

LDMOS 射频功率晶体管

HTU7G06S005P

1. 产品描述

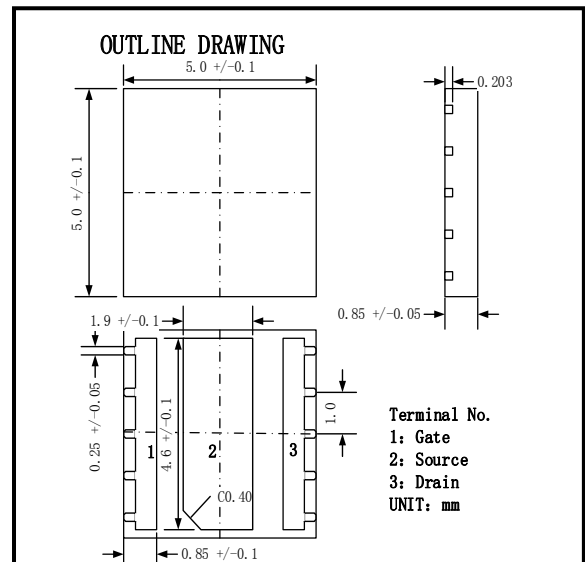
HTU7G06S005P 是一款为 VHF/UHF 频段射频功率放大器而设计的 LDMOS 射频功率晶体管。器件内部集成静电保护电路。

100-600MHz, 10W, 7.5V
WIDE BAND
RF POWER LDMOS TRANSISTOR

2. 典型性能

Frequency (MHz)	VDD (V)	Pin (W)	Pout (W)	Eff (%)
400-470 ⁽¹⁾	3.6	0.50	4.5	60
400-470 ⁽²⁾	7.2	0.32	8.0	65
400-470 ⁽³⁾	7.5	0.32	10.0	63

1. 基于 3.6V, 4W 参考设计性能测试
2. 基于 7.2V, 8W 参考设计性能测试
3. 基于 7.5V, 10W 参考设计性能测试
4. 上述性能为参考设计整个带内的最低性能



3. 产品应用

- VHF 频段手持对讲机
- UHF 频段手持对讲机
- 100-600MHz 其他应用驱动或末级功放

4. 极限参数

参数	符号	条件	值	单位
漏源电压	V _{DSS}	-	26	V
栅源电压	V _{GG}	-	-5~+10	V
工作电压	V _{DD}	-	9	V
温度存储	T _{stg}	-	-55 ~ 150	°C
工作结温	T _J	-	-40 ~ 150	°C
热阻	Z _{th(j-c)}	-	2.8	°C/W

5. 电气特性

参数	符号	测试条件	最小值	典型值	最大值	单位
击穿电压	$V_{(BR)DDS}$	$V_{GG}=0V, I_D=500\mu A$	26	-	-	V
漏极漏电流	I_{DSS}	$V_{DD}=28V, V_{GG}=0V$	-	-	10	μA
栅极漏电流	I_{GGS}	$V_{DD}=0V, V_{GG}=5V$	-	-	1	μA
阈值电压	V_{th}	$V_{DD}=V_{GG}, I_D=40\mu A$	1.6	1.8	2.0	V
输出功率	P_{out}	$V_{DD}=3.6V, P_{in}=0.5W$ $f=435MHz, I_{dq}=500mA$	-	5	-	W
漏极效率	η_d		-	65	-	%
输出功率	P_{out}	$V_{DD}=7.2V, P_{in}=0.3W$ $f=435MHz, I_{dq}=500mA$	-	8	-	W
漏极效率	η_d		-	70	-	%
输出功率	P_{out}	$V_{DD}=7.5V, P_{in}=0.3W$ $f=435MHz, I_{dq}=500mA$	-	10	-	W
漏极效率	η_d		-	68	-	%

6. ESD 特性

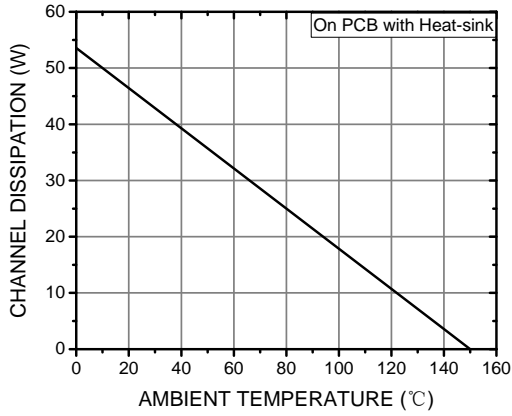
条件	等级
HBM (JESD22 - A114)	1B
MM (EIA/JESD22 - A115)	A
CDM (JESD22 - C101)	III

7. 负载失配测试（基于华太 Demo PA 测试板）

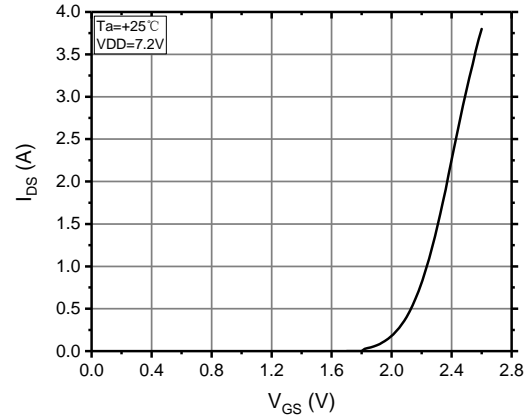
条件	结果
VSWR = 20:1 at all Phase Angles CW: $V_{DD}=7.2V, I_{DQ}=500mA, f=435MHz, P_{out}=40.0dBm$.	晶体管性能不变
VSWR = 20:1 at all Phase Angles CW: $V_{DD}=9.5V, I_{DQ}=500mA, f=435MHz, P_{out}=38.5dBm$.	晶体管性能不变

8. 典型直流性能

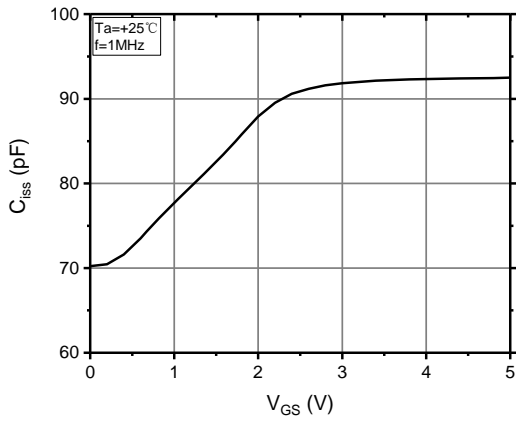
**CHANNEL DISSIPATION VS.
AMBIENT TEMPERATURE**



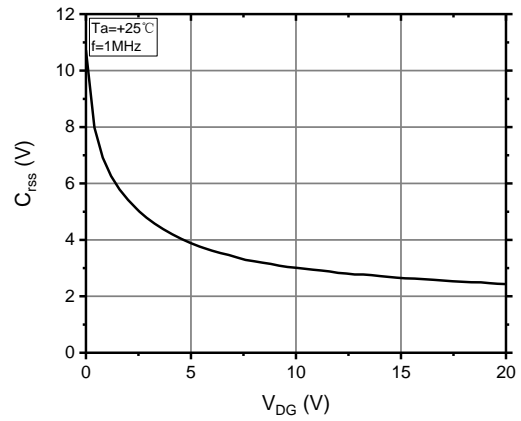
I_{DS} VS. V_{GS}



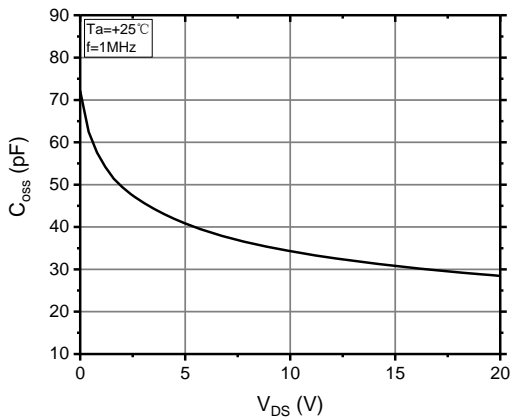
C_{iss} VS. V_{GS}



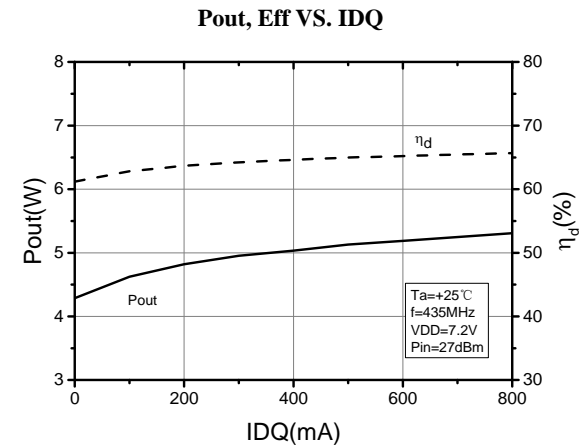
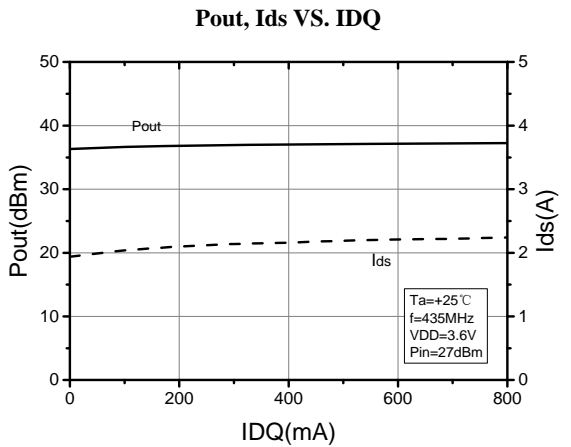
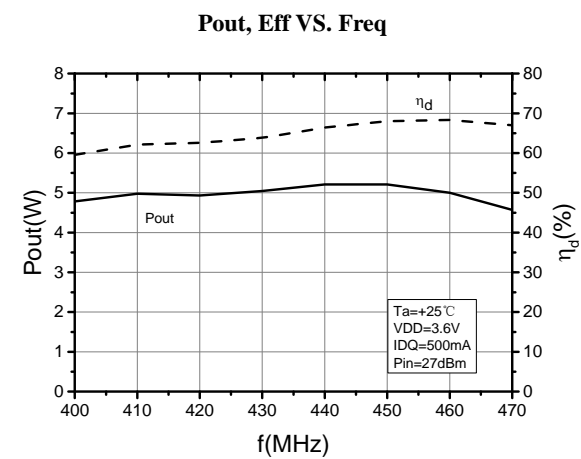
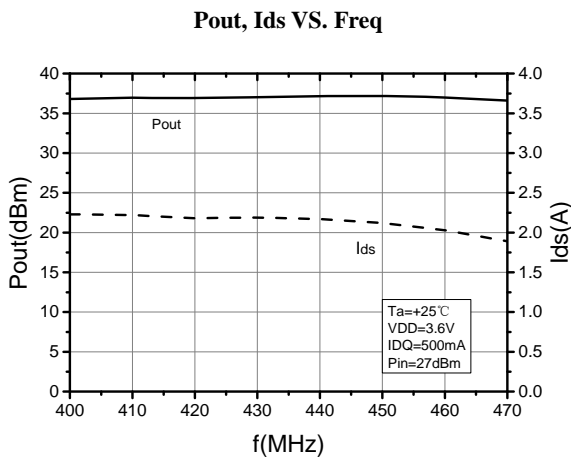
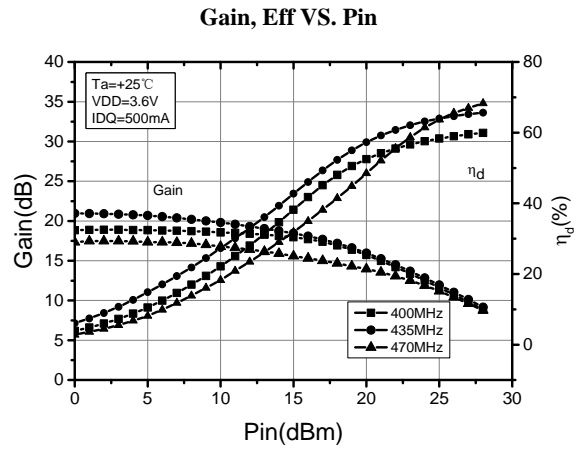
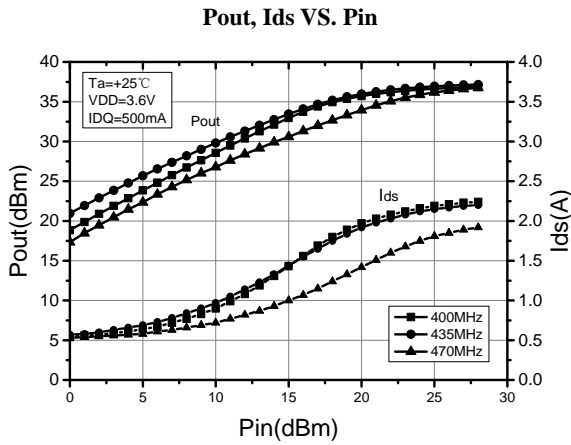
C_{rss} VS. V_{DG}



C_{oss} VS. V_{DS}

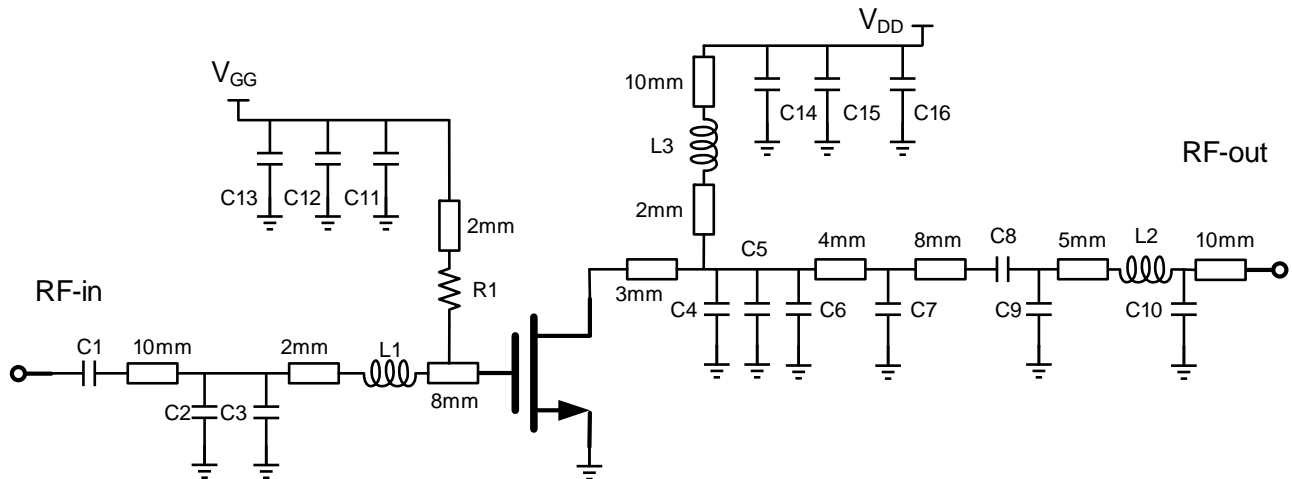


9. UHF-Band 4W 典型性能(f=400-470MHz, VDD=3.6V)



10. UHF-Band 3.6V 4W 参考设计

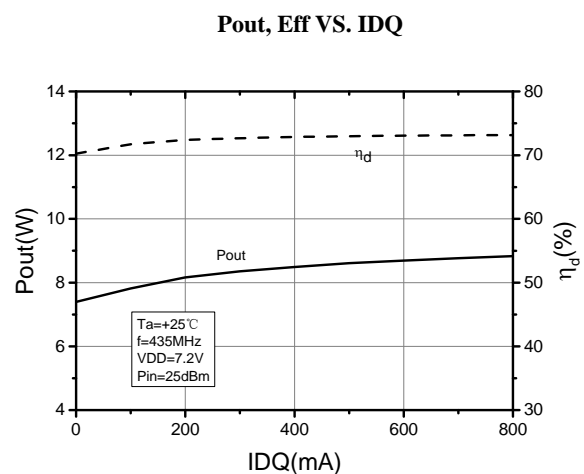
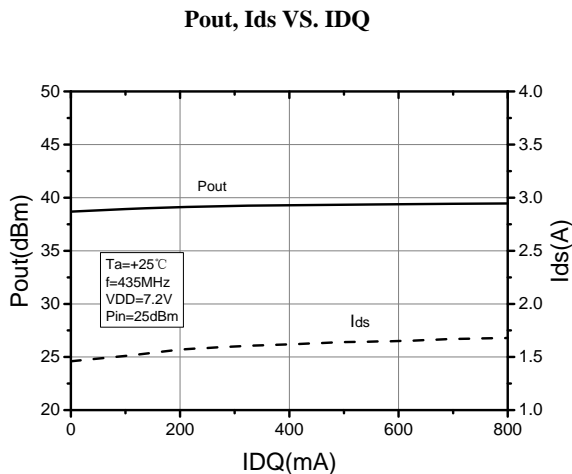
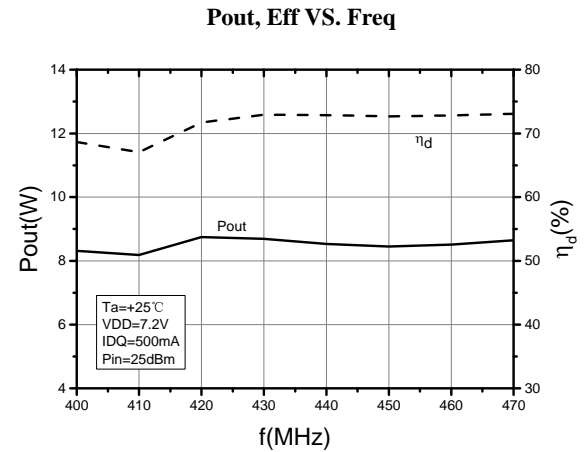
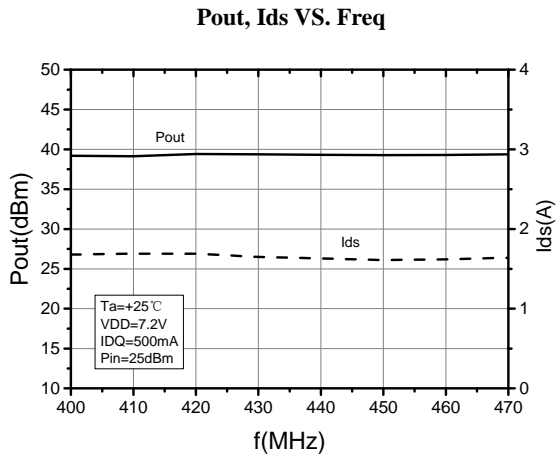
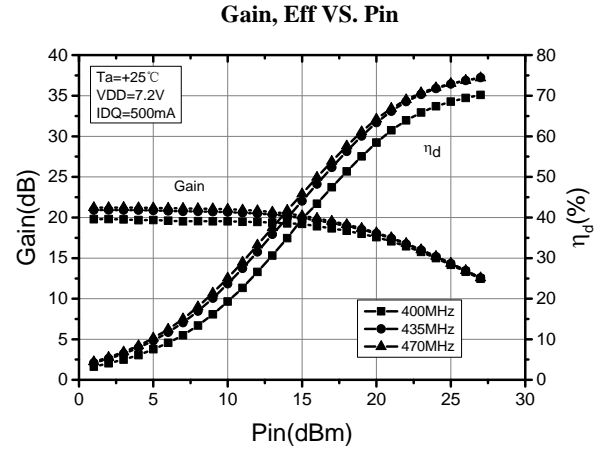
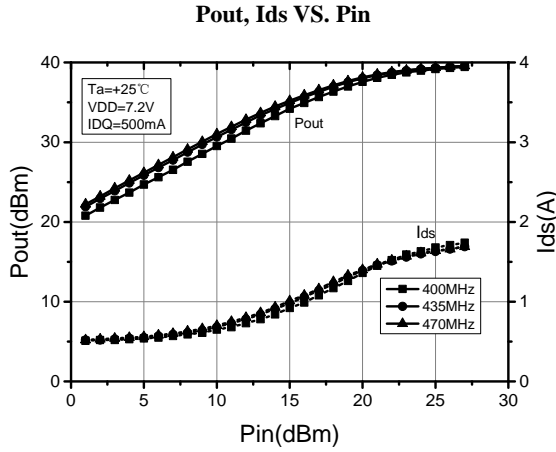
400-470MHz (@VDD=3.6V, IDQ = 500mA)



注：微带线特性阻抗均为 50 欧姆

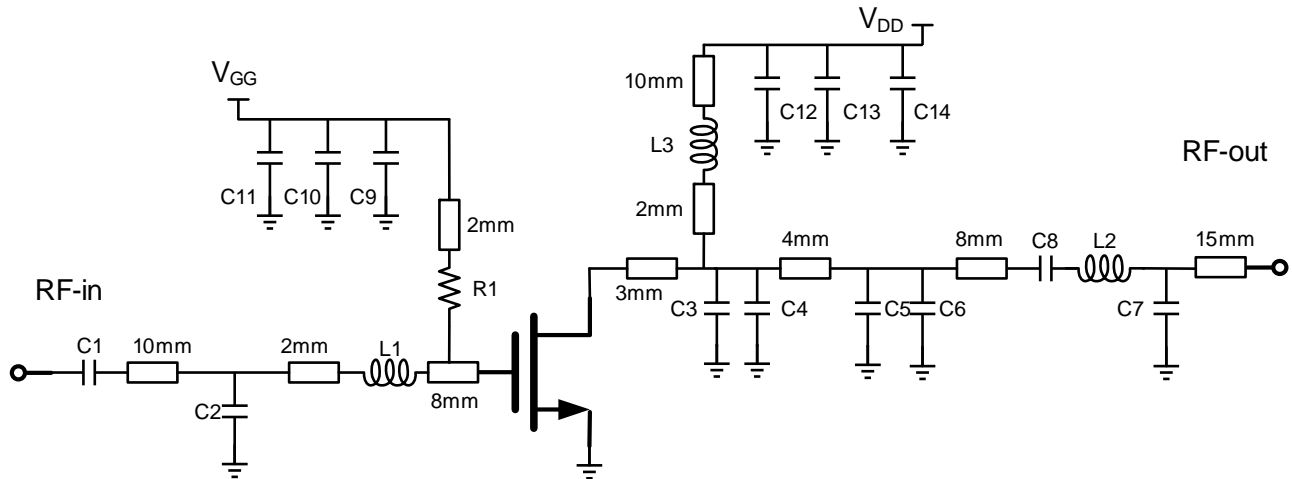
编号	描述	型号	制造商
C1, C8, C11, C14	100pF Chip Ceramic Capacitors	GRM1885C1H101JA01	Murata
C2, C9	10pF Chip Ceramic Capacitors	GRM1885C1H100JA01	Murata
C3	15pF Chip Ceramic Capacitors	GRM1885C1H150JA01	Murata
C4, C5, C6	22pF Chip Ceramic Capacitors	GRM1885C1H220JA01	Murata
C7	27pF Chip Ceramic Capacitors	GRM1885C1H270JA01	Murata
C10	8pF Chip Ceramic Capacitors	GRM1885C1H8R0JA01	Murata
C12, C15	1nF Chip Ceramic Capacitors	GRM1885C1H102JA01	Murata
C13	4.7uF Chip Ceramic Capacitors	GRM32ER61H474KA12L	Murata
C16	10uF Chip Ceramic Capacitors	GRM32ER61H105KA12L	Murata
L1	3.3nH Chip Inductor	0603	Arbitrary
L2	D: 0.45mm, Inside: 1.8mm, 1.5 Turns	Enameled wire	Arbitrary
L3	D: 1mm, Inside: 2mm, 5 Turns	Enameled wire	Arbitrary
R1	50Ω Chip Resistors	Arbitrary	Arbitrary
Q1	RF LDMOS	HTU7G06S005P	Kunshan Huatai Electronics Ltd.
PCB	er = 4.3	FR4	Arbitrary

11. UHF-Band 8W 典型性能(f=400-470MHz, VDD=7.2V)



12. UHF-Band 7.2V 8W 参考设计

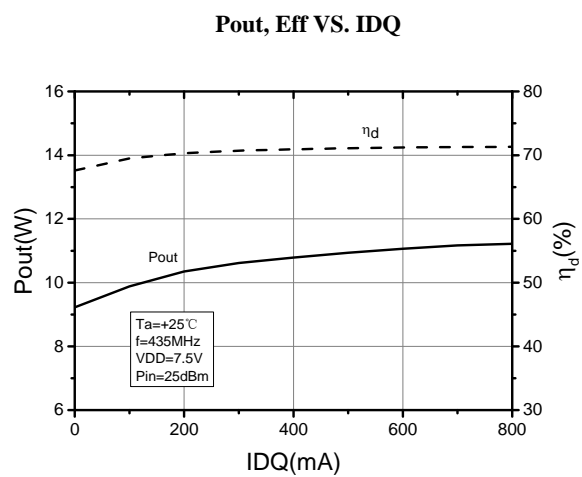
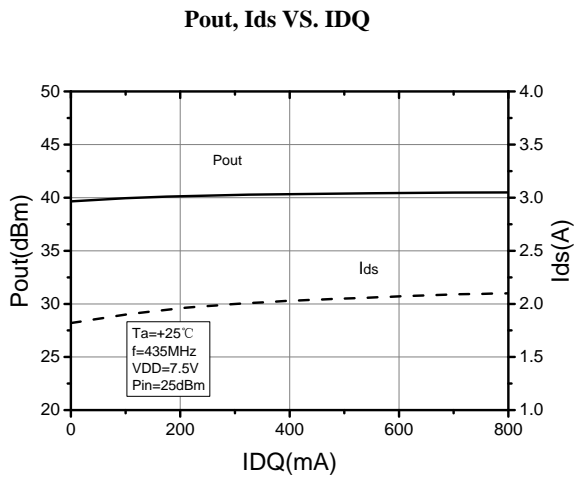
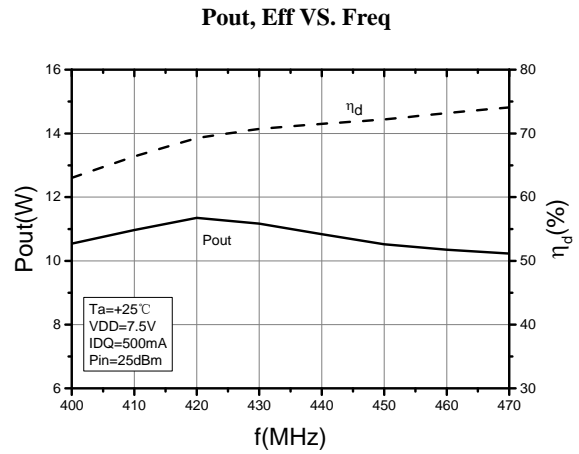
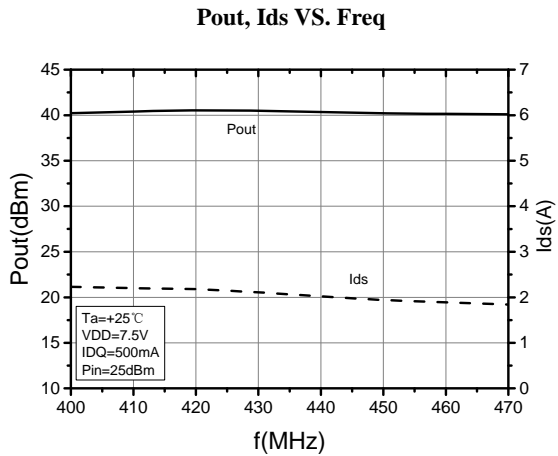
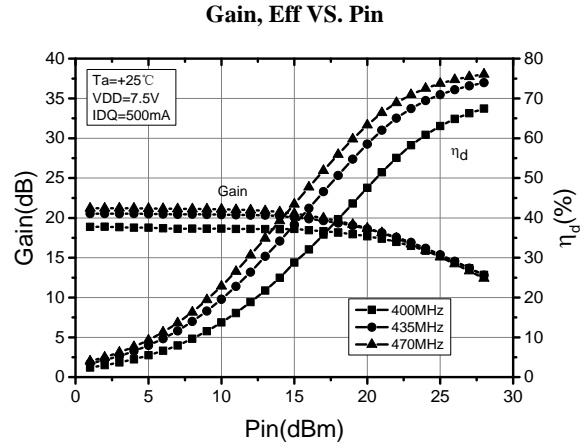
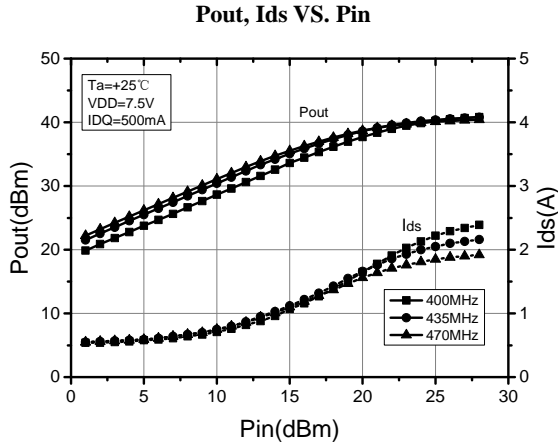
400-470MHz (@VDD=7.2V, IDQ = 500mA)



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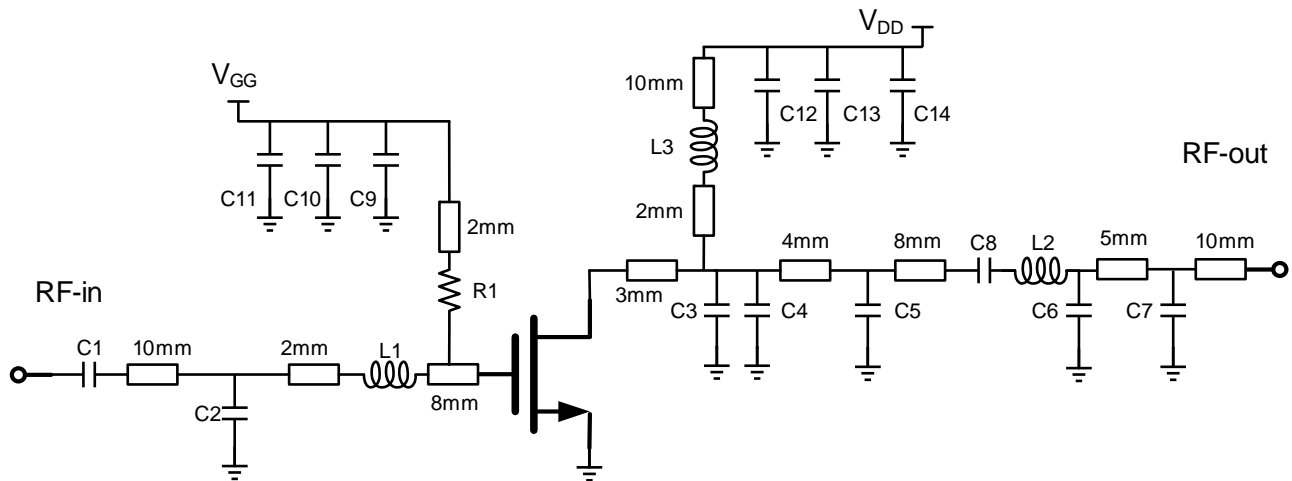
编号	描述	型号	制造商
C1, C8, C9, C12	100pF Chip Ceramic Capacitors	GRM1885C1H101JA01	Murata
C2	18pF Chip Ceramic Capacitors	GRM1885C1H180JA01	Murata
C3	22pF Chip Ceramic Capacitors	GRM1885C1H220JA01	Murata
C4,	15pF Chip Ceramic Capacitors	GRM1885C1H150JA01	Murata
C5	2pF Chip Ceramic Capacitors	GRM1885C1H2R0JA01	Murata
C6	18pF Chip Ceramic Capacitors	GRM1885C1H180JA01	Murata
C7	10pF Chip Ceramic Capacitors	GRM1885C1H100JA01	Murata
C10, C13	1nF Chip Ceramic Capacitors	GRM1885C1H102JA01	Murata
C11	4.7uF Chip Ceramic Capacitors	GRM32ER61H474KA12L	Murata
C14	10uF Chip Ceramic Capacitors	GRM32ER61H105KA12L	Murata
L1	3.3nH Chip Inductor	0603	Arbitrary
L2	D: 0.31mm, Inside: 2mm, 1.5 Turns	Enameled wire	Arbitrary
L3	D: 1mm, Inside: 2mm, 5 Turns	Enameled wire	Arbitrary
R1	50Ω Chip Resistors	Arbitrary	Arbitrary
Q1	RF LDMOS	HTU7G06S005P	Kunshan Huatai Electronics Ltd.
PCB	$\epsilon_r = 4.3$	FR4	Arbitrary

13. UHF-Band 10W 典型性能(f=400-470MHz, VDD=7.5V)



14. UHF-Band 7.5V 10W 参考设计

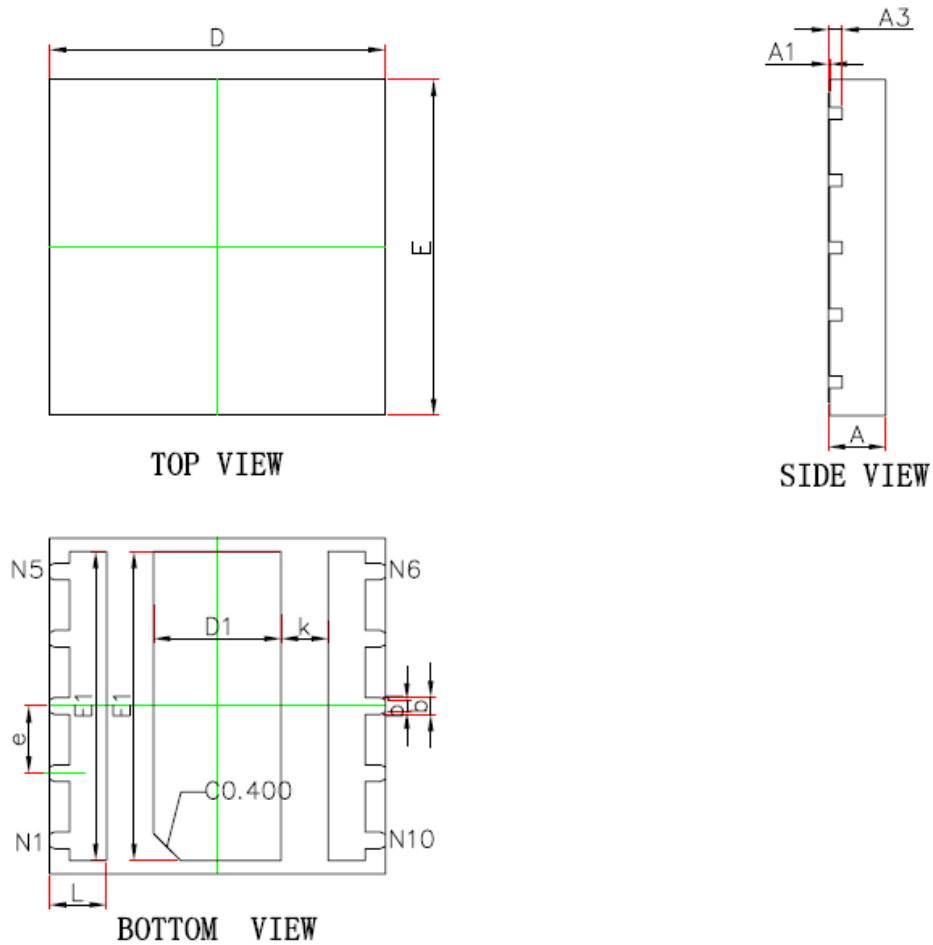
400-470MHz (@VDD=7.5V, IDQ = 500mA)



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编号	描述	型号	制造商
C1, C8, C9, C12	100pF Chip Ceramic Capacitors	GRM1885C1H101JA01	Murata
C2	18pF Chip Ceramic Capacitors	GRM1885C1H180JA01	Murata
C3	22pF Chip Ceramic Capacitors	GRM1885C1H220JA01	Murata
C4, C5	15pF Chip Ceramic Capacitors	GRM1885C1H150JA01	Murata
C6	7pF Chip Ceramic Capacitors	GRM1885C1H7R0JA01	Murata
C7	1pF Chip Ceramic Capacitors	GRM1885C1H1R0JA01	Murata
C10, C13	1nF Chip Ceramic Capacitors	GRM1885C1H102JA01	Murata
C11	4.7uF Chip Ceramic Capacitors	GRM32ER61H474KA12L	Murata
C14	10uF Chip Ceramic Capacitors	GRM32ER61H105KA12L	Murata
L1	3.3nH Chip Inductor	0603	Arbitrary
L2	D: 0.31mm, Inside: 2mm, 1.5 Turns	Enameled wire	Arbitrary
L3	D: 1mm, Inside: 2mm, 5 Turns	Enameled wire	Arbitrary
R1	50Ω Chip Resistors	Arbitrary	Arbitrary
Q1	RF LDMOS	HTU7G06S005P	Kunshan Huatai Electronics Ltd.
PCB	$\epsilon_r = 4.3$	FR4	Arbitrary

15. 封装尺寸及管脚分布



Symbol	Dimesions in Milimeters		Dimesions in Inches	
	Min.	Max.	Min.	Max.
A	0.800	0.900	0.031	0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	4.900	5.100	0.193	0.201
E	4.900	5.100	0.193	0.201
D1	1.800	2.000	0.071	0.079
E1	4.500	4.700	0.177	0.185
k	0.700REF.		0.028REF.	
b	0.200	0.300	0.008	0.012
b1	0.180REF.		0.028REF.	
e	1.000BSC.		0.039BSC.	
L	0.750	0.950	0.030	0.037