

B1

HV switches with fixed on-time, general purpose, MOSFET

- Cost-efficient high voltage switch solution for simple pulse and discharge applications
- Very EMC tolerant
- Absolutely noise free in on-state and off state
- Low control power at high frequency
- The standard on-time of 100 to 300 ns can optionally be changed to any other value from 25 ns to 100 μ s.

Note: The model number contains coded information about voltage, current and turn-on behavior. The first digits stand for the voltage in kV, the last digit before the dash indicates the turn-on behavior (0 = fixed on-time, 1 = variable on-time). The digits after the dash indicate the current in Amperes x10. Special features are coded by the letters after a second dash.
Example HTS 40-06: HTS = HV Transistor Switch, 4 = 4 kV, 0 = fixed on-time, 06 = 60 Ampere

Model [sorted by dimensions]	Description / Comment • Preferred stock type ◦ Limited stock X Not for new development	Dimensions [mm ³]	Voltage [kV]	Pk. Current [A]	On-Resist. [Ω]	On-Time [ns]
HTS 40-06	• LED indicators. 1 ns rise time. Very compact design	80 x 38 x 25	4	60	3.4	100
HTS 50-05	• LED indicators. 1 ns rise time. Very compact design	80 x 38 x 25	5	50	4.8	100
HTS 60-04	• LED indicators. Very compact design	80 x 38 x 25	6.4	40	8.8	100
HTS 80-03	• LED indicators. Very compact design	80 x 38 x 25	8	30	16	100
HTS 160-01	• LED indicators. Very compact design	80 x 38 x 25	16	15	64	100
HTS 20-08	•	70 x 50 x 26	2	80	1	150
HTS 30-06	•	70 x 50 x 26	3	60	3	150
HTS 50-06	•	70 x 50 x 26	5	60	5	150
HTS 90-06	•	89 x 64 x 27	9	60	8	150
HTS 150	•	89 x 64 x 27	15	30	36	120
HTS 180	◦	89 x 64 x 27	18	30	36	120
HTS 300	•	140 x 103 x 35	30	30	68	150
HTS 340	◦	140 x 103 x 35	34	30	68	150
HTS 100-20	• LED indicators. Very compact design - CF options partly not applicable!	103 x 70 x 35	10	200	2.2	200
HTS 200-10	• LED indicators. Very compact design - CF options partly not applicable!	103 x 70 x 35	20	100	8.8	200
HTS 220-10	◦ LED indicators. Very compact design - CF options partly not applicable!	103 x 70 x 35	22	100	8.8	200
HTS 200-20	• LED indicators. Very compact design - CF options partly not applicable!	155 x 70 x 35	20	200	4	200
HTS 400-10	• LED indicators. Very compact design - CF options partly not applicable!	155 x 70 x 35	40	100	16	200
HTS 300-20	• LED indicators. Very compact design - CF options partly not applicable!	206 x 70 x 35	30	200	6	200
HTS 600-10	• LED indicators. Very compact design - CF options partly not applicable!	206 x 70 x 35	60	100	24	200
HTS 400-20	• LED indicators. Very compact design - CF options partly not applicable!	266 x 70 x 35	40	200	8	200
HTS 800-10	• LED indicators. Very compact design - CF options partly not applicable!	343 x 70 x 35	80	100	32	200
HTS 500-10	• Tubular housing. 8mm bolts on each end for HV & attachment. Separate control unit.	l=400 x d=80	50	100	20	200
HTS 500-20	• Tubular housing. 8mm bolts on each end for HV & attachment. Separate control unit.	l=400 x d=80	50	200	10	200
HTS 1000-10	• Tubular housing. 8mm bolts on each end for HV & attachment. Separate control unit.	l=700 x d=80	100	100	40	250
HTS 1000-20	• Tubular housing. 8mm bolts on each end for HV & attachment. Separate control unit.	l=700 x d=80	100	200	20	250
HTS 1500-10	• Tubular housing. 8mm bolts on each end for HV & attachment. Separate control unit.	l=1000 x d=80	150	100	60	300
HTS 1500-20	• Tubular housing. 8mm bolts on each end for HV & attachment. Separate control unit.	l=1000 x d=80	150	200	30	300
Old models	Switches are available, but not recommended for new development:					
HTS 30 (old ref.)	X Use HTS 40-06 for new developments	70 x 50 x 26	3	30	8	120
HTS 50 (old ref.)	X Use HTS 50-05 for new developments	70 x 50 x 26	5	30	12	120
HTS 80 (old ref.)	X Use HTS 80-03 for new developments	70 x 50 x 26	8	30	20	120
HTS 650	X Use HTS 600-10 / HTS 800-10 for new developments	280 x 103 x 35	65	30	136	200

Options (1)

HFB	High Frequency Burst: Improved burst capability of driver by means of external buffer capacitors. Recommended if more than 10 pulses with less than 10 μ s spacing are generated.
HFS	High Frequency Switching: External supply of auxiliary driver voltage (50-350 VDC according to type). Necessary if the specified "Maximum Operating Frequency" shall be exceeded. (2)
LP	Low Pass: Low pass filter at the control input. Propagation delay time will be increased by ~50 ns. Jitter + 500 ps. Improved EMC and less critical wiring in high speed applications. (3)
S-ON	Soft Turn-On: Turn-On Rise Time increased by ~20%. Simplified EMC design and less critical wiring if the shortest possible edge steepness is not required. (3)
S-OFF	Soft Turn-Off: Turn-Off Rise Time increased by ~20%. Simplified EMC design and less critical wiring if the shortest possible edge steepness is not required. (3)
S-TT	Soft Transition Time: Turn-On Rise Time & Turn-Off Rise Time increased by ~20%. Simplified EMC design if the shortest possible edge steepness is not required. (3)
TT-C	Customized Transition Time: Customized rise & fall times to meet individual design requirements. (2)
TT-P	Programmable Transition Time: Switching speed adjustable in certain limits by means of external programming resistors. (2)
OT-1μ	On-Time Extension: On-Time increased to approx. 1 μ s (-10%, +30%). Turn-Off Rise Time >500 ns.
OT-10μ	On-Time Extension: On-Time increased to approx 10 μ s (-10%, +30%). Turn-Off Rise Time > 5 μ s.
OT-100μ	On-Time Extension: On-Time increased to approx 100 μ s (-10%, +30%). Turn-Off Rise Time >50 μ s.
OT-100n	On-Time Reduction: On-Time reduced to approx 100ns (-5%, +10%). Not for all models available. Please consult Behlke.
OT-75n	On-Time Reduction: On-Time reduced to approx 75ns (-5%, +10%). Not for all models available. Please consult Behlke.
OT-50n	On-Time Reduction: On-Time reduced to approx 50ns (-5%, +10%). Not for all models available. Please consult Behlke.
OT-25n	On-Time Reduction: On-Time reduced to approx 25ns (-5%, +10%). Not for all models available. Please consult Behlke.
OT-C	Customized On-Time: On-Time according to customer's specifications. Any value between 25 ns and 100 μ s.
MIN-PS	Minimum Pulse Spacing: Individually increased Recovery Time to ensure a minimum HV pulse spacing independtly of control pulse spacing. For safety relevant circuits.
ST	Stage Tapping: Connectors at the individual stages of stack in order to utilize single power semiconductors. To achieve fast rise times also at very low operating voltages.
LNC	Low Natural Capacitance: CN reduced by approximately 30%. To minimize capacitive power losses in applications with high switching frequency and high switching voltage.
LL	Low Leakage Current: Off-state current reduced to less than 10% of the specified value. Not available in connection with the cooling fin options and for switches of the UF series.
ISO-25	25 kV Isolation: Isolation Voltage increased to 25 kVDC. Housing dimensions may change for some models.
ISO-40	40 kV Isolation: Isolation Voltage increased to 40 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV or TH.

ISO-80	80 kV Isolation: Isolation Voltage increased to 80 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV or TH.
ISO-120	120 kV Isolation: Isolation Voltage increased to 120 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV or TH.
ISO-200	200 kV Isolation: Isolation Voltage increased to 200 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV or TH.
SEP-C	Separated Control Unit. Control unit with LED indicators in a separate housing (dim. 79x38x17 mm). Linkage cable (<1m) with plug. Control unit with soldering pins or pigtails
I-PC	Integrated Part Components: Integration of small part components according to customer's specifications (e.g. buffer capacitors, snubbers, damping resistors, diodes, opto couplers). (2)
LS-C	LEMO socket for Control Connection. Input Z=100Ω. An assembled linkage cable (1m/3ft) with two plugs and one socket is included in supply. Improved noise immunity. (3)
PT-C	Pigtail for Control Connection: Flexible leads (l=75 mm) with PCB connector. This option is only relevant for switching modules with pins, which must be replaced if option CF & GCF is ordered.
PIN-C	Pins for Control Connection: Gold plated pins for printed circuit board designs (special sockets available). This option is only relevant for switching modules which have pigtails as standard.
PT-HV	Pigtails for HV Connection: Flexible leads with cable lugs. For increased creepage. PT-HV is standard for all types with >25 kV switching voltage. Not recommended in extremely fast circuits.
ST-HV	Screw Terminals for HV Connection: Threaded inserts at the bottom of module (if not standard). For PCB design. Operation above 25 kV requires liquid insulation or potting.
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	Non-Isolated Cooling Fins: Standard sizes in categories I to VII according to model. Nickel plated copper 0.5 mm, fin height 35 mm. For air cooling and oil immersion.
CF-1	Non-Isolated Cooling Fins d=1mm: Nickel plated copper 1.0 mm instead of 0.5 mm. The Max. Power Dissipation will be increased by ~80 %. For air cooling and oil immersion.
CF-X2	Non-Isolated Cooling Fins enlarged by x2: Fin area enlarged by factor 2. Not relevant in connection with oil cooling.
CF-X3	Non-Isolated Cooling Fins enlarged by x3: Fin area enlarged by factor 3. Not relevant in connection with oil cooling.
CF-CS	Non-Isolated Cooling Fins with customized shape: Individual shape to meet specific OEM requirements. (2)
CF-LC	Non-isolated Cooling Fins optimized for liquid cooling: Double fins, nickel plated copper, 0.5 mm thickness, height 20 mm.
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, height 35 mm.
CCS	Ceramic Cooling Surface. Top side of switching module made of special ceramics. Heat transfer properties similar to alumina. Forced convection recommended.
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 High Power applications. 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 including mains water. Internal heat exchanger made of ceramics. For medium power applications.
DLC	Direct Liquid Cooling: Internal cooling channels around the power semiconductors. The most efficient cooling solution especially for high frequency applications. For 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.
(4) This option is not available in connection with Sync. I/O for parallel connection. Please consult factory for detailed information.

Further information, data sheets and drawings are available on request. All data and specifications subject to change without notice. BEHLKE POWER ELECTRONICS 07-11-2011

