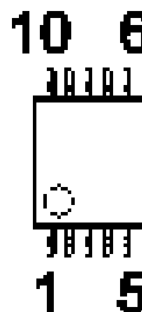
Preliminary Datasheet

- 2 stages Bluetooth InGaP HBT-Power Amplifier
- Single Voltage Supply
- Operating voltage range: 2.0 to 6 V
- Pout = 23dBm at Vd=3.2V
- Overall power added efficiency up to 50%
- 4 Power Steps [**Analog Power Control**]
- High PAE at Low Power Mode 16dBm / 30%
- High harmonic suppression typ > 35dBc
- Easy external matching



ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!

Applications: - Bluetooth - WLAN
- Home-RF - Cordless Phones
- IEEE802.11 - ISM-band spread spectrum

Type	Marking	Ordering code (taped)	Package
CGB 240	CGB 240	Q62702-G0174	TSSOP10

Maximum ratings

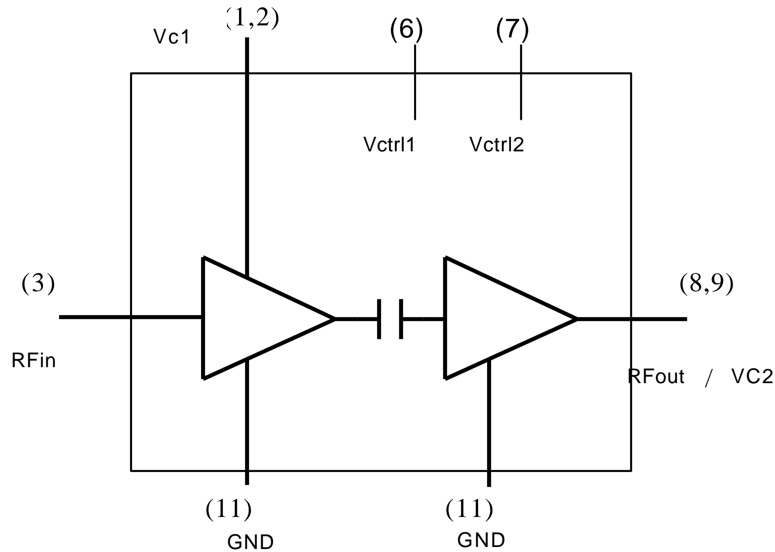
Characteristics	Symbol	max. Value	Unit
Positive supply voltage	V_{CC}	6	V
Supply current	Icc	0.5	A
Maximum input power	$Pinmax$	10	dBm
Channel temperature	T_{Ch}	150	°C
Storage temperature	T_{stg}	-55...+150	°C
Total power dissipation *(Ts ≤ 80 °C)* *Ts: Temperature at soldering point*	P_{tot}	0.7	W
Pulse peak power	P_{Pulse}	2.0	W

Thermal Resistance

contact person: monika.latteier@infineon.com

Channel-soldering point	R_{thChS}	100	K/W

Functional Block Diagram



Pin #		Configuration
1,2	**VC1**	Supply voltage of the 1st stage/Interstage match
3	**RFin**	RF-Input
4,5,10	**n.c.**	
6	**Vctrl1**	Control 1st stage
7	**Vctrl2**	Control 2nd stage
8,9	**VC2**	Supply Voltage 2nd stage / RFoutput
11	**GND**	Package RF and DC ground

Electrical characteristics [Bluetooth-Application]

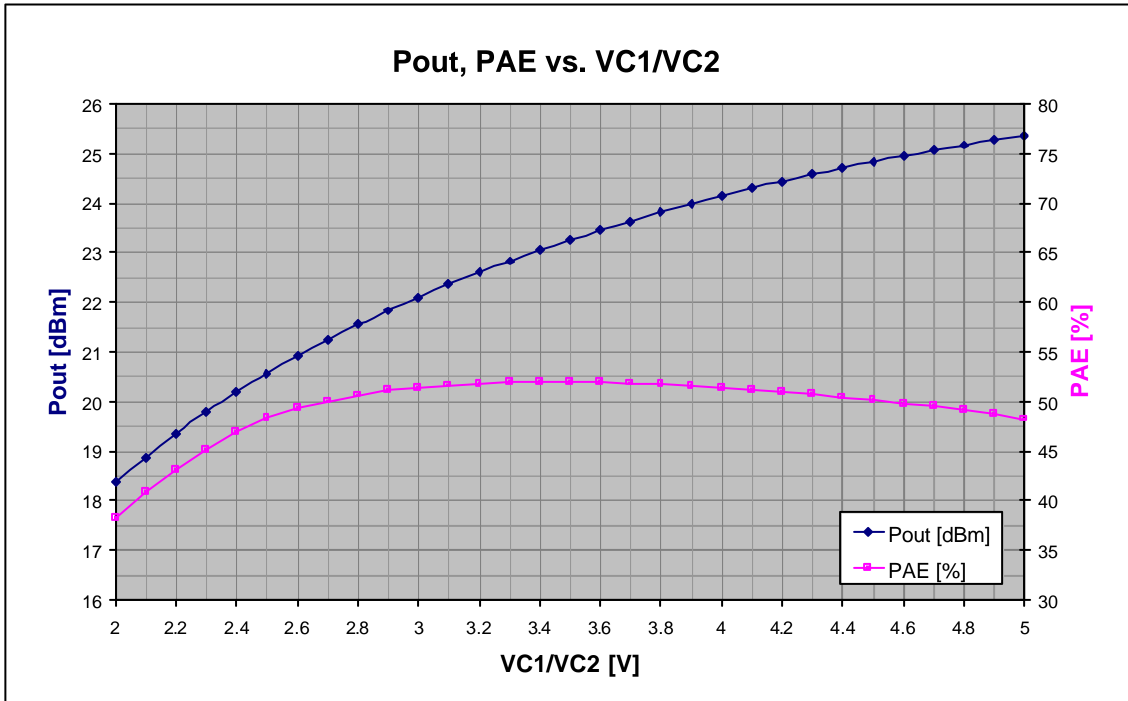
(T_A = 25°C ,Vc1=Vc2=Vcc f=2.4...2.5 GHz, Z_S=Z_L=50 Ohm, unless otherwise specified)

Characteristics	Symbol	min	typ	max	Unit
Supply current *Vcc=3.2V; Pin = -10 dBm Vcon=2.5V*	I_{CC}	100	130	150	mA
Gain *Vcc=3.2V; P_{in} = -10 dBm Vcon=2.5V*	*G*	23	25	28	dB
Output Power *Vcc=3.2V; P_{in} = +3 dBm Vcon=2.5V*	P_O	22.0	23.0	24.0	dBm
Overall Power added Efficiency *Vcc=3.0V; P_{in} = +3 dBm Vcon=2.5V*	*PAE*	40	50	-	%
Output Power *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.5V*	*Po*		17		dBm
Supply current *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.5V*	*Icc*		52	-	mA
Overall Power added Efficiency *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.5V*	*PAE*		32	-	%
Output Power *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.3V*	P_O		12		dBm
Supply current *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.3V*	*Icc*		25	-	mA
Overall Power added Efficiency *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.3V*	*PAE*		20	-	%
Output Power *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.15V*	P_O		7		dBm
Supply current *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.15V*	*Icc*		15	-	mA
Overall Power added Efficiency *Vcc=3.2V; P_{in} = +3 dBm Vcon=1.15V*	*PAE*		10	-	%
Leakage current [no input power] *Vcc=4.8V; Vcon=0V ;*	*Ico*			10	µA
2nd Harmonic *Vcc=3.2v; Pin=+3dBm Vcon=2.5V*		-38	-45	-	dBc
Off Isolation *Vcc=2.8..4.8V; P_{in} = 3 dBm; Vcon=0V*	*S21*				26
Ruggedness *Pin=5dBm, Vcc=4.8V, Vctr=2.5V* *Z_S=50 Ohm, Load VSWR = 10:1 for all phase*	-	No module damage for 10 sec			-
Stability [not including harmonics] *Pin=5dBm , Vcc=4.0V , Z_S=50 Ohm,* *Load VSWR = 10:1 for all phase*	-	All spurious output more than 55 dB below desired signal level			-

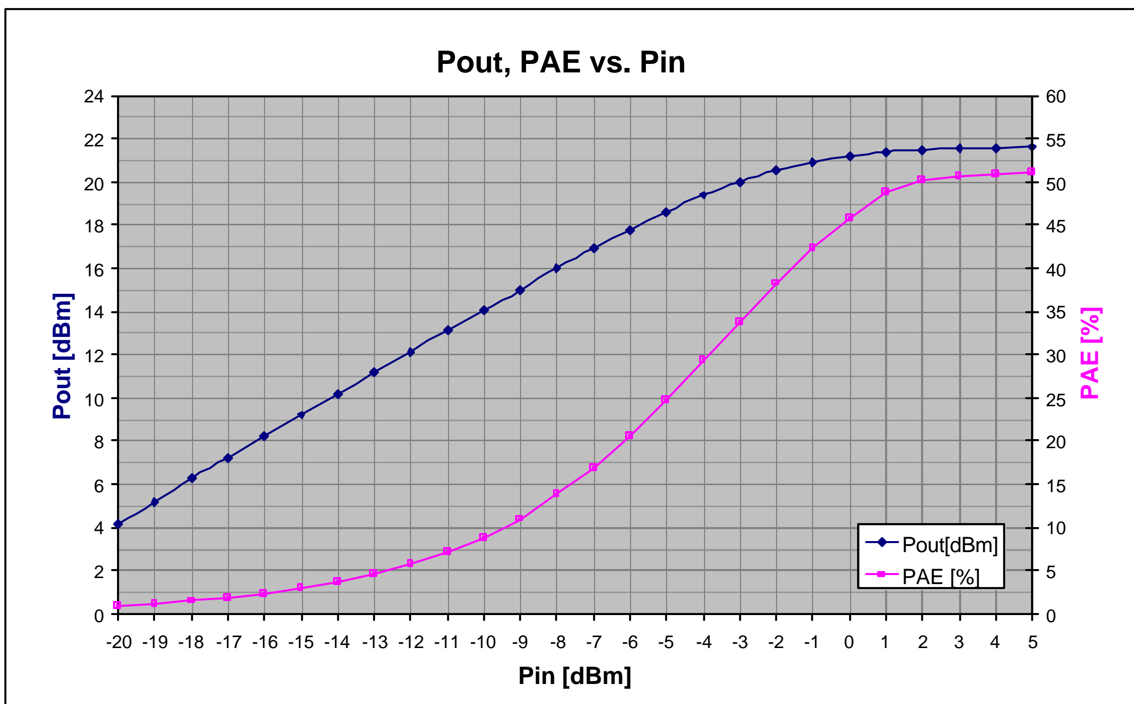
contact person: monika.latteier@infineon.com

Bluetooth measurements

(Pin=3dBm; Vctrl1/2=2.5V; f=2.45GHz,T_A = 25°C , Z_S=Z_L=50 Ohm)



(VC1/VC2=2.8V; Vctrl1/2=2.5V; f=2.45GHz,T_A = 25°C , Z_S=Z_L=50 Ohm)



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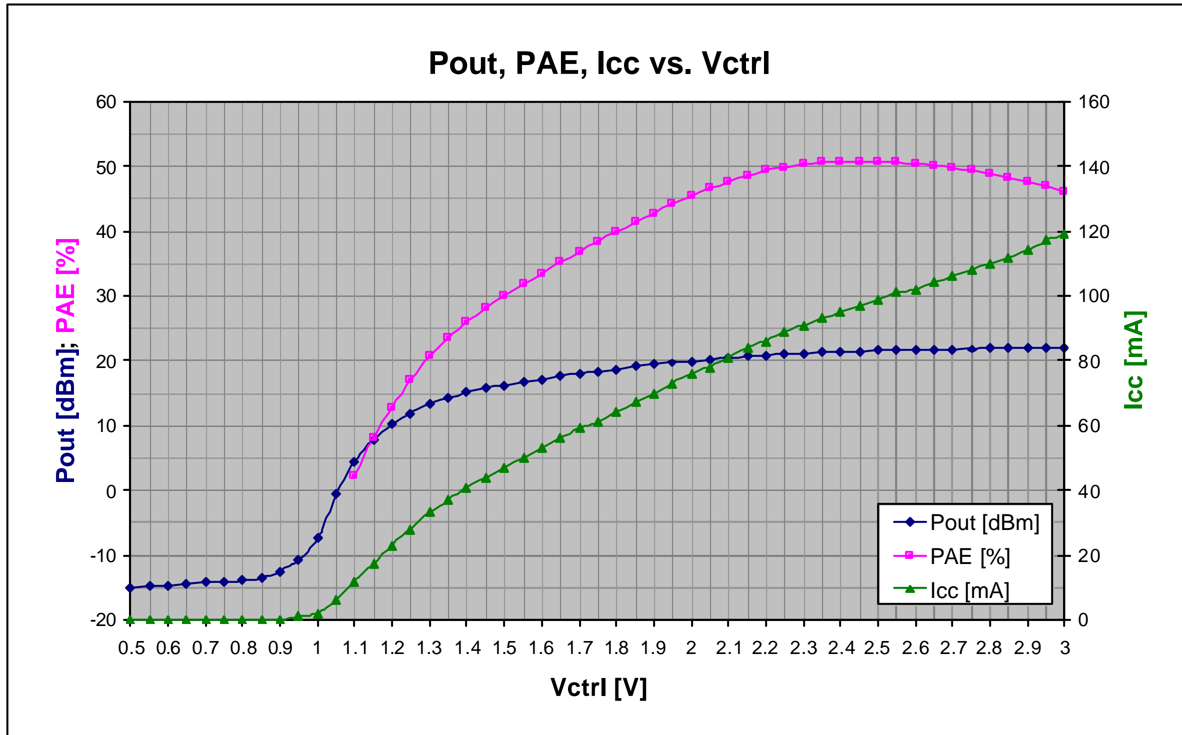
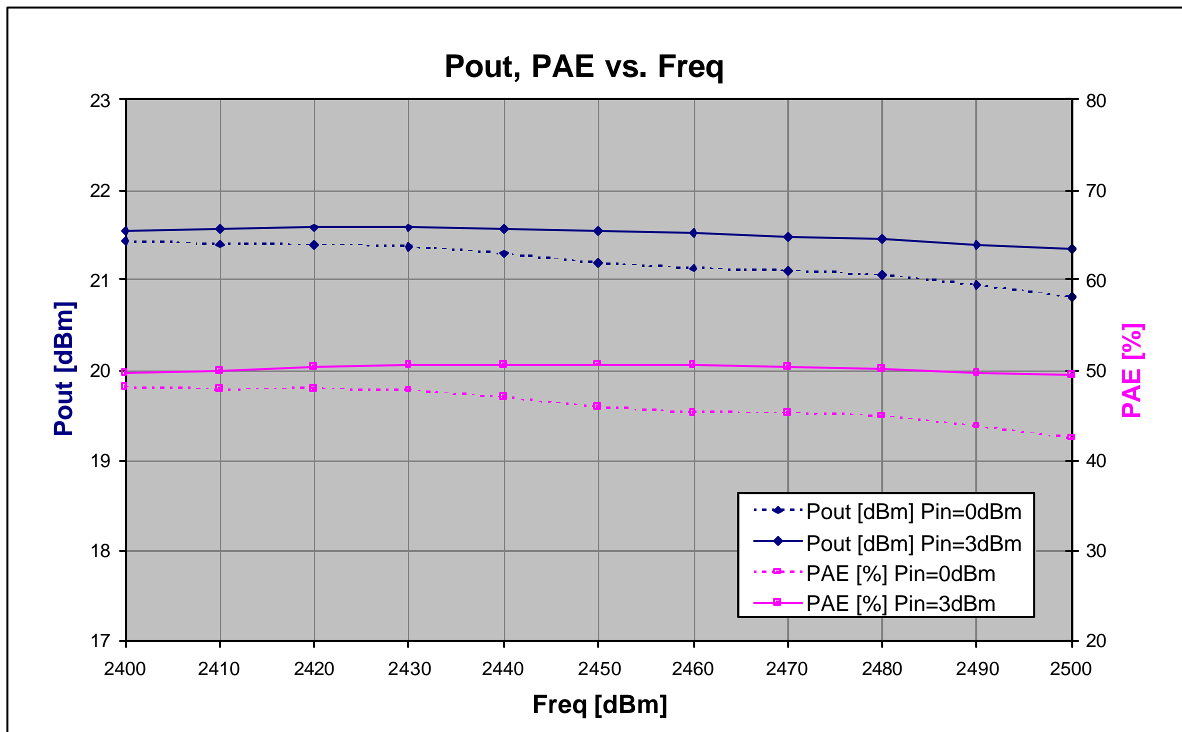
(Pin=3dBm; VC1/VC2=2.8V; f=2.45GHz,T_A = 25°C , Z_S=Z_L=50 Ohm)



(Pin=3dBm; VC1/VC2=2.8V; Vctrl1/2=2.5V, T_A = 25°C , Z_S=Z_L=50 Ohm)



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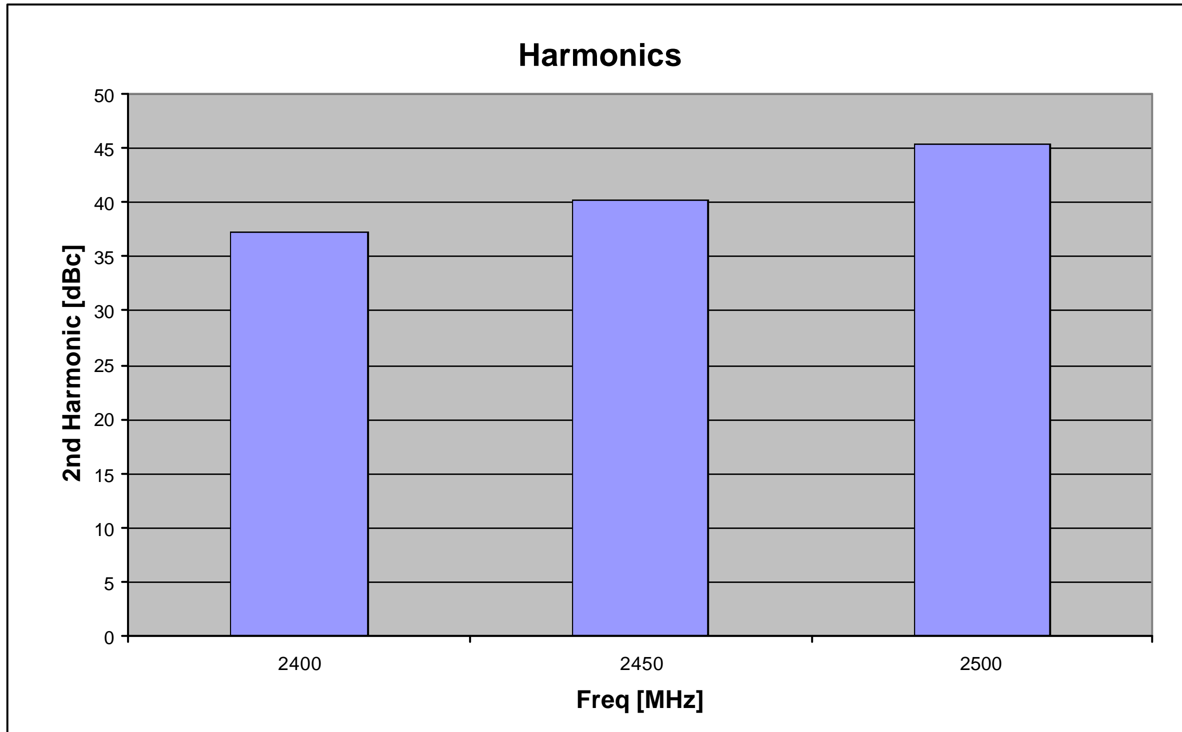
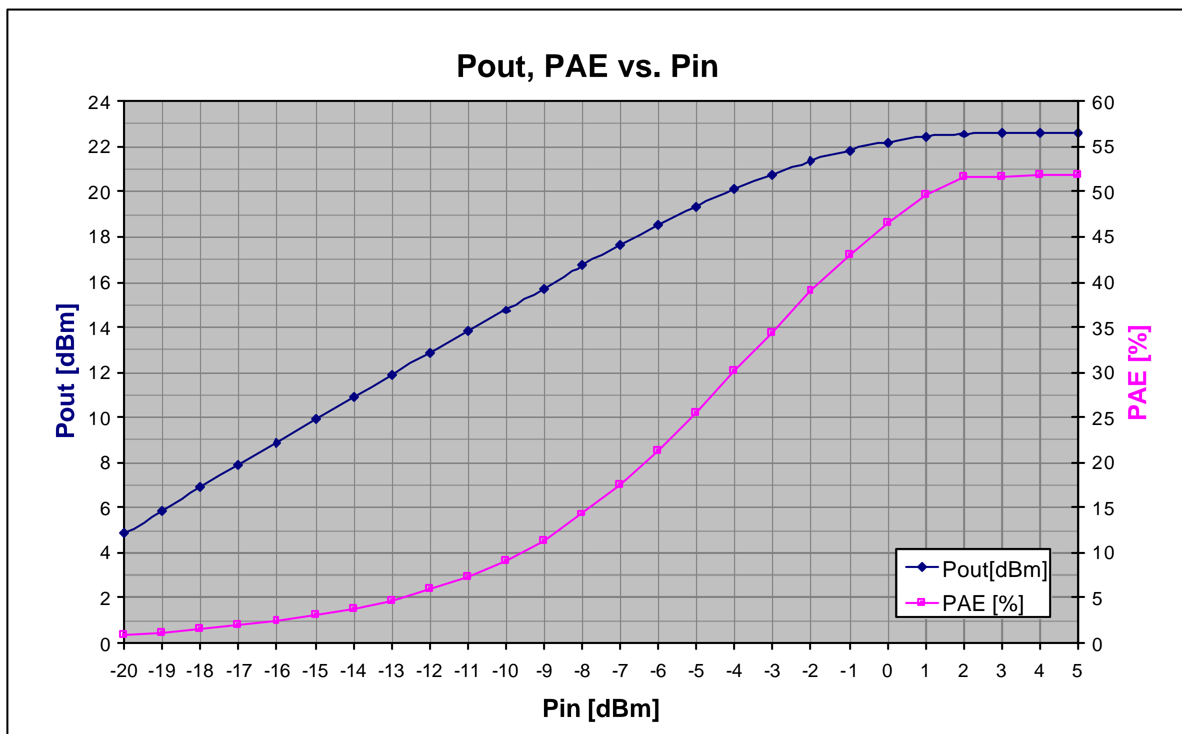


(VC1/VC2=3.2V; Vctrl1/2=2.5V; f=2.45GHz,T_A = 25°C , Z_S=Z_L=50 Ohm)



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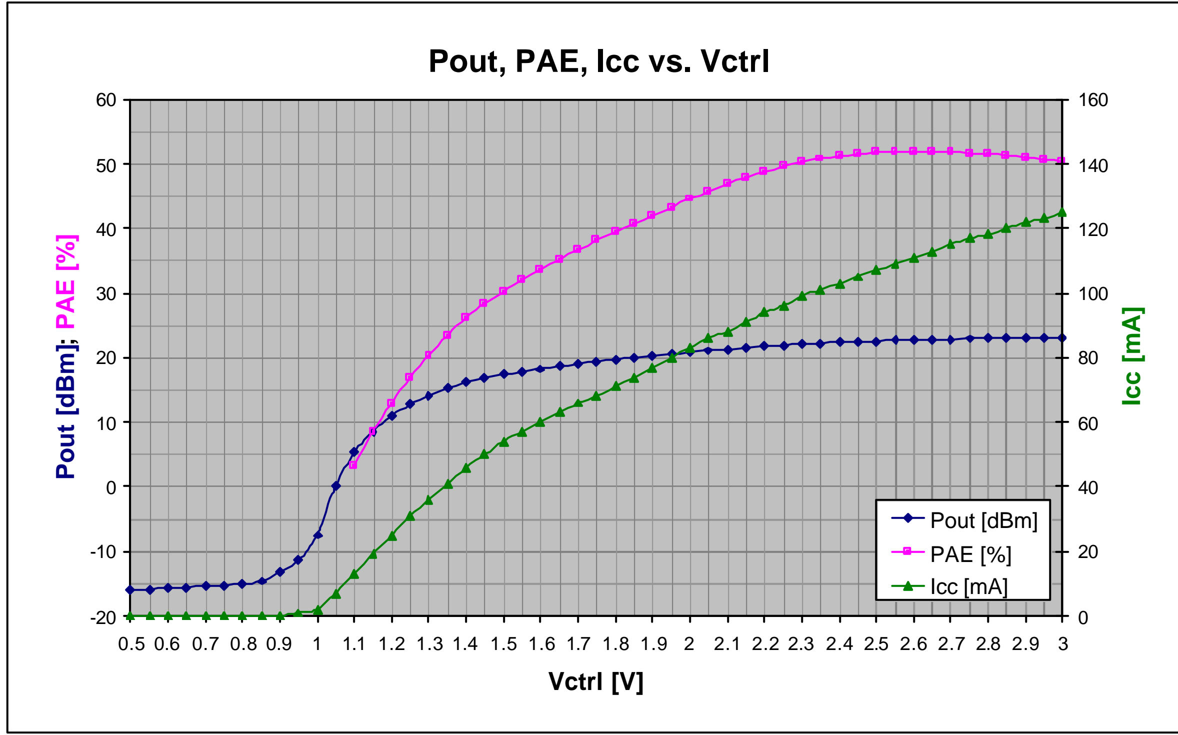

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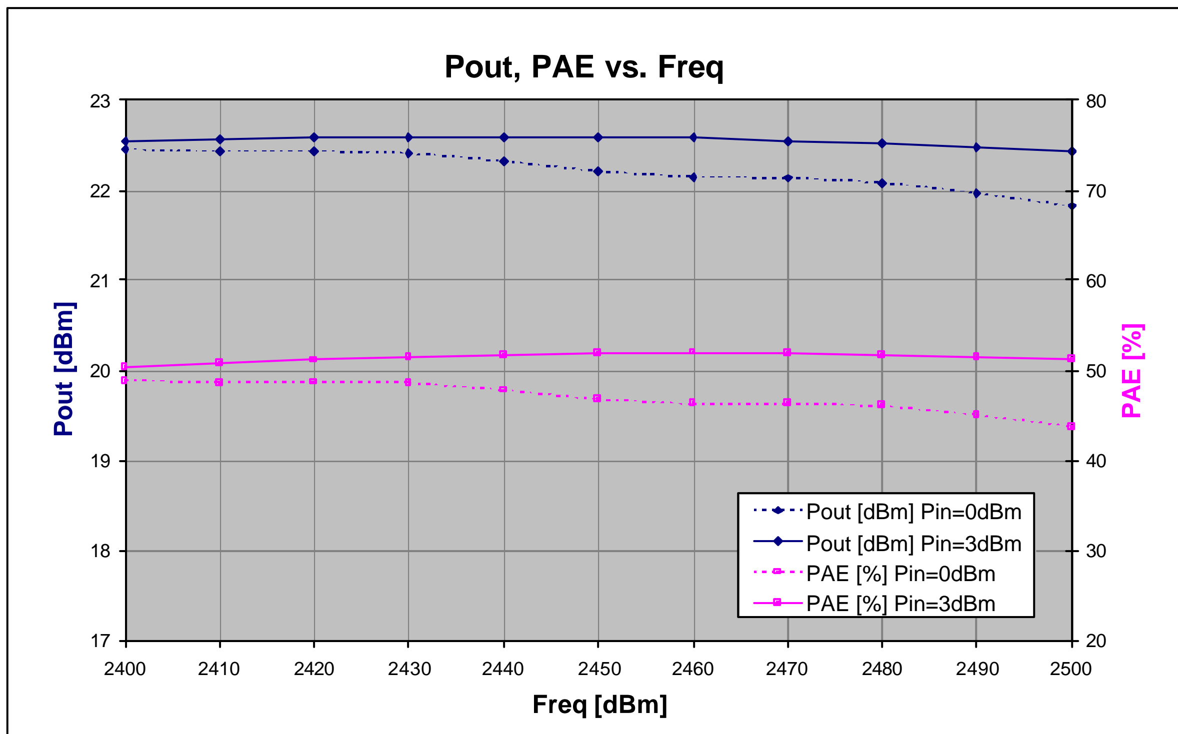

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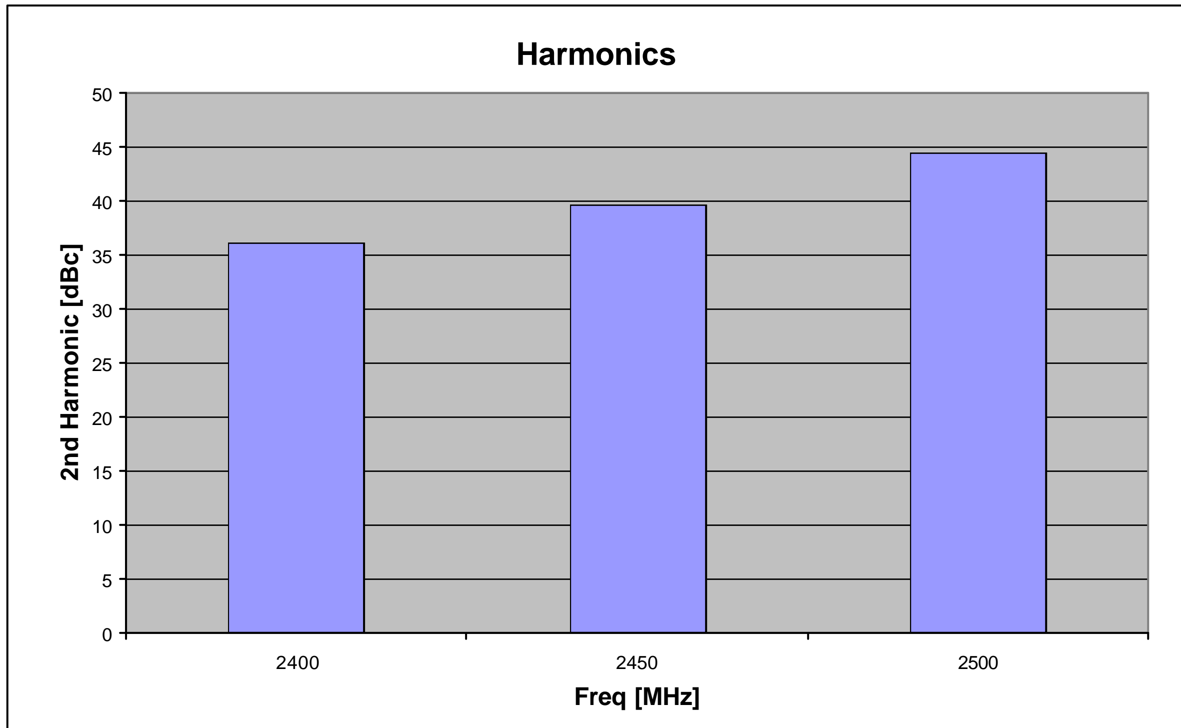

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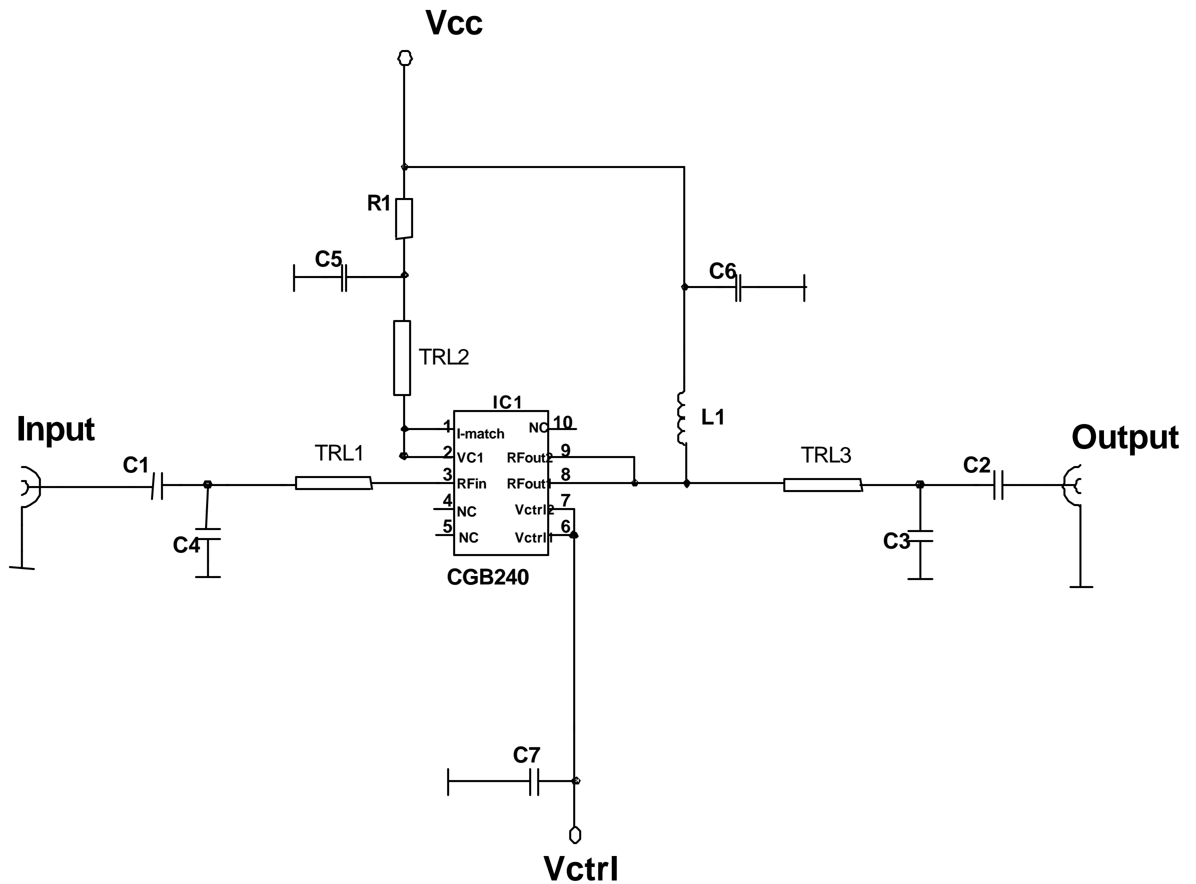
Evaluation Board Schematic



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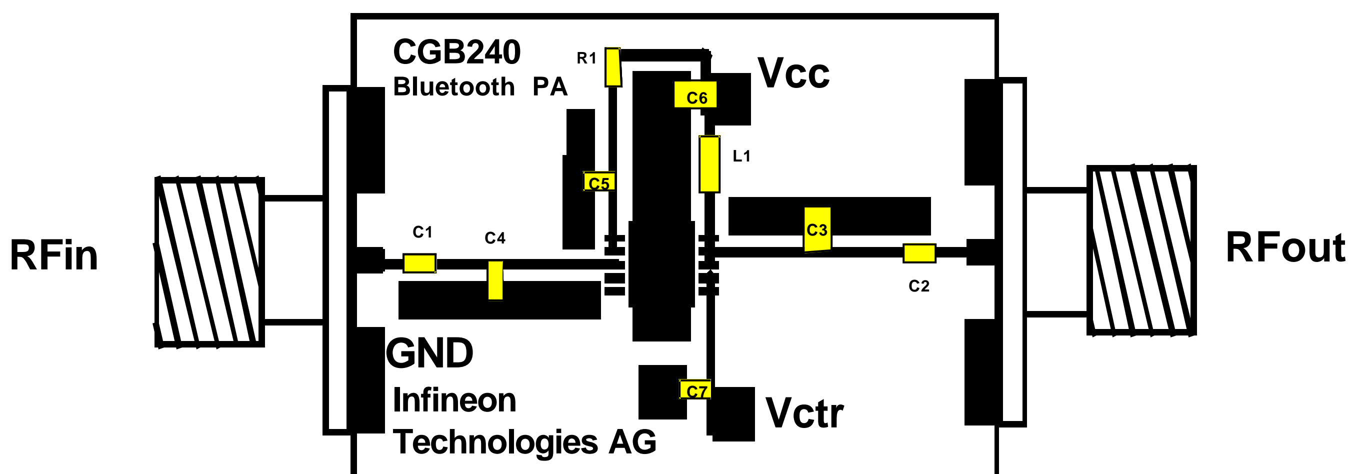
Assembly Drawing

Board material: Epoxy $\varepsilon_r = 4.8$; h=0.2mm [RF-Layer]



Evaluation Board Part List

Part Type	Position	Description	Manufacturer	Part Number
Capacitor	C1	22pF 0402	Murata COG	
Capacitor	C2	22pF 0402	Murata COG	
Capacitor	C3 *	1.8pF 0603	**AVX / ACCU-P Series**	**06035J1R8BBT**
Capacitor	C4	2.2pF 0402	Murata COG	
Capacitor	C5	10pF 0402	Murata COG	
Capacitor	C6	1uF 0603	Murata X7R	
Capacitor	C7	1nF 0402	Murata X7R	
Inductor	L1	22nH 0603	TOKO	LL1608-FS
Resistor	R1	10Ω 0402	Mira	
Microstripline	TRL1**	L=4.3mm w=0.35mm	Epsr=4.8 d=0.2mm	ZL=50Ω
Microstripline	TRL2	L=2.5mm w=0.35mm	Epsr=4.8 d=0.2mm	ZL=50Ω
Microstripline	TRL3 **	L=4.4mm w=0.35mm	Epsr=4.8 d=0.2mm	ZL=50Ω

* To reduce the BOM-costs we suggest an AVX-CU (C3 = 1.8pF) instead of the AVX-AccuP-capacity. The AVX-CU-capacitiy leads to improved 2nd harmonics (typ. H2 = - 45 dBc) but reduced PAE values by -2%.

** The TRL1 and TRL3 Microstriplines can be replaced by lumped SMD inductors (L2 = L3 = 1.2nH / 0402 TOKO LL1005-FH).

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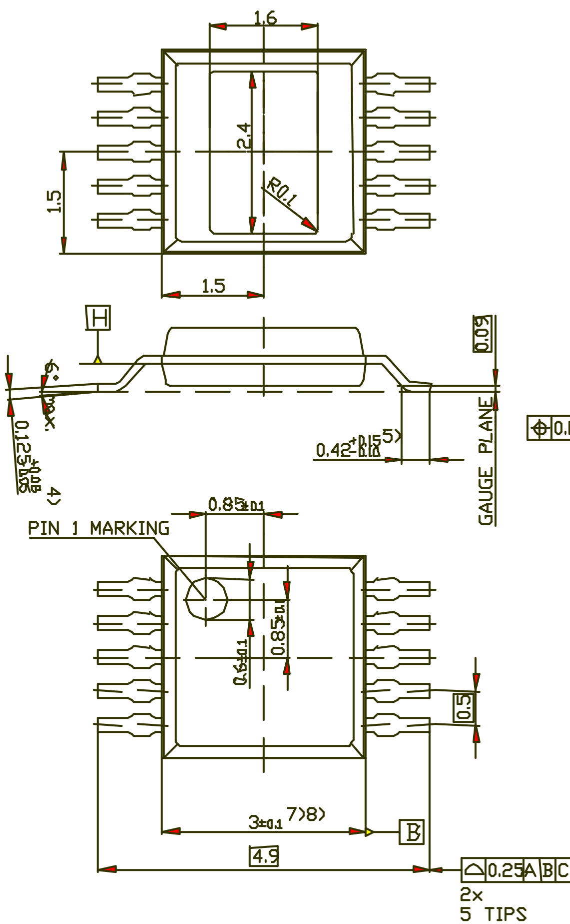
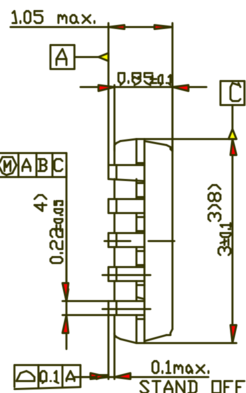
Semiconductor Device Outline TSSOP-10



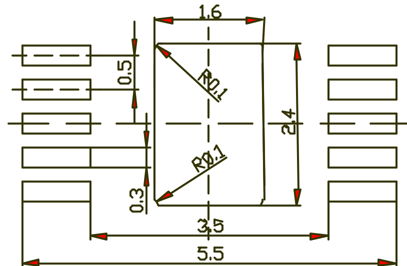


1. ALL DIMENSIONS IN MILLIMETER
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994
3) DIMENSION 3±0.1 DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE
4) DIMENSIONS OF LEADS APPLY TO PLATED LEADS

SOLDERING

6) DATUMS B AND C TO BE DETERMINED AT DATUM PLANE H
7) DIMENSION DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 PER SIDE
8) DIMENSIONS TO BE DETERMINED AT DATUM PLANE H

Footprint 20:1



02 Official start drawing
Rev Change

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Drawing according to ISO 8015, General tolerances
Scale 20:1

Date 30.11.98
Name Mark
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PACKAGE OUTLINE
P-TSSOP-10-2

02 N99C63A07 16.09.99 STA
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contact person: monika.latteier@infineon.com

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