KU SG 2.45-450 A

2.45 GHz ISM-Band

Microwave Generator



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Technical data

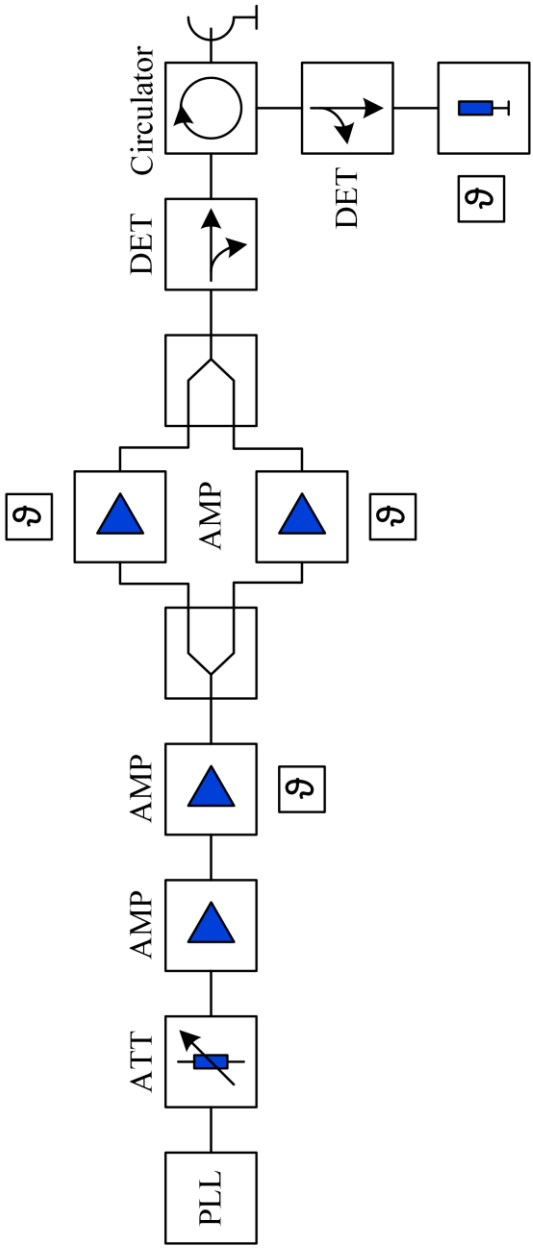
CE

Type	KU SG 2.45-450 A
Output frequency range	2400 … 2500 MHz
Frequency steps	100 kHz (10 kHz optional)
Frequency stability	+/- 3 ppm
Output power	0 ... 450 W at 50 Ohms
Power steps	1 W
Power accuracy	+/- 0.2 dB max.
Signal waveform	Continous wave, Pulsed (various frequencies)
Protection	VSWR (Isolator), Over temperature, UV/OV protection
Temperature range	-20 °C … 60 °C
Features (selection)	Find best frequency function Frequency sweep function Pulse mode with regulated output power Water and air cooling possible
Optional	Combining of two and more signal generators (master-slave or phase control)
Supply voltage	32 V
Current Consumption	max. 26 A @ 450 W
Case	Milled aluminium, white bronze coated
Output connector	N-female, 50 Ohms
Control input	Serial Interface, 3.3 V UART interface Analog interface 0 V … 10 V External I2C bus extensions
Dimensions (w x d x h)	180 mm x 65 mm x 40 mm
Weight	typ. 1500 g

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Block Diagram



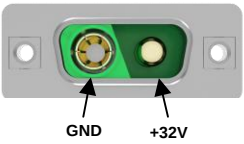
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Peripherals

DC PORT

The DC connector is delivered with a 2-pin plug in terminal for 6 mm^2



CONTROL PORT



(1) – PWR IN (Analog 0-10V)
(2) – FREQ IN (Analog 0-10V)
(3) – ENABLE (Schaltschwelle 1.36V aktiv high)
(4) – ENABLE 2 (Schaltschwelle ab 4.4V aktiv high)
(5) – UART RX
(6) – FWD MON
(7) – REV MON
(8) – TEMP MON
(9) – GPO EXT
(10) – UART TX
(11) – GND
(12) – GND
(13) – GND
(14) – SDA
(15) – SCL

The 15 pin connector is delivered with a empty coupling housing and 15 pin solder contacts.

LED

The LED indicates different operating conditions, warnings and alarms.

normal operation

Error State
If the information on this lights up for various errors, you can use the INFO command to query it

Overvoltage and undervoltage warning

Pulse Mode is active

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General Description

A serial interface for remote control of the microwave generator is provided at the 15-pin connector. It has the following specification:

- 3.3V logic levels
- 115200 BAUD data rate
- 8 data bits, 1 stop bit
- No parity, no flow control

Programmer's reference

All commands must be followed by a „carriage return" (0x0D). If the sent command is unknown, the module returns „*\r".

Monitoring

Command	Function	Return Value
INFO	error messages	
V?	query software version	
SN?	query serial number	5 digits and \r
AC:	activation code for features (8 digits)	A\r or N\r
M0	operating voltage, in mV	5 digits and \r
M1	power consumption in mA	5 digits and \r
M4	freq_in in mV	5 digits and \r
M5	pwr_in in mV	5 digits and \r
M6	forward power	5 digits and \r
M7	reverse power	5 digits and \r
M8	power consumption in W	5 digits and \r
M9	efficiency in %	5 digits and \r
T0	driver temperature	4 digits and \r
T1	output transistor above	4 digits and \r
T2	output transistor below	4 digits and \r
T3	temperature terminating resistor	4 digits and \r
T4	MCU temperature	4 digits and \r
PLL?	returns status of the PLL's	0\r or 1\r

Controls

Command	Function	Return Value
A	set output power in watts (4 digits)	A\r or N\r
f	frequency in kHz (7 digits)	A\r or N\r
f?	query frequency in kHz	7 digits and \r
B	reverse power limit in watt (4 digits)	A\r or N\r
B?	query reverse power limit	4 digits and \r
C	preserve power in memory when powered off	A\r or N\r
C?	status of C	0\r or 1\r
O	signal generator ON incl. idle	A\r or N\r
o	signal generator OFF incl. quiescent current	A\r or N\r
o?	is the signal generator ON?	0\r or 1\r
IM0	Input mode digital	A\r or N\r
IM1	Input mode analog / low voltage enable signal (0 / 3.3V)	A\r or N\r
IM2	Input mode analog / low voltage enable signal (0 / 10V)	A\r or N\r
IM?	which input mode is active?	0\r, 1\r or 2\r
BL	start bootloader for firmware update	

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Pulsmode

Command	Function	Return Value
PM0	pulse mode OFF	A\r or N\r
PM1	pulse mode ON	A\r or N\r
PM?	is pulse mode ON?	0\r or 1\r
PMP	pulse periode (5 digits in µs) 5 – 99999 µs	A\r or N\r
PMP?	returns pulse periode	5 digits and \r
PMW	pulse width (5 digits in µs) 1 – 99998 µs (1-24 µs is optional)	A\r or N\r
PMW?	returns pulse width	5 digits and \r
NM0	noise mode off	A\r or N\r
NM1	noise mode on	A\r or N\r
NM?	is noise mode on?	0\r or 1\r
NML	noise level (2 digits in %) 1 – 20%	A\r or N\r
NML?	returns noise mode level	2 digits and \r

Frequenz Sweep

Command	Function	Return Value
fs0	start frequency sweep	A\r or N\r
fs1	stop frequency sweep	A\r or N\r
fs2	best frequency find, sets direction to 0 (up), freq to start and sets the best frequency	A\r or N\r
fs?	is the frequency sweep ON ?	0\r or 1\r
fsb	sweep-start(begin)-frequency in kHz (7 digits)	A\r or N\r
fsb?	sweep-start frequency query	7 digits and \r
fse	sweep-stop(end)-frequency in kHz (7 digits)	A\r or N\r
fse?	sweep-stop frequency query	7 digits and \r
fss	frequency – steps in kHz (7 digits)	A\r or N\r
fss?	frequency – steps query	7 digits and \r
fsd	Dwell time per frequency (4 digits) 1 - 1000 ms	A\r or N\r
fsd?	query Dwell time	4 digits and \r

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ON/OFF CONTROL (O/r)

Enabling and disabling the amplifier can either be done via the serial interface or via external inputs on the 15-pin connector.

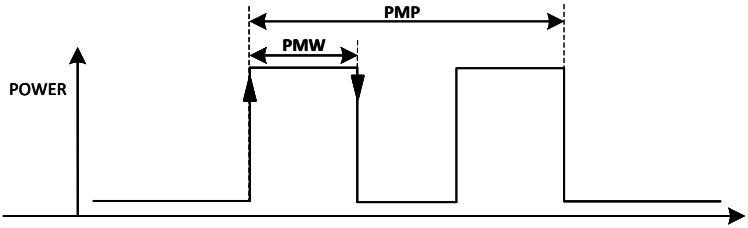
Turn on sequence:
1.) Activate the RF signal either via command „O“ or via a high level on pin 3 or 4
2.) Set output frequency (default 2450 MHz) and power (default 0W)

Turn off sequence:
1.) Deactivate the RF signal either via command „o“ or via a low level on pin 3 or 4

PULSE MODE

During pulse mode, the RF signal is turned on and off with respect to the specified values (see commands „PM1“ and „PM0“).

Beispiel / Example



Turn on sequence:
1.) Specify the PULSE periode in µs via commands „PMP“
2.) Specify the PULSE width in µs via commands „PMW“
3.) Set output frequency and power
4.) Activate the RF signal in pulse mode via command „PM1“
5.) Activate RF via command „O“

Turn off sequence:
1.) Deactivate RF signal via command „o“
2.) Deactivate the pulse mode with command „PM0“

BEST FREQUENCY (fs2)

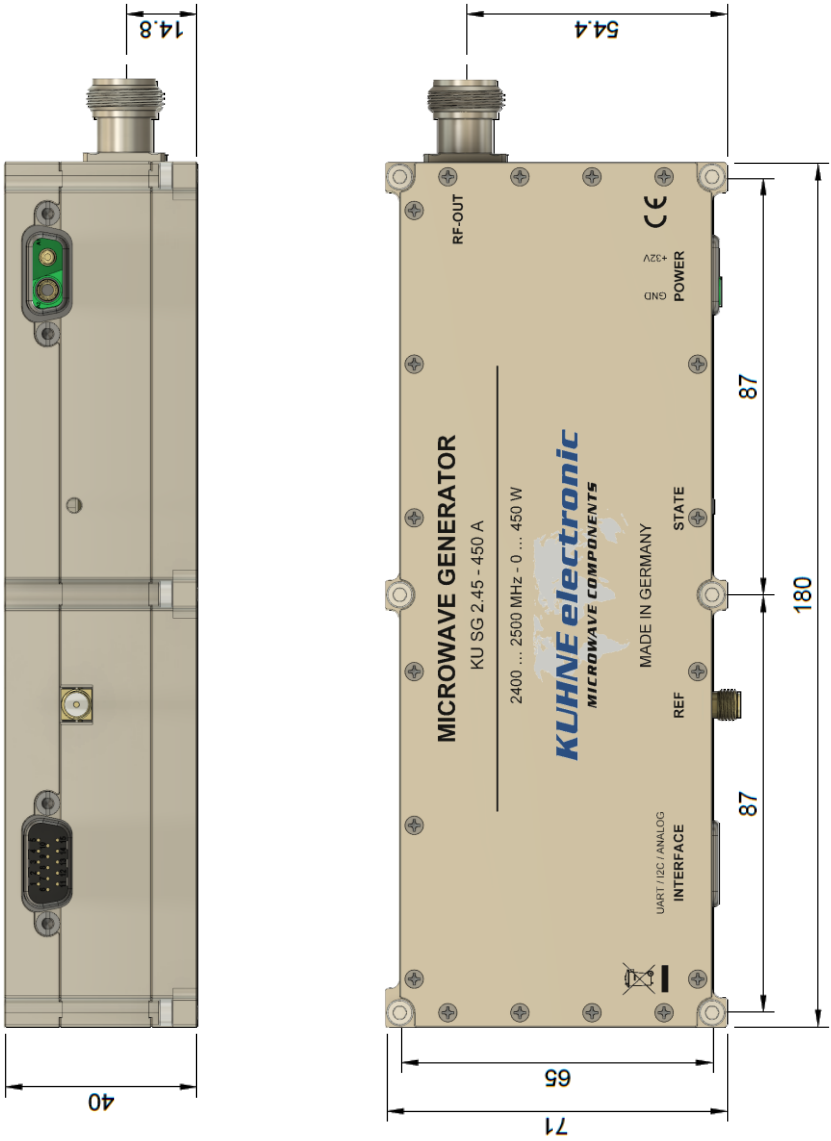
Command „fs2“ starts the „best frequency find“ algorithm. The frequency is swept for a given output power value, specified in the command and the generator is set to the frequency with minimum reflection after the sweep.

SAVE TO EEPROM (ES)

Command „ES“ saves the following parameters to the internal EEPROM:
- Frequency
- Output power
- ON/OFF control setting
- Reflection limit
- On-time for pulse mode
- Off-time for pulse mode

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Dimensions



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