

Technical Data

	Specification	Symbol	Condition / Comment	HTS 501-10-LC2	HTS 701-10-LC2	HTS 901-10-LC2	Unit	
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 50 \mu ADC$, $T_{case} = 70^\circ C$	50	70	90	kVDC	
	Maximum Isolation Voltage	V_I	Between HV switch and control input / GND	80	100	120	kVDC	
	Max. Housing Insulation Voltage	V_{INS}	Between switch and housing surface, 3 minutes		150		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	$T_{case} = 25^\circ C$ $T_{fluid} = 25^\circ C$	Standard model Option DLC - 1.0 / 1.4 / 1.8 ¹⁾ Option DLC - 3.0 / 4.2 / 5.4 ¹⁾	0.85 4.75 8.25	0.85 4.75 8.25	0.85 4.75 8.25	ADC
	Max. Continuous Power Dissipation	$P_{d(max)}$	$T_{case} = 25^\circ C$ $T_{fluid} = 25^\circ C$	Standard model Option DLC - 1.0 / 1.4 / 1.8 ¹⁾ Option DLC - 3.0 / 4.2 / 5.4 ¹⁾	32 1000 3000	45 1400 4200	58 1800 5400	Watts
	Linear Derating		Above $25^\circ C$	Standard model Option DLC - 1.0 / 1.4 / 1.8 ¹⁾ Option DLC - 3.0 / 4.2 / 5.4 ¹⁾	0.711 22.22 66.66	1 31.11 93.33	1.288 40 120	W/K
	Operating Temperature Range	T_O				-40...70		$^\circ C$
	Storage Temperature Range	T_S				-40...90		$^\circ C$
	Maximum Auxiliary Supply Voltage	$V_{aux(max)}$				9		VDC
ELECTRICAL CHARACTERISTICS	Permissible Operating Voltage Range	V_O		0...50	0...70	0...90	kVDC	
	Typical Breakdown Voltage	V_{br}	CAUTION: V_{br} is a test parameter only for quality control purposes and is not applicable in normal operation! $I_{off} > 500 \mu ADC$	53	74	95	kVDC	
	Typical Off-State Current	I_{off}	$0.8 \times V_O$, $T_{case} = 25^\circ C$, lower leakage current on request		20		μADC	
	Typical Static On-Resistance	R_{stat}	$t_p < 1 \mu s$, duty cycle $< 1\%$ $0.1 \times I_{P(max)}$, $T_{case} = 25^\circ C$ $1.0 \times I_{P(max)}$, $T_{case} = 25^\circ C$ $1.0 \times I_{P(max)}$, $T_{case} = 70^\circ C$	18 21 44	25 30 62	32 38 80	Ohm	
	Typical Turn-On Delay Time	$t_{d(on)}$	Resistive load, $0.1 \times I_{P(max)}$, $0.8 \times V_O(max)$, 50-50%		250		ns	
	Typical Turn-On Rise Time	$t_{r(on)}$	Resistive load, 10-90% $0.1 \times V_O(max)$, $0.1 \times I_{P(max)}$ $0.8 \times V_O(max)$, $0.1 \times I_{P(max)}$ $0.8 \times V_O(max)$, $1.0 \times I_{P(max)}$	12 32 35	14 45 50	15 56 62	ns	
	Typical Turn-Off Rise Time	t_{off} , t_q	Resistive load, 10-90% $0.8 \times V_O(max)$, $0.1 \times I_{P(max)}$ $0.8 \times V_O(max)$, $1.0 \times I_{P(max)}$		30 80		ns	
	Maximum On-Time	$t_{on(max)}$			Infinitely			
	Minimum On-Time	$t_{on(min)}$	$t_{on(min)}$ can be customized. Please consult factory.		250		ns	
	Maximum Off-Time	$t_{off(max)}$			Infinitely			
	Minimum Off-Time	$t_{off(min)}$	$t_{off(min)}$ can be customized. Please consult factory.		250		ns	
	Typical Turn-On Jitter	$t_{j(on)}$	$V_{aux} / V_{tr} = 5.00 VDC$		3		ns	
	Max. Continuous Switching Frequency	$f_{(max)}$	$V_{aux} = 5.00 VDC$, $T_{case} = 25^\circ C$, switch will be turned off, if $f_{(max)}$ is exceeded	Standard Option HFS	1.7 100	1.2 100	1 100	kHz
	Maximum Burst Frequency	$f_b(max)$	CAUTION: Applications with long lasting high frequency bursts may require special cooling measures to prevent overheating of the MOSFET junctions. Please consult factory.			2		MHz
	Maximum Number of Pulses / Burst	N	@ $f_b(max)$, Note: Option HFB requires external buffer capacitors ($V > 630VDC$, $C_{ext} \approx 100nF$ per generated pulse)	Standard Option I-HFB Option HFB		10 >100 >10000		Pulses
	Coupling Capacitance	C_C	HV side against control side		33	46	60	pF
	Natural Capacitance	C_N	Between switch poles		27	20	15	pF
	Auxiliary Supply Voltage Range	V_{aux}	5.00 VDC recommended for best driver efficiency			4.75 – 9.00		VDC
	Intrinsic Diode Forward Voltage	V_F	$T_{case} = 25^\circ C$, $I_F = 10 A$		40	57	74	VDC
	Diode Reverse Recovery Time	t_{rc}	CAUTION: Intrinsic diodes must not be used in normal operation. Inductive load requires fast free-wheeling diodes (FDA) in parallel to the switch! $I_F = 10A$			<250		ns
Auxiliary Supply Current	I_{aux}	$V_{aux} = 5.00 VDC$, $T_{case} = 25^\circ C$ $0.1 \times f_{(max)}$ @ $f_{(max)}$		250 800	350 800	450 800	mADC	
Control Voltage Range	V_{tr}	>5 VDC recommended for best EMC			3 - 10		VDC	
MECHANICAL &	Dimensions		Standard housing, without pigtails	252 x 150 x 68	312 x 150 x 68	372 x 150 x 68	mm ³	
	Weight		Standard housing	3200	4000	4700	g	
	Recommended Options:							
	Option HFB	High Frequency Burst: Improved burst capability of driver by means of external buffer capacitors. Recommended for burst operation with >100 pulses within a burst of <100 μs duration.						
	Option I-HFB	Integrated High Frequency Burst: Improved burst capability by integrated buffer capacitors. For moderate burst requirements (10-100 pulses within a burst of <100 μs duration).						
	Option HFS	High Frequency Switching: Connector for additional auxiliary voltages (+12 VDC and +350 VDC to +450 VDC, model depending). Necessary for operation above standard $f_{(max)}$.						
	Option LP	Low Pass: Low pass filter at the control input. Propagation delay time will be increased by ~200 ns. Improved noise immunity and less critical wiring in high speed applications.						
	Option MIN-ON	Minimum On-Time: Individually increased "Minimum On-Time" to avoid unwanted triggering by input noise during this time. Please indicate the demanded $t_{on(min)}$ with order.						
	Option MIN-OFF	Minimum Off-Time: Individually increased "Minimum Off-Time" to avoid unwanted triggering by input noise during this time. Please indicate the demanded $t_{off(min)}$ with order.						
	Option DLC – X.X	Direct Liquid Cooling: Internal liquid channel in direct contact with the power semiconductors. Excellent cooling method for very high voltages. GALDEN® & non-conductive liquids only.						
Option TH	Tubular Housing: Self-supporting axial housing. Attachment & HV connection by M10 bolts at the tube ends. Dimension $\varnothing 90 \times 350$, $\varnothing 90 \times 450$ or $\varnothing 90 \times 550$ mm (depending on switch model).							
Option EXC	External Control Unit: Control unit (dimension $79 \times 38 \times 25$ mm ³) separated from high-voltage switching unit. 1m connecting cable between switch and control (standard if option TH is ordered).							

Note 1) Customized switching units with max. power dissipation of up to 15 kW are available on request.

All data and specifications subject to change without notice!