

Specification		Symbol	Condition / Comment		HTS 60-500 SCR		Unit
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 300 \mu ADC$, $T_{case} = 70^{\circ}C$		6		kVDC
	Minimum Operating Voltage	$V_{O(min)}$			1000		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	$I_{P(max)}$	$T_{case} = 25^{\circ}C$	$t_p < 100 \mu s$, duty cycle $< 1\%$ $t_p < 500 \mu s$, duty cycle $< 1\%$ $t_p < 1 ms$, duty cycle $< 1\%$ $t_p < 10 ms$, duty cycle $< 1\%$	5000 2500 1700 1000		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, $t_p < 20 \mu s$	10000 20000		ADC
	Max. Coutinuous Load Current	I_L	Standard devices & FC, forced air 4 m/s Opt. CF- Copper cooling Fins, forced air 4 m/s		2 15		ADC
	Max. Rate-of-Rise of OFF-State Voltage	dv/dt	@ $V_{O(max)}$, exponential waveform		30		kV/ μs
	Max. Continuous Power Dissipation	$P_{d(max)}$	$T_{case} = 25^{\circ}C$	Standard devices & FC, forced air 4 m/s Opt. CF- Copper cooling Fins, forced air 4 m/s	10 110		Watt
	Linear Derating		Above $25^{\circ}C$	Standard devices & FC, forced air 4 m/s Opt. CF- Copper cooling Fins, forced air 4 m/s	0.22 2.33		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. Auxilliary Voltage	V_{aux}	Built-in overvoltage limiter (replaceable)		5		VDC
ELECTRICAL CHARACTERISTICS	Permissible Operating Voltage Range	V_O			6		kVDC
	Typical Breakdown Voltage	V_{br}	NOTE: V_{br} is a test parameter for quality control purposes only. Not applicable in $I_{off} > 0.5 mA$		6.5		kVDC
	Typical Off-State Current	I_{off}	$0.8 \times V_O$, $T_{case} = 25...70^{\circ}C$, reduced I_{off} on request		100		μADC
	Typical Holding Current			$T_{case} = 25^{\circ}C$ $T_{case} = 70^{\circ}C$	50 35		mADC
	Typical On-State Voltage	V_{sat}	Each switching path $t_p < 1 \mu s$, duty cycle $< 1\%$	$0.001 \times I_{P(max)}$ $0.01 \times I_{P(max)}$ $0.1 \times I_{P(max)}$ $1.0 \times I_{P(max)}$	6 7.2 12 32		VDC
	Typical Propagation Delay Time	$t_{d(on)}$	Resistive load, $0.1 \times I_{P(max)}$, $0.8 \times V_{O(max)}$, 50-50%		200		ns
	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%	$0.1 \times V_{O(max)}$, $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$, $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$, $I_L = 1.0 \times I_{P(max)}$	630 135 300		ns
	Typical Turn-Off Time	t_{off}, t_q	Resistive load, 10-90%	$0.1 \times V_{O(max)}$, $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$, $I_L = 1.0 \times I_{P(max)}$	35 90		ns
	On Time (min)	$t_{on(min)}$			35		ns
	On Time (max)	$t_{on(max)}$	Please note $P_{d(max)}$ limitations		Depending on holding current flow only		
	Internal Driver Recovery Time	t_{rc}			500		ns
	Max. Continuous Switching Frequency	$f_{(max)}$	Please note $P_{d(max)}$ limitations		10		kHz
	Maximum Burst Frequency	$f_{b(max)}$	Use option HFB for > 10 pulses within $20 \mu s$ or less		20		kHz
	Coupling Capacitance	C_C	HV side against control side		> 50		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.	$0.01 \times f_{(max)}$ @ $f_{(max)}$	320 600		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		3-10		VDC
HOUSING	Dimensions	$L \times W \times H$	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). Pin 2 / Black. The ground pin is internally connected with the safety earthing terminal (threaded insert) on bottom side. 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. Pin 4 / Orange. TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault. Pin 5 / Green. TTL compatible, Schmitt-Trigger characteristics for the connection of external safety circuits. L = Switch Inhibited. GREEN: "Auxiliary power good, switch OFF". YELLOW: "Control signal received, switch ON". RED: "Fault condition, switch OFF" A) Standard switches and switches with option CF, GCF: Thermo trigger $75^{\circ}C$, response time $< 60 s$ @ $3 \times P_d(max)$, $\Delta T = 25K$ (50 to $75^{\circ}C$). Separate driver protection. B) Switches with option DLC: $65^{\circ}C$, response time $< 3 s$ @ $3 \times P_d(max)$, $\Delta T = 25K$ (40 to $65^{\circ}C$), coolant flow $> 3 l / min$. Separate driver protection.					
	Logic GND / 5V Return						
ORDERING TI	5V Auxiliary Supply						
	Fault Signal Output						
	Inhibit Signal Input						
	LED Indicators						
	Temperature Protection						
	HTS 60-500 SCR	Thyristor Switch, 6 kVDC, 5000 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 Thermo trigger. 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 Thermo sensor. Response time $< 5s$. NTC $10k / \pm 1\%$	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.							
Customized switching units are available on request. All data and specifications subject to change without notice. Please visit www.behlke.com for up-dates. Revision 12.11.2021 ©2017 All rights reserved							