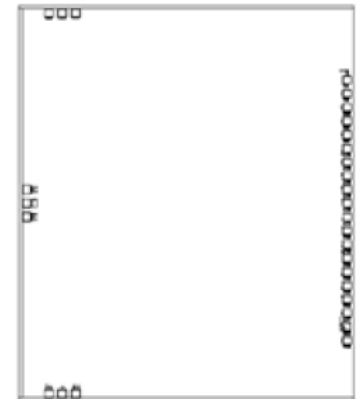


AMT1307
8 - 12GHz Multi-Function Chip



Key Features :

- Frequency range : 8 – 12GHz
- Receiver gain : 13dB
- Transmitter gain : 6dB
- Receiver, transmitter output power at P-1 : 12/13dBm
- Phase shift bit : 6 bits
- Phase shift step : 5.625°
- Phase shift RMS : 2°, Phase shift additive attenuation ±1.2dB
- Attenuation bit : 6 bits
- Attenuation step : 0.5dB
- Attenuation RMS : 0.4dB, Attenuation additive phase shift ±9°
- Input/Output standing wave : 1.4
- Operating voltage : +4.3V/-2.9V
- Control method : TTL, parallel control
- Chip dimensions : 3.8mm x 4.5mm x 0.1mm
- Applications : wireless communication, transceiver module, radio telecommunication etc.

Description :

AMT1307 is a multi-function chip incorporating with amplifier, switch, 6-digit attenuator, 6-digit phase shifter, control driver etc. X band MMIC, it uses Gallium Arsenide (GaAs) pHEMT process. The chip uses +4.3V/-2.9V operation voltage, control level is TTL, with parallel control for phase shift and attenuation. This chip is designed with ground through metal vias on the back technology. All chip products p are 100% RF tested.

Absolute Maximum Ratings (Ta = 25°C)

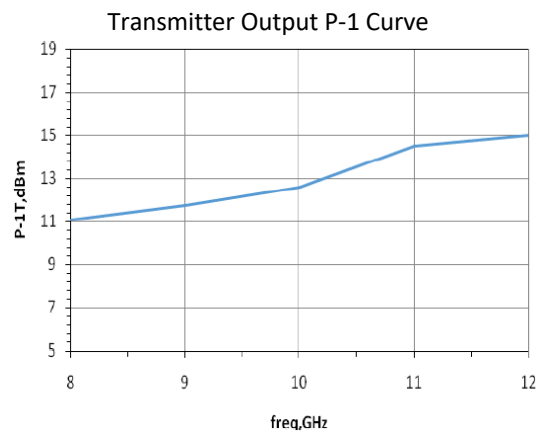
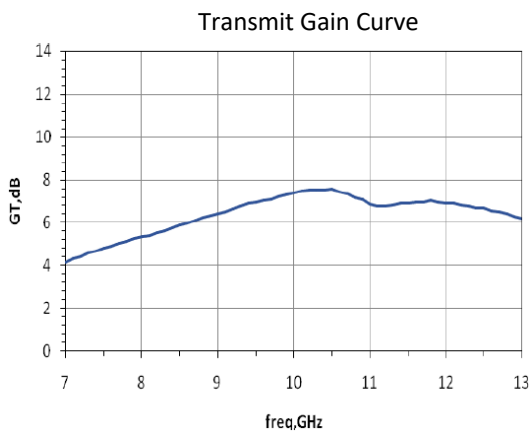
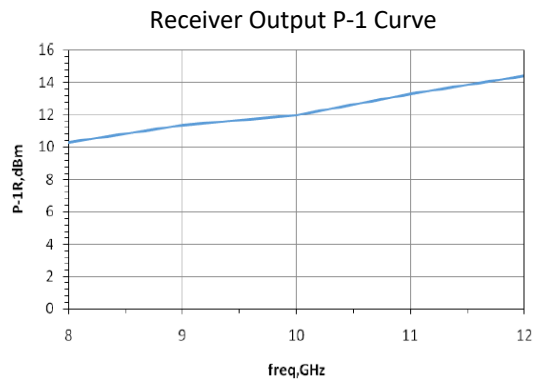
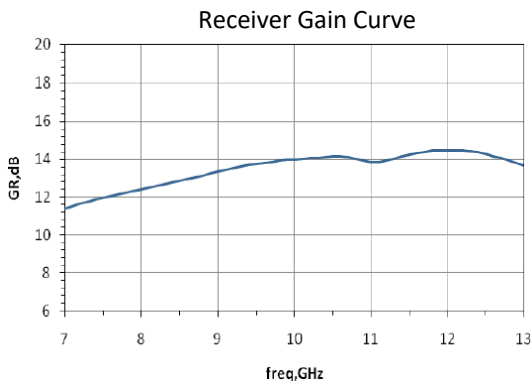
Symbol	Parameter	Value	Remark
AT1, PS1 ...	Control voltage	+7V	
VD, VDR	Operating voltage	+7V	
VE	Operating voltage	-7V	
Pin	Input Power	+20dBm	
Tch	Operating Temperature	150°C	
Tm	Sintering Temperature	310°C	30s, N ₂ protection
Tstg	Storage Temperature	-65 ~ +150°C	

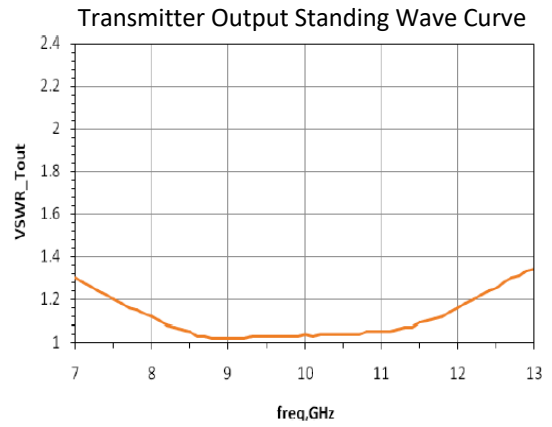
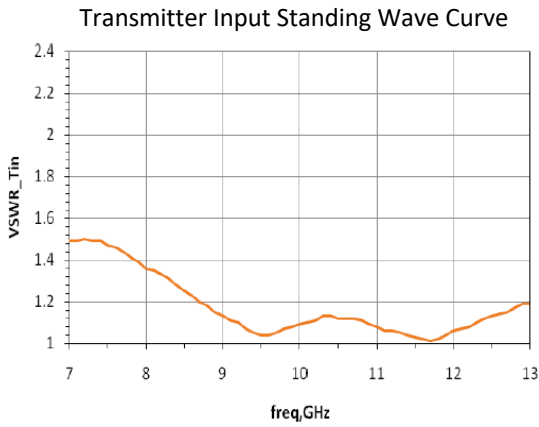
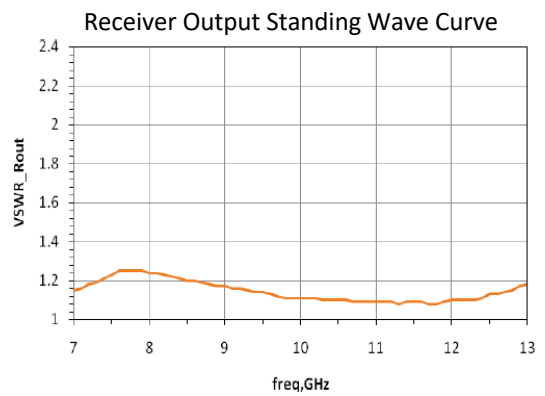
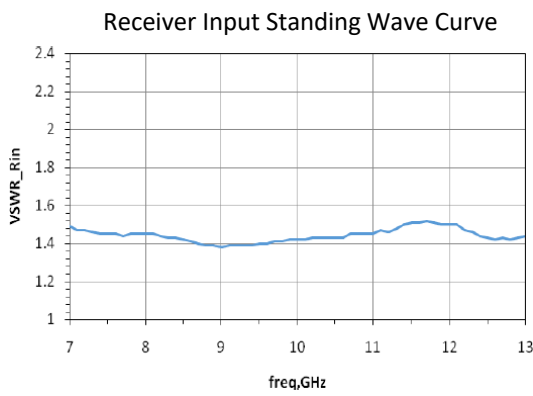
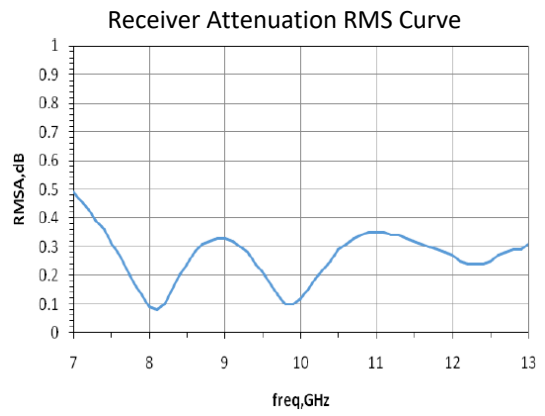
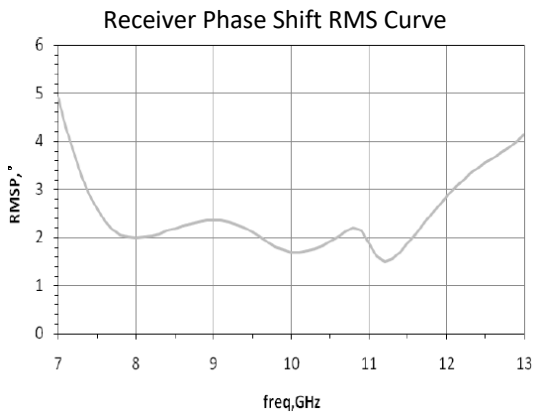
[1] Operation outside any of the Absolute Maximum Ratings may cause permanent device damage.

Electrical Characteristics (Ta = 25°C, Test box data)

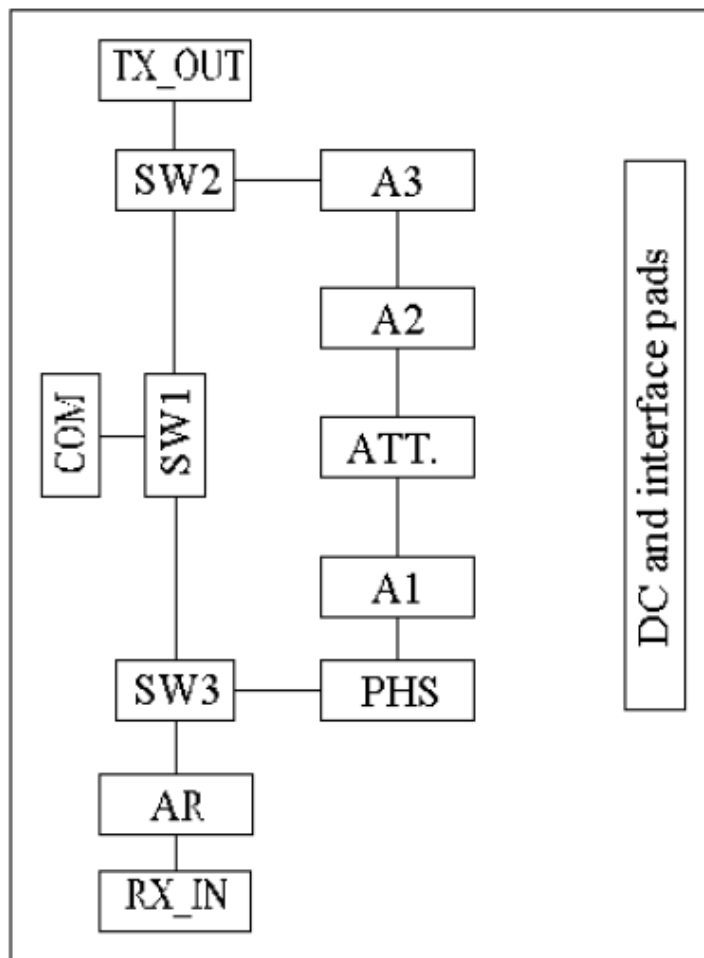
Symbol	Parameter	Value			Unit	Remark
		Min	Typical	Max		
F	Frequency	8 ~ 12			GHz	
Gain_R	Receiver gain	10	13	-	dB	About 1.5dB positive slope
P-1_R	Receiver output at P-1 point	9	12	-	dBm	
NF	Noise figure	-	10	12	dB	
Gain_T	Transmitter gain	4	6	-	dB	
P-1_T	Transmitter output at P-1 point	9	13	-	dBm	
PS	Phase shift range	5.625 – 354.375 (6 bits phase shift)			°	
Δps	Phase shift additive attenuation variation	-	±1	±1.5	dB	
RMSps	Phase shift RMS	-	2	4.5	°	
ATT	Attenuation range	0.5 – 31.5 (6 bits attenuation)			dB	
Δat	Attenuation additive phase shift variation	-	±6	±15	°	
RMSAT	Attenuation RMS	-	0.4	0.8	dB	
VSWR	Input/Output standing wave	-	1.4	1.8		
Id	Operation current (+4.3V)	-	-	0.12	A	

Typical Performance

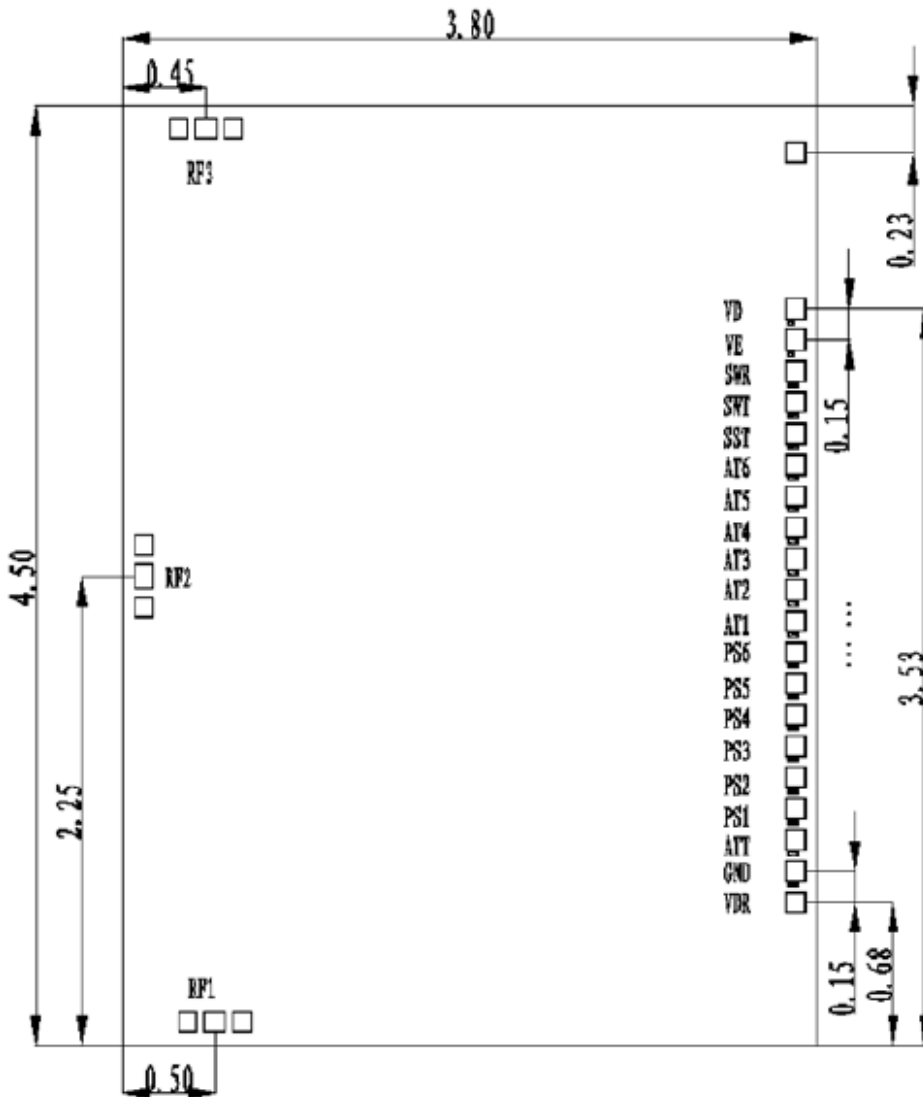




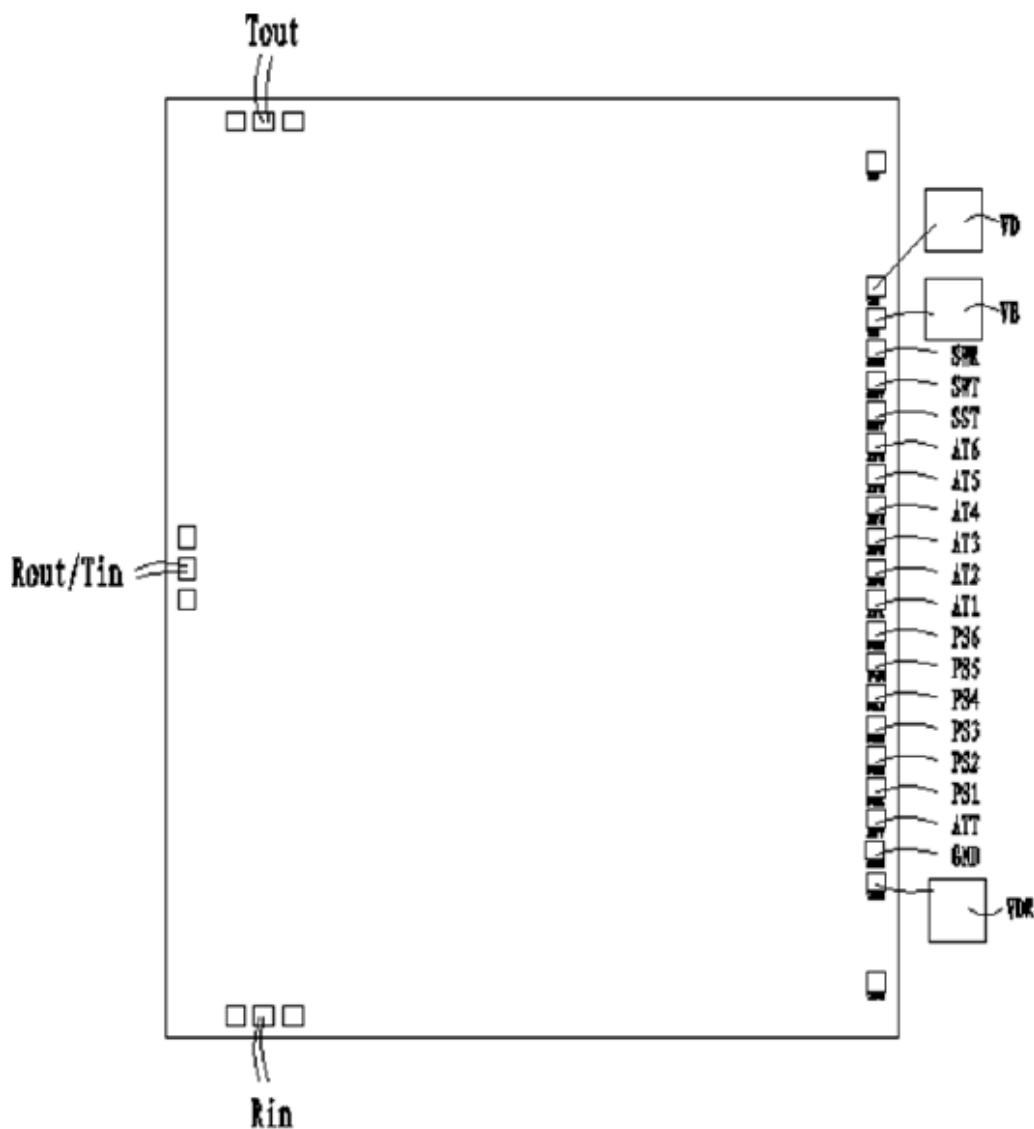
Internal Functional Block Diagram



Chip Dimensions (Unit : μm)



Chip Layout Diagram



Solder Pad Definition

Name	Dimension	Remark
RF1 / RF2 / RF3	120 μ m x 100 μ m	RF Input Output Ports
VD / VDR / VE	100 μ m x 100 μ m	Supply pad : +4.3V/+4.3V/-2.9V
AT1~AT6, PS1~PS6	100 μ m x 100 μ m	TTL, control signal input
SWR, SWT, SST	100 μ m x 100 μ m	TTL, control signal input

Truth Table

Phase Shift	5.625°	11.25°	22.5°	45°	90°	180°
	PS1	PS2	PS3	PS4	PS5	PS6
Initial	0	0	0	0	0	0
-5.625°	1	0	0	0	0	0
-11.25°	0	1	0	0	0	0
-22.5°	0	0	1	0	0	0
-45°	0	0	0	1	0	0
-90°	0	0	0	0	1	0
-180°	0	0	0	0	0	1
Attenuation	0.5dB	1dB	2dB	4dB	8dB	16dB
	AT1	AT2	AT3	AT4	AT5	AT6
Initial	0	0	0	0	0	0
0.5dB	1	0	0	0	0	0
1dB	0	1	0	0	0	0
2dB	0	0	1	0	0	0
4dB	0	0	0	1	0	0
8dB	0	0	0	0	1	0
16dB	0	0	0	0	0	1

Status	SWR	SWT	SST
Receive	1	0	0
Transmit	0	1	0
Load	0	0	1

Please see Appendix A for details.