TQM 7M4008

(Preliminary data sheet)

3V Dual-Band E-GSM/DCS Power Amplifier Module

Description:

Advanced dual-band, compact 3V power amplifier module designed for mobile handset applications. The small size and high performance is achieved with high-reliability InGaP HBT technology. The module is fully integrated, providing a simple 50 Ohms interface on all input and output ports. No external matching or bias components are required. Despite its very compact size, the module has exceptional efficiency in both bands.

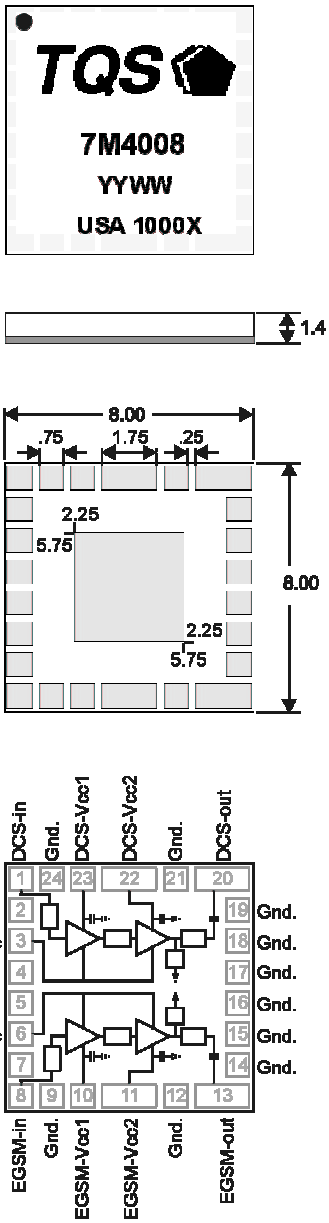
Features:

- **Very compact size – 8×8×1.4 mm^3.**
- **High efficiency – E-GSM typical 55%, DCS typical 50%.**
- **Positive supply voltage – 3.2 to 4.8 V.**
- **50 Ω input and output impedances.**
- **GPRS class 12 compatible.**
- **High-reliability InGaP technology.**
- **Ruggedness 10:1.**
- **Few external components.**

Description:

The module is a built around a highly integrated dual power amplifier InGaP die. By virtue of advanced design techniques, exceptional performance is achieved with only two stages in each amplifier. On die interstage matching is employed using a high Q passives technology. Together these technologies allow an extremely compact size to be achieved with excellent electrical performance. Module construction is a low-profile overmolded land-grid array on laminate.

Package Outline:



Dimensions in mm

All specifications subject to change without notice

Absolute Maximum Ratings:

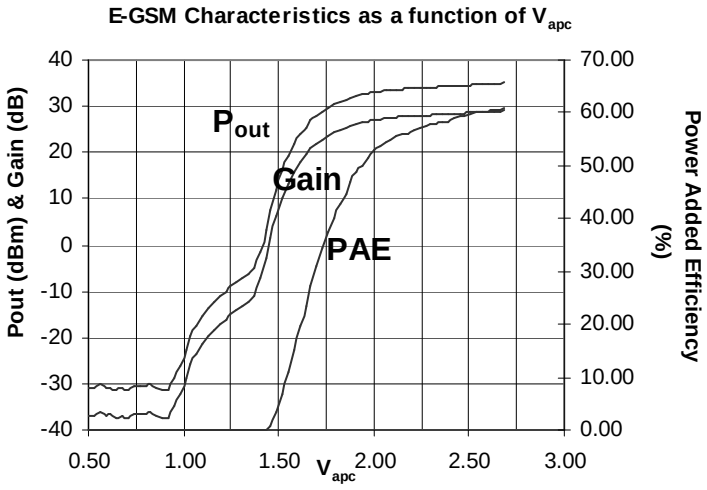
Parameter	Symbol	Min.	Max.	Units
Supply voltage	V_{cc}	-0.5	6.0	V_{dc}
DC supply current	I_{cc}		2.4	A
Power control voltage	V_{apc}	-0.5	3.0	V
Duty cycle at max. power	δ		50	%
Operating case temperature	T_a	-20	85	ºC
Storage temperature	T_s	-55	150	ºC

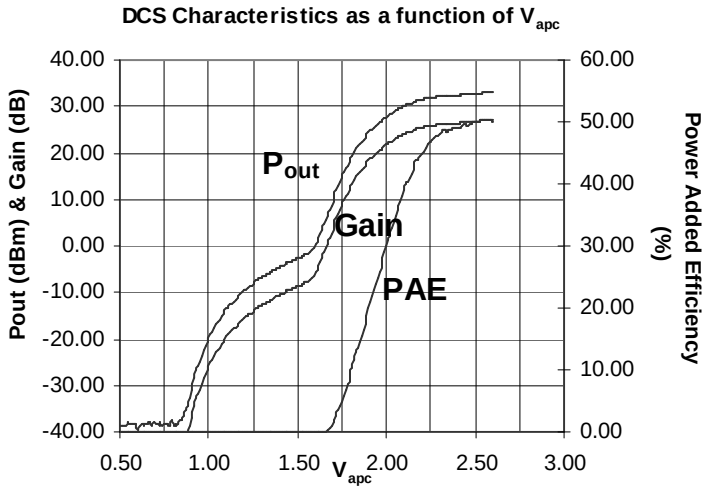
Note: The amplifier will survive over the full range specified for any individual input, while other parameters are nominal and with no RF input.

Operating Parameters:

Parameter	Symbol	Min.	Typ.	Max.	Units
Supply voltage	V_{cc}	3.2	3.6	4.8	V_{dc}
DC supply current	I_{cc}		1.6		A
Leakage current	I_l		1	20	μA
Load impedances	Z_0		50		Ω

Typical Performance:





E-GSM Electrical Characteristics:

Test conditions (unless noted): V_{cc} = +3.6 V, V_{apc} = 2.6 V, P_{in} = 4 dBm, Duty Cycle =25%, Ta = 25ºC

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Frequency Range	f	880		915	MHz	
Input Power for P_{out} max.	P_{in}	2.0	4.0	6.0	dBm	
Output Power	P_{out}	34.5	35.0		dBm	
		33.0	34.0		dBm	V_{cc} = 3.2 V, Temp: -20ºC to +85ºC
Power Added Efficiency	η	50	55		%	
Power Control Voltage	V_{apc}	0.2		2.6	V	
Power Control Current	I_{apc}			5	mA	
Power Control Slope	P_{out}/V_{apc}			200	dB/V	0 ≤ P_{out} ≤ 34.5 dBm, Temp: -20ºC to +85ºC
Power Control Dynamic Range			70		dB	
Input VSWR				2.0:1		-3 ≤ P_{out} ≤ 34.5 dBm
Forward Isolation	Iso			-30.0	dBm	V_{apc} ≤ 0.2 V, P_{in} = - 5 dBm
Cross-band Isolation	Iso			-16.0	dBm	P_{out} ≤ 35.0 dBm
Harmonics	$2f_0$			0.0	dBm	P_{out} ≤ 34.5 dBm, Temp: -20ºC to +85ºC
	$3f_0$			-5.0		
	$> 3f_0$			-7.0		
Rx noise power: 925 - 935 MHz				-72.0	dBm	P_{out} ≤ 34.5 dBm, RBW = 100 kHz
Rx noise power: 935 - 960 MHz				-84.0	dBm	P_{out} ≤ 34.5 dBm, RBW = 100 kHz
Stability				8:1		All phase angles, V_{apc} ≤ 2.6 V, P_{in} = 4 dBm, P_{out} ≤ 35.0 dBm
Ruggedness				10:1		All phase angles, V_{apc} ≤ 2.6 V, P_{in} = 4 dBm, P_{out} ≤ 35.0 dBm

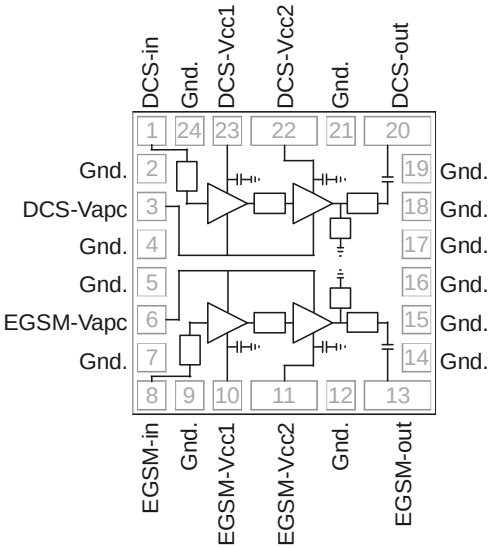
DCS Electrical Characteristics:

Test conditions (unless noted): V_{cc} = +3.6 V, V_{apc} = 2.6 V, P_{in} = 4 dBm, Duty Cycle = 25%, T_a = 25ºC

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Frequency Range	f	1710		1785	MHz	
Input Power for P_{out} max.	P_{in}	2.0	4.0	6.0	dBm	
Output Power	P_{out}	32.0	32.5		dBm	
		30.5	31.0		dBm	V_{cc} = 3.2 V, Temp: -20ºC to +85ºC
Power Added Efficiency	η	45	50		%	
Power Control Voltage	V_{apc}	0.2		2.6	V	
Power Control Current	I_{apc}			5	mA	
Power Control Slope	P_{out}/V_{apc}			200	dB/V	0 ≤ P_{out} ≤ 32.5 dBm, Temp: -20ºC to +85ºC
Power Control Dynamic Range			70		dB	
Input VSWR				3.0:1		-3 ≤ P_{out} ≤ 32 dBm
Forward Isolation	Iso			-32.0	dBm	V_{apc} ≤ 0.2 V, P_{in} = - 5dBm
Harmonics	$2f_0$			-11.0	dBm	P_{out} ≤ 32 dBm, Temp: -20ºC to +85ºC
	$3f_0$			-11.0		
	$> 3f_0$			-11.0		
Rx noise power: 1805 - 1880 MHz				-76.0	dBm	P_{out} ≤ 32 dBm, RBW = 100 kHz
Stability				8:1		All phase angles, V_{apc} ≤ 2.6 V, P_{in} = 4 dBm, Pout ≤ 32.5 dBm
Ruggedness				10:1		All phase angles, V_{apc} ≤ 2.6 V, P_{in} = 4 dBm, P_{out} ≤ 32.5 dBm

Pin Out:

Top view



Pin	Symbol	Description
1	RFin - DCS	DCS power in
2	Gnd.	Ground
3	V_{apc} - DCS	DCS control voltage
4	Gnd.	Ground
5	Gnd.	Ground
6	V_{apc} - EGSM	EGSM control voltage
7	Gnd.	Ground
8	RF_{in} - EGSM	EGSM power in
9	Gnd.	Ground
10	$V_{cc}1$ - EGSM	EGSM 1st stage input voltage
11	$V_{cc}2$ - EGSM	EGSM 2nd stage input voltage
12	Gnd.	Ground
13	RF_{out} - EGSM	EGSM power out
14	Gnd.	Ground
15	Gnd.	Ground
16	Gnd.	Ground
17	Gnd.	Ground
18	Gnd.	Ground
19	Gnd.	Ground
20	RF_{out} - DCS	DCS power out
21	Gnd.	
22	$V_{cc}2$ - DCS	DCS 2nd stage input voltage
23	$V_{cc}1$ - DCS	DCS 1st stage input voltage
24	Gnd.	Ground

Schematic: