## **Semiconductor Probe**

#### SEMICONDUCTOR PROBE

ECT has a long history manufacturing single-ended and double-ended fine pitch probes.

Thanks to our large market exposure at most major semiconductor producers, we have gained substantial expertise from our worldwide customer base. This expertise is reflected in each new probe series we develop, allowing us to stay a head of the very technically demanding semiconductor market.

Please feel free to contact us for further requirements or more information, as we can meet a variety of special requirements including ultra-high temperature applications or none magnetic probes for the MEMS market.

#### The ZIP® Advantage

ECT's ZIP® series feature a number of innovative designs that provide superior contact capable of meeting your application needs. Utilizing ECT's patented flat technology, ZIP semiconductor spring probes present a new level of accuracy, scalability, and performance. While conventional round technology restricts longer travel and can have its reliability undermined by its small contact area, ZIP possesses a large internal contact area, resulting in low C-Res, superior bandwidth, and excellent high current behavior. The performance, economy, and application versatility provided by ZIP probes are further enhanced by the use of an external spring. Conventional spring probes rely on contact between the barrel and plunger, which allows for the possibility of conductivity interference through contamination build up in dirty test environments. By having an external spring and no barrel, ZIP greatly reduces the threat of contamination, thereby reducing cost-of-test and increasing efficiency. ECT has produced flat compliant contacts since 1995. The ZIP series is the culmination of years of experience and development, and reflects the industry's finest semiconductor contacts. With its broad scope of application solutions and special options, the ZIP family of products can satisfy all of your semiconductor test needs. If your spring probes aren't meeting your tough, high volume challenges, then you don't know ZIP.

#### Bantam® Series

The Bantam® probe is a high-performance, spring loaded compliant contact for applications requiring robust, short contact to support fine pitch and high bandwidth production needs. Unlike conventional spring probes, the Bantam has only one internal sliding / wiping contact surface, providing consistent low resistance levels while maintaining a high level of Z-Axis compliance.

#### **CSP and SPLJ Series**

These probes are traditional but state of the art double ended probes ranging from 0.4mm to 1.27mm pitch. The CSP probe series offers a selection of different plating options to optimize contact challenges and maximize probe life. Various length options also allow drop-in replacement capability for most competitor probes.

#### Mini-Mite™ Series

The SCP or Mini-Mite™ probe features a unique single ended design, providing very low, consistent DC resistance. The uniform design allows all three product pitches to be used on the same test height. The single sliding contact cuts the failure mode in half and ensures highly repeatable results.











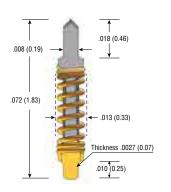
## **Z0**

0.40 mm, 0.50 mm

#### **Ultra HIGH Bandwidth**

The Z0 Ultra High Bandwidth Series takes advantage of the ZIP® scalable architecture to arrive at an ultra-compact design with 0.50 nH and 0.60 nH inductance. Z0 offers a bandwidth of 30GHz and 40GHz, making Z0 an ideal solution for high frequency testing.

#### Z0-040



#### Mechanical

PILCII:	.016 (0.40)
Recommended Travel:	.018 (0.46)
Full Travel:	.020 (0.50)
Test Height:	.059 (1.51)
Mechanical Life*:	200,000 cycles
Operating Temperature:	-55°C to +155°C

#### Spring Force in oz. (grams)

	Order Code	Test Height
Standard		0.66 (19)
High	- 1	0.96 (27)

#### **Electrical (Static Conditions)**

Current Rating DC: 2.5 amps

Average DC Probe Resistance\*\*: <90 mOhms

Self Inductance (Ls): 0.50 nH

Capacitance (Cc): 0.030 pF

Bandwidth @ -1dB: >30.0 GHz

#### **Materials and Finishes**

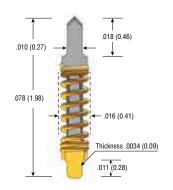
Plunger DUT: HyperCore™

Plunger HIB: BeCu, Gold plated over hard Nickel Spring: Stainless Steel, Gold plated

## Tip Style - DUT B L D R Y

# Tip Style - HIB

#### Z0-050



#### Mechanical

Pitch:	.020 (0.50)
Recommended Travel:	.019 (0.48)
Full Travel:	.022 (0.56)
Test Height:	.059 (1.51)
Mechanical Life*:	500,000 cycles
Operating Temperature:	$-55^{\circ}$ C to $+155^{\circ}$ C

#### Spring Force in oz. (grams)

	Order Code	Test Height
Standard		0.65 (18)
High	- 1	1.11 (31)

#### **Electrical (Static Conditions)**

Current Rating DC: 2.88 amps

Average DC Probe Resistance\*\*: <90 m0hms

Self Inductance (Ls): 0.60 nH

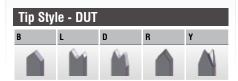
Capacitance (Cc): 0.03 pF

Bandwidth @ -1dB: >40.0 GHz

#### **Materials and Finishes**

Plunger DUT: HyperCore™

Plunger HIB: BeCu with proprietary plating Spring: Stainless Steel, Gold plated



Tip Style	- HIB	
J		





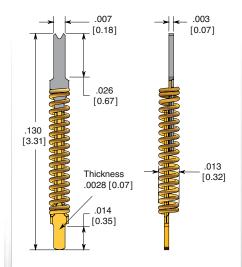




**Z-040** 

0.40 mm

#### Z-040



#### Mechanical

 Pitch:
 .016 (0.40)

 Recommended Travel:
 .025 (0.64)

 Full Travel:
 .028 (0.71)

 Test Height:
 .105 (2.67)

 Mechanical Life\*:
 500,000 cycles

 Operating Temperature:
 -55°C to +155°C

 Spring Force in oz. (grams):
 1.20 (34)

#### **Electrical (Static Conditions)**

Current Rating DC: 2.0 amps
Average DC Probe Resistance\*\*: <85 mOhms
Self Inductance (Ls): 1.07 nH
Capacitance (Cc): 0.21 pF
Bandwidth @ -1dB: 30.0 GHz

#### **Materials and Finishes**

Plunger DUT: HyperCore™

Plunger HIB: BeCu with proprietary plating Spring: Stainless Steel, Gold plated

#### **HIGH Bandwidth**

The ZIP® Z High Bandwidth Series yields the highest and most stable bandwidth for its package size. The high performance provided by these contacts makes the Z series a perfect choice for the most demanding test applications. High Bandwidth probes are available in 0.4mm and 0.5mm pitches.



#### Tip Style - HIB









## **Z-050**

0.50 mm

#### **HIGH Bandwidth**

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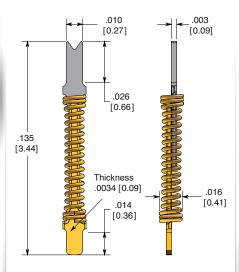








#### Z-050



#### Mechanical

PITCN:	.020 (0.50)
Recommended Travel:	.025 (0.64)
Full Travel:	.030 (0.76)
Test Height:	.110 (2.79)
Mechanical Life*:	500,000 cycles
Operating Temperature:	-55°C to +155°C
Spring Force in oz. (grams):	1.40 (40)

#### **Electrical (Static Conditions)**

Current Rating DC:	2.8 amps
Average DC Probe Resistance**:	<65 m0hms
Self Inductance (Ls):	1.01 nH
Capacitance (Cc):	0.20 pF
Bandwidth @ -1dB:	25.0 GHz

#### **Materials and Finishes**

Plunger DUT: HyperCore™

Plunger HIB: BeCu with proprietary plating Spring: Stainless Steel, Gold plated



## Z - Kelvin

0.40 mm

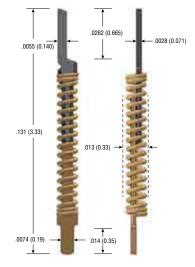
#### **Z-KELVIN**

ECT's ZIP® Kelvin .4mm is ideal for voltage sensitive tests on array or peripheral devices requiring milliohm resistance measurements as well as high-power test applications.





#### **Z-040KHJ**



#### Mechanical

Pitch:	.016 (0.40)
Recommended Travel:	.025 (0.64)
Full Travel:	.028 (0.71)
Test Height:	.105 (2.67)
Mechanical Life*:	500,000 cycles
Operating Temperature:	$-55^{\circ}\text{C}$ to $+155^{\circ}\text{C}$
Spring Force in oz. (grams):	1.20 (34)

#### **Electrical (Static Conditions)**

Current Rating DC: 1.2 amps

Average DC Probe Resistance\*\*: <70 mOhms

Self Inductance (Ls): 1.0 nH

Capacitance (Cc): 0.40 pF

Bandwidth @ -1dB: 7.0 GHz

#### **Materials and Finishes**

Plunger DUT: HyperCore™

Plunger HIB: BeCu with proprietary plating Spring: Stainless Steel, Gold plated

Tip Style - DUT			
K			
Tip Style	- HIB		
J			
N.			

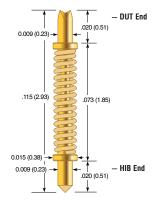




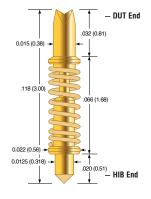
### **BTM**

0.50 mm, 0.75 mm, 1.00 mm

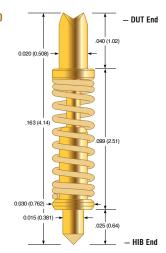




#### BTM-075



#### BTM-100



#### Mechanical

Pitch:	.019 (0.50)
Recommended Travel:	.015 (0.38)
Full Travel:	.020 (0.51)
Test Height:	.098 (2.49)
Mechanical Life*:	500,000 cycles
Operating Temperature:	$-55^{\circ}\text{C}$ to $+155^{\circ}\text{C}$
Spring Force in oz. (grams):	1.10 (31)

#### **Electrical (Static Conditions)**

Current Rating:	2.5 amps
Average DC Probe Resistance**:	<50 m0hms
Self Inductance (Ls):	0.95 nH
Capacitance (Cc):	0.28 pF
Bandwidth @ -1dB:	23.00 GHz

#### **Materials and Finishes**

Heat-treated BeCu, Gold plated over Plunger:

hard Nickel or

Primeguard 1 for NiPd solder or Primeguard 2 for Lead free solder Work-hardened BeCu, Gold plated

Barrel: over hard Nickel

Spring: Steel alloy, Gold plated over hard Nickel

#### Mechanical Ditoh

PILCII:	.030 (0.73)
Recommended Travel:	.015 (0.38)
Full Travel:	.020 (0.51)
Test Height:	.103 (2.62)
Mechanical Life*:	500,000 cycles
Operating Temperature:	-55°C to +155°C
Spring Force in oz. (gran	ms): 1.00 (28)

#### **Electrical (Static Conditions)**

Current Rating:	2.9 amps
Average DC Probe Resistance**:	<50 m0hms
Self Inductance (Ls):	0.77 nH
Capacitance (Cc):	0.25 pF
Bandwidth @ -1dB:	15.84 GHz

#### **Materials and Finishes**

Heat-treated BeCu, Gold plated over Plunger:

hard Nickel or

Primeguard 1 for NiPd solder or Primeguard 2 for Lead free solder

Work-hardened Brass, Gold plated Barrel:

over hard Nickel

Spring: Steel alloy, Gold plated over hard Nickel

#### Mechanical

020 (0.75)

Pitch:	.040 (1.00)
Recommended Travel:	.028 (0.71)
Full Travel:	.030 (0.76)
Test Height:	.136 (3.45)
Mechanical Life*:	500,000 cycles
Operating Temperature:	-55°C to +155°C
Spring Force in oz. (grams):	1.40 (39)

#### **Electrical (Static Conditions)**

Current Rating:	3.5 amps
Average DC Probe Resistance**:	<50 m0hms
Self Inductance (Ls):	1.30 nH
Capacitance (Cc):	0.34 pF
Bandwidth @ -1dB:	10.00 GHz

#### **Materials and Finishes**

Barrel:

Heat-treated BeCu, Gold plated over Plunger:

hard Nickel or

Primeguard 1 for NiPd solder or Primeguard 2 for Lead free solder Work-hardened Brass, Gold plated

over hard Nickel

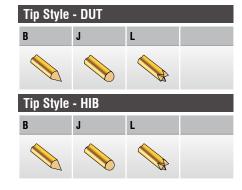
Spring: Steel alloy, Gold plated over hard Nickel

### Tip Style - DUT



В	J	

# Tip Style - DUT Tip Style - HIB



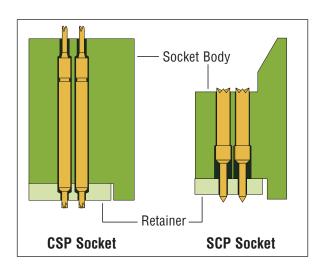




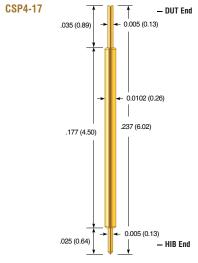
0.40 mm

#### **Socket Design Considerations**

- CSP series is captured between the socket body and retainer plate, with the barrel fixed in place.
- SCP Socket series is captured between the socket body and retainer plate, with the barrel sliding freely counter bore.
- Counter bore should not be too deep, and enable a minimum amount of preload against interface board.
- Body height and device cavity should be designed to prevent probe from being compressed shorter than test height.



Tip Style - DUT / HIB			
В	L		



#### Mechanical

 Pitch:
 .016 (0.40)

 Recommended Travel:
 .020 (0.51)

 Full Travel:
 .025 (0.64)

 Test Height:
 .217 (5.51)

 Mechanical Life\*:
 250.000 cycles

 Operating Temperature:
 -55°C to +105°C

 Spring Force in oz. (grams):
 0.85 (24)

#### **Electrical (Static Conditions)**

Current Rating: 2.0 amps
Average DC Probe Resistance\*\*: <100 mOhms
Self Inductance (Ls): 1.71 nH
Capacitance (Cc): 0.58 pF
Bandwidth @ -1dB: 6.8 GHz

#### **Materials and Finishes**

Plunger DUT: Heat-treated Steel, Gold plated

over hard Nickel

Plunger HIB: Heat-treated Steel, Gold plated

over hard Nickel

Barrel: Work-hardened Phosphorous

Bronze, Gold plated over hard Nickel

Spring: Music Wire, Gold plated



S= STEEL

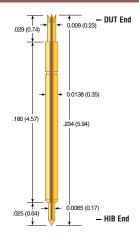




\* Life specifications are based on lab results but are dependent on cleaning frequency and the specific customer application, including DUT materials, handler kit, maintenance, etc. \*\* Contact resistance will increase over time due to solder build-up and wear

0.50 mm

CSP5-18



#### Mechanical

Pitch:	.019 (0.50)
Recommended Travel:	.020 (0.51)
Full Travel:	.025 (0.64)
Test Height:	.214 (5.44)
Mechanical Life*:	500,000 cycles
Operating Temperature:	-55°C to $+155$ °C
Spring Force in oz. (grams):	0.7 (19.8)

#### **Electrical (Static Conditions)**

Current Rating:	2 amps
Average DC Probe Resistance**:	<150 m0hms
Self Inductance (Ls):	1.5 nH
Capacitance (Cc):	0.63 pF
Bandwidth @ -1dB:	8.13 GHz

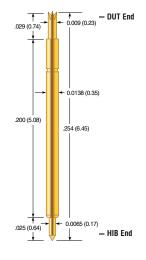
#### **Materials and Finishes**

Plunger DUT:	Heat-treated BeCu or Steel, Gold plated over hard Nickel or
	Primeguard 1 for NiPd solder or Primeguard 2 for Lead free solder
Plunger HIB:	Heat-treated BeCu or Steel, Hard Gold over Nickel

Work-hardended Phosphor Bronze, Barrel: Gold plated over hard Nickel

Spring: Steel alloy, Gold plated

#### CSP5-20



#### Mechanical

Pitch:	.019 (0.50)
Recommended Travel:	.020 (0.51)
Full Travel:	.025 (0.64)
Test Height:	.234 (5.94)
Mechanical Life*:	500,000 cycles
Operating Temperature:	$-55^{\circ}\text{C}$ to $+155^{\circ}\text{C}$
Spring Force in oz. (grams):	0.7 (19.8)

#### **Electrical (Static Conditions)**

Current Rating:	2 amps
Average DC Probe Resistance**:	<150 m0hms
Self Inductance (Ls):	1.65 nH
Capacitance (Cc):	0.69 pF
Bandwidth @ -1dB:	7.4 GHz

Heat-treated BeCu or Steel,

#### **Materials and Finishes**

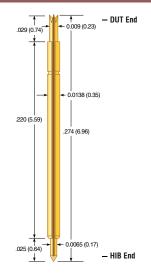
Plunger DUT:

	Gold plated over hard Nickel or
	Primeguard 1 for NiPd solder or
	Primeguard 2 for Lead free solder
Plunger HIB:	Heat-treated BeCu or Steel,
	Hard Gold over Nickel
Barrel:	Work-hardended Phosphor Bronze

Gold plated over hard Nickel

Spring: Steel alloy, Gold plated

#### CSP5-22



#### Mechanical

Pitch:	.019 (0.50)
Recommended Travel:	.020 (0.51)
Full Travel:	.030 (0.76)
Test Height:	.254 (6.45)
Mechanical Life*:	500,000 cycles
Operating Temperature:	$-55^{\circ}\text{C} \text{ to } +155^{\circ}\text{C}$
Spring Force in oz. (grams):	1.2 (34.9)

#### **Electrical (Static Conditions)**

Current Rating:	2 amps
Average DC Probe Resistance**:	<150 m0hms
Self Inductance (Ls):	1.79 nH
Capacitance (Cc):	0.75 pF
Bandwidth @ -1dB:	6.8 GHz

#### **Materials and Finishes**

Plunger DUT:	Heat-treated BeCu or Steel,
	Gold plated over hard Nickel or
	D. I.A.C. NUD.I. I.I.

Primeguard 1 for NiPd solder or Primeguard 2 for Lead free solder

Heat-treated BeCu or Steel, Plunger HIB: Hard Gold over Nickel

Barrel:

Work-hardended Phosphor Bronze,

Gold plated over hard Nickel

Spring: Steel alloy, Gold plated

#### Tip Style - DUT / HIB



## Tip Style - DUT / HIB

#### Tip Style - DUT / HIB



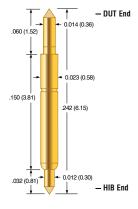




114

0.80 mm

#### CSP8-15



#### Mechanical

Pitch:	.032 (0.80)
Recommended Travel:	.030 (0.76)
Full Travel:	.034 (0.86)
Test Height:	.212 (5.38)
Mechanical Life*:	500,000 cycles
Operating Temperature:	$-55^{\circ}$ C to $+155^{\circ}$ C
Spring Force in oz. (grams):	1.0 (28.3)

#### **Electrical (Static Conditions)**

Current Rating:	3 amps
Average DC Probe Resistance**:	<150 m0hms
Self Inductance (Ls):	1.23 nH
Capacitance (Cc):	0.65 pF
Bandwidth @ -1dB:	9.23 GHz

#### **Materials and Finishes**

Plunger HIB:

Barrel:

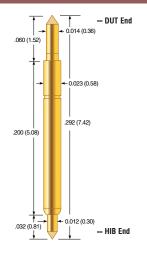
Plunger DUT:	Heat-treated BeCu or Steel,
	Gold plated over hard Nickel or
	Primeguard 1 for NiPd solder of

Primeguard 2 for Lead free solder Heat-treated BeCu or Steel,

Hard Gold over Nickel

Work-hardened Phosphor Bronze, Gold plated over hard Nickel

Spring: Steel alloy, Gold plated CSP8-20



#### Mechanical Pitch:

i itoli.	.002 (0.00)
Recommended Travel:	.030 (0.76)
Full Travel:	.035 (0.89)
Test Height:	.262 (6.65)
Mechanical Life*:	500,000 cycles
Operating Temperature:	-55°C to +155°C
Spring Force in oz. (grams):	1.0 (28.3)

#### **Electrical (Static Conditions)**

Current Rating:	3 amps
Average DC Probe Resistance**:	<150 m0hms
Self Inductance (Ls):	1.52 nH
Capacitance (Cc):	0.81 pF
Bandwidth @ -1dB:	7.45 GHz

#### **Materials and Finishes**

Spring:

Plunger DUT:	Heat-treated BeCu or Steel, Gold plated over hard Nickel or Primeguard 1 for NiPd solder or Primeguard 2 for Lead free solde
Plunger HIB:	Heat-treated BeCu or Steel, Hard Gold over Nickel
Barrel:	Work-hardened Phosphor Bronze

Gold plated over hard Nickel Steel alloy, Gold plated

Tip Style - DUT / HIB

## - DUT End CSP8-25 0.023 (0.58) .342 (8.69) .250 (6.35)

#### Mechanical

032 (0.80)

Pitch:	.032 (0.80)
Recommended Travel:	.030 (0.76)
Full Travel:	.040 (1.02)
Test Height:	.312 (7.92)
Mechanical Life*:	500,000 cycles
Operating Temperature:	-55°C to +155°C
Spring Force in oz. (grams):	1.1 (31.2)

.032 (0.81) — HIB End

#### **Electrical (Static Conditions)**

Current Rating:	3 amps
Average DC Probe Resistance**:	<150 m0hms
Self Inductance (Ls):	1.81 nH
Capacitance (Cc):	0.96 pF
Bandwidth @ -1dB:	5.25 GHz

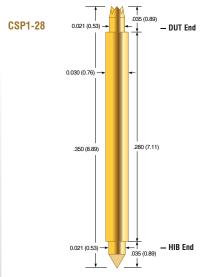
#### **Materials and Finishes**

Plunger DUT:	Heat-treated BeCu or Steel, Gold plated over hard Nickel or Primeguard 1 for NiPd solder or Primeguard 2 for Lead free solder
Plunger HIB:	Heat-treated BeCu or Steel, Hard Gold over Nickel
Barrel:	Work-hardened Phosphor Bronze, Gold plated over hard Nickel
Spring:	Steel alloy, Gold plated

## Tip Style - DUT / HIB

Tip Style - DUT / HIB			
В	J	L	

1.0 mm



#### Mechanical

 Pitch:
 .039 (1.0)

 Recommended Travel:
 .030 (0.76)

 Full Travel:
 .040 (1.02)

 Test Height:
 .315 (8.00)

 Mechanical Life\*:
 500,000 cycles

 Operating Temperature:
 -55°C to +155°C

 Spring Force in oz. (grams):
 2.0 (57)

#### **Electrical (Static Conditions)**

Current Rating: 3 amps
Average DC Probe Resistance\*\*: <100 mOhms
Self Inductance (Ls): 3.10 nH
Capacitance (Cc): 0.95 pF
Bandwidth @ -1dB: 3.80 GHz

#### **Materials and Finishes**

Plunger DUT: Heat-treated BeCu, Gold plated over

hard Nickel

Plunger HIB: Heat-treated BeCu, Gold plated over

hard Nickel

Barrel: Work-hardened Phosphor Bronze,

Gold plated over hard Nickel

Spring: Steel alloy, Gold plated

# Tip Style - DUT / HIB B L J

## CONTACT PRODUCTS A CODU COMPONITY ECT-CPG.com shop.ECT-CPG.com



#### **ORDER KEY**

#### BTM-050 / 075 / 100

Series	Size	OUT TIP Style	HIB To Style	Plating Type
втм -	- 050	L	1	- 2
втм	075	В	1	- 111
BTM :	- 100	L	240	- 1

Blank = Gold

-1 = Primeguard 1

-2 = Primeguard 2

#### CSP-1



#### CSP5 / CSP8

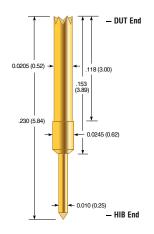
Series	Site	DUT Tip Style	DUT Material	HIS TO SIYM	HIS Material		Plating	
CSP5 -	22	T.	C	idei	3	1-1	1	
CSP5 -	22	Ł	\$	1	S	-	2	7
CSP8 -	25	1	S	1.	\$	ш		

#### SCP-080 / 100 / 127

Series	Size	DUT Tip Style	нів Тір біуіс
SCP	980	7.	dil
SCP -	100 127	8 2	77

0.80 mm, 1.00 mm, 1.27 mm

#### SCP-080



#### Mechanical

Pitch:	.032 (0.80)
Recommended Travel:	.030 (0.76)
Full Travel:	.035 (0.89)
Test Height:	.200 (5.08)
Mechanical Life*:	1,000,000 cycles
Operating Temperature:	$-55^{\circ}$ C to $+155^{\circ}$ C
Spring Force in oz. (grams):	1.50 (42.5)

#### **Electrical (Static Conditions)**

Current Rating:	5 amps
Average DC Probe Resistance**:	<50 m0hms
Self Inductance (Ls):	1.27 nH
Capacitance (Cc):	0.12 pF
Bandwidth @ -1dB:	6.0 GHz

#### **Materials and Finishes**

Plunger: Heat-treated BeCu, Gold plated over

hard Nickel

Barrel: Work-hardened BeCu, Gold plated

over hard Nickel

Steel alloy, Gold plated Spring:

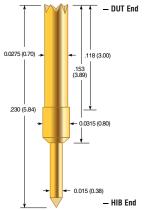
## Tip Style - DUT



#### Tip Style - HIB



#### **SCP-100**



#### Mechanical

Pitch:	.039 (1.00)
Recommended Travel:	.030 (0.76)
Full Travel:	.035 (0.89)
Test Height:	.200 (5.08)
Mechanical Life*:	1,000,000 cycles
Operating Temperature:	$-55^{\circ}\text{C}$ to $+155^{\circ}\text{C}$
Spring Force in oz. (grams):	1.50 (42.5)

#### **Electrical (Static Conditions)**

Current Rating:	7 amps
Average DC Probe Resistance**:	<50 m0hms
Self Inductance (Ls):	1.40 nH
Capacitance (Cc):	0.66 pF
Randwidth @ -1dR·	6 70 GHz

#### **Materials and Finishes**

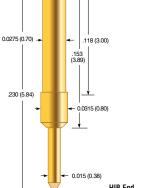
Plunger: Heat-treated BeCu, Gold plated over

hard Nickel

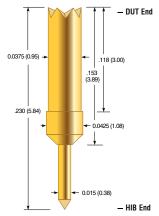
Work-hardened BeCu, Gold plated Barrel:

over hard Nickel

Spring: Steel alloy, Gold plated



## **SCP-127**



#### Mechanical

	.030 (0.76)
Recommended Travel:	
Full Travel:	.035 (0.89)
Test Height:	.200 (5.08)
Mechanical Life*: 1	,000,000 cycles
Operating Temperature: -5	55°C to +155°C
Spring Force in oz. (grams):	1.50 (42.5)

#### **Electrical (Static Conditions)**

Current Rating:	9 amps
Average DC Probe Resistance**:	<50 m0hms
Self Inductance (Ls):	1.40 nH
Capacitance (Cc):	0.79 pF
Bandwidth @ -1dB:	7.6 GHz

#### **Materials and Finishes**

Plunger:	Heat-treated BeCu,	Gold plated over

hard Nickel

Barrel: Work-hardened BeCu, Gold plated

over hard Nickel

Steel alloy, Gold plated Spring:

#### Tip Style - DUT

В	L	Z				
Tin Style - HIB						

В	J	

#### Tip Style - DUT



#### Tip Style - HIB

В	J	





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