

NANOPULSE SERIES · MODEL NANO-I 10KV-300W

High voltage nanosecond pulsed generator

Self-contained unipolar pulse generator based on a solid-state Marx bank with SiC MOSFET switches. Optimised for capacitive loads, it delivers trapezoidal pulses with independently programmable rise, flat-top and fall times and pulse-to-pulse consistency. No external HV supply required: the load connects directly to the rear HV output.

9.9 kV

Peak output voltage

35 A

Peak output current

50 ns

Min. rise time

1 kHz

Max. repetition rate

300 W

Average output power

< 1 ns

Jitter, RMS



Key features

SiC solid-state Marx. Symmetric, controlled edges; no voltage tails, full waveform control.

Programmable trapezoid. t_R 50–2000 ns, t_p and t_F 200–2000 ns, set independently in 25 ns steps, to separate slew-rate and pulse-width effects.

Current limiter. When the 1–30 A threshold is exceeded for a set number of consecutive pulses (1–100).

System integration. BNC trigger in/out, V/I monitors, LAN with VNC remote control, RS-232.

Applications

Plasma & surface treatment. Atmospheric-pressure non-thermal plasma, DBD and plasma jets, polymer and textile surface activation, plasma-activated water.

Biomedical & biotech research. nsPEF and electroporation studies, gene electrotransfer.

HV & materials testing. Dielectric and insulation testing under fast repetitive stress, breakdown studies.

Environment & food. VOC abatement and ozone generation by pulsed corona and DBD; lab-scale PEF of liquid foods.

Measured example waveforms

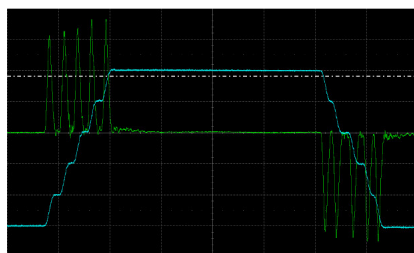


Fig. 1 – V_p 5 kV, 100 pF load. Cyan: V_{out} , 1 kV/div; green: I_{load} , 1 A/div; 500 ns/div.

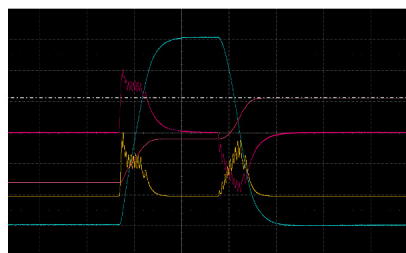


Fig. 2 – V_p 9.5 kV, $t_R = t_F = 500$ ns, 560 pF load. Cyan: V_{out} , 1.5 kV/div; magenta: I_{load} , 1 μs/div.

PULSE OUTPUT

Output voltage V_p	1.0 – 9.9 kV, 0.1 kV steps
Polarity	Unipolar, positive or negative
Peak output current	35 A
Nominal load impedance	300 Ω
Rise time t_R	50 – 2000 ns, 25 ns steps
Flat-top time t_p	200 – 2000 ns, 25 ns steps
Fall time t_F	200 – 2000 ns, 25 ns steps
Repetition rate f_p	1 Hz – 1 kHz, 1 Hz steps
Average output power	300 W max, continuous
Jitter, pulse-to-pulse	< 1 ns RMS
Trigger-to-output delay	< 150 ns
Topology	Solid-state Marx, SiC MOSFET, optical gate drive

OPERATING MODES

Pulse modes	Single · Burst · Free run
Burst count	1 – 60 000 pulses
Trigger source	Internal / external
Current limit	1 – 30 A threshold, 1 A steps
Limiter trip	After 1 – 100 consecutive pulses over threshold
Power limit	$E_{\text{pulse}} \times f_p \leq 300 \text{ W}$ (1 s window)

ENVIRONMENT

Operating temperature	+10 ... +40 °C
Relative humidity	< 80 %, non-condensing
Cooling	Forced air, front to rear

Front panel



- | | |
|--------------------------------|---------------------------|
| A Voltage monitor (BNC) | F LED Armed |
| B Current monitor (BNC) | G LED Error |
| C Trigger output (BNC) | H LED Power |
| D 7" TFT touch panel | I Rotary encoder |
| E LED Trig Out | J Pulse START/STOP |

INTERFACES

Voltage monitor	BNC (front), 1000:1, 50 Ω
Current monitor	BNC (front), 0.1 V/A
Trigger input	BNC (rear), 5 V TTL/CMOS, 50 Ω
Trigger output	BNC (front and rear)
HV output	Rear terminals (+/-), > 12 kV insulation
Network	LAN RJ-45, static/DHCP, VNC remote control
Serial	RS-232, 1200 – 115 200 baud, 8 bit
Local control	7" TFT touch panel, encoder, status LEDs

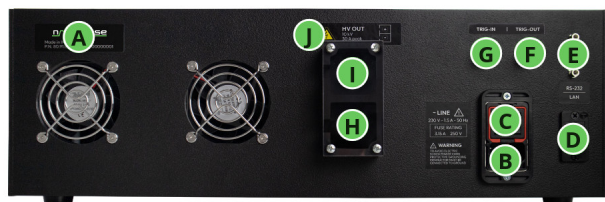
PROTECTION

Overcurrent	Desaturation detection, < 500 ns
Overvoltage	Hardware threshold 10.5 kV
Arc detection	Burst inhibit on repeated arcs
Overtemperature	Shutdown at 85 °C (SiC heatsinks)
Safety interlock	Option -IL: NC dry contact, rear terminal block
HV bleed-down	< 2 s after shutdown or trip

POWER & MECHANICAL

Mains supply	230 VAC ± 10 %, 50 Hz, 1.5 A
Fuse	3.15 A, 250 V
Form factor	19" rack, 3U
W x H x D	482.6 x 133.4 x 558.8 mm
Weight	≈ 22 kg

Rear panel



- | | |
|-------------------------------|-------------------------------|
| A Identification label | F Trigger output (BNC) |
| B Mains inlet, IEC | G Trigger input (BNC) |
| C Fuse 3.15 A 250 V | H HV output (-) |
| D LAN RJ-45 | I HV output (+) |
| E RS-232 | J HV present indicator |

Ordering code

NANO-I-10KV-300W-A-P
Positive polarity

NANO-I-10KV-300W-A-N
Negative polarity

Suffix **-IL**: interlock option

Supplied with

IEC mains cord, 2 m

Interlock plug (-IL option)

19" rack mounting kit

Individual test certificate with recorded waveforms

Options

NANO-LOAD-300R Coaxial non-inductive test load, 300 Ω , 300 W

NANO-CBL-1 HV output cable, 1 m, double shield

Compliance

IEC/EN 61010-1

EN 61326-1

EN 55011 Class A

CE · RoHS 3

Warning: lethal voltages. For qualified personnel in a controlled environment only. Specifications measured on a nominal non-inductive resistive load and subject to change without notice.