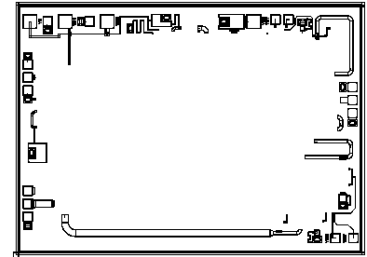


## 12 ~ 18GHz Switch Power Amplifier Chip

## Key Features :

- Frequency range : 12~18GHz
- Typical small signal gain : 29dB
- Typical output power : 42dBm
- Typical added efficiency : 28%
- Supply Voltage: 28V, -1.8V
- Chip dimensions: 4.0mm\*2.9mm\*0.1mm
- Application : microwave transceiver, wireless communication etc.



## Description :

AMT2401 chip is a high performance 12 ~ 18GHz switch power amplifier, it is designed by Gallium Nitrate (GaN) HEMT process, with ground through metal via on the back technology. All chip products are 100% RF tested. AMT2401 chip is with dual voltage supply, drain voltage  $V_{ds} = 28V$ , provides 42dBm output power in 12 ~ 18GHz frequency range.

Absolute Maximum Ratings ( $T_a = 25^\circ C$ )

Symbol	Parameter	Value	Remark
Vd	Drain Voltage	35V	
Id	Drain Current	5A	
Vg	Gate Voltage	-1.5V	
Ig	Gate Current	150mA	
Pd	DC Power Consumption	120W	
Pin	Input Signal Power	30dBm	
Tch	Operating Temperature	150°C	
Tm	Sintering Temperature	310°C	30s, N <sub>2</sub> protection

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

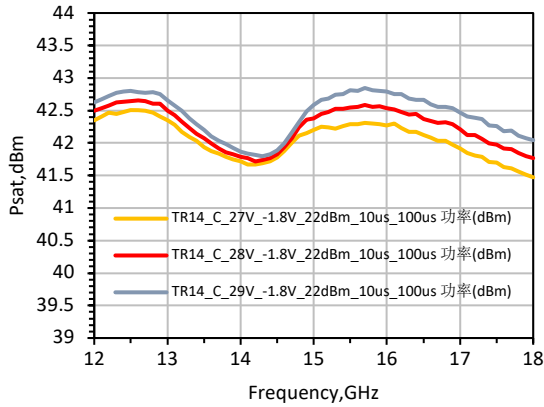
Electrical Characteristics ( $T_a = 25^\circ C$ )

Symbol	Parameter	Test Condition	Value			Unit
			Min	Typical	Max	
$G_L$	Small Signal Gain	Transmit : VD : 28V, VG : -1.8V VCT : -28V, VCR : 0V F : 12~18GHz Duty Cycle : 10%	-	29	-	dB
$G_P$	Power Gain		-	20	-	dB
Pout	Saturated Output Power		-	42	-	dBm
PAE	Power Added Efficiency		-	28	-	%
Id	Operating Current		-	1.9	-	A
IL	Insertion Loss	Receive : VCT : 0V, VCR : -28V F : 12~18GHz	-	1.2	-	dB
IRL	Input Return Loss		-	-1.5	-	dB
ORL	Output Return Loss		-	-1.5	-	dB
ISO	Isolation		-	-30	-	dB

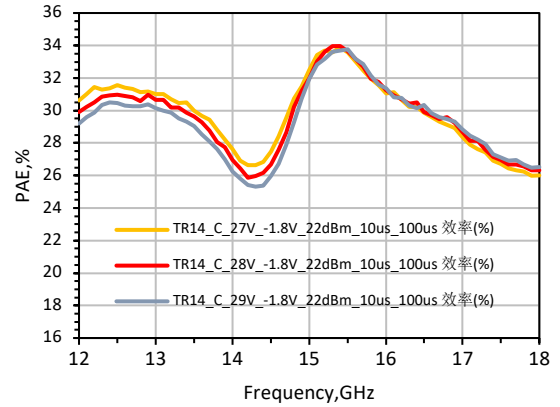
12 ~ 18GHz Switch Power Amplifier Chip

Typical Performance

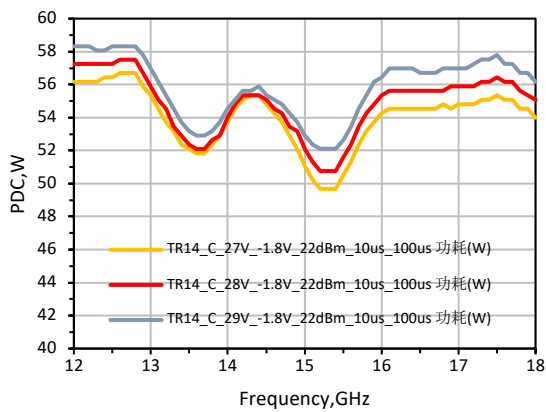
Transmit Output Power Curve



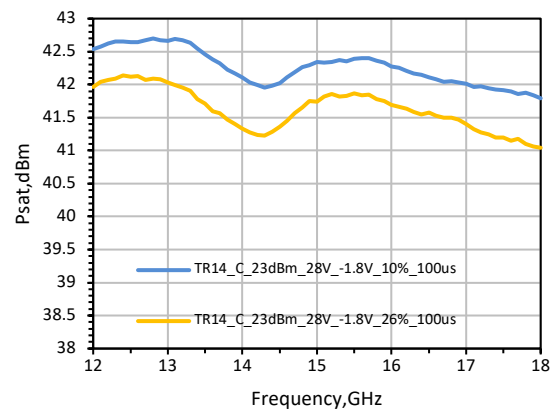
Transmit Efficiency Curve



Transmit Power Consumption Curve

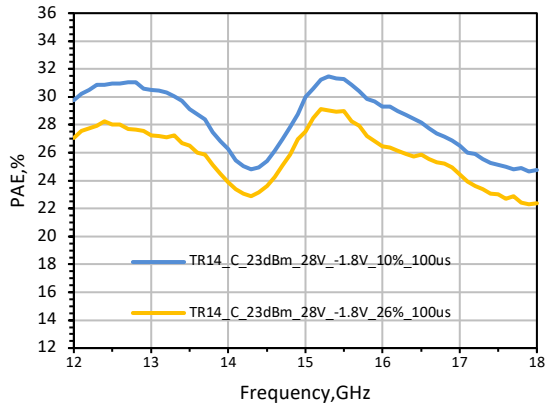


Power Curve under Different Transmit Duty Cycle

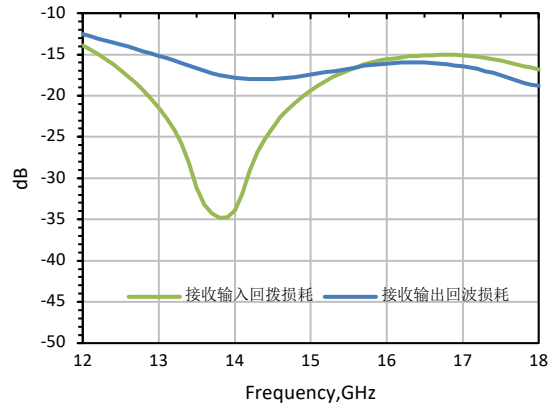


12 ~ 18GHz Switch Power Amplifier Chip

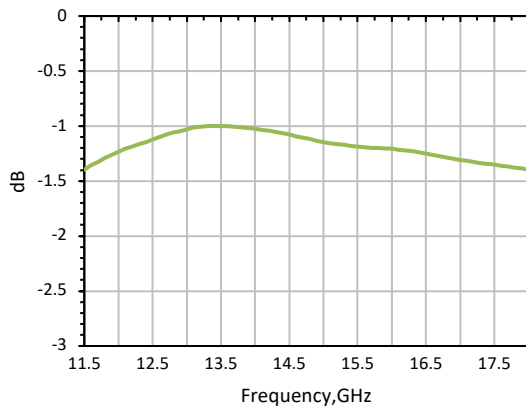
Efficiency Curve under Different Transmit Duty Cycle



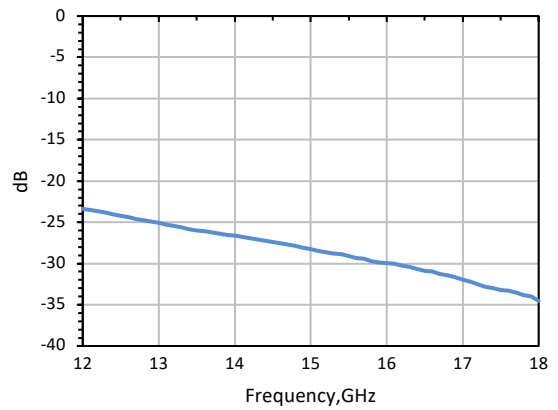
Receive Return Loss Curve



Receive Insertion Loss Curve

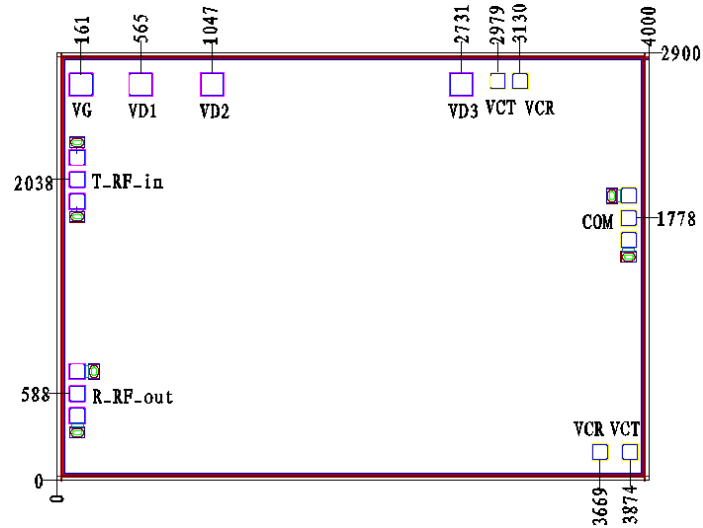


Switch Isolation Curve

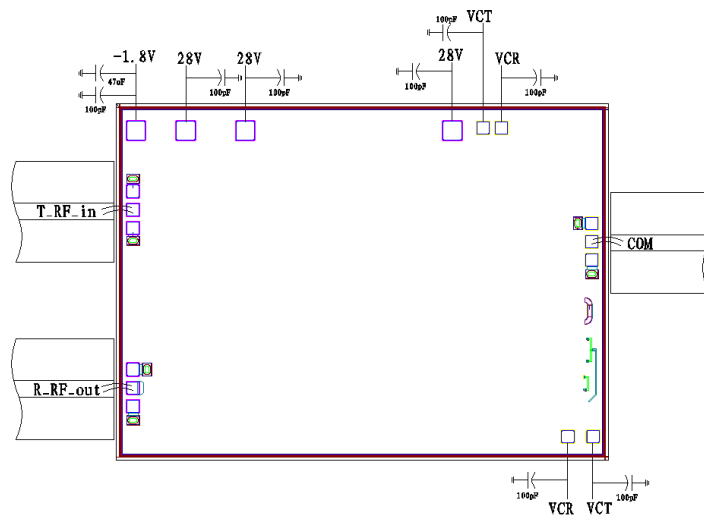


12 ~ 18GHz Switch Power Amplifier Chip

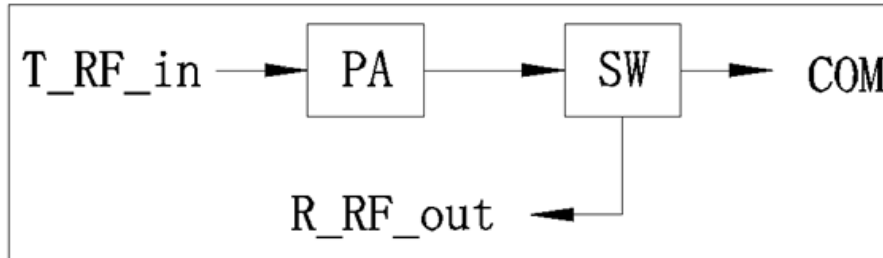
Chip Dimension (Unit :  $\mu\text{m}$ )



Chip Layout Diagram



## Internal Function Diagram



## Pad Definition

Symbol	Function	Dimension
T_RF_in	Transmit RF signal input port	100*100 $\mu\text{m}^2$
R_RF_out	Receive RF signal output port	100*100 $\mu\text{m}^2$
COM	Transmit RF output port/Receive RF input port	100*100 $\mu\text{m}^2$
VG	Power amplifier gate supply port	150*150 $\mu\text{m}^2$
VD1	Power amplifier first stage drain supply port	150*150 $\mu\text{m}^2$
VD2	Power amplifier second stage drain supply port	150*150 $\mu\text{m}^2$
VD3	Power amplifier third stage drain supply port	150*150 $\mu\text{m}^2$
VCT	Switch control voltage supply port	100*100 $\mu\text{m}^2$
VCR	Switch control voltage supply port	100*100 $\mu\text{m}^2$

## Truth Table

VCT	VCR	Operation Status
0	1	Transmit link operates
1	0	Receive link operates

Note, "1" is high level 0V, "0" is low level -40V.

Please see Appendix A for details.