	Specification	Symbol	Condition / Comment		HTS 80-2000 SCR	Unit
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	$V_{O(max)}$	I_{off} < 600 µADC, T_{case} = 70°C		8	kVDC
	Minimum Operating Voltage	$V_{O(min)}$			1500	VDC
	Maximum Isolation Voltage	V_I	Between HV switch and control / GND, continuously		± 15	kVDC
	Max. Housing Insulation Voltage	V_{INS}	Between switch and housing surface, 3 minutes		± 10	kVDC
	Maximum Turn-On Peak Current	$I_{P(max)}$	T_{case} = 25°C	t_p< 200 µs, duty cycle <1% t_p< 1 ms, duty cycle <1% t_p< 10 ms, duty cycle <1% t_p< 100 ms, duty cycle <1%	20000 10000 7700 3600	ADC
	Max. Non-Repetitive Peak Current	$I_{p(nr)}$	T_{case} = 25°C	Half sine single pulse, tp<200 µs Half sine single pulse, tp<20 µs	20000 40000	ADC
	Max. Coutinuous Load Current	I_L	T_{case} = 25°C		5.4	ADC
	Max. Rate-of-Rise of OFF-State Voltage	dv/dt	@ $V_{O(max)}$, exponential waveform		125	kV/ µs
	Max. Continuous Power Dissipation	$P_{d(max)}$	T_{case} = 25°C	Standard devices & FC, forced air 4 m/s Opt. CF- Copper cooling Fins, forced air 4 m/s	26 260	Watt
	Linear Derating		Above 25°C	Standard devices & FC, forced air 4 m/s Opt. CF- Copper cooling Fins, forced air 4 m/s	0.58 5.77	W/K
	Operating Temperature Range	T_O	Standard devices & options CF, GCF, ILC. (Option DLC)		-40...75	C°
	Storage Temperature Range	T_S	Switches with option ILC may require frost protection!		-50...90	C°
	Max. Permissible Magnetic Field	B	Homogeneous steady-field, surrounding the whole switch		25	mT
	Max. Auxilliary Voltage	V_{aux}	Built-in overvoltage limiter (replaceable)		5	VDC
ELECTRICAL CHARACTERISTICS	Permissible Operating Voltage Range	V_O			0... ± 8	kVDC
	Typical Breakdown Voltage	V_{br}	**NOTE:** V_{br} is a test parameter for quality control purposes only. Not applicable in	I_{off} > 0.5 mA	>8.8	kVDC
	Typical Off-State Current	I_{off}	0.8xV_O, T_{case} =25...70°C, reduced I_{off} on request		< 600	µADC
	Typical Holding Current			Tcase=70°C	35	mADC
	Typical On-State Voltage	V_{sat}	Each switching path t_p < 1µs, duty cycle < 1%	0.01 x $I_{P(max)}$ 0.1 x $I_{P(max)}$ 1.0 x $I_{P(max)}$	150 310 830	VDC
	Typical Propagation Delay Time	$t_{d(on)}$	Resistive load, 0.1 x $I_{P(max)}$, 0.8 x $V_{O(max)}$, 50-50%		0.4	µs
	Typical Output Pulse Jitter	t_j	Impedance matched input, V_{aux} / V_{ctrl} = 5.00 VDC		1	ns
	Typical Turn-On Rise Time	$t_{r(on)}$	Resistive load, 10-90%	0.1 x $V_{O(max)}$, I_L = 0.1 x $I_{p(max)}$ 0.8 x $V_{O(max)}$, I_L = 0.1 x $I_{p(max)}$ 0.8 x $V_{O(max)}$, I_L = 1.0 x $I_{p(max)}$	TBD.	ns
	Typical Turn-Off Time	t_{off}, t_q	Resistive load, 10-90%	0.1 x $V_{O(max)}$, I_L = 0.1 x $I_{p(max)}$ 0.8 x $V_{O(max)}$, I_L = 1.0 x $I_{p(max)}$	35 90	ns
	On Time	t_{on}			35….∞	ns
	Internal Driver Recovery Time	t_{rc}			500	ns
	Max. Continuous Switching Frequency	$f_{(max)}$	@ V_{aux}= 5.00 V Sw. shutdown if $f_{(max)}$ is exceeded	Standard devices without HFS option Standard devices with HFS supply Opt. HFS + sufficient cooling option	TBD.	kHz
	Maximum Burst Frequency	$f_{b(max)}$	Use option HFB for >10 pulses within 20µs or less		10	kHz
	Maximum Number of Pulses / Burst	$N_{(max)}$	@ $f_{b(max)}$ Note: Option HFB requires external buffer capacitors with a voltage rating of > 630VDC and a cpacitance of 100nF per additional pulse	Standard Option I-HFB Option HFB	15 Use option HFB for >15 >100 >1000	Pulses
	Coupling Capacitance	C_C	HV side against control side		>280	pF
	Control Voltage Range	V_{ctrl}	The V_{ctrl} has no impact on the output pulse shape.		4… 5	VDC
	Auxiliary Supply Voltage Range	V_{aux}	The +5 V supply is not required in the HFS mode.		5	VDC
	Typical Auxiliary Supply Current	I_{aux}	V_{aux} = 5.00 VDC, T_{case} = 25°C. Active current limitation above 1A.	0.01 x $f_{(max)}$ @ $f_{(max)}$	TBD. 600	mADC
	Fault Signal Output		Switch will be turn off, if f>$f_{(max)}$, V_{aux}<4.75V or T_{case}>75°C Fault condition is indicated by a logical "L"		H=4V, L=0.5V	VDC
	Trigger Voltage Range	V_{TR}	Switching behaviour is not influenced by trigger quality		<10	VDC
HOUSING	Dimensions	LxWxH	Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC		Please contact the manufactured!	mm^3
	Weight		Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC		Please contact the manufactured!	g

FUNCTIONS	
Control Signal Input	**Pin 1** / Yellow. TTL compatible with Schmitt-Trigger characteristics. Control voltage 2-10 V (3-5 V recommended for low jitter).
Logic GND / 5V Return	**Pin 2** / Black. The ground pin is internally connected with the safety earthing terminal (threaded insert) on bottom side.
5V Auxiliary Supply	**Pin 3** / Red. The 5 V input is used for rep rates up to the specified max. frequency $f_{(max)}$. Higher rep rates require option HFS.
Fault Signal Output	**Pin 4** / Orange. TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault.
Inhibit Signal Input	**Pin 5** / Green. TTL compatible, Schmitt-Trigger characteristics for the connection of external safety circuits. L = Switch Inhibited.
LED Indicators	**GREEN**: "Auxiliary power good, switch OFF". **YELLOW**: "Control signal received, switch ON". **RED**: "Fault condition, switch OFF"
Temperature Protection	**A)** Standard switches and switches with option CF, GCF: Thermo trigger 75°C, response time < 60 s @ 3xPd(max), ΔT=25K (50 to 75°C). Separate driver protection. **B)** Switches with option DLC: 65°C, response time < 3 s @ 3xPd(max), ΔT=25K (40 to 65°C), coolant flow > 3l / min. Separate driver protection.

ORDERINGTI

HTS 80-2000 SCR	Thyristor Switch, 8 kVDC, 2000 ADC	**Option LP**	Low Pass. Input filter for increased noise immunity.	**Option CCS**	Ceramic Cooling Surface. $P_{d(max)}$ can be increased by the factor 2 to 3.
		Option S-TT	Soft Transition Time. Slower switching speed for simplified EMC.	**Option CCF**	Ceramic Flange Housing. $P_{d(max)}$ can be increased by the factor 3 to 15.
		Option HFB	High Frequency Burst, Improved burst capability by driver.	**Option CF**	Copper Cooling Fins. $P_{d(max)}$ can be increased by the factor 3 to 10.
		Option HFS	High Frequency Switching (two auxiliary supply inputs V1 & V2)	**Option GCF**	Grounded Cooling Flange (copper). $P_{d(max)}$ can be increased by the factor 3 to 15.
		Option UFTR	Ultra Fast Thermotrigger. Response time for shut down < 5s.	**Option ILC**	Indirect Liquid Cooling (for water). $P_{d(max)}$ can be increased by the factor 3 to 15.
		Option UFTS	Ultra Fast Thermosensor. Response time < 5s. NTC 10k / ± 1%	**Option DLC**	Direct Liquid Cooling (for FPE/PFC). $P_{d(max)}$ can be increased by the factor 10 to 100. 15.

FOR FURTHER PRODUCT OPTIONS PLEASE REFER TO THE OPTIONS PAGE.