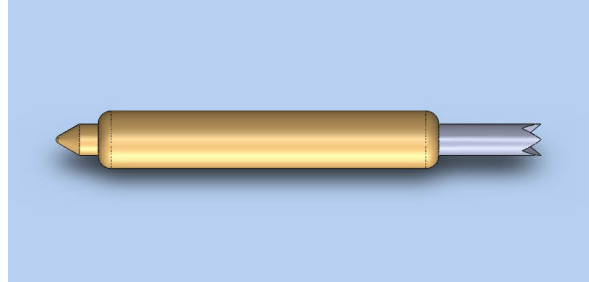


FEATURES

- **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 |

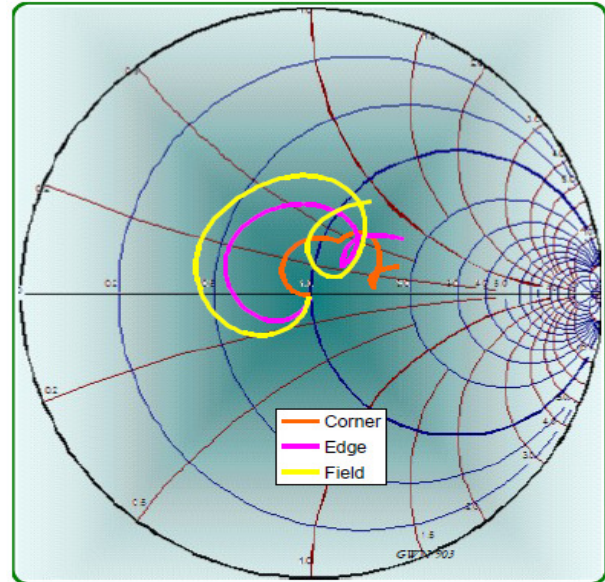


Figure 2: Measurement into 50Ω, D4694-F6

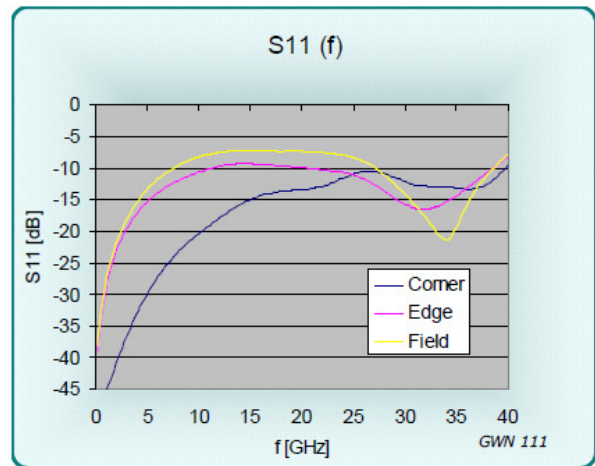


Figure 3: Return Loss, S11, D4694-F6

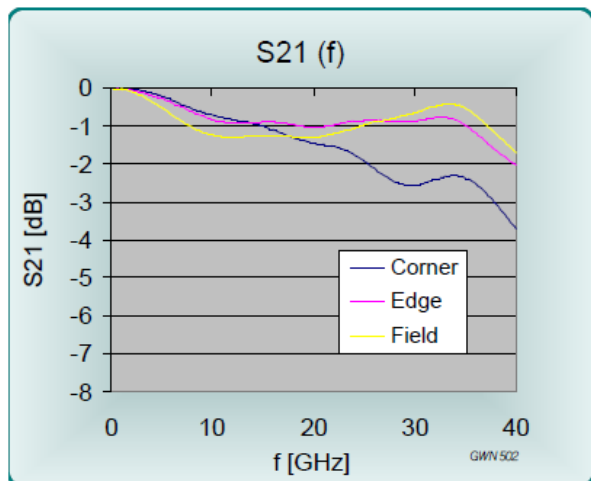


Figure 1: Insertion Loss, S21, D4694-F6

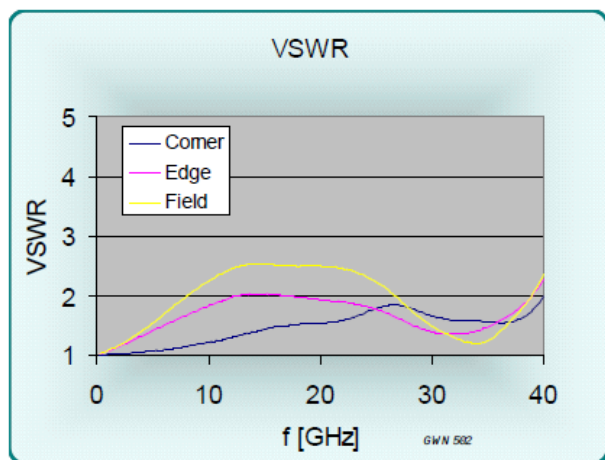


Figure 4: VSWR, D4694-F6

EQUIVALENT CIRCUITS / SPICE MODELS

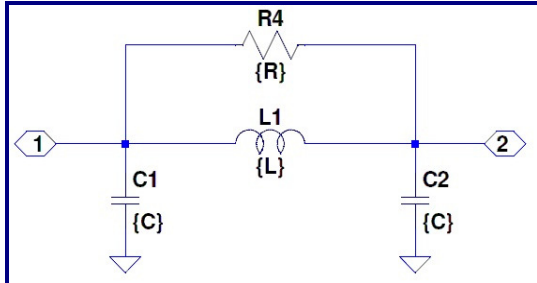


Figure 5: Pi Equivalent, Valid to >10 GHz

| 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 |

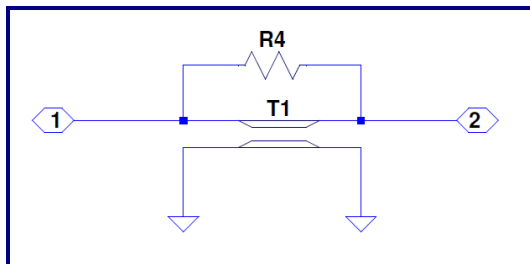


Figure 6: Transmission Line Model Valid to >40GHz

| 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 |

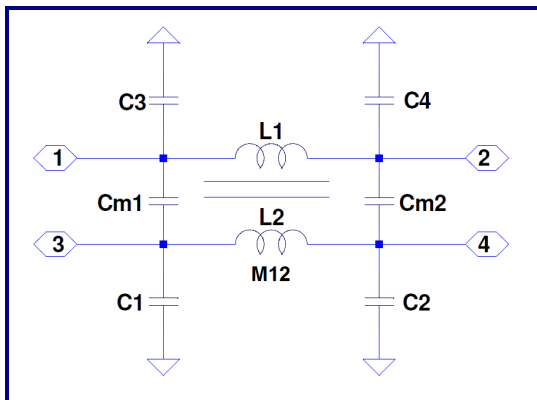


Figure 7: Lumped, Mutual Elements

| 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 |

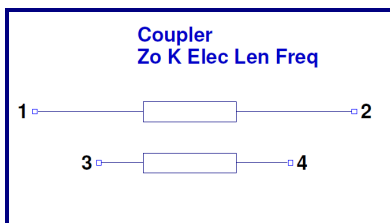
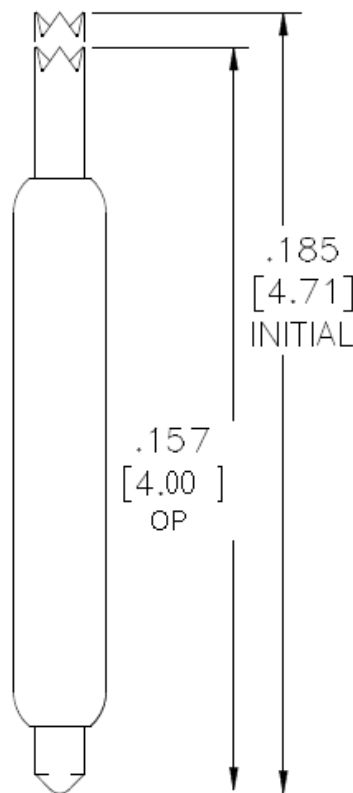


Figure 8: Transmission Line Equivalent for Crosstalk

| | | |
|-----|------|------|
| 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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