

# PF08109B

## MOS FET Power Amplifier Module for E-GSM and DCS1800 Dual Band Handy Phone

# HITACHI

ADE-208-821B (Z)  
3rd Edition  
Mar. 2000

### Application

- Dual band Amplifier for E-GSM (880 to 915 MHz) and DCS1800 (1710 to 1785 MHz)
- For 3.5 V nominal battery use

### Features

- 2 in / 2 out dual band amplifire
- Simple external circuit including output matching circuit
- High gain 3stage amplifier : 0 dBm input Typ
- Lead less thin & Small package : 11 × 13.75 × 1.8 mm Typ
- High efficiency : 50% Typ at nominal output power for E-GSM  
43% Typ at 32.7 dBm for DCS1800

### Absolute Maximum Ratings (Tc = 25°C)

Item	Symbol	Rating	Unit
Supply voltage	Vdd	8	V
Supply current	I <sub>dd</sub> <sub>GSM</sub>	3	A
	I <sub>dd</sub> <sub>DCS</sub>	2	A
Vtxlo voltage	Vtxlo	4	V
Vapc voltage	Vapc	4	V
Input power	Pin	10	dBm
Operating case temperature	Tc (op)	-30 to +100	°C
Storage temperature	Tstg	-30 to +100	°C
Output power	Pout GSM	5	W
	Pout DCS	3	W

Note: The maximum ratings shall be valid over both the E-GSM-band (880 to 915 MHz), and the DCS1800-band (1710 to 1785 MHz).

## Electrical Characteristics for DC (Tc = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Drain cutoff current	I <sub>ds</sub>	—	—	100	μA	V <sub>dd</sub> = 8 V, V <sub>apc</sub> = 0 V
V <sub>apc</sub> control current	I <sub>apc</sub>	—	—	3	mA	V <sub>apc</sub> = 2.2 V
V <sub>txlo</sub> control current	I <sub>txlo</sub>	—	—	100	μA	V <sub>txlo</sub> = 2.4 V

## Electrical Characteristics for E-GSM mode (Tc = 25°C)

Test conditions unless otherwise noted:

f = 880 to 915 MHz, V<sub>dd GSM</sub> = 3.5 V, Pin<sub>GSM</sub> = 0 dBm, R<sub>g</sub> = R<sub>l</sub> = 50 Ω, T<sub>c</sub> = 25°C, V<sub>apc DCS</sub> = 0.1 V

Pulse operation with pulse width 577 μs and duty cycle 1:8 shall be used.

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Frequency range	f	880	—	915	MHz	
Total efficiency (Hi)	η <sub>T(Hi)</sub>	41	50	—	%	P <sub>out GSM</sub> = 35.5dBm, V <sub>txlo</sub> = 0.1V,
2nd harmonic distortion	2nd H.D.	—	-45	-38	dBc	V <sub>apc GSM</sub> = controlled
3rd harmonic distortion	3rd H.D.	—	-45	-40	dBc	
Input VSWR	VSWR (in)	—	1.5	3	—	
Total efficiency (Lo)	η <sub>T(Lo)</sub>	27	35	—	%	P <sub>out GSM</sub> = 30.8dBm, V <sub>txlo</sub> = 2.4V, V <sub>apc GSM</sub> = controlled
Output power (1)(Hi)	P <sub>out (1)(Hi)</sub>	35.5	36.0	—	dBm	V <sub>apc GSM</sub> = 2.2V, V <sub>txlo</sub> = 0.1V
Output power (1)(Lo)	P <sub>out (1)(Lo)</sub>	30.8	31.3	—	dBm	V <sub>apc GSM</sub> = 2.2V, V <sub>txlo</sub> = 2.4V
Output power (2)(Hi)	P <sub>out (2)(Hi)</sub>	33.5	34.0	—	dBm	V <sub>dd GSM</sub> = 3.0V, V <sub>apc GSM</sub> = 2.2V, T <sub>c</sub> = +85°C, V <sub>txlo</sub> = 0.1V
Output power (2)(Lo)	P <sub>out (2)(Lo)</sub>	28.8	29.3	—	dBm	V <sub>dd GSM</sub> = 3.0V, V <sub>apc GSM</sub> = 2.2V, T <sub>c</sub> = +85°C, V <sub>txlo</sub> = 2.4V
Isolation	—	—	-42	-36	dBm	V <sub>apc GSM</sub> = 0.2V, V <sub>txlo</sub> = 0.1V
Isolation at DCS RF-output when GSM is active	—	—	-23	-17	dBm	P <sub>out GSM</sub> = 35.5dBm, V <sub>txlo</sub> = 0.1V Measured at f = 1760 to 1830MHz
Switching time	t <sub>r</sub> , t <sub>f</sub>	—	1	2	μs	P <sub>out GSM</sub> = 0 to 35.5dBm, V <sub>txlo</sub> = 0.1V
Stability	—	No parasitic oscillation			—	V <sub>dd GSM</sub> = 3.0 to 5.1V, P <sub>out GSM</sub> ≤ 35.5dBm, V <sub>txlo</sub> = 0.1, 2.4V, V <sub>apc GSM</sub> ≤ 2.2V, GSMpulse. R <sub>g</sub> = 50Ω, Output VSWR = 6 : 1 All phases
Load VSWR tolerance	—	No degradation			—	V <sub>dd GSM</sub> = 3.0 to 5.1V, t = 20sec., P <sub>out GSM</sub> ≤ 35.5dBm, V <sub>txlo</sub> = 0.1, 2.4V, V <sub>apc GSM</sub> ≤ 2.2V, GSM pulse. R <sub>g</sub> = 50Ω, Output VSWR = 10 : 1 All phases

**Electrical Characteristics for DCS1800 mode (Tc = 25°C)**

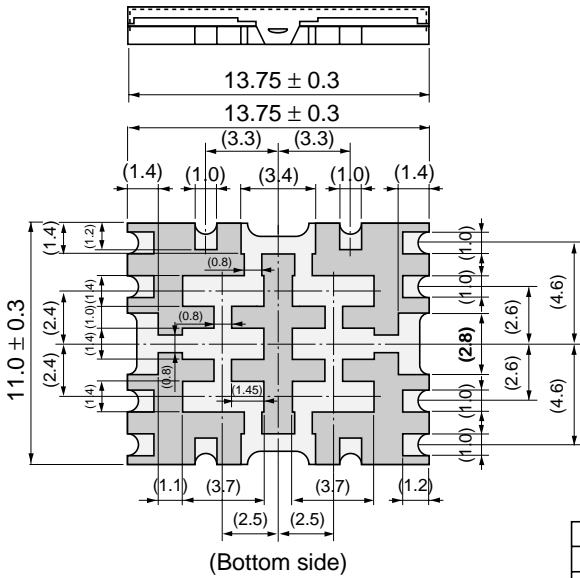
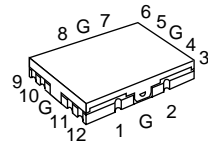
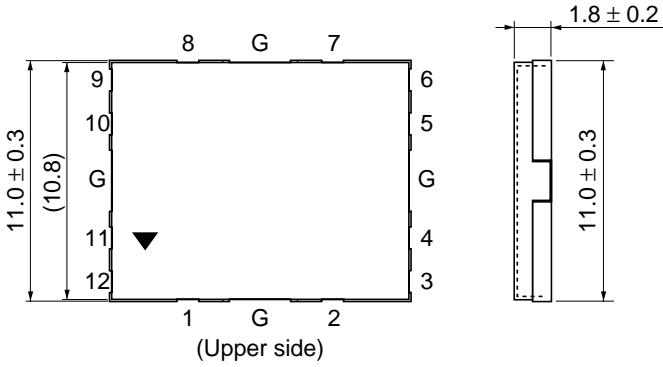
Test conditions unless otherwise noted:

f = 1710 to 1785 MHz, Vdd<sub>DCS</sub> = 3.5 V, Pin<sub>DCS</sub> = 0 dBm, Rg = Rl = 50 Ω, Tc = 25°C, Vapc<sub>GSM</sub> = 0.1 V  
Pulse operation with pulse width 577 μs and duty cycle 1:8 shall be used.

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Frequency range	f	1710	—	1785	MHz	
Total efficiency (Hi)	$\eta_{T(Hi)}$	36	43	—	%	Pout <sub>DCS</sub> = 32.7dBm,
2nd harmonic distortion	2nd H.D.	—	-45	-38	dBc	Vapc <sub>DCS</sub> = controlled
3rd harmonic distortion	3rd H.D.	—	-45	-40	dBc	
Input VSWR	VSWR (in)	—	1.5	3	—	
Total efficiency (Lo)	$\eta_{T(Lo)}$	17	25	—	%	Pout <sub>DCS</sub> = 26.7dBm, Vapc <sub>DCS</sub> = controlled
Output power (1)	Pout (1)	32.7	33.2	—	dBm	Vapc <sub>DCS</sub> = 2.2V,
Output power (2)	Pout (2)	30.7	31.2	—	dBm	Vdd <sub>DCS</sub> = 3.0V, Vapc <sub>DCS</sub> = 2.2V, Tc = +85°C
Isolation	—	—	-42	-36	dBm	Vapc <sub>DCS</sub> = 0.2V
Isolation at GSM RF-output when DCS is active	—	—	-10	0	dBm	Pout <sub>DCS</sub> = 32.7dBm, Measured at f = 1710 to 1785MHz
Switching time	t <sub>r</sub> , t <sub>f</sub>	—	1	2	μs	Pout <sub>DCS</sub> = 0 to 32.7dBm
Stability	—	No parasitic oscillation			—	Vdd <sub>DCS</sub> = 3.0 to 5.1V, Pout <sub>DCS</sub> ≤ 32.7dBm, Vapc <sub>DCS</sub> ≤ 2.2V, DCS pulse. Rg = 50Ω, Output VSWR = 6 : 1 All phases
Load VSWR tolerance	—	No degradation			—	Vdd <sub>DCS</sub> = 3.0 to 5.1V, Pout <sub>DCS</sub> ≤ 32.7dBm, t = 20sec., Vapc <sub>DCS</sub> ≤ 2.2V, DCS pulse. Rg = 50Ω, Output VSWR = 10 : 1 All phases

Package Dimensions

Unit: mm



Hitachi Code	RF-O-12
JEDEC	—
EIAJ	—
Mass (reference value)	—

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