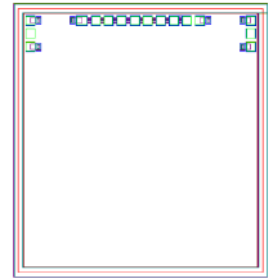


**AMT1604**  
**6 – 18GHz Digital Phase Shifter Chip**



**Key Features :**

- Frequency range : 6 – 18GHz
- Insertion loss : 10dB
- Phase shift bit : 7 bit
- Phase shift step : 2.8125°
- Phase shift RMS : 3°
- Phase shift additive attenuation : ±2dB
- Input/output standing wave : 1.5
- Control method : TTL parallel control
- Supply : -5V/3mA
- Chip dimensions : 2.8mm x 3.0mm x 0.1mm
- Applications : wireless communication, transceiver module, radio telecommunication etc.

**Description :**

AMT1604 is a 7-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 are 100% RF tested. It covers a frequency range of 6 ~ 18GHz, typical insertion loss is 10dB, 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)**

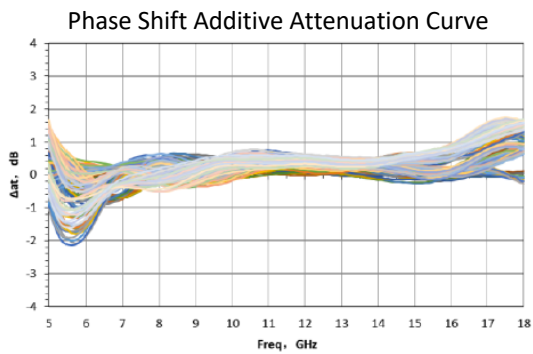
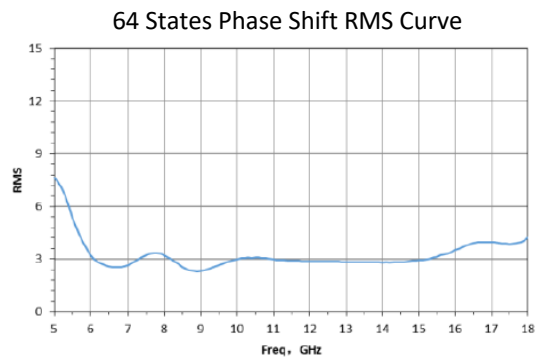
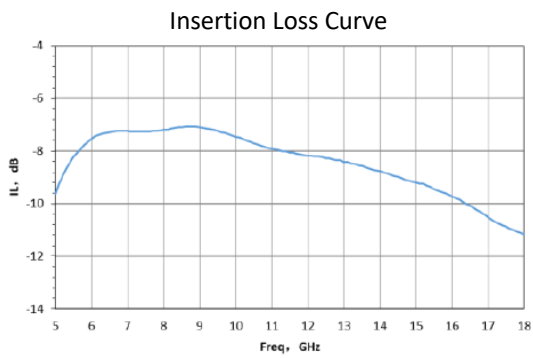
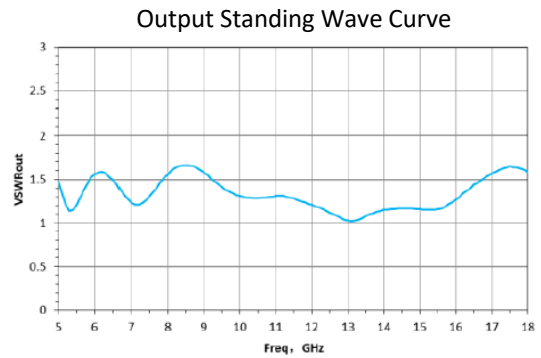
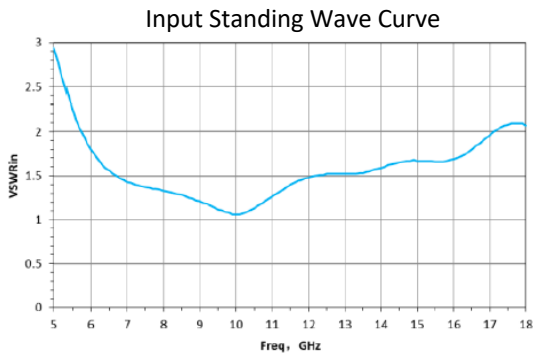
Symbol	Parameter	Value	Remark
Pin	Input Power	25dBm	
Tch	Operation Temperature	-55 ~ +125°C	
Tm	Sintering Temperature	310°C	30s, N <sub>2</sub> protection
Tstg	Storage Temperature	-65 ~ +150°C	

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

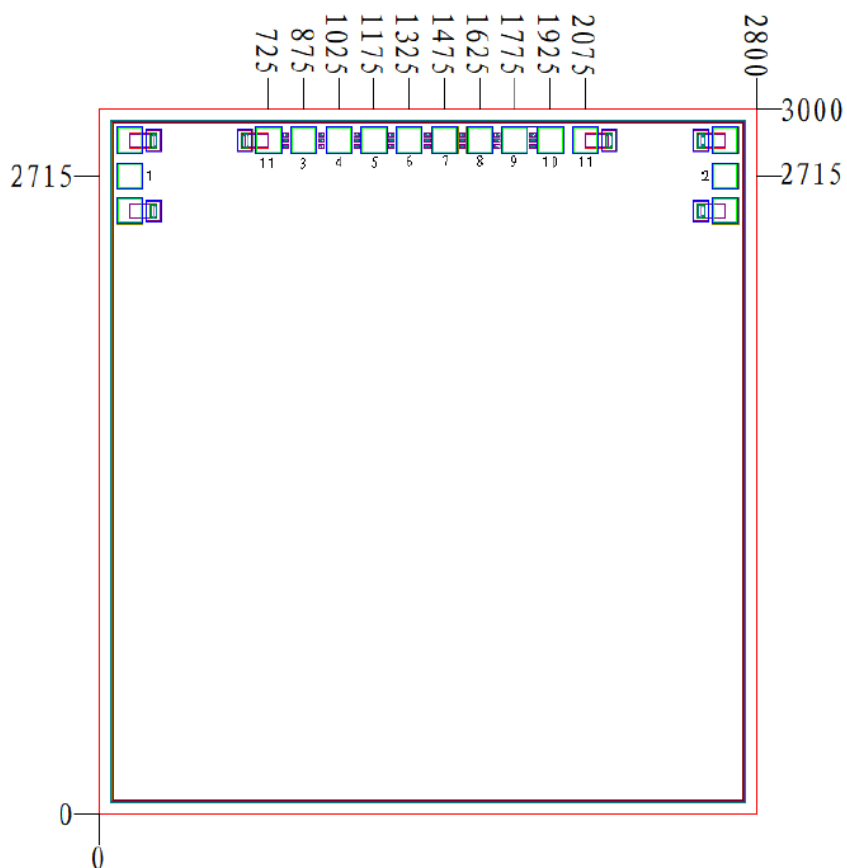
**Electrical Characteristics (Ta = 25°C)**

Symbol	Parameter	Test Conditions	Value			Unit
			Min	Typical	Max	
IL	Insertion Loss	VEE = -5V F : 6 ~ 18GHz	-	10	12	dB
PS	Phase shift range		2.8125 – 357.1875			°
Δat	Phase shift additive attenuation		-2	±1	2	dB
RMS	64 states phase shift RMS error		-	3	4.5	°
VSWRin	Input Standing Wave		-	1.5	2.1	-
VSWRout	Output Standing Wave		-	1.3	1.7	-

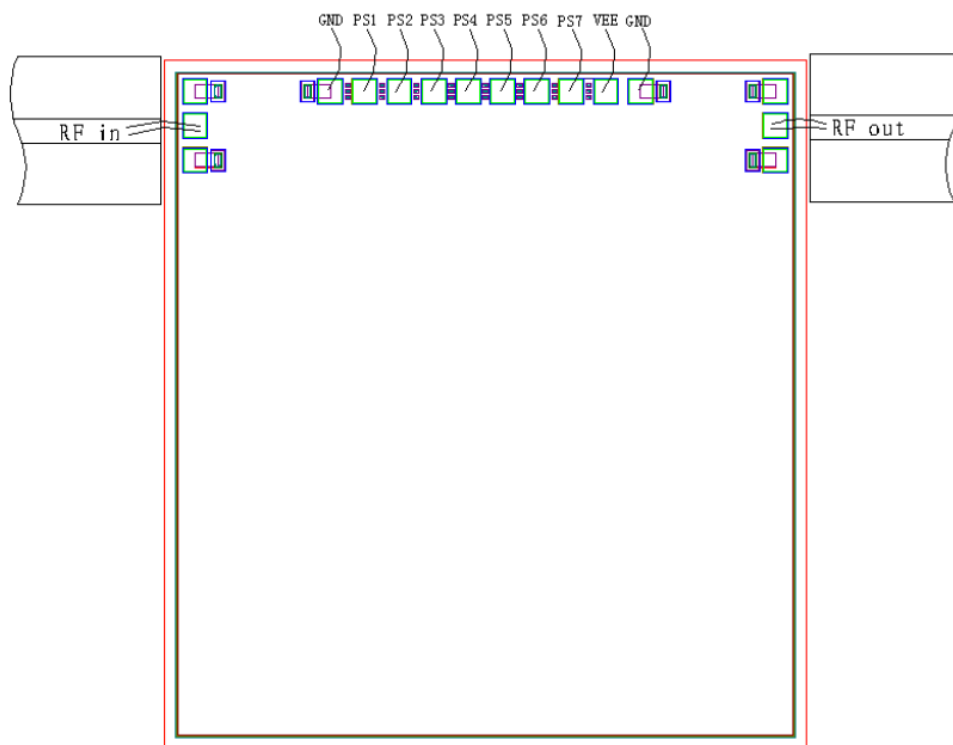
## Typical Performance



### Chip Dimensions (Unit : $\mu\text{m}$ )



### Chip Layout Diagram



**Pad Definition**

<b>Symbol</b>	<b>Function Description</b>	<b>PAD Dimension</b>
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
PS1	2.8125° bit control	100μm *100μm
PS2	5.625° bit control	100μm *100μm
PS3	11.25° bit control	100μm *100μm
PS4	22.5° bit control	100μm *100μm
PS5	45° bit control	100μm *100μm
PS6	90° bit control	100μm *100μm
PS7	180° bit control	100μm *100μm
VEE	-5V supply	100μm *100μm
GND	Ground	100μm *100μm

**Truth Table**

<b>Phase Shift</b>	<b>2.8125°</b>	<b>5.625°</b>	<b>11.25°</b>	<b>22.5°</b>	<b>45°</b>	<b>90°</b>	<b>180°</b>
	<b>PS1</b>	<b>PS2</b>	<b>PS3</b>	<b>PS4</b>	<b>PS5</b>	<b>PS6</b>	<b>PS7</b>
<b>Initial</b>	0	0	0	0	0	0	0
<b>2.8125°</b>	1	0	0	0	0	0	0
<b>5.625°</b>	0	1	0	0	0	0	0
<b>11.25°</b>	0	0	1	0	0	0	0
<b>22.5°</b>	0	0	0	1	0	0	0
<b>45°</b>	0	0	0	0	1	0	0
<b>90°</b>	0	0	0	0	0	1	0
<b>180°</b>	0	0	0	0	0	0	1

Please see Appendix A for details.