

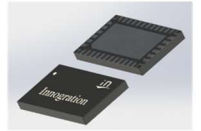


## GaN HEMT 50V, 15W\*2, 4.4-5GHz Fully matched transistor

### Description

The SMAV50030C6 is a dual path 15W\*2, fully matched transistor, operating from 4.4-5GHz. Each 15W path is independent and identical which enables great flexibilities of multiple amplifier configurations (see below). It features high gain, high efficiency, wide band and low cost, in 10\*6mm open cavity plastic package. In particular, it helps size limited amplifier design, easy to use, thanks to its 50ohm in and out configuration. There is no guarantee of performance when this part is used outside of stated frequencies.

### SMAV50030C6



**Pls notice that there are integrated DC block capacitors inside the package for input and output.**

- Typical pulsed CW performance Characterization Performance of **half section**

$V_{DD} = 50\text{ Vdc}$ ,  $I_{DQ} = 20\text{ mA}$ ,  $V_{GS} = -3\text{ Vdc}$ , pulsed width 20us and 10% duty cycle

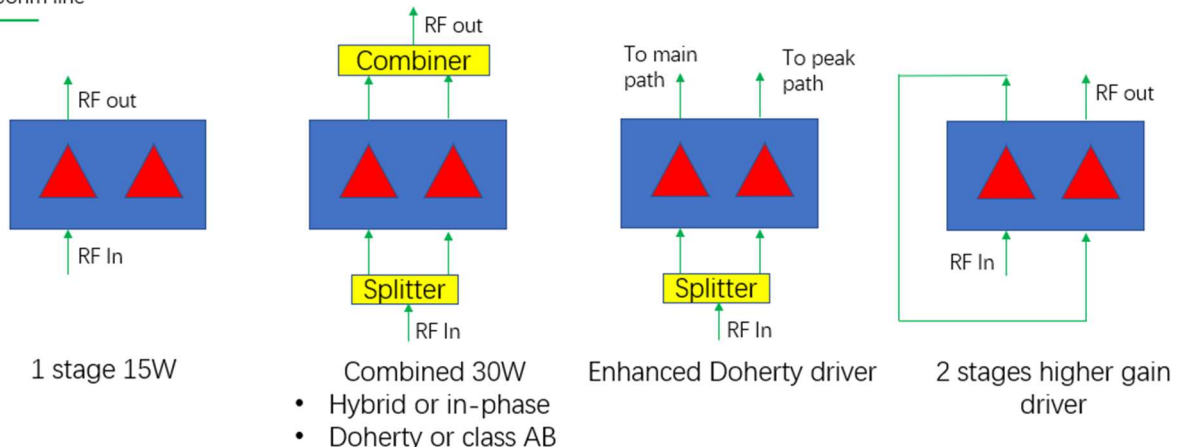
Freq(MHz)	P-1(dBm)	P-1Gain (dB)	P-3(dBm)	P-3(W)	EFF (%)
4400	40.38	17.8	42.33	17.1	51.7
4600	40.48	16.8	42.32	17.1	51.2
4800	40.61	16.2	42.31	17.0	54.8
5000	40.56	15.4	42.19	16.5	58.7

### Applications

- Sub-5GHz power amplifier
- Driver stage for 5G power amplifier within N79, like 4.4-4.6, 4.8-5GHz
- C band pulsed power amplifier like 4.4-5GHz

### Typical configuration

50ohm line



Hybrid Splitter and combiner recommendation: Yantel HC55703 (2\*1.25mm IL<0.35dB, 4W CW capable)

## Important Note: Proper Biasing Sequence for GaN HEMT Transistors

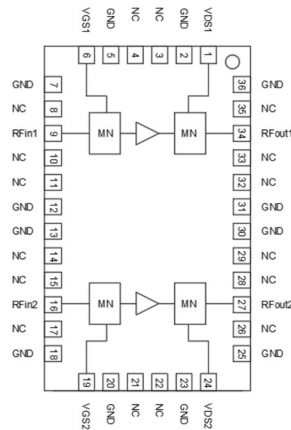
### Turning the device ON

1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

### Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically -5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Figure 1: Pin Connection definition--- transparent top view (Backside grounding for source)



Pin No.	Symbol	Description
6	Vgs1	Vgs bias for path 1
1	VDD1	Vdd bias for path 1
9	RFIn1	RF Input for path 1
34	RFout1	RF Output for path 1
19	Vgs2	Vgs bias for path 2
24	VDD2	Vdd bias for path 2
16	RFIn2	RF Input for path 2
27	RFout2	RF Output for path 2
Rest pins	NC	No connection
Package Base	GND	DC/RF Ground.

Table 1. Maximum Ratings (half section)

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DSS}$	+200	Vdc
Gate--Source Voltage	$V_{GS}$	-8 to +0.5	Vdc
Operating Voltage	$V_{DD}$	55	Vdc
Maximum gate current	$I_{GS}$	2	mA
Storage Temperature Range	$T_{stg}$	-65 to +150	°C
Case Operating Temperature	$T_C$	+150	°C
Operating Junction Temperature	$T_J$	+225	°C



**Table 2. Thermal Characteristics (half section)**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case by FEA T <sub>c</sub> = 85°C, 4.6GHz Pout=16W pulsed CW	R <sub>θJC</sub>	10	°C /W

- (1) The thermal resistance is acquired by FEA model, which was calibrated by IR measurement, the value shall be applied to reliability.
- (2) The reference T<sub>case</sub> temperature 85°C is applied on the backside of package.
- (3) The device on application board is soldered onto the 20mil Rogers PCB with 108 × Φ0.25mm via hole beneath the package backside.

**Table 3. Electrical Characteristics (TA = 25°C unless otherwise noted)**

**DC Characteristics (half section, measured on wafer prior to packaging)**

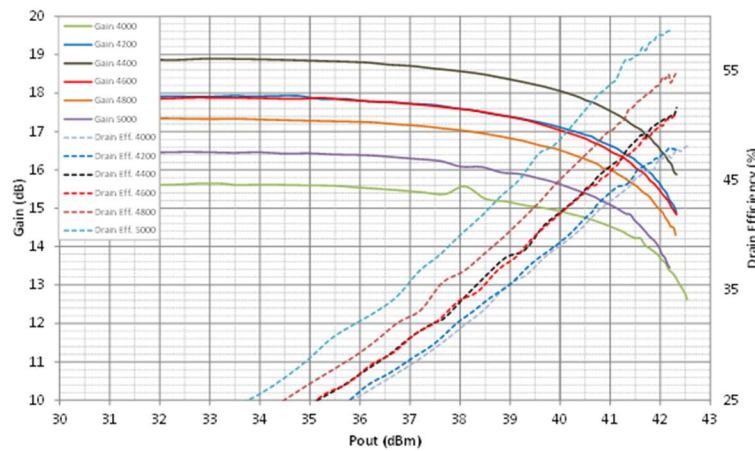
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>GS</sub> = -8V; I <sub>DS</sub> = 2mA	V <sub>DSS</sub>		200		V
Gate Threshold Voltage	V <sub>DS</sub> = 10V, I <sub>D</sub> = 2mA	V <sub>GS(th)</sub>	-4	-3.2	-2	V
Gate Quiescent Voltage	V <sub>DS</sub> = 50V, I <sub>DS</sub> = 20mA, Measured in Functional Test	V <sub>GS(Q)</sub>		-3		V

**Ruggedness Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	4.6G, Pout=42dBm Pulsed CW, All phase, No device damages	VSWR		10:1		

**Figure 2: Figure 1: Efficiency and power gain as function of Pout**

V<sub>DD</sub> = 50 Vdc, I<sub>DQ</sub> = 20 mA, Pulse width=20us, duty cycle=20%



**Figure 3: Application board layout info of half section (RO4350B 20mils)**

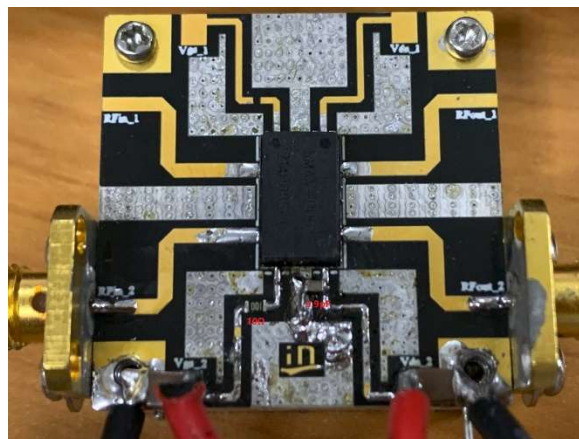




Figure 4: S11/S21 output from Network analyser of **half section**

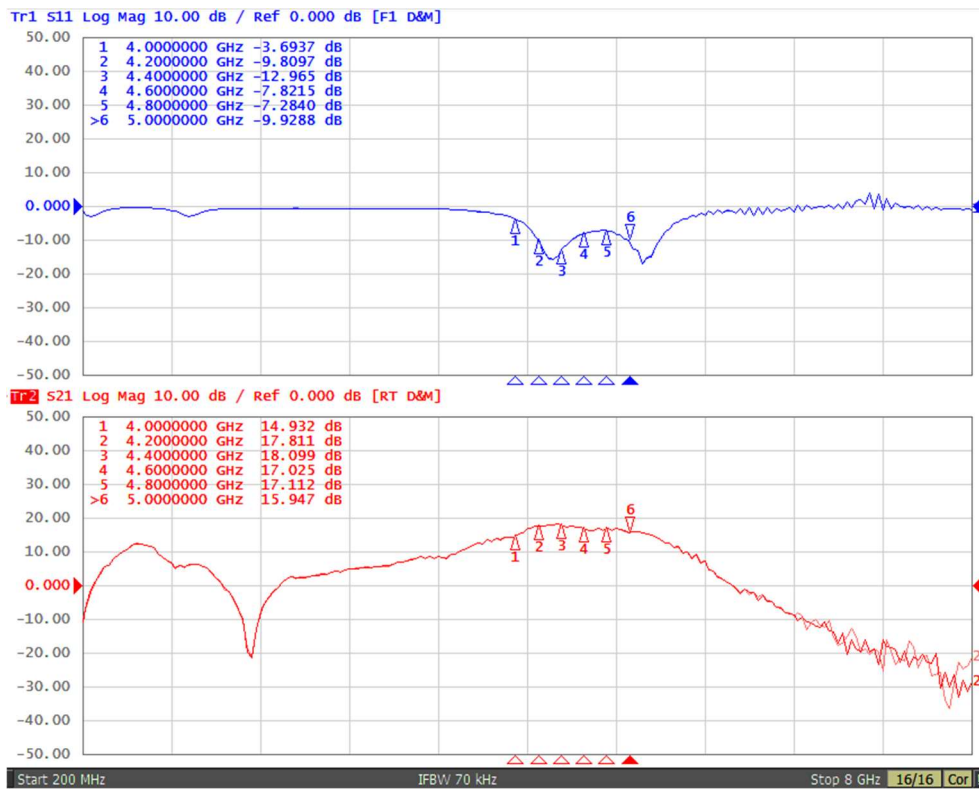
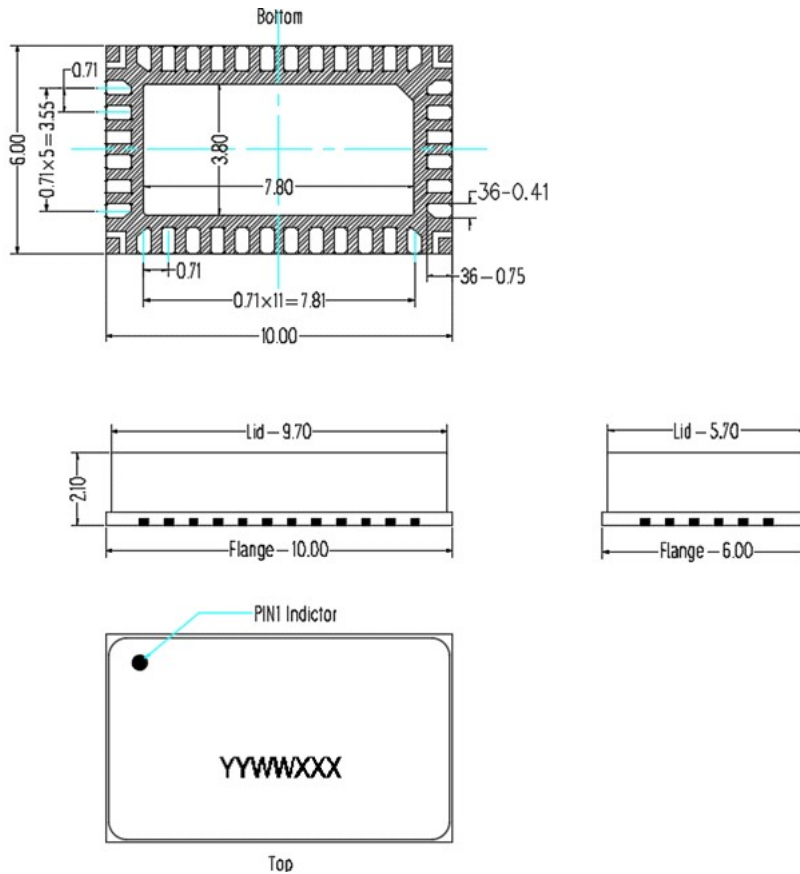


Table 4: 1 Carrier WCDMA back off performance of **half section**

P(dBm)	Freq(MHz)	4400	4600	4800	5000
28	ACPR(dBc)	-35.8	-39.1	-39.0	-41.7
29		-35.5	-38.8	-39.1	-41.4
30		-35.1	-38.4	-38.8	-41.2
31		-34.7	-38.0	-38.5	-40.6
32		-34.4	-37.4	-37.8	-39.6
33		-33.8	-36.6	-37.2	-38.3
28	Gain(dB)	18.3	17.5	16.9	16.1
29		18.3	17.4	16.9	16.0
30		18.3	17.4	16.8	16.0
31		18.2	17.3	16.8	16.0
32		18.1	17.3	16.7	15.9
33		18.0	17.1	16.6	15.8
28	Eff(%)	12.9	12.7	13.6	14.7
29		14.5	14.3	15.4	16.6
30		16.2	15.9	17.2	18.6
31		18.1	17.9	19.3	20.9
32		20.3	19.9	21.5	23.3
33		22.5	22.3	24.0	26.0

## Package Dimensions

### 10\*6 Plastic Package



#### Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are  $\pm 0.2$ mm.

## Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2021/10/21	V1.0	Preliminary Datasheet Creation
2021/11/19	V1.1	Add recommended splitter and combiner
2022/10/8	V1.2	Modify the typo of pin definition

Application data based on: HJ-21-15

### Notice

Specifications are subject to change without notice. Innogrations believes the information within the data sheet to be reliable. Innogrations makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.

“Typical” parameter is the average values expected by Innogrations in quantities and are provided for information purposes only. It can and do vary in different applications and related performance can vary over time. All parameters should be validated by customer’s technical experts for each application.

Innogrations products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogrations product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

For any concerns or questions related to terms or conditions, please check with Innogrations and authorized distributors

Copyright © by Innogrations (Suzhou) Co.,Ltd.