

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC41V3642

3.6~4.2GHz BAND 12W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC41V3642 is an internally impedance-matched GaAs power FET especially designed for use in 3.6 ~ 4.2 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

FEATURES

- Class A operation
 - Internally matched to 50Ω system
 - High output power
 $P_{1dB} = 14W$ (TYP) @ 3.6~4.2GHz
 - High power gain
 $G_{LP} = 12.5\text{dB}$ (TYP) @ 3.6~4.2GHz
 - High power added efficiency
 $\eta_{add} = 40\%$ (TYP) @ 3.6~4.2 GHz, P_{1dB}
 - Hermetically sealed metal-ceramic package
 - Low distortion [Item: -51]
 $IM_3 = -45 \text{ dBc}$ (TYP) @ $P_o = 30 \text{ (dBm)}$ S.C.L.

APPLICATION

Item-01: 3.6~4.2 GHz band power amplifier
Item-51: Digital radio communication

QUALITY GRADE

- IG

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Symbol	Parameter	Ratings	Unit
V _{GDO}	Gate to drain voltage	-15	V
V _{GSO}	Gate to source voltage	-15	V
I _D	Drain current	12	A
I _{GR}	Reverse gate current	-30	mA
I _{GF}	Forward gate current	63	mA
P _T	Total power dissipation *1	57.7	W
T _{ch}	Channel temperature	175	°C
T _{stg}	Storage temperature	-65 ~ +175	°C

*1: $T_0 = 25^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	$V_{DS}=3V, V_{GS}=0V$	—	—	12	A
g_m	Transconductance	$V_{DS}=3V, I_D=3.0A$	—	3.0	—	S
$V_{GS(\text{off})}$	Gate to source cut-off voltage	$V_{DS}=3V, I_D=30mA$	—	—	-5	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS}=10V, I_D=3.4A, f=3.6\sim4.2GHz$	40	41.5	—	dBm
G_{LP}	Linear power gain		11.0	12.5	—	dB
I_D	Drain current		—	3.3	—	A
η_{add}	Power added efficiency		—	40	—	%
* IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(\text{ch-c})}$	Thermal resistance *2	ΔV_f method	—	—	2.6	°C/W

*1: Item-51, 2-tone test $P_0 = 30 \text{ dBm}$ Single Carrier Level $f = 4.2 \text{ GHz}$ $\Delta f = 10 \text{ MHz}$ *2: Channel to case

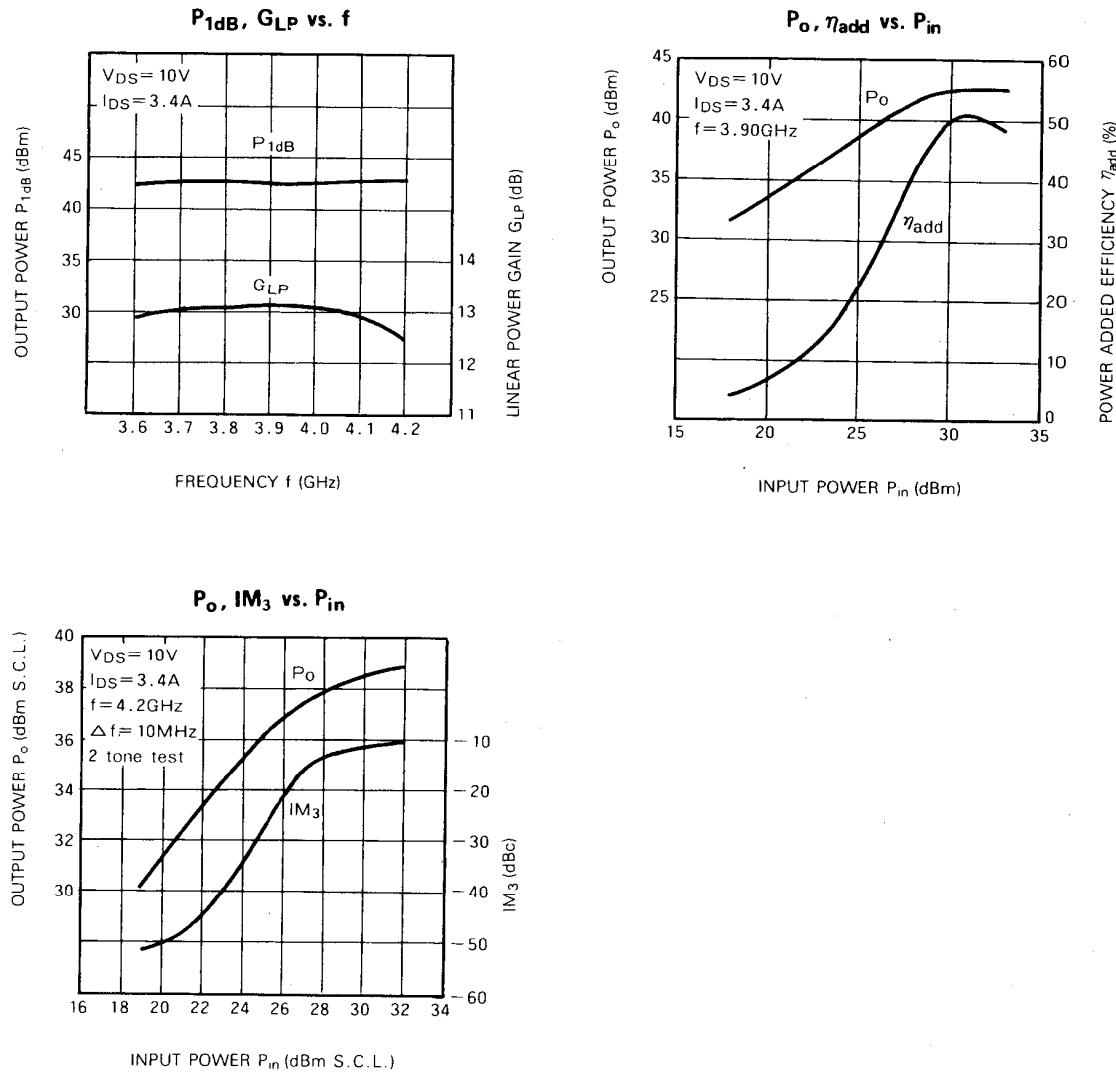
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TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS (Ta=25°C, V_{DS}=10V, I_{DS}=3.4A)

f (GHz)	S Parameters (TYP.)							
	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)
3.6	0.48	-168	4.13	57	0.042	10	0.45	-23
3.7	0.47	155	4.29	32	0.052	-21	0.34	-45
3.8	0.44	121	4.45	6	0.052	-45	0.26	-73
3.9	0.40	86	4.39	-20	0.058	-75	0.23	-115
4.0	0.35	42	4.34	-46	0.060	-101	0.22	-160
4.1	0.31	-11	4.17	-73	0.066	-123	0.28	166
4.2	0.34	-70	3.70	-100	0.057	-150	0.29	140

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