3.5V 3.3W RF Power Amplifier IC for GSM
ITT2110AH / ITT2111AH / ITT2112AH

PRELIMINARY DATA SHEET

General Description

The ITT211X family of GaAs MESFET power amplifiers is designed for Class IV GSM cellular phones. With 3.3W output power, these parts are suitable for dual band GSM/PCN designs. The ITT2110AH and ITT2111AH include a built-in negative voltage generator, while the ITT2112AH is a stand-alone dual bias PA. Also, the ITT2110AH has a detected power "sense" output that eliminates the need for a coupler and detector in the AGC circuit.

Features

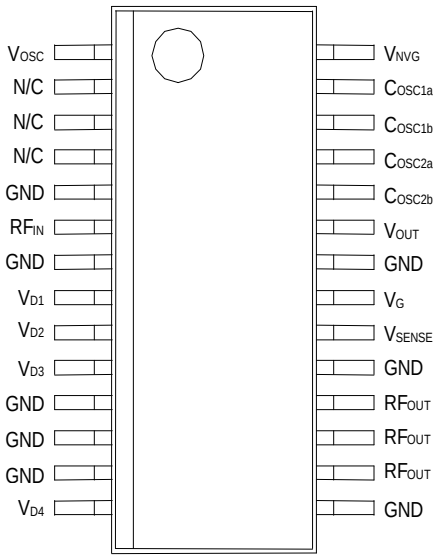
- Single Bias (ITT2110AH, ITT2111AH)
- Detected Output Power Sense (ITT2110AH)
- Class AB Operation
- Self-Aligned MSAG®-Lite MESFET Process
- Guaranteed Stability and Ruggedness

Typical 3.5 Volt Performance

35.2 dBm Power Output

35.2 dB Power Gain

41% Power Added Efficiency



28 pin narrow body SSOP
ITT2110AH

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
DC Supply Voltage (Pins 8, 9, 10, 14)	V_{DD}	10	Vdc
DC Gate Bias Voltage (Pin 21)	V_G	-5	Vdc
DC Supply Voltage (NVG – ITT2110AH, ITT2111AH: Pins 1, 28)	V_{OSC},V_{NVG}	10	Vdc
RF Input Power	P_{IN}	10	mW
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-40 to +150	°C

ELECTRICAL CHARACTERISTICS V_{DD}=3.5 V, P_{IN}=0 dBm, T_A=25 °C, Input and output externally matched to 50 Ω.

Characteristic	Symbol	Typical	Unit
Frequency Range	f	880 to 915	MHz
Output Power (V_{CTL} adjusted for desired output power)	P_{OUT}	35.2	dBm
Power Gain (P_{OUT} = 35.2 dBm)	G_P	35.2	dB
Power Added Efficiency (P_{OUT} = 35.2 dBm)	η	41	%
Harmonics (P_{OUT} = 35.2 dBm)	$2f_o$, $3f_o$	<–40	dBc
Input VSWR (P_{OUT} = 35.2 dBm), 50 Ω Ref.	—	<2:1	—
Thermal Resistance (Junction of 4th stage FET to solder point of pin 11)	$R_{TH\ J\text{-}S}$	17	°C/W
Load Mismatch (V_{DD} = 5.1V, VSWR = 10:1, P_{IN} = +6 dBm)	—	No Degradation in Power Output	
Stability (P_{IN} = -3 to +10 dBm, V_{DD} = 2 to 5.1 V, P_{OUT} < 35.2 dBm, Load VSWR = 10:1)	—	All non-harmonically related outputs more than 70 dB below desired signal	

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Note: Electrical data were taken with an evaluation board using the schematic shown in Figure 1, pulsed according to the ETSI GSM specification.

APPLICATION INFORMATION

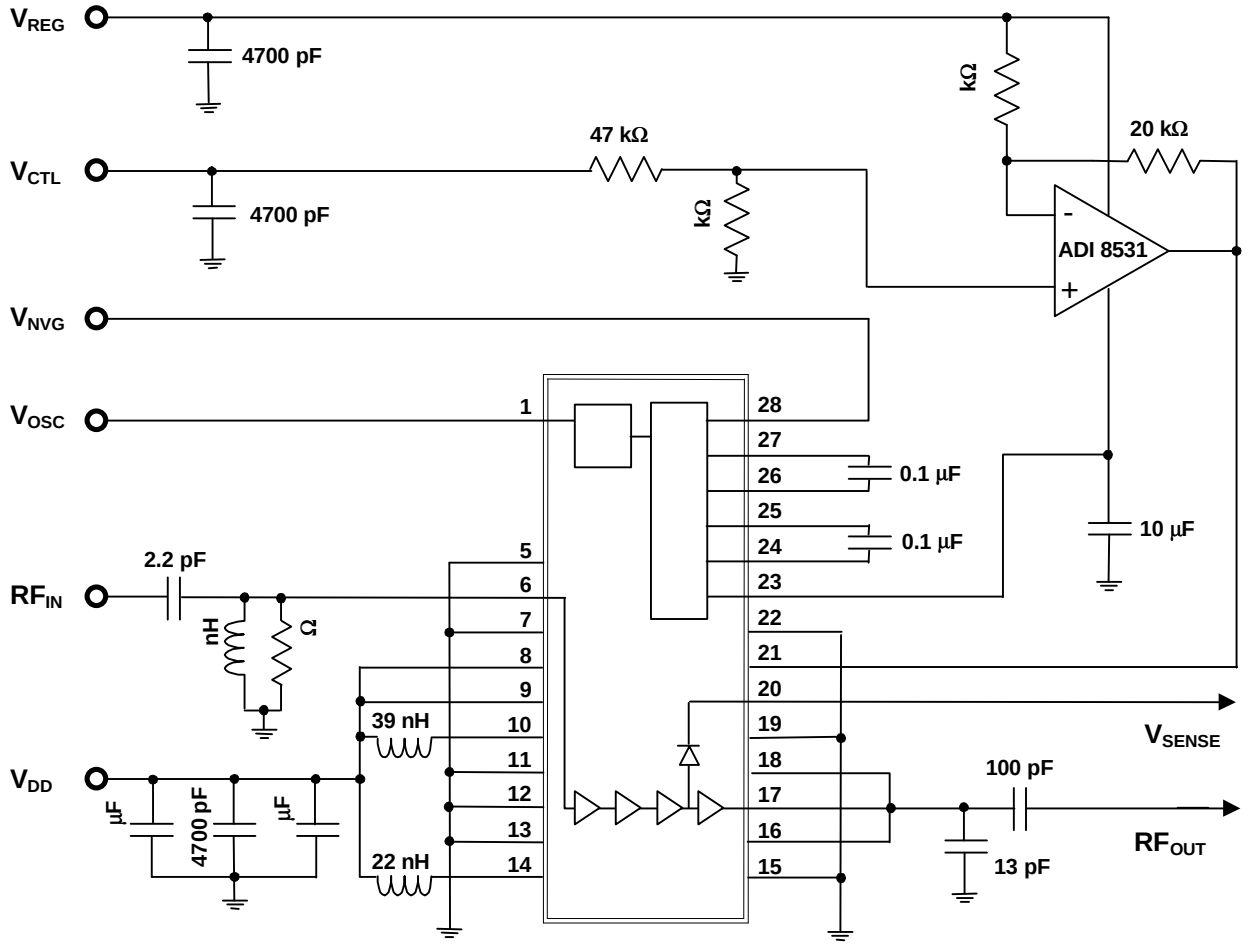

Figure 1. Evaluation Board Schematic (ITT2110AH)

The ITT2111AH and ITT2112AH do not have the Vsense output. The ITTT2112AH does not have the internal oscillator and NVG. All other portions of the schematic are identical for each of the three parts.

Biasing: The negative voltage generator must be on (V_{NVG} and V_{OSC} fully biased) and the control voltage must be low (V_{CTL} <= 0.2 V) prior to the application of RF input power and drain bias voltage. Reverse the sequence when turning the part off — remove the RF input and disable drain bias before disabling the negative voltage generator.

V_{REG} should be from a regulated source so that it will not increase to the battery charging voltage and exceed the rail to rail specification of the op amp.

V_{DD}, V_{NVG}, and V_{OSC} may be tied to unregulated sources.

V_{OSC} may be turned off during the transmit pulse to eliminate all spurious noise from the negative voltage generator. Alternatively, filtering may be used to limit NVG emissions.

ATTENTION
Static-Sensitive Devices
Handling Precautions Required

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TYPICAL CHARACTERISTICS (ITT2110AH)

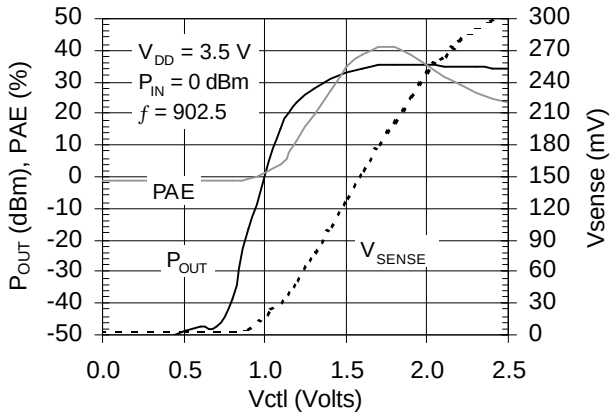

Figure 2. Power, Efficiency and Vsense vs. Control Voltage

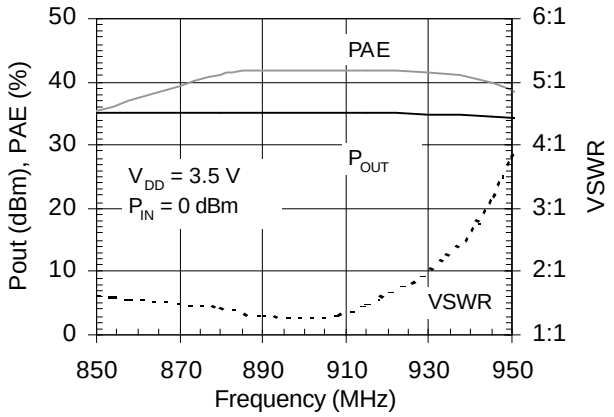

Figure 3. Power, Efficiency and VSWR vs. Frequency

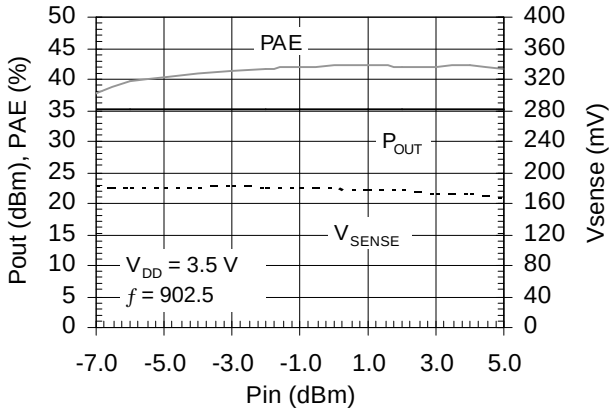

Figure 4. Power, Efficiency and Vsense vs. Input Power

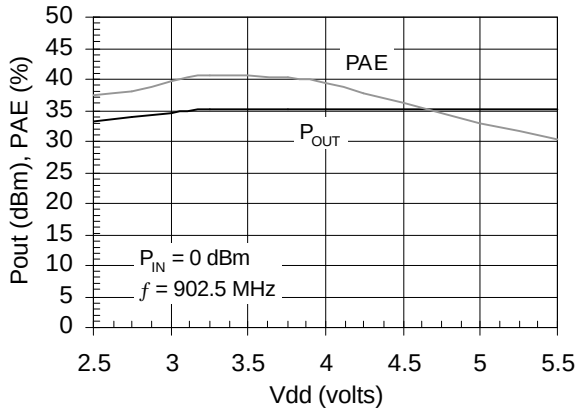

Figure 5. Power, Efficiency and Vsense vs. Drain Voltage

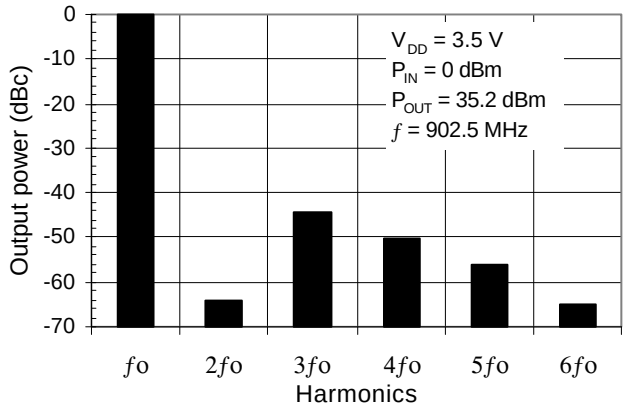

Figure 6. Harmonics

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