SPECTRUM CONTROL

DATA SHEET

Three Terminal Chips

Surface Mount EMI Filters

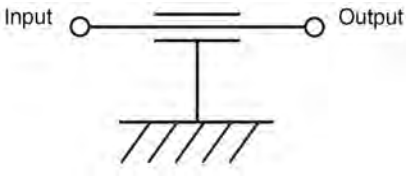
Features

- Excellent performance in high current applications
- Non-polar, surface mountable
- Superior filtering characteristics
- Superb ability to withstand transient voltages and surge
- Offers exceptional solderability and resistance to solder heat
- Available in 0603, 0805, 1205, and 1806 body size
- Two amp current rating available
- Available lead free/RoHS Compliant

Applications

- Cellular telephones and base stations
- Telecommunication equipment
- Industrial electronic interface or programmable controllers
- Electronic automotive equipment
- Computer and peripheral equipment

Circuit Schematic



Typical Electrical Characteristics

Capacitance Range	COG (NPO) 22 pF to 470 pF X7R 470 pF to 47,000 pF YV5 220,000 pF X5R 100,000 pF
Capacitance Tolerance	COG (NPO) +50/-20% X7R +50/-20% YV5 +80/-20% X5R +/-20%
Temperature Coefficient	COG (NPO) 0 ±/30 ppm/°C, -55 to +125°C +/-15% X7R -55 to +125°C YV5 -25 to +85˚C X5R -55 to +85˚C
Insulation Resistance	up to 100,000 pF 10000 Megohms 47,000 pF 5000 Megohms
DC Resistance	0.4 Amp or less 0.3 ohm max. 1 Amp 0.08 ohm max. 2 Amp 0.04 ohm max.
Rated Voltage	up to 100 VDC
Rated Current	up to 2 Amps

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Selection Guide

Part Number	Body Size	Capacitance (In Picofarad)	Capacitance Tolerance	Temp. Charact.	Rated Voltage (Volts DC)	Rated Current (Amps DC)	IR (Megohms Min.)	DC Resistance (ohm Max.)	Operating Temp.
SF0603C220SBNB-*	0603	22	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603C470SBNB-*	0603	47	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603C101SBNB-*	0603	100	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603C221SNNB-*	0603	220	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603X471SBNB-*	0603	470	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF0603X102SBNB-*	0603	1,000	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF0603X222SBNB-*	0603	2,200	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF0603X223SANC-*	0603	22,000	+50/-20%	X7R	25	0.5	10,000	0.15	-55/+125°C
SF0603R104MAND-*	**0603**	**100,000**	**+/-20%**	**X7R**	**25**	**1.0**	**10,000**	**0.08**	**-55/+85°C**
SF0805C220SBNC-*	0805	22	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0805C470SBNC-*	0805	47	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0805C101SBNC-*	0805	100	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0808C221SBNS-*	0805	22	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0805X471SBNC-*	0805	470	+50/-20%	X7R	50	0.4	10,000	0.3	-55/+125°C
SF0805X102SBNC-*	0805	1,000	+50/-20%	X7R	50	0.4	10,000	0.3	-55/+125°C
SF0805X222SBNC-*	0805	2,200	+50/-20%	X7R	50	0.4	10,000	0.3	-55/+125°C
SF0805X223SBND-*	**0805**	**22,000**	**+50/-20%**	**X7R**	**50**	**1.0**	**10,000**	**0.08**	**-55/+125°C**
SF1205C220SBNB-*	1205	22	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205C470SBNB-*	1205	47	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205C101SBNB-*	1205	100	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205C221SBNB-*	1205	220	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205X471SBNB-*	1205	470	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X102SBNB-*	1205	1,000	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X222SBNB-*	1205	2,200	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X223SBNB-*	1205	22,000	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X473SBND-*	**1205**	**47,000**	**+50/-20%**	**X7R**	**50**	1.0	5,000	0.08	-55/+125°C
SF1806C220SDNB-*	1806	22	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C470SDNB-*	1806	47	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C101SDNB-*	1806	100	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C221SDNB-*	1806	220	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C471SDNB-*	1806	470	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806X102SDNB-*	1806	1,000	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
SFI1806X222SDNB-*	1806	2,200	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
SF1806X103SDNB-*	1806	10,000	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
SF1806X223SDNB-*	1806	22,000	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
2 AMP FILTER SF1806Y224ZBNE-*	**1806**	**220,000**	**+80/-20%**	**Y5V†**	**50**	**2.0**	**1,000**	**0.048**	**-25/+85°C**

Bold Part Number *= High Current Applications*

† *= Temperature Characteristic is +30/-80%*

***-** = Denotes Packaging Style. Replace with T for Tape and Reel*

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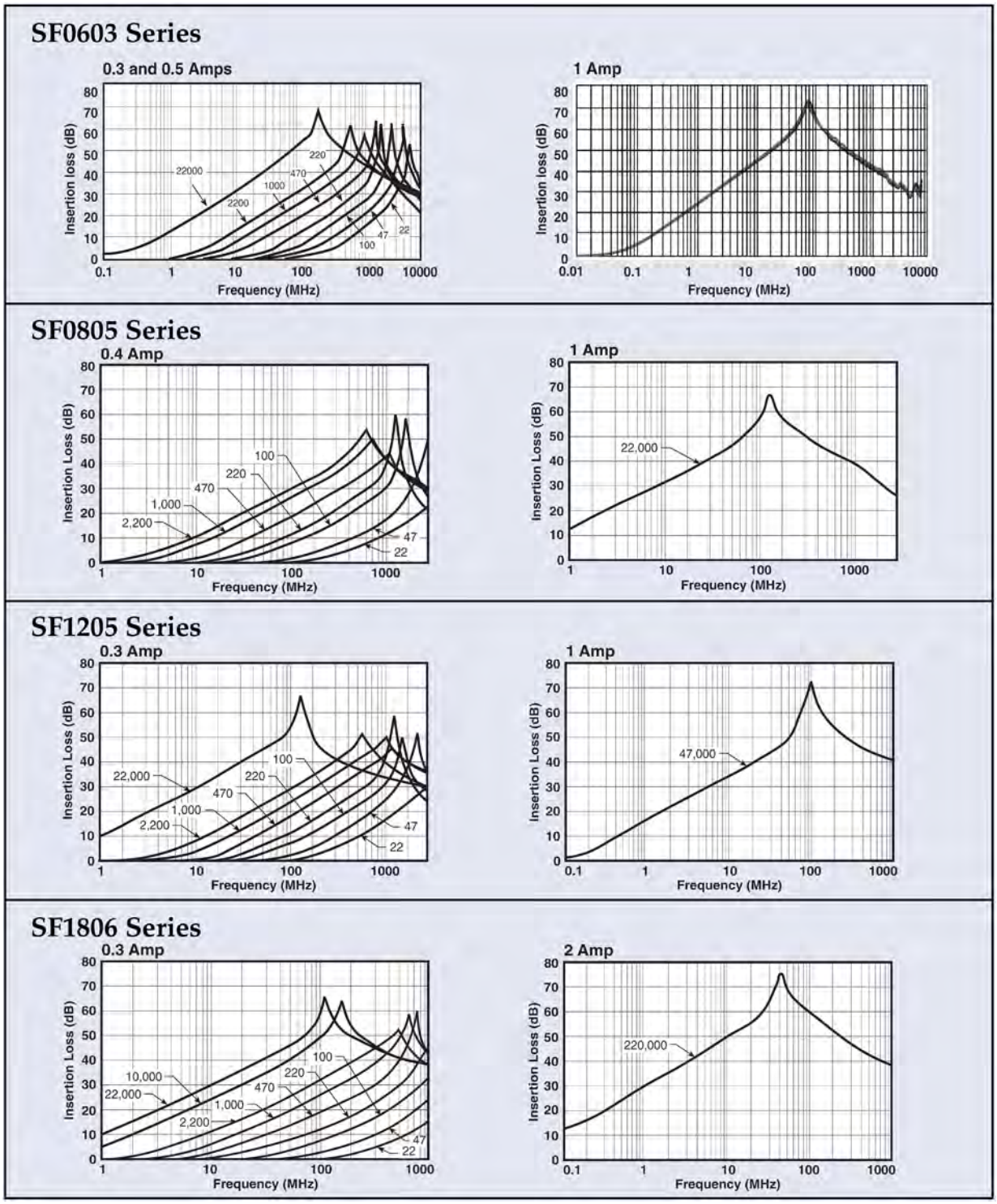
Surface Mount EMI Filters

Insertion Loss (Per MIL-STD-220)



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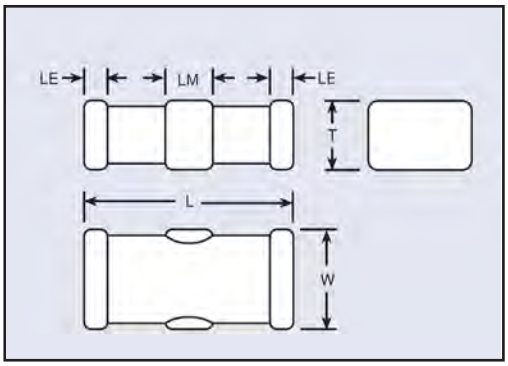

Mechanical Dimensions

Dimensions in inches (mm)

Body Style/Size	Body Length (L)	Body Width (W)	Body Thickness (T)	End Terminal Length (LE)	Middle Terminal Length (LM)
SF0603	0.063 +/- 0.006 *(1.60 +/- 0.15)*	0.031 +/- 0.006 *(0.80 +/- 0.15)*	0.023 +/- 0.006 *(0.6 +/- 0.15)*	0.008 +/- 0.006 *(0.2 +/- 0.15)*	0.020 +/- 0.006 *(0.5 +/- 0.15)*
SF0805	0.079 +/- 0.008 *(2.0 +/- 0.2)*	0.049 +/- 0.008 *(1.25 +/- 0.2)*	0.032 +/- 0.008 *(0.8 +/- 0.2)*	0.012 +/- 0.008 *(0.3 +/- 0.2)*	0.024 +/- 0.008 *(0.6 +/- 0.2)*
SF1205	0.126 +/- 0.008 *(3.2 +/- 0.2)*	0.049 +/- 0.008 *(1.25 +/- 0.2)*	0.028 +/- 0.008 *(0.7 +/- 0.2)*	0.016 +/- 0.012 *(0.4 +/- 0.3)*	0.043 +/- 0.012 *(1.1 +/- 0.3)*
SF1806	0.177 +/- 0.012 *(4.5 +/- 0.3)*	0.063 +/- 0.012 *(1.6 +/- 0.3)*	0.039 +/- 0.012 *(1.0 +/- 0.3)*	0.020 +/- 0.012 *(0.5 +/- 0.3)*	0.055 +/- 0.012 *(1.4 +/- 0.3)*

Ordering Information

Example: **SF0805C221SBNCT**

This part number represents a three terminal chip with a body size of 0805 with a COG (NPO) dielectric. The capacitance is 220 pF with a capacitance tolerance of +50%/-20%. Voltage rating is 50 Volts DC. It has nickel barrier, solder plated terminations and a current rating of 0.4 Amp, (400 milliamps). The parts are taped and reeled.

SF
Style
SF

0805
Size
0603
0805
1205
1806

C
Ceramic
C - COG
X - X7R
Y - Y5V
R - X5R

221
Capacitance Code
First two numbers are significant the third number refers to number of zeros

S
Capacitance Tolerance
S - +50%/-20%
Z - +80%/-20%
M - +/- 20%

B
Rated Voltage
A - 25
B - 50
D - 100

N
Termination
N - Ni Barrier, Solder Plated

C
Current Rating
B - 0.3 A
C - 0.4 A
D - 1A
E - 2A
F - 3A
G - 4A
H - 5A
I - 6A

T
Packaging
T - Tape & Reel

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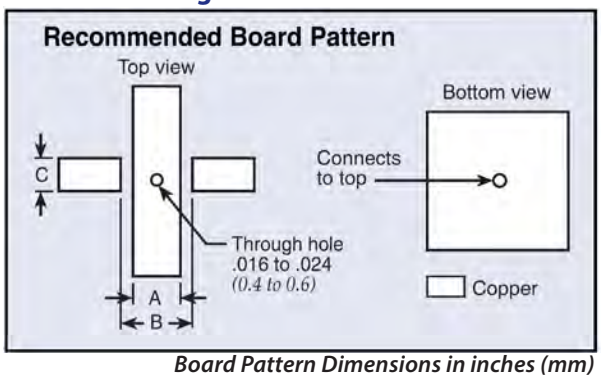
Surface Mount EMI Filters

Soldering Instructions

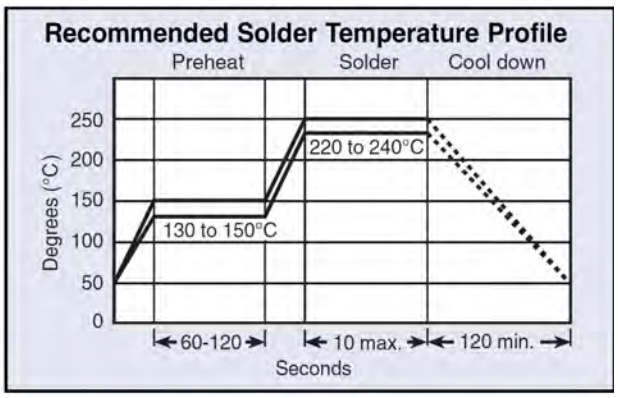
Reflow Soldering



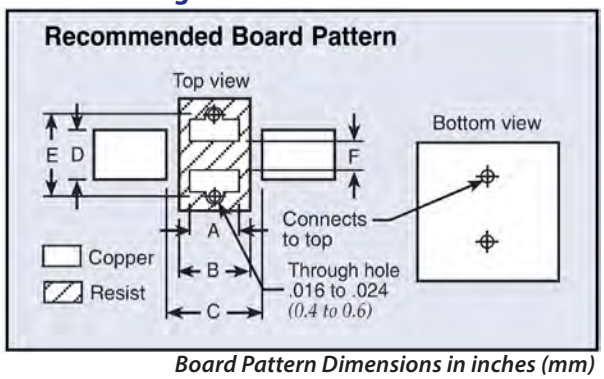
Board Pattern Dimensions in inches (mm)

Body Style/Size	Dimension		
	A	B	C
SF0603	0.020 *(0.5)*	0.047 *(1.2)*	0.031 *(0.8)*
SF0805	0.024 *(0.6)*	0.059 *(1.59)*	0.039 *(1.0)*
SF1205	0.051 *(1.3)*	0.091 *(2.3)*	0.047 *(1.2)*
SF1806	0.079 *(2.0)*	0.138 *(3.5)*	0.051 *(1.3)*

Reflow Soldering



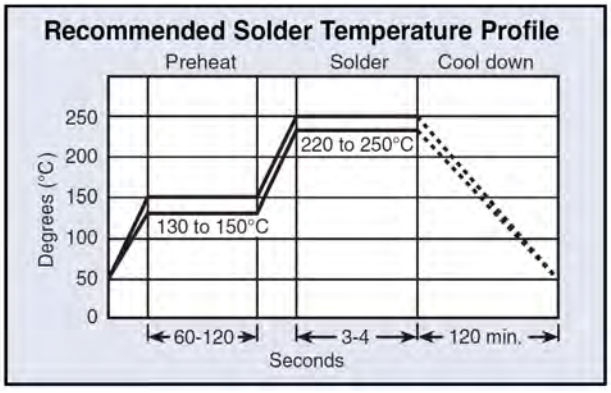
Flow Soldering



Board Pattern Dimensions in inches (mm)

Body Style/Size	Dimension					
	A	B	C	D	E	F
SF0603	0.020 *(0.5)*	0.031 *(0.8)*	0.047 *(1.2)*	0.031 *(0.8)*	0.071 *(1.8)*	0.016 *(0.4)*
SF0805	0.024 *(0.6)*	0.031 *(0.8)*	0.059 *(1.5)*	0.039 *(1.0)*	0.087 *(2.2)*	0.024 *(0.6)*
SF1205	0.051 *(1.3)*	0.059 *(1.5)*	0.091 *(2.3)*	0.047 *(1.2)*	0.118 *(3.0)*	0.024 *(0.6)*
SF1806	0.059 *(1.5)*	0.079 *(1.5)*	0.138 *(3.5)*	0.051 *(1.3)*	0.118 *(3.0)*	0.024 *(0.6)*

Flow Soldering



General Soldering Notes

- High soldering temperatures and long soldering times can cause leaching of the termination and adversely affect adhesion. These conditions can also decrease capacitance value. Use the above recommended solder temperature cycle.
- Due to the mechanical characteristic of ceramic composition, aggressive thermal shock will degrade performance. Preheat the assembly before soldering using the above solder temperature profile as a guide.
- Use mild flux (less than 0.2% by weight of Chlorine), preferable rosin based. If water soluble, wash thoroughly to assure all residue is removed from the underside of components.
- Ultrasonic Cleaning
  When using an ultrasonic cleaning method, the following range is recommended:

  Frequency: Not to exceed 28kHz
  Output Power: Not to exceed 20W/liter
  Cleaning Time: 5 minutes max

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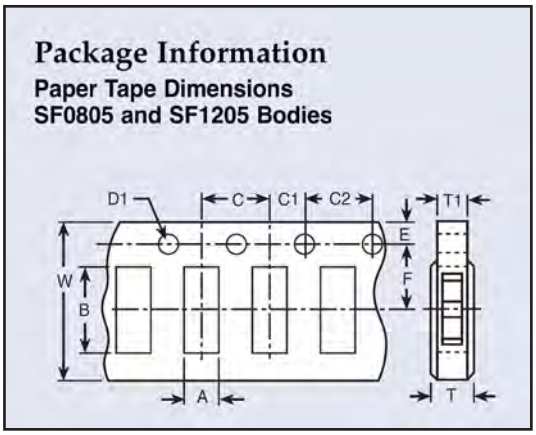
Package Quantities

Body Style/Size	Tape and Reel
SF0603	4,000 units/reel
SF0805	4,000 units/reel
SF1205	4,000 units/reel
SF1806	2,000 units/reel

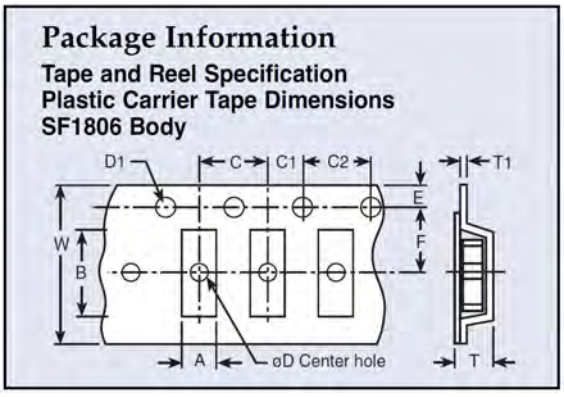


Dimensions in inches (mm)

Body Style/ Size	Chip Cavity		Tape			Holes			Hole Diameter	Thickness	
	Length A	Width B	Width w	Center to End F	Indexing to End E	Center to Center C	Indexing to Center C	Indexing to Indexing C	Indexing D1	Overall T (Max.)	Carrier Tape T1 (Max.)
SF0603	0.039 +/-0.00? *(1.0 +/-0.?)*	0.075 +/-0.00? *(1.9 +/-0.?)*	0.0315 +/-0.012 *(8.0 +/-0.3)*	0.138 +/-0.002 *(3.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 +0.004/0 *(1.5 +0.1/-0)*	0.048 *(1.1)*	0.039 *(1.0)*
SF0805	0.064 +/-0.008 *(1.62 +/-0.2)*	0.091 +/-0.008 *(2.3 +/-0.2)*	0.0315 +/-0.012 *(8.0 +/-0.3)*	0.138 +/-0.002 *(3.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 +0.004/0 *(1.5 +0.1/-0)*	0.048 *(1.1)*	0.039 *(1.0)*
SF1205	0.067 +/-0.008 *(1.70 +/-0.2)*	0.138 +/-0.008 *(3.5 +/-0.2)*	0.0315 +/-0.012 *(8.0 +/-0.3)*	0.138 +/-0.002 *(3.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 +0.004/0 *(1.5 +0.1/-0)*	0.048 *(1.1)*	0.039 *(1.0)*

Plastic Reel Dimensions

Body Style/Size	Diameter (Max.)	Width (Max.)
SF0603	7.00 *(180)*	0.46 *(11.5)*
SF0805	7.00 *(180)*	0.46 *(11.5)*
SF1205	7.00 *(180)*	0.46 *(11.5)*
SF1806	7.00 *(180)*	0.46 *(11.5)*



Dimensions in inches (mm)

Body Style/ Size	Chip Cavity		Tape			Holes			Hole Diameter		Thickness	
	Length A	Width B	Width w	Center to End F	Indexing to End E	Center to Center C	Indexing to Center C	Indexing to Indexing C	Center D (Min.)	Indexing D1	Overall T (Max.)	Carrier Tape T1 (Max.)
SF1806	0.071 +/-0.008 *(1.80+/-.02)*	0.185 +/-0.008 *(4.70 +/-0.2)*	0.472 +/-0.008 *(12.0+/-0.2)*	0.217 +/-0.002 *(5.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 *(1.5)*	0.059 +0.004/0 *(1.5 +0.1/-0)*	0.048 *(1.1)*	0.039 *(1.0)*