

- HV switches in pulser configuration • Ready for use • No external components required • All pulsers optimized for system integration • Laboratory pulsers additionally with CE marking

GHTS Series, pulser for the laboratory use (with CE certification)

Model [sorted by dimensions]	Description / Comment ● Preferred stock type ○ Limited stock X Not for new development	Drawing (PDF)	Dimensions [mm ³]	Voltage [kV]	Pk. Current [A]	HV Pulse Width [ns]
GHTS 60	● Very compact. Polarity reversal manually by earthing plug. 15 nF buffer capacitor.	request	170 x 110 x 45	2 x 6	2 x 15	100...∞
GHTS 30	● Very compact. Polarity reversal manually by earthing plug. 15 nF buffer capacitor.	request	170 x 110 x 45	2 x 3	2 x 30	100...∞
GHTS 30 A	● Very compact. Polarity reversal manually by earthing plug. 15 nF buffer capacitor.	request	170 x 110 x 45	2 x 3	2 x 60	100...∞
GHTS 100	● Very compact. Polarity reversal manually by earthing plug. 15 nF buffer capacitor.	request	210 x 110 x 45	2 x 10	2 x 15	100...∞
GHTS 60 A	● Very compact. Polarity reversal manually by earthing plug. 15 nF buffer capacitor.	request	210 x 110 x 45	2 x 6	2 x 30	100...∞
GHTS 100 A	● Very compact. Polarity reversal manually by earthing plug. 15 nF buffer capacitor.	request	210 x 110 x 45	2 x 10	2 x 30	100...∞
GHTS 60 B	● Very compact. Polarity reversal manually by earthing plug. 15 nF buffer capacitor.	request	210 x 110 x 45	2 x 6	2 x 60	100...∞

GHTS Options:

Option 01	Protective Series Resistor 200 Ohm.
Option 02	Built-in Miniature Fan
Option 03	Improved thermal conductivity of the internal switching module by means of an internal ceramic cooling surface

FHPP Series, Fast High-Voltage Precision Pulser (with CE certification)

Model [sorted by dimensions]	Description / Comment ● Preferred stock type ○ Limited stock X Not for new development	Drawing (PDF)	Dimensions [mm ³]	Voltage [kV]	Pk. Current [A]	HV Pulse Width [ns]
FHPP 60	● Polarity reversal by internal relays via TTL signal. Built in 100 nF buffer capacitor.	request	184 x 105 x 92	2 x 6	2 x 80	60...∞
FHPP 80	● Polarity reversal by internal relays via TTL signal. Built in 100 nF buffer capacitor.	request	184 x 105 x 92	2 x 8	2 x 60	60...∞
FHPP 100	● Polarity reversal by internal relays via TTL signal. Built in 100 nF buffer capacitor.	request	184 x 105 x 92	2 x 10	2 x 50	60...∞
FHPP 120	● Polarity reversal by internal relays via TTL signal. Built in 100 nF buffer capacitor.	request	184 x 105 x 92	2 x 12	2 x 30	60...∞

FSWP Series, Fast Square Wave Pulser, for system integration

Model [sorted by dimensions]	Description / Comment ● Preferred stock type ○ Limited stock X Not for new development	Drawing (PDF)	Dimensions [mm ³]	Voltage [kV]	Pk. Current [A]	HV Pulse Width
FSWP 51-02	● Fast square wave pulser, max. repetition rate 3 MHz with option DLC. Image here.	PDF	175 x 80 x 45	5.4	25	50 ns...∞
FSWP 71-02	● Fast square wave pulser, max. repetition rate 3 MHz with option DLC. Image here.	request	175 x 80 x 45	7.2	20	50 ns...∞
FSWP 91-01	● Fast square wave pulser, max. repetition rate 3 MHz with option DLC. Image here.	PDF	175 x 80 x 45	9	15	50 ns...∞

FQD Series, Fast Q-Switch Pockels Cell Driver, for system integration

Model [sorted by dimensions]	Description / Comment ● Preferred stock type ○ Limited stock X Not for new development	Dimensions [mm ³]	Voltage [kV]	Pk. Current [A]	HV Pulse Width Depends on R x C
FQD-30-04-C	● Compact Series. Plastic flange housing with pigtails. Cooling options partly not applicable.	64 x 30 x 18	3	40	100 ns...1 ms
FQD-40-02-C	● Compact Series. Plastic flange housing with pigtails. Cooling options partly not applicable.	64 x 30 x 18	4	20	100 ns...1 ms
FQD-40-03-C	● Compact Series. Plastic flange housing with pigtails. Cooling options partly not applicable.	64 x 30 x 18	4	30	100 ns...1 ms
FQD-50-02-C	● Compact Series. Plastic flange housing with pigtails. Cooling options partly not applicable.	64 x 30 x 18	5	20	100 ns...1 ms
FQD-60-03-C	● Compact Series. Plastic flange housing with pigtails. Cooling options partly not applicable.	64 x 30 x 18	6	30	100 ns...1 ms
FQD-80-02-C	● Compact Series. Plastic flange housing with pigtails. Cooling options partly not applicable.	64 x 30 x 18	8	25	100 ns...1 ms
FQD 40-03	● Based on HTS 40-03, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	4	35	100 ns...1 ms
FQD 40-06	● Based on HTS 40-06, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	4	60	100 ns...1 ms
FQD 50-02	● Based on HTS 50-02, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	5	25	100 ns...1 ms
FQD 50-05	● Based on HTS 50-05, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	5	50	100 ns...1 ms
FQD 60-02	● Based on HTS 60-02, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	6	20	100 ns...1 ms
FQD 60-04	● Based on HTS 60-04, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	6	40	100 ns...1 ms
FQD 80-01	● Based on HTS 80-01, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	8	15	100 ns...1 ms
FQD 80-03	● Based on HTS 80-03, with 200 mm long pigtails for direct pockels cell connection	79 x 38 x 19	8	30	100 ns...1 ms
FQD 30-08-UF	● Based on HTS 30-08-UF, with 200 mm long pigtails for direct pockels cell connection, ultra fast	79 x 38 x 19	3	80	100 ns...1 ms
FQD 30-06-UF	● Based on HTS 30-06-UF, with 200 mm long pigtails for direct pockels cell connection, ultra fast	79 x 38 x 19	3.6	60	100 ns...1 ms

DSM Series, Differential Switch Mode Pulser, for system integration

DSM-Series: Universal pulser for capacitive loads (e.g. pockels cells) in full bridge configuration with ~3 ns to 6 ns electrical transition time and variable pulse width from 4 ns to infinite. The unit consists of two push-pull switches (half-bridge circuits), which are turned on by an internally generated phase-shifted signal, where by phase 1 is given by the leading edge and phase 2 by the trailing edge of the control pulse. The pulse width of the HV pulse across the capacitive load corresponds with the time difference of the shifted signals respectively with the pulse width at the control input. For capacitive load only. Very compact design for placement directly at the pockels cell. Available with cooling options CF, GCF, ILC and DLC for high power operation.

DSM 31-03	•	LEMO socket for control input with Z=100Ω and SMC input with Z=50Ω. SHV-NIM socket for HV	102 x 76 x 20	3	30	4 ns - ∞
DSM 31-02	•	LEMO socket for control input with Z=100Ω and SMC input with Z=50Ω. SHV-NIM socket for HV	102 x 76 x 20	3,6	25	5 ns - ∞
DSM 61-01	•	LEMO socket for control input with Z=100Ω and SMC input with Z=50Ω. SHV-NIM socket for HV	102 x 76 x 20	6	15	5 ns - ∞
DSM 91-01	•	LEMO socket for control input with Z=100Ω and SMC input with Z=50Ω. SHV-NIM socket for HV	102 x 76 x 20	9	12	10 ns - ∞

Options for the FHPP, FWSP, FQD and DSM Series (not applicable to the GHTS series)

HFS	High Frequency Switching: External supply of auxiliary driver voltage. Necessary if the specified "Max. Operating Frequency" shall be exceeded. (2)
I-PC	Integrated Part Components: Integration of small part components according to customer's specifications (e.g. buffer capacitors, snubbers, resistors, diodes, opto couplers). (2)
PT-C	Pigtail for Control Connection: Flexible leads (l=75 mm) with PCB connector. This option is only relevant for switching modules with pins.
PIN-C	Pins for Control Connection: Gold plated pins for printed circuit board designs (special sockets available). Only relevant for switching modules which have pigtails as standard.
UL94	Flame Retardant Casting Resin: Casting resin according to UL-94-VO. Minimum order quantity required. (2)
TH	Tubular Housing: Tubular instead of rectangular housing. Adaption to specific ambient conditions or in case of difficult assembly situations. (2)
FC	Flat Case: Height of standard plastic housings reduced to 19 mm or less. Not in combination with cooling options CF, GCF and DLC.
ITC	Increased Thermal Conductivity: Special moulding process to increase the thermal conductivity of the module. Pd(max) will be increased by approx. 20-30%. (2)
CF	Copper Cooling Fins d = 0.5 mm: Fin height 35 mm. Nickel plated. For air cooling with forced or natural convection as well as for liquid cooling with non-conductive coolants.
CF-1	Copper Cooling Fins d = 1 mm: Fin thickness 1.0 mm instead of 0.5 mm. The Max. Power Dissipation Pd(max) will be increased by ~80%. For air or liquid cooling (e.g. Galden® or oil).
CF-X2	Copper Cooling Fins "XL": Fin area enlarged by factor 2. Recommended for natural air convection. No significant cooling power improvement in connection with forced air or liquid cooling.
CF-X3	Copper Cooling Fins "XXL": Fin area enlarged by factor 3. Recommended for natural air convection. No significant cooling power improvement in connection with forced air or liquid cooling.
CF-CS	Copper Cooling Fins with customized shape: Individual shape to meet specific OEM requirements. (2) Can be combined with options CF-1, CF-D and CF-S for increased cooling power.
CF-LC	Copper Cooling Fins for liquid cooling: Double fins, nickel plated copper, height 20 mm. For the immersion in oil tanks etc. Forced convection recommended. Combinable with opt. CF-S.
CF-D	Double Copper Cooling Fins: Approx. 100% more cooling power, approx. 2mm spacing between fins, forced convection recommended. Combinable with opt. CF-S, CF-X2, CF-X3 and CF-CS.
CF-S	Copper Cooling Fins: Semiconductors soldered on fins. Approx. 30% to 100% more cooling power (type depending). Combinable with options CF-D, CF-X2, CF-X3 and CF-CS.
CF-GRA	Non-isolated Cooling Fins made of graphite: Very light weight compared to copper at similar heat transfer, but reduced heat capacity. 0.5 or 1 mm thickness, height 35 mm.
CF-CER	Isolated Cooling Fins made of ceramics: Heat transfer properties similar to alumina. Forced convection recommended due to 2 mm spacing between fins. Height 35 mm.
CCS	Ceramic Cooling Surface: Top side of switching module made of ceramics. Heat transfer properties similar to alumina. Max. 20 kVDC isolation. Forced convection recommended.
CCF	Ceramic Cooling Flange: Bottom side of switching module made of a plano grinded ceramic plate. Integrated metal frame for uniform and safe contact pressure. Max. 40 kVDC isolation.
C-DR	Cooling for Driver: Extra cooling for the driver and control electronics. Recommended in combination with option HFS at higher switching frequencies. (2)
GCF	Grounded Cooling Flange: Nickel-plated copper flange for medium power. Max. isolation voltage 40kV. Increased coupling capacitance CC.
GCF-X2	Grounded Cooling Flange, Max. Continuous Power Dissipation increased by x2: Thermal resistance "Switch to Flange" reduced for twice the power capability. (2)
ILC	Indirect Liquid Cooling: Liquid cooling for all kind of conductive coolants incl. water. Internal heat exchanger made of ceramics. For medium power dissipation.
DLC	Direct Liquid Cooling: Internal cooling channels around the power semiconductors. The most efficient cooling for high frequency applications. Non-conductive coolants only.
HI-REL	High Reliability / MIL Versions: Available on request. (2)

(1) New option code: Data sheets may differ from this coding system (especially older ones) and do not indicate all possible options as per above table. (2) Please consult factory for detailed information.
 (3) These options are EMC-relevant and are recommended for industrial power applications, difficult noise ambients, prototype experiments with flying leads and for users without special EMC design experience.

Further information, data sheets and drawings are available on request. All data and specifications subject to change without notice.

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BEHLKE Product Lines

