

## C8

## HV switch, variable on-time, push-pull, MOSFET

- HV push-pull switch in halfbridge configuration
- Two switching paths for fast rise and fall time
- Safe operation due to passive switching path locking
- No cross-over current
- Ideal for precise HV square wave pulses into capacitive load
- No working resistor required
- No necessity for large HV input energy storage capacitors

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 31-03-HB-C:** HTS = HV Transistor Switch, 3 = 3 kV, 1 = variable on-time, 03 = 30 Ampere, HB = Half Bridge, C = Compact Series.

Model [sorted by dimensions]	Description / Comment • Preferred stock type ◦ Limited stock X Not for new development	Dimensions [mm3]	Voltage [kV]	Pk. Current [A]	On-Resist. [Ω]	On-Time [ns]
HTS 11-07-HB-C	• Compact series. HV screw connectors at bottom side (for PCB's)	79 x 38 x 17	2 x 1.2	2 x 70	2 x 1.2	50...∞
HTS 31-03-HB-C	• Compact series. HV screw connectors at bottom side (for PCB's)	79 x 38 x 17	2 x 3	2 x 30	2 x 5	50...∞
HTS 31-13-HB-B-C	• Compact series. HV screw connectors at bottom side (for PCB's)	79 x 38 x 17	2 x 3.9	2 x 130	2 x 0.5	150...∞
HTS 41-02-HB-LC-C	• Compact series. HV screw connectors at bottom side (for PCB's)	79 x 38 x 17	2 x 4.8	2 x 25	2 x 7	50...∞
HTS 61-01-HB-C	• Compact series. HV screw connectors at bottom side (for PCB's)	79 x 38 x 17	2 x 6	2 x 15	2 x 22	50...∞
HTS 91-01-HB-C	• Compact series. HV screw connectors at bottom side (for PCB's)	79 x 38 x 17	2 x 9	2 x 12	2 x 42	50...∞
HTS 21-07-HB-C	• Compact series. HV screw connectors at bottom side (for PCB's)	79 x 38 x 17	2 x 2.4	2 x 70	2 x 2.4	50...∞
HTS 61-03-HB-C	• Compact series. HV screw connectors at bottom side (for PCB's)	125 x 38 x 17	2 x 6	2 x 30	2 x 10	70...∞
HTS 71-13-HB-B-C	• Compact series. HV screw connectors at bottom side (for PCB's)	125 x 38 x 17	2 x 7.8	2 x 130	2 x 1	180...∞
HTS 91-02-HB-LC-C	• Compact series. HV screw connectors at bottom side (for PCB's)	125 x 38 x 17	2 x 9.6	2 x 25	2 x 15	70...∞
HTS 121-01-HB-C	• Compact series. HV screw connectors at bottom side (for PCB's)	125 x 38 x 17	2 x 12	2 x 15	2 x 44	70...∞
HTS 181-01-HB-C	• Compact series. HV pigtailed at front side (for free wiring)	140 x 38 x 20	2 x 18	2 x 12	2 x 84	70...∞
HTS 111-13-HB-B-C	• Compact series. HV screw connectors at bottom side (for PCB's)	158 x 38 x 17	2 x 11.7	2 x 130	2 x 1.5	220...∞
HTS 21-03-GSM	• HV soldering connectors at front side	89 x 64 x 27	2 x 2	2 x 30	2 x 3.4	80...∞
HTS 21-06-GSM	• HV soldering connectors at front side	89 x 64 x 27	2 x 2	2 x 60	2 x 1.7	80...∞
HTS 31-01-GSM	• HV soldering connectors at front side	89 x 64 x 27	2 x 3	2 x 15	2 x 16	80...∞
HTS 31-03-GSM	• HV soldering connectors at front side	89 x 64 x 27	2 x 3	2 x 30	2 x 8	80...∞
HTS 41-03-GSM	• HV screw connectors at bottom side (for PCB attachment)	112 x 64 x 27	2 x 4	2 x 30	2 x 7.2	60...∞
HTS 41-06-GSM	• HV screw connectors at bottom side (for PCB attachment)	112 x 64 x 27	2 x 4	2 x 60	2 x 3.6	60...∞
HTS 61-01-GSM	• HV screw connectors at bottom side (for PCB attachment)	112 x 64 x 27	2 x 6	2 x 15	2 x 32	60...∞
HTS 61-03-GSM	• HV screw connectors at bottom side (for PCB attachment)	112 x 64 x 27	2 x 6	2 x 30	2 x 16	60...∞
HTS 81-03-GSM	• HV screw connectors at bottom side (for PCB attachment)	163 x 64 x 27	2 x 8	2 x 30	2 x 16	150...∞
HTS 81-06-GSM	• HV screw connectors at bottom side (for PCB attachment)	163 x 64 x 27	2 x 8	2 x 60	2 x 8	150...∞
HTS 151-01-GSM	• HV screw connectors at bottom side (for PCB attachment)	163 x 64 x 27	2 x 15	2 x 15	2 x 72	150...∞
HTS 151-03-GSM	• HV screw connectors at bottom side (for PCB attachment)	163 x 64 x 27	2 x 15	2 x 30	2 x 36	150...∞
HTS 111-03-GSM	• HV screw connectors at bottom side (for PCB attachment)	200 x 70 x 28	2 x 11	2 x 30	2 x 20.4	150...∞
HTS 111-06-GSM	• HV screw connectors at bottom side (for PCB attachment)	200 x 70 x 28	2 x 11	2 x 60	2 x 10.2	150...∞
HTS 201-01-GSM	• HV screw connectors at bottom side (for PCB attachment)	200 x 70 x 28	2 x 20	2 x 15	2 x 96	150...∞
HTS 201-03-GSM	• HV screw connectors at bottom side (for PCB attachment)	200 x 70 x 28	2 x 20	2 x 30	2 x 48	150...∞
HTS 161-03-GSM	• HV screw connectors at bottom side (for PCB attachment)	263 x 70 x 35	2 x 16	2 x 30	2 x 32	150...∞
HTS 161-06-GSM	• HV screw connectors at bottom side (for PCB attachment)	263 x 70 x 35	2 x 16	2 x 60	2 x 16	150...∞
HTS 301-01-GSM	• HV pigtail connectors at front side (PT-HV, for free wiring)	263 x 70 x 35	2 x 30	2 x 15	2 x 144	150...∞
HTS 301-03-GSM	• HV pigtail connectors at front side (PT-HV, for free wiring)	263 x 70 x 35	2 x 30	2 x 30	2 x 72	150...∞
HTS 301-10-GSM	• HV pigtail connectors at front side (PT-HV, for free wiring)	263 x 70 x 35	2 x 30	2 x 100	2 x 14	200...∞
HTS 651-01-GSM	• HV pigtail connectors at front or top side (PT-HV, for free wiring)	312 x 200 x 47	2 x 65	2 x 15	2 x 288	250...∞
HTS 651-03-GSM	• HV pigtail connectors at front or top side (PT-HV, for free wiring)	312 x 200 x 47	2 x 65	2 x 30	2 x 144	250...∞
HTS 651-10-GSM	• HV pigtail connectors at front or top side (PT-HV, for free wiring)	312 x 200 x 47	2 x 65	2 x 100	2 x 28	300...∞
HTS 901-10-GSM	• HV pigtail connectors at front or top side (PT-HV, for free wiring)	372 x 200 x 47	2 x 90	2 x 100	2 x 32	300...∞
HTS 901-20-GSM	• HV pigtail connectors at front or top side (PT-HV, for free wiring)	372 x 200 x 47	2 x 90	2 x 200	2 x 16	300...∞
HTS 1401-10-GSM	• HV pigtail connectors at front or top side (PT-HV, for free wiring)	672 x 350 x 90	2 x 140	2 x 100	2 x 52	300...∞
HTS 1401-20-GSM	• HV pigtail connectors at front or top side (PT-HV, for free wiring)	672 x 350 x 90	2 x 140	2 x 200	2 x 26	300...∞
HTS 80-PGSM	X Replaced by HTS 91-01-HB-C (compact series)					
HTS 150-PGSM	X Replaced by HTS 181-01-HB-C (compact series)					

### Options (1)

<b>HFB</b>	<b>High Frequency Burst:</b> Improved burst capability of driver by means of external buffer capacitors. Recommended if more than 10 pulses with less than 10 μs spacing are generated.
<b>HFS</b>	<b>High Frequency Switching:</b> External supply of auxiliary driver voltage (50-350 VDC according to type). Necessary if the specified "Maximum Operating Frequency" shall be exceeded. (2)
<b>LP</b>	<b>Low Pass:</b> Low pass filter at the control input. Propagation delay time will be increased by ~50 ns. Jitter + 500 ps. Improved noise immunity and less critical wiring in high speed applications. (3)
<b>S-TT</b>	<b>Soft Transition Time:</b> "Turn-On Rise Time" & "Turn-Off Rise Time" increased by ~20%. Simplified EMC design and less critical wiring if the shortest possible edge steepness is not required. (3)
<b>LNC</b>	<b>Low Natural Capacitance:</b> C <sub>N</sub> reduced by approximately 30%. To minimize capacitive power losses in applications with high switching frequency and high switching voltage (P <sub>c</sub> = V <sup>2</sup> x C x f).
<b>LL</b>	<b>Low Leakage Current:</b> 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.

<b>LN</b>	<b>Low Noise:</b> Internal power driver modified for zero noise emission for a specific period of time. Relevant in conjunction with sensitive detector amplifiers (e.g. SEV/MCP applications) only. (2)
<b>ISO-25</b>	<b>25 kV Isolation:</b> Isolation Voltage increased to 25 kVDC. Housing dimensions may change for some models.
<b>ISO-40</b>	<b>40 kV Isolation:</b> Isolation Voltage increased to 40 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV.
<b>ISO-80</b>	<b>80 kV Isolation:</b> Isolation Voltage increased to 80 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV.
<b>ISO-120</b>	<b>120 kV Isolation:</b> Isolation Voltage increased to 120 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV.
<b>ISO-200</b>	<b>200 kV Isolation:</b> Isolation Voltage increased to 200 kVDC. Housing dimensions may change for some models. Only in connection with option PT-HV.
<b>I-PC</b>	<b>Integrated Part Components:</b> Integration of small part components according to customer's specifications (e.g. buffer capacitors, snubbers, damping resistors, diodes, opto couplers). (2)
<b>PC</b>	<b>Pulser Configuration.</b> Switch combined with custom specific part components. Integrated in a flange housing with hv connectors according to the customers specifications. (2)
<b>I-FWD</b>	<b>Integrated Free-Wheeling Diode:</b> Built-in parallel diode with short recovery time. In connection with inductive load only.
<b>I-FWDN</b>	<b>Integrated Free-Wheeling Diode Network:</b> Built-in parallel diode plus serial blocking diode with short recovery time. In connection with inductive load only.
<b>LS-C</b>	<b>LEMO socket for Control Connection.</b> Input Z=100Ω. An assembled linkage cable (1m/3ft) with two plugs and one socket is included in supply. For improved noise immunity. (3)
<b>PT-C</b>	<b>Pigtails for Control Connection:</b> Flexible leads (l=75 mm) with AMP-modu plug. Refers to switching modules with pins only. Suggested for modules with options CF & GCF.
<b>PT-HV</b>	<b>Pigtails for HV Connection:</b> Flexible leads with cable lugs. For increased creepage. PT-HV is standard for all types with >25 kV switching voltage. Not for extremely fast circuits.
<b>ST-HV</b>	<b>Screw Terminals for HV Connection:</b> Threaded inserts at the bottom of module for PCB attachment. Operation above 25 kV requires liquid insulation (Galden®/Oil) or potting.
<b>SEP-C</b>	<b>Separated Control Unit.</b> Control unit with LED indicators in a separate housing (dim. 79x38x17 mm). Linkage cable (<1m) with plug. Control unit with soldering pins or pigtails.
<b>UL94</b>	<b>Flame Retardant Casting Resin:</b> Casting resin according to UL-94-V0. Minimum order quantity required. (2)
<b>TH</b>	<b>Tubular Housing:</b> Tubular instead of rectangular housing. Adaption to specific ambient conditions or in case of difficult assembly situations. (2)
<b>FC</b>	<b>Flat Case:</b> Height of standard plastic housings reduced to 19 mm or less. Not in combination with cooling options CF, GCF and DLC.
<b>ITC</b>	<b>Increased Thermal Conductivity:</b> Special moulding process to increase the thermal conductivity of the module. $P_{d(max)}$ will be increased by approx. 20-30%. (2)
<b>CF</b>	<b>Non-Isolated Cooling Fins:</b> Standard sizes in categories I to VII according to model. Nickel plated copper 0.5 mm, fin height 35 mm. For air and oil cooling.
<b>CF-1</b>	<b>Non-Isolated Cooling Fins d=1mm:</b> Nickel plated copper 1.0 mm instead of 0.5 mm. The Max. Power Dissipation will be increased by ~80 %. For air and oil cooling.
<b>CF-X2</b>	<b>Non-Isolated Cooling Fins enlarged by x2:</b> Fin area enlarged by factor 2. Not relevant in connection with liquid cooling.
<b>CF-CS</b>	<b>Non-Isolated Cooling Fins with customized shape:</b> Individual shape to meet specific OEM requirements. (2)
<b>CF-LC</b>	<b>Non-isolated Cooling Fins optimized for liquid cooling:</b> Double fins, nickel plated copper, 0.5 mm thickness, height 20 mm.
<b>CF-GRA</b>	<b>Non-isolated Cooling Fins made of graphite.</b> Very light weight compared to copper at similar heat transfer, but reduced heat capacity. 0.5 or 1 mm thickness, height 35 mm.
<b>CF-CER</b>	<b>Isolated Cooling Fins made of ceramics.</b> Heat transfer properties similar to alumina. Forced convection recommended, height 35 mm.
<b>CCS</b>	<b>Ceramic Cooling Surface.</b> Top side of switching module made of special ceramics. Heat transfer properties similar to alumina. Forced convection recommended.
<b>C-DR</b>	<b>Cooling for Driver:</b> Extra cooling for the driver and control electronics. Recommended in combination with option HFS at higher switching frequencies. (2)
<b>GCF</b>	<b>Grounded Cooling Flange:</b> Nickel-plated copper flange for medium power. Max. isolation voltage 40kV. Increased coupling capacitance $C_C$ .
<b>ILC</b>	<b>Indirect Liquid Cooling:</b> Liquid cooling for all kind of conductive coolants incl. water. Internal heat exchanger made of ceramics. For medium power dissipation.
<b>DLC</b>	<b>Direct Liquid Cooling:</b> Internal cooling channels around the power semiconductors. The most efficient cooling for high frequency applications. Non-conductive coolants only.
<b>HI-REL</b>	<b>High Reliability / MIL Versions:</b> 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. BEHLKE POWER ELECTRONICS 07-11-2011

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