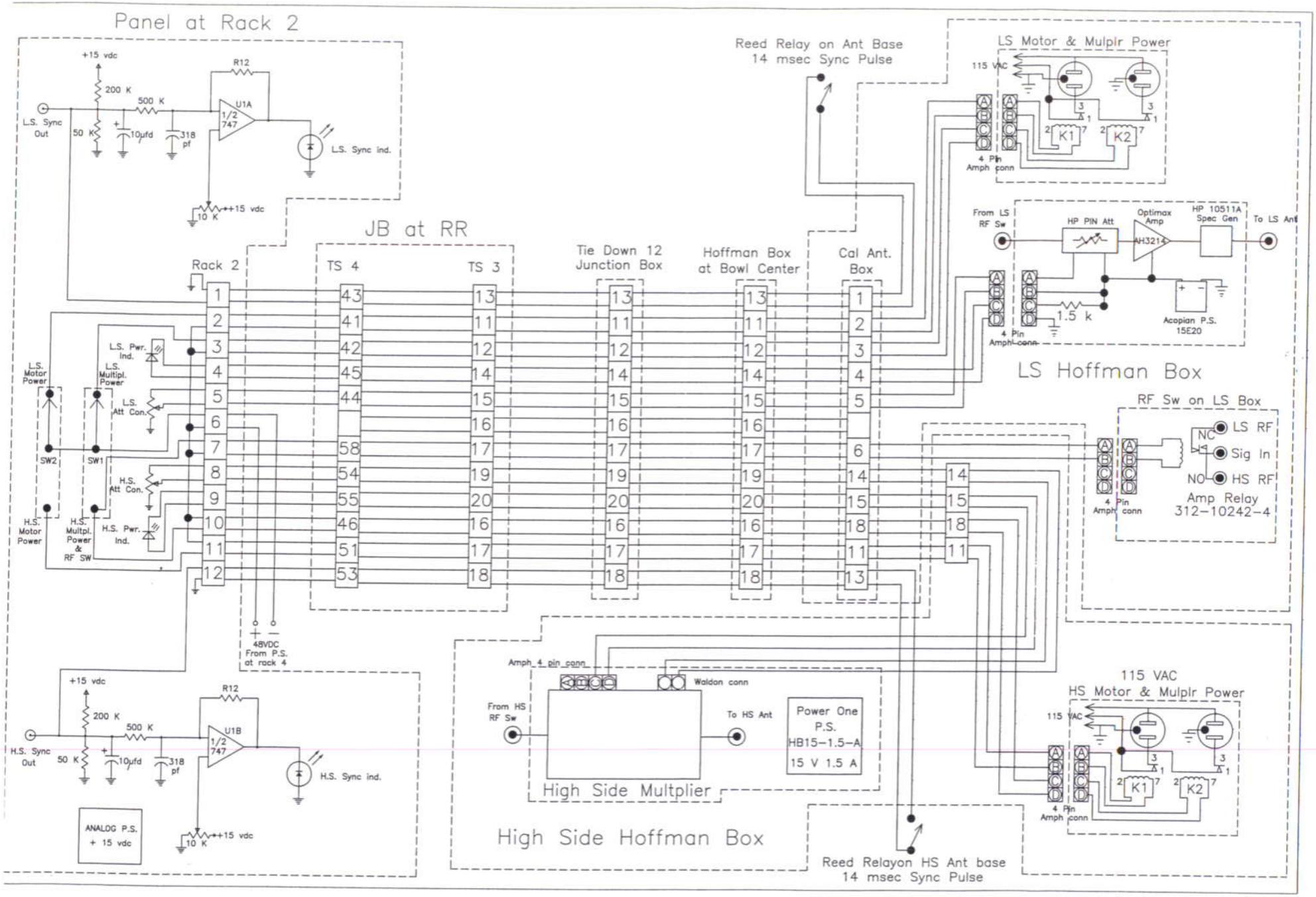
Calibration Dipole
R-359

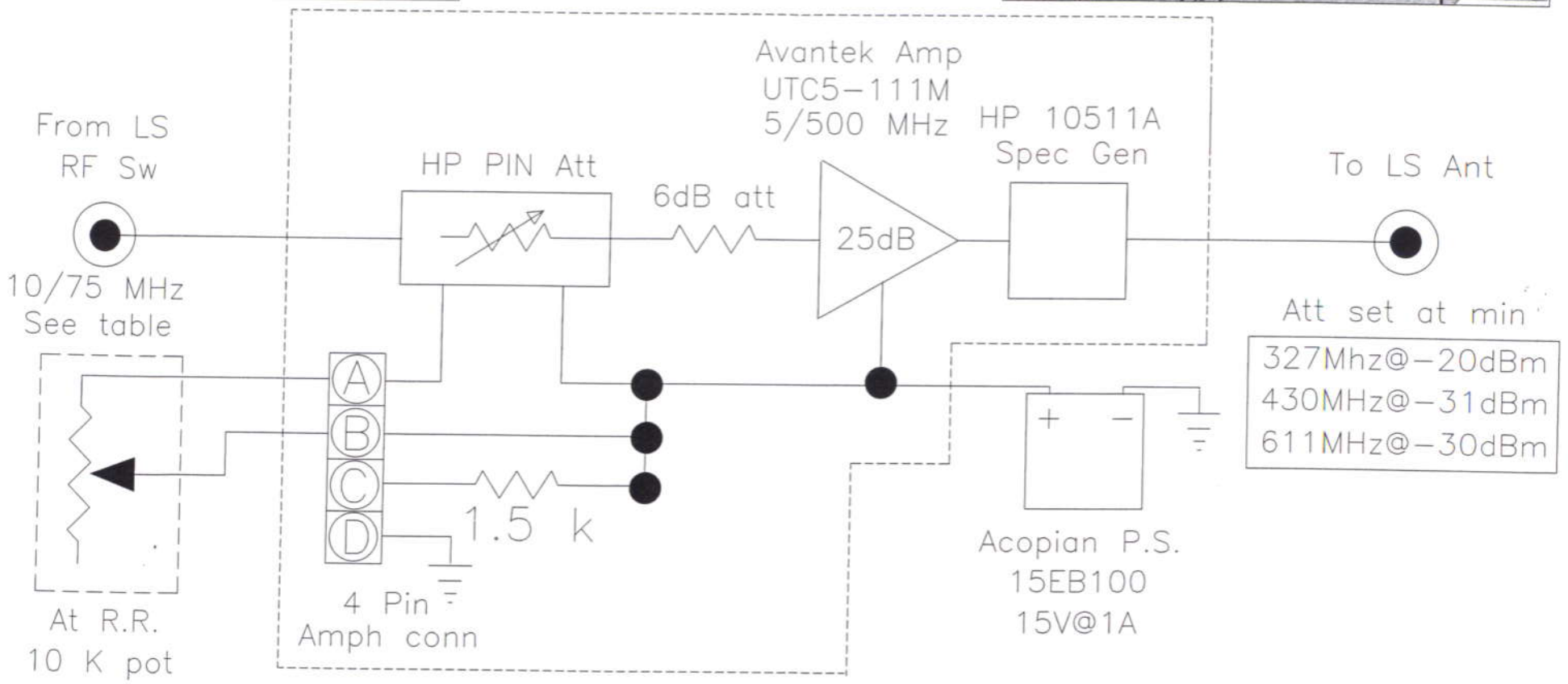
3/9/2007 ans

PR #	Color	Function	
1	Blk/Brwn	Multiplier Power (relay driver) / Low Side	
2	Blk/Red	Antenna Motor Power (relay driver) / Low Side	
3	Blk/Ora	Sync Signal (reed relay) / Low Side	
4	BLk/Yell	Pin Diode Att. Control / Low Side	
5	Blk/Grn	Multiplier Power Power Indicator / Low Side	
6	Blk/Blue	Low / High side RF drive selector	
7	Blk/Wht	Tel 314	
8	Red Brwn	Bad (open)	
9	Red/Ora	Tel 265 (noisy)	
10	Red/Yell	Bad (open)	
11	Red/Grn	Antenna Motor Power (relay driver) / H Side	
12	Grn/Wht	Bad /leaky 3/27/91	
13	Red/Wht	Sync Signal (reed relay) / High Side	
14	Grn/Brwn		
15	Grn/Ora	Multiplier Power Power Indicator / High Side	
16	Grn/Yell	Free	
17	Grn/Blue	Free	
18	Red/Blue	Multiplier Power (relay driver) / High Side	
19	Blue/Wht	Tel 265	
20			
21			
22			
23			
24			
25			


Panel at Rack 2
+15 vdc
R12
200 K
500 K
U1A
1/2
747
LS. Sync
Out
50 K
10μfd
318
pf
LS. Sync ind.
10 K
+15 vdc
JB at RR
Rack 2
TS 4
TS 3
Tie Down 12
Junction Box
Hoffman Box
at Bowl Center
Cal Ant.
Box
Reed Relay on Ant Base
14 msec Sync Pulse
LS Motor & Mulplr Power
115 VAC
K1
K2
4 Pin
Amph conn
From LS
RF Sw
HP PIN Att
Optimax
Amp
AH3214
HP 10511A
Spec Gen
To LS Ant
1.5 k
Acopian P.S.
15E20
LS Hoffman Box
RF Sw on LS Box
LS RF
NC
Sig In
NO
HS RF
Amp Relay
312-10242-4
L.S.
Motor
Power
L.S.
Multipl.
Power
L.S. Pwr.
Ind.
L.S.
Att Con.
SW2
SW1
H.S.
Att Con.
H.S.
Motor
Power
H.S.
Multpl.
Power
&
RF SW
H.S. Pwr.
Ind.
48VDC
From P.S.
at rack 4
Amph 4 pin conn
Waldon conn
From HS
RF Sw
To HS Ant
Power One
P.S.
HB15-1.5-A
15 V 1.5 A
High Side Multplier
115 VAC
HS Motor & Mulplr Power
High Side Hoffman Box
Reed Relayon HS Ant base
14 msec Sync Pulse
H.S. Sync
Out
H.S. Sync ind.
ANALOG P.S.
+ 15 vdc

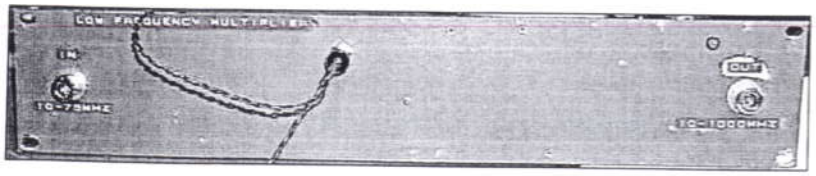
Low Side

327Mhz@(16.5MHz)−1.2dBm
430MHz@(21.5MHz)−4.5dBm
611MHz@(30.55MHz)−6.5dBm



Notes: 1) Level at RR Synth. +13 dBm

Notes: 2) Measurments taken with HP 8591A Spectrum Analyzer



REVISIONS	DATE 2/27/2007	ARECIBO OBSERVATORY CORNELL UNIVERSITY	SCALE
	APPD.		
	BY ans	Low Side Cal Dipole Multiplier	DWN.NO.

SPECTRUM GENERATOR/DOUBLER

Versatile broadband operation

Models 10511A, 10515A

HP 10511A Spectrum Generator

The Hewlett-Packard 10511A Spectrum Generator is a passive device that generates a train of 1 nanosecond wide pulses when driven by a sinusoidal signal source. The 10511A was specifically designed as an accessory to the HP 5100A Frequency Synthesizer. However, it is useful with any 50Ω source that can provide the proper input signal.

With a sine wave input, in the frequency range of 10 MHz to 75 MHz, a spectrum of harmonics is generated. This spectrum contains all harmonics of the input frequency to the 1 GHz region. To extract a desired harmonic, a 50Ω bandpass filter can be cascaded with the 10511A to give a sinusoidal output. The HP 230A Power Amplifier (tuned) may be used for higher level outputs for harmonics up to 500 Hz.

Operation of the 10511A with the 5100A without a bandpass filter on the output produces a pulse train whose repetition rate is precisely controlled. The 10511A, with a tuned filter, produces precise CW frequencies between 50 MHz and 500 MHz.

Specifications 10511A

Input requirements

Frequency range: 25 to 50 MHz.*

Drive level: 1 to 3 volts RMS available to 50Ω.

Output

Pulse width: 1 nanosecond, ± 15% at mid-amplitude.

Pulse height: 0.75 volt minimum for minimum drive level.

Impedance: 50Ω (nominal).

Available harmonic power: −19 dBm minimum for any harmonic number between 1 and 10.

General

Dimensions: 3 in. long, 1⅝ in. dia. (76 x 41 mm).

Weight: net, 3 oz (85 grams). Shipping, 1 lb (0,45 kg).

Price: model 10511A, $150.00.

*Useful operation is obtained for input frequencies from 10 MHz to 75 MHz.

HP 10515A Frequency Doubler

The Hewlett-Packard Model 10515A Frequency Doubler is an ideal accessory for use in extending the usable frequency range of signal generators, frequency synthesizers or other signal sources. Operating on input frequencies of 0.5 MHz to 500 MHz it provides a doubled output in the range of 1 MHz to 1 GHz. This 50 ohm device uses a full-wave rectifier circuit which is extremely flat over its entire frequency range. The frequency response is very flat (< ± 1 dB over entire range typically), and undesired harmonics are very well suppressed.

The output of this unit does not have an internal dc return so that it will provide a very broadband ac to dc conversion only if not dc terminated. This mode of operation is useful for detection of low level amplitude modulations.

The 10515A may be used with the following Hewlett-Packard instruments (this is only a partial listing):

5100A Frequency Synthesizer	606A Signal Generator
5102A Frequency Synthesizer	3200B VHF Oscillator
5103A Frequency Synthesizer	608 Signal Generators
5105A Frequency Synthesizer	

Specifications 10515A

Frequency range: 0.5-500 MHz input; 1-1000 MHz output.

Impedance: 50Ω nominal (source and load).

Input signal voltage: 0.5 - 3.0 V_{RMS}.

Input signal power: 180 mW (maximum).

Conversion loss:*

<12 dB (typically <11 dB) for >1 volt

<13 dB (typically <12 dB) for >0.5 volt

Suppression of 1st and 3rd harmonic input:*

>30 dB for 0.5 to 50 MHz input (typically >35 dB).

>10 dB for input to 500 MHz (typically >15 dB).

Connectors: input: BNC male; output: BNC female.

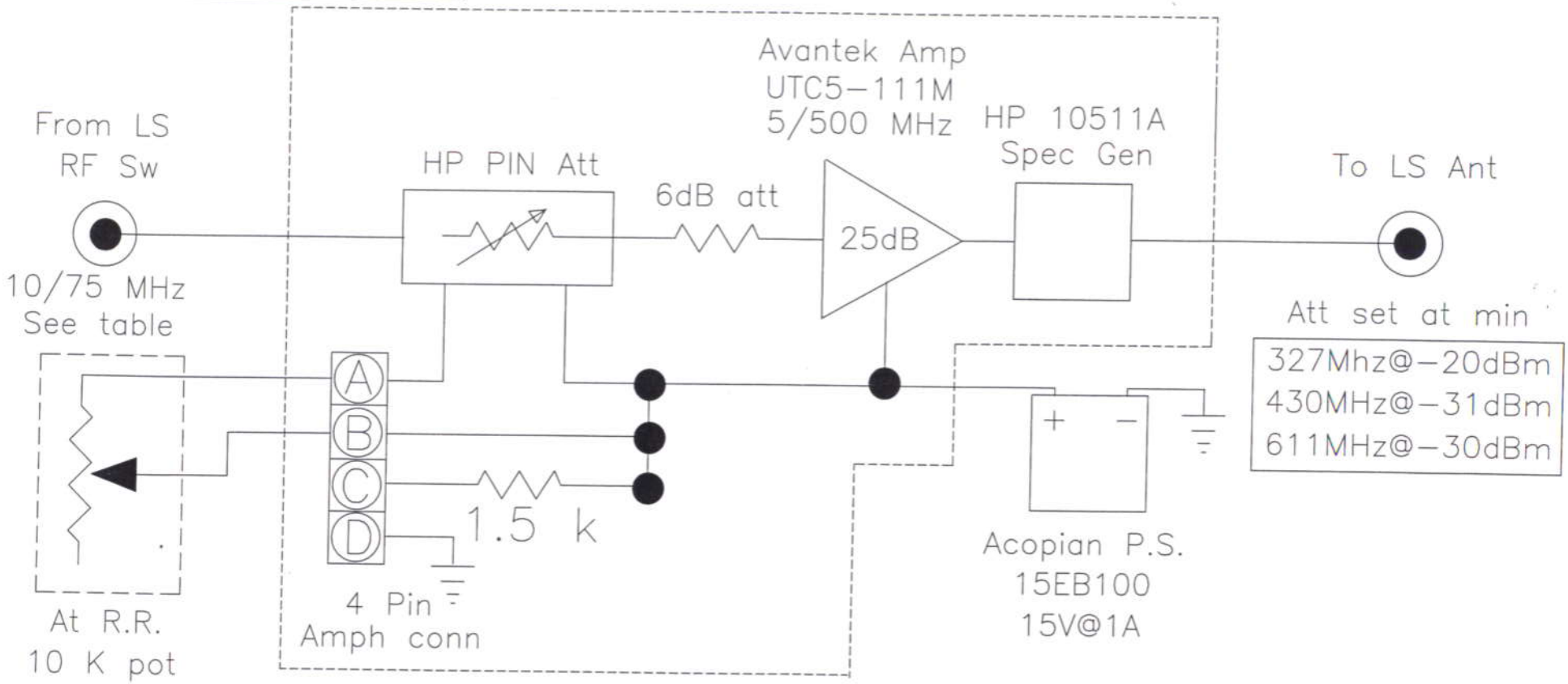
Dimensions: diameter: 0.7" (18 mm); length: 2.5" (64 mm).

Weight: net, approximately 2 oz (56 grams); shipping, 1 lb (0,45 kg).

Price: model 10515A, $120.00.

*With a 50 ohm resistive load and a single input frequency. Suppression values are referred to the desired output level.

327Mhz@(16.5MHz)−1.2dBm
430MHz@(21.5MHz)−4.5dBm
611MHz@(30.55MHz)−6.5dBm

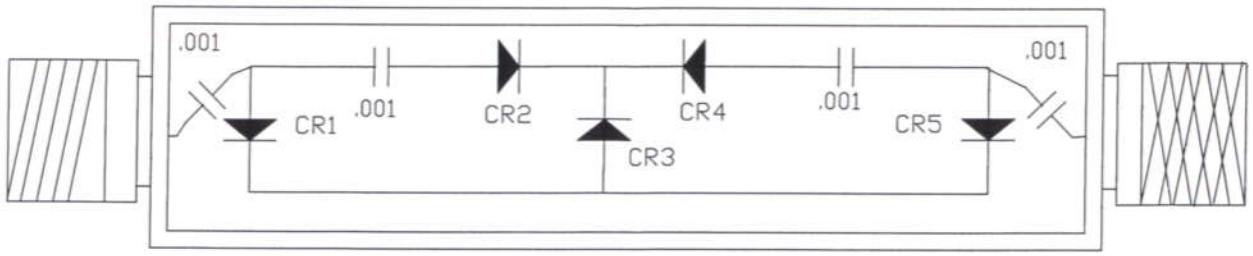


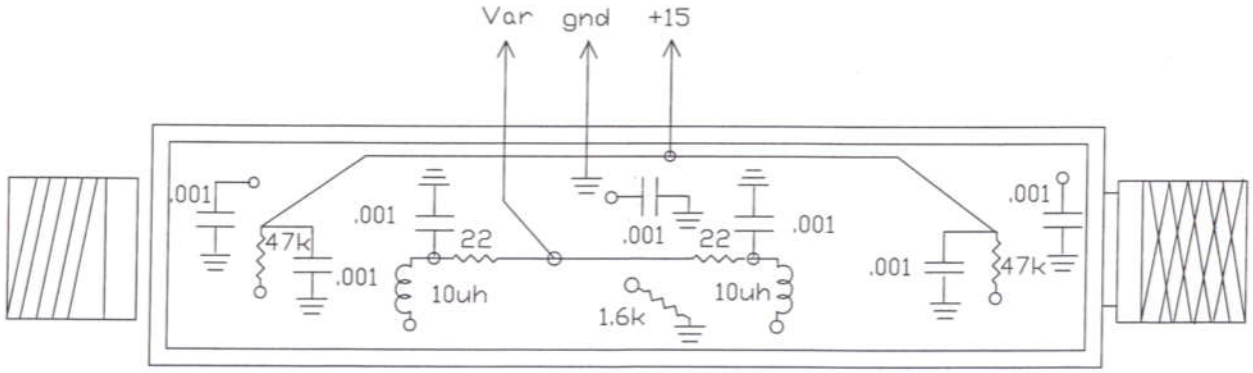
Notes: 1) Level at RR Synth. +13 dBm

Notes: 2) Measurments taken with HP 8591A Spectrum Analyzer

REVISIONS	DATE 2/27/2007	ARECIBO OBSERVATORY CORNELL UNIVERSITY	SCALE
	APPD.		
	BY ans	Low Side Cal Dipole Multiplier	DWN.NO.

Top





Botton

Notes:

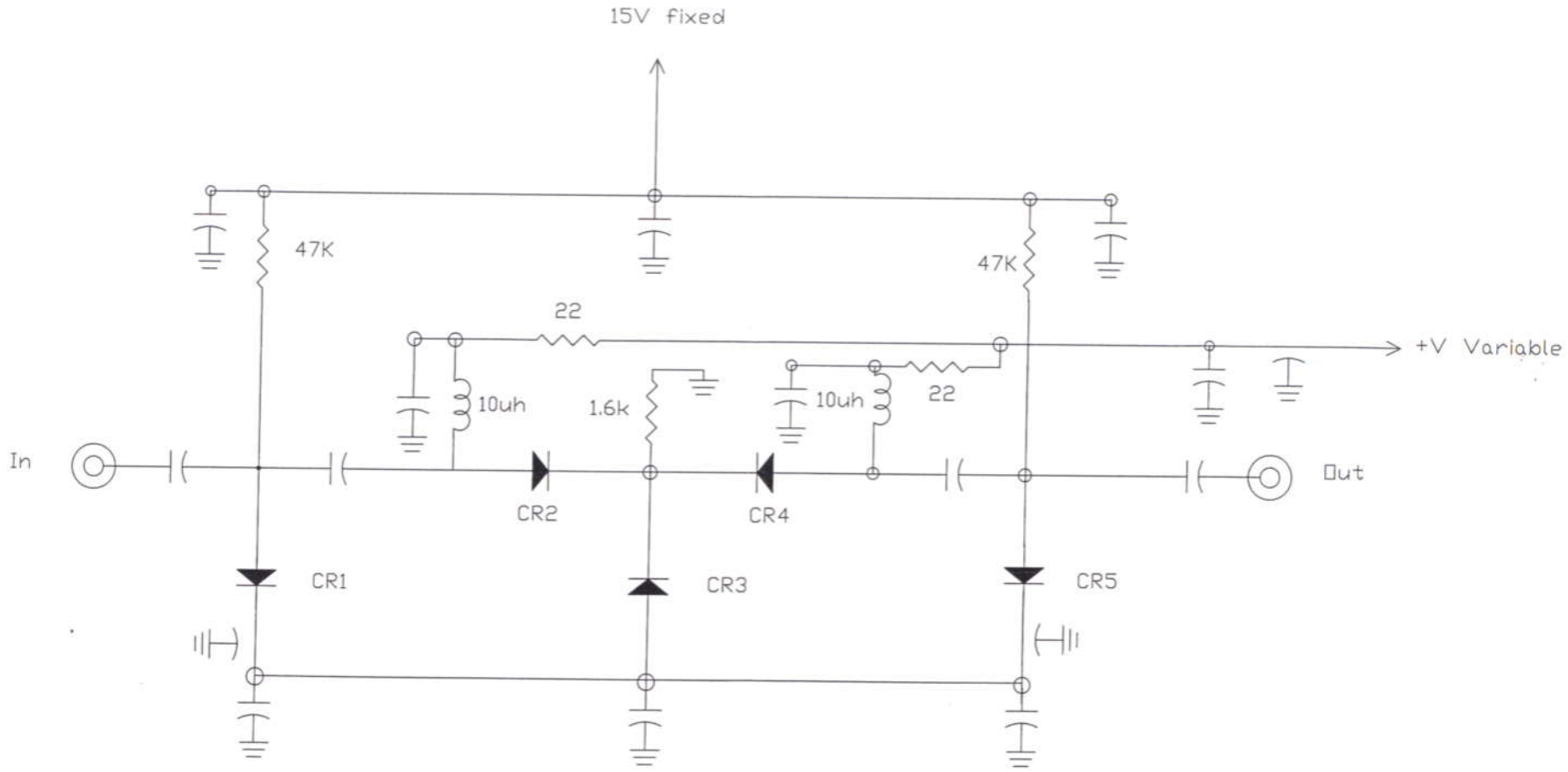
All diodes HP 5082 - 3039

All capacitors .001 uf

Chokes 10 uh

All resistors 1/4 w

REVISIONS	DATE 3/2/2007	*ARECIBO OBSERVATORY* CORNELL UNIVERSITY	SCALE
	APPD.		
	BY ans	Double PI PIN diode Att. Low Side cal dipole	DWN.NO.



Notes:

CR1 to CR5 are HP 5082-3039

All caps .001 uf

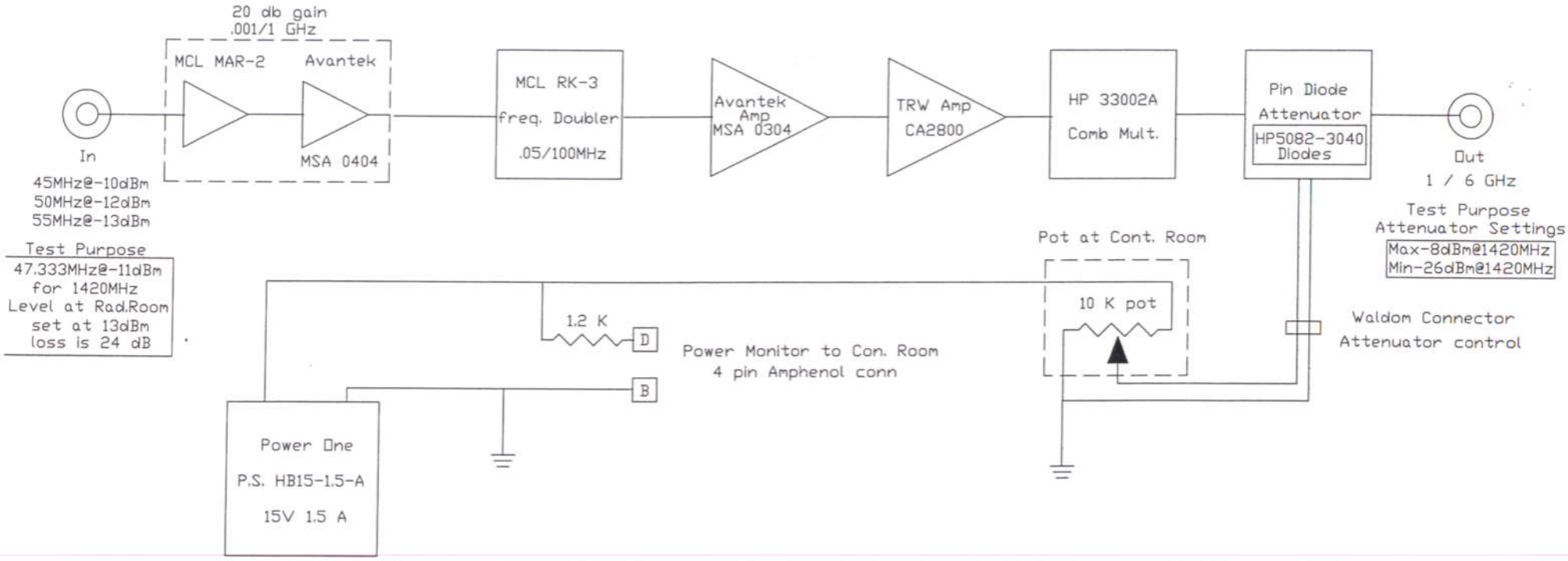
Resistors are 1/4 w 10 %

See lay-Out drawings for construction

V fixed	I fixed	V Variable	I	Att.
15 Vdc	-----	15 Vdc	6.8	

REVISIONS	DATE 3/1/2007	ARECIBO OBSERVATORY CORNELL UNIVERSITY	SCALE
	APPD.		
	BY ans	Double Pi Pin Diode Att. Loe Side Cal Dipole	DWN.NO.

High Side



NOTE: All In/Out levels measurments taken with HP 8591A Spectrum Analyzer

REVISIONS	DATE 2/23/2007	*ARECIBO OBSERVATORY* CORNELL UNIVERSITY	SCALE
	APPD.		
	BY ans	Cal Dipole High Side Multiplier	DWN.NO.

Doubler

Frequency Multiplier

50Ω Output 0.1 to 300 MHz

RK-3+
RK-3

CASE STYLE: A01
PRICE: $18.20 ea. QTY (1-9)

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications.

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Input Power	200mW

Pin Connections

INPUT	1,3,4^
OUTPUT	8
GROUND	2,5,6,7
CASE GROUND	2

^ *pins must be connected together externally*

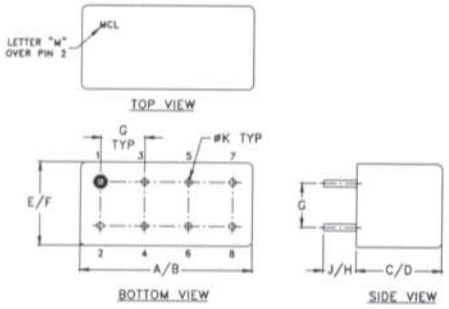
Features

- hermetic case
- low conversion loss, 11 dB typ.

Applications

- synthesizers
- local oscillators
- military, hi-rel applications

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F
.770	.800	.385	.400	.370	.400
19.56	20.32	9.78	10.16	9.40	10.16
G	H	J	K		wt
.200	.20	.14	.031		grams
5.08	5.08	3.56	0.79		5.2

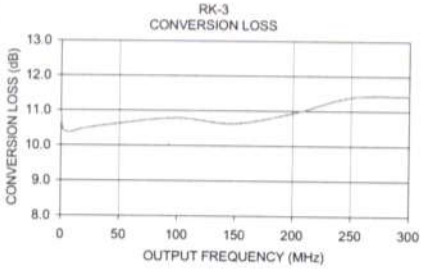
Frequency Multiplier Electrical Specifications

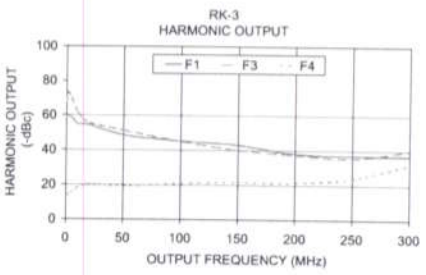
MULTIPLICATION FACTOR	FREQUENCY (MHz)		INPUT POWER (dBm)		CONVERSION LOSS (dB)		*HARMONIC OUTPUT (dBc)					
							F1		F3		F4	
	Input	Output	Min.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.
2	0.05-50	0.1-200	0	13	11.0	17.0	40	28	45	30	16	8
	50-150	200-300	0	13	11.5	15.0	35	20	40	20	16	12

* Harmonic output below power level of F2

Typical Performance Data

Output Frequency (MHz)	Conversion Loss (dB)	Harmonic Output (-dBc) F1	F3	F4
0.20	10.92	59.00	68.00	14.40
2.00	10.44	60.00	73.00	14.20
10.00	10.38	55.00	61.60	18.20
20.00	10.47	54.20	55.60	20.00
50.00	10.62	48.60	51.30	19.30
100.00	10.78	45.00	45.00	20.80
150.00	10.63	43.00	40.00	21.50
200.00	10.93	38.00	37.60	21.40
250.00	11.39	37.00	35.60	24.00
300.00	11.43	36.70	40.00	32.00





Frequency Multiplier (Doubler)

RK-3

Typical Performance Data

FREQUENCY (MHz)				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X 1 OUTPUT	X 2 OUTPUT	X 3 OUTPUT	X 4 OUTPUT	X 2 OUTPUT	X 1 OUTPUT	X 3 OUTPUT	X 4 OUTPUT
0.2	0.4	0.6	0.8	10.92	59.00	68.00	14.40
1	2	3	4	10.44	60.00	73.00	14.20
5	10	15	20	10.38	55.00	61.60	18.20
10	20	30	40	10.47	54.20	55.60	20.00
25	50	75	100	10.62	48.60	51.30	19.30
50	100	150	200	10.78	45.00	45.00	20.80
75	150	225	300	10.63	43.00	40.00	21.50
100	200	300	400	10.93	38.00	37.60	21.40
125	250	375	500	11.39	37.00	35.60	24.00
150	300	450	600	11.43	36.70	40.00	32.00

*Harmonic Output below power level of X 2 Output .

MMIC Amplifier MAR-2+

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions or to view GRAPHS.

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: INPUT POWER = -20dBm, Icc = 25mA, Vd = 4.82V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
50	12.83	18.22	24.31	20.87	1.19	0.54	22.47	8.53	3.63
100	12.80	18.18	24.30	21.34	1.19	0.54	22.56	8.31	3.66
150	12.80	18.23	24.67	21.18	1.20	0.54	23.18	8.48	3.71
200	12.78	18.23	24.33	21.33	1.20	0.54	23.09	8.31	3.71
250	12.76	18.23	24.57	21.37	1.20	0.54	21.97	8.25	3.67
300	12.75	18.20	24.47	21.38	1.20	0.54	23.02	8.37	3.77
350	12.71	18.21	24.53	21.61	1.20	0.54	22.58	8.28	3.77
400	12.71	18.20	24.51	21.50	1.20	0.54	22.76	8.47	3.74
450	12.69	18.21	24.52	21.72	1.20	0.53	22.10	8.15	3.74
500	12.67	18.19	24.71	21.74	1.20	0.53	22.65	8.28	3.73
550	12.63	18.19	24.74	21.97	1.21	0.53	22.05	8.04	3.75
600	12.61	18.19	24.83	22.05	1.21	0.53	22.35	8.28	3.77
650	12.61	18.19	24.89	22.07	1.21	0.53	22.17	8.26	3.77
700	12.55	18.16	24.97	22.44	1.21	0.53	22.31	8.15	3.78
750	12.53	18.15	25.01	22.48	1.21	0.53	22.55	8.30	3.75
800	12.50	18.15	25.41	22.65	1.21	0.52	22.71	8.04	3.79
850	12.47	18.14	25.40	22.72	1.22	0.52	22.60	8.34	3.73
900	12.43	18.13	25.68	23.06	1.22	0.52	22.31	7.91	3.70
940	12.41	18.12	25.83	22.97	1.22	0.52	22.59	8.07	3.70
1000	12.36	18.11	25.81	23.09	1.22	0.52	22.15	8.09	3.69
1050	12.33	18.10	26.50	23.11	1.22	0.52	22.58	8.06	3.67
1100	12.29	18.07	26.24	23.13	1.22	0.51	22.01	8.10	3.73
1150	12.24	18.06	26.27	23.16	1.23	0.51	22.26	7.93	3.80
1200	12.19	18.07	26.86	23.05	1.23	0.51	21.88	8.07	3.77
1250	12.15	18.04	26.85	23.05	1.23	0.51	22.33	7.85	3.76
1300	12.12	18.02	27.03	22.80	1.23	0.51	22.13	7.90	3.81
1350	12.06	18.01	27.38	22.72	1.24	0.50	22.43	7.84	3.79
1400	12.00	17.99	27.26	22.44	1.24	0.50	22.00	7.85	3.81
1450	11.97	17.98	27.65	22.23	1.24	0.50	22.04	7.94	3.85
1500	11.92	17.97	27.55	21.94	1.24	0.50	22.10	7.99	3.91
1550	11.87	17.96	27.70	21.70	1.25	0.49	22.34	7.91	3.82
1600	11.82	17.94	27.61	21.48	1.25	0.49	22.34	7.84	3.86
1650	11.74	17.90	27.71	21.13	1.25	0.49	22.40	7.67	3.81
1700	11.68	17.90	27.54	20.88	1.25	0.49	22.59	7.82	3.87
1750	11.65	17.89	27.50	20.52	1.25	0.48	22.53	7.68	3.77
1800	11.59	17.88	27.46	20.34	1.26	0.48	22.32	7.88	3.80
1850	11.51	17.84	27.39	19.94	1.26	0.48	21.71	7.69	3.84
1900	11.46	17.83	27.23	19.67	1.26	0.48	21.58	7.82	3.77
1950	11.41	17.82	27.11	19.41	1.27	0.47	21.70	7.70	3.73
2000	11.36	17.81	26.77	19.14	1.27	0.47	21.52	7.50	3.74

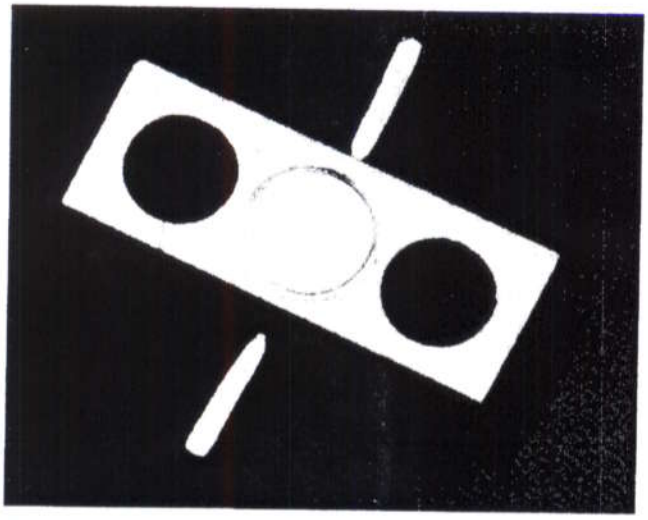
Pin diode #4 for high side [illegible]

HEWLETT hp PACKARD

COMPONENTS

PIN DIODES FOR STRIPLINE AND MICROSTRIP SWITCHES ATTENUATORS AND LIMITERS

5082-3040/41 — 3040
5082-3046
5082-3071
5082-3140/41
5082-3170
5082-3340



Features

HERMETIC
(5082-3140, 3141, 3170)

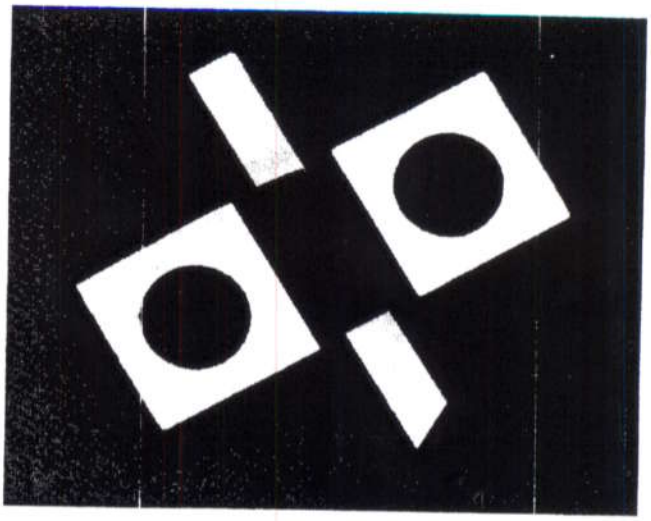
BROADBAND OPERATION
HF through X-band

LOW INSERTION LOSS
Less than 0.5 dB to 10 GHz (5082-3140, 3170)

HIGH ISOLATION
Greater than 20 dB to 10 GHz (5082-3140, 3170)

FAST SWITCHING/MODULATING
5 ns typical (5082-3141)

LESS DRIVE CURRENT REQUIRED
Less than 20 mA for 20 dB isolation (5082-3141)



Features

LOW COST TO USE
Designed for easy mounting

BROADBAND OPERATION
HF through Ku-band

LOW INSERTION LOSS
Less than 0.5 dB to 10 GHz (5082-3040, 3340)

LOW DRIVE CURRENT REQUIRED
Less than 20 mA for 20 dB isolation (5082-3041)

FAST SWITCHING MODULATION
5 ns typical (5082-3041)

HIGH POWER LIMITING
50 W peak pulse power (5082-3071)

Description

When forward biased these PIN diodes will appear as current variable resistors in shunt with a 50 ohm transmission line. The resistance varies between less than 1 ohm at high forward bias to greater than 10,000 ohms at zero or reverse bias.

The HP 5082-3040, -3046, -3340, -3140 and -3170 are passivated planar devices. The HP 5082-3041, -3071 and -3141 are passivated mesa devices. All of the devices are in a shunt configuration in stripline packages. These diodes are optimized for good continuity of characteristic impedance which allows a continuous transition when used in 50 ohm microstrip or stripline circuits.

Of these devices, the HP 5082-3040, -3041, -3046, -3071 and -3340 are in HP Package Outline 61.

The HP 5082-3140, -3141 and -3170 are in HP Package Outline 60. This package is hermetic and can be used for Hi-Rel applications. The HP 5082-3140, -3141 and -3170 are direct mechanical replacements for Outline 61 (with top cap in place) diodes HP 5082-3040, -3041, and -3340 respectively. The only electrical difference is the location of the chip in each package. Except in those few applications where the difference in phase relationship is important, the Outline 60 devices can be used as replacements.

The HP 5082-3071 passive limiter chip is functionally integrated into a 50 ohm transmission line to provide a broadband, linear, low insertion loss transfer characteristic for small signal levels. At higher signal levels self-rectification reduces the diode resistance to provide limiting as shown in Figure 6. Limiter performance is practically independent of temperature over the rated temperature range.

Applications

SWITCHES/ATTENUATORS

These diodes are designed for applications in microwave and HF-UHF systems using stripline, or microstrip transmission line techniques.

Typical circuit functions performed consist of switching, duplexing, multiplexing, leveling, modulating, limiting, or gain control functions as required in TR switches, pulse modulators, phase shifters, and amplitude modulators operating in the frequency range from HF through Ku-Band.

These diodes provide nearly ideal transmission characteristics from HF through Ku-Band.

The 5082-3340 and 4082-3170 are reverse polarity devices with characteristics similar to the 5082-3040 and 5082-3140 respectively.

The 5082-3041 and 5082-3141 are recommended for applications requiring fast switching or high frequency modulation of microwave signals, or where the lowest bias current for maximum attenuation is required.

The 5082-3046 has been developed for high peak pulse power handling as required in TR switches for distance measurement and TACAN equipment. The long effective minority carrier lifetime provides for low intermodulation products down to 10 MHz.

More information is available in HP Application Note 922 (Applications of PIN Diodes) and 929 (Fast Switching PIN Diodes).

LIMITER

The 5082-3071 limiter module is designed for applications in telecommunication equipment, ECM receivers, distance measuring equipment, radar receivers, telemetry equipment, and transponders operating anywhere in the frequency range from 500 MHz through 10 GHz. An external dc return is required for self bias operation. This dc return is often present in the existing circuit, i.e. inductively coupled antennas, or it can be provided by a $\lambda/4$ resonant shunt transmission line. Selection of a high characteristic impedance for the shunt transmission line affords broadband operation. Another easy to realize dc return consists of a small diameter wire connected at a right angle to the electric field in a microstrip or stripline circuit. A 10 mA forward current will actuate the PIN diode as a shunt switch providing approximately 20 dB of isolation.

HP Package Outline 61 Cover Channel

The cover channel supplied with each diode should be used in balanced stripline circuits in order to provide good electrical continuity from the upper to the lower ground plane through the package base metal. Higher order modes will be excited if this cover is left off or if poor electrical contact is made to the ground plane.

The package transmission channel is filled with epoxy resin which combines a low expansion coefficient with high chemical stability.

Maximum Ratings at $T_{CASE}=25°C$

Part No. 5082-	-3140 -3170	-3141	-3040 -3340	-3041	-3046	-3071
Junction Operating and Storage Temperature Range	-65°C to 150°C	-65°C to 150°C	-65°C to 125°C	-65°C to 125°C		
Power Dissipation[1]	2.5 W	1.0 W	2.5 W	1.0 W	4.0 W	1.0 W
Peak Incident Pulse Power[2]	225 W	50 W	225 W	50 W	2000 W	50 W
Peak Inverse Voltage	150 V	70 V	150 V	70 V	450 V	50 V
Soldering Temperature	230°C for 5 sec.					

Notes:

1. Device properly mounted in sufficent heat sink, derate linearly to zero at maximum operating temperature.
2. $t_p = 1\ \mu s$, f = 10 GHz, Du - .001, $Z_o = 50\Omega$. (Exception: -3071 is tested at 9.4 GHz.)

Electrical Specifications at T_A=25°C - Attenuator Diodes

Part Number 5082-	Package Outline	Heat Sink	Minimum Isolation (dB)	Maximum Insertion Loss (dB)	Maximum SWR	Maximum Reverse Recovery Time t_{rr} (ns)	Typical Carrier Lifetime τ (ns)	Typical CW Power Switching Capability P_A (W)
3140	60	Anode	20	0.5	1.5	–	500	30
3141	60	Cathode	20	1.0	1.5	10	15	13
3170	60	Cathode	20	0.5	1.5	–	500	30
3040	61	Anode	20	0.5	1.5	–	500	30
3041	61	Cathode	20	1.0	1.5	10	15	13
3046	61	Anode	20	1.0	1.5	–	1000	50
3340	61	Cathode	20	0.5	1.5	–	500	30
Test Conditions (Note 3)	–	–	I_F=100mA (Except 3041,3141: I_F=20mA)	I_F = 0 P_{in} = 1mW	I_F = 0 P_{in} = 1mW	I_F = 20mA V_R = 10V Recovery to 90%	I_F = 50mA I_R = 250mA	–

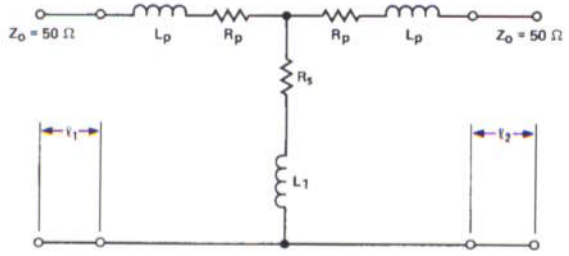
Note 3: Test Frequencies: 8 GHz 5082-3041, -3046 and -3141. 10 GHz 5082-3040, -3140, 3170 and -3340.

Electrical Specifications at T_A=25°C - Limiter Diode

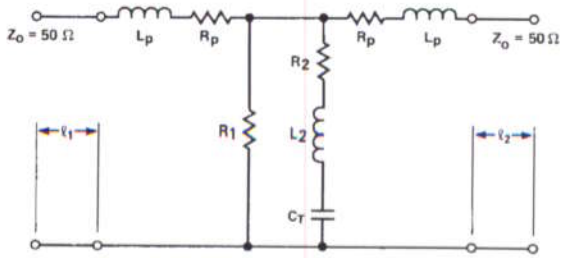
Part Number 5082-	Package Outline	Heat Sink	Maximum Insertion Loss (dB)	Maximum SWR	Maximum RF Leakage Power (W)	Typical Recovery Time (ns)
3071	61	Cathode	1.2	2.0	1.0	100
Test Conditions	–	–	P_{in} = 0 dBm f = 9.4GHz	P_{in} = 0 dBm f = 9.4GHz	P_{in} = 50 W	P_{in} = 50 W

Equivalent Circuits

Forward Bias (Isolation State)



Zero Bias (Insertion Loss State)



Typical Equivalent Circuit Parameters - Forward Bias

Part Number 5082-	Lp (pH)	Rp (Ω)	Rs (Ω)	L_1 (pH)	ℓ_1 (mm)	ℓ_2 (mm)
3040, 3340	200	0.25	1.0	20	2.4	5.0
3041	220	0.25	1.0	20	2.4	5.0
3046	220	0.25	0.6	17	2.4	5.0
3140, 3170	150	0.0	0.95	30	3.8	3.8
3141	150	0.0	0.8	20	3.8	3.8

Typical Equivalent Circuit Parameters - Zero Bias

Part Number 5082-	Lp (pH)	Rp (Ω)	R_1 (KΩ)	L_2 (pH)	R_2 (KΩ)	C_T (pF)	ℓ_1 (mm)	ℓ_2 (mm)
3040, 3340	200	0.25	∞	0	5.0	0.10	2.4	5.0
3041	220	0.25	∞	0	1.5	0.15	2.4	5.0
3046	220	0.25	∞	0	1.5	0.15	2.4	5.0
3140, 3170	30	0.0	1.2	16	0.0	0.20	5.3	5.3
3141	200	0.0	∞	0	0.4	0.14	4.4	4.4

Typical Parameters

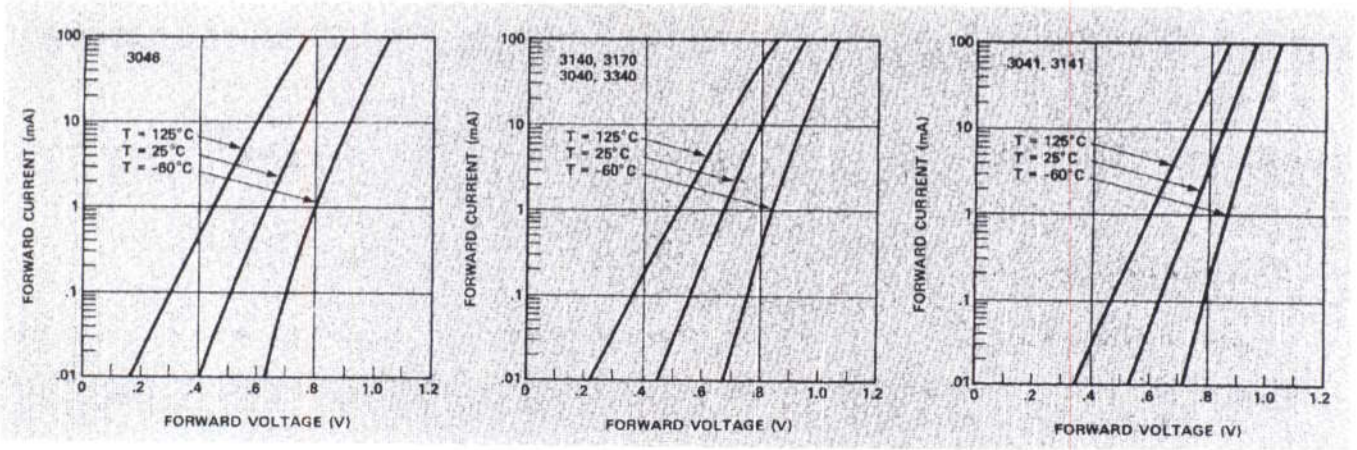


Figure 1. Typical Forward Characteristics.

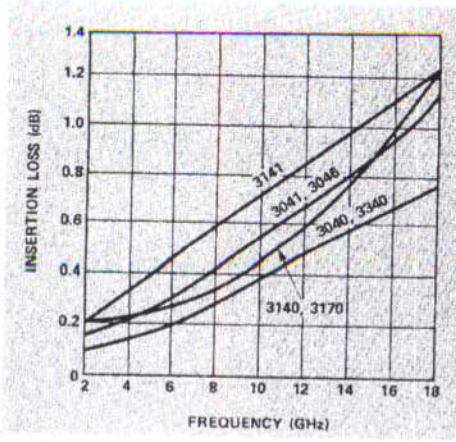


Figure 2. Typical Insertion Loss vs. Frequency.

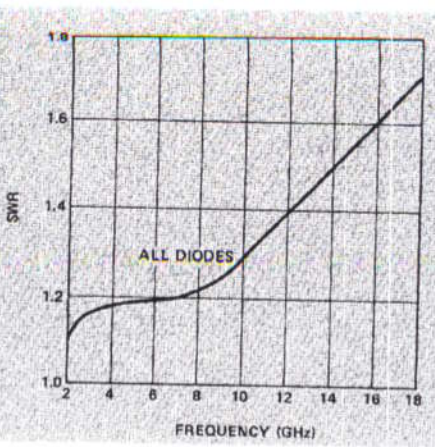


Figure 3. Typical SWR vs. Frequency.

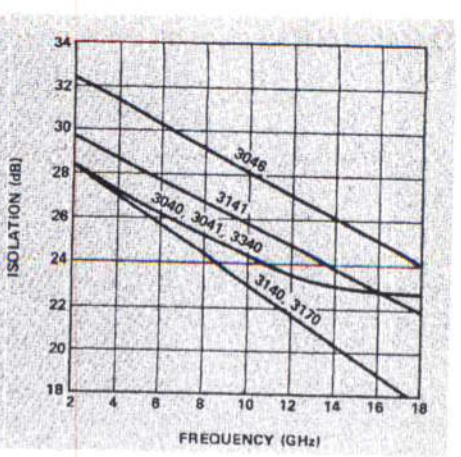


Figure 4. Typical Isolation vs. Frequency.

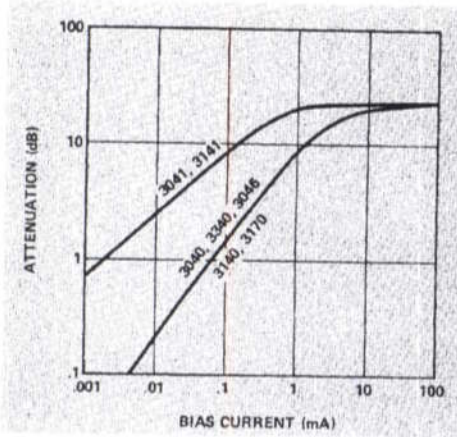


Figure 5. Typical Attenuation Above Zero Bias Insertion Loss vs. Bias Current at f = 8 GHz.

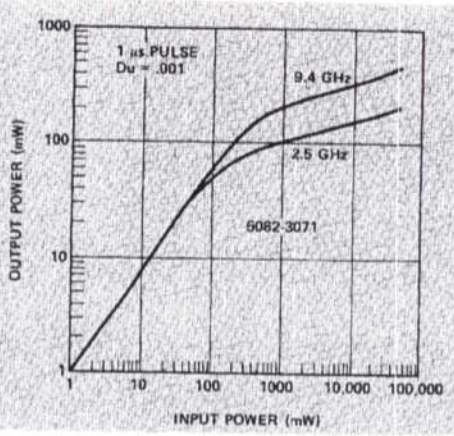
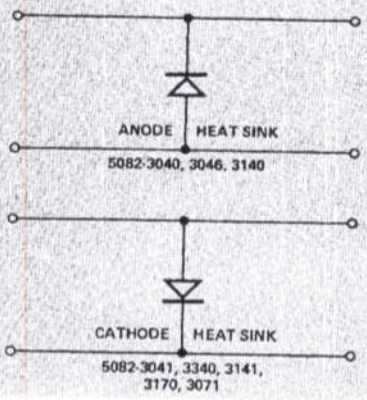


Figure 6. Typical Pulse Limiting Characteristics.



HEAT SINK POLARITY

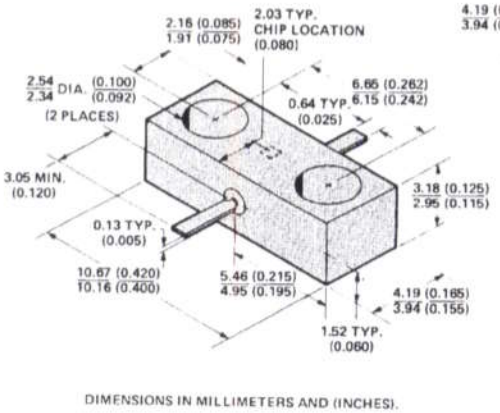


Figure 7. HP Package 60 Outline.

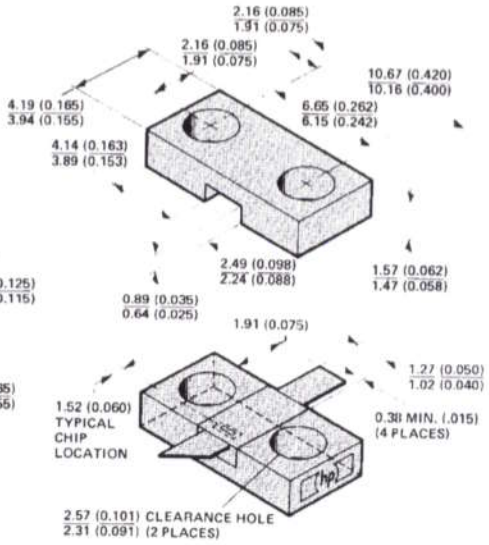


Figure 8. HP Package 61 Outline.

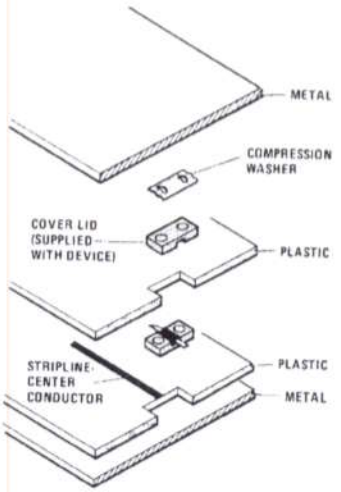


Figure 9. Suggested Stripline Assembly.

Typical Switching Parameters

RF SWITCHING SPEED

HP 5082-3141 and HP 5082-3041

The RF switching speed of the HP 5082-3141 and HP 5082-3041 may be considered in terms of the change in RF isolation at 2 GHz. This switching speed is dependent upon the forward bias current, reverse bias drive pulse, and characteristics of the pulse source. The RF switching speed for the shunt-mounted stripline diode in a 50Ω system is considered for two cases: one driving the diode from the forward bias state to the reverse bias state (isolation to insertion loss), second, driving the diode from the reverse bias state to the forward bias state (insertion loss to isolation).

The total time it takes to switch the shunt diode from the isolation state (forward bias) to the insertion loss state (reverse bias) is shown in Figure 10. These curves are for three forward bias conditions with the diode driven in each case with three different reverse voltage pulses (V_{PR}). The total switching time for each case includes the delay time (pulse initiation to 20 dB isolation) and transition time (20 dB isolation to 0.9 dB isolation). Slightly faster switching times may be realized by spiking the leading edge of the pulse or using a lower impedance pulse driver.

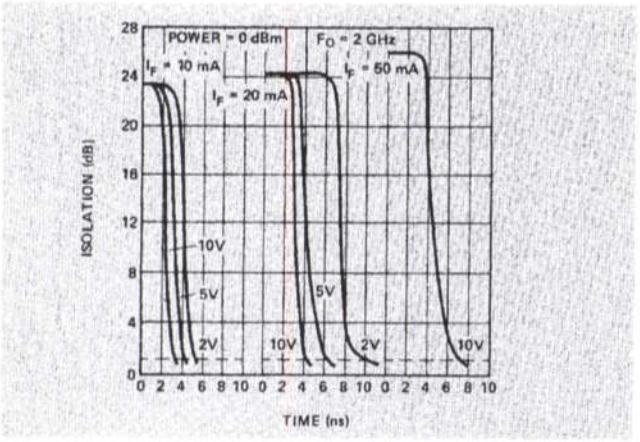


Figure 10. Isolation vs. Time (Turn-on) for HP 5082-3141 and HP 5082-3041. Frequency, 2 GHz.

The time it takes to switch the diode from zero or reverse bias to a given isolation is less than the time from isolation to the insertion loss case. For all cases of forward bias generated by the pulse generator (positive pulse), the RF switching time from the insertion loss state to the isolation state was less than 2 nanoseconds. A more detailed treatise on switching speed is published in AN929; Fast Switching PIN Diodes.

REVERSE RECOVERY TIME

Shown below is reverse recovery time, (t_{rr}) vs. forward current,(I_F) for various reverse pulse voltages V_{PR}. The circuit used to measure t_{rr} is shown in Figure 11.

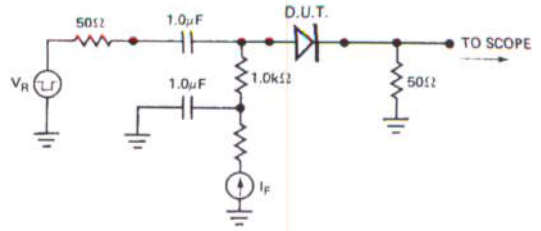


Figure 11. Basic t_{rr} Test Setup.

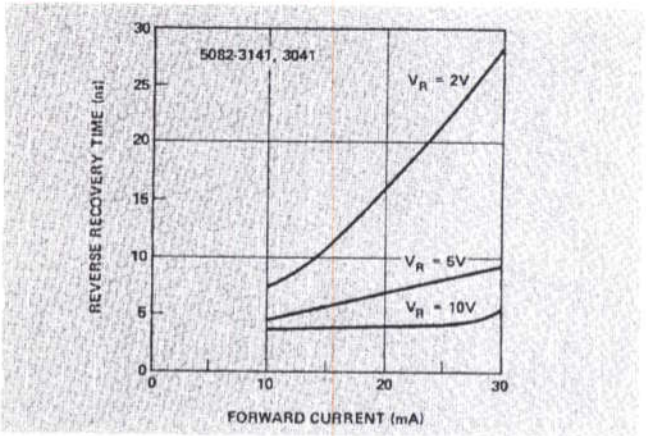


Figure 12. Typical Reverse Recovery Time vs. Forward Current for Various Reverse Driving Voltages, 5082-3141, -3041.

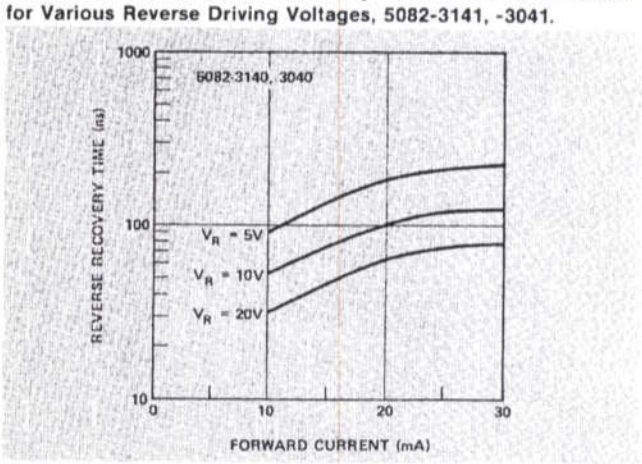


Figure 13. Typical Reverse Recovery Time vs. Forward Current for Various Reverse Driving Voltages, 5082-3140, -3040.

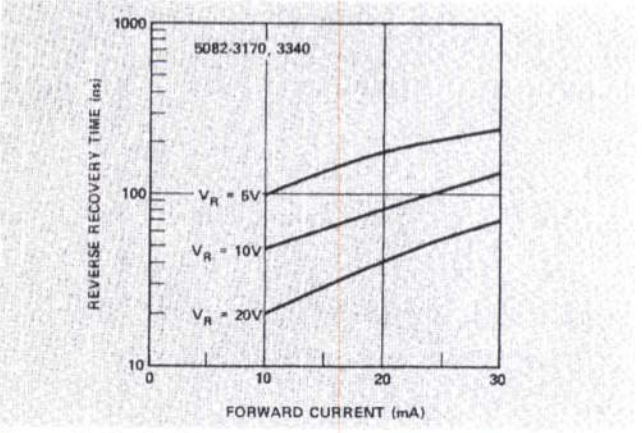


Figure 14. Typical Reverse Recovery Time vs. Forward Current for Various Reverse Driving Voltages, 5082-3170, -3340.

COMP GENERATOR HIGH SIDE
(Input frequency range 45 to 50 MHz)

From MHz	To MHz	N Equals
900	1000	20
990	1100	22
1080	1200	24
1170	1300	26
1260	1400	28
1350	1500	30
1440	1600	32
1530	1700	34
1620	1800	36
1710	1900	38
1800	2000	40
1890	2100	42
1980	2200	44
2070	2300	46
2160	2400	48
2250	2500	50
2340	2600	52
2430	2700	54
2520	2800	56
2610	2900	58
2700	3000	60
2790	3100	62
2880	3200	64
2970	3300	66
3060	3400	68
3150	3500	70
3240	3600	72
3330	3700	74
3420	3800	76
3510	3900	78
3600	4000	80
3690	4100	82
3780	4200	84
3870	4300	86
3960	4400	88
4050	4500	90
4150	4600	92
4230	4700	94
4320	4800	96
4410	4410	98
4500	5000	100
4590	5100	102
4680	5200	104
4770	5300	106
4860	5400	108
4950	5500	110
5040	5600	112
5130	5700	114
5220	5800	116
5310	5900	118
5400	6000	120

(To compute Freq. $\frac{Fin=Fout}{N}$

COMP GENERATOR HIGH SIDE
(Input frequency range 45 to 59 MHz)

From MHz	To MHz	N Equals
900	1000	20
990	1100	22
1080	1200	24
1170	1300	26
1260	1400	28
1350	1500	30
1440	1600	32
1530	1700	34
1620	1800	36
1710	1900	38
1800	2000	40
1890	2100	42
1980	2200	44
2070	2300	46
2160	2400	48
2250	2500	50
2340	2600	52
2430	2700	54
2520	2800	56
2610	2900	58
2700	3000	60
2790	3100	62
2880	3200	64
2970	3300	66
3060	3400	68
3150	3500	70
3240	3600	72
3330	3700	74
3420	3800	76
3510	3900	78
3600	4000	80
3690	4100	82
3780	4200	84
3870	4300	86
3960	4400	88
4050	4500	90
4150	4600	92
4230	4700	94
4320	4800	96
4410	4410	98
4500	5000	100
4590	5100	102
4680	5200	104
4770	5300	106
4860	5400	108
4950	5500	110
5040	5600	112
5130	5700	114
5220	5800	116
5310	5900	118
5400	6000	120

(To compute Freq. $\frac{Fin=Fout}{N}$

Notes: