



A RECOGNIZED GLOBAL INNOVATOR IN THE TRIMMER CAPACITOR INDUSTRY FOR MAGNETIC RESONANCE IMAGING, NUCLEAR MAGNETIC RESONANCE AND OTHER MEDICAL APPLICATIONS. WE ARE AT THE FOREFRONT OF TECHNOLOGY, DESIGN, QUALITY AND CUSTOMIZED SOLUTIONS.

## NON-MAGNETIC TRIMMER CAPACITORS



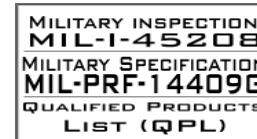
### Contact Information

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President

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Email: [dditlya@spraguegoodman.com](mailto:dditlya@spraguegoodman.com)



# NON-MAGNETIC TRIMMER CAPACITORS

*Sprague Goodman Electronics, Inc. has been at the forefront of design, manufacturing and customization of non-magnetic trimmer capacitors for over 15 years. Based on increasing customer demand for reliable high voltage solutions, we continue to expand our offerings to meet the specific requirements for the most complicated projects.*

## Non-Magnetic Product Summary

- **Special Designs and Customization**
  - The heart and soul of our company and what sets us apart from our competitors. David Ditlya, President, is an expert in non-magnetic components for the MRI, NMR and Semi Conductor industries; and currently holds several US Patents:
    - 4,575,782
    - 5,155,654
    - 5,229,911
    - 6,498,712
  - A majority of our latest designs come from specific customer requests for their new applications. We offer a level of customization that is unavailable anywhere in the industry.
- **High Quality Materials**
  - MRI and NMR specifications demand that a capacitor is specially designed not to distort a 14,000 Gauss field by more than one part per 600 millions. To guarantee that we achieve these specifications, we use very carefully sourced and tested specialty materials and a proprietary manufacturing process that insures consistent performance, high precision tuning and long term reliability.
  - We use materials with a typical magnetic susceptibility of  $40 \times 10^{-6}$  CGS units. Additionally, we keep a strict traceability system and perform diligent testing to insure this parameter.
- **Sealed Products**
  - The SGNM Series is internally sealed to withstand immersion in flux and cleaning solvents without leaking.
- **Cryogenic Trimmer Capacitors**
  - Due to increased demand from our more discerning customers, we designed our capacitors to be used and tuned at temperatures down to 4°K. This specific request came from our NMR customers and is the fastest growing product line we offer as our competitors do not have similar offerings.

# OUR APPROACH

*“Our objective is to provide innovative passive component technology solutions and unique custom products to our customers.”*

In addition to our industry leading product lines, we work with companies that require a high level of customization for their most advanced projects. Through our Specialty Products Development Team, we are able to deliver a degree of customization and a level of client service which is virtually unparalleled in our industry. We work diligently to insure that our products meet the most stringent quality control requirements.

By leveraging our areas of expertise, the diverse experience of our team, and our extensive industry network, we provide creative solutions to a wide variety of leading-edge customers including Magnetic Resonance Imaging, Nuclear Magnetic Resonance, and other medical applications in addition to Defense, RFID, cellular technologies, and many others. We strive to build the best performing components for your next project.



# SGNM – SERIES I

## CERAMIC HIGH VOLTAGE NON-MAGNETIC TRIMMER CAPACITOR



### Product Highlights

- High Voltage Ceramic Dielectric
- Internally Sealed to Withstand External Pressure of Up to 40 PSI
- Residual Magnetic Value Less Than 20 nT

### Applications

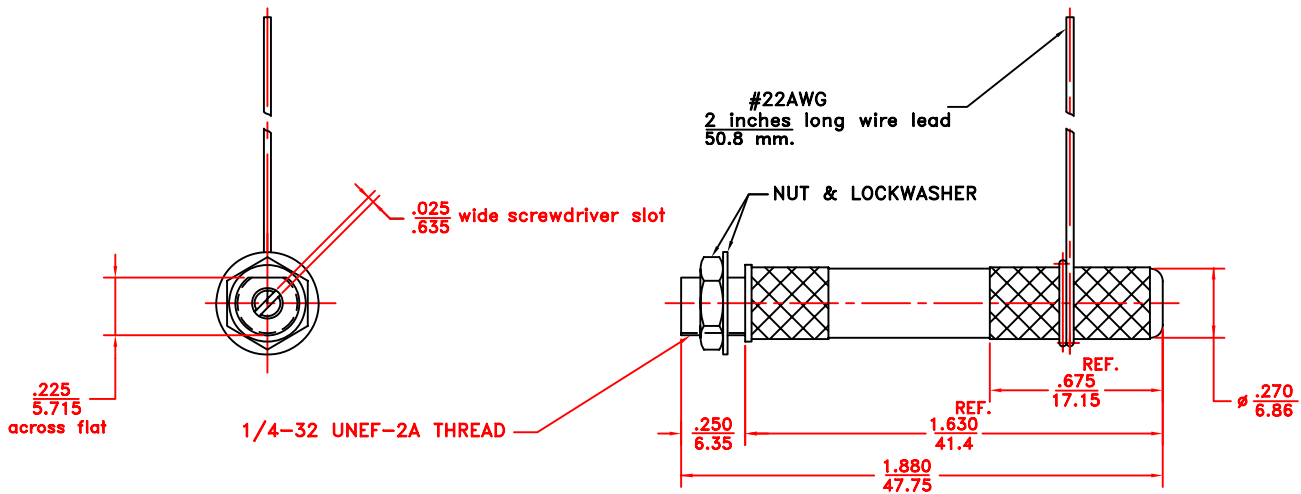
- MRI and NMR Coils
- Transmitting and Receiving Sections of MRI and NMR Machines
- Cryogenic Projects

Model Number	Capacitance Range (pF)		Q Min (at 25 MHz C Max)	Rated DC Working Voltage (V)	Dielectric Withstanding Voltage (V)
	Min	Max			
SGNMNC1054	0.50	5.00	2,000	4,000	8,000
SGNMNC1056	0.50	5.00	2,000	6,000	12,000
SGNMNC1059	0.50	5.00	2,000	8,750	17,500
SGNMNC1103	1.00	10.00	1,700	3,000	6,000
SGNMNC1106	1.00	10.00	1,700	6,000	12,000
SGNMNC1108	1.00	10.00	1,700	7,500	15,000
SGNMNC1152	1.00	15.00	1,500	2,000	4,000
SGNMNC1156	1.50	15.00	1,500	6,000	12,000
SGNMNC1206	2.00	20.00	1,500	6,000	12,000

### Options:

1. **Extended Shaft** - Add suffix "E" to model number
2. **Cryogenic Version** - Add suffix "K" for model that operates and may be tuned at temperatures as low as 4K. This model is not sealed
3. **No Lead Option** - Add suffix "NL" for a model that does not include a wire lead attached to stator terminal
4. Please contact us directly for additional customization options

REV	DESCRIPTION	DATE	APP
00	NEW DRAWING	11/15/12	D.D.



**NOTES:**

1. Capacitance:  $C_{max} > 20\text{pF}$
2. Capacitance:  $C_{min} < 3.0\text{ pF}$
3. Working voltage: 4.5 kVDC
4. Withstanding voltage: 9 kVDC
5. Quality factor "Q" @ 25 MHz over 1500
6. Torque .5 to 1.0 oz-in
7. Construction: 40 psi sealed, non-magnetic
8. Dimensions: In/mm
9. Operation temperature: -55°C up to 125°C.
10. TC Temperature coefficient  $0 \pm 300$  (ppm/°C)
11. Current rating: 10 amps.
12. Rotational life: 10,000 turns.

TOLERANCES: (EXCEPT AS NOTED)		SPRAGUE GOODMAN ELECTRONICS INC. 1700 SHAMES DRIVE WESTBURY, NY 11590			
DECIMAL: ±0.002 In ±0.051 mm	MATERIAL:	SCALE: 2:1	DRAWN BY: R. LEVIN		
			APPROVED: D. DITLYA		
FRACTIONAL: 1/64	TITLE: OUTLINE DWG SGNMNC1205			USED FOR:	
ANGULAR: 1°	DATE: 11/15/12	DRAWING NUMBER SGNMNC1205		REV. 00	

# SGNM – SERIES 2

## CERAMIC HIGH VOLTAGE NON-MAGNETIC TRIMMER CAPACITOR



### Product Highlights

- High Voltage Ceramic Dielectric
- Internally Sealed to Withstand External Pressure of Up to 40 PSI
- Residual Magnetic Value Less Than 20 nT

### Applications

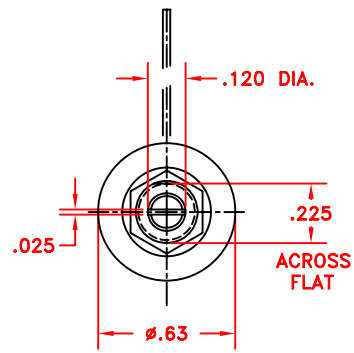
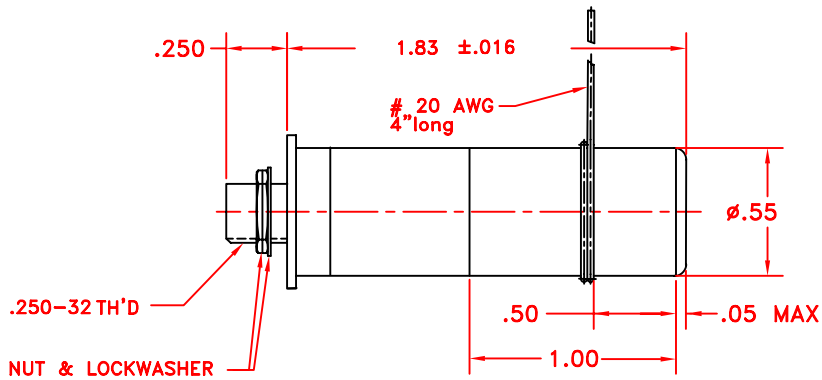
- MRI and NMR Coils
- Transmitting and Receiving Sections of MRI and NMR Machines
- Cryogenic Projects

Model Number	Capacitance Range (pF)		Q Min (at 25 MHz C Max)	Rated DC Working Voltage (V)	Dielectric Withstanding Voltage (V)
	Min	Max			
SGNMNC2106	1.00	10.00	3,000	6,000	12,000
SGNMNC2156	1.50	15.00	2,000	6,000	12,000
SGNMNC2206	2.00	20.00	1,500	6,000	12,000
SGNMNC2236	2.00	23.00	1,200	6,000	12,000
SGNMNC2256	3.00	25.00	1,200	6,000	12,000
SGNMNC2306	3.00	30.00	600	6,000	12,000
SGNMNC2356	3.50	35.00	600	6,000	12,000
SGNMNC2406	4.00	40.00	500	6,000	12,000
SGNMNC2502	5.00	50.00	500	2,500	5,000

### Options:

1. **Extended Shaft** - Add suffix "E" to model number
2. **Cryogenic Version** - Add suffix "K" for model that operates and may be tuned at temperatures as low as 4K. This model is not sealed
3. **No Lead Option** - Add suffix "NL" for a model that does not include a wire lead attached to stator terminal
4. Please contact us directly for additional customization options

REV	DESCRIPTION	DATE	APP
N.R	DESCRIPTION	REV.DATE	REV.APP.



**NOTES:**

1. CAPACITANCE:  $C_{max} \geq 70$  pF,  $C_{min} \leq 5.0$  pF.
2. WORKING VOLTAGE: 6,000 VDC.
3. WITHSTANDING VOLTAGE: 12,000 VDC
4. Q over 600 @ 25MHz
5. TORQUE: 1.0 TO 2.5 oz-in.
6. OPERATING TEMPERATURE: BELOW -55°C TO +125°C
7. DIMENSIONS: in/mm.
8. Construction: 40 psi sealed, non-magnetic
9. Rotational life: 10,000 turns

TOLERANCES: (EXCEPT AS NOTED)		SPRAGUE GOODMAN ELECTRONICS INC. 1700 SHAMES DRIVE WESTBURY, NY 11590	
DECIMAL: ±.002 in ±.051 mm	MATERIAL: MATERIAL	SCALE: NONE	DRAWN BY: DRAWN APPROVED: D.DITLYA
FRACTIONAL: 1/64	TITLE: OUTLINE DWG SGNMNC2706		
ANGULAR: 1°	DATE: 06/27/08	DRAWING NUMBER 7104	REV. REV

# SGNM – SERIES 3

## CERAMIC HIGH VOLTAGE NON-MAGNETIC TRIMMER CAPACITOR



### Product Highlights

- High Voltage Ceramic Dielectric
- Internally Sealed to Withstand External Pressure of Up to 40 PSI
- Residual Magnetic Value Less Than 20 nT

### Applications

- MRI and NMR Coils
- Transmitting and Receiving Sections of MRI and NMR Machines
- Cryogenic Projects

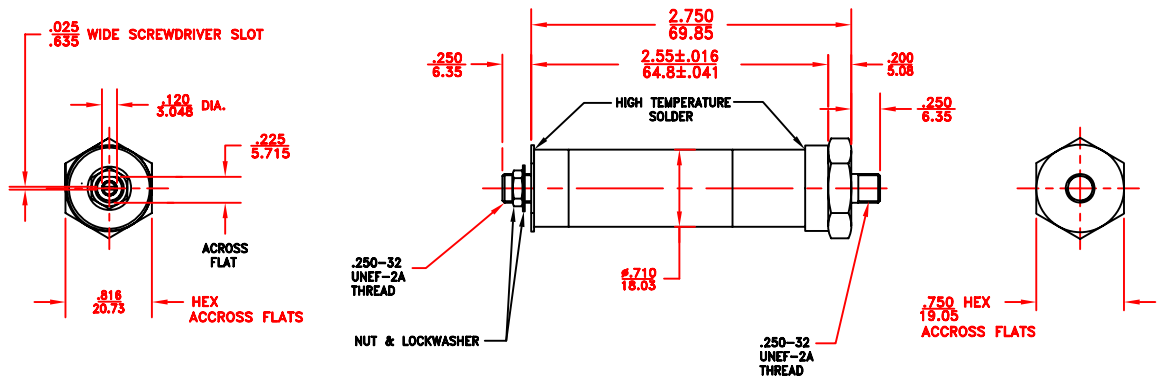
Model Number	Capacitance Range (pF)		Q Min (at 25 MHz C Max)	Rated DC Working Voltage (V)	Dielectric Withstanding Voltage (V)
	Min	Max			
SGNMNC3101	1.00	10.00	2,000	1,500	3,000
SGNMNC3103	1.50	10.00	2,000	3,000	6,000
SGNMNC3106	2.00	10.00	1,800	6,000	12,000
SGNMNC3153	1.50	15.00	2,000	3,000	6,000
SGNMNC3205	3.00	20.00	600	4,500	9,000
SGNMNC3253	5.00	25.00	1,200	3,000	6,000
SGNMNC3256	7.00	25.00	1,200	6,000	12,000
SGNMNC3306	4.00	30.00	1,000	6,000	12,000
SGNMNC3505	5.00	50.00	700	4,500	9,000
SGNMNC3706	2.00	70.00	600	6,000	12,000
SGNMNC3708	6.50	70.00	600	7,500	15,000
SGNMNC3806	5.00	85.00	500	6,000	12,000
SGNMNC31006	10.00	100.00	500	6,000	12,000

### Options:

1. **Extended Shaft** - Add suffix "E" to model number
2. **Cryogenic Version** – Add suffix "K" for model that operates and may be tuned at temperatures as low as 4K. This model is not sealed
3. **No Lead Option** – Add suffix "NL" for a model that does not include a wire lead attached to stator terminal
4. Please contact us directly for additional customization options



REV	DESCRIPTION	DATE	APP
00	NEW DRAWING	05/01/08	D.D.
01	DIM. .816 HEX ACCROSS FLATS WAS .750 HEX ACCROSS FLATS, ADD NEW PROJECTION	06/25/10	D.D.
02	ADDED NOTES 8 AND 9	05/14/12	D.D.



**NOTES:**

1. CAPACITANCE:  $C_{max} \geq 70$  pF,  $C_{min} \leq 4.0$  pF.
2. WORKING VOLTAGE: 6,000 VDC.
3. WITHSTANDING VOLTAGE: 12,000 VDC
4.  $Q \geq 600 @ 25$  MHZ
5. TORQUE: 0.5 TO 5.0 oz-in.
6. CONSTRUCTION: 40 psi sealed, non magnetic
7. DIMENSIONS IN INCHES/MM.
8. WORKING TEMPERATURE RANGE:  $-55^{\circ}\text{C}$  UP TO  $125^{\circ}\text{C}$
9. ROTATIONAL LIFE: 10,000 TURNS

<b>TOLERANCES:</b> (EXCEPT AS NOTED)				<b>SPRAGUE GOODMAN ELECTRONICS INC.</b> 1700 SHAMES DRIVE WESTBURY, NY 11590			
DECIMAL: $\pm 0.002$ in $\pm 0.051$ mm		MATERIAL:		SCALE: 1:1		DRAWN BY: R. LEVIN	
				APPROVED: D. DITLYA			
FRACTIONAL: 1/64		TITLE: <b>SGNMNC3706HTT</b>				USED FOR:	
ANGULAR: 1°		DATE: 08/27/08		DRAWING NUMBER <b>SGNMNC3706HTT</b>		REV. 02	

# GXE SERIES

## MINIATURE HIGH VOLTAGE NON-MAGNETIC TRIMMER CAPACITORS

### Product Highlights

- High Voltage PTFE Dielectric
- Miniature Design
- Half Turn Adjustment



### Applications

- MRI and NMR Coils
- Receiving Sections of MRI and NMR Machines
- Cryogenic Projects

Model Number	Capacitance Range (pF)		Q Min (at 25 MHz C Max)	Rated DC Working Voltage (V)	Dielectric Withstanding Voltage (V)
	Min	Max			
GXE5R000NM	1.00	10.00	600	250	500
GXE5R000NM	1.50	10.00	600	250	500
GXE18000NM	2.00	10.00	600	250	500
GXE27000NM	1.50	15.00	600	250	500
GXE36000NM	3.00	20.00	600	250	500
GXE45000NM	5.00	25.00	600	250	500

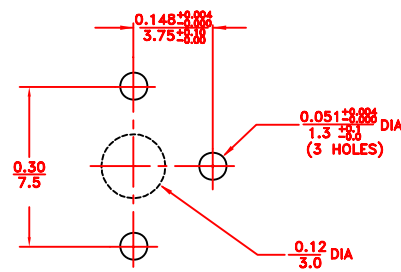
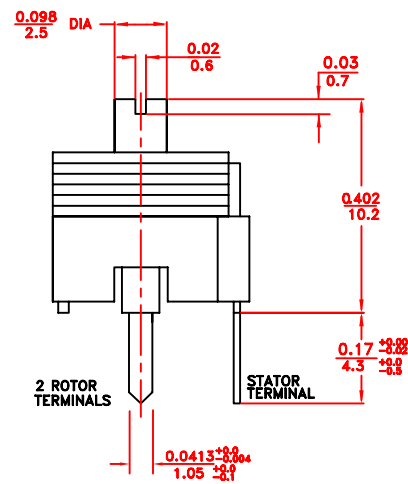
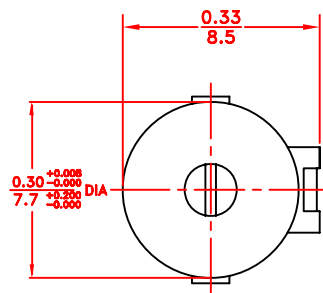
#### Options:

1. Wide Variety of lead configurations
2. Horizontal and vertical mounting options
3. Variety of dielectric materials

REV	DESCRIPTION	DATE	APP
00	NEW DRAWING	09/01/09	S.G.

### SPECIFICATIONS:

1. Capacitance range: 3.5 to 27.0 pF
2. Q min: 1500 at 1 MHz
3. TCC:  $0 \pm 250$  ppm/ $^{\circ}$ C
4. Operating temperature range:  $-40^{\circ}$ C to  $+ 125^{\circ}$ C
5. Construction: non magnetic
6. Working voltage: 200 VDC
7. Dielectric withstanding voltage: 300 VDC
8. Insulation resistance:  $10^4$  megohms min
9. Torque: 0.21 to 3.5 oz-in (15 to 250 g-cm )
10. Linear capacitance change vs.rotation
11. Color code: Red
12. Dielectric: PTFE



### SUGGESTED MOUNTING HOLES LAYOUT

TOLERANCES: (EXCEPT AS NOTED)				SPRAGUE GOODMAN ELECTRONICS INC. 1700 SHAMES DRIVE WESTBURY, NY 11590			
DECIMAL: $\pm 0.002$ in $\pm 0.051$ mm		MATERIAL:		SCALE: 4:1		DRAWN BY: R. LEVIN APPROVED: S. GRINBERG	
FRACTIONAL: 1/64		TITLE: GXE27000NM				USED FOR:	
ANGULAR: 1 $^{\circ}$		DATE: 08/01/2009		DRAWING NUMBER: GXE27000NM			REV: 00

# SGC3 SERIES

## MINIATURE CERAMIC SURFACE MOUNT NON-MAGNETIC TRIMMER CAPACITORS

### Product Highlights

- Miniature Surface Mount Design
- Ceramic Dielectric
- Half Turn Adjustment

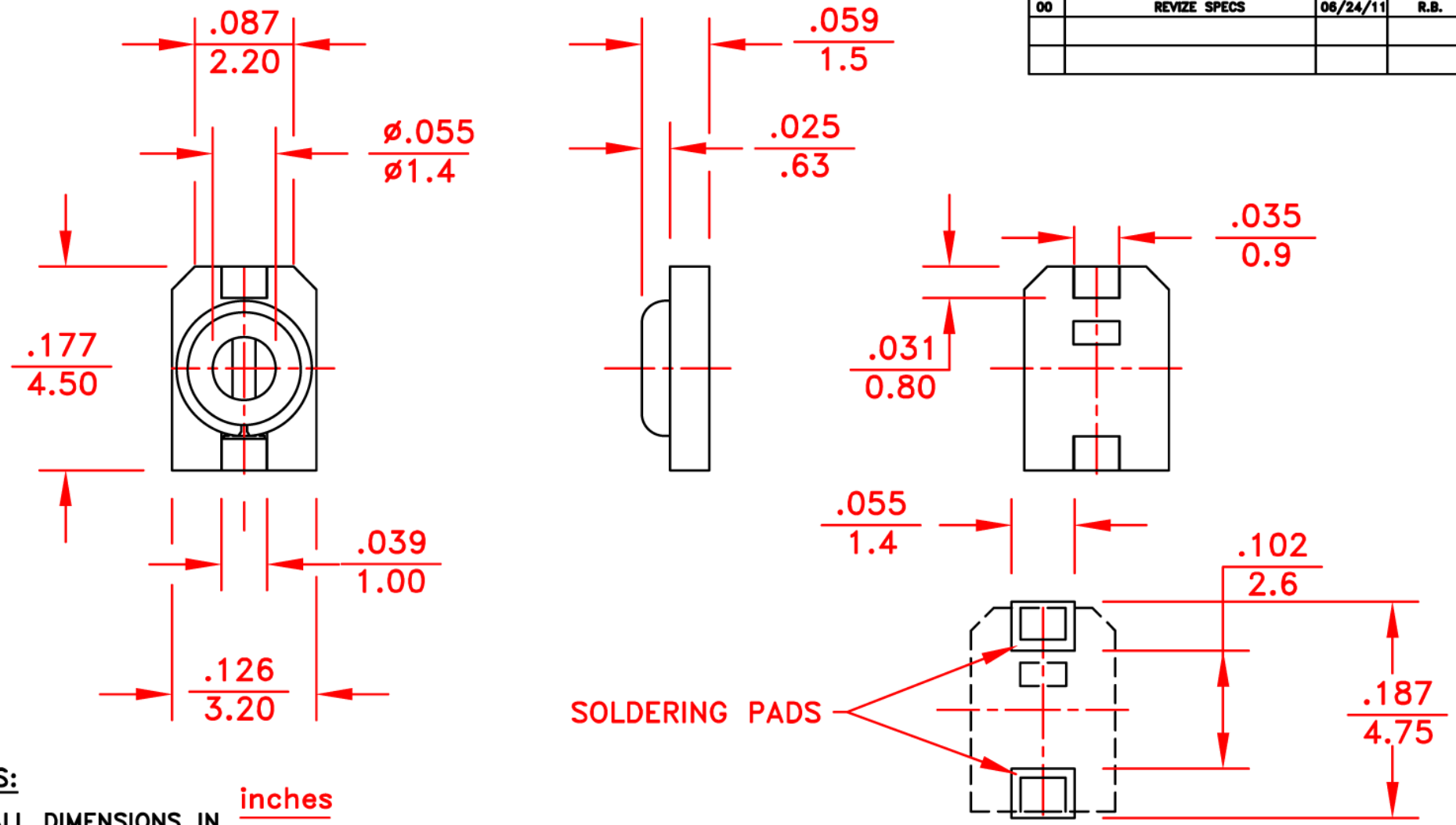


### Non-Magnetic and Other Applications

- Transmitting Sections of MRI and NMR Machines
- Cell Phones
- Commercial Instrumentation
- Radar Systems

Model Number	Capacitance Range (pF)		Q Min (at 25 MHz C Max)	Rated DC Working Voltage (V)	Dielectric Withstanding Voltage (V)
	Min	Max			
SGC3S030NM	1.80	4.50	500	500	1,000
SGC3S060NM	2.00	6.00	500	500	1,000
SGC3S100NM	3.00	10.00	700	500	1,000
SGC3S200NM	5.50	20.00	500	500	1,000
SGC3S300NM	8.00	30.00	300	500	1,000

REV.	DESCRIPTION	DATE	APP.
00	REVIZE SPECS	06/24/11	R.B.



**NOTES:**

1. ALL DIMENSIONS IN  $\frac{\text{inches}}{\text{mm}}$

**SUGGESTED SURFACE MOUNT LAYOUT**

RECOMMENDED THICKNESS OF SOLDER  $\frac{.0006}{0.15}$

SPECS	PART NUMBER	SGC3S030	SGC3S060	SGC3S100	SGC3S200	SGC3S300
COLOR CODE	BLACK	BLUE	IVORY	PINK	GREEN	
Capacitance (pF min.)	1.8 max	2.0 max	3.0 max	5.5 max	8.0 max	
Capacitance (pF max.)	4.5 +50%/-0%	6.0 +50%/-0%	10.0 +50%/-0%	20.0 +50%/-0%	30.0 +50%/-0%	
Temperature coefficient (ppm/°C)	NPO±100	NPO±100	N600±400	N900±300	N1200±300	
Q (at 1MHz and C max) min.	500	500	500	500	500	
Insulation resistance	10 <sup>4</sup> megohms					
Torque	0.14 to 1.0 oz-in / 10 to 72 gf-cm					
DC Working voltage	500 VDC	500 VDC	500 VDC	500 VDC	500 VDC	
DC Withstanding voltage	1000 VDC	1000 VDC	1000 VDC	1000 VDC	1000 VDC	
Operating temperature C°	-40 to +85					
Self resonant frequency @ Cmax	2.0 GHz	1.5 GHz	1.3 GHz	0.8GHz	0.6 GHz	

TOLERANCES: (EXCEPT AS NOTED)	SPRAGUE GOODMAN ELECTRONICS INC. 1700 SHAMES DRIVE WESTBURY, NY 11590		
DECIMAL: xxx ±.016 In ±.41 mm	MATERIAL:	SCALE 8:1	DRAWN BY: R. LEVIN
FRACTIONAL: 1/64	TITLE: <b>OUTLINE DWG SGC3 PRODUCT LINE</b>	APPROVED: R.B. 06/24/11	
ANGULAR: 1/64	DATE: 9/29/06	DRAWING NUMBER <b>SGC3</b>	Rev. 00

# SGNMA3T SERIES

## MINIATURE MID-RANGE NON-MAGNETIC TRIMMER CAPACITORS

### Product Highlights

- High Voltage PTFE Dielectric
- High Precision
- Multi-Turn Economical Solution



### Applications

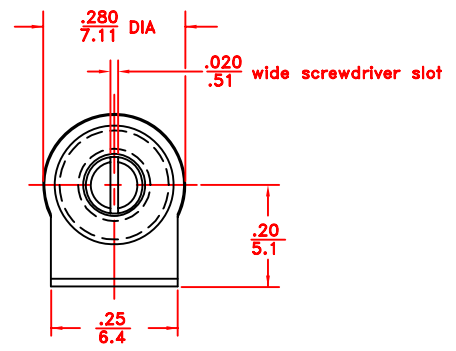
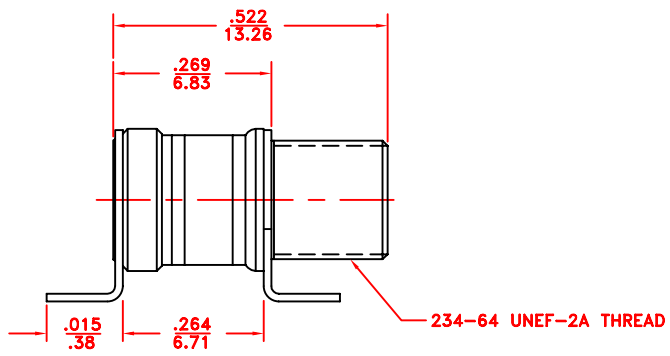
- MRI and NMR Coils
- Transmitting and Receiving Sections of MRI and NMR Machines
- Cryogenic Projects

Model Number	Capacitance Range (pF)		Q Min (at 25 MHz C Max)	Rated DC Working Voltage (V)	Dielectric Withstanding Voltage (V)
	Min	Max			
SGNMA3T1000	1.00	10.00	2,000	1,000	2,000
SGNMA3T2000	1.00	20.00	2,000	1,000	2,000

#### Options:

1. Wide Variety of lead configurations
2. Horizontal and vertical mounting options

REV	DESCRIPTION	DATE	APP
00	NEW DRAWING	10/10/12	D.D



**NOTES:**

1.  $C_{max} > 20$  pF
2.  $C_{min}$  below 2.0pF
3. Working voltage 1000 VDC
4. Withstanding voltage 2000 VDC
5.  $Q @ C_{max}$  and 100 MHz over 2000
6. Operating temperature  $-65^{\circ}$  C to  $+125^{\circ}$  C
7. Torque .5 to 5.0 oz-in
8. Rotational life 10,000 turns
9. Dimensions: ( in/mm )
10. Construction: nonmagnetic

TOLERANCES: (EXCEPT AS NOTED)		SPRAGUE GOODMAN ELECTRONICS INC. 1700 SHAMES DRIVE WESTBURY, NY 11590			
DECIMAL: $\pm 0.002$ in $\pm 0.051$ mm	MATERIAL:	SCALE: 4:1	DRAWN BY: R. LEVIN		APPROVED: D. DITLYA
FRACTIONAL: 1/64	TITLE: OUTLINE DWG SGNMA3T20005		USED FOR:		
ANGULAR: 1°	DATE: 10/10/12	DRAWING NUMBER SGNMA3T20005		REV. 00	