

	Specification	Symbol	Condition / Comment	HTS 201-20-AC	Unit	
<b>ABSOLUTE MAXIMUM RATINGS</b>	Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 50 \mu ADC$ , $T_{case} = 70^\circ C$	$\pm 20$	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 $< 1\%$	200 118 57 4.4	ADC	
	Maximum Continuous Load Current	$I_{L(max)}$	$T_{case} = 25^\circ C$ Standard devices Devices with option DLC	1.7 3	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	30 2500	Watt	
	Linear Derating		Above $25^\circ C$ Standard devices & FC, forced air 4 m/s Devices with option DLC	0.74 62.2	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!	-50...90	$^\circ C$	
	Permissible Operating Voltage Range	$V_O$		$0 \dots \pm 20$	kVDC	
<b>ELECTRICAL CHARACTERISTICS</b>	Typical Breakdown Voltage	$V_{br}$	NOTE: $V_{br}$ is a test parameter for quality control purposes only. Not applicable in $I_{off} > 0.5 mA$	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 $< 1\%$	$0.1 \times I_{P(max)}$ , $T_{case} = 25^\circ C$ $1.0 \times I_{P(max)}$ , $T_{case} = 25^\circ C$ $1.0 \times I_{P(max)}$ , $T_{case} = 70^\circ C$	3.9 5.1 13.5	Ohm
	Residual Voltage (Total Voltage drop on-state)	$V_{res}$	$T_{case} = 25^\circ C$	$I_L = 0.001 A$ $I_L = 0.01 A$ $I_L = 0.1 A$ $I_L = 1.0 A$ $I_L = 10.0 A$	0.032 0.32 3.2 40 180	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%	$0.1 \times V_{O(max)}$ , $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$ , $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$ , $I_L = 1.0 \times I_{P(max)}$	54 70 95	ns
	Typical Turn-Off Rise Time	$t_{off}, t_q$	Resistive load, 10-90%	$0.1 \times V_{O(max)}$ , $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$ , $I_L = 1.0 \times I_{P(max)}$	40 90	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		200	ns
	Minimum Turn-Off Time	$t_{off(min)}$	$t_{off(min)}$ can be customized. Please consult factory		200	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. 50...100 500	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 Use option HFB for $> 150$ $> 100$ $> 10000$	Pulses
	Coupling Capacitance	$C_C$	HV side against control side		$< 25$	pF
	Natural Capacitance	$C_N$	Between switch poles, @ $0.5 \times V_{O(max)}$		$< 50$	pF
	Control Voltage Range	$V_{ctrl}$	The $V_{ctrl}$ has no impact on the output pulse shape.		2... 6	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 $1A$ .	$0.01 \times f_{max}$ @ $f_{max}$	tbd. 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 $< 0.9 mA/kHz$ @ $25^\circ C$		tbd.	VDC
Intrinsic Diode Forward Voltage	$V_F$	$T_{case} = 25^\circ C$ , $I_F = 0.3 \times I_{P(max)}$		$< 10$	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	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 $< 60 s$ @ $3 \times P_{d(max)}$ , $\Delta T = 25K$ (50 to $75^\circ C$ ). Separate driver protection. <b>B)</b> Switches with option DLC: $65^\circ C$ , response time $< 3 s$ @ $3 \times P_{d(max)}$ , $\Delta T = 25K$ (40 to $65^\circ C$ ), coolant flow $> 3l / min$ . Separate driver protection.					
<b>ORDERING</b>	HTS 201-20 AC	Transistor Switch, 15 kVDC, 200 ADC	<b>Option LP</b>	Low Pass. Input filter for increased noise immunity.	<b>Option CCF</b>	Ceramic Flange Housing. $P_{d(max)}$ can be increased by the factor 3 to 15.
			<b>Option S-TT</b>	Soft Transition Time. Slower switching speed for simplified EMC.	<b>Option CF</b>	Copper Cooling Fins. $P_{d(max)}$ can be increased by the factor 3 to 10.
			<b>Option HFB</b>	High Frequency Burst, Improved burst capability by driver.	<b>Option GCF</b>	Grounded Cooling Flange (copper). $P_{d(max)}$ can be increased by the factor 3 to 15.
			<b>Option HFS</b>	High Frequency Switching (two auxiliary supply inputs V1 & V2)	<b>Option ILC</b>	Indirect Liquid Cooling (for water). $P_{d(max)}$ can be increased by the factor 3 to 15.
			<b>Option CCS</b>	Ceramic Cooling Surface. $P_{d(max)}$ can be increased by the factor 2	<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.						