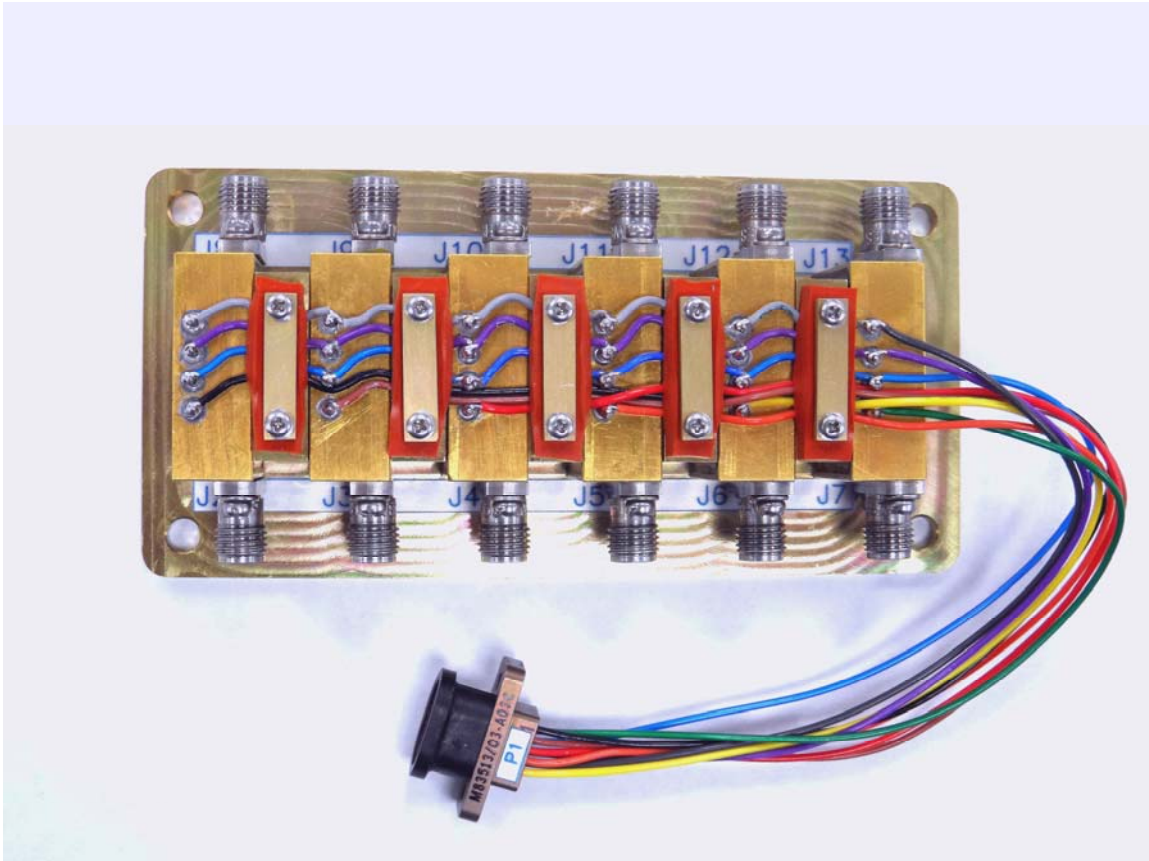




**TYPICAL CHARACTERISTICS
ON
SAA-218-093-013542 Opt. HERM**

PMI MODEL SAA-218-6-093-013542 OPT. HERM IS A SWITCHABLE RF ATTENUATOR FOR SIX SIGNAL PATHS OPERATING FROM 2 TO 18 GHz. DESIGNED TO BE SWITCHED BETWEEN A LOW LOSS STATE (2 dB LOSS TYPICAL) AND HIGH LOSS STATE (20 dB LOSS TYPICAL). THE SETTINGS ARE SELECTED BY SIX DIGITAL CONTROL BITS.



September 1, 2015

**Designed By:
PMI Engineering**

**Tested & Reported By:
Kevin Mansfield**

Page 1 of 12

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**TYPICAL CHARACTERISTICS
ON
SAA-218-093-013542 Opt. HERM**

Table of Contents

Product Feature-----Page 3-5

Typical Specifications -----Page 6-7

Low Loss-----Page 8

High Loss-----Page 8

Output 1 dB Compression-----Page 9

Isolation-----Page 9

Stability-----Page 10

Video Spike Leakage-----Page 10

Spectral Activity-----Page 11

Switching Speed-----Page 12



TYPICAL CHARACTERISTICS ON SAA-218-093-013542 Opt. HERM

DESCRIPTION

PMI MODEL SAA-218-6-093-013542 OPT. HERM IS A SWITCHABLE RF ATTENUATOR FOR SIX SIGNAL PATHS OPERATING FROM 2 TO 18 GHz. DESIGNED TO BE SWITCHED BETWEEN A LOW LOSS STATE (2 dB LOSS TYPICAL) AND A HIGH LOSS STATE (20 dB LOSS TYPICAL). THE SETTINGS WILL BE SELECTED BY SIX DIGITAL CONTROL BITS.

SPECIFICATIONS

- FREQUENCY RANGE: 2 TO 18 GHz
- LOGIC HIGH VOLTAGE, VH: 2.0 V MINIMUM, 3.5 V MAXIMUM
- LOGIC LOW VOLTAGE, VL: 0 V MINIMUM, 0.8 V MAXIMUM
- CURRENT AT VH: 0 mA MINIMUM, 24 mA MAXIMUM
- CURRENT AT VL: 0 mA MINIMUM, 24 mA MAXIMUM
- LOAD CAPACITANCE: 0 pF MINIMUM, 35 pF MAXIMUM
- RISE TIME: 1.0 ns MINIMUM, 2.0 ns TYPICAL, 10.0 ns MAXIMUM
- FALL TIME: 1.0 ns MINIMUM, 2.0 ns TYPICAL, 10.0 ns MAXIMUM
- RESPONSE TIME: 100 ns MAXIMUM (50% VOLTAGE OF INPUT LOGIC SIGNAL TO 1 dB OF FINAL VALUE OF RF ATTENUATION)
- REPETITION RATE: SUPPORT SWITCHING FROM DC TO 500 kHz
- INSERTION LOSS: "1" = 2 dB INSERTION LOSS
"0" = 20 dB INSERTION LOSS
- TOLERANCE AND FLATNESS: LOW LOSS: +1 dB, -2 dB (IL OF 1 dB TO 4 dB)
HIGH LOSS: +2 dB, -2 dB (IL OF 18 dB TO 22 dB)
- VSWR: 2.0:1 MAXIMUM
- OUTPUT 1 dB COMPRESSION: 18 dBm
- ISOLATION: 50 dB MINIMUM, BETWEEN ANY OF THE SIX OUTPUTS WITH ANY SWITCH SETTING
- STABILITY: < -70 dBm SPIRIOUS OUTPUT SIGNAL*
- VIDEO SPIKE LEAKAGE: < 500 mV PEAK TO PEAK (MEASURED WITH A MINIMUM BANDWIDTH OF 200 MHz)
- SPECTRAL ACTIVITY: -70 dBm MAXIMUM @ 500 kHz SWITCHING RATE
- DC VOLTAGE: -5 ± 0.1 VDC @ 0.30 A MAXIMUM
+5 ± 0.1 VDC @ 0.30 A MAXIMUM
- AC RIPPLE: 120 mV PEAK TO PEAK MAXIMUM**
- CONNECTORS
 - INPUT - OUTPUT: SMA (F) REMOVABLE
 - CONTROL & POWER: 9 PIN MICRO D PLUG (M83513-03A03C)
- SIZE: 1.859" (MAX) X 4.000" (MAX) X 0.810" (MAX)
- WEIGHT: 1.0 LBS MAXIMUM
- FINISH: PLATE & WIRE BAR - CHEMICAL FILM ;
YELLOW COLOR CLASS 3 PER MIL-C-5541
ATTENUATORS - GOLD PLATED AND
HERMETICALLY SEALED

- * SHOULD BE UNCONDITIONALLY STABLE PER THE FOLLOWING CONDITIONS: A, B, C
- A. WITH ANY INPUT OR OUTPUT PORT TERMINATED IN ANY PASSIVE SOURCE OR LOAD IMPEDANCE
- B. WITH INPUT POWER LEVELS RANGING FROM NO INPUT TO THE MAXIMUM THAT IS SPECIFIED ON TABLE 1
- C. WITH ANY OPERATING TEMPERATURE SPECIFIED IN TABLE 1
- ** AC RIPPLE FREQUENCY IS 600 kHz TYPICAL

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

ENVIRONMENTAL RATINGS:

TABLE 1: ABSOLUTE MAXIMUM RATINGS

PARAMETER	ZONE	SPECIFICATION
CONTINUOUS OPERATING TEMPERATURE	B	-40 °C TO 71.1 °C - CONTINUOUS N/A - MTBF
	C	-40 °C TO 71.1 °C - CONTINUOUS N/A - MTBF
TRANSIENT TEMPERATURE	B	-53.9 °C TO 48.9 °C
	C	TBD
STORAGE TEMPERATURE	ALL	-53.9 °C TO 95 °C
SURROUNDING AIR PRESSURE UNPRESSURIZED AREAS, EQUIPMENT BAYS	ALL	0.44 PSIA TO 15.5 PSIA AT 0.6 PSI/SEC
NON-GUNFIRING VIBRATION ENVIRONMENT	ALL	FIGURE 1, VIBRATION VALUES (SEE PAGE 2)
GUNFIRING VIBRATION ENVIRONMENT	ALL	FIGURE 2, GUNFIRING VIBRATION VALUES (SEE PAGE 2)
CONTINUOUS RF INPUT POWER (1)	N/A	24 dBm (MAXIMUM)
+5 VOLT POWER SUPPLY	N/A	±6 V (MAXIMUM)
-5 VOLT POWER SUPPLY	N/A	±6 V (MINIMUM)

NOTE 1: IN THE FREQUENCY BAND OF 2 TO 18 GHz

TABLE 3: RF INPUT AND OUTPUT CONNECTORS

CONNECTOR	SIGNAL NAME	SPECIFICATION
J2	ATTEN LF A INPUT	OUTPUT CONTROL
J8	ATTEN LF A OUTPUT	LEFT FORWARD TRANSMITTER A
J3	ATTEN LF B INPUT	OUTPUT CONTROL
J9	ATTEN LF B OUTPUT	LEFT FORWARD TRANSMITTER B
J4	ATTEN RF A INPUT	OUTPUT CONTROL
J10	ATTEN RF A OUTPUT	RIGHT FORWARD TRANSMITTER A
J5	ATTEN RF B INPUT	OUTPUT CONTROL
J11	ATTEN RF B OUTPUT	RIGHT FORWARD TRANSMITTER B
J6	ATTEN AFT A INPUT	OUTPUT CONTROL
J12	ATTEN AFT A OUTPUT	AFT TRANSMITTER A
J7	ATTEN AFT B INPUT	OUTPUT CONTROL
J13	ATTEN AFT B OUTPUT	AFT TRANSMITTER B

REV	NO.	DESCRIPTION	DATE	APPROVED
1		ORIGINAL RELEASE	03/05/15	

TABLE 2: P1 CONNECTOR

PIN NO.	SIGNAL NAME	SPECIFICATION
1	ATTEN LF A	ATTENUATION CONTROL BIT LF A
2	ATTEN LF B	ATTENUATION CONTROL BIT LF B
3	ATTEN RF A	ATTENUATION CONTROL BIT RF A
4	ATTEN RF B	ATTENUATION CONTROL BIT RF B
5	ATTEN AFT A	ATTENUATION CONTROL BIT AFT A
6	ATTEN AFT B	ATTENUATION CONTROL BIT AFT B
7	-5 VDC	DC POWER
8	GROUND	GROUND
9	+5 VDC	DC POWER

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ISO 9001 CERTIFIED



APPROVALS	DATE	TITLE
DR	04/24/15	PRODUCT FEATURE
SAA-218-6-093-13542 OPT. HERM		
DRAWN	REV NO.	REV.
DR	B 05XQ0	27013482
SCALE	N-S	SHEET 1 OF 3

ALL DIMENSIONS ARE IN INCHES
TOLERANCES:
XXX .010
XXX .010



TYPICAL CHARACTERISTICS ON SAA-218-093-013542 Opt. HERM

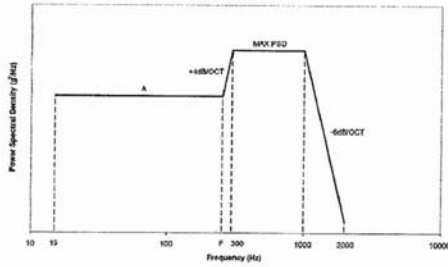
DESCRIPTION

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REV	DESCRIPTION	DATE	APPROVED
1	ORIGINAL RELEASE	03/25/13	

NON-GUNFIRING VIBRATION ENVIRONMENT

Figure 1: Minimal Integrity Test – General
MIL-STD-810, 814.4-39, Modified

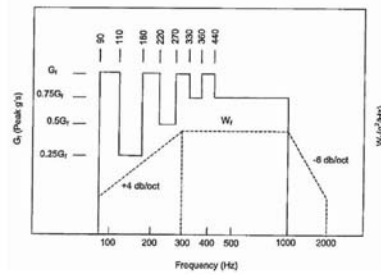


Vibration Values

Zone	Performance			Endurance		
	A	MAX PSD	F (REF)	A	MAX PSD	F (REF)
A	0.020	0.025	253.8	0.020	0.033	206.1
B	0.020	0.040	178.4	0.020	0.053	144.4
C	0.040	0.070	197.2	0.040	0.093	159.3
E	0.040	0.280	69.7	0.040	0.370	56.6
F	0.040	0.140	117.2	0.040	0.186	94.7

GUNFIRING VIBRATION ENVIRONMENT

Figure 2: Gunfiring Vibration Environment



Gunfiring Vibration Values

	Gf	Wf PSD
A	2.7	0.012
B	8.4	0.036
C	3.3	0.014
E	SEE 3.2.12	
F	N/A	N/A

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APPROVAL	DATE	TITLE
DESIGNED	04/23/13	PRODUCT FEATURE
CHECKED		SAA-218-6-093-13542 OPT. HERM
REVISED		

REV	FROM NO.	DATE	BY
B	05X00	27013482	

REV: N5 SHEET: 2 OF 3

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

ALL DIMENSIONS ARE IN INCHES
TOLERANCES:
XXX .0100
X.XX .0175

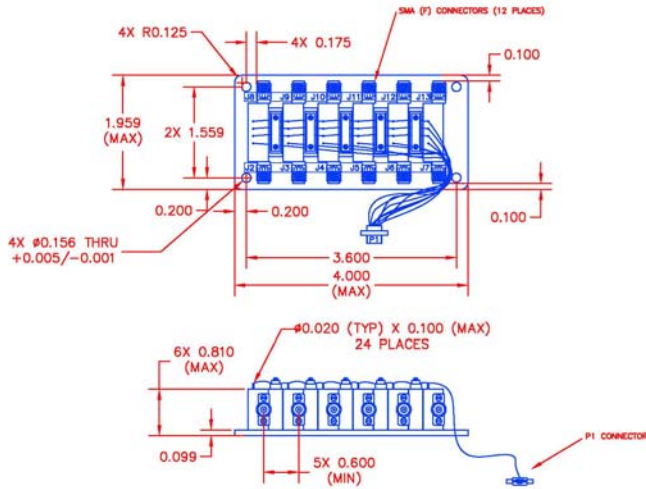


TYPICAL CHARACTERISTICS ON SAA-218-093-013542 Opt. HERM

DESCRIPTION

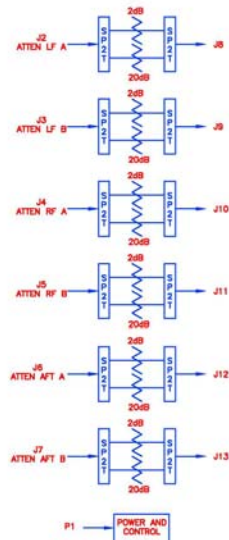
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MECHANICAL OUTLINE



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

BLOCK DIAGRAM



REVISIONS			
REV. NO.	DESCRIPTION	DATE	APPROVED
1	ORIGINAL RELEASE	03/05/05	

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APPROVALS		DATE		TITLE	
DESIGNED	THJ	DATE	03/04/05	PRODUCT FEATURE	
				SAA-218-6-093-13542 OPT. HERM	
SCALE	N-S	SIZE	FROM NO. B	DWG. NO.	27013482
				REV.	1
				SHEET	3 OF 3

ALL DIMENSIONS ARE IN INCHES
TOLERANCES
XXX .0000
XXX .0010



**TYPICAL CHARACTERISTICS
ON
SAA-218-093-013542 Opt. HERM**

TEST. ITEM NO	PARAMETERS	SPECIFIED VALUE	ATT1 (J2 – J8) PL17390	ATT2 (J3 – J9) PL17391	ATT3 (J4 – J10) PL17392	ATT4 (J5 – J11) PL17393	ATT5 (J6 – J12) PL17394	ATT6 (J7 – J13) PL17395	QA QC
1	Frequency Range:	2 to 18 GHz	2 to 18 GHz See Plot						
2	Logic High Voltage, VH:	2.0 V Min 3.5 V Max	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	
3	Logic Low Voltage, VL:	0 V Min 0.8 V Max	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	
4	Current at VH:	0 mA Min 24 mA Max	0.21 mA	0.20 mA	0.20 mA	0.21 mA	0.20 mA	0.20 mA	
5	Current at VL:	0 mA Min 24 mA Max	0.06 mA	0.06 mA	0.06 mA	0.06 mA	0.06 mA	0.06 mA	
6	Load Capacitance:	0 pF Min 35 pF Max	< 35 pF	< 35 pF	< 35 pF	< 35 pF	< 35 pF	< 35 pF	
7	Rise Time:	1.0 ns Min 2.0 ns Typ 10.0 ns Max	5.5 ns See Plot	7.0 ns See Plot	7.5 ns See Plot	7.5 ns See Plot	6.5 ns See Plot	7.0 ns See Plot	
8	Fall Time:	1.0 ns Min 2.0 ns Typ 10.0 ns Max	4.5 ns See Plot	5.5 ns See Plot	5.0 ns See Plot	4.5 ns See Plot	4.5 ns See Plot	4.5 ns See Plot	
9	Response Time:	100 ns Max (50% Voltage of input logic signal to 1 dB of final value of RF Attenuation)	31 ns See Plot	27.5 ns See Plot	26.5 ns See Plot	27 ns See Plot	28 ns See Plot	33 ns See Plot	
10	Repetition Rate:	Support Switching from DC to 500 kHz	500 KHz	500 KHz	500 KHz	500 KHz	500 KHz	500 KHz	
11	Insertion Loss:	"1 = 2 dB Insertion Loss" "0 = 20 dB Insertion Loss"	Pass	Pass	Pass	Pass	Pass	Pass	
12	Tolerance and Flatness:	Low Loss: +1 dB, -2 dB (IL of 1dB to 4dB) High Loss: +2 dB, -2 dB (IL of 18dB to 22dB)	IL -2.5 dB -1.5 dB Flatness ±0.9 dB 20.7 dB Flatness ± 1.0 dB See Plot	IL -2.5 dB -1.6 dB Flatness ±0.9 dB 20.6 dB Flatness ±0.6 dB See Plot	IL -2.5 dB -1.5 dB Flatness ±0.9 dB 19.7 dB Flatness ±0.8 dB See Plot	IL -2.2 dB -1.4 dB Flatness ±0.8 dB 19.9 dB Flatness ±1.0 dB See Plot	IL -2.2 dB -1.4 dB Flatness ±0.8 dB 19.9 dB Flatness ±0.7 dB See Plot	IL -2.2 dB -1.4 dB Flatness ±0.8 dB 20.3 dB Flatness ±0.6 dB See Plot	



**TYPICAL CHARACTERISTICS
ON
SAA-218-093-013542 Opt. HERM**

13	VSWR:	2.0:1 Max	1.9:1 See Plot	1.7:1 See Plot	1.9:1 See Plot	1.9:1 See Plot	1.8:1 See Plot	1.9:1 See Plot	
14	Output 1 dB Compression:	18 dBm	>23 dBm See Plot	>23 dBm See Plot	>23 dBm See Plot	>23 dBm See Plot	>23 dBm See Plot	>23 dBm See Plot	
15	Isolation:	50 dB Min, Between any of the six outputs with any switch setting	-66.7 dB See Plot	-65.2 dB See Plot	-64.2 dB See Plot	-66.0 dB See Plot	-63.3 dB See Plot	-65.8 dB See Plot	
16	Stability:	< -70 dBm Spurious Output Signal *	-71.2 dBm See Plot	-70.7 dBm See Plot	-70.4 dBm See Plot	-70.5 dBm See Plot	-71.1 dBm See Plot	-71.2 dBm See Plot	
17	Video Spike Leakage:	< 500 mV Peak to Peak (Measured with a min bandwidth of 200 MHz)	127 mV See Plot	115 mV See Plot	127 mV See Plot	129 mV See Plot	117 mV See Plot	121 mV See Plot	
18	Spectral Activity:	-70 dBm Max	-75.4 dBm See Plot	-75.7 dBm See Plot	-75.1 dBm See Plot	-75.6 dBm See Plot	-74.7 dBm See Plot	-74.6dBm See Plot	
19	DC Voltage:	+5 VDC @ 0.30 A Max -5 VDC @ 0.30 A Max	+5VDC @ 0.058A -5VDC @ 0.047A	+5VDC @ 0.058A -5VDC @ 0.047A	+5VDC @ 0.058A -5VDC @ 0.047A	+5VDC @ 0.058A -5VDC @ 0.047A	+5VDC @ 0.058A -5VDC @ 0.047A	+5VDC @ 0.058A -5VDC @ 0.047A	

*Should be unconditionally stable per the following conditions: A, B, C

A. With any input or output port terminated in any passive source or load impedance

B. With input power levels ranging from no input to the maximum that is specified on Table 1 (see Outline drawing)

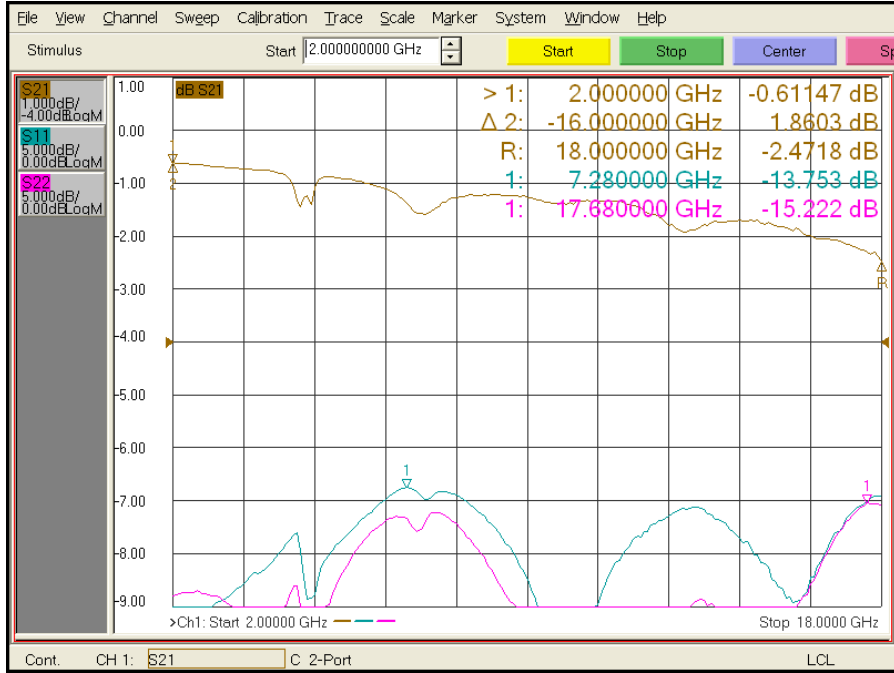
C. With any operating temperature specified in Table 1 (see Outline drawing)

**AC Ripple Frequency is 600 kHz Typical



TYPICAL CHARACTERISTICS ON SAA-218-093-013542 Opt. HERM

Low Loss



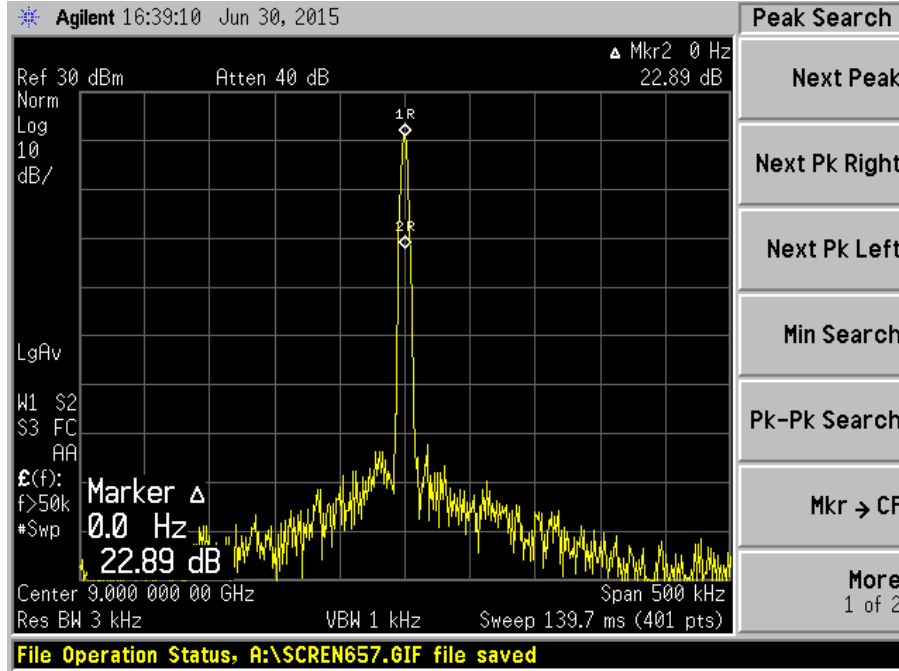
High Loss



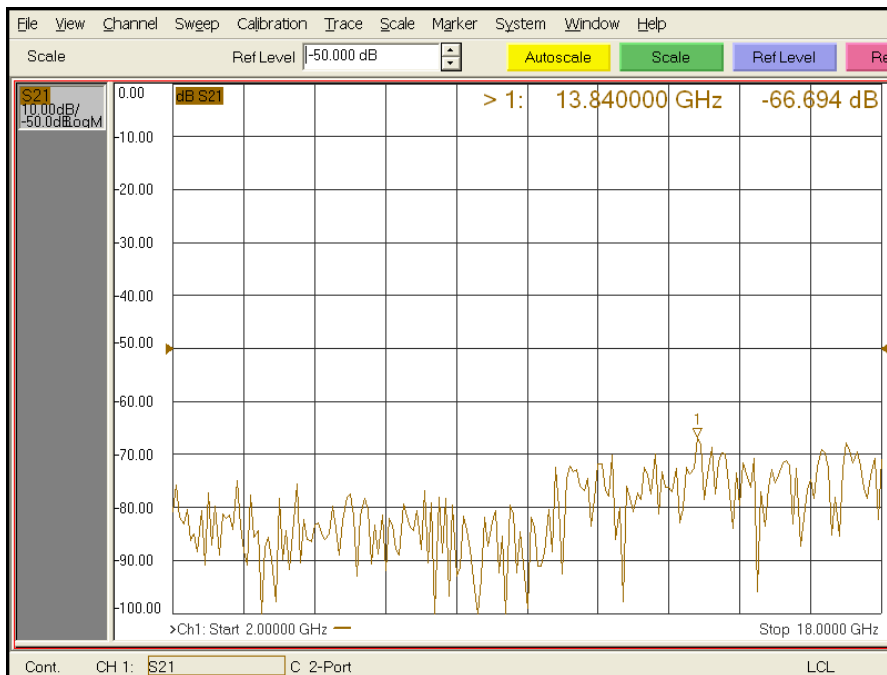


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ON
SAA-218-093-013542 Opt. HERM**

Output 1 dB Compression



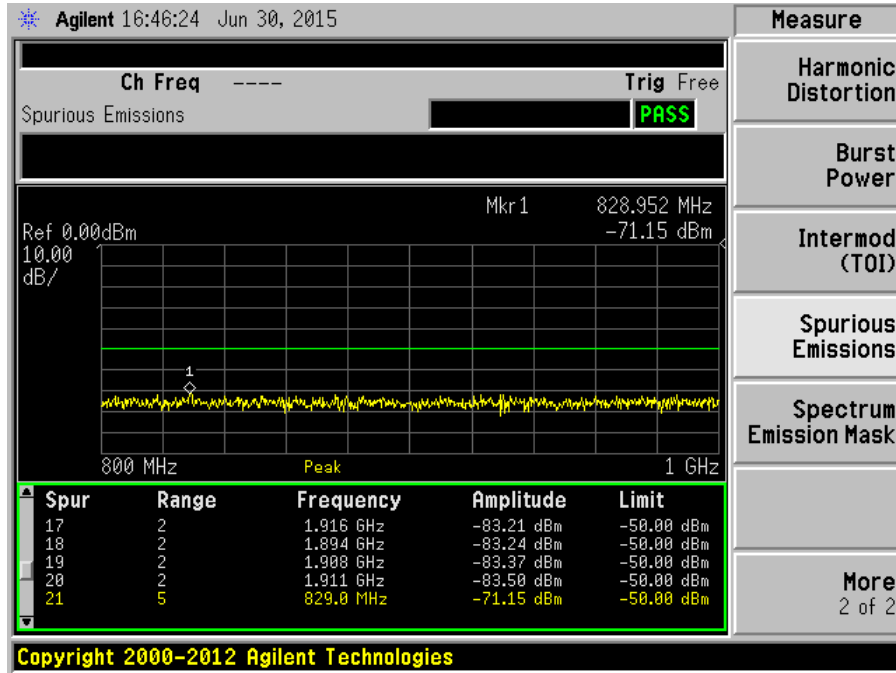
Isolation



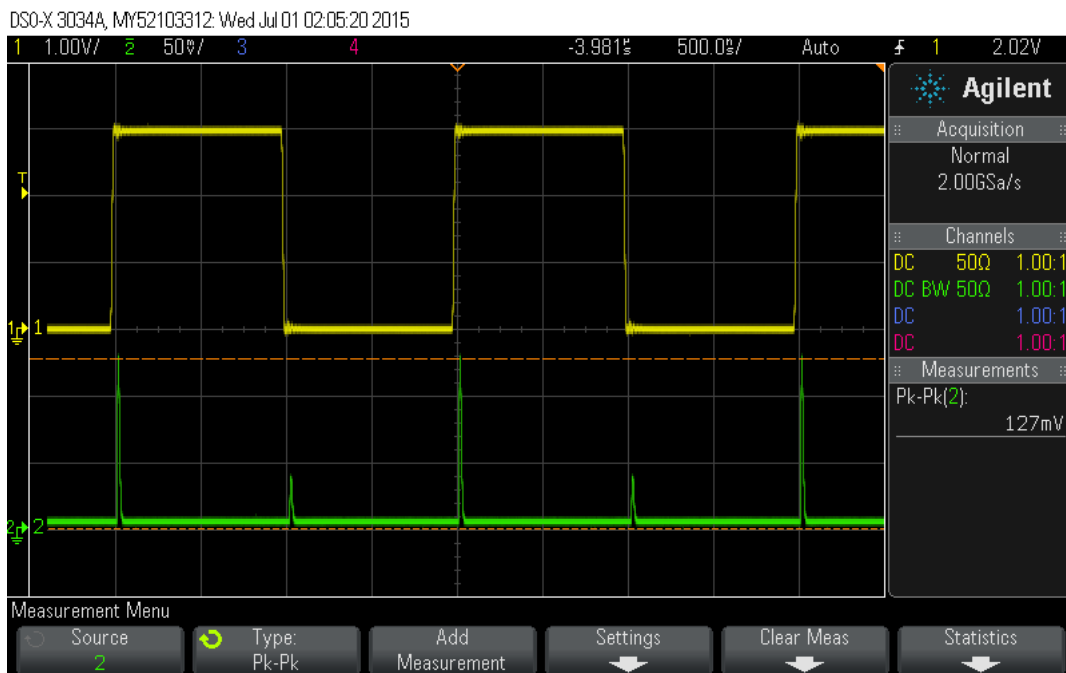


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Stability



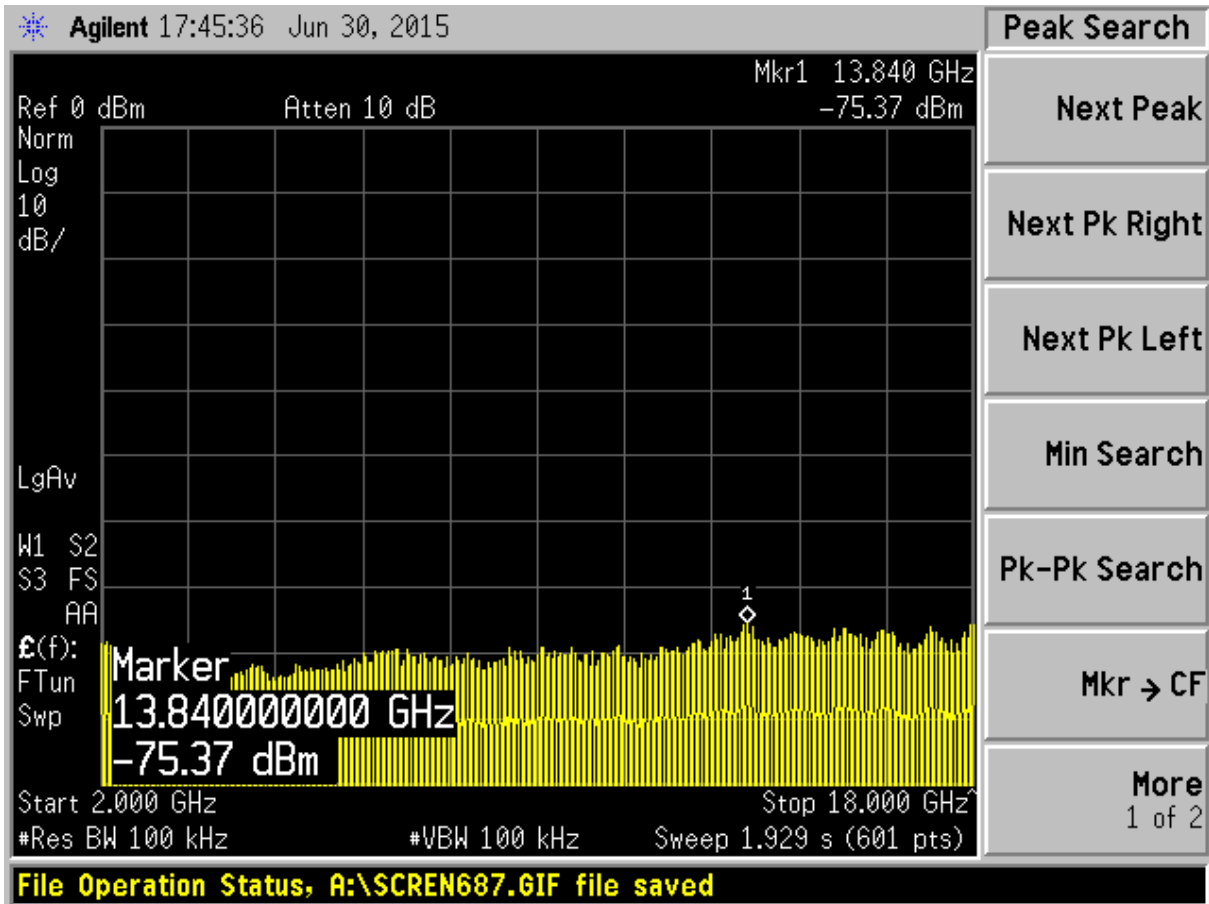
Video Spike Leakage





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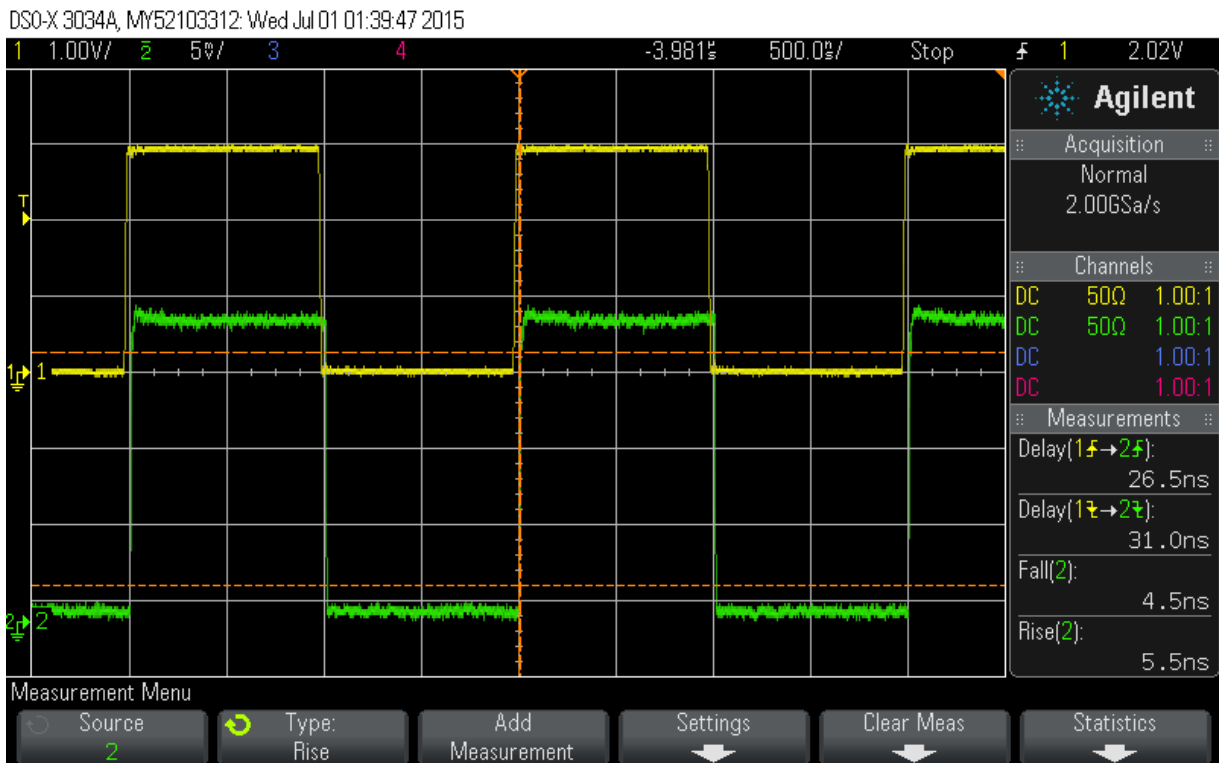
Spectral Activity





**TYPICAL CHARACTERISTICS
ON
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Switching Speed



**Yellow: TTL Signal
Green: RF Signal**