PF08122B

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

HITACHI

ADE-208-1400C (Z)
Target Specifications
4th Edition
Feb. 2001

Application

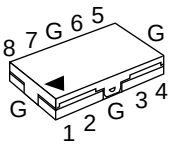
- Dual band amplifier for E-GSM (880 MHz to 915 MHz) and DCS1800 (1710 MHz to 1785 MHz).
- For 3.5 V & GPRS Class12 operation compatible

Features

- All in one including output matching circuit
- Simple external circuit
- One power control pin with one band switch
- High gain 3stage amplifier : 0 dBm input Typ
- Lead less thin & Small package : $8 \times 13.75 \times 1.6$ mm Typ
- High efficiency : (55)% Typ at 35.0 dBm for E-GSM
  (50)% Typ at 32.5 dBm for DCS1800

Pin Arrangement

• RF-K-8A



1: Pin $_{GSM}$
2: Vapc
3: Vdd1
4: Pout $_{GSM}$
5: Pout $_{DCS}$
6: Vdd2
7: Vctl
8: Pin $_{DCS}$
G: GND

Hitachi semiconductor

Absolute Maximum Ratings (Tc = 25°C)

Item	Symbol	Rating	Unit	Remark
Supply voltage	Vdd	7.0	V	at no-operation
		5.0	V	at operation (50 Ω load)
Supply current	Idd_{GSM}	3.5	A	
	Idd_{DCS}	2	A	
Vctl voltage	Vctl	4	V	
Vapc voltage	Vapc	4	V	
Input power	Pin	10	dBm	
Operating case temperature	Tc (op)	–25 to +85	°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	Ids	—	—	20	µA	Vdd = 4.7 V, Vapc = 0 V, Vctl = 0.2 V
Vapc control current	Iapc	—	—	2.0	mA	Vapc = 2.2 V
Vctl control current	Ictl	—	—	2	µA	Vctl = 3 V

Electrical Characteristics for GSM900 band (Tc = 25°C)

Test conditions unless otherwise noted:
f = 880 to 915 MHz, Vdd1 = Vdd2 = 3.5 V, Pin = 0 dBm, Vctl = 2.0 V, Rg = Rl = 50 Ω, Tc = 25°C,
Pulse operation with pulse width 577 µs and duty cycle 2:8 shall be used.

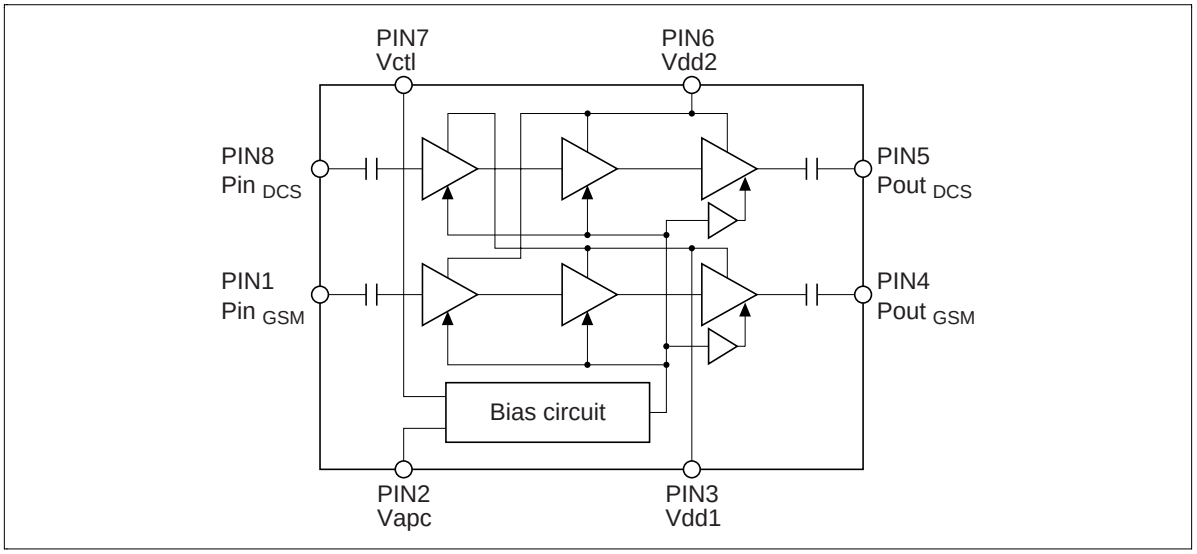
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Frequency range	f	880	—	915	MHz	
Band select (GSM active)	Vctl	2.0	—	2.8	V	
Input power	Pin	–2	0	2	dBm	
Control voltage range	Vapc	0.2	—	2.2	V	
Supply voltage	Vdd	3.0	3.5	4.5	V	
Total efficiency	η_T	(48)	(55)	—	%	Pout $_{GSM}$ = 35 dBm,
2nd harmonic distortion	2nd H.D.	—	–45	–35	dBc	Vapc = controlled
3rd harmonic distortion	3rd H.D.	—	–45	–35	dBc	
4th~8th harmonic distortion	4th~8th H.D.	—	—	–35	dBc	
Input VSWR	VSWR (in)	—	1.5	3	—	
Output power (1)	Pout (1)	35.0	36.0	—	dBm	Vapc = 2.2 V
Output power (2)	Pout (2)	33.5	34.5	—	dBm	Vdd = 3.1 V, Vapc = 2.2 V, Tc = +85°C
Idd at Low power	—	—	100	(300)	mA	Pout $_{GSM}$ = 7 dBm
Isolation	—	—	–50	–37	dBm	Vapc = 0.2 V, Pin = 0 dBm
Isolation at DCS RF-output when GSM is active	—	—	–30	–20	dBm	Pout $_{GSM}$ = 35 dBm, Measured at f = 1760 to 1830 MHz
Switching time	t_r, t_f	—	1	2	µs	Pout $_{GSM}$ = 5 to 35 dBm
Stability	—	No parasitic oscillation			—	Vdd = 3.1 to 4.5 V, Pout ≤ 35 dBm, Vapc $_{GSM}$ ≤ 2.2 V, Rg = 50 Ω, Tc = 25°C, Output VSWR = 6 : 1 All phases
Load VSWR tolerance	—	No degradation			—	Vdd = 3.1 to 4.5 V, Pout $_{GSM}$ ≤ 35 dBm, Vapc $_{GSM}$ ≤ 2.2 V, Rg = 50 Ω, t = 20 sec., Tc = 25°C, Output VSWR = 10 : 1 All phases
Slope Pout/Vapc	—	—	180	200	dB/V	Pout $_{GSM}$ = 5 to 35 dBm
AM output	—	—	20	30	%	Pout $_{GSM}$ = 5 to 35 dBm, 4% AM modulation at input 50 kHz modulation frequency

Electrical Characteristics for DCS1800 band (Tc = 25°C)

Test conditions unless otherwise noted:
f = 1710 to 1785 MHz, Vdd1 = Vdd2 = 3.5 V, Pin = 0 dBm, Vctl = 0.2 V, Rg = Rl = 50 Ω, Tc = 25°C,
Pulse operation with pulse width 577 µs and duty cycle 2:8 shall be used.

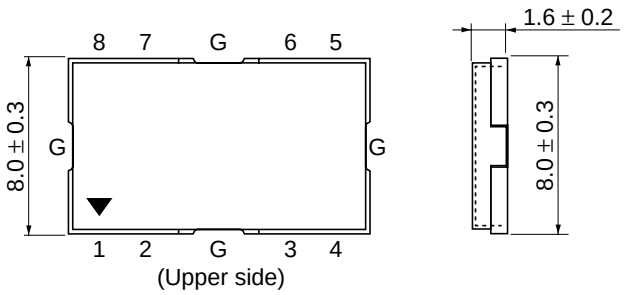
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Frequency range	f	1710	—	1785	MHz	
Band select (DCS active)	Vctl	0	—	0.2	V	
Input power	Pin	–2	0	2	dBm	
Control voltage range	Vapc	0.2	—	2.2	V	
Supply voltage	Vdd	3.0	3.5	4.5	V	
Total efficiency	η_T	(43)	(50)	—	%	Pout $_{DCS}$ = 32.5 dBm,
2nd harmonic distortion	2nd H.D.	—	–45	–35	dBc	Vapc = controlled
3rd harmonic distortion	3rd H.D.	—	–45	–35	dBc	
4th~8th harmonic distortion	4th~8th H.D.	—	—	–35	dBc	
Input VSWR	VSWR (in)	—	1.5	3	—	
Output power (1)	Pout (1)	32.5	33.5	—	dBm	Vapc = 2.2 V
Output power (2)	Pout (2)	31.0	32.0	—	dBm	Vdd = 3.1 V, Vapc = 2.2 V, Tc = +85°C, Pin $_{DCS}$ = 0 dBm
Idd at Low power	—	—	50	(100)	mA	Pout $_{DCS}$ = 5 dBm
Isolation	—	—	–47	–37	dBm	Vapc = 0.2 V, Pin $_{DCS}$ = 0 dBm
Switching time	t_r, t_f	—	1	2	µs	Pout $_{DCS}$ = 0 to 32.5 dBm
Stability	—	No parasitic oscillation			—	Vdd = 3.1 to 4.5 V, Pout $_{DCS}$ ≤ 32.5 dBm, Vapc ≤ 2.2 V, Rg = 50 Ω, Output VSWR = 6 : 1 All phases
Load VSWR tolerance	—	No degradation			—	Vdd = 3.1 to 4.5 V, Pout $_{DCS}$ ≤ 32.5 dBm, Vapc ≤ 2.2 V, Rg = 50 Ω, t = 20 sec., Output VSWR = 10 : 1 All phases
Slope Pout/Vapc	—	—	180	200	dB/V	Pout $_{DCS}$ = 0 to 32.5 dBm
AM output	—	—	20	30	%	Pout $_{DCS}$ = 0 to 32.5 dBm, 4% AM modulation at input 50 kHz modulation frequency

Circuit Diagram

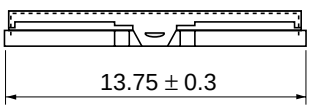


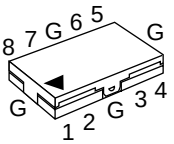
Package Dimensions

Unit: mm



(Upper side)





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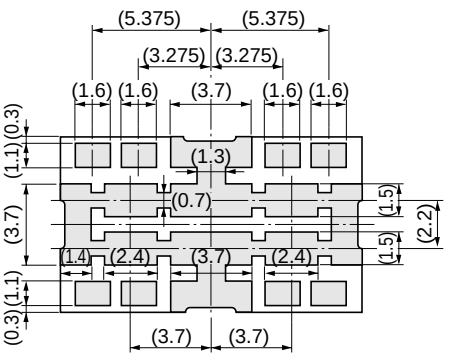

(Bottom side)

Remark:
Coplanarity of bottom side of terminals are less than 0 ± 0.1mm.

Hitachi Code	RF-K-8A
JEDEC	—
EIAJ	—
Mass (reference value)	—

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