AMT1301

2.7 - 3GHz Multi-Function Chip

Key Features :

- Frequency range : 2.7 – 3GHz
- Receiver gain : 8dB
- Transmitter small signal gain : 20dB
- Receiver output P-1 : 14dBm
- Transmitter saturated output power : 24dBm
- Receiver noise figure : 10dB
- Phase shift bit : 6 bits
- Phase shift step : 5.625°
- Phase shift RMS : 3°, Phase shift additive attenuation ±0.8dB
- Attenuation bit : 6 bits
- Attenuation step : 0.5dB
- Attenuation RMS : 0.5dB, Attenuation additive phase shift ±8°
- Receiver Input/Output standing wave : 1.5
- Transmitter Input/Output standing wave : 1.5
- Operating voltage : +5V/+5V/-5V
- Static current : 100mA (transmitting) / 70mA (public) / 15mA (-5V)
- Control method : TTL parallel code control
- Chip dimensions : 4.5mm x 3.5mm x 0.1mm
- Applications : wireless communication, transceiver module, radio telecommunication etc.

Description :

AMT1301 is a multi-function chip incorporating amplifier, switch, 6-digit attenuator, 6-digit phase shifter, control driver etc. functions (MMIC), it is designed by Gallium Arsenide (GaAs) pHEMT process. The chip operation voltage are +5V/+5V/-5V, 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)

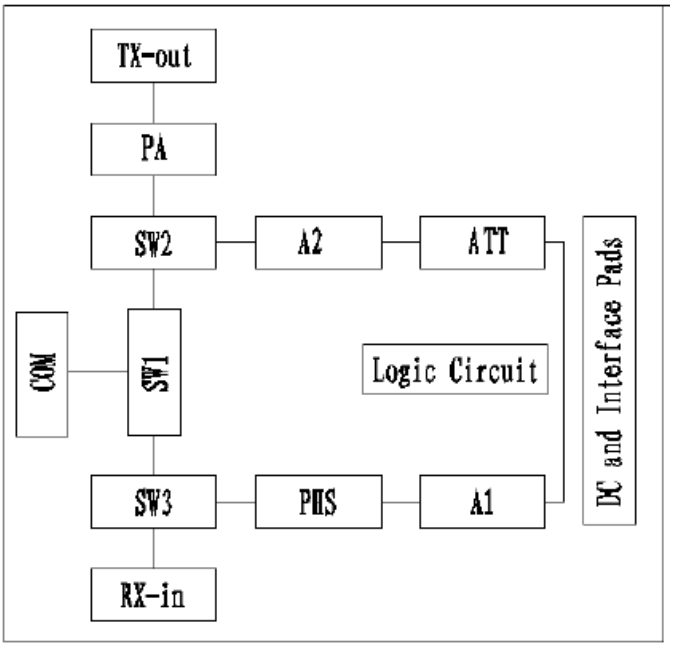
Symbol	Parameter	Value	Remark
P1~P6, A1~A6, S1, S2	Control voltage	+6V	
VD1, VD2	Operating voltage	+6V	
VS	Operating voltage	-6V	
Pin	Max. Input Signal Power	+20dBm	
Tch	Operating Temperature	150°C	
Tm	Sintering Temperature	310°C	30s, N_2 protection
Tstg	Storage Temperature	-65 ~ +150°C	

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

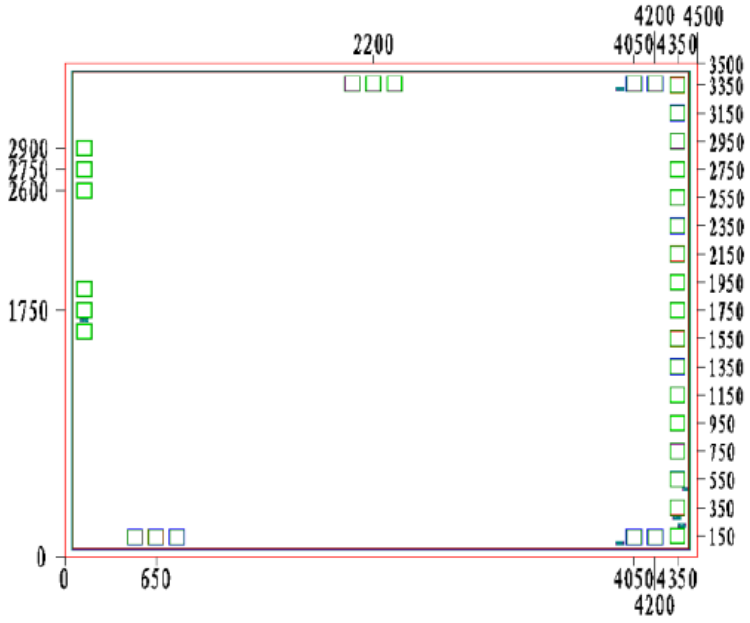
Electrical Characteristics (Ta = 25°C)

Symbol	Parameter	Value			Unit	Remark
		Min	Typical	Max		
F	Frequency		2.7 ~ 3		GHz	
Gain_R	Receiver gain	-	8	-	dB	About 1.5dB positive slope
P-1_R	Receiver output at P-1 point	-	14	-	dBm	
NF_R	Noise figure	-	10	-	dB	
Gain_T	Transmitter small signal gain	-	20	-	dB	
Psat_T	Transmitter saturated output power	-	24	-	dBm	
PS	Phase shift range	5.625 – 354.375 (6 digit phase shift)			°	
∆at	Phase shift additive amplitude varation	-0.8	-	+0.8	dB	
RMSp	Phase shift RMS	-	3	-	°	
ATT	Attenuation range	0.5 – 31.5 (6 digit attenuation)			dB	
∆ps	Attenuation additive phase shift varation	-8	-	+8	°	
RMS_A	Attenuation RMS	-	0.5	-	dB	
VSWR_R	Receiver Input/Output standing wave	-	1.5	-		
VSWR_T	Transmitter Input standing wave	-	1.5	-		
Id2	+5V (transmit) current	-	100	-	mA	
Id1	+5V (public) current	-	70	-	mA	
Is	-5V current	-	15	-	mA	

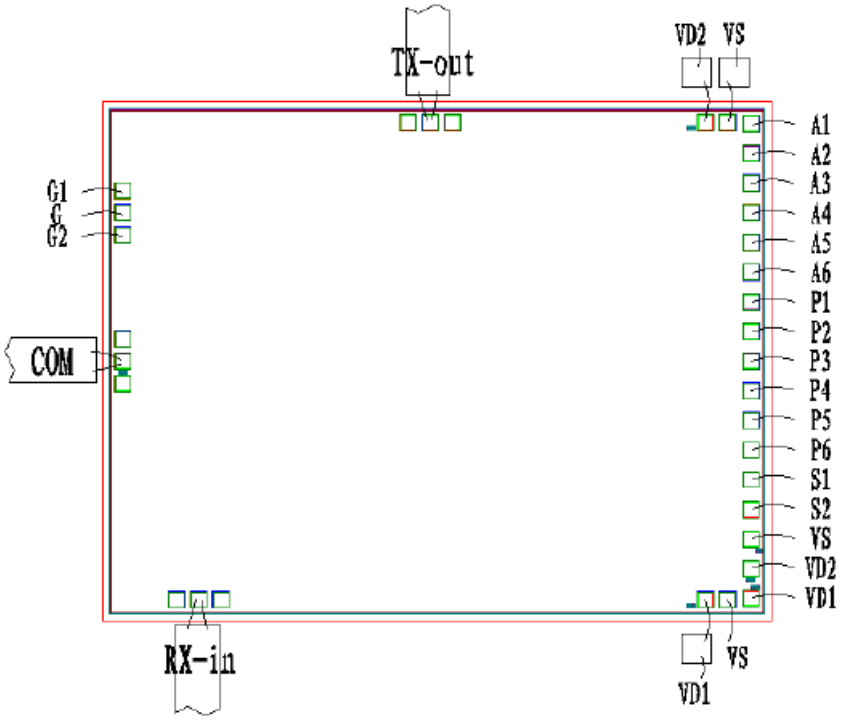
Internal Functional Diagram



Chip Dimensions (Unit : μm)



Chip Layout Diagram



Pad Definition

Name	Dimension	Description
RX_in/TX_out	100μm x 100μm	Receiver input/Transmitter output
COM	100μm x 100μm	Receiver output/Transmitter input
VD1/VD2/VS	100μm x 100μm	Supply pad, +5V(public)/+5V(transmit)/=5V
A1~A6, P1~P6	100μm x 100μm	TTL, attenuation phase shift control signal
S1, S2	100μm x 100μm	TTL, switch control signal
G1, G2	100μm x 100μm	1dB, 2dB gain adjustment

Please see Appendix A for details.