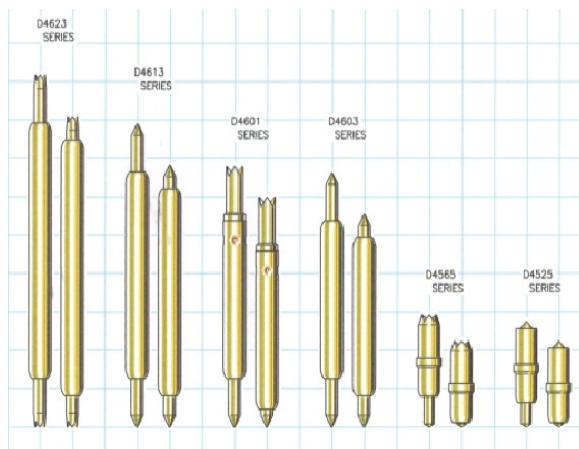


## FEATURES

- <-1db insertion loss to 12.8GHz
- <2:1VSWR to 10.4GHz
- 24-30g operating spring force
- $Z_0 = 34.5\Omega$
- <31.5ps risetime
- 50milliOhms contact resistance
- 6Amps max. drive current



## GENERAL DESCRIPTION

The D4601 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 12.8GHz. 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 31.5ps and a propagation delay of 25.5ps, the AC performance of the D4601 series probes are transparent for test applications and interconnections solutions that operate in high speed CMOS, SiGe and GaAs technologies.

### SERIES D4601 MODELS: ORDERING INFORMATION

D Series 0.8mm (.0315) Pitch				
Model	Length - Operating/Initial inch [mm]	DUT Plunger and Plating	Spring	Operating Spring Force
D4601-A1	.186 [4.72] / .214 [5.43]	Crown – Gold - BeCu	Stainless Steel	24 Grams
D4601-B2		Conical – Gold - BeCu		24 Grams
D4601-D4		Conic – Gold – Tool Steel		24 Grams
D4601-C3		Crown - Gold – Tool Steel		34 Grams
D4601-K2		Crown – Gold - BeCu		30 Grams
D4601-J1		Crown – Gold -BeCu		39 Grams

**FUNCTIONAL SPECIFICATIONS**

Model	D4601-A1			
Time Domain	Min.	Typ.	Max.	Units
TDT Risetime into 50Ω			31.5	ps
TDR Risetime open circuit			48.0	ps
TDR Risetime short circuit			54.0	ps
Signal Delay into 50Ω	25.5			ps
Frequency Domain				
Insertion Loss <-1db	12.8			GHz
<-3db	>40.0			GHz
Return Loss, S11 <-10db	11.0			GHz
<-20db	3.0			GHz
VSWR <2:1	10.4			GHz
Equivalent Circuit Parameters				
Pin Inductance		1.01		nH
Pin Capacitance to ground		0.69		pF
Mutual Inductance		0.28		nH
Mutual Capacitance		0.12		pF
Transmission Line Zo		34.5		Ω
Tl		25.5		ps
DC Parameters				
Contact Resistance		50		mΩ
Maximum Rating				
Drive Current		6		A

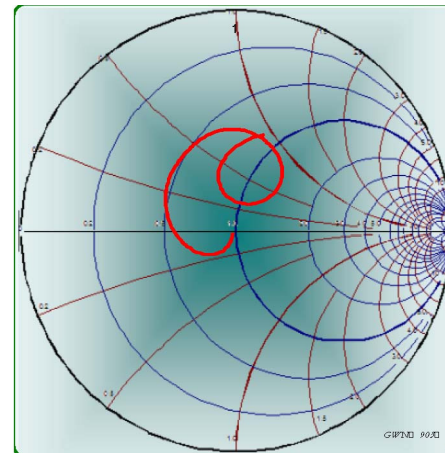


Figure 2: Measurement into 50Ω, D4601-A1

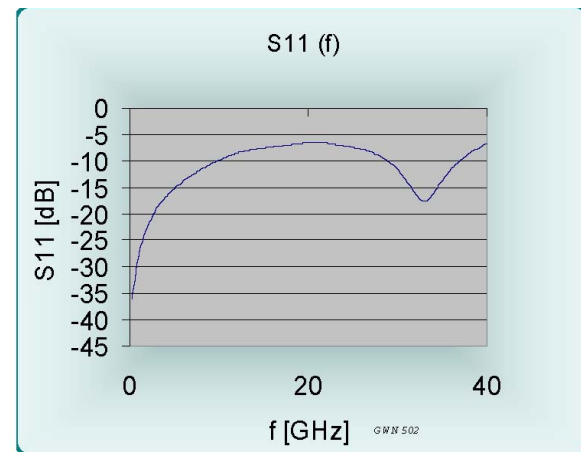


Figure 3: Return Loss, S11, D4601-A1

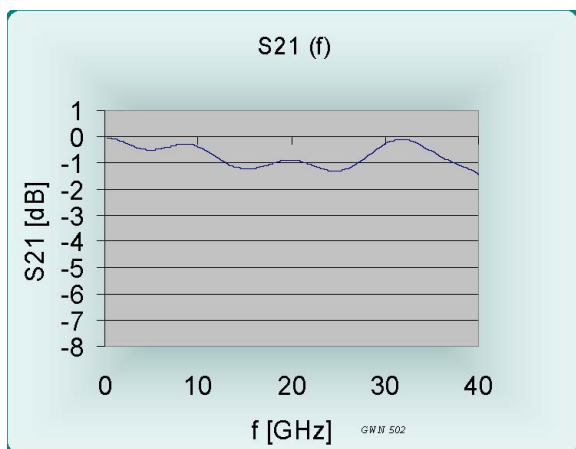


Figure 1: Insertion Loss, S21, D4601-A1

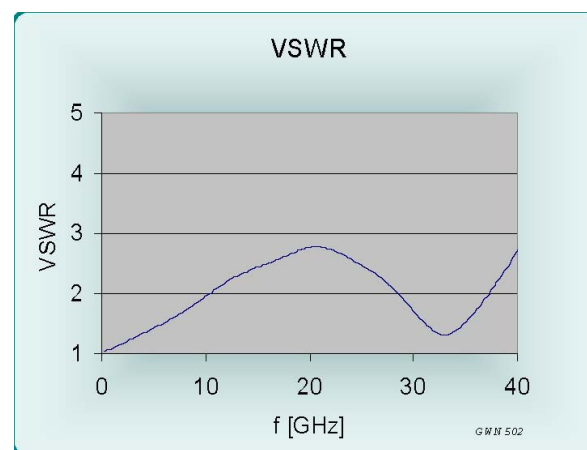


Figure 4: VSWR, D4601-A1

EQUIVALENT CIRCUITS / SPICE MODELS

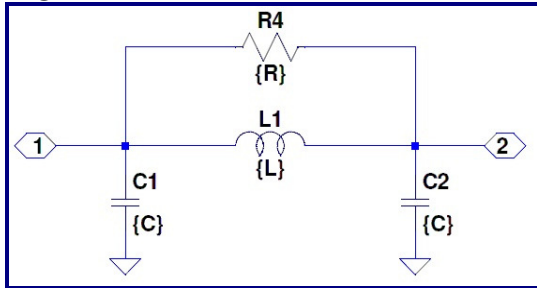


Figure 5 Pi Equivalent, Valid to <9GHz

C1, C2	0.347	pF
L1	1.01	nH
R4	500	Ohms

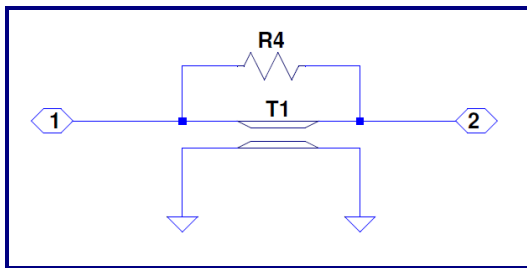


Figure 6 Transmission Line Model, Valid to >40GHz

Z0	34.5	Ohms
L	25.5	ps
R4	5000	Ohms

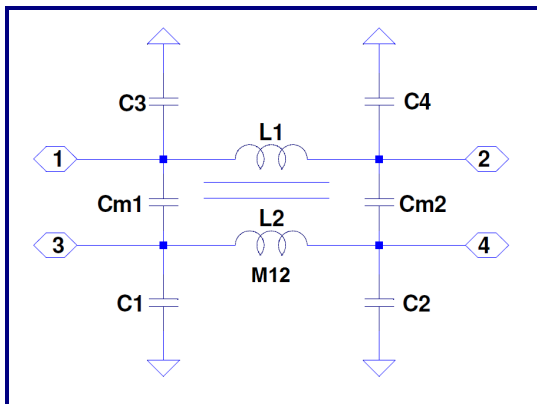


Figure 7: Lumped, Mutual Elements

C1,2,3,4	0.347	pF
Cm1, Cm2	0.061	pF
L1, L2	1.01	nH
M12	0.276	nH

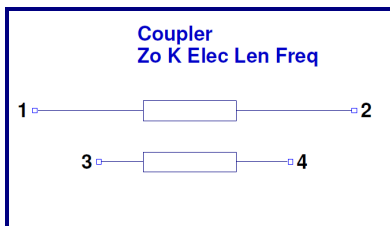
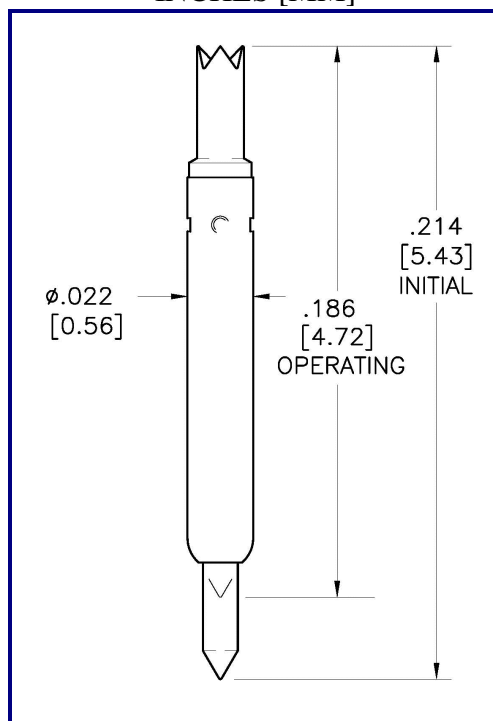


Figure 8: Transmission Line Equivalent for Crosstalk

Z0	34.5	Ohms
Tl	25.5	ps

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					
<a href="#">D4525</a>	.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
<a href="#">D4595</a>	.154"	3.91	.128"	3.25	38 g	0.82 nH	19.5 GHz	30 mOhms	3.0 A
<a href="#">D4601</a>	.214"	5.43	.186"	4.72	24-34 g	1.0 nH	12.8 GHz	50 mOhms	6.0 A
<a href="#">D4603</a>	.209"	5.30	.181"	4.59	24 g	1.16 nH	12.4 GHz	70 mOhms	4.0 A
<a href="#">D4613</a>	.249"	6.32	.213-.216"	5.49	24-34 g	1.25 nH	14.3 GHz	40 mOhms	2.15 A
<a href="#">D4623</a>	.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	-	-	-	-
<a href="#">D4693</a>	.185"	4.71	.157"	4.00	24-34 g	0.92 nH	18.3 GHz	40 mOhms	3.0 A
<a href="#">D4694</a>	.185"	4.71	.157"	4.00	23-36 g	0.80 nH	7.8 GHz	40 mOhms	3.0 A
<a href="#">D4697</a>	.339"	8.61	.295"	7.50	32 g	2.01 nH	8.6 GHz	45 mOhms	2.6 A

### MECHANICAL DIMENSIONS INCHES [MM]



Signal Integrity, Inc.  
 104 County Street, Ste. 210, Attleboro, MA 02703  
 Tel: 1-508-226-6480 Fax: 1-508-226-6488 Internet: [www.signalin.com](http://www.signalin.com)

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