



MAAPSS0066 V2

# WDCT Power Amplifier 2400 – 2500 MHz

#### **Features**

- Ideal for WDCT Applications
- Saturated Output Power: +25 dBm Typical
- Power Gain: 25 dB Typical
- Low Current: 400 mA at P<sub>SAT</sub>
- Micro-Amp Shutdown
- Operates from 1.5 V to 4.0 V
- Lead-Free 3 mm 12-Lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS\* Compliant and 260°C Reflow Compatible

### **Description**

The MAAPSS0066 is a three stage power amplifier designed for Cordless Telephone applications. This power amplifier is packaged in a standard outline, lead-free 3 mm 12-lead PQFN plastic package. The MAAPSS0066 features an integrated bias controller that allows for micro amp shut down current.

### **Ordering Information**

Part Number	Package	
MAAPSS0066	Bulk Packaging	
MAAPSS0066TR-3000	3000 piece reel	
MAAPSS0066SMB	Sample Test Board (Includes 5 Samples)	

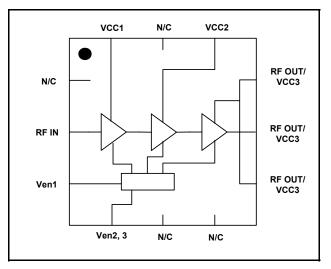
Note: Reference Application Note M513 for reel size information

## **Absolute Maximum Ratings** <sup>1,2</sup>

Parameter	Absolute Maximum	
Input Power	+ 5 dBm	
Operating Supply Voltage	+4.0 Volts	
Operating Control Voltage	+3.0 Volts	
Operating Temperature	-20°C to +85°C	
Channel Temperature	+150°C	
Storage Temperature	-40°C to +150°C	

- 1. Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.

#### **Functional Schematic**



### **Pin Configuration**

PIN No.	PIN Name	Description	
1	N/C	No Connection	
2	RF <sub>IN</sub>	RF Input	
3	V <sub>EN1</sub>	Power Enable	
4	V <sub>EN2,3</sub>	Power Enable	
5	N/C	No Connection	
6	N/C	No Connection	
7	RF <sub>OUT</sub> / V <sub>CC3</sub>	RF Output, 3rd Stage Supply	
8	RF <sub>OUT</sub> / V <sub>CC3</sub>	RF Output, 3rd Stage Supply	
9	RF <sub>OUT</sub> / V <sub>CC3</sub>	RF Output, 3rd Stage Supply	
10	V <sub>CC2</sub>	2nd Stage Supply	
11	N/C	No Connection	
12	V <sub>CC1</sub>	1st Stage Supply	
Pad <sup>3</sup>	GND	RF & DC Ground	

The exposed pad centered on the package bottom must be connected to RF and DC ground.

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<sup>\*</sup> Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.





MAAPSS0066

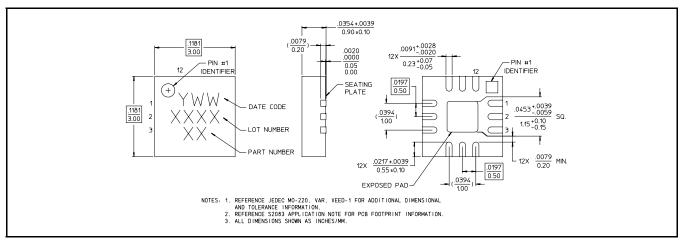
**WDCT Power Amplifier** 2400 - 2500 MHz

### **Electrical Specifications:**

Frequency = 2450 MHz,  $P_{IN}$  = -1 to 3 dBm,  $V_{CC}$  = 2.4 V,  $V_{EN}$  = 2.5 V,  $T_A$  = 25 °C,  $Z_0$  = 50 $\Omega$ 

Parameter	Test Conditions	Units	Min.	Тур.	Max
Small Signal Gain	Pin = -20 dBm	dB	_	27	_
Input Return Loss	_	dB	_	15	_
Output Power	_	dBm	23	25	_
Power Flatness	2.0 V < V <sub>CC</sub> < 3.0 V	dB	_	3	_
PAE	_	%	_	33	_
Current	_	mA	_	400	500
Current, Off	V <sub>EN</sub> = 0 V	μA		3	10
Pdiss	P <sub>OUT</sub> = 25.0 dBm	W	_	0.6	_
Control Pins	V <sub>EN.</sub> Low V <sub>EN.</sub> High Current	V V mA	0 2.0 —	_ _ 3	0.5 2.5 4.0
Harmonics	2f 3f	dBc dBc	_	-54 -42	_
Forward Isolation	V <sub>EN</sub> = 0 V	dB	_	39	_
Duty Cycle	_	%	_	_	100
Stability	$+1.5 \text{ V} < \text{V}_{\text{CC}} < +3.5 \text{ V}, \text{P}_{\text{IN}} = -1 \text{ to } 3 \text{ dBm}, \text{VSWR} < 6:1}$ $-20^{\circ}\text{C} < \text{T}_{\text{C}} < +70^{\circ}\text{C}, \text{ RBW} = 3 \text{ MHz max hold}$		Alls	spurs < -60	dBc

### Lead-Free 3 mm 12-Lead PQFN<sup>†</sup>



Reference Application Note M538 for lead-free solder reflow recommendations.

#### Operating the MAAPSS0066

The MAAPSS0066 can be damaged by electrostatic discharge (ESD). Use proper ESD control techniques when handling this device. To operate the MAAPSS0066, turn on  $V_{CC}$  before  $V_{EN}$  for power on and turn off  $V_{\text{CC}}$  after  $V_{\text{EN}}$  for shutdown.

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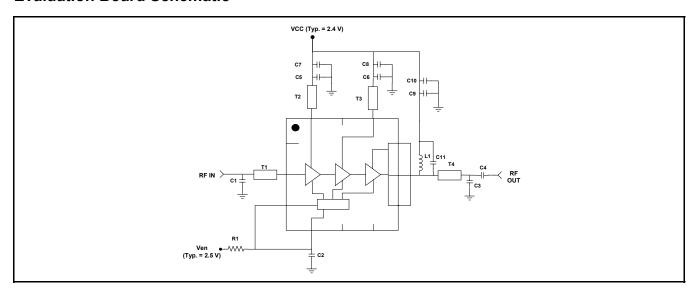




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# WDCT Power Amplifier 2400 – 2500 MHz

#### **Evaluation Board Schematic**

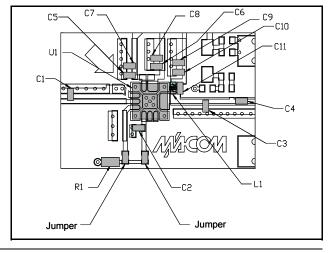


#### **MAAPSS0066 External Parts List**

Designator	Value	Footprint	Manufacturer	Part ID
C1, C3	2 pF	0402	Murata	GRM1555C1H2R0CZ01
C2	1 nF	0402	Murata	GRM1555R71H102KA01
C4, C5, C6	47 pF	0402	Murata	GRM1555C1H470JZ01
C7, C8, C9	1 uF	0402	Murata	GRM1555R60J105KE19
C10	4700 pF	0402	Murata	GRM155R71H472KA01D
C11	1 pF	0402	Murata	GRM36C0G010C50
L1	10 nH	0402	Coilcraft	0402CS-10NXJB
R1	250 Ohm	0402	Panasonic	ERJ-2RKF2490X

### Transmission Line Dimensions, 0.20 mm thick FR4

Designator	Length (mm) *	Width (mm)	
T1	5.20	0.37	
T2	1.00	0.37	
Т3	1.27	0.37	
T4	3.20	0.37	
<ul> <li>From package edge to center of component</li> </ul>			



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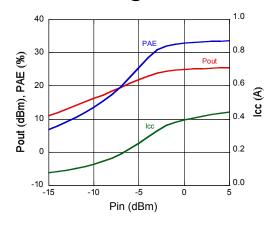


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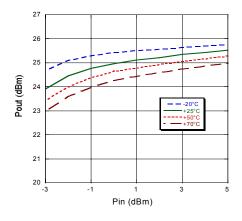
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### Typical Characteristics (All data uses the supplied sample board BOM)

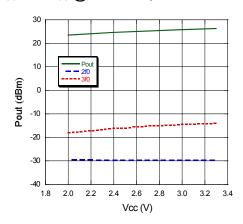
POUT, PAE, ICC VS. PIN @ 2.4 V, 2450 MHz



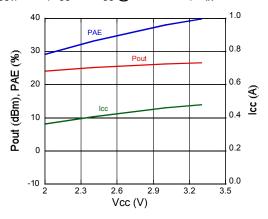
Pout vs. Pin and Temp @ 2.4 V, 2450 MHz



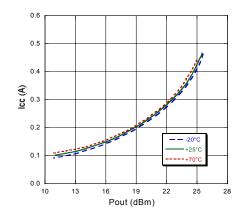
 $P_{OUT}$  vs.  $V_{CC}$  @ 2450 MHz, Pin = 1 dBm



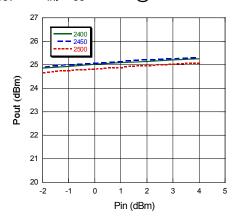
 $P_{OUT}$ , PAE,  $I_{CC}$  vs.  $V_{CC}$  @ 2450 MHz,  $P_{IN}$  = 1 dBm



I<sub>CC</sub> vs. P<sub>OUT</sub> and Temp @ 2.4 V, 2450 MHz



 $P_{OUT}$  vs.  $P_{IN}$ ,  $V_{CC}$  = 2.4 V @ 2450 MHz



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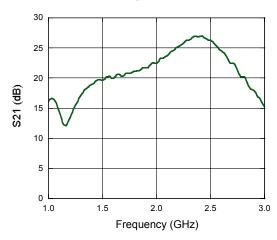


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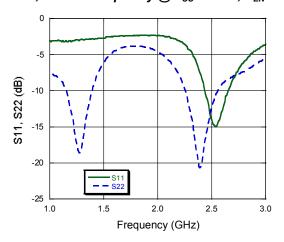
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### Typical Characteristics (All data uses the supplied sample board BOM)

S21 vs. Frequency @  $V_{CC}$  = 2.4 V,  $V_{EN}$  = 2.5 V



S22, S11 vs. Frequency @  $V_{CC}$  = 2.4 V,  $V_{EN}$  = 2.5 V



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