

C-Band Internally-Matched Power GaAs FETs (IMFETs) 6.4 to 7.2 GHz

Technical Data

**IM6472-4L
IM6472-8L
IM6472-16L**

Features

- **High Output Power:**
 - IM6472-4L:** 36.5 dBm typ. (4.5W)
 - IM6472-8L:** 39.5 dBm typ. (9W)
 - IM6472-16L:** 42.5 dBm typ. (18W)
- **High Power-Added Efficiency:** Up to 42%
- **High Linearity:** -45 dBc IMD₃ @ Specified Output Single Carrier Level
- **Superior Gain Flatness:** ± 0.5 dB max.
- **Linear, Class A Operation**
- **Input and Output Internally Matched To 50 Ohms**
- **Industry Compatible Packages**

Applications

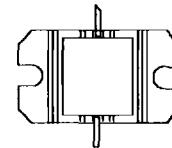
- **Solid State Power Amplifiers for Satellite Earth Station Uplink**
- **Digital Point-to-Point and Point-to-Multipoint Communications**

Description

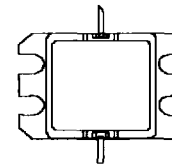
The Hewlett-Packard IM6472-xL series of internally-matched GaAs power FETs, or IMFETs™ is designed to provide efficient power amplification in the 6.4 to 7.2 GHz communications band. Designed for SatCom and Point-to-Point Radio communications, these products offer the system designer benefits associated with higher output power, gain, and net power-added efficiency.^[1] Typical output power of the IM6472-4L exceeds 4 watts, with similar performance advantages for the IM6472-8L and -16L models. Higher levels of gain and operating efficiency are the result of leading edge GaAs MESFET technology developed at HP.

HP IMFETs are manufactured using hybrid construction techniques, combining GaAs power MESFETs with low loss, thin-film substrates. Internal 50 ohm matching networks eliminate the RF matching, handling, and die attach difficulties usually associated with using large geometry, high power chip devices. Automated assembly and test proce-

C21A



C24A



dures provide excellent unit-to-unit repeatability and uniformity for easier cascading. HP IMFETs are housed in copper/ceramic packages to allow for maximum heat transfer from the GaAs FET device to the heatsink. The sealing process used is a commercial standard, non-hermetic epoxy, proven for environmental protection. Each unit conforms to the industry's standard outline dimensions. Electrical performance is guaranteed at +25°C.

Note 1: Net power added efficiency = (Pout - Pin)/(Ids x Vds), where Pout and Pin are in watts.

Absolute Maximum Ratings ($T_{\text{Flange}} = 25^{\circ}\text{C}$)

Symbols	Parameters	Units	Ratings		
			IM6472-4L	IM6472-8L	IM6472-16L
V_{DS}	Drain to Source Voltage	V	15	15	15
V_{GS}	Gate to Source Voltage	V	-10	-10	-10
V_{GD}	Gate to Drain Voltage	V	-15	-15	-15
I_{DS}	Drain Current	A	I_{DSS}	I_{DSS}	I_{DSS}
I_{GRF}	Gate Current	mA	± 25	± 50	± 100
T_{CH}	Max. Channel Temperature	$^{\circ}\text{C}$	175	175	175
T_{STG}	Storage Temperature	$^{\circ}\text{C}$	-65 to +150	-65 to +150	-65 to +150
$P_{\text{T}}^{(2)}$	Total Power Dissipation	W	31	38	83

Electrical Characteristics ($T_{\text{Flange}} = 25^{\circ}\text{C}$)

Symbols	Parameters	Units	IM6472-4L			IM6472-8L			IM6472-16L			Test Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
P1dB	Output Power @ 1 dB Gain Compression $I_{\text{DSQ}} = 1.0\text{A}$ $I_{\text{DSQ}} = 2.0\text{A}$ $I_{\text{DSQ}} = 4.0\text{A}$	dBm dBm dBm	36.0	36.5		39.0	39.5		41.5	42.5		$V_{\text{DS}} = 10.0\text{V}$ Freq. = 6.4 – 7.2 GHz $Z_{\text{S}} = Z_{\text{L}} = 50\text{ ohms}$ R_{G} (IM6472-4L & 8L) = 20 ohms R_{G} (IM6472-16L) = 5 ohms
η_{ADD}	Power-Added Efficiency @ 1 dB Gain Compression	%		42			40			38		
I_{DS}	Drain Current @ P1dB	A		1.1	1.5		2.2	3.0		4.4	6.0	
G1dB	Power Gain @ 1 dB Gain Compression	dB	8.5	9.5		7.5	8.5		7.0	8.0		
ΔG	Gain Flatness	dB		± 0.3	± 0.5		± 0.3	± 0.5		± 0.3	± 0.5	
IMD ₃	3rd Order Intermod Distortion $P_{\text{out SCL}}^{(1)}$ I_{DSQ} 26 dBm 1.0 A 29 dBm 2.0 A 31.5 dBm 4.0 A	dBc dBc dBc		-45	-42		-45	-42		-45	-42	$V_{\text{DS}} = 10.0\text{V}$ Two Equal Tone Test $f_1 = 7.19\text{GHz}$ $f_2 = 7.20\text{GHz}$
I_{DSS}	Saturated Drain Current	A	1.5	2.5	3.5	3.0	5.0	7.0	6.0	10.0	14.0	$V_{\text{GS}} = 0\text{V}; V_{\text{DS}} = 2.5\text{V}$
V_{P}	Pinch Off Voltage $I_{\text{DS}} = 63\text{mA}$ $I_{\text{DS}} = 125\text{mA}$ $I_{\text{DS}} = 250\text{mA}$	V V V	-4.5	-3.0	-1.5	-4.5	-3.0	-1.5	-4.5	-3.0	-1.5	$V_{\text{DS}} = 2.5\text{V}$
BV_{GDO}	Gate-Drain Breakdown Voltage $I_{\text{GD}} = -6\text{mA}$ $I_{\text{GD}} = -12\text{mA}$ $I_{\text{GD}} = -25\text{mA}$	V V V	-16.0			-16.0			-16.0			
g_{m}	Transconductance $I_{\text{DS}} = 1.0\text{A}$ $I_{\text{DS}} = 2.0\text{A}$ $I_{\text{DS}} = 4.0\text{A}$	S S S		1.3			2.5			5.0		$V_{\text{DS}} = 2.5\text{V}$
R_{TH}	Thermal Resistance (Channel to Flange)	$^{\circ}\text{C/W}$		4.9			4.0			1.8		I. R. Method; $V_{\text{DS}} = 10.0\text{V}$ $I_{\text{DS}} = 1, 2 \& 4\text{A}$
ΔT	Temperature Rise Channel to Flange; DC on & RF off	$^{\circ}\text{C}$		49			80			72		I. R. Method
	Case Style		C21A			C21A			C24A			

Notes:

- SCL: Single Carrier Level
- See Application Note, AN 1083

Typical Performance ($T_{\text{Flange}} = 25^{\circ}\text{C}$)

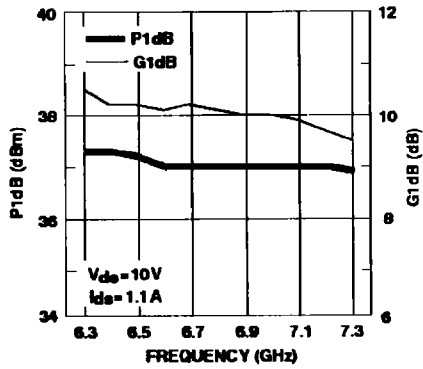


Figure 1. IM6472-4L Output Power, Gain vs. Frequency.

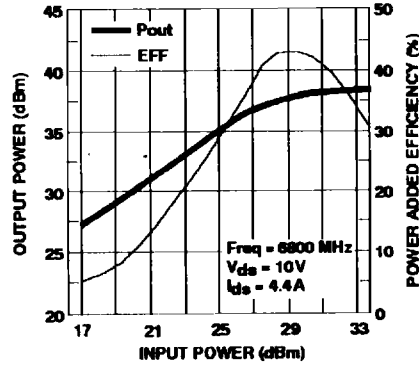


Figure 2. IM6472-4L Output Power, Power Added Efficiency vs. Input Power.

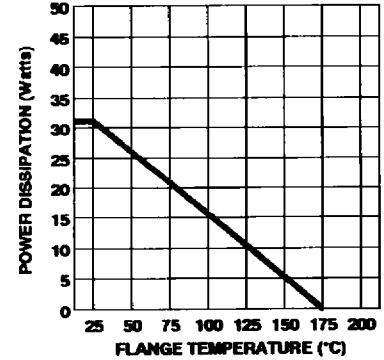


Figure 3. IM6472-4L Maximum Total Power Dissipation vs. Flange Temp.

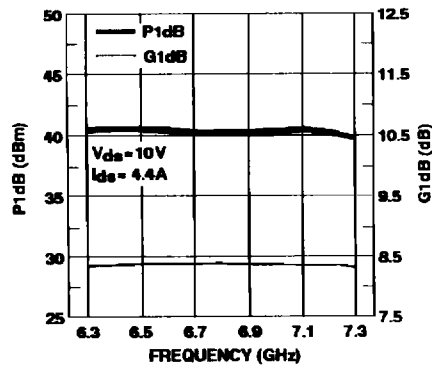


Figure 4. IM6472-8L Output Power, Gain vs. Frequency.

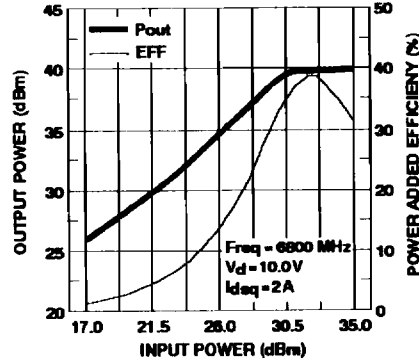


Figure 5. IM6472-8L Output Power, Power Added Efficiency vs. Input Power.

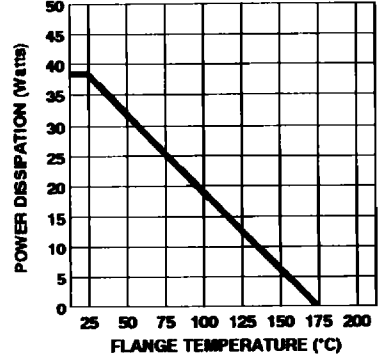


Figure 6. IM6472-8L Maximum Total Power Dissipation vs. Flange Temp.

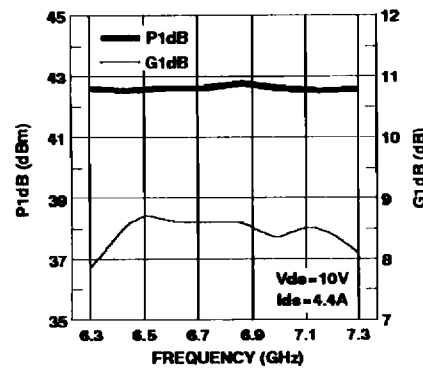


Figure 7. IM6472-16L Output Power, Gain vs. Frequency.

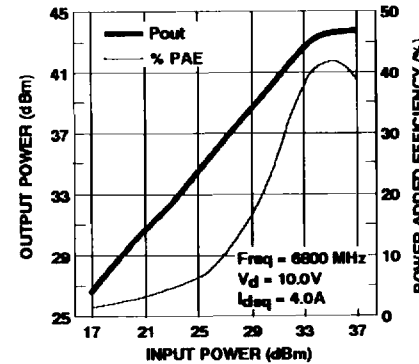


Figure 8. IM6472-16L Output Power, Power Added Efficiency vs. Input Power.

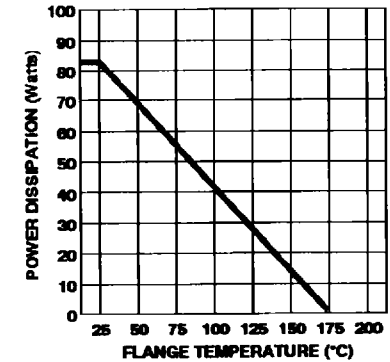
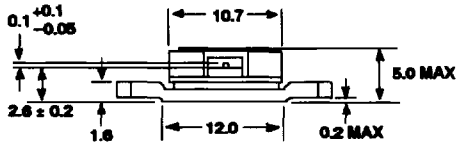
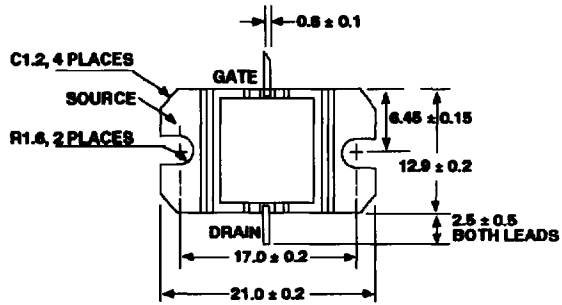
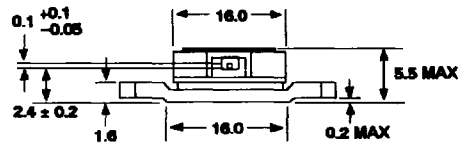
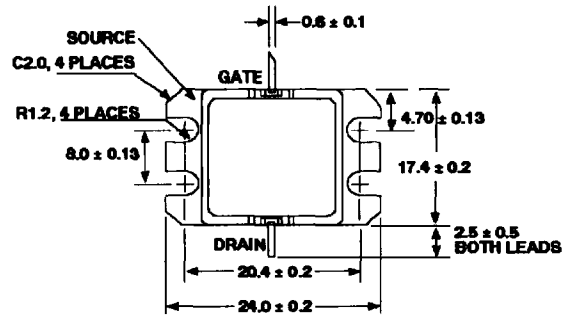


Figure 9. IM6472-16L Total Power Dissipation vs. Flange Temperature.

Case Dimensions



**Figure 10. C21A Package Outline
IM6472-4L and IM6472-8L.**



**Figure 11. C24A Package Outline
IM6472-16L.**

NOTES (UNLESS OTHERWISE SPECIFIED):
1. DIMENSIONS ARE SPECIFIED IN mm

For technical assistance or the location of your nearest Hewlett-Packard sales office, distributor or representative call:

Americas/Canada: 1-800-235-0312 or 408-654-8675

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