

MOS FET Power Amplifier Module for GSM Handy Phone

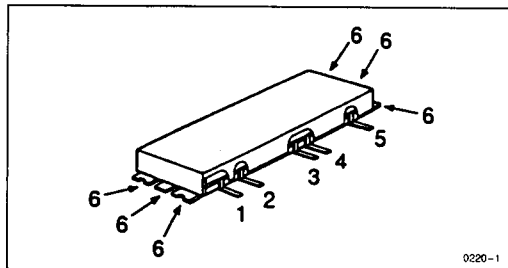
■ FEATURES

- Low Power Control Current 1.5 mA
- High Speed Switching 1.2 μ s
- Wide Power Control Range 80 dB typ.
- Surface Mounted Thin Package
with Shielded Cover 3.8mm

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

Parameter	Symbol	Value	Unit
Supply Voltage	V_{DD}	12	V
Supply Current	I_{DD}	3	A
APC Voltage	V_{APC}	4	V
Input Power	P_{in}	20	mW
Operating Case Temperature	$T_{C(op)}$	- 30 ~ 100	$^\circ\text{C}$
Storage Temperature	T_{stg}	- 30 ~ 100	$^\circ\text{C}$

■ PIN ARRANGEMENT



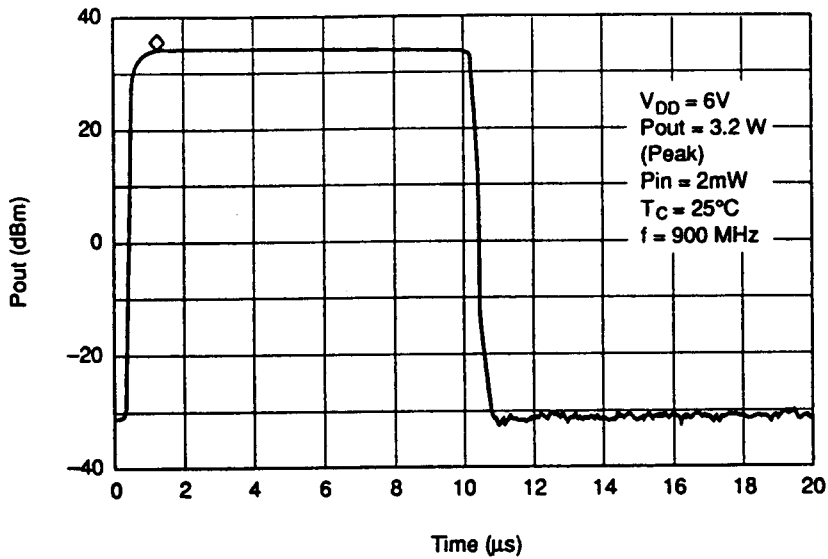
■ PIN OUT

Pin No.	Pin Name
1	P_{in}
2	V_{APC}
3	V_{DD}
4	P_{out}
G	GND

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

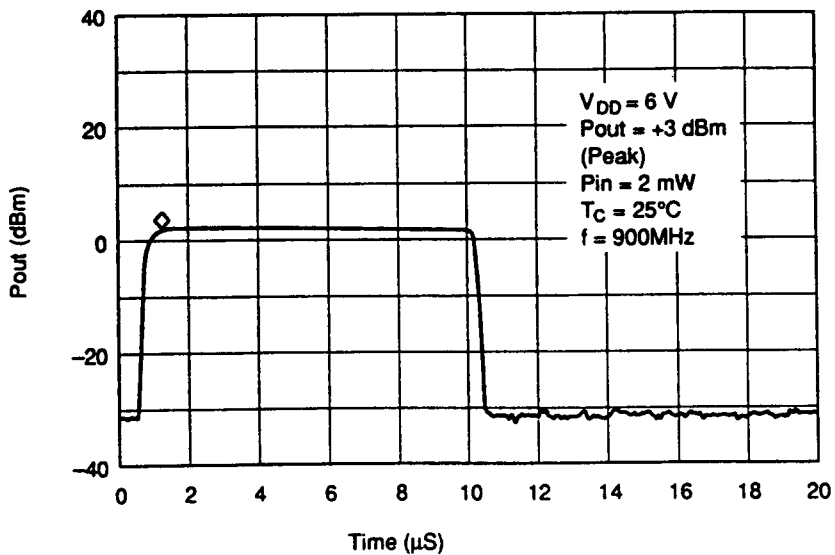
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain Cutoff Current	I_{DS}	—	—	100	μA	$V_{DD} = 12\text{V}, V_{APC} = 0\text{V}$
Total Efficiency	η_T	30	35	—	%	$P_{in} = 2\text{mW}, V_{DD} = 6\text{V},$ $P_{out} = 3.2\text{W (at APC Controlled)},$ $R_L = R_g = 50\Omega, T_C = 25^\circ\text{C}$
2nd Harmonic Distortion	2nd H.D.	—	- 45	- 30	dB	
3rd Harmonic Distortion	3rd H.D.	—	- 45	- 30	dB	
Input VSWR	VSWR (in)	—	2	3	—	
Output Power (1)	$P_{out} (1)$	3.6	4.2	—	W	$P_{in} = 2\text{mW}, V_{DD} = 6\text{V}, V_{APC} = 4\text{V},$ $R_L = R_g = 50\Omega, T_C = 25^\circ\text{C}$
Output Power (2)	$P_{out} (2)$	2.0	2.4	—	W	$P_{in} = 2\text{mW}, V_{DD} = 5.4\text{V}, V_{APC} = 4\text{V},$ $R_L = R_g = 50\Omega, T_C = 80^\circ\text{C}$
Isolation	—	—	- 43	- 35	dBm	$P_{in} = 2\text{mW}, V_{DD} = 6\text{V}, V_{APC} = 0.5\text{V},$ $R_L = R_g = 50\Omega, T_C = 25^\circ\text{C}$
Switching Time	t_R, t_F	—	1.2	2	μs	$P_{in} = 2\text{mW}, V_{DD} = 6\text{V}, P_{out} = 3.2\text{W},$ $R_L = R_g = 50\Omega, T_C = 25^\circ\text{C}$
Stability	—	No Parasitic Oscillation			—	$P_{in} = 2\text{mW}, V_{DD} = 7.5\text{V},$ $P_{out} \leq 3.2\text{W (at APC controlled)},$ $R_g = 50\Omega, t = 20\text{ sec.}, T_C = 25^\circ\text{C},$ Output VSWR = 20 All Phases

Switching Response



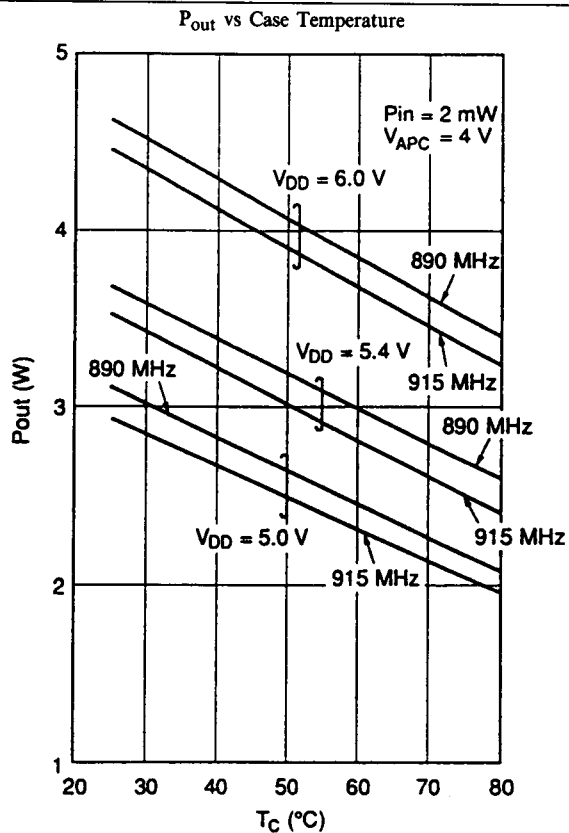
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Switching Response



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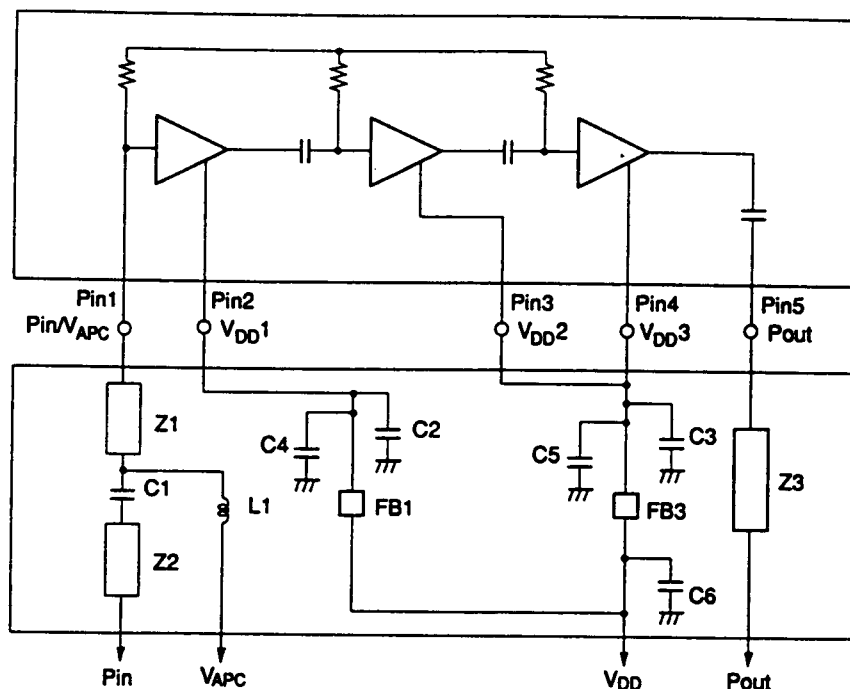

$$1/(S_{21})^2 = 1/(0.9805)^2 = 1.04$$

Unit: mm



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■ INTERNAL DIAGRAM

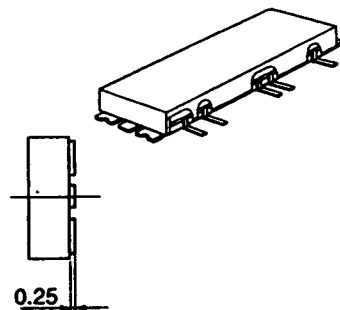
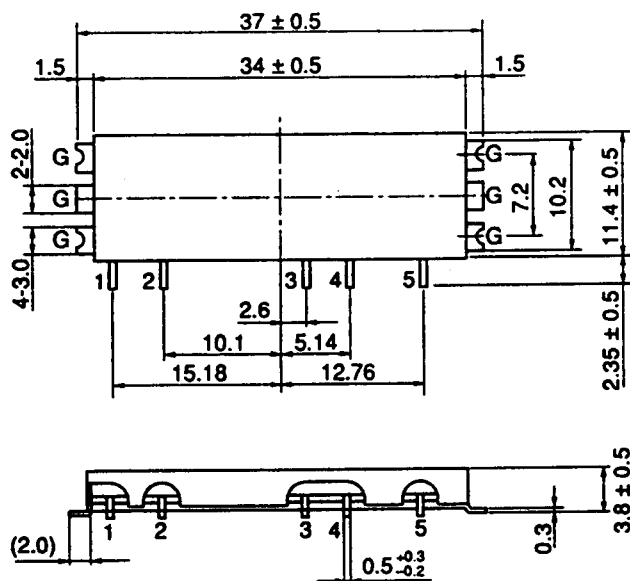


- C1 = 100 pF Ceramic Chip
 C2, C3 = 0.01 μ F Ceramic Chip
 C4, C5 = 4.7 μ F Tantalum
 C6 = 220 μ F Aluminum Electrolyte
 L1 = RFC 1 mm $\varnothing$, 15 turns
 FB = Ferrite Bead BLO1RN1-A62-001 (Murata) or Equivalent
 Z1, Z2, Z3 = 50 Ω Microstrip Line

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2

■ PACKAGE DIMENSIONS



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Hitachi Code	RF-G
JEDEC Code	—
EIAJ Code	—
Weight (g)	4

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■ NOTES FOR USE

1. Don't apply the reflow soldering process.
2. Don't apply the dipping solder process to the lead pins.
3. To avoid the stress against the lead pins, lead pins should be soldered after the soldering of ground flange.
4. Soldering temperature and time should be less than 230°C, 10 sec. per each pin.
5. To protect devices from electro-static damage, soldering iron, measuring equipment and human body etc., should be grounded.
6. To avoid the degradation of efficiency and output power, lead pins should not be floating from PCB, and connected just on the RF signal line. (Refer to Figure 1.)
7. Recommendation to decrease the thermal resistance is shown below.
 - a. Arrangement of through holes under as many as possible under module.
 - b. Addition of external heat sink on the metal case of module.
8. Don't wash module except lead pins and ground flange.
9. It should be recommended to apply a non-chlorine solder for modules. For example, KR19 by Nihon Almit Co., LTD.
10. When the external parts (Isolator, Duplexer, etc.) of the module are changed, the electrical characteristics should be evaluated enough.
11. To get stable operation, all ground pins (total 6 pins) should be connected to PCB ground plane directly, and the through holes under module should be made as many as possible.

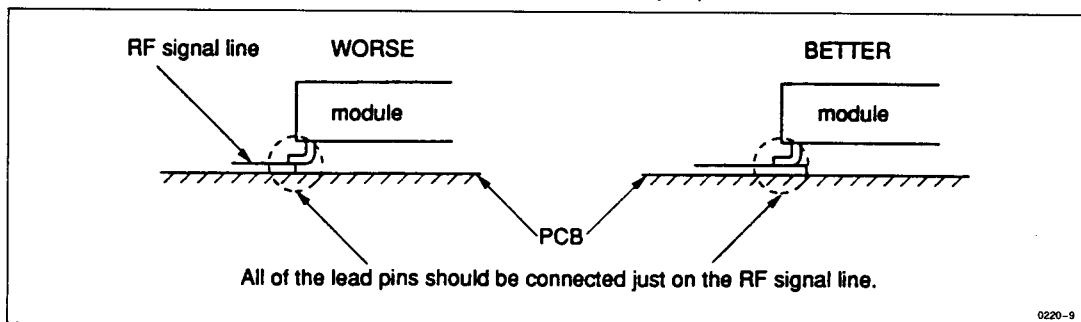


Figure 1