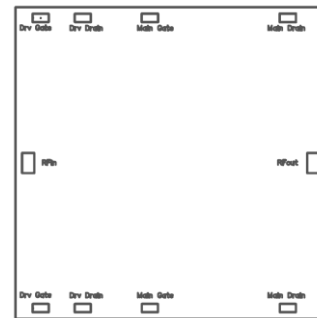


### Product Features

- Radar band 5000-6000 MHz
- Small signal gain 24.2 dB
- Saturation power 47 dBm (50 W)
- Drain efficiency 42.5% @ $P_{sat}=47$  dBm (50 W)
- 2-stage power amplifier MMIC
- GaN-HEMT MMIC
- 3.95×3.95 mm<sup>2</sup> size bare die



3.95 mm × 3.95 mm bare die

### Applications

- AESA Radar
- Weather Radar
- Defense Radar

### Description

The MR5005060B is a 2-stage power amplifier MMIC designed for radar applications, covering frequency range from 5.0 GHz to 6.0 GHz. The device delivers up to 50 W of saturation power and has 43.0% drain efficiency at saturation power with operating drain voltage of 28 V.

### Electrical Specifications

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	CONDITIONS
Frequency Range	f	5.0	5.5	6.0	GHz	
Small Signal Gain	G	24.2	25.6	26.2	dB	
Gain Flatness	$\Delta G$	-1		+1	dB	Over any 100 MHz bandwidth
Input Return Loss	S <sub>11</sub>	7.5		25.8	dB	
Output Return Loss	S <sub>22</sub>	8.0		28.7	dB	
Saturated Output Power	P <sub>sat</sub>	-	47	-	dBm	
Drain Efficiency	$\eta$	41.5	43.5	44.5	%	P <sub>IN</sub> =26 dBm

Note: I<sub>q</sub>=200 mA, V<sub>ds</sub>=28 V, T=+25°C,  
5ms / 10% pulse signal

## DC Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	CONDITIONS
Gate Threshold Voltage	$V_{GS\_TH}$		-2.6		$V_{DC}$	$V_D=28\text{ V}$ , $I_D=1\text{ mA}$
Gate Quiescent Voltage	$V_{GS\_Q}$		-2.4		$V_{DC}$	$V_D=28\text{ V}$ , $I_D=200\text{ mA}$
Saturated Drain Current	$I_{D\_SAT}$	4.0	4.6		A	$V_D=28\text{ V}$ , $I_{D\_Q}=200\text{ mA}$
Drain-Source Breakdown Voltage	$V_{D\_B}$		120		$V_{DC}$	$I_D=1\text{ mA/mm}$

## Absolute Maximum Ratings

PARAMETER	SYMBOL	RATING	UNIT	CONDITIONS
Drain-Source Voltage	$V_{DSS}$	120	$V_{DC}$	
Gate-Source Voltage	$V_{GS}$	-10, +2	$V_{DC}$	
Storage Temperature	$T_{STG}$	200	$^{\circ}\text{C}$	
Operating Junction Temperature	$T_J$	250	$^{\circ}\text{C}$	
Soldering Temperature	$T_S$	240	$^{\circ}\text{C}$	
Thermal Resistance	$R_{TH}$	TBD	$^{\circ}\text{C/W}$	
Forward Gate Current	$I_{GS}$	TBD	mA	

## Electrostatic Discharge (ESD) Classification

PARAMETER	SYMBOL	CLASS	TEST METHODOLOGY
Human Body Model	HBM	TBD	TBD
Charge Device Model	CDM	TBD	TBD

Figure 1. Gain and Return Losses vs. Frequency of the MR5005060B

$V_{DD}=28\text{ V}$ ,  $I_Q=200\text{ mA}$ ,  $T=25^\circ\text{C}$

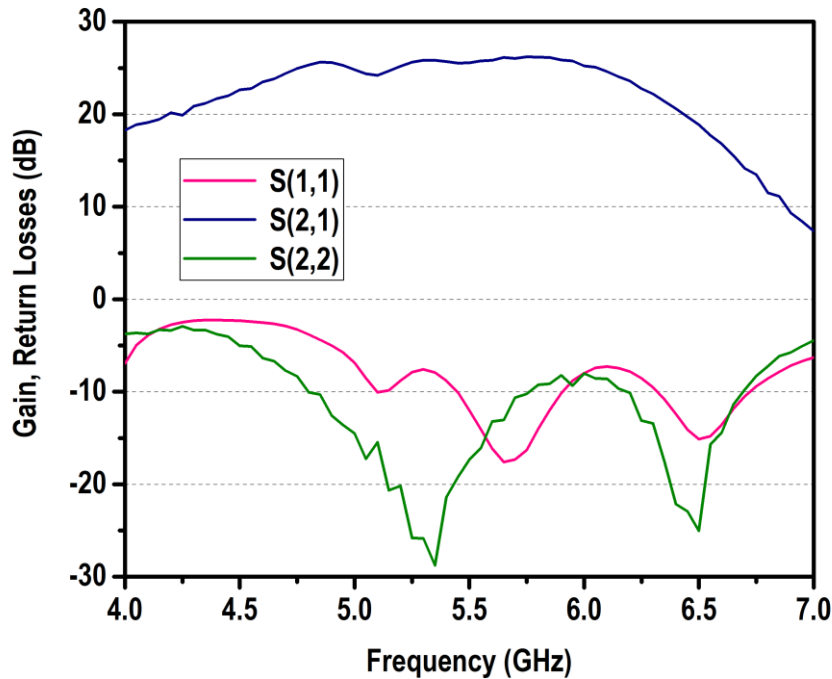


Figure 2. Output Power, Gain, and Drain Efficiency vs. Frequency of the MR5005060B

$V_{DD}=28\text{ V}$ ,  $I_Q=200\text{ mA}$ ,  $T=25^\circ\text{C}$ ,  $P_{IN}=26\text{ dBm}$ , Pulse Width=500  $\mu\text{s}$ , Duty Cycle=10%

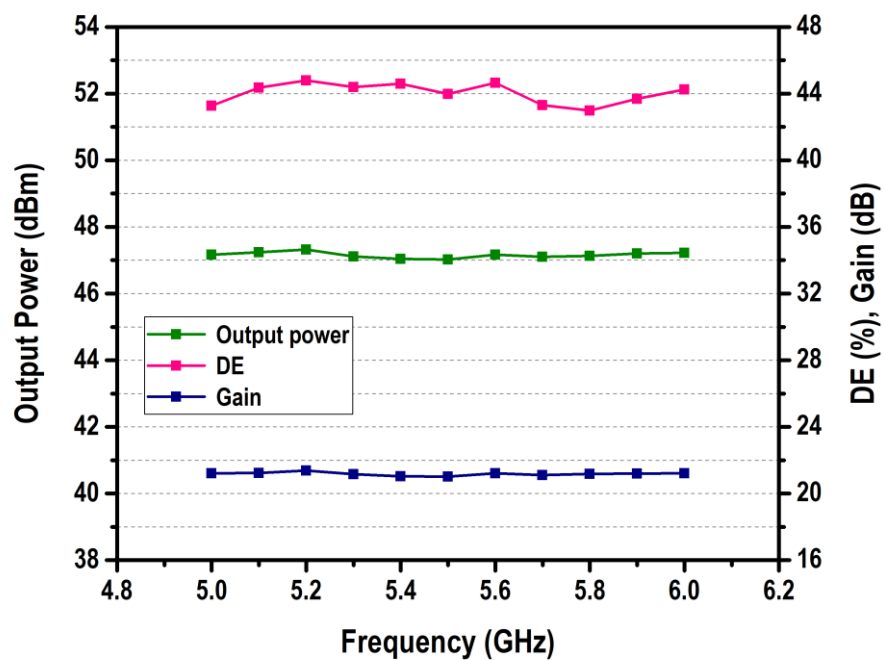
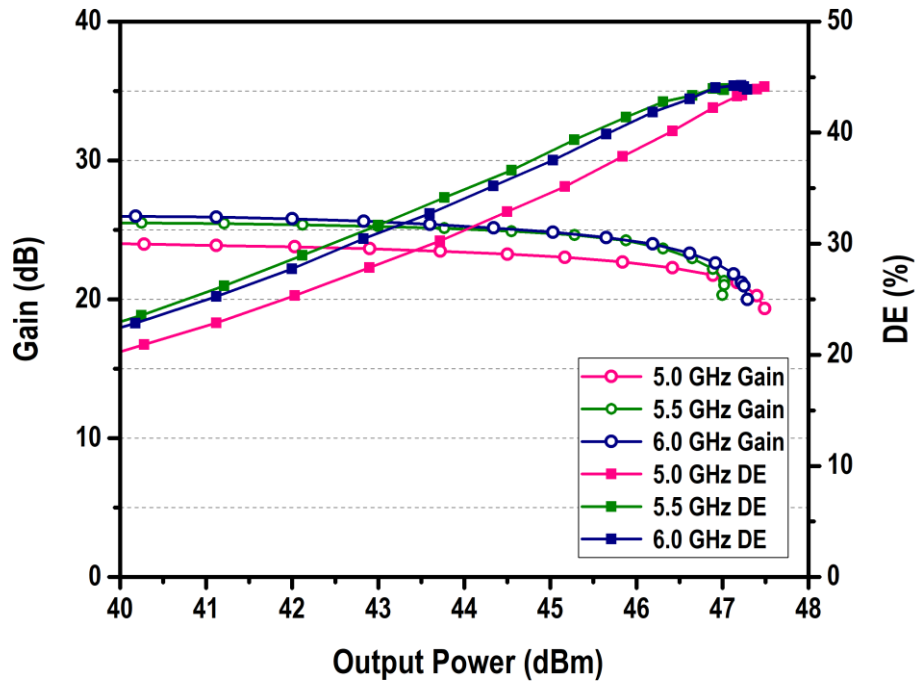
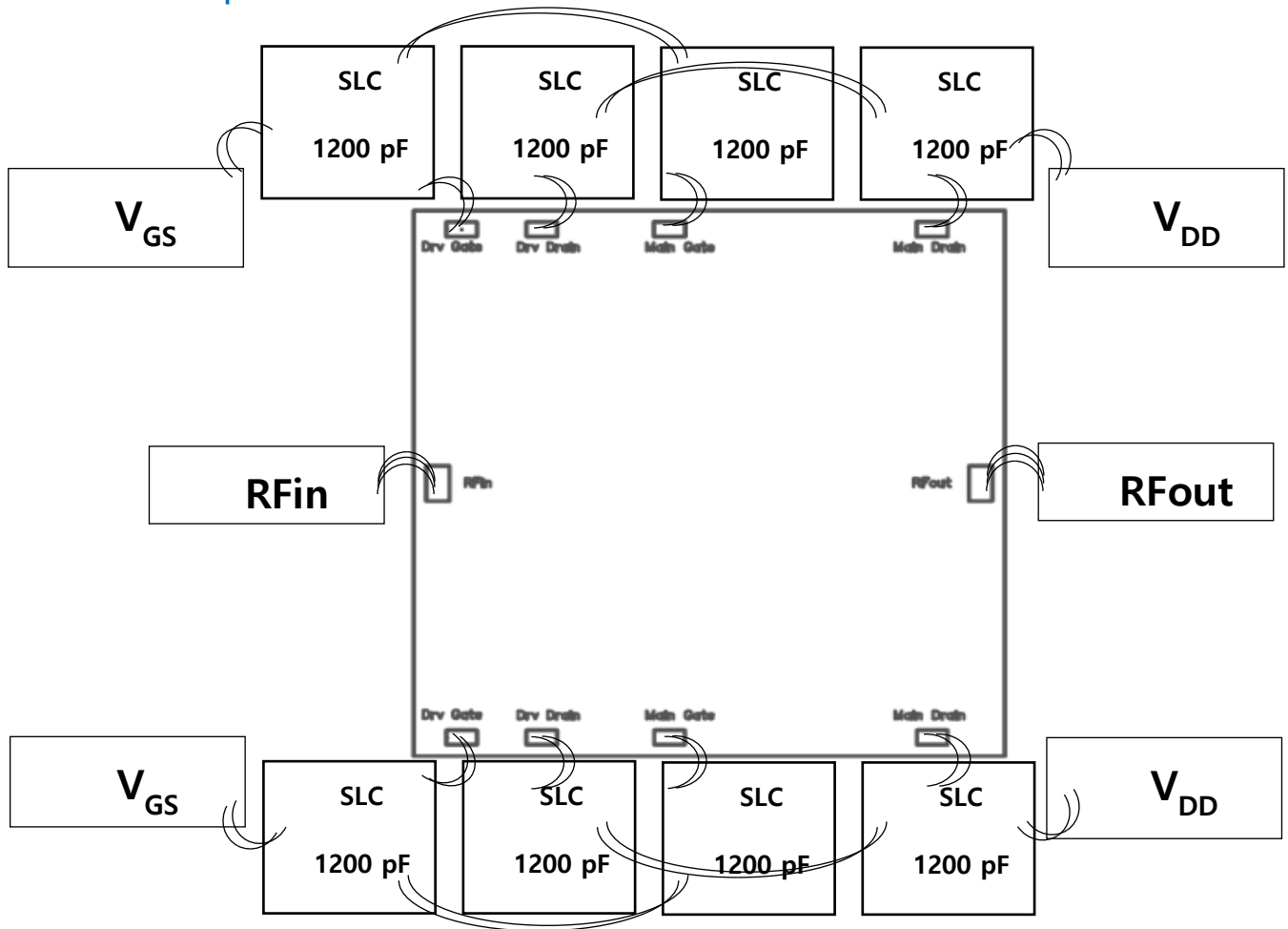


Figure 3. Gain and Drain Efficiency vs. Output Power of the MR5005060B

$V_{DD}=28\text{ V}$ ,  $I_Q=200\text{ mA}$ ,  $T=25^\circ\text{C}$ , Pulse Width=500  $\mu\text{s}$ , Duty Cycle=10%



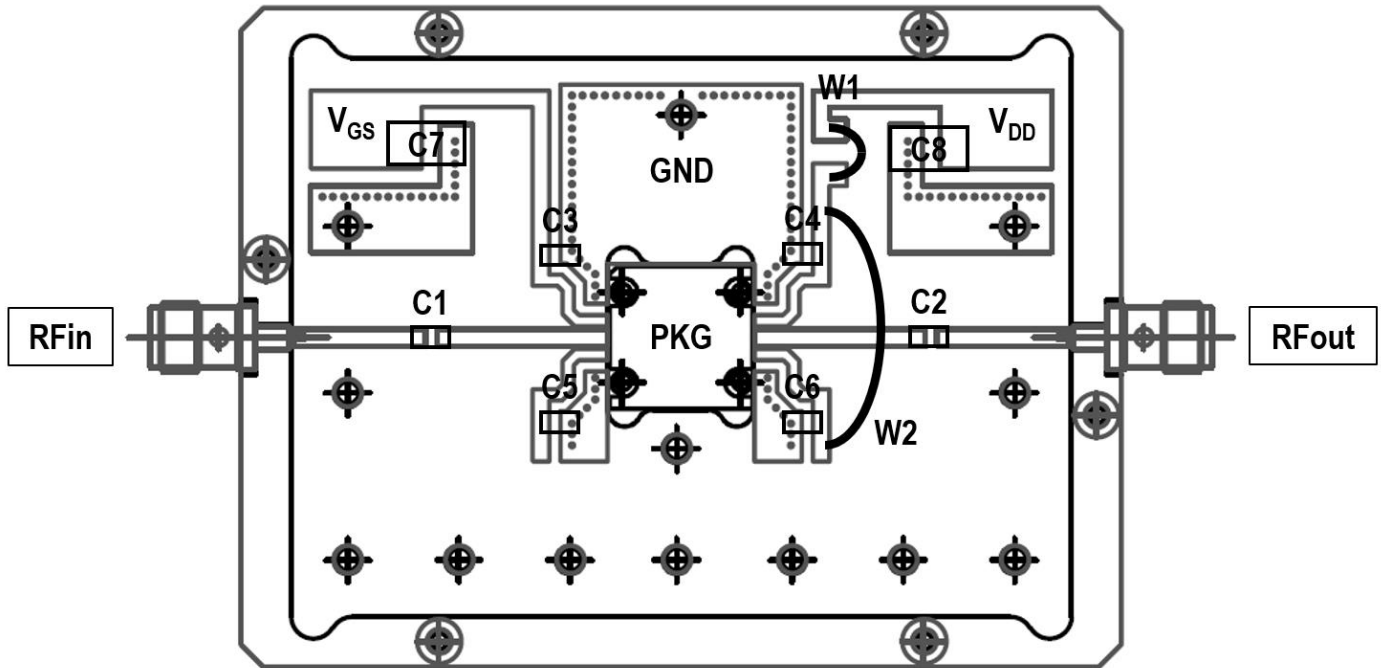
MR5005060B Pin Map



Pin Number

PIN NO.	DESCRIPTION
1	V <sub>GS</sub>
2	RFin
3	V <sub>GS</sub>
4	V <sub>DD</sub>
5	RFout
6	V <sub>DD</sub>

## MR5005060B Demonstration Circuit



## Demonstration Circuit Components

PART NO.	DESCRIPTION
C1, C2	ATC 600S 3.9 pF
C3, C4, C5, C6	Walsin General Purpose Caps (0.1 uF; 1608 size)
C7, C8	Murata GRM32DC72A475KE01L (4.7 uF; 3225 size)
W1, W2	Wire

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