

- Versatile switching elements with true relay character
- On-time controllable by TTL signal
- Low turn-on losses
- Very high peak current capability
- Current rise time 25 ~ 150 ns

Model [sorted by housing dimensions]	Description / Comment ● Preferred stock type ○ Limited stock X Not recommended for new development	Dimensions [mm <sup>3</sup> ]	Voltage [kV]	Pk. Current [A]	Sat. Voltage [V] @ 0.1 I(max)	On-Time [μs]
HTS 31-480-SI	● Standard IGBT	200 x 76 x 25	3	4800	9	1 μs...∞
HTS 51-240-SI	● Standard IGBT	200 x 76 x 25	5	2400	15	1 μs...∞
HTS 61-240-SI	● Standard IGBT	200 x 76 x 25	6	2400	18	1 μs...∞
HTS 31-320-FI	● Fast IGBT	200 x 76 x 25	3	3200	13	0.2 μs...∞
HTS 51-160-FI	● Fast IGBT	200 x 76 x 25	5	1600	27	0.2 μs...∞
HTS 61-160-FI	● Fast IGBT	200 x 76 x 25	6	1600	22	0.2 μs...∞
HTS 101-120-SI	● Standard IGBT	153 x 102 x 25	10	1200	30	1 μs...∞
HTS 101-80-FI	● Fast IGBT	153 x 102 x 25	10	800	44	0.2 μs...∞
HTS 31-960-SI	● Standard IGBT	252 x 200 x 45	3	9600	9	1 μs...∞
HTS 61-480-SI	● Standard IGBT	252 x 200 x 45	6	4800	18	1 μs...∞
HTS 31-640-FI	● Fast IGBT	252 x 200 x 45	3	6400	13	0.2 μs...∞
HTS 61-320-FI	● Fast IGBT	252 x 200 x 45	6	3200	22	0.2 μs...∞
HTS 121-240-SI	● Standard IGBT	252 x 200 x 45	12	2400	36	1 μs...∞
HTS 121-160-FI	● Fast IGBT	252 x 200 x 45	12	1600	44	0.2 μs...∞
HTS 91-480-SI	● Standard IGBT	312 x 200 x 45	9	4800	27	1 μs...∞
HTS 181-240-SI	● Standard IGBT	312 x 200 x 45	18	2400	54	1 μs...∞
HTS 91-320-FI	● Fast IGBT	312 x 200 x 45	9	3200	39	0.2 μs...∞
HTS 181-160-FI	● Fast IGBT	312 x 200 x 45	18	1600	66	0.2 μs...∞
HTS 181-400-FI	- Under development. Sync. I/O. Modular design, separate control part	372 x 250 x 45	18	4000		0.3 μs...∞
HTS 361-200-FI	- Under development. Sync. I/O. Modular design, separate control part	372 x 250 x 45	36	2000		0.3 μs...∞

## 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-TT	<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
MIN-ON	<b>Minimum On-Time:</b> Individually increased Minimum On-Time to ensure a minimum on duration independently of control signal. For safety relevant circuits.
MIN-OFF	<b>Minimum Off-Time:</b> Individually increased Minimum Off-Time to ensure a minimum off duration independently of control signal. 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.
LN	<b>Low Noise:</b> Internal power driver modified for zero noise emission for a specific period of time. Relevant in conjunction with extremely sensitive detector amplifiers (e.g. SEV/MCP applications) only. ②
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.
PL	<b>Passive Lock:</b> Special inhibit function for two single switches in fast push-pull circuits. The input of the passive switch will be locked by the activated switch to avoid turn-on by noise.
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.
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.

Mar. 2002