

	Specification	Symbol	Condition / Comment	HTS 1600-1200 SCR	Unit	
<b>ABSOLUTE MAXIMUM RATINGS</b>	Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 400 \mu ADC$ , $T_{case} = 70^\circ C$	160	kVDC	
	Maximum Isolation Voltage	$V_I$	Between HV switch and control / GND, continuously	$\pm 160$	kVDC	
	Max. Housing Insulation Voltage	$V_{INS}$	Between switch and housing surface, 3 minutes	$\pm 100$	kVDC	
	Maximum Turn-On Peak Current	$I_{P(max)}$	$T_{case} = 25^\circ C$ $t_p < 200 \mu s$ , duty cycle $< 1\%$ $t_p < 1 ms$ , duty cycle $< 1\%$ $t_p < 10 ms$ , duty cycle $< 1\%$ $t_p < 100 ms$ , duty cycle $< 1\%$	10000 5000 3880 1800	ADC	
	Max. Non-Repetitive Peak Current	$I_{P(nr)}$	$T_{case} = 25^\circ C$ Half sine single pulse, $t_p < 200 \mu s$ Half sine single pulse, $t_p < 20 \mu s$	20000 40000	ADC	
	Max. Continuous Load Current	$I_L$	$T_{case} = 25^\circ C$	2.7	ADC	
	Max. Rate-of-Rise of OFF-State Voltage	$dv/dt$	@ $V_{O(max)}$ , exponential waveform	125	kV / $\mu s$	
	Max. Continuous Power Dissipation	$P_{d(max)}$	$T_{case} = 25^\circ C$   Standard devices & FC, forced air 4 m/s	430	Watt	
	Linear Derating		Above $25^\circ C$   Standard devices & FC, forced air 4 m/s	10	W/K	
	Operating Temperature Range	$T_O$	Standard devices & options CF, GCF, ILC. (Option DLC)	-40...75	$^\circ C$	
	Storage Temperature Range	$T_S$	Switches with option ILC may require frost protection!	-50...90	$^\circ C$	
	Max. Permissible Magnetic Field	B	Homogeneous steady-field, surrounding the whole switch	25	mT	
	Max. Auxiliary Voltage	$V_{aux}$	Built-in overvoltage limiter (replaceable)	5	VDC	
<b>ELECTRICAL CHARACTERISTICS</b>	Permissible Operating Voltage Range	$V_O$		$0... \pm 160$	kVDC	
	Typical Breakdown Voltage	$V_{br}$	<b>NOTE:</b> $V_{br}$ is a test parameter for quality control purposes only. Not applicable in $I_{off} > 0.5 mA$	$> 176$	kVDC	
	Typical Off-State Current	$I_{off}$	$0.8xV_O$ , $T_{case} = 25...70^\circ C$ , reduced $I_{off}$ on request	$< 400$	$\mu ADC$	
	Typical Holding Current		$T_{case} = 70^\circ C$	35	mADC	
	Typical On-State Voltage	$V_{sat}$	Each switching path $t_p < 1 \mu s$ , 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	$\mu s$	
	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%	$0.1 x V_{O(max)}$ , $I_L = 0.1 x I_{P(max)}$ $0.8 x V_{O(max)}$ , $I_L = 1.0 x I_{P(max)}$	TBD.	ns
	On Time	$t_{on}$		$35... \infty$	ns	
	Internal Driver Recovery Time	$t_{rc}$		1000	$\mu s$	
	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 $20 \mu s$ 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 capacitance of $100nF$ per additional	Standard Option I-HFB Option HFB	150 Use option HFB for $> 150$ $> 1000$ $> 10000$	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	$I_{aux}$	$V_{aux} = 5.00 VDC$ , $T_{case} = 25^\circ C$ . 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 $T_{case} > 75^\circ C$ 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	
	<b>HOUSING</b>	Dimensions	$LxWxH$	Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC	Please contact the manufacturer!	mm <sup>3</sup>
		Weight		Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC	Please contact the manufacturer!	g
	<b>FUNCTIONS</b>	Control Signal Input	<b>Pin 1 / Yellow.</b> TTL compatible with Schmitt-Trigger characteristics. Control voltage 2-10 V (3-5 V recommended for low jitter).			
Logic GND / 5V Return		<b>Pin 2 / Black.</b> The ground pin is internally connected with the safety earthing terminal (threaded insert) on bottom side.				
5V Auxiliary Supply		<b>Pin 3 / Red.</b> 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		<b>Pin 4 / Orange.</b> TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault.				
Inhibit Signal Input		<b>Pin 5 / Green.</b> TTL compatible, Schmitt-Trigger characteristics for the connection of external safety circuits. L = Switch Inhibited.				
LED Indicators		<b>GREEN:</b> "Auxiliary power good, switch OFF". <b>YELLOW:</b> "Control signal received, switch ON". <b>RED:</b> "Fault condition, switch OFF"				
Temperature Protection		<b>A)</b> Standard switches and switches with option CF, GCF: Thermo trigger $75^\circ C$ , response time $< 60 s$ @ $3xPd(max)$ , $\Delta T = 25K$ (50 to $75^\circ C$ ). Separate driver protection. <b>B)</b> Switches with option DLC: $65^\circ C$ , response time $< 3 s$ @ $3xPd(max)$ , $\Delta T = 25K$ (40 to $65^\circ C$ ), coolant flow $> 3 l / min$ . Separate driver protection.				
<b>ORDERING TI</b>	HTS 1600-1000 SCR	Thyristor Switch, 160 kVDC, 1000 ADC	<b>Option LP</b> Low Pass. Input filter for increased noise immunity.	<b>Option CCS</b> Ceramic Cooling Surface. $P_{d(max)}$ can be increased by the factor 2 to 3.		
			<b>Option S-TT</b> Soft Transition Time. Slower switching speed for simplified EMC.	<b>Option CCF</b> Ceramic Flange Housing. $P_{d(max)}$ can be increased by the factor 3 to 15.		
			<b>Option HFB</b> High Frequency Burst, Improved burst capability by driver.	<b>Option CF</b> Copper Cooling Fins. $P_{d(max)}$ can be increased by the factor 3 to 10.		
			<b>Option HFS</b> High Frequency Switching (two auxiliary supply inputs V1 & V2)	<b>Option GCF</b> Grounded Cooling Flange (copper). $P_{d(max)}$ can be increased by the factor 3 to 15.		
			<b>Option UFTR</b> Ultra Fast Thermotriiger. Response time for shut down $< 5s$ .	<b>Option ILC</b> Indirect Liquid Cooling (for water). $P_{d(max)}$ can be increased by the factor 3 to 15.		
			<b>Option UFTS</b> Ultra Fast Thermosensor. Response time $< 5s$ . NTC $10k / \pm 1\%$	<b>Option DLC</b> 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.

Customized switching units are available on request. All data and specifications subject to change without notice. Please visit [www.behlke.com](http://www.behlke.com) for up-dates.

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