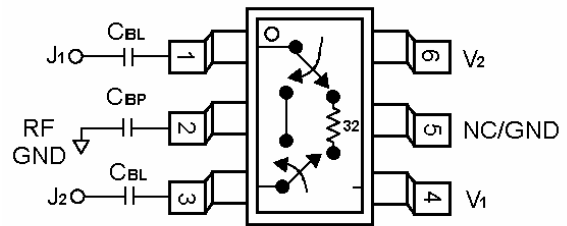


➤ **Features ver1.04**

1 Bits Digital Control Attenuator
 DC-1GHz Attenuation Volume 32 dB, 1-2 GHz
 Attenuation Volume 27 dB
 2-2.5GHz Attenuation 24 dB
 Adjustment of operating frequency through external capacitor.



➤ **Description**

SS104 is a GaAs MMIC 1bits digital control attenuator in the SOT-6 package.. With the features of low power loss, low insertion loss, it is controlled by 0/+5V. It also can be used together with numbers of digital control attenuator. It is adapt to various of telecommunication systems including GSM, PCS, 3G base station etc.

DC blocking Capacitors (C_{BL}) must be supplied for positive operation.

The relation of Operation frequency, C_{BL} and C_{BP} is as the following table.

➤ **Typical Electrical Specification at 25°C**

Characteristic	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss	DC-1.0GHz		0.8	1.0	dB
	1.0-2.0GHz		0.9	1.2	dB
	2.0-2.5GHz		1.0	1.3	dB
Attenuation Volume	DC-1.0GHz		32		dB
	1.0-2.0GHz		27		dB
	2.0-2.5GHz		24		dB
Attenuation Precision	DC-0.5GHz	±(0.4+10% of Attenuation Setting in dB)			dB
	0.85-0.95GHz	±(0.4+5% of Attenuation Setting in dB)			dB
	1.7-2.0GHz	±(0.5+6% of Attenuation Setting in dB)			dB
	2.0-2.5GHz	±(0.6+7% of Attenuation Setting in dB)			dB
VSWR (Insertion loss state)	DC-2.5GHz		1.2:1	1.5:1	
VSWT (Attenuation State)	DC-2.5GHz		1.5:1	2.0:1	

➤ **Using Characteristic**

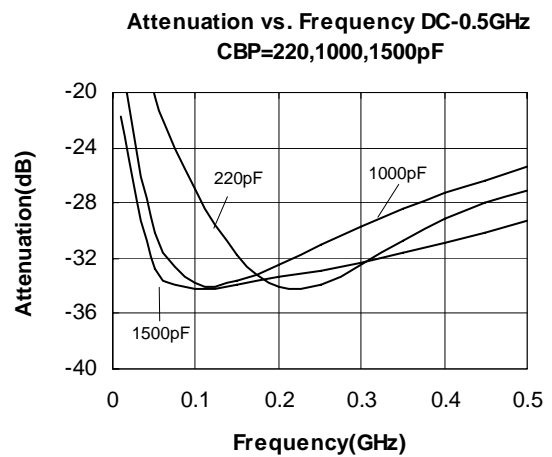
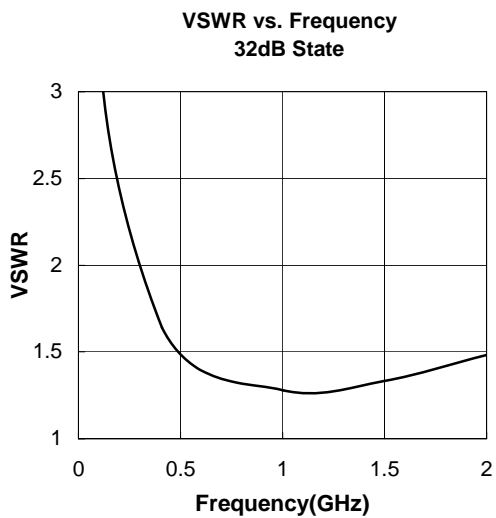
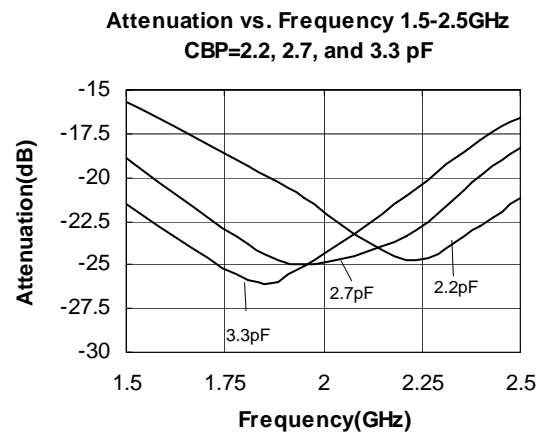
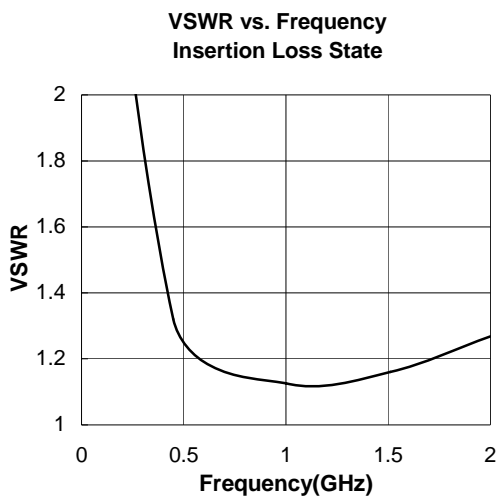
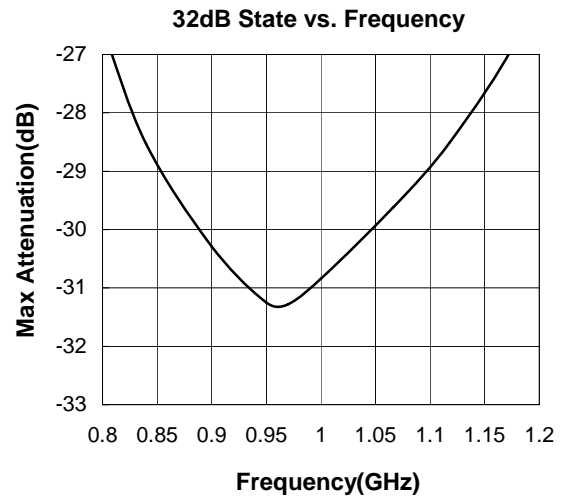
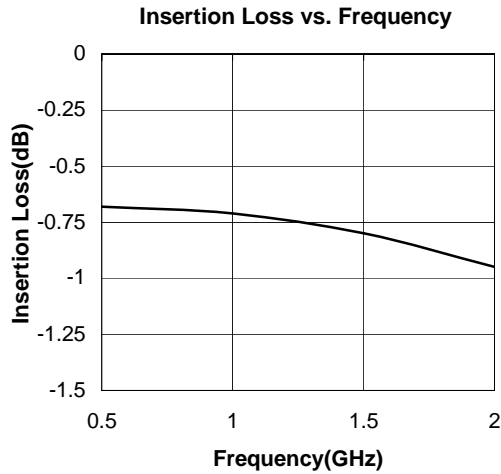
Characteristic	Frequency	Min.	Typ.	Max.	Unit
Switch Characteristic	Rise or Fall (10/90% or 90/10 %RF)		50		ns
	On or Off(50%CTL to 90/10% RF)		100		ns
IP ₃	Two-tone, +10dBm 0/+3V	0.5-2.5GHz	+36	+41	dBm
	0/+5V	0.5-2.5GHz	+38	+44	dBm
P ₋₁	0/+3V	0.5-2.5GHz	+14	+21	dBm
	0/+5V	0.5-2.5GHz	+18	+23	dBm
Control Voltage	V _{Low} =0-0.2V @20 μ A Max. V _{High} =+3V @100 μ A Max. to +5V @200 μ A Max.				

1. All measurements in a 50-Ω system, unless otherwise specified
2. No need C_{BP} when operate in negative voltage.
3. Attenuation Volume depends on C_{BP}

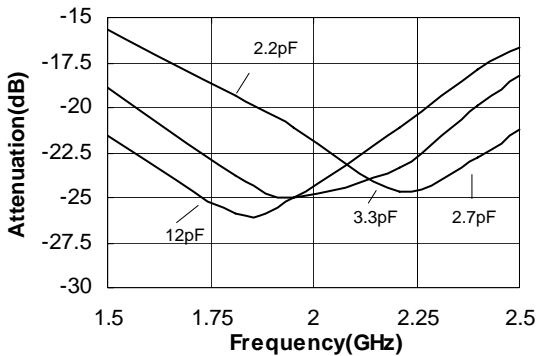
➤ **Typical Performance Curves**

(0, +5V)

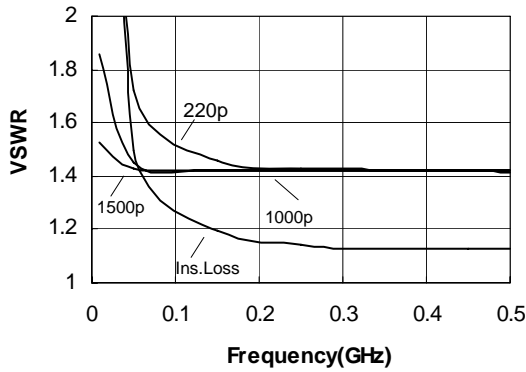
$C_{BP}=12\text{pF}$, $C_{BL}=47\text{pF}$



Attenuation vs. Frequency 1.5-2.5GHz
CBP=2.2, 2.7, and 3.3 pF



VSWR vs. Frequency DC-0.5 GHz
CBP=220,1000,1500pF



➤ **Relation Between C_{BP} and Frequency**

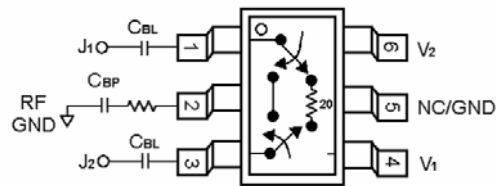
C_{BL} (pF)	C_{BP} (pF)	Operating Frequency (GHz)
47	2.2	2.00-2.30
47	2.7	1.80-2.00
47	3.3	1.60-1.80
47	12	0.90-1.05
47	15	0.80-0.90
330	220	0.20-0.35
1500	1000	0.07-0.20
10000	1500	0.015-0.25

➤ **Truth Table**

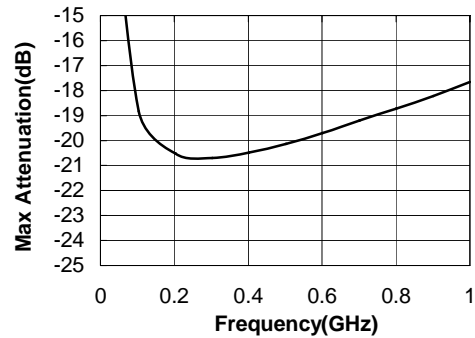
V_1	V_2	Attenuation J1-J2
V_{High}	0	Reference I.L.
0	V_{High}	32dB

➤ **Other Application:**

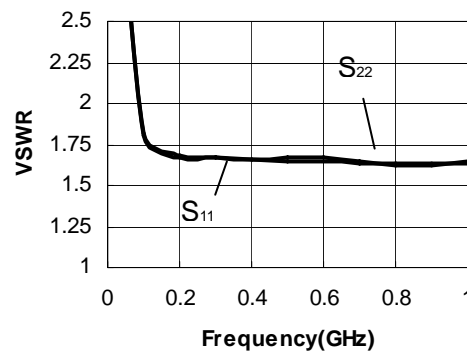
External capacitor and resistor make one 20dB attenuator (0, +5V)



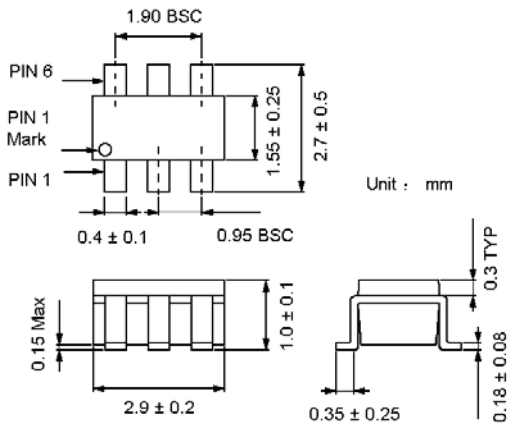
$C_{BL}=200pF, C_{BP}=100pF, R_{BP}=15 \Omega, f_c=400MHz$
20 dB State vs. Frequency
 $CBP=100pF, CBL=220pF, RBP=15 \Omega$



VSWR vs. Frequency 20 dB State



➤ **SOT-6 Outline Dimension**



➤ **Absolute Maximum Ratings**

Item	Value
RF Input Power	1W > 500MHz, 0/+8V 0.5W @ 50MHz, 0/+8V
Power Voltage	+8V
Control Voltage	-0.2V, +8V
Operation Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C

1. Operation of this device above any one of these parameters may cause permanent damage