New Products

-Thin Film Chip Resistors RG-LL

-Thin Film Attenuators

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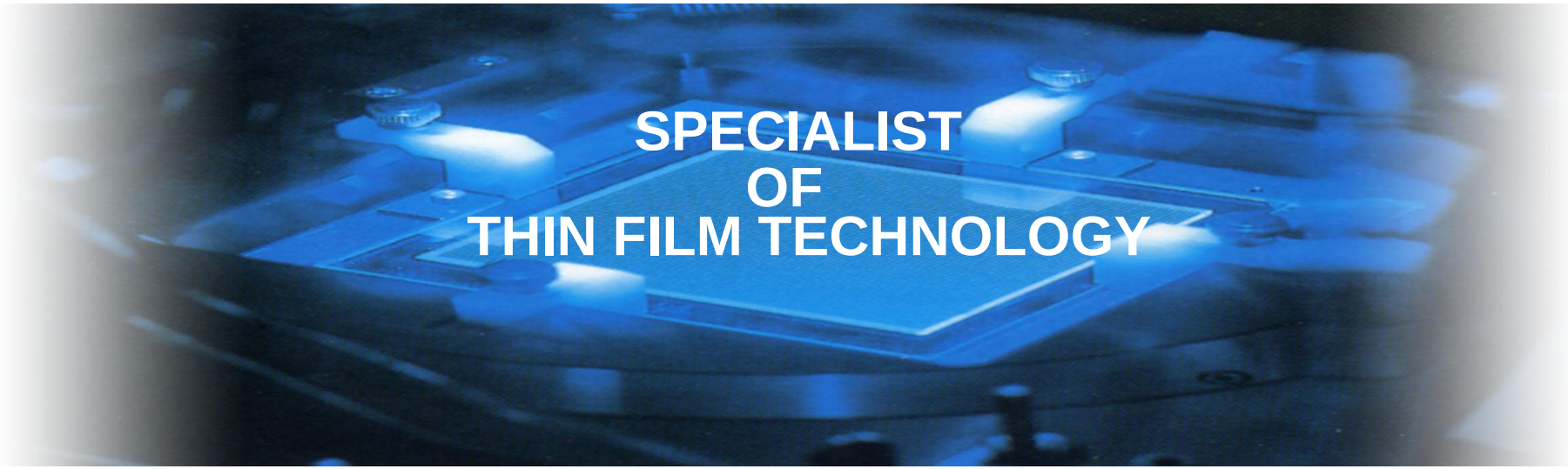
the most advanced thin film chip resistors



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Chip Resistor Technology Map

Technology	Resistance Tolerance						
	5%	1%	0.5%	0.10%	0.05%	0.02%	0.01%
THICK FILM (General)							
THIN FILM (General)							
SUSUMU THIN FILM							
FOIL (General)							

Technology	Temperature Coefficient							
	200ppm	100ppm	50ppm	25ppm	10ppm	5ppm	2ppm	0.2ppm
THICK FILM (General)								
THIN FILM (General)								
SUSUMU THIN FILM								
FOIL (General)								

SUSUMU THIN FILM	RR Series	RR			NEW	
	RG Series		RG-PB	RG-NB	RG-VP	RG-LL
	URG Series				URG	

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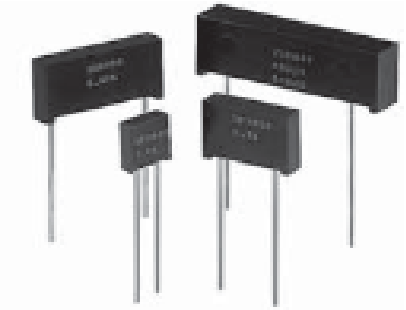
FOIL Resistors



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Why SUSUMU RG?

- **RG is already the best thin film chip resistor**
- **Yet, there is another technology that exceed thin film technology: foil technology**
- **Foil exceeds RG in:**
  - **Absolute tolerance, TCR**
  - **Long term reliability**
  - **But very expensive!**
- **SSM wants to push the limit of thin film technology and offer reasonably priced foil alternative!**

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URG specs (compare with FOIL)

Item	Test Method (MIL-PRF-55342/JIS C5201-1)	ΔR Limits (RG-VP, RG-LL)	ΔR Limits (URG)	ΔR Limits (VISHAY FOIL
Short Time Overload	2.5 times of Rated Load X 5sec.	+/- 0.05%	+/- 0.02%	+/- 0.01%
Load Life	70oC Rated Load 90min. On/ 30min. Off per Cycle X 2000	+/- 0.1%	+/- 0.02%	+/- 0.01%
Temp. Hum. Bias	85oC 85% RH 1/10 power loaded 90min. On/ 30min. Off per Cycle X 2000	+/- 0.1%	+/- 0.05%	+/- 0.02%
Thermal Shock	-65oC (30min)/room temp.(2min) / +150oC(30min)/room temp.(2min), 100 cycles, no bias	+/- 0.1%	+/- 0.02%	+/- 0.01%
High Temperature	155oC for 100h, no bias	+/- 0.1%	+/- 0.02%	+/- 0.02%

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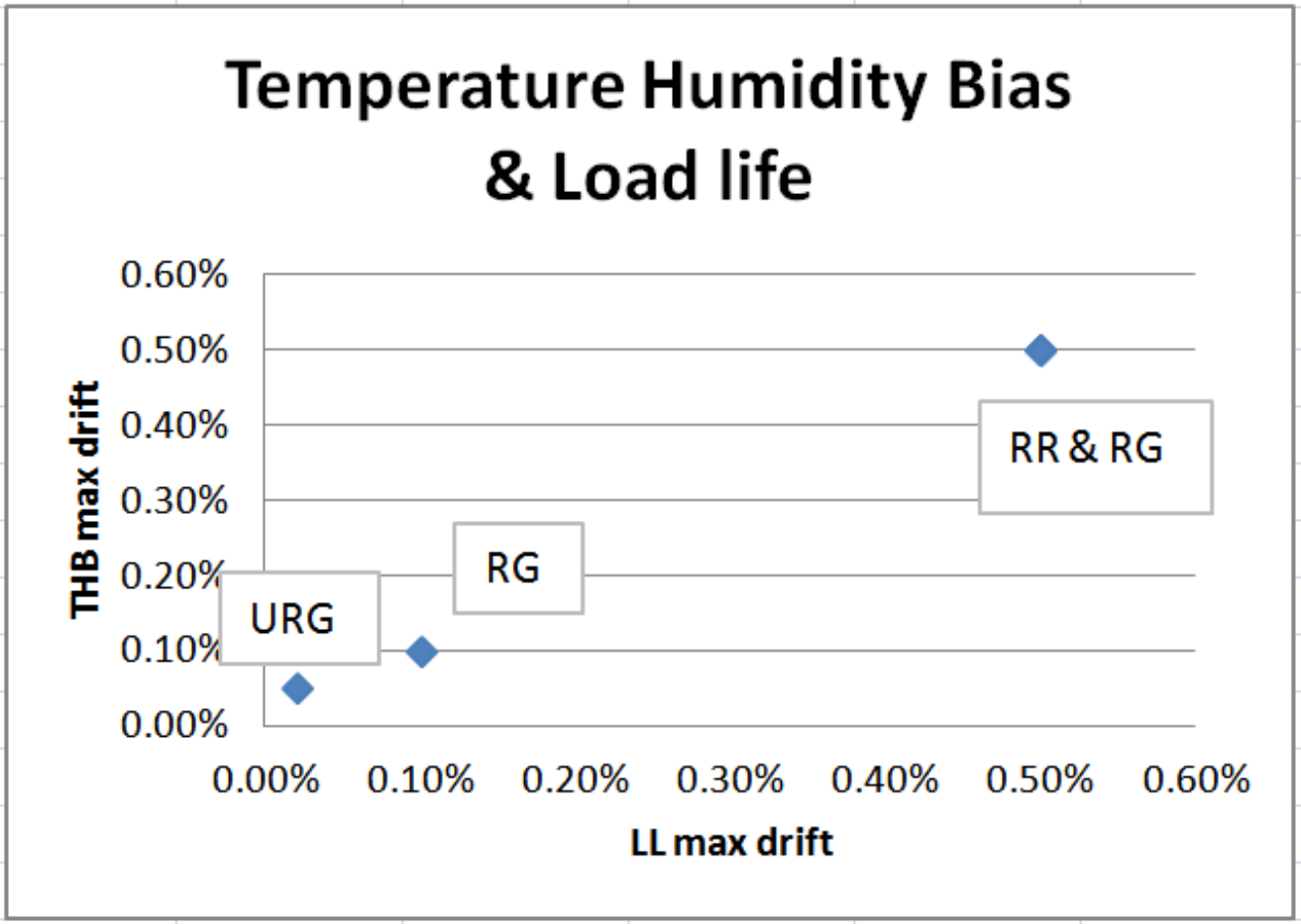

	LL	THB
RR	70℃, 100h	90℃/40RH ,1000h
RG	85℃, 2000h	85℃/85RH, 2000h
URG	70℃ 4000h	85℃/85RH ,4000h

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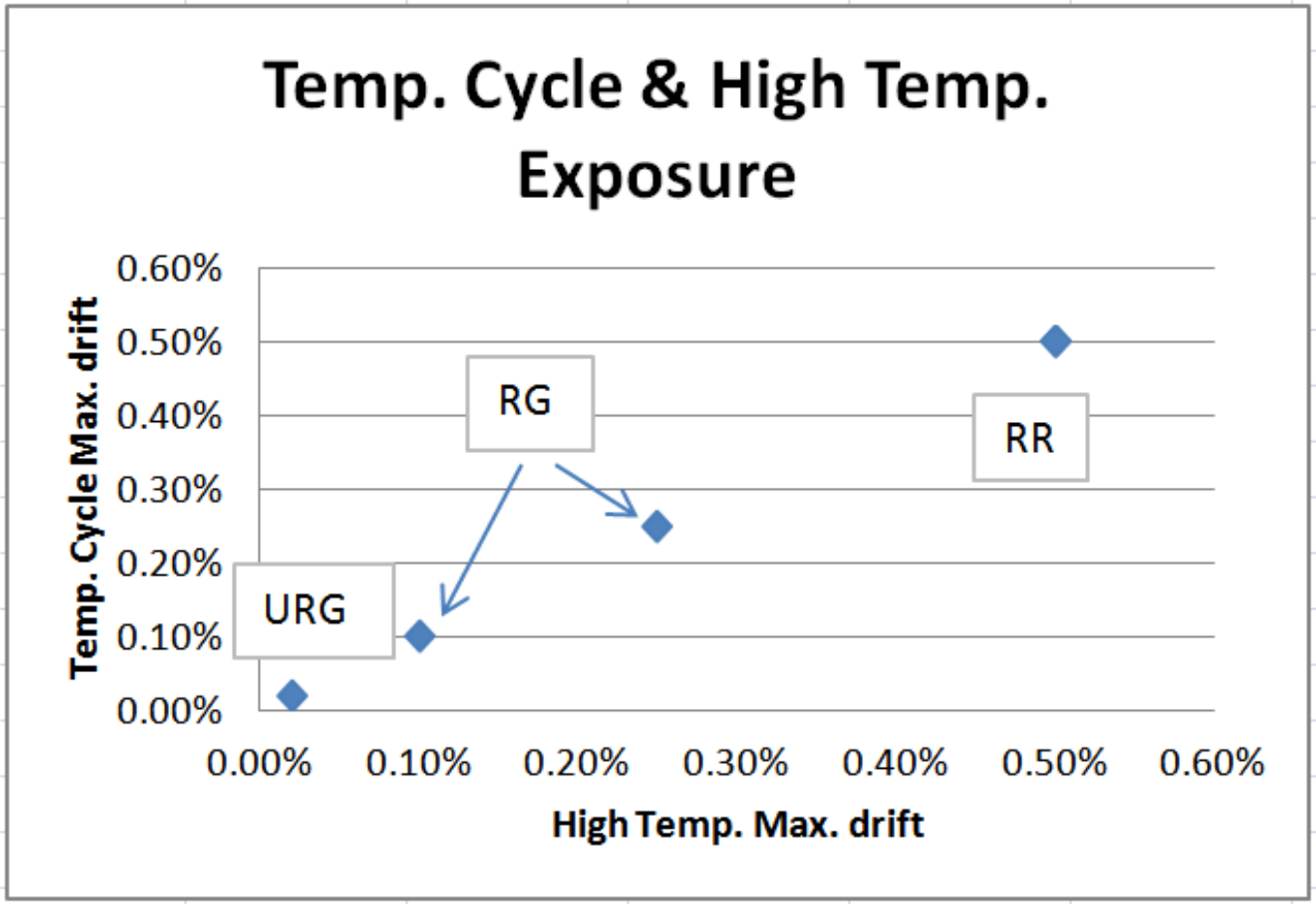
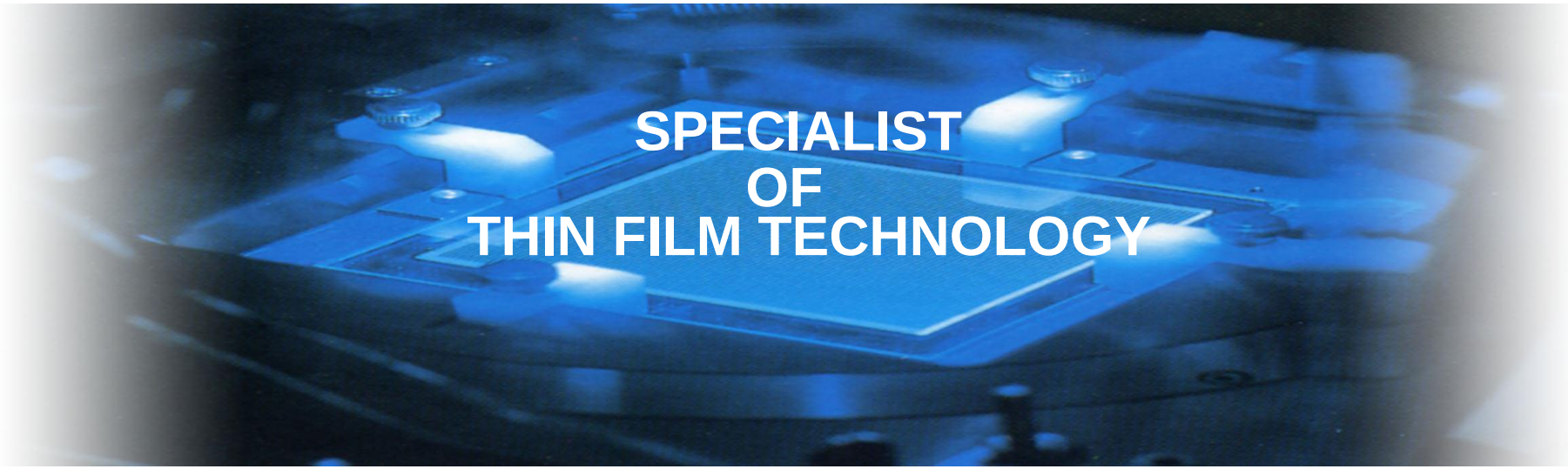


	Temperature Cycle	High Temperature Exposure
RR	-55℃/125℃, 5 cycle	125C, 1000h
RG	-55℃/125℃, 1000cycle	155℃, 1000h
URG	-65℃/150℃, 100 cycle	155℃, 100h

thin film chip attenuators



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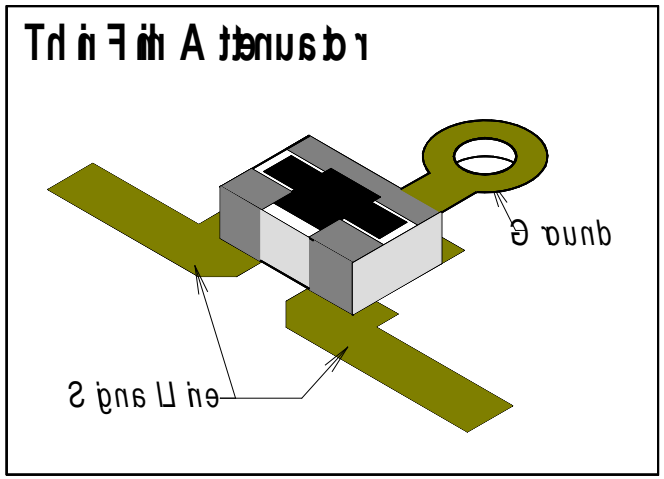
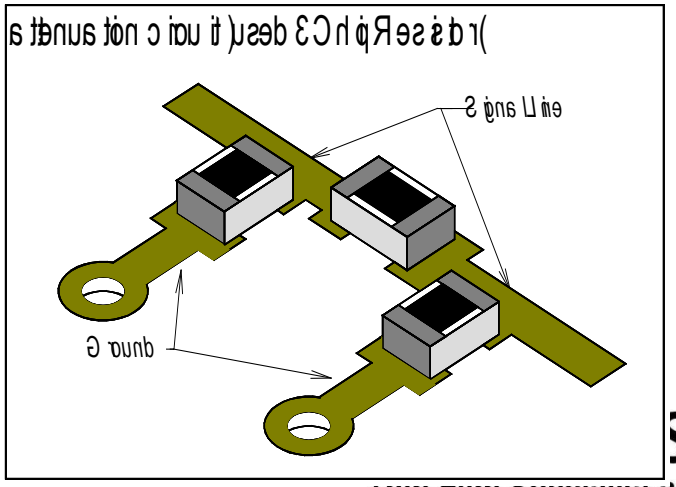
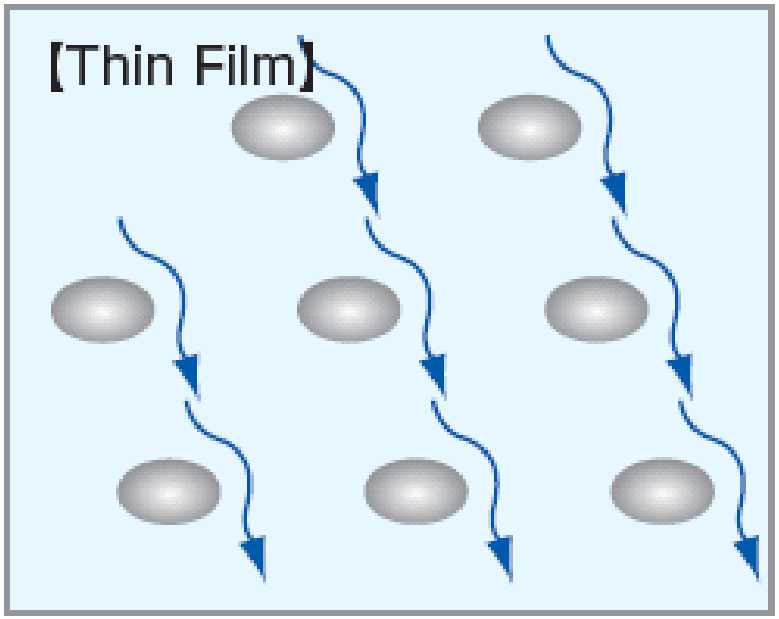
idea of the attenuators

- By reducing the number of the components, you can save space, weight, and mounting frequency with our attenuators.
- attenuator vs. attenuator circuit with 3 discrete chip resistors. Our chip attenuator has one ground terminal and two signal terminals, which makes it easier to meet the requirement of the micro strip lines designed based on the circuit board characteristics. If you use discrete resistors, each chip resistor involves at least two soldering joints, which may introduce parasitic capacitance and inductance affecting the frequency performance. The circuit design becomes much simpler when you use Susumu attenuators as shown in the figure below.

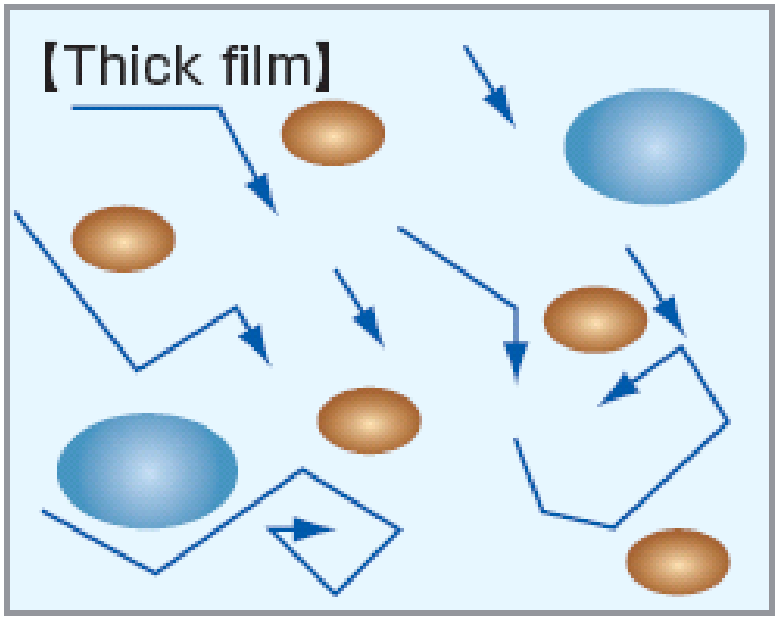




Electron Flow

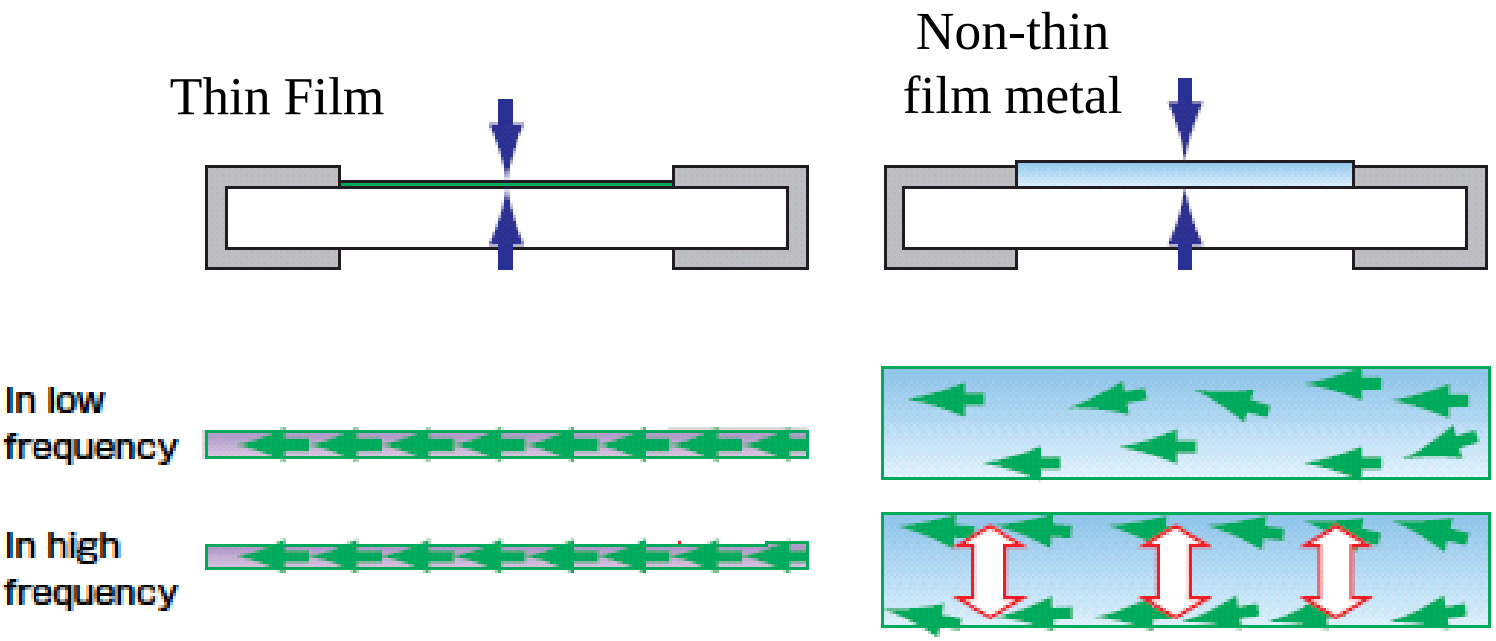


Electrons move smoothly without much dispersion that creates noise.



Electron moves randomly creating noise.

Film thickness & skin effect



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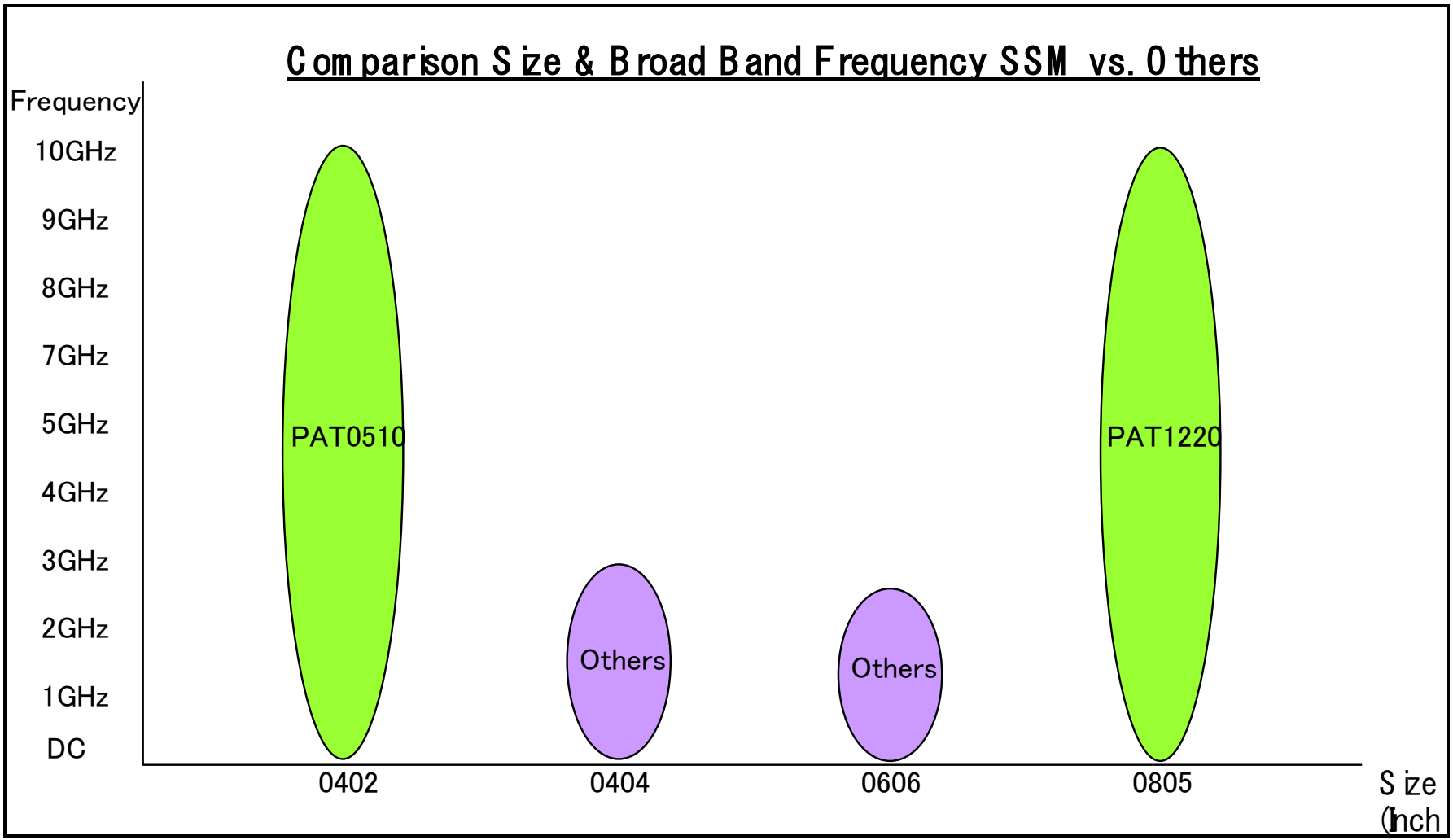
product features Susumu vs. Others



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