HTM7G06S035P

35W, 1.8 - 600 MHz LDMOS Amplifier

Product datasheet

Description

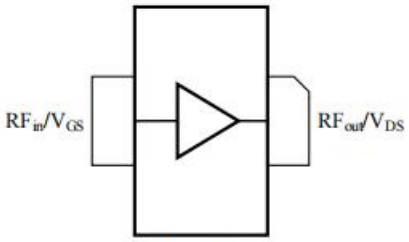
The HTM7G06S035P is an unmatched discrete LDMOS Power Amplifier with 35W saturated output power covering frequency range for VHF/UHF applications.

Features

- Operating Frequency Range: VHF/UHF
- Operating Drain Voltage: +12.5V
- Saturation Output Power: 35W
- Excellent thermal stability due to low thermal resistance package
- Enhanced robustness design without device degradation
- Internally integrated enhanced ESD design

TO-270

Over-Molded 2 leads (Straight)



(Top View)

Note: Exposed backside of the package is the source terminal for the transistor

Pin Connections

Freq (MHz)	Vdd (V)	Pin (W)	Pout (W)	Eff (%)
136-174[1]	12.5	2.0	44.9	61.2
400-470[2]	12.5	2.5	38.9	61.4
400-470[3]	12.5	2.5	75.5	62.1

Test conditions unless otherwise noted: 25 °C, VDD = +12.5Vdc, IDQ= 500mA, CW Signal

[1] Based on 12.5V, VHF band,

[2] Based on 12.5V, UHF frequency band,

[3] Based on 12.5V, UHF frequency band, Push-Pull

Applications

- VHF Band handheld Walkie-talkie
- UHF Band handheld Walkie-talkie
- Industrial Scientific Medical (ISM)
- Driver or Final stage Power Amplifier

Ordering Information

Part Number	Description
HTM7G06S035P	Reel Package
HTM7G06S035P EVB	470 - 700 MHz EVB
HTM7G06S035P EVB1	136 - 174 MHz EVB

Absolute Maximum Ratings

Parameter	Range/Value	Unit
Drain voltage (V_{DSS})	-0.5, +48	V
Gate voltage (V_{GS})	-5 to +10	V
Operation voltage (V_{DD})	+0 to +24	V
Storage Temperature (T_{STG})	-55 to +150	°C
Junction Temperature (T_J)	-40 to +225	°C
Thermal Resistance Junction to Case (R_{TH})	0.81	°C /W

Electrical Specification

DC Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Breakdown Voltage $V_{(BR)DSS}$	Vgs=0V, Ids=100uA	48	-	-	V
Gate-Source Threshold Voltage $V_{GS(th)}$	Vds=Vgs, Ids=100uA	0.8	1.3	1.8	V
Drain Leakage Current I_{DSS}	Vgs=0V, Vds=17V	-	-	10	uA
Gate Leakage Current I_{GSS}	Vgs=5V, Vds=0V	-	-	1	uA

Load Mismatch Test

Condition	Test Result
VSWR=20:1, at all Phase Angles, VDD = +17Vdc, IDQ= 500mA, CW signal 48dBm @156 MHz test on HOTLO Application Board	No Device Degradation
VSWR=20:1, at all Phase Angles, VDD = +17Vdc, IDQ= 500mA, CW signal 47.8dBm @435 MHz test on HOTLO Application Board	No Device Degradation

RF Characteristics (CW)

Freq (MHz)	Vdd (V)@Idq (mA)	Pin (W)	Pout (W)	Eff (%)
166[1]	12.5@500	2.0	48	73
435[2]	12.5@500	2.0	46	70
435[3]	12.5@600	2.5	78	66

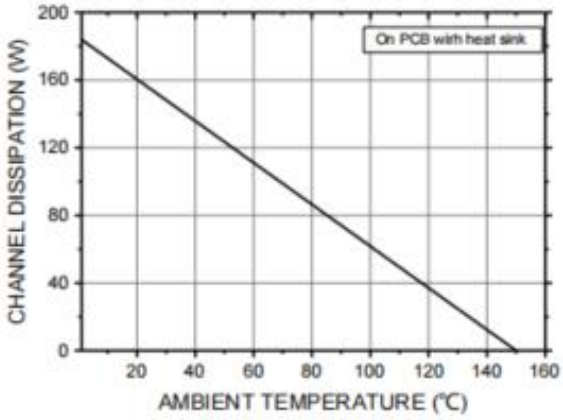
Test conditions unless otherwise noted: 25 °C, CW Signal

[1]Based on 12.5V, VHF band, reference design performance test

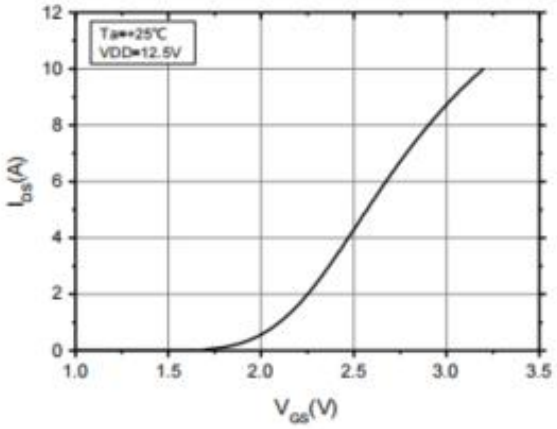
[2]Based on 12.5V, UHF frequency band, reference design performance test

[3]Based on 12.5V, UHF frequency band, Push-Pull reference design performance test

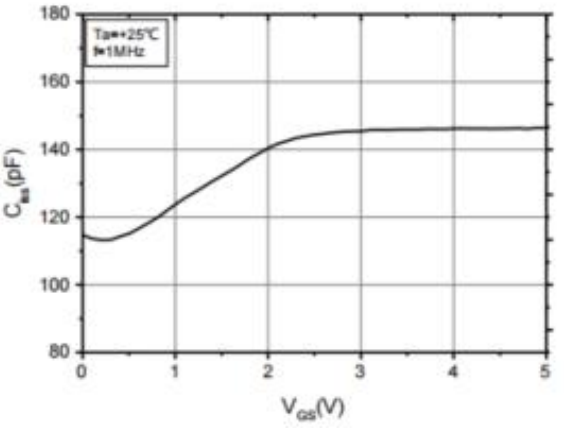
CHANNEL DISSIPATION VS. AMBIENT TEMPERATURE



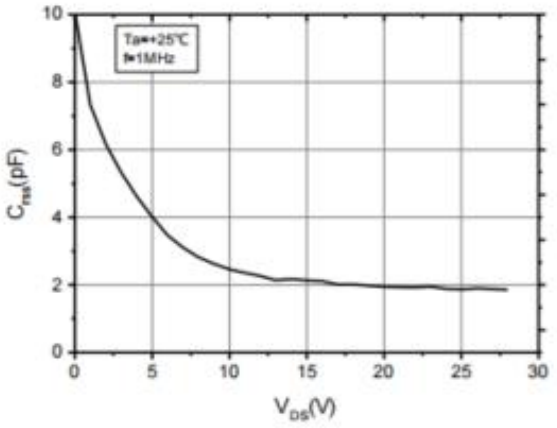
I_{DS} VS. V_{GS}



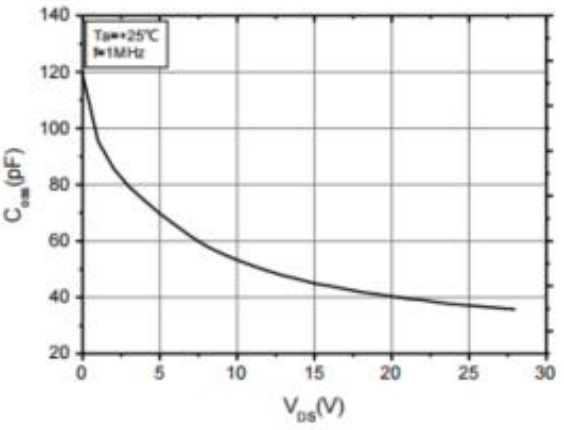
C_{iss} VS. V_{GS}



C_{rss} VS. V_{DS}

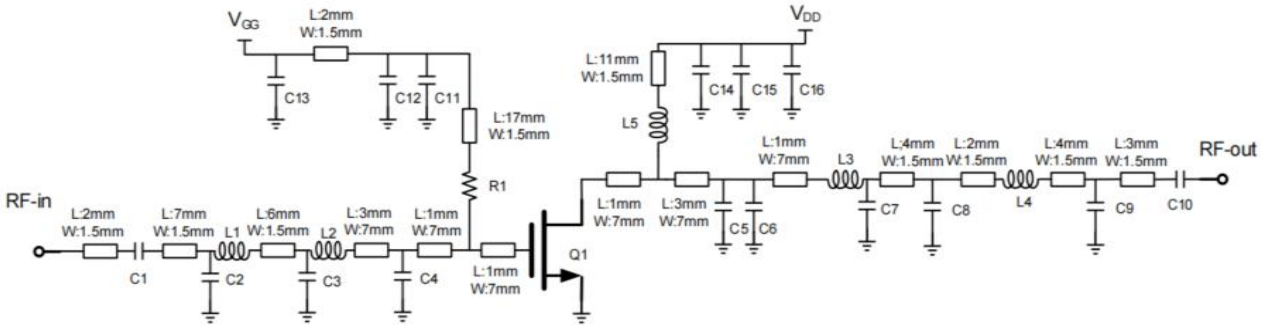


C_{oss} VS. V_{DS}



Test conditions unless otherwise noted: 25 °C, DC Characteristics

HTM7G06S035P 136- 174 MHz Reference Design (VHF)



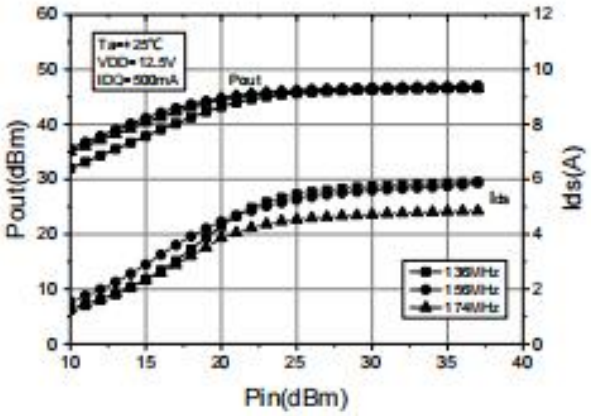
EVB Layout

Bill of Materials (BoM) - HTM7G06S035P 136- 174 MHz Reference Design (VHF)

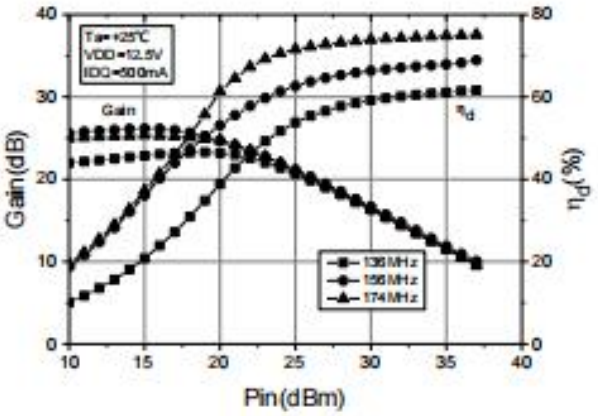
Reference	Value	Description	Manufacturer	P/N
Q1	-	35W, 1.8 - 600 MHz LDMOS PA	Holto	HTM7G06S035P
C1, C3	47pF	MLCC	Murata	GRM1885C1H470JA01
C2, C6	27pF	MLCC	Murata	GRM1885C1H270JA01
C4, C9	33pF	MLCC	Murata	GRM1885C1H330JA01
C5	180pF	MLCC	Murata	GRM1885C1H181JA01
C7, C8	39pF	MLCC	Murata	GRM1885C1H390JA01
C10	1nF	MLCC	Murata	GRM1885C1H102JA01
C11, C14	470pF	MLCC	Murata	GRM1885C1H471JA01
C12, C15	1nF	MLCC	Murata	GRM32ER61H102JA01
C13, C16	10uF	MLCC	Murata	GRM32ER61H105KA12L
L1	D: 0.31mm, Inside: 1.2mm, 4 Turns		-	Enameled wire
L2, L4	D: 0.35mm, Inside: 1.5mm, 3 Turns		-	Enameled wire
L3	D: 0.45mm, Inside: 1.2mm, 2 Turns		-	Enameled wire
L5	D: 1mm, Inside: 3mm, 4 Turns		-	Enameled wire
R1	51Ω	Thick Film Resistor	YAGEO	RC0603FR-0751RL
PCB	FR-4 (er = 4.3), 30 mil (0.762 mm), 35 µm (1oz)			

Performance Plots 136- 174 MHz Reference Design (VHF)

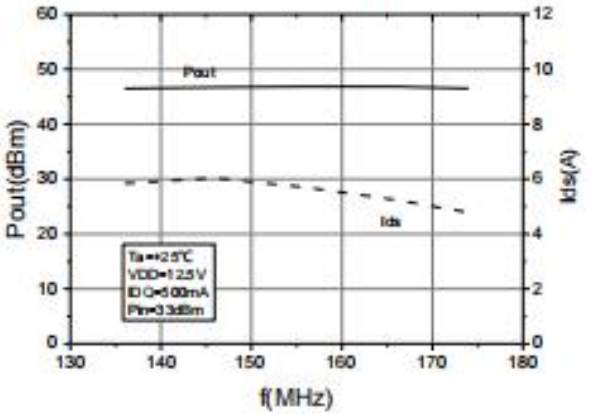
Pout, Ids VS. Pin



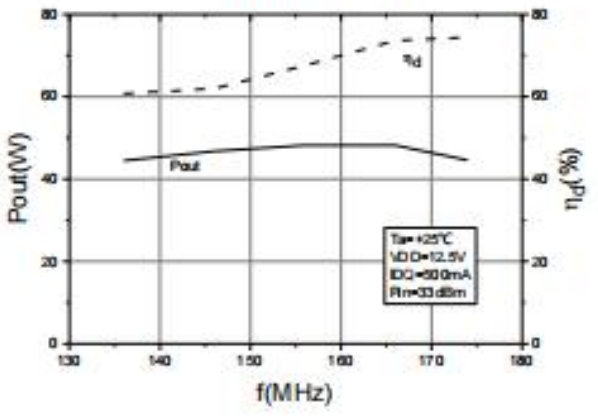
Gain, Eff VS. Pin



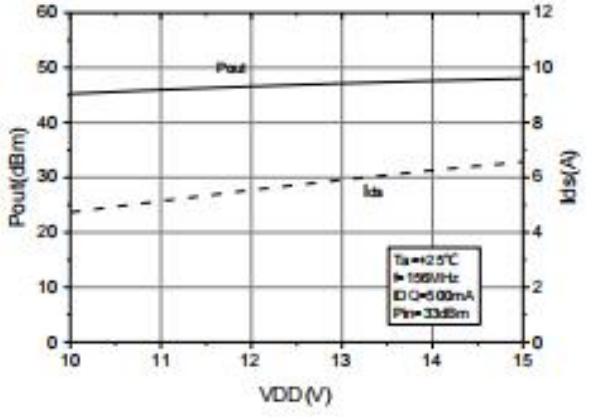
Pout, Ids VS. Freq



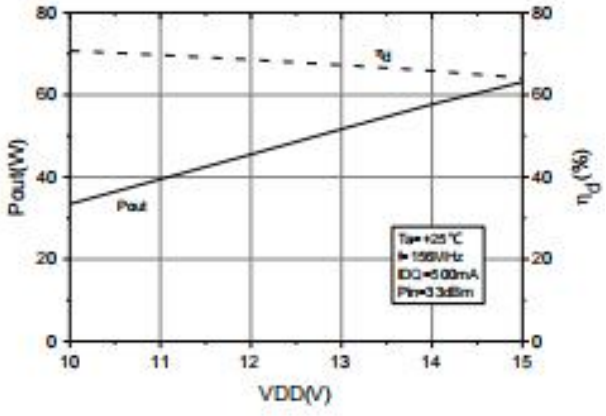
Pout, Eff VS. Freq



Pout, Ids VS. VDD

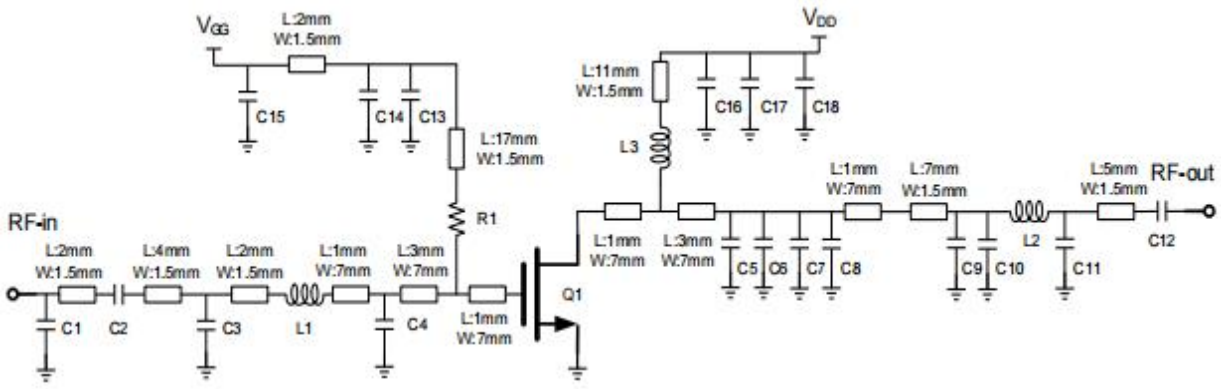


Pout, Eff VS. VDD



Test conditions unless otherwise noted: 25 °C, VDD = +12.5Vdc, IDQ=500mA, CW test on HOTLO Application Board

HTM7G06S035P 400 - 470 MHz Reference Design (UHF)



EVB Layout

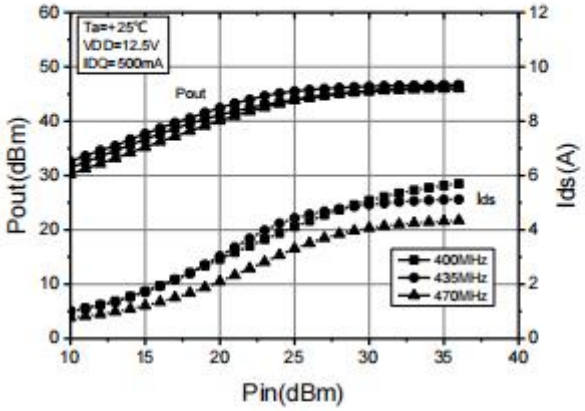
Bill of Materials (BoM) - HTM7G06S035P 400 - 470 MHz Reference Design (UHF)

Reference	Value	Description	Manufacturer	P/N
Q1	-	35W, 1.8 - 600 MHz LDMOS PA	Holto	HTM7G06S035P
C1	3pF	MLCC	Murata	GRM1885C1H3R0JA01
C2	30pF	MLCC	Murata	GRM1885C1H300JA01
C3, C7	22pF	MLCC	Murata	GRM1885C1H220JA01
C4, C5	18pF	MLCC	Murata	GRM1885C1H180JA01
C6	2pF	MLCC	Murata	GRM1885C1H2R0JA01
C8	27pF	MLCC	Murata	GRM1885C1H270JA01
C9, C10	20pF	MLCC	Murata	GRM1885C1H200JA01
C11	9pF	MLCC	Murata	GRM1885C1H9R0JA01
C12, C13, C16	100pF	MLCC	Murata	GRM1885C1H101JA01
C14, C17	1nF	MLCC	Murata	GRM32ER61H102JA01
C15, C18	10uF	MLCC	Murata	GRM32ER61H105KA12L
L1	D: 0.51mm, Inside: 1.2mm, 1 Turns		-	Enameled wire
L2	D: 0.51mm, Inside: 1.8mm, 2 Turns		-	Enameled wire
L3	D: 1mm, Inside: 3mm, 4 Turns		-	Enameled wire

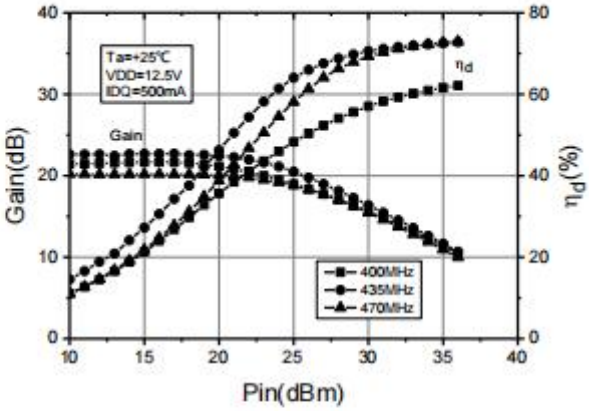
Reference	Value	Description	Manufacturer	P/N
R1	51Ω	Thick Film Resistor	YAGEO	RC0603FR-0751RL
PCB	FR-4 (er = 4.3), 30 mil (0.762 mm), 35 µm (1oz)			

Performance Plots 400 - 470 MHz Reference Design (UHF)

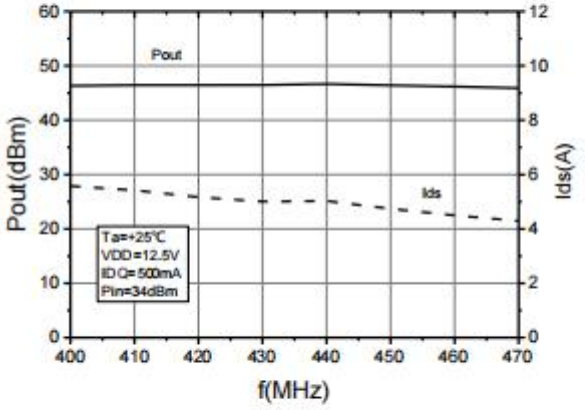
Pout, Ids VS. Pin



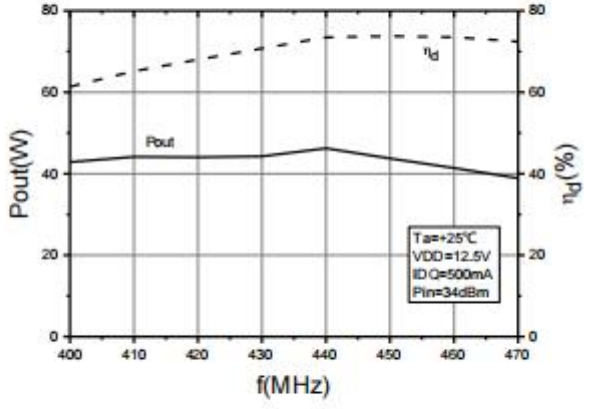
Gain, Eff VS. Pin



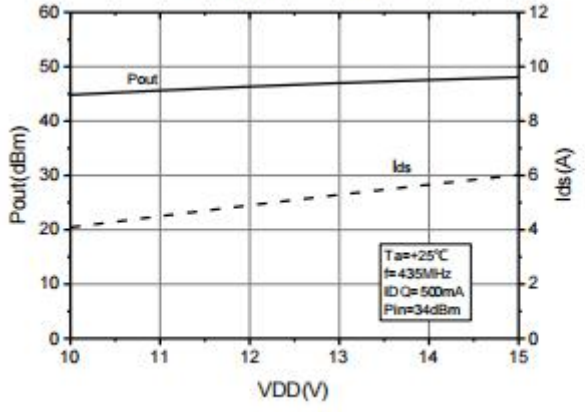
Pout, Ids VS. Freq



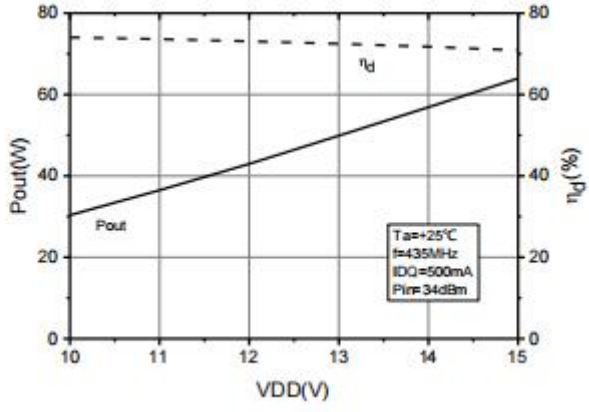
Pout, Eff VS. Freq



Pout, Ids VS. VDD

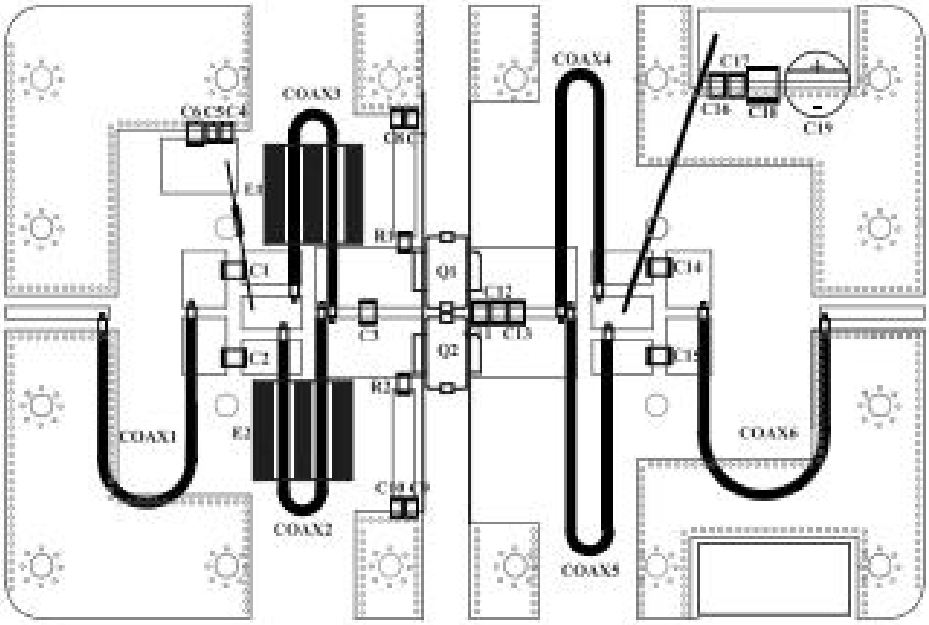


Pout, Eff VS. VDD



Test conditions unless otherwise noted: 25 °C, VDD = +12.5Vdc, IDQ=500mA, CW test on HOTLO Application Board

HTM7G06S035P Push-Pull 400 - 470 MHz Reference Design (UHF)



EVB Layout

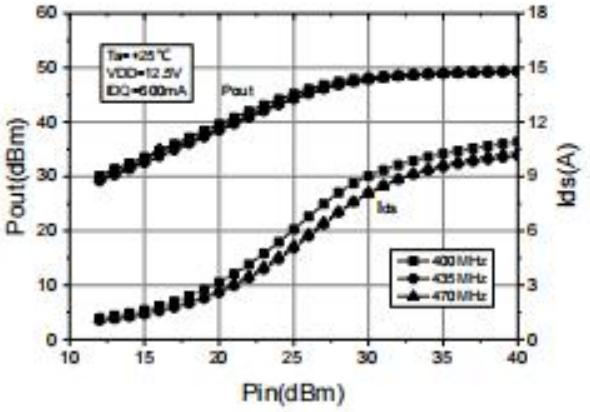
Bill of Materials (BoM) - HTM7G06S035P Push-Pull 400 - 470 MHz Reference Design

Reference	Value	Description	Manufacturer	P/N
Q1	-	35W, 1.8 - 600 MHz LDMOS PA	Holto	HTM7G06S035P
C1, C2, C14, C15, C16	100pF	MLCC	ATC	ATC100B101JT500XT
C4, C7, C9	100pF	MLCC	TDK	GRM1885C1H101JA01D
C5, C8, C10	10nF	MLCC	Murata	GR321AD72E103KW01D
C6	10uF	MLCC	-	-
C11, C12	20pF	MLCC	ATC	ATC100B200JT500XT
C16	15pF	MLCC	ATC	ATC100B150JT500XT
C17	1000pF	MLCC	ATC	ATC100B102JT500XT
C18	10uF	MLCC	AVX	22201C106MAT2A
C19	470uF	Electrolytic Capacitors	-	-
E1, E2	#61 Multi-Aperture Core		Fair-Rite	2861000302

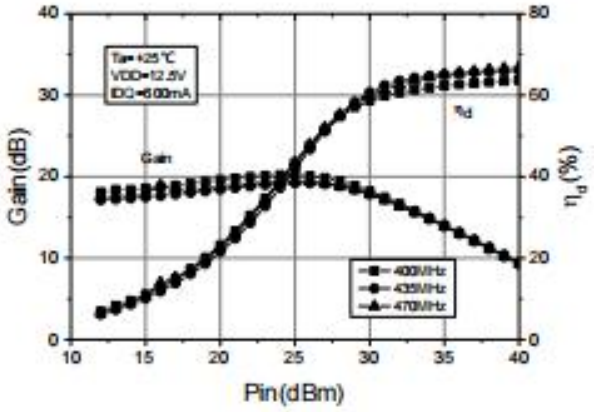
Reference	Value	Description	Manufacturer	P/N
Coax1,6	50 Ω SR Coax, 166 mm			
Coax2,3	25 Ω SR Coax, 60 mm			
Coax4,5	16 Ω SR Coax, 80 mm			
R1, R2	51 Ω	Thick Film Resistor	-	-
R3	1K Ω	Wire Resistors	-	-
PCB	FR-4 (er = 4.3), 30 mil (0.762 mm), 35 µm (1oz)			

Performance Plots Push-Pull 400 - 470 MHz Reference Design (UHF)

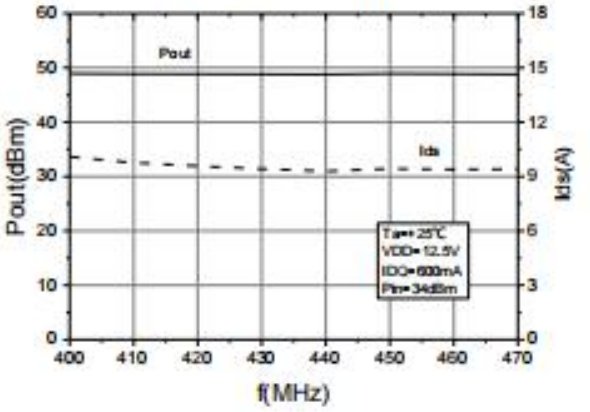
Pout, Ids VS. Pin



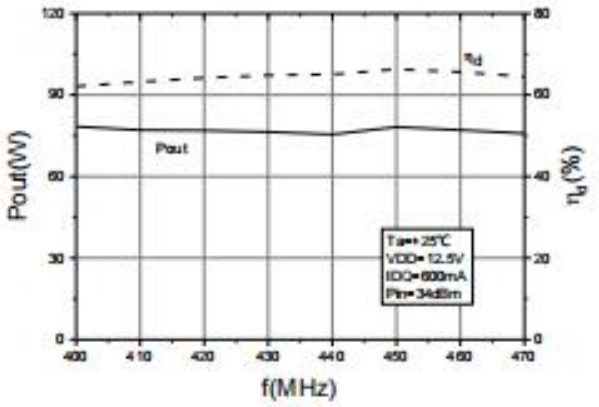
Gain, Eff VS. Pin



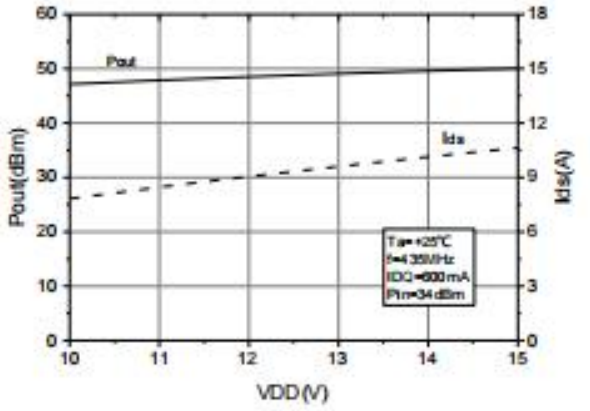
Pout, Ids VS. Freq



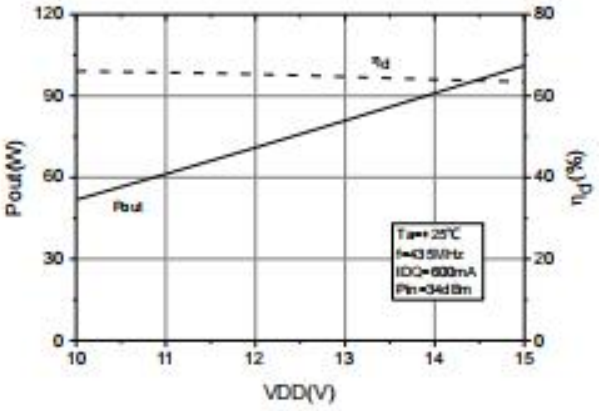
Pout, Eff VS. Freq



Pout, Ids VS. VDD

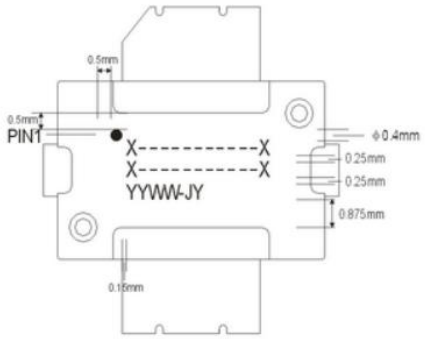


Pout, Eff VS. VDD



Test conditions unless otherwise noted: 25 °C, VDD = +12.5Vdc, IDQ=500mA, CW test on HOTLO Application Board

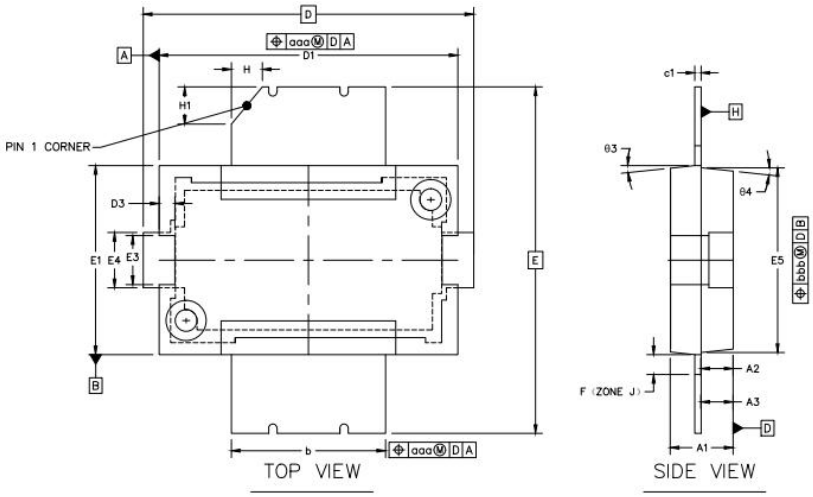
Package Marking and Dimensions

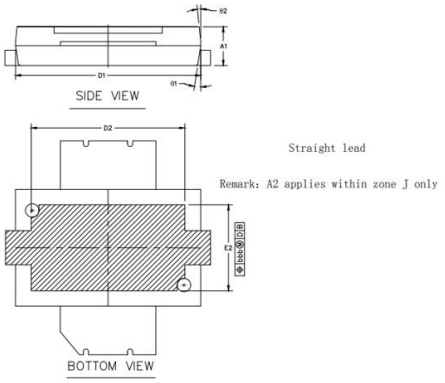


- Line1 (fixed): Device name in W/O
- Line2 (unfixed): Marking Lot No in W/O (Sample: E596-20140001)
- Line3 (unfixed): Date Code + JY

This Marking SPEC only stipulates the content of Marking. For marking requirements such as font and size, please refer to the latest version of “Holto Product Printing Specification”

Marking



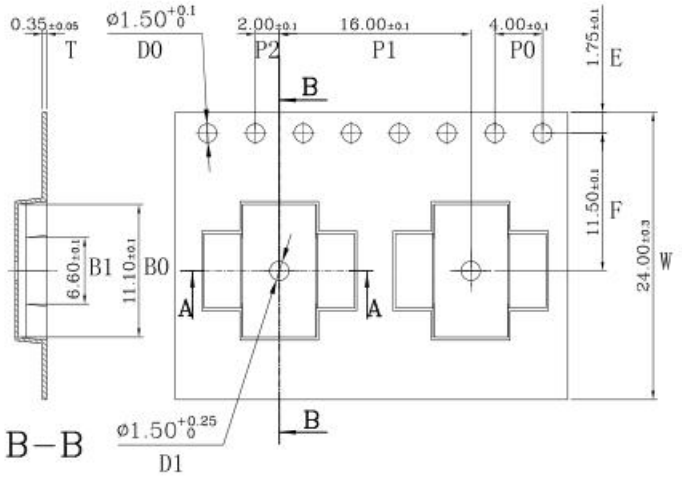


		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A1	1.98	2.03	2.08
MOLD THICKNESS		A2	1.02	1.045	1.07
		A3	0.99	1.04	1.09
L/F THICKNESS		C1		0.203 REF	
BODY SIZE	X	D	10.57	10.67	10.77
	Y	E	11.08	11.18	11.28
CION SIZE	X	D2		7.37 MIN	
	Y	E2		3.81 MIN	
MOLD LENGTH		D1	9.6	9.65	9.7
LENGTH		D3	0.41	0.51	0.61
MOLD WIDTH		E1	6.05	6.1	6.15
WIDTH		E3	1.48	1.58	1.68
		E4	1.68	1.78	1.88
		E5	5.91	5.96	6.01
ZONE WIDTH		F		0.64 BSC	
LEAD WIDTH		b	4.9	4.98	5.06
PACKAGE EDGE TOLERANCE		aaa		0.1	
LEAD OFFSET		bbb		0.2	
TAPER ANGLE		θ1	7°	9°	11°
		θ2	4°	6°	8°
		θ3	4°	6°	8°
		θ4	4°	6°	8°
PIN1 SIZE		H		1 REF	
		H1		1.2 REF	

Package Dimensions

Tape and Reel Information

Package Type	Reel Size(inch)	Qty/Reel(pcs)	Qty/Box(pcs)	Qty/Carton(pcs)
TO270	13inch	1500	1500	7500



Tape & Reel Packaging Descriptions

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1B	JESD22-A114
ESD – Human Body Model (MM)	Class A	EIA/JESD22-A115
ESD – Charged Device Model (CDM)	Class III	JESD22-C101

RoHS Compliance

This product is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

Datasheet Status

Document status	Product status	Definition
Objective Datasheet	Design simulation	Product objective specification
Preliminary Datasheet	Customer sample	Engineering samples and first test results
Product Datasheet	Mass production	Final product specification

Abbreviations

Acronym	Definition
LDMOS	Laterally-Diffused Metal-Oxide Semiconductor
CW	Continuous Waveform

Revision history

Document ID	Datasheet Status	Release Date	Revision Version
Rev 2.2	Product	March 2023	New format based on English version datasheet
Rev 2.3	Product	March 2024	Version released after re review
Rev 2.4	Product	May 2024	Update package 3D picture

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations and information about HOTLO:

- Web: www.andesource.com
- Email: andehk@andesource.com

For technical questions and application information:

- Email: andetech@andesource.com

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