

FEATURES

- **D4694-F6 features a solid Pd alloy tip**
- **<-1db insertion loss to 7.8 GHz**
- **<2:1 VSWR to 8 GHz**
- **26-36g operating spring force**
- **Z0 = 34.1Ω**
- **<40.5 ps risetime**
- **45 milliohms**
- **2.4 Amps max drive current**



GENERAL DESCRIPTION

The D4694 series spring probes from Signal Integrity Inc. are designed to meet the rigorous test probe bandwidth of the wireless and RF test markets as well as very fast rise times in test applications for telecommunication and broadband data communications system-on-a-chip devices. The risetime requirements for these devices are usually well below 150 picoseconds. Along with speed and accuracy, these probes are designed for testing very fine pitch to 0.8mm, well suited to the packaging constraints driven by the consumer wireless market.

The high bandwidth of these probes provides very low insertion loss up to 11.6GHz. These probes will provide transparent operation on Bluetooth, 802.11b and 3G wireless protocol devices as well as exceed the test probe demands of proprietary microwave communications devices and systems.

With an impulse risetime of less than 40.5ps and a propagation delay of 12.6ps, the AC performance of the D4694 probe is transparent for test applications and interconnections solutions that operate in high speed CMOS, SiGe and GaAs technologies.

SERIES D4694 MODELS: ORDERING INFORMATION

D Series 0.8mm (.0315inch) Pitch				
Model	Length Operating / Initial inches [mm]	DUT Plunger and Plating	Spring	Operating Spring Force
D4694-D4	.157 [4.00] / .185 [4.71]	4 Point Crown – Gold	Stainless Steel	28 Grams
D4694-E5		4 Point Crown - Palladium		36 Grams
D4694-F6		4 Point Crown – Solid Pd Alloy		26 Grams

FUNCTIONAL SPECIFICATIONS

Model	D4694-F6			Units
	Corner	Edge	Field	
TDT Risetime thru 50Ω	33	33	40.5	ps
TDR Risetime open circuit	36	48	51	ps
TDR Risetime short circuit	30	39	42	ps
Signal Delay into 50Ω	13.4	12.3	12.6	ps
Insertion Loss <-1db	14.9	18.7	7.8	GHz
Insertion Loss <-3db	37.9	>40	>40	GHz
VSWR <2:1	>40	12.8	8.0	GHz

Equivalent Circuit Parameters

	Min.	Typ.	Max.	Units
Pin Inductance		0.80		nH
Pin Capacitance to ground		0.612		pF
Mutual Inductance		0.151		nH
Mutual Capacitance		0.098		pF
Transmission Line				
Zo		34.1		Ω
Tl		12.6		Ps

MAXIMUM DC CURRENT

DUTY CYCLE	DC	50%	25%	10%	1%
AMPS	2.44	4.24	5.06	5.95	6.91

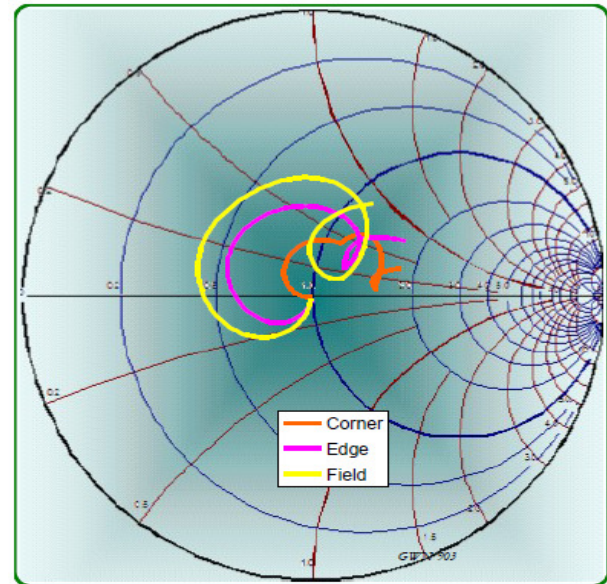


Figure 2: Measurement into 50Ω, D4694-F6

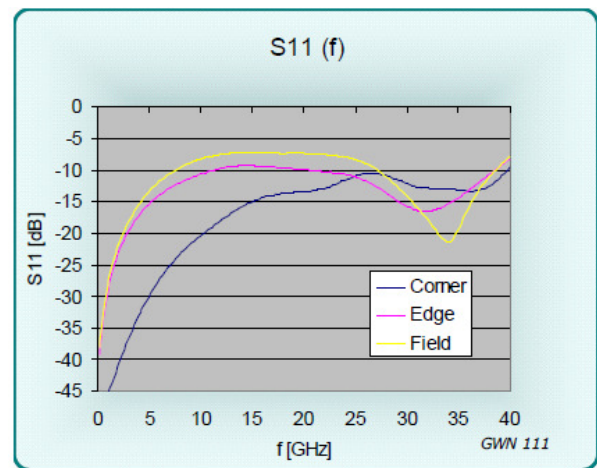


Figure 3: Return Loss, S11, D4694-F6

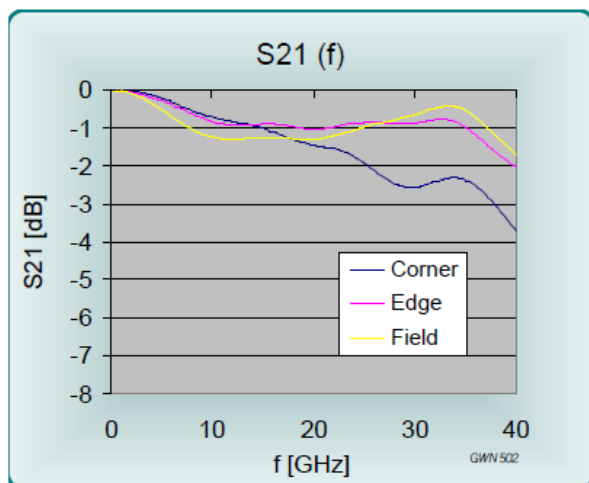


Figure 1: Insertion Loss, S21, D4694-F6

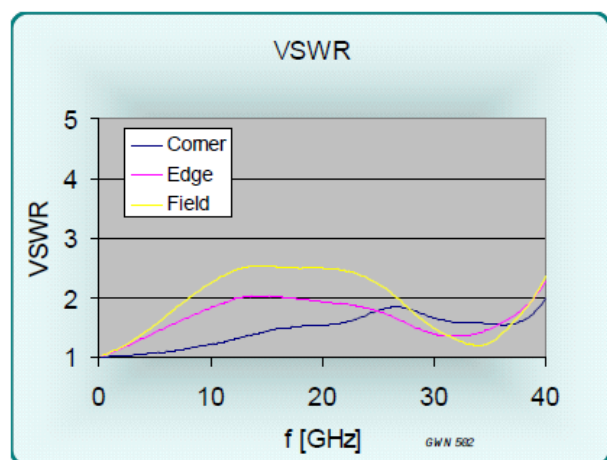


Figure 4: VSWR, D4694-F6

EQUIVALENT CIRCUITS / SPICE MODELS

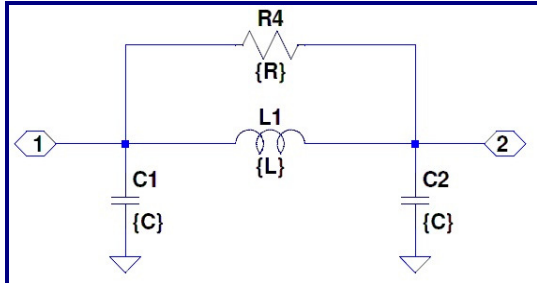


Figure 5: Pi Equivalent, Valid to >10 GHz

Site	Cg = C1+C2	L1	R4
Corner	0.498 pF	1.15 nH	600 Ω
Edge	0.572 pF	0.89 nH	500 Ω
Field	0.612 pF	0.80 nH	300 Ω
Diagonal	0.612 pF	0.80 nH	300 Ω

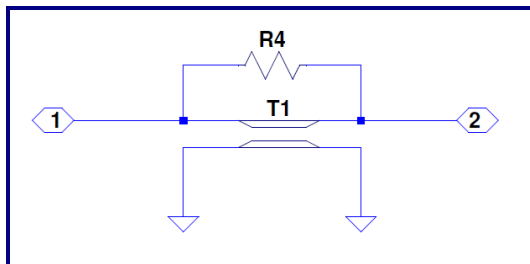


Figure 6: Transmission Line Model Valid to >40GHz

Site	Zo	L	R4
Corner	48.1 Ω	23.94 ps	1000 Ω
Edge	39.5 Ω	22.62 ps	1000 Ω
Field	36.1 Ω	22.09 ps	1000 Ω

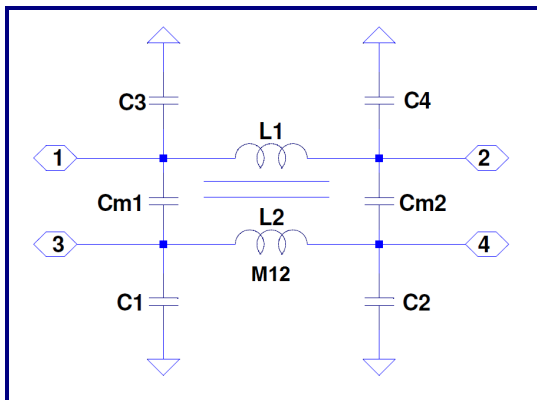


Figure 7: Lumped, Mutual Elements

Site	C1,2,3,4	Cm1,Cm2	L1,L2	M
Corner	0.249	0.080 pF	1.15	0.371 nH
Edge	0.286	0.072 pF	0.89	0.284 nH
Field	0.306	0.049 pF	0.80	0.151 nH
Diagonal	0.306	0.015 pF	0.80	0.044 nH

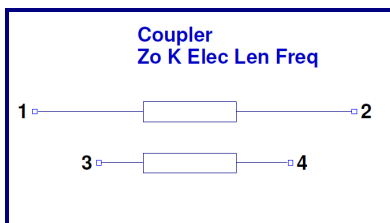
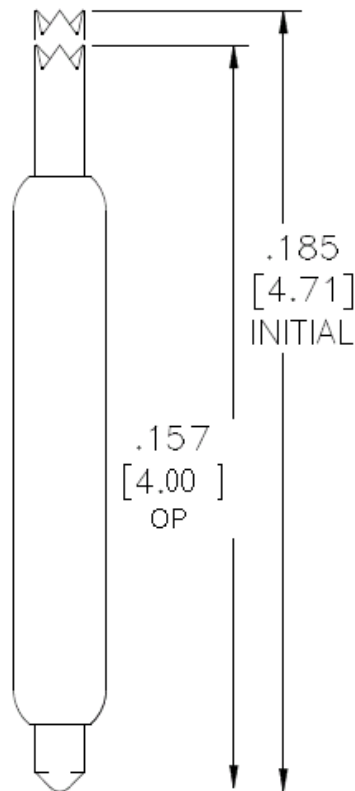


Figure 8: Transmission Line Equivalent for Crosstalk

Z0	34.1	Ohms
Lel	12.6	ps
k	0.19	
f	22.6	Ghz

D Series 0.8mm (.0315) pitch									
Probe Series	Initial Length		Operating Position		Spring Force	Self Inductance	Insertion Loss < -1db to	Typical Contact Resistance	Maximum Current
	inch/mm	inch/mm	inch/mm	inch/mm					
D4525	.087"	2.21	.071"	1.80	30 g	0.5 nH	17.0 GHz	20 mOhms	6.0 A
D4565	.092"	2.33	.071"	1.80	30 g	0.5 nH	17.0 GHz	25 mOhms	6.0 A
D4595	.154"	3.91	.128"	3.25	38 g	0.82 nH	19.5 GHz	30 mOhms	3.0 A
D4601	.214"	5.43	.186"	4.72	24-34 g	1.0 nH	12.8 GHz	50 mOhms	6.0 A
D4603	.209"	5.30	.181"	4.59	24 g	1.16 nH	12.4 GHz	70 mOhms	4.0 A
D4613	.249"	6.32	.213-.216"	5.49	24-34 g	1.25 nH	14.3 GHz	40 mOhms	2.15 A
D4623	.289"	7.33	.253"	6.43	34 g	1.55 nH	8.2 GHz	60 mOhms	5.4 A
D4823	.289"	7.33	.253"	6.43	28 g	-	-	-	-
D4693	.185"	4.71	.157"	4.00	24-34 g	0.92 nH	18.3 GHz	40 mOhms	3.0 A
D4694	.185"	4.71	.157"	4.00	23-36 g	0.80 nH	7.8 GHz	40 mOhms	3.0 A
D4697	.339"	8.61	.295"	7.50	32 g	2.01 nH	8.6 GHz	45 mOhms	2.6 A

MECHANICAL DIMENSIONS INCHES [MM]


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