

- Extremely low impedance ● Very fast transition times ● Very EMC tolerant ● Robust regarding overload and voltage reversal ● Low control power at high switching frequency
- Designed for attachment on PCB's ● Available with on-time options from 50 ns to 250 ns

| Model [sorted by housing dimensions] | Description / Comment<br>● Preferred stock type ○ Limited stock X Not recommended for new development | Dimensions [mm <sup>3</sup> ] | Voltage [kV] | Pk. Current [A] | On-Resist. [Ω] | On-Time [ns] |
|--------------------------------------|---|-------------------------------|--------------|-----------------|----------------|--------------|
| HTS 05-160                           | ●   | 89 x 64 x 31                  | 0.5          | 1600            | 0.08           | 150          |
| HTS 10-70                            | ●   | 89 x 64 x 31                  | 1            | 700             | 0.017          | 150          |
| HTS 20-36                            | ●   | 89 x 64 x 31                  | 2            | 360             | 0.36           | 150          |
| HTS 30-12                            | ●   | 89 x 64 x 31                  | 3            | 120             | 1              | 150          |
| HTS 50-12                            | ●   | 89 x 64 x 31                  | 5            | 120             | 1.7            | 150          |
| HTS 25-32                            | ●   | 89 x 64 x 31                  | 2.5          | 320             | 0.85           | 150          |
| HTS 50-16                            | ●   | 89 x 64 x 31                  | 5            | 160             | 1.7            | 150          |
| HTS 60-16                            | ● Very compact design - CF options partly not applicable!   | 89 x 64 x 31                  | 6            | 160             | 2              | 150          |
| HTS 80-07                            | ●   | 89 x 64 x 31                  | 8            | 70              | 8              | 150          |
| HTS 40-32                            | ●   | 122 x 64 x 31                 | 4            | 320             | 1.35           | 150          |
| HTS 80-16                            | ●   | 122 x 64 x 31                 | 8            | 160             | 2.7            | 150          |
| HTS 50-32                            | ●   | 153 x 64 x 31                 | 5            | 320             | 1.7            | 150          |
| HTS 100-16                           | ●   | 153 x 64 x 31                 | 10           | 160             | 3.4            | 150          |
| HTS 140-25                           | ● LED indicators & Sync. I/O. Very compact design - CF options partly not applicable!                 | 174 x 103 x 35                | 14           | 250             | 3              | 150          |
| HTS 70-50                            | ● LED indicators & Sync. I/O for parallel connection  | 204 x 103 x 35                | 7.5          | 500             | 1.5            | 150          |
| HTS 150-25                           | ● LED indicators & Sync. I/O for parallel connection  | 204 x 103 x 35                | 15           | 250             | 3              | 150          |
| HTS 100-50                           | ● LED indicators & Sync. I/O for parallel connection  | 253 x 103 x 35                | 10           | 500             | 2.12           | 150          |
| HTS 200-25                           | ● LED indicators & Sync. I/O for parallel connection  | 253 x 103 x 35                | 20           | 250             | 4.24           | 150          |
| HTS 400-12                           | ● LED indicators & Sync. I/O for parallel connection  | 253 x 103 x 35                | 40           | 120             | 20             | 150          |

## Option ① Description

|         |  |
|---------|--|
| HFB     | <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.  |
| HFS     | <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   |
| LP      | <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                           |
| S-ON    | <b>Soft Turn-On:</b> 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   | <b>Soft Turn-Off:</b> Turn-Off Rise Time increased by ~20%. Simplified EMC design and less critical wiring if the shortest possible edge steepness is not required. ③  |
| ST      | <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                                     |
| TT-C    | <b>Customized Transition Time:</b> Customized rise & fall times to meet individual design requirements. ②  |
| TT-P    | <b>Programmable Transition Time:</b> Switching speed adjustable in certain limits by means of external programming resistors. ②  |
| OT-P    | <b>Programmable On-Time:</b> On-Time adjustable in certain limits by means of external programming resistors. ②  |
| OT-C    | <b>Customized On-Time:</b> On-Time according to customer's specifications. Any value between 50 ns and 250 ns. ②   |
| MIN-PS  | <b>Minimum Pulse Spacing:</b> Individually increased Recovery Time to ensure a minimum HV pulse spacing independently of control pulse spacing. For safety relevant circuits.  |
| ST      | <b>Stage Tapping:</b> 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 (<0.01xVo).                                       |
| LNC     | <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). |
| LL      | <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.   |
| ISO-25  | <b>25 kV Isolation:</b> Isolation Voltage increased to 25 kVDC. Housing dimensions may change for some models.   |
| ISO-40  | <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.   |
| ISO-80  | <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.   |
| ISO-120 | <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.   |
| I-PC    | <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                                       |
| I-FWD   | <b>Integrated Free-Wheeling Diode:</b> Built-in parallel diode with short recovery time. In connection with inductive load only.   |
| I-FWDN  | <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.  |
| SPT-C   | <b>Shielded Pigtail for Control Connection:</b> Cable (l=300mm, Z=100Ω) with LEMO plug+socket and 100Ω termination. Improved noise immunity in case of long distance to driver circuits. ③   |
| PT-C    | <b>Pigtail for Control Connection:</b> Flexible leads (l=75 mm) with PCB connector. This option is only relevant for switching modules with pins. Recommended for modules with options CF & GCF.                                     |
| PIN-C   | <b>Pins for Control Connection:</b> 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   | <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 recommended in extremely fast circuits.                                |
| ST-HV   | <b>Screw Terminals for HV Connection:</b> Threaded inserts at the bottom of module (if not standard). For PCB design. Operation above 25 kV requires liquid insulation (Galden®/Oil) or potting.                                     |
| ITC     | <b>Increased Thermal Conductivity:</b> Special moulding process to increase the thermal conductivity of the module. P <sub>dlmax</sub> will be increased by approx. 20-30%. ②  |
| UL94    | <b>Flame Retardant Casting Resin:</b> Casting resin according to UL-94-V0. Minimum order quantity required. ②  |
| TH      | <b>Tubular Housing:</b> Tubular instead of rectangular housing. Adaption to specific ambient conditions or in case of difficult assembly situations. ②   |
| FC      | <b>Flat Case:</b> Height of standard plastic housings reduced to 19 mm or less. Not in combination with cooling options CF, GCF, DLC and HPMC.   |
| CF      | <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 liquid cooling (e.g. Galden® or oil).   |
| CF-1    | <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 liquid cooling (e.g. Galden® or oil).                                       |
| CF-X2   | <b>Non-Isolated Cooling Fins enlarged by x2:</b> Fin area enlarged by factor 2. Not relevant in connection with liquid cooling.  |
| CF-X3   | <b>Non-Isolated Cooling Fins enlarged by x3:</b> Fin area enlarged by factor 3. Not relevant in connection with liquid cooling and forced air convection.  |
| CF-CS   | <b>Non-Isolated Cooling Fins with customized shape:</b> Individual shape to meet specific OEM requirements. ②  |
| CF-LC   | <b>Non-Isolated Cooling Fins optimized for liquid cooling:</b> Double fins, nickel plated copper, 0.5 mm thickness., height 20 mm.   |
| CF-DR   | <b>Cooling Fin for Driver:</b> Small extra cooling fin for the control electronics. On ground potential. Can be necessary in combination with HFS. ②   |
| GCF     | <b>Grounded Cooling Flange:</b> Nickel-plated copper flange for High Power applications. Max. isolation voltage 40kV. Increased coupling capacitance C <sub>c</sub> . In combination with option SPT-C only.                         |
| GCF-X2  | <b>Grounded Cooling Flange, Max. Continuous Power Dissipation increased by x2:</b> Thermal resistance "Switch to Flange" reduced for twice the power capability. ②   |
| GCF-W   | <b>Water Cooler for Grounded Cooling Flange:</b> Flat water cooling plate attached to the grounded cooling flange GCF. With water inlet and outlet.  |
| DLC     | <b>Direct Liquid Cooling:</b> Internal liquid channel in direct contact with the power semiconductors. Very compact cooling solution for medium power. Galden® and non-conductive liquids only. ②                                    |
| HPMC    | <b>High Power Metal Case:</b> Potential free & hermetically sealed metal housing filled with Galden®. Available both with heat sink flange or with secondary water coolant circulation. From I/2002. ②                               |
| HI-REL  | <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 technical information, detailed data sheets and mechanical drawings are available on request. All data and specifications subject to change without notice.

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