

# VMMK-2203

E-pHEMT Amplifier in a Wafer Scale Package  
(1 - 10GHz)



## Product Brief

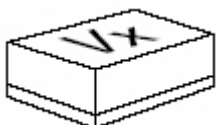
### Description

Avago Technologies has combined its industry leading E-pHEMT technology with a revolutionary chip scale package. The GaAsCap wafer scale sub-miniature leadless package is small and ultra thin, yet can be handled and placed with standard 0402 pick and place assembly. This product is easy to use since it requires only positive DC voltages for bias and no matching coefficients are required for impedance matching to 50 Ω systems.

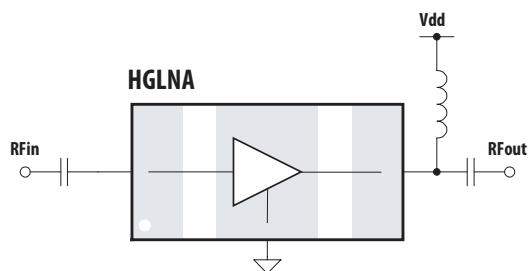
### Applications

- 2.4 GHz, 3.5GHz, 5-6GHz WLAN and WiMax notebook computer, access point and mobile wireless applications
- 802.16 & 802.20 BWA systems
- Military Radar, radio and ECM systems

**GaAsCap 0402, 1.0mm x 0.5mm x 0.25mm**



### Pin Connections (Top View)



### Features

- Sub-miniature 0402 (1mm x 0.5mm) Surface Mount Leadless Package
- Low height (0.25mm)
- Frequency Range 1 to 10 GHz
- Enhancement Mode

### Specifications (5.0V, 28mA Typ. @ 5 GHz)

- 16 dB available gain
- 2.3 dB Noise Figure
- 15 dBm output 3rd order intercept

### VMMK-2203 Product DC and RF Specifications

Symbol	Parameters/Condition	Unit	Typ.
	Frequency	GHz	1-10
Vdd	Supply Voltage	V	5
Idd	Supply Current	mA	28
Ga	Associated Gain	dB	16
NF	Noise Figure	dB	2.3
S11	Input Return Loss	dB	-10
S22	Output Return Loss	dB	-10
OIP3	Output 3rd Order IP	dBm	+15

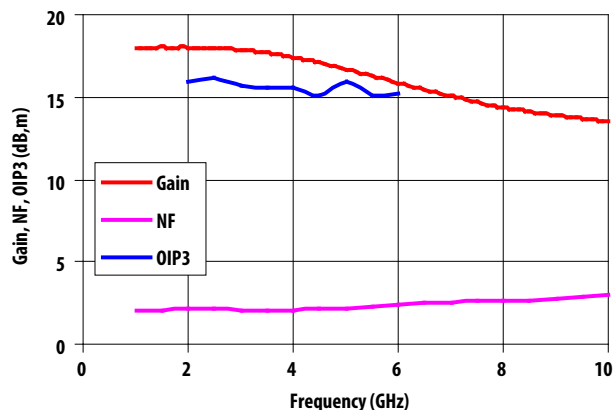


Figure 1. Gain, NF, Bypass & OIP3 vs. Frequency

## Recommended SMT Attachment

The VMMK Packaged Devices are compatible with high volume surface mount PCB assembly processes.

## Manual Assembly for Prototypes

1. Follow ESD precautions while handling packages.
2. Handling should be along the edges with tweezers or from topside if using a vacuum collet.
3. Recommended attachment is solder paste. Please see Figure 8 for recommended solder reflow profile. Conductive epoxy is not recommended. Hand soldering is not recommended.
4. Apply solder paste using either a stencil printer or dot placement. The volume of solder paste will be dependent on PCB and component layout and should be controlled to ensure consistent mechanical and electrical performance. Excessive solder will degrade RF performance.
5. Follow solder paste and vendor's recommendations when developing a solder reflow profile. A standard profile will have a steady ramp up from room temperature to the pre-heat temp to avoid damage due to thermal shock.
6. Packages have been qualified to withstand a peak temperature of 260°C for 20 to 40 sec. Verify that the profile will not expose device beyond these limits.
7. Clean off flux per vendor's recommendations.
8. Clean the module with Acetone. Rinse with alcohol. Allow the module to dry before testing.

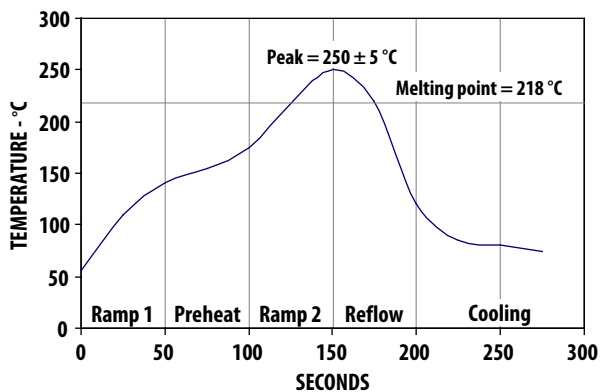
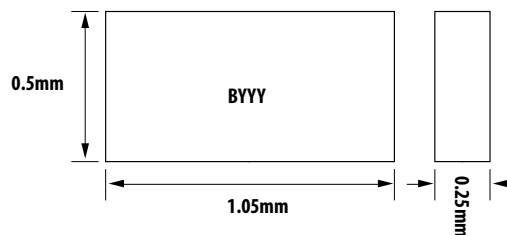


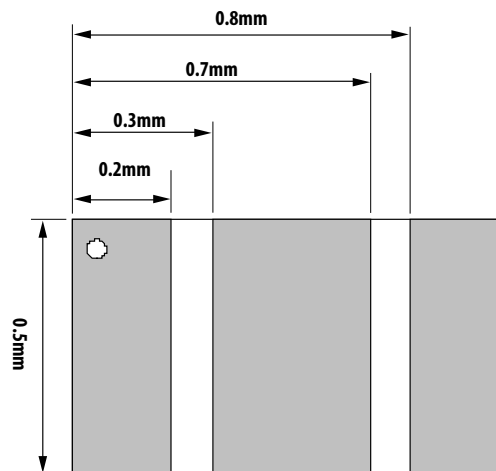
Figure 2. Suggested Lead-Free Reflow Profile for SnAgCu Solder Paste

## Outline Drawing

### Top and Side View



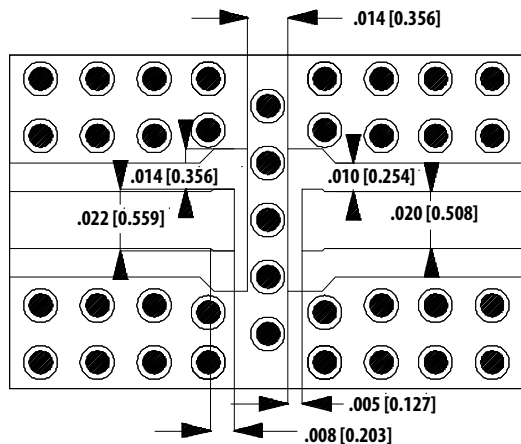
### Bottom View



#### Notes:

1. • indicates pin 1
2. Dimensions are in millimeters
3. Pad Material is minimum 5.0 um thick Au

## Suggested PCB Material and Land Pattern



#### Notes:

1. 0.010" Rogers RO4350

For product information and a complete list of distributors, please go to our web site: [www.avagotech.com](http://www.avagotech.com)