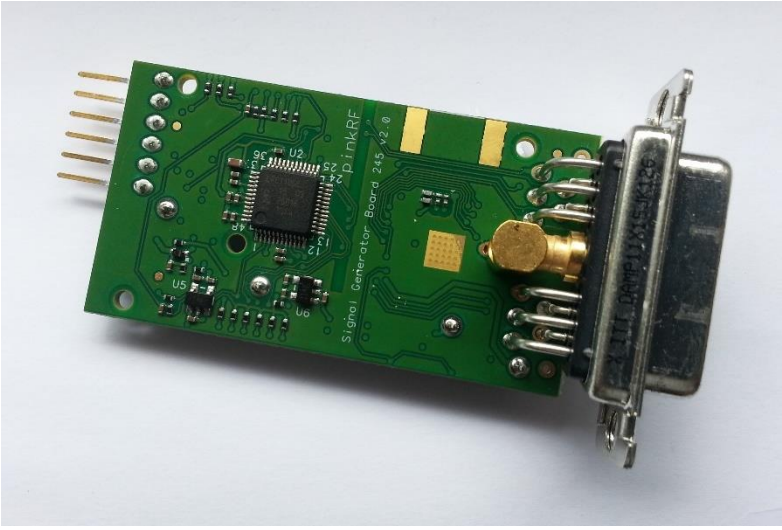
pinkRF

Turn-key RF-Energy Systems for cooking, lighting, industrial and medical applications

www.pinkrf.com



p*RF*-S00022450XXE1

Small signal generator in the 2.4 – 2.5 GHz band with +27dBm RF output power.

Product summary	
RF output power (mW / dBm)	500 / 27
Frequency band (GHz)	2.4 - 2.5
DC Voltage (V)	5
Current (mA)	< 500
ROHS compliant	

Description

The pink*RF* small signal generator module **p*RF*-S00022450XXE1** offers a reliable and basic functionality of generating the, in RF-Energy systems required, initial level of RF signal (up to +27dBm) in the 2.4 – 2.5 GHz ISM band.

The attributes (frequency, amplitude and PWM modulation) of the generated RF signal can be controlled either by the embedded powerful micro controller or from external (host-) controller.

Based on the analog sensing signals ($P_{forward}$, $P_{reflected}$) or the digital I²C sensing signals ($P_{forward}$, $P_{reflected}$, T_{final} and $T_{ambient}$), the embedded control logic (firmware) can optimize the RF vector (frequency, power, time) depending on the application needs in real time.

1.1 Initial (20-07-2017)

Features & Benefits
High accuracy settings for the RF attributes
Multiple interfaces (and API) for external host control
Analog inputs for forward and reflected power readings
Analog and digital interfaces
Single power supply (5V, 500 mA)
Integrated powerful microcontroller, capable to accommodate the board control firmware and application-level SW
Direct, single plug connectable with pink*RF*'s power amplifier modules

Applications

The pink*RF* small signal generator module **p*RF*-S00022450XXE1** can be used as an RF signal source driving a power amplifier, in a single-channel system. It delivers RF power to an applicator (i.e. a "device" to contain and/or apply the RF energy) like an antenna or a cavity.

With the embedded micro-controller, it is possible to run the **p*RF*-S00022450XXE1** as a stand-alone device in a single channel system. A host controller can communicate with the individual module, to keep track of the overall system status.

Such a system can be used for various applications like plasma lighting, plasma torches, RF car ignition, industrial heating, solid state cooking, medical treatment or any other high power RF-Energy application.

Functionality
Independent frequency control
Independent output power level control
Independent modulation scheme (PWM) control
Forward and reflected power detection
Host interfaces: UART and SWD/JTAG
I^2C bus (master) for communication with a system compatible PA

Specifications	
Nominal output power, both modes (mW / dBm)	500 / 27
Output power control range (dB)	>30
Output power resolution (dB)	0.2
Frequency band (GHz)	2.4 - 2.5
Frequency resolution (kHz)	100
Output settling time (us)	< 25
Typical RF output signal switching time (us)	0.1
Detector input impedance (kΩ)	100
Detector level range (V)	0 – 2.5
Harmonics (dBc)	< -40

Frequency control

In this small signal generator module the frequency is adjusted (externally or by embedded application software) to optimize parameters of the system, based on previously acquired system knowledge and/or calibration data.

RF output power level control

In the **p*RF*-S00022450XXE1** the generated power level is set, based on calibration data and, for example, the forward and reflected feedback signals.

Timing control

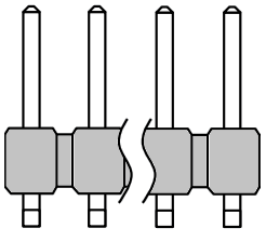
The control of the switching times of the generated RF signal can be implemented by the host controller (via UART control interface) in the RF energy system or, locally, by the embedded processor.

Module p*RF*-S00022450XXE1	
Dimensions (including connectors, mm)	75 x 38 x 20
Weight (kg)	tbd
ROHS compliant	

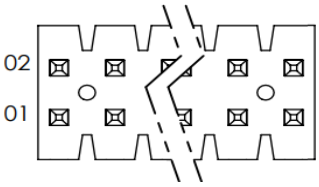
Ambient	
Temperature range of operation	0 – 50 °C
Humidity	< 90%
Altitude	< 2000 m

Related products
RF power amplifier @ 2450MHz
Housing (heatsink, protective casing and mechanically robust)
Cabling (UART, USB)
Power supply

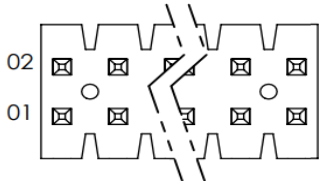
Connections



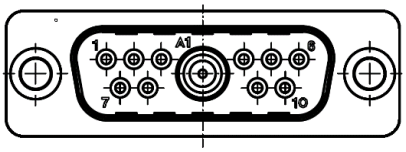
J4 (TSW-106-25-F-S-RA) UART:	
1	GND
2	UART-CTS
3	NC
4	UART-RXD
5	UART-TXD
6	UART-RTS



J3 (FTSH-105-01-L-DV) JTAG:	
1	3V3
2	SWDIO
3, 5, 9	GND
4	SWCLK
6	TDO
7	NC
8	TDI
10	RESETN



J5 (FTSH-103-01-L-DV):	
1	PWM-1 (u-Controller)
2, 4, 6	GND
3	PWM-2
5	PWM-3



J901 Combined output / control connector): ITT/Cannon DAMP11X1SJK126	
A1 J901-2	Coaxial analog RF output
1	$P_{forward}$ analog input
2	RFenable output (active high, 3.3V compatible)
3	Not Connected
4, 10	Ground
5	I²C SCL
6	+5-6V DC supply input (1A)
7	$P_{reflected}$ analog input
8	PWM-PA
9	I²C SDA

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