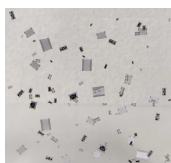


Typical RF/ μ Wave Products Overview



SMT Thick/Thin Film Chip Attenuator/Terminations

Attenuators/terminations with having favorable frequency characteristic and stability, and less individual difference in performance (less variation of each element). These attenuators/terminations are for use of RF/Microwave, and they were developed, based on thin film resistive with ultra precision, higher reliability, higher stability and lower noise, making the best use of EMF simulation and RF/Microwave technology. Our thin film resistive are deliberately construed of pure metals, and furthermore their thin film structure is featuring less impedance variation in higher frequency range under less impact of skin-effect. Besides, attenuator would have almost zero temperature coefficient due to tracking performance among each elements.



Thermo Compensating Chip Attenuator

This element matches its attenuation up to temperature change. In general RF power amplifier has tendency to decrease amplification ratio at higher temperature. In such circuit, by series connection with this thermo-variable chip attenuator, the amplifier gain loss is compensated, and constant output level can be obtained at any temperature. Instantaneously analog compensation can be done through simple structure. No complicated measures such as loop or program controls are not needed and led to total cost reduction.



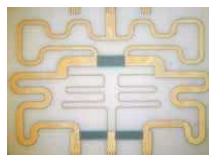
High Power Chip Terminations

High thermal conductive alumina nitride substrate is used for this high power chip terminations with low reflection over wider band width. Rated power covers from several ten watts up to more than hundred watts. On high power product, due to its substrate size becomes larger, frequency characteristic is deteriorated in its tendency. However, through our own design technology, being capable of higher frequency with high power handling. Reliability considered designing such as reducing stress due to difference in CTE against RF pulse load.



Ultra-broad band thin film Resistive Power Divider

Resistive power divider in use for ultra-broad band from DC to 20GHz. Excellent performance of thin film is designed into smaller case sized resistive power divider, other losses than resistive-induced are reduced and dividing errors well-minimized. It's used for signal dividing over board-band digital signal and wider range of signal measurements. As applicable customized products, unequal power divider with attenuator build-in and reflection controllable element can be available on request.



Thin Film Wilkinson Power Divider

Thin film Wilkinson power divider with excellent characteristic for insertion loss, VSWR, isolation is available on tailor-made request. Especially for lower loss dividing with higher accuracy can be possible, two ways, three ways, four ways dividing and so on can be addressable. In accordance with requirements, designing is looked closely on request. Besides, pattern formation on to ceramic substrate and customized thin film requirements is available on request. Please feel free to contact us.

Basic Technology

- Design Technology

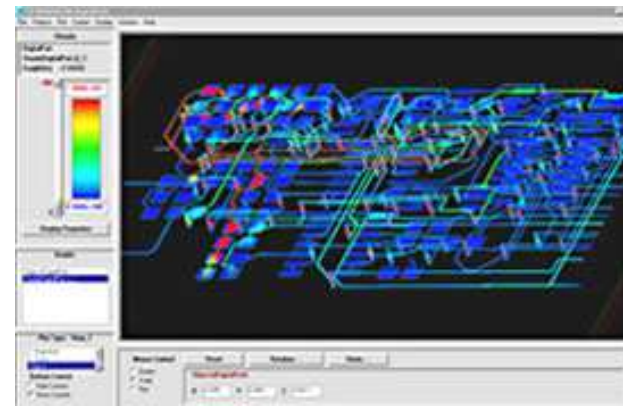
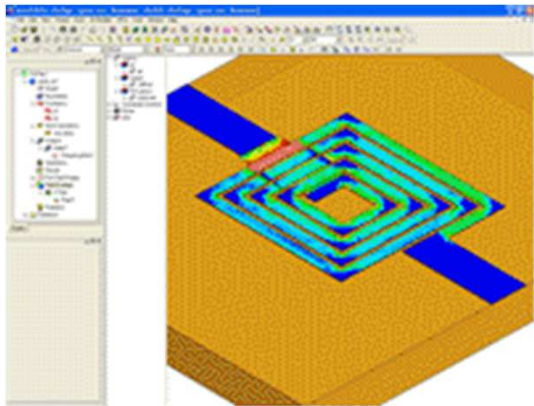
[Structural/Patterning Design, Electro-Magnetic Simulation, Safety/Environmental Considering Design]

- Processing Technology

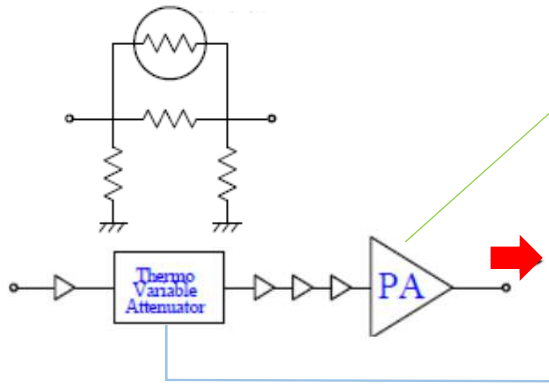
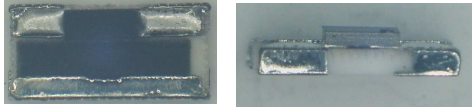
[Multi-layer/High Functional Dielectric film formation, Photolithography/Laser processing, Environmental Protection Functioning, Chemical/Electrolytic plating/Side Electrode Forming Ion Plating, Oxygen Plasma Applied Engineering..etc]

- Evaluation Technology

[Higher Accuracy Measurement, Environmental Performance/Microwave Characteristic Evaluation, High Speed Digital Signal Measurement, Power Durability Performance Evaluation, SEM/Surface Element Analysis...etc]

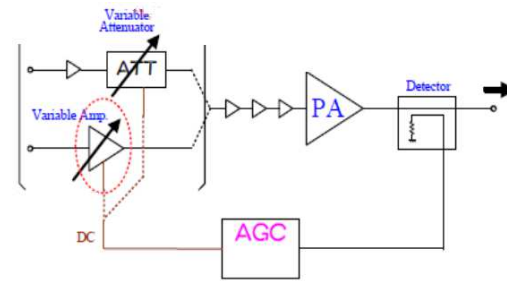
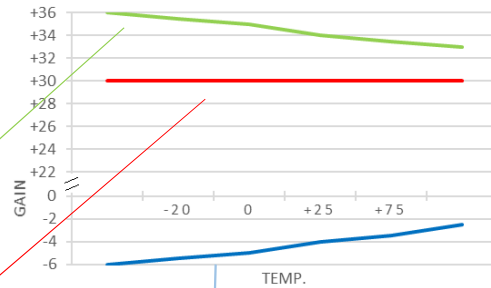


Thermo Compensating Attenuator



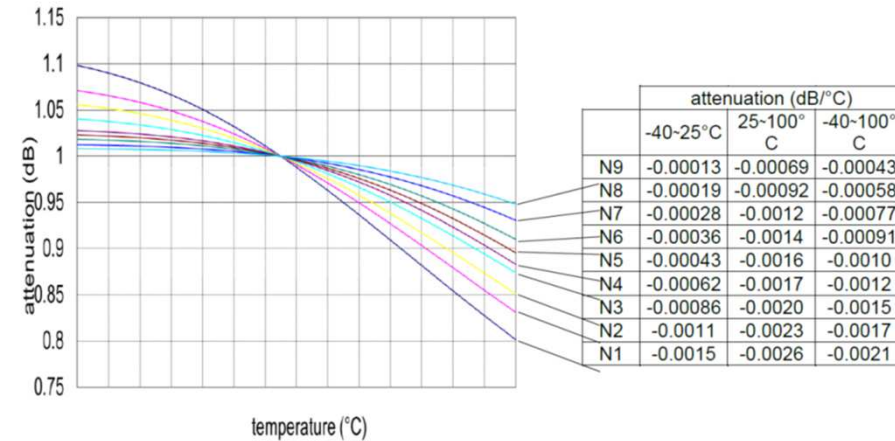
Single Chip Thermo Comp. Att

- Simplify/Miniaturize circuitry
- Regionally analog controllable
- Optimize matching/spurious performance
- Save gain with no detector presence



Conventional AGC

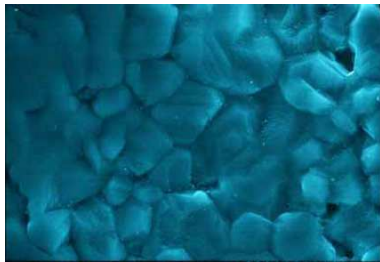
Parameter	Specification
Attenuation	3dB Other attenuation available on request
Attenuator Tolerance	±0.5dB
Impedance	75ohm
VSWR	Less than 1.3
Temperature Characteristics	Symbol: N1-N3 Other Temp. Curve available on request
Range of Frequency	DC~3GHz
Rated input power	63mW (Fig.1 Derating curve)
Operation temperature range	-40C deg. To +100C deg.
Rated ambient temperature	70C deg.



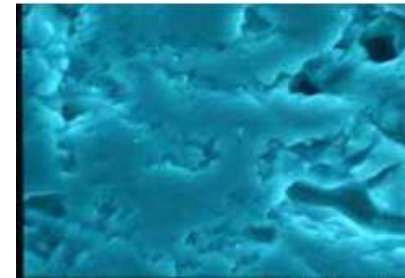
Microwave Thermistor(up to X band and higher)

Crystallinity :

Commodity type is intended to bring crystalline size smaller and even. It is for the purpose that multiplies the number of interfaces to make B constant larger and stable.

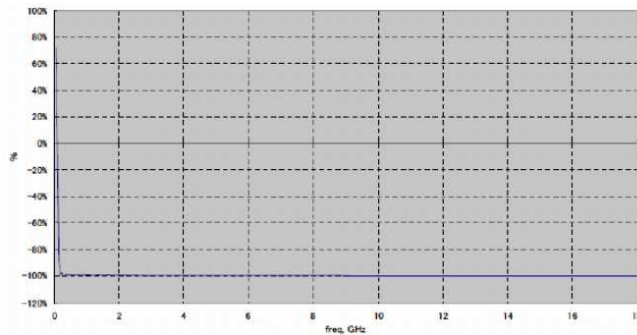


No crystallization on newly developed thermistor. It is achieved by the function of new material where crystalline linkage is compensated

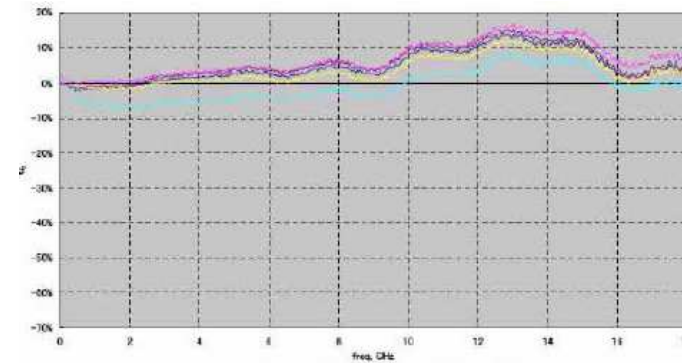


Freq. Characteristic :

Consequently those interfaces becomes capacitance, and freq.-induced impedance change will be occurred rapidly. 1GHz is minimal freq. ceiling in general



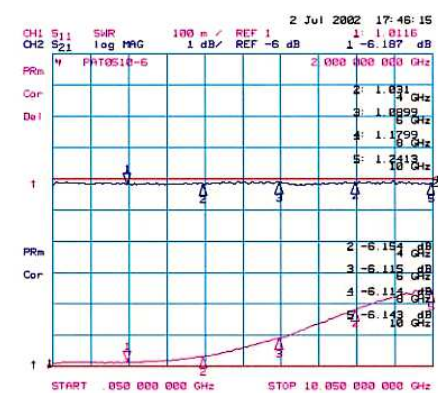
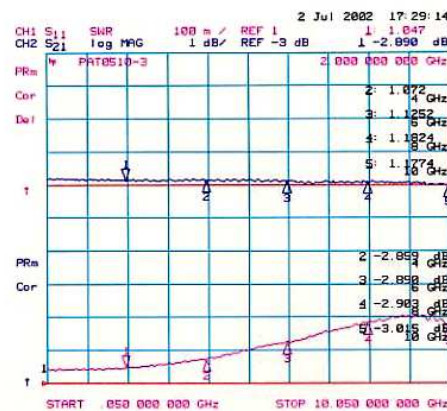
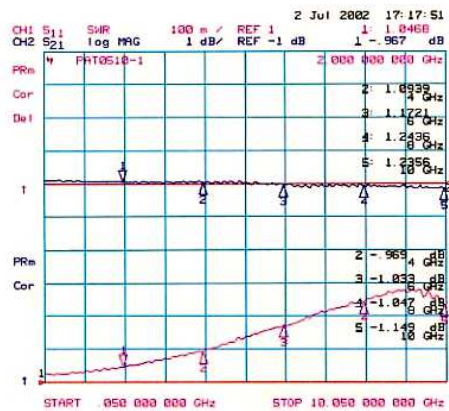
Consequently thermistor characteristic is remarkably improved and now this thermistor achieved the freq. characteristic comparable with thin film resistor in spite of thermistor function.



STM Microwave Chip Attenuator

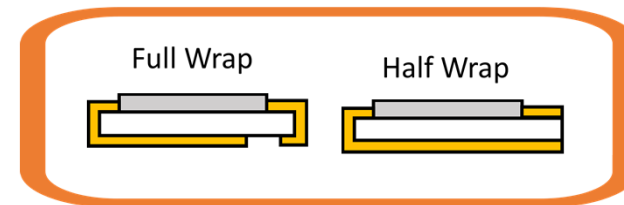
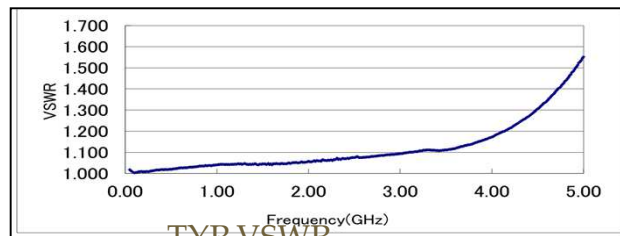


Size	1005	1608	2012	1632	3042
Prat	32mW	64mW	100mW	125mW	250W
Size	1005(0402)	1608(0603)	2012(0805)	3216(1206)	4230(1612)
Freq. Range	DC-20GHz	DC-15GHz	DC-10GHz	DC-8GHz	DC-6GHz
Attenuation	0-10dB	0-10dB	0-10dB	0-10dB	0-10dB
Tolerance(Max.)	±1dB	±1dB	±0.5dB	±0.5dB	±0.5dB
Impednace	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm
VSWR		1.3	1.3	1.3	1.3



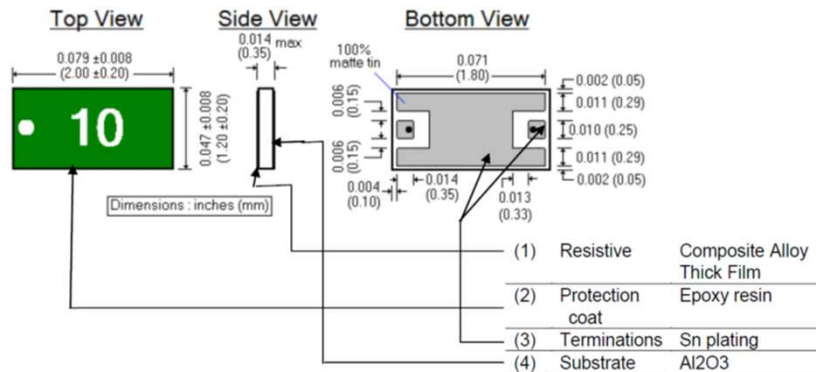
High Power Pad/Term

Type	Spec	Overview Image	Prat			
			10W	30W	60W	100W
High Power Pad : ~30dB	Size		0805 (Prat=15W)	2010	2525	2335
	Freq. Range		DC—4GHz	DC to 4GHz	DC to 3GHz	DC to 3GHz
	VSWR(TYP)		1.30:1	1.15: 1	1.25: 1	1.25: 1
High Power Term	Size		1206	2010	2525	2335
	Freq. Range		DC to 5GHz	DC to 4GHz	DC to 4GHz	DC to 3GHz
	VSWR(TYP)		1.15: 1	1.15: 1	1.25: 1	1.25: 1
	Size		1206	2512	2525	3725
	Freq. Range		DC to 5GHz	DC to 3GHz	DC to 3GHz	DC to 3GHz
	VSWR(TYP)		1.30: 1	1.30: 1	1.30: 1	1.30: 1

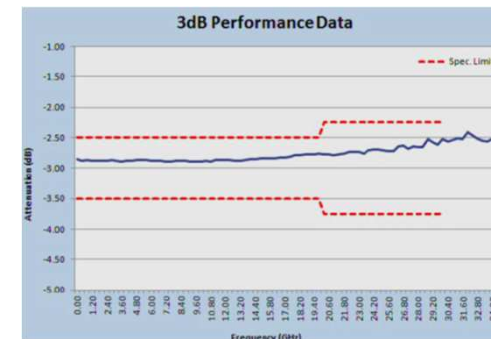




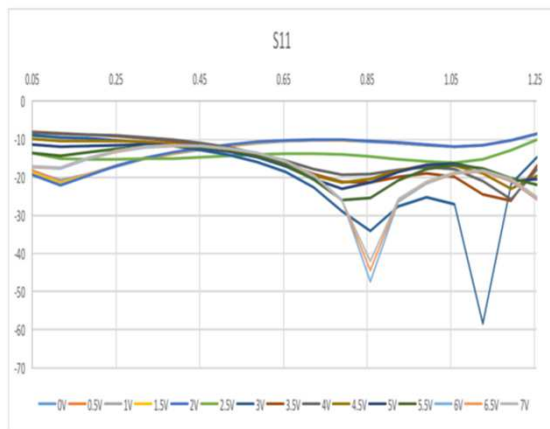
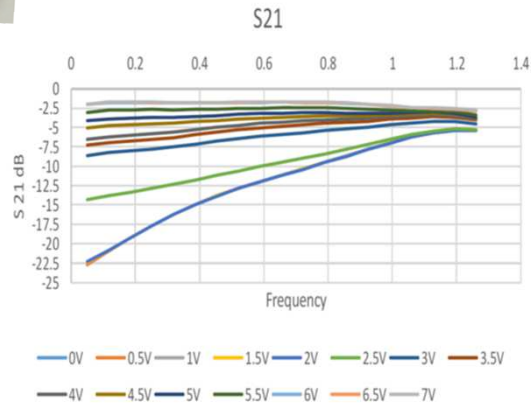
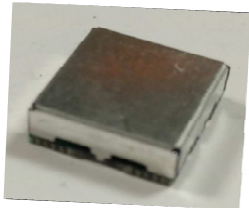
Ka band SMT Attenuator



Parameters	Rating
Attenuation	0~10dB
Attenuation tol.(TYP)	±0.5dB for DC to 20GHz ±0.75dB for 20GHz to 30GHz ±1dB for 30GHz to 40GHz
Impedance	50Ω (Symbol: C)
VSWR(TYP)	1.2 for DC to 30GHz 1.5 for 30 to 40GHz
Operating Frequency Range	DC~40GHz
Input power	200mW 1dB to 3dB 100mW 4dB to 10dB
Operating Ambient Temperature	-55°C~+125°C
Rate Operating Temperature	70°C

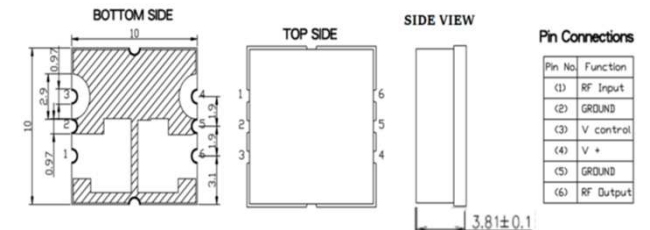
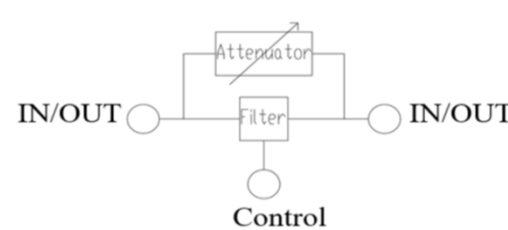


Active EQ



Parameter	Rating
Operating temperature	0 deg. C to +85 deg. C
Storage temperature	-55 deg. C to +100 deg. C
Input signal intensity	+23dBm
Supply Voltage	+7V
Control Voltage	+11V

Parameter	Condition	Specification			
		Min	TYP	Max	Units
Freq. Range	At 25 deg. C, V+=5V _{DC}	50		1220	MHz.
Insertion Loss(S21)	At 50 MHz, Vctl: 0 - 7V 1200MHz, Vctl: 0 - 7V		15 - 1.7 4.7 - 3.3		dB
Deviation from Linear Loss	Vctl: 0 - 7V		±0.5		dB
IP3	Vctl: 2.5 - 7V	+42	+50		dBm
P-1dB	Vcnt: 0 - 7V		+30		dBm
Return Loss(S11)	Vcnt: 0 - 7V		13		dB
Return Loss(S22)	Vcnt: 0 - 7V		11.5		dB
Vdc(V+)	Vcnt: 0 - 7V	3.5	5	5.5	V
I _{dc}	Vctl: 7V Vctl: 0V		0 10	16	mA
I _{ctl}	Vctl: 7V Vctl: 2.5V		12 0	20	mA



Application in D-CCAP

