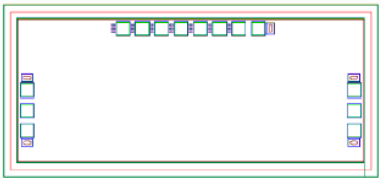
AMT1603

4.5 – 6.5GHz Digital Phase Shifter Chip



Key Features :

- Frequency range : 4.5 – 6.5GHz
- Insertion loss : 5dB
- Phase shift bit : 6 bit
- Phase shift step : 5.625°
- Phase shift RMS : 2°
- Phase shift additive attenuation : ±1dB
- Input/output standing wave : 1.3
- Control method : TTL parallel control
- Chip dimensions : 2.8mm x 1.2mm x 0.1mm
- Applications : wireless communication, transceiver module, radio telecommunication etc.

Description :

AMT1603 is a 6-bit digital control phase shifter, it is designed by Gallium Arsenide (GaAs) process. This chip is designed with ground through metal vias on the back technology, all chip products p are 100% RF tested. It covers a frequency range of 4.5 ~ 6.5GHz, typical insertion loss is 5dB, it uses TTL logic control. This chip is for microwave transceiver module, to realize transceiver signal phase control function.

Absolute Maximum Ratings (Ta = 25°C)

Symbol	Parameter	Value	Remark
Pin	Input Power	25dBm	
Tch	Operation Temperature	-55 ~ +125°C	
Tm	Sintering Temperature	310°C	30s, N_2 protection
Tstg	Storage Temperature	-65 ~ +150°C	

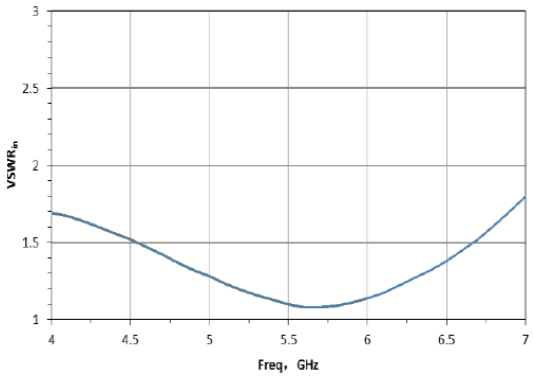
[1] Operation outside any of the Absolute Maximum Ratings may cause permanent device damage.

Electrical Characteristics (Ta = 25°C)

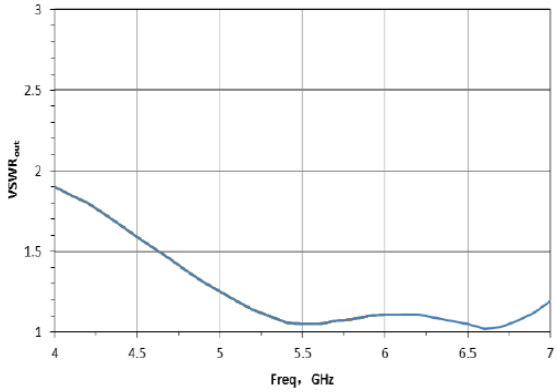
Symbol	Parameter	Test Conditions	Value			Unit
			Min	Typical	Max	
IL	Insertion Loss	VEE = -5V F : 4.5 ~ 6.5GHz	-	5	6	dB
PS	Phase shift range		5.625 – 354.375			°
Δat	Phase shift additive attenuation		-1.2	±1	1.2	dB
RMS	64 states phase shift RMS error		-	2	3	°
VSWRin	Input Standing Wave		-	1.3	1.5	-
VSWRout	Output Standing Wave		-	1.3	1.6	-

Typical Performance

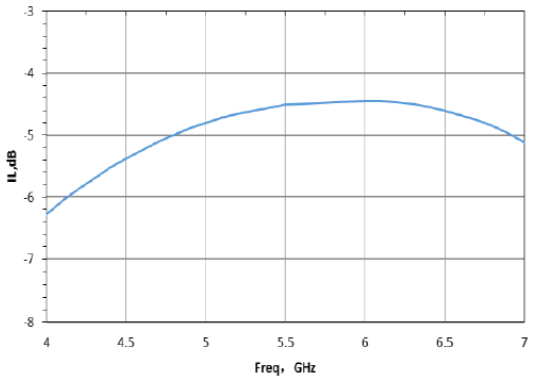
Input Standing Wave Curve



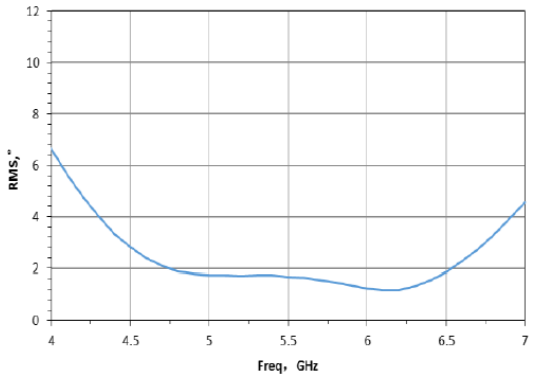
Output Standing Wave Curve



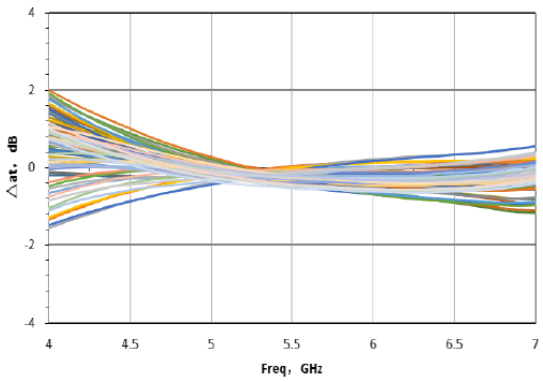
Insertion Loss Curve



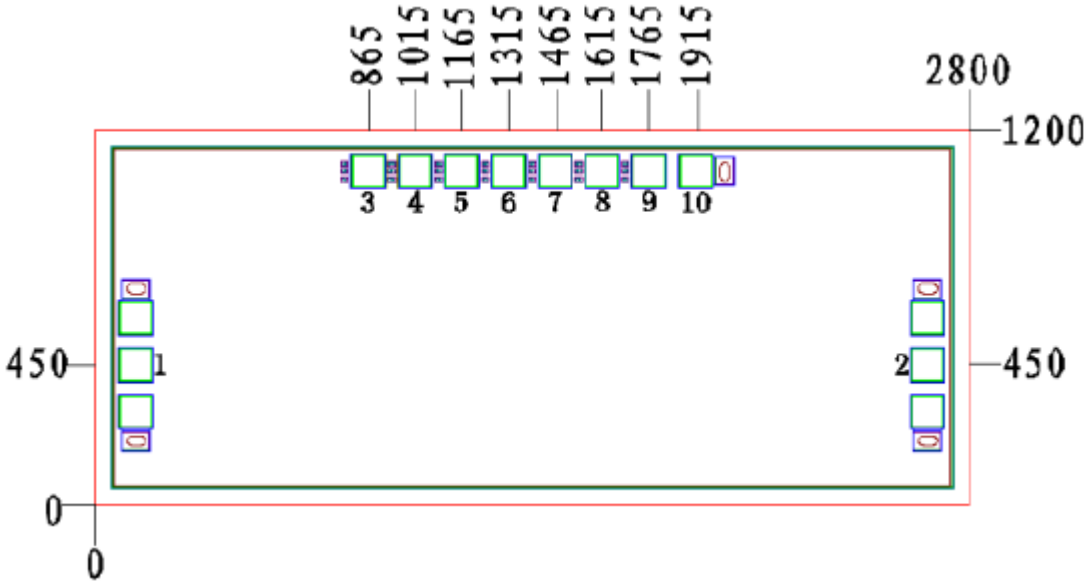
64 States Phase Shift RMS Curve



Phase Shift Additive Attenuation Curve



Chip Dimensions (Unit : μm)



Chip Layout Diagram

Pad Definition

Symbol	Function Description	PAD Dimension
RFin	RF signal input port, external connect to 50Ω system, no DC blocking capacitor	100μm *100μm
RFout	RF signal output port, external connect to 50Ω system, no DC blocking capacitor	100μm *100μm
VEE	-5V supply	100μm *100μm
PS1	5.625° bit control	100μm *100μm
PS2	11.25° bit control	100μm *100μm
PS3	22.5° bit control	100μm *100μm
PS4	45° bit control	100μm *100μm
PS5	90° bit control	100μm *100μm
PS6	180° bit control	100μm *100μm
GND	Ground	100μm *100μm

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

Pleases see Appendix A for details.