900 MHz / 3 V Power Amplifier

Description

The TST0902 is a GaAs monolithic microwave IC. Using MESFET technology the device integrates a three stage power amplifier and a DC/DC converter. The IC also features a gain control and is optimized for minimum external components. The TST0902 is designed for generating the output power, up to 32 dBm, in GSM cellular phones. The single DC supply voltage should be connected to elements of rechargeable cells giving a nominal voltage of 3.3 V. The IC is available in a shrinked small outline 28-pin (SSO28) package with heat slug.

Main Features

- Single supply: 3.3 V
- 32 dBm output power
- High efficiency: 45%
- Built-in gain control
- SSOP28 plastic package
- 50 Ω input impedance

Benefits

- Low cost
- Small size
- Surface mount package
- Low external part count
- Small SSO28 package

Block Diagram

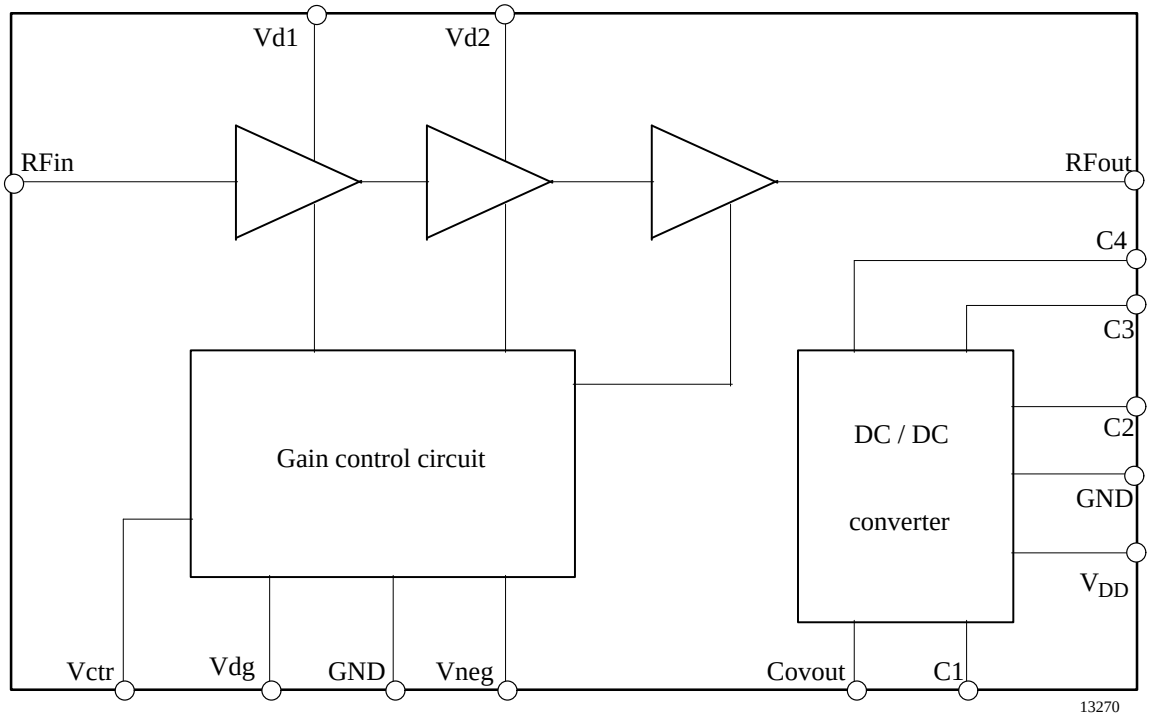


Figure 1. Block diagram

Pin Description

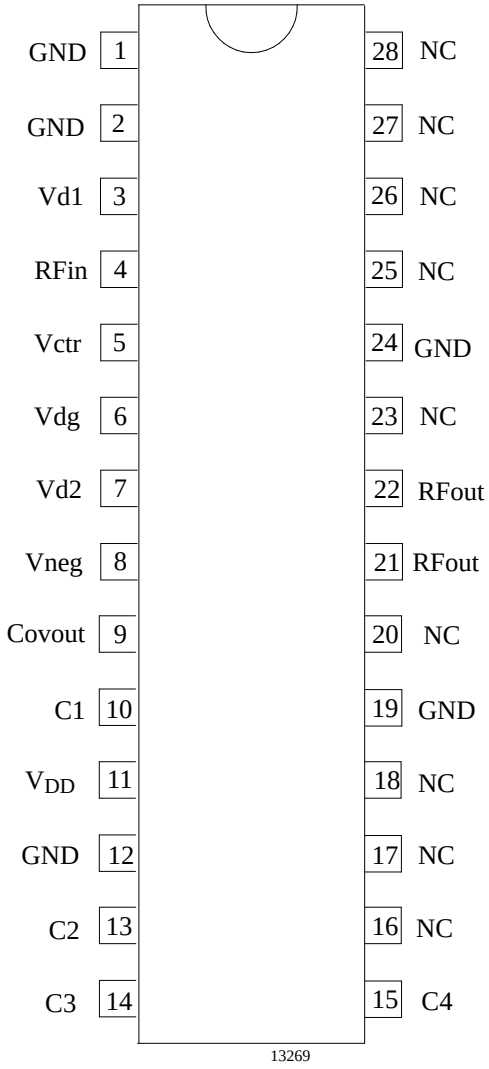


Figure 2. Pinning

Pin	Signal	Description
1, 2, 19, 24	GND	RF and DC ground
3	Vd1	1st stage drain supply
4	RFin	RF input power
5	Vctr	Pulse control voltage
6	Vdg	Gain control circuit supply
7	Vd2	2nd stage drain supply
8	Vneg	Negative voltage connected to the DC/DC converter output (Pin 9)
9	Covout	Negative output voltage from the DC/DC converter
11	V_{DD}	DC/DC converter supply
12	GND	AC and DC ground for the DC/DC converter
10, 13, 14, 15	C1, C2, C3, C4	Capacitors as parts of the DC/DC converter
16, 17, 18, 20, 23, 25, 26, 27, 28	NC	Not connected
21, 22	RFout	RFout

Main Characteristics

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Operating frequency range		f_{op}	880	900	915	MHz
Maximum output power range		P_{max}	–20		+32	dBm
Power added efficiency at Pout max		PAE		40		%
RF input power		P_{in}	0		15	dBm

Electrical Characteristic

Supply voltage = 3.3 V, P_{in} = 0 dBm, T_{amb} = 25°C, Z_{in} = 50 Ω, pulsed conditions with output matching components on a FR4 0.4 mm thick board.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Operating voltage		V_{op}	2.9		5.25	V
Operating frequency range		f_{op}	880		915	MHz
Output power at typical PAE	Vctr = 2 V	P_{out}		32		dBm
Minimum output power	Vctr = 0.5 V	P_{min}	–20			dBm
Output controlled power range	log law vs. Vctr	ΔP	5		32	dBm
Power added efficiency	Pout = 35 dBm Pout = 24 dBm	PAE		40 15		%
Input VSWR				2:1		
2nd and 3rd harmonic level	Vctr = 2 V	H2, H3			–30	dBc
DC drain current		I_D			2.0	A
Spurious in Pout range	VSWR < 10:1 and all phases				–60	dBc
Operating temperature		T_{amb}	–25		+85	°C

Typical Bias Tuning

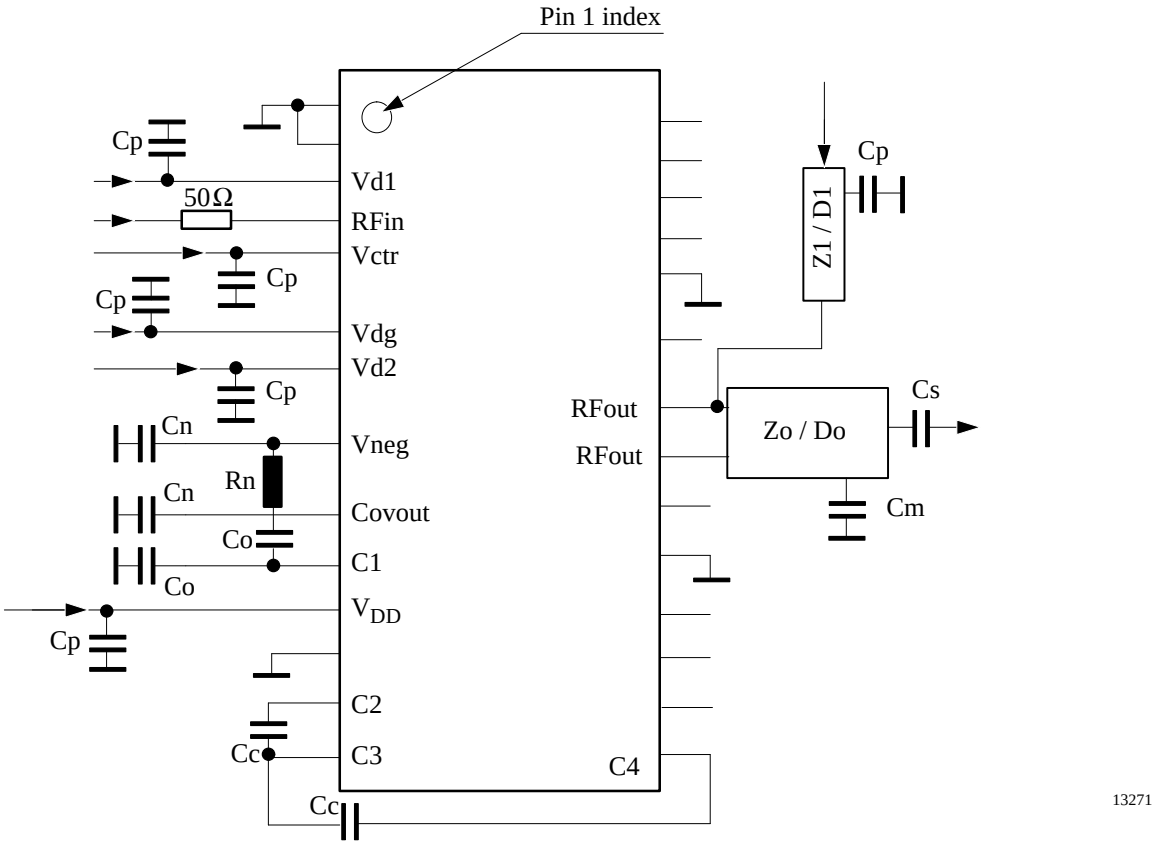


Figure 3.

Procedure to Set the Power Up and Down

To Set the Power Up

1. Check that all the power supplies are set to 0 V
2. Set input power to 0 dBm and Vctr to 0 V
3. Switch on V_{DD} on Pin 11 (3.3 V)
4. Check that Vneg on Pin 8 is in the range –2 to –3 V
5. Turn on Vd1 (Pin 3), Vd2 (Pin 7) and Vdg (Pin 6) to 3.3 V
6. Set Vctr enable using the pulse shape of the burst. Adjust Vctr to the desired output power in the range 0.5 to 2.0 V

To Set the Power Down

Use the same sequence in the reverse order.

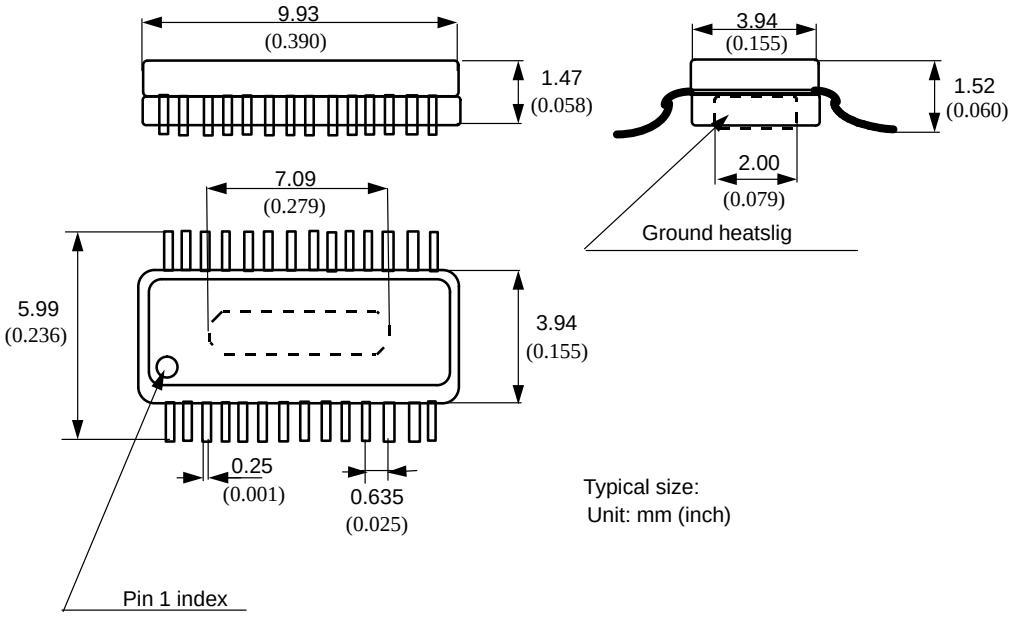
Handling, Die Attach and Wire Bonding Recommendations

Solderability: Solder: Sn/Pb = 63/37
95% area covered with solder

Solder heat proof:
Reflow 2 times at 220°C max. within 10 s

Package Information

Package: SSOP28 with heatslug



Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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