

	Specification	Symbol	Condition / Comment	HTS 201-10 LC2	Unit
<b>ABSOLUTE MAXIMUM RATINGS</b>	Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 50 \mu ADC$ , $T_{case} = 70^\circ C$	20	kVDC
	Maximum Isolation Voltage	$V_i$	Between HV switch and control / GND, continuously	$\pm 40$	kVDC
	Max. Housing Insulation Voltage	$V_{INS}$	Between switch and housing surface, 3 minutes	$\pm 40$	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 $< 1\%$	100 59 36 27	ADC
	Maximum Continuous Load Current	$I_{L(max)}$	$T_{case} = 25^\circ C$ Standard devices Devices with option DLC	0.85 8.25	ADC
	Max. Continuous Power Dissipation	$P_{d(max)}$	$T_{case} = 25^\circ C$ Standard devices & FC, forced air 4 m/s Devices with option DLC	13 1200	Watt
	Linear Derating		Above $25^\circ C$ Standard devices & FC, forced air 4 m/s Devices with option DLC	0.28 26	W/K
	Operating Temperature Range	$T_o$	Standard devices & options CF, GCF, ILC. (Option DLC)	-40...70	$^\circ C$
	Storage Temperature Range	$T_s$	Switches with option ILC may require frost protection!	-40...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	$V_o$		$0 \dots \pm 20$	kVDC
	Typical Breakdown Voltage	$V_{br}$	<b>NOTE:</b> $V_{br}$ is a test parameter for quality control purposes only. Not applicable in $I_{off} > 0.5 mA$	22	kVDC
	Typical Off-State Current	$I_{off}$	$0.8 \times V_o$ , $T_{case} = 25 \dots 70^\circ C$ , reduced $I_{off}$ on request	20	$\mu ADC$
	Typical Turn-On Resistance	$R_{stat}$	Each switching path $t_p < 1 \mu s$ , duty cycle $< 1\%$ $0.1 \times I_{P(max)}$ , $T_{case} = 25^\circ C$ $1.0 \times I_{P(max)}$ , $T_{case} = 25^\circ C$ $1.0 \times I_{P(max)}$ , $T_{case} = 70^\circ C$	7.8 9.1 19	Ohm
	Typical Propagation Delay Time	$t_{d(on)}$	Resistive load, $0.1 \times I_{P(max)}$ , $0.8 \times V_{O(max)}$ , 50-50%	250	ns
	Typical Output Pulse Jitter	$t_j$	Impedance matched input, $V_{aux} / V_{ctrl} = 5.00 VDC$	3	ns
	Typical Turn-On Rise Time	$t_{r(on)}$	Resistive load, 10-90% $0.1 \times V_{O(max)}$ , $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$ , $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$ , $I_L = 1.0 \times I_{P(max)}$	12 22 25	ns
	Typical Turn-Off Rise Time	$t_{off}, t_q$	Resistive load, 10-90% $0.1 \times V_{O(max)}$ , $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$ , $I_L = 1.0 \times I_{P(max)}$	30 80	ns
	Maximum Turn-On Time	$t_{on(max)}$	No limitation	$\infty$	
	Minimum Turn-On Time	$t_{on(min)}$	$t_{on(min)}$ can be customized. Please consult factory	150	ns
	Maximum Turn-Off Time	$t_{off(max)}$	No limitation	$\infty$	
	Minimum Turn-Off Time	$t_{off(min)}$	$t_{off(min)}$ can be customized. Please consult factory	150	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	6 100 200	kHz
	Maximum Burst Frequency	$f_{b(max)}$	Use option HFB for $> 10$ pulses within 20 $\mu s$ or less	2	MHz
	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 pulse. Standard Option I-HFB Option HFB	10 >100 >10000	Pulses
	Coupling Capacitance	$C_C$	HV side against control side	$< 100$	pF
	Natural Capacitance	$C_N$	Between switch poles, @ $0.5 \times V_{O(max)}$	26	pF
	Control Voltage Range	$V_{ctrl}$	The $V_{ctrl}$ has no impact on the output pulse shape.	3... 10	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. $0.01 \times f_{(max)}$ @ $f_{(max)}$	170 800	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
	Opt. HFS, Ext. Supply Voltage V1	$V_{HFS(V1)}$	Stability $\pm 3\%$ , current consumption $< 0.4 mA/kHz$ @ $25^\circ C$	15	VDC
	Opt. HFS, Ext. Supply Voltage V2	$V_{HFS(V2)}$	Stability $\pm 3\%$ , current consumption $< 0.9 mA/kHz$ @ $25^\circ C$	101	VDC
	Intrinsic Diode Forward Voltage	$V_F$	$T_{case} = 25^\circ C$ , $I_F = 0.3 \times I_{P(max)}$	$< 26$	VDC
	Diode Reverse Recovery Time	$t_{rrc}$	$T_{case} = 25^\circ C$ , $I_F = 0.3 \times I_{P(max)}$ , $di/dt = 100 A/\mu s$	$< 250$	ns
	<b>HOUSING</b>	Dimensions	LxWxH Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC	200x75x56 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</b> / Yellow. 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</b> / Black. The ground pin is internally connected with the safety earthing terminal (threaded insert) on bottom side.			
	5V Auxiliary Supply	<b>Pin 3</b> / 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	<b>Pin 4</b> / Orange. TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault.			
	Inhibit Signal Input	<b>Pin 5</b> / Green. 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 $< 60 s$ @ $3 \times Pd(max)$ , $\Delta T = 25K$ (50 to $75^\circ C$ ). Separate driver protection. <b>B)</b> Switches with option DLC: $65^\circ C$ , response time $< 3 s$ @ $3 \times Pd(max)$ , $\Delta T = 25K$ (40 to $65^\circ C$ ), coolant flow $> 3 l / min$ . Separate driver protection.			
<b>ORDERING TI</b>	HTS 201-10 LC2	Transistor Switch, 20 kVDC, 100 ADC	<b>Option LP</b> Low Pass. Input filter for increased noise immunity. <b>Option S-TT</b> Soft Transition Time. Slower switching speed for simplified EMC. <b>Option HFB</b> High Frequency Burst, Improved burst capability by driver. <b>Option HFS</b> High Frequency Switching (two auxiliary supply inputs V1 & V2) <b>Option UFTR</b> Ultra Fast Thermotriiger. Response time for shut down $< 5s$ . <b>Option UFTS</b> Ultra Fast Thermosensor. Response time $< 5s$ . NTC 10k $\pm 1\%$	<b>Option CCS</b> Ceramic Cooling Surface. $P_{d(max)}$ can be increased by the factor 2 to 3. <b>Option CCF</b> Ceramic Flange Housing. $P_{d(max)}$ can be increased by the factor 3 to 15. <b>Option CF</b> Copper Cooling Fins. $P_{d(max)}$ can be increased by the factor 3 to 10. <b>Option GCF</b> Grounded Cooling Flange (copper). $P_{d(max)}$ can be increased by the factor 3 to 15. <b>Option ILC</b> Indirect Liquid Cooling (for water). $P_{d(max)}$ can be increased by the factor 3 to 15. <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 <a href="http://www.behlke.com">www.behlke.com</a> for up-dates.				
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