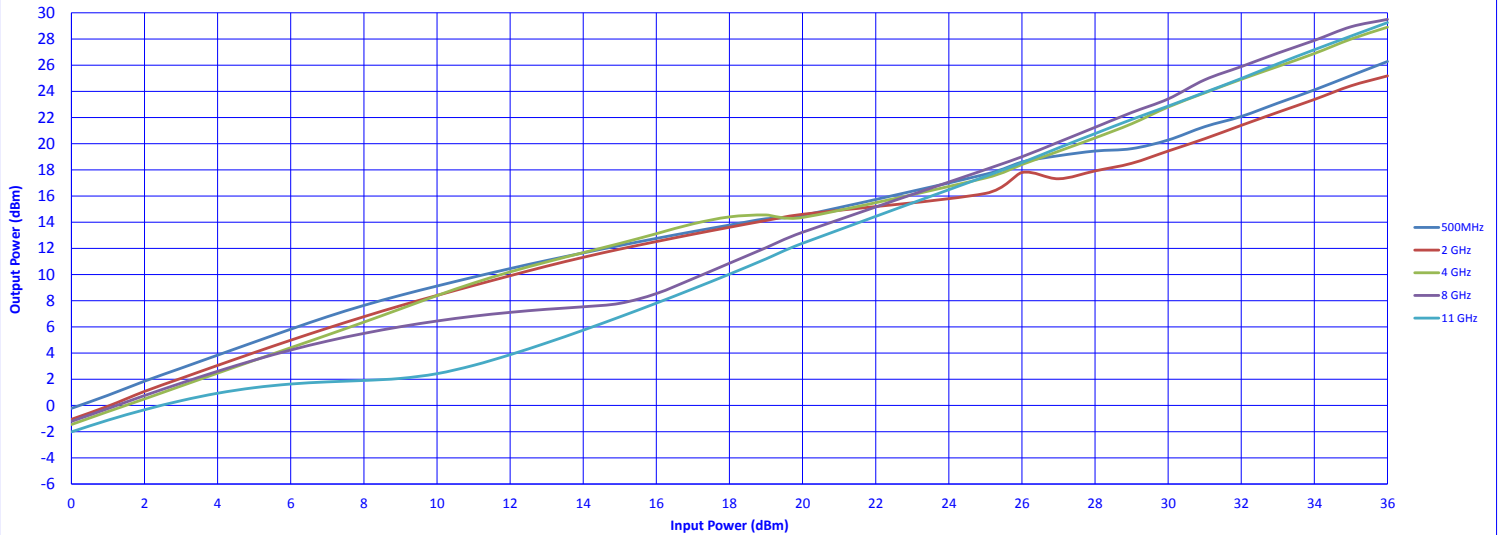


High Power Test														
500MHz			2 GHz			4 GHz			8 GHz			11 GHz		
Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss
0	-0.31	0.31	0	-1.00	1.00	0	-1.44	1.44	0	-1.21	1.21	0	-1.44	1.44
1	0.69	0.31	1	0.01	0.99	1	-0.44	1.44	1	-0.22	1.22	1	-0.42	1.42
2	1.78	0.22	2	1.14	0.86	2	0.53	1.47	2	0.81	1.19	2	0.58	1.42
3	2.77	0.23	3	2.15	0.85	3	1.53	1.47	3	1.81	1.19	3	1.56	1.44
4	3.77	0.23	4	3.16	0.84	4	2.52	1.48	4	2.80	1.20	4	2.52	1.48
5	4.77	0.23	5	4.17	0.83	5	3.52	1.48	5	3.79	1.21	5	3.41	1.60
6	5.77	0.23	6	5.17	0.83	6	4.51	1.49	6	4.78	1.22	6	4.16	1.84
7	6.77	0.23	7	6.17	0.83	7	5.50	1.50	7	5.74	1.26	7	4.68	2.32
8	7.76	0.24	8	7.15	0.85	8	6.49	1.51	8	6.60	1.40	8	4.81	3.19
9	8.67	0.33	9	8.07	0.93	9	7.45	1.55	9	7.29	1.71	9	4.59	4.41
10	9.42	0.58	10	8.93	1.07	10	8.37	1.63	10	7.74	2.26	10	4.16	5.84
11	10.10	0.90	11	9.72	1.28	11	9.32	1.68	11	8.08	2.92	11	3.64	7.36
12	10.74	1.27	12	10.47	1.53	12	10.38	1.62	12	8.39	3.61	12	3.39	8.61
13	11.35	1.66	13	11.15	1.85	13	11.46	1.54	13	8.60	4.40	13	4.08	8.92
14	11.91	2.09	14	11.86	2.15	14	12.32	1.68	14	8.68	5.32	14	5.08	8.92
15	12.46	2.54	15	12.56	2.44	15	13.00	2.00	15	8.62	6.38	15	6.14	8.86
16	12.97	3.03	16	13.19	2.81	16	13.62	2.38	16	8.50	7.50	16	7.24	8.76
17	13.48	3.52	17	13.76	3.24	17	14.27	2.73	17	8.82	8.18	17	8.37	8.63
18	13.97	4.03	18	14.28	3.72	18	15.02	2.98	18	10.12	7.88	18	9.53	8.47
19	14.44	4.56	19	14.78	4.22	19	15.90	3.10	19	11.46	7.54	19	10.73	8.27
20	14.69	5.31	20	15.29	4.71	20	16.40	3.60	20	12.74	7.26	20	11.98	8.02
25	17.62	7.38	25	16.30	8.70	25	17.32	7.68	25	17.95	7.05	25	17.40	7.60
26	18.44	7.56	26	16.77	9.23	26	18.30	7.70	26	18.95	7.05	26	18.62	7.38
27	18.99	8.01	27	17.28	9.72	27	19.38	7.62	27	20.08	6.92	27	19.75	7.25
28	19.20	8.80	28	17.88	10.12	28	20.42	7.58	28	21.20	6.80	28	20.80	7.20
29	19.50	9.50	29	18.62	10.38	29	21.65	7.35	29	22.40	6.60	29	21.98	7.02
30	20.20	9.80	30	19.38	10.62	30	22.77	7.23	30	23.62	6.38	30	22.92	7.08
31	21.20	9.80	31	20.41	10.59	31	23.92	7.08	31	24.82	6.18	31	23.90	7.10
32	22.15	9.85	32	21.44	10.56	32	24.90	7.10	32	25.90	6.10	32	25.10	6.90
33	23.25	9.75	33	22.50	10.50	33	25.95	7.05	33	26.88	6.12	33	26.20	6.80
34	24.20	9.80	34	23.62	10.38	34	26.99	7.01	34	27.90	6.10	34	27.40	6.60
35	25.23	9.77	35	24.68	10.32	35	28.05	6.95	35	28.98	6.02	35	28.30	6.70
36	26.31	9.69	36	25.14	10.86	36	29.20	6.80	36	29.40	6.60	36	29.28	6.72
DO NOT EXCEED														
														1Watt
														1.25Watts
														1.6Watts
														2Watts
														2.5Watts
														3Watts
														4Watts



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

High Power Test +85°C



High Power Test														
500MHz			2 GHz			4 GHz			8 GHz			11 GHz		
Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss	Pin(dBm)	Pout (dBm)	Loss
0	-0.22	0.22	0	-1.06	1.06	0	-1.45	1.45	0	-1.21	1.21	0	-2.02	2.02
1	0.78	0.22	1	-0.05	1.05	1	-0.47	1.47	1	-0.24	1.24	1	-1.12	2.12
2	1.86	0.14	2	1.07	0.93	2	0.50	1.50	2	0.76	1.24	2	-0.33	2.33
3	2.85	0.15	3	2.07	0.93	3	1.49	1.51	3	1.71	1.29	3	0.37	2.63
4	3.85	0.15	4	3.06	0.94	4	2.47	1.53	4	2.61	1.39	4	0.94	3.06
5	4.84	0.16	5	4.04	0.96	5	3.45	1.55	5	3.46	1.54	5	1.36	3.64
6	5.83	0.17	6	4.99	1.01	6	4.41	1.59	6	4.24	1.76	6	1.64	4.36
7	6.78	0.22	7	5.90	1.10	7	5.38	1.62	7	4.92	2.08	7	1.80	5.20
8	7.64	0.36	8	6.78	1.22	8	6.37	1.63	8	5.51	2.49	8	1.91	6.09
9	8.42	0.58	9	7.62	1.38	9	7.38	1.62	9	6.02	2.98	9	2.07	6.93
10	9.13	0.87	10	8.41	1.59	10	8.40	1.60	10	6.45	3.55	10	2.43	7.57
11	9.81	1.19	11	9.17	1.83	11	9.35	1.65	11	6.82	4.18	11	3.07	7.93
12	10.46	1.54	12	9.91	2.09	12	10.20	1.80	12	7.11	4.89	12	3.88	8.12
13	11.08	1.93	13	10.64	2.36	13	10.96	2.04	13	7.35	5.65	13	4.78	8.22
14	11.66	2.34	14	11.32	2.68	14	11.68	2.32	14	7.54	6.46	14	5.75	8.25
15	12.22	2.78	15	11.94	3.06	15	12.38	2.62	15	7.80	7.20	15	6.77	8.23
16	12.76	3.24	16	12.52	3.48	16	13.12	2.88	16	8.55	7.45	16	7.82	8.18
17	13.29	3.72	17	13.08	3.92	17	13.88	3.13	17	9.68	7.32	17	8.91	8.09
18	13.78	4.22	18	13.61	4.39	18	14.41	3.59	18	10.87	7.13	18	10.03	7.97
19	14.27	4.73	19	14.13	4.87	19	14.56	4.45	19	12.05	6.95	19	11.20	7.80
20	14.52	5.48	20	14.61	5.39	20	14.36	5.64	20	13.24	6.76	20	12.40	7.61
25	17.66	7.34	25	16.20	8.80	25	17.38	7.62	25	18.02	6.98	25	17.50	7.50
26	18.60	7.40	26	17.80	8.20	26	18.41	7.59	26	19.00	7.00	26	18.55	7.45
27	19.08	7.92	27	17.32	9.68	27	19.42	7.58	27	20.12	6.88	27	19.68	7.32
28	19.44	8.56	28	17.92	10.08	28	20.44	7.56	28	21.25	6.75	28	20.77	7.23
29	19.62	9.38	29	18.50	10.50	29	21.52	7.48	29	22.38	6.62	29	21.85	7.15
30	20.28	9.72	30	19.44	10.56	30	22.80	7.20	30	23.42	6.58	30	22.87	7.13
31	21.30	9.70	31	20.38	10.62	31	23.88	7.12	31	24.88	6.12	31	23.92	7.08
32	22.08	9.92	32	21.40	10.60	32	24.92	7.08	32	25.89	6.11	32	24.98	7.02
33	23.10	9.90	33	22.40	10.60	33	25.90	7.10	33	26.92	6.08	33	26.11	6.89
34	24.11	9.89	34	23.38	10.62	34	26.89	7.11	34	27.89	6.11	34	27.18	6.82
35	25.20	9.80	35	24.42	10.58	35	27.99	7.01	35	28.93	6.07	35	28.22	6.78
36	26.28	9.72	36	25.18	10.82	36	28.90	7.10	36	29.50	6.50	36	29.25	6.75
DO NOT EXCEED														
1Watt														
1.25Watts														
1.6Watts														
2Watts														
2.5Watts														
3Watts														
4Watts														



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

Frequency 8GHz, Input Power +20dBm (0.1 Watt)
Input Pulse (Pw 1 μ s, Duty Cycle 0.1%, Pulse Rate 1KHz)
Rise Time Measured Value = 6 ns



Frequency 8GHz, Input Power +20dBm (0.1 Watt)
Input Pulse (Pw 1 μ s, Duty Cycle 0.1%, Pulse Rate 1KHz)
Recovery (11 ns), Fall Time (4.19ns)

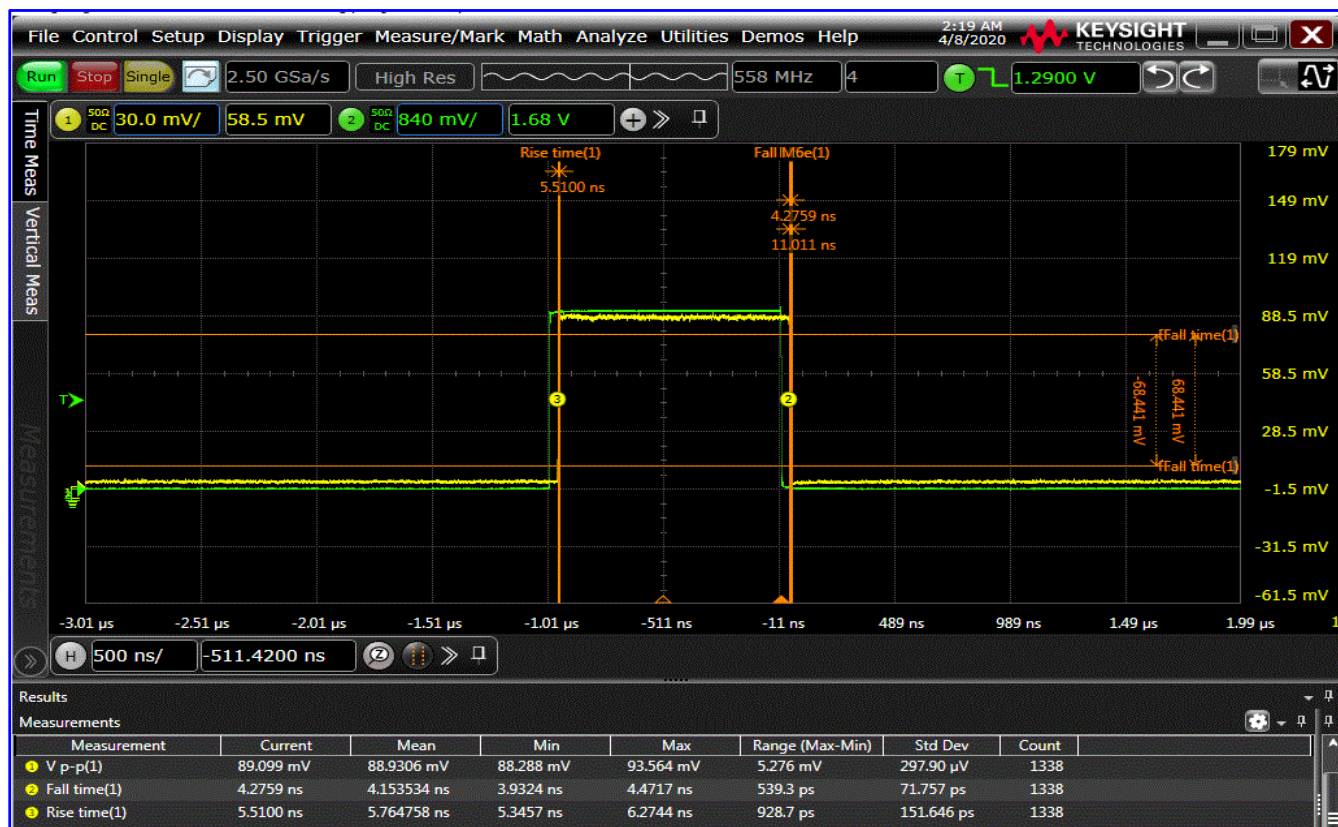


Green Signal = Video Output (Internal Signal Gen)
Yellow Signal = Video Output (Crystal Detector)



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

Frequency 8GHz, Input Power +20dBm (0.1 Watt)
Full Pulse (Pw 1μs, Duty Cycle 0.1%, Pulse Rate 1KHz)



Green Signal = Video Output (Internal Signal Gen)
Yellow Signal = Video Output (Crystal Detector)



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

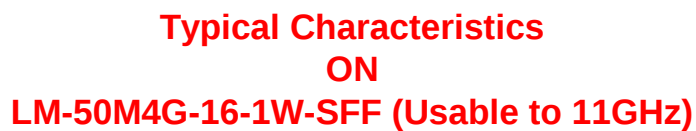
Frequency 8GHz, Input Power +30dBm (1 Watt)
Input Pulse (Pw 1 μ s, Duty Cycle 0.1%, Pulse Rate 1KHz)
Rise Time Measured Value = (5.73ns)



Frequency 8GHz, Input Power +30dBm (1 Watt)
Input Pulse (Pw 1 μ s, Duty Cycle 0.1%, Pulse Rate 1KHz)
Recovery (10.88 ns), Fall Time (4.08 ns)



Green Signal = Video Output (Internal Signal Gen)
Yellow Signal = Video Output (Crystal Detector)



File Control Setup Display Trigger Measure/Mark Math Analyze Utilities Demos Help 2:21 AM 4/8/2020 KEYSIGHT TECHNOLOGIES

Run Stop Single 2.50 GSa/s High Res 558 MHz 4 1.2900 V

Time Meas Vertical Meas

120 mV/ 230 mV 840 mV/ 1.68 V

Rise time(1) 5.6304 ns

Fall time(1) 3.8644 ns

Fall time(1) 11.011 ns

350 mV

230 mV

110 mV

-130 mV

-250 mV

-3.01 μs -2.51 μs -2.01 μs -1.51 μs -1.01 μs -511 ns -11 ns 489 ns 989 ns 1.49 μs 1.99 μs

500 ns/ -511.4200 ns

Results

Measurements

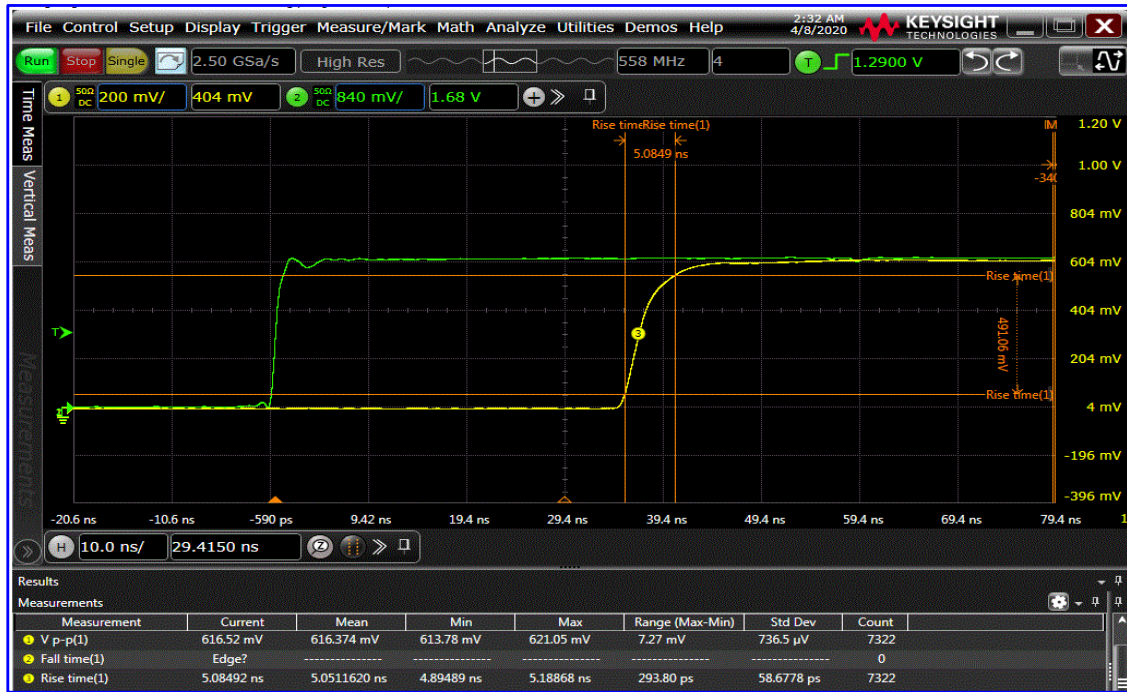
Measurement	Current	Mean	Min	Max	Range (Max-Min)	Std Dev	Count
V p-p(1)	364.89 mV	364.845 mV	363.38 mV	370.67 mV	7.29 mV	510.6 μV	3544
Fall time(1)	3.8644 ns	3.860490 ns	3.7623 ns	3.9918 ns	229.5 ps	30.661 ps	3544
Rise time(1)	5.6304 ns	5.588403 ns	5.4783 ns	5.7365 ns	258.3 ps	37.722 ps	3544

Green Signal = Video Output (Internal Signal Gen)
Yellow Signal = Video Output (Crystal Detector)



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

Frequency 8GHz, Input Power +45dBm (32 Watts)
Input Pulse (Pw 1 μ s, Duty Cycle 0.1%, Pulse Rate 1KHz)
Rise Time Measured Value = (5.08 ns)



Frequency 8GHz, Input Power +45dBm (32 Watts)
Input Pulse (Pw 1 μ s, Duty Cycle 0.1%, Pulse Rate 1KHz)
Recovery (8.33ns), Fall Time (3.69ns)



Green Signal = Video Output (Internal Signal Gen)
Yellow Signal = Video Output (Crystal Detector)



Typical Characteristics ON LM-50M4G-16-1W-SFF (Usable to 11GHz)

Frequency 8GHz, Input Power +45dBm (32 Watts)
Full Pulse (Pw 1μs, Duty Cycle 0.1%, Pulse Rate 1KHz)



Green Signal = Video Output (Internal Signal Gen)
Yellow Signal = Video Output (Crystal Detector)