	Specification	Symbo	Condition / Comment				401-10-GSM	501-10-GSM	651-10-GSM	Unit
	Maximum Operating Voltage	$V_{O(max)}$	I _{off} < 50 μADC, T _{case} = 70°C				± 40	± 50	± 65	kVDC
	Maximum Isolation Voltage	V _{O(max)}	Between HV switch and control / GND, continuously				± 40	± 80	± 03	kVDC
RATINGS	Max. Housing Insulation Voltage	VINS	Between switch and housing surface, 3 minutes					± 100		kVDC
	Maximum Turn-On Peak Current	I _{P(max)}	T _{case} = 25°C	t _p < 200 µs, duty cycle <1%				100		
		()		t _p < 1 ms, duty cycle <1%				59		
17				t _p < 10 ms, duty cycle <1%				36		
8				t _p < 100 ms, duty cycle <1%				27		ADC
1	Maximum Continuous Load Current I _{L(max)}			Standard devices				0,85		
MAXIMUM			T _{case} = 25°C	Devices v	vith option	DLC		8,25		ADC
Ž	M. Oufus Business	<u> </u>	Standard dovisos 8 EC forced oir 4 m/s			FO (1 4 /	00	20	40	
	Max. Continuous Power Dissipation	$P_{d(max)}$	T _{case} = 25°C	Standard devices & FC, forced air 4 m/s Devices with option DLC			26 2400	32 3000	42 3900	Watt
ABSOLUTE	Linear Derating				andard devices & FC, forced air 4 m/s		0.568	0,711	0,924	wall
70	Linear Deraung		Above 25°C			evices with option DLC		66.66	86,66	
BS			2011333 man opnon 225				53,33	00,00	33,03	W/K
4	Operating Temperature Range	To	Standard devices & options ILC, DLC					-4070 (60)		°C
	Storage Temperature Range	Ts	Switches with option ILC may require frost protection!					-4090		°C
	Max. Permissible Magnetic Field	В				g the whole switch		25		mT
	Max. Auxilliary Voltage	Vaux	Built-in overvoltage limiter (replaceable)				0 40000	5.5	0 05000	VDC
	Permissible Operating Voltage	Vo	Unipolar operation (one switch pole grounded or floated) Bipolar operation (positive & negative voltage applied)				0 ± 40000 0 ± 20000	0 ± 50000 0 ± 25000	0 ± 65000 0 ± 32500	VDC
	Range Typical Breakdown Voltage	V _{br}	NOTE: V. is a test parameter for quality control				44000			1/00
			purposes only. Not a	purposes only. Not applicable in normal operation! Ioff > 0.5 mA				56000	70000	VDC
	Typical Off-State Current	l _{off}	0.8xV ₀ , T _{case} =25					< 40	22.1	μADC
	Typical Turn-On Resistance	R _{stat}	Each switching p			ax), T _{case} =25°C	14.4	18 21	23.4	
			t_p < 1 μ s, duty cycle < 1% 1.0 x I _{P(max)} , T_{case} =25 1.0 x I _{P(max)} , T_{case} =70			**	16.8 35,2	44	27.3 57,2	Ohm
	Typical Propagation Delay Time	t _{d(on)}	Resistive load. 0	.1 x I _{P(max)} , (x I _{P(max)} , 0.8 x V _{O(max)} , 50-50%		00,2	250	01,Z	ns
60	Typical Output Pulse Jitter	ti	Impedance matched input, V _{aux} / V _{ctrl} = 5.00 VDC					3		ns
CHARACTERISTICS	Typical Ouput Transition Time	t _r , t _f	Resistive load, 1	0-90%	0.1 x '	$V_{O(max)}$, $I_L = 0.1 \times I_{p(max)}$	11	12	14	
ISI	(Rise Time & Fall Time)			0.8 x V _{O(max}			29 32	32	41	
Ä	Marian at an Outine		NI Partice	$0.8 \text{ x V}_{O(max)}$, $I_L = 1.0 \text{ x I}_{p(max)}$				35	47	ns
45	Maximum Turn-On Time Minimum Turn-On Time	ton(max)	No limitation can be customized. Please consult factory					 250		ns
8	Max. Continuous Switching	t _{on(min)}	Vaux = 5.00 V Standard devices without HFS option				1.4	1.2	0.6	ns
CH	Frequency	I(IIIdX)	Sw. shutdown if Standard devices with HFS supply				30	30	30	
	,		f _(max) is exceeded Opt. HFS + sufficient cooling option				70	70	70	kHz
2	Maximum Burst Frequency	$f_{b(max)}$	Use option HFB for >10 pulses within 20µs or less					400		kHz
Ĭ,	Maximum Number of Pulses / Burst	$N_{(max)}$	$f_{b} \! = \! 1 MHz$ (1 $\! \mu s$ spacing). Switch shutdown if $N_{(max)}$ is exceeded.						st option HFB for >20 pulses	Pulses
ELECTRICAL	Coupling Capacitance	Cc	Switch against Standard devices & options CF, DLC					<50 70 200		
4	Natural Capacitance	C _N	control side Devices with options GCF, ILC Between switch poles, @ 0.5 x V _{O(max)}				33	27	21	pF 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.					4.5 5.5		VDC
	Typical Auxiliary Supply Current	l _{aux}	$V_{aux} = 5.00 \text{ VDC}, T_{case} = 25^{\circ}\text{C}.$ 0.01 x f _(max)				210 800	240	280	
	Ont LICC Fut Cumply Voltage V/1	V		Active current limitation above 1A. @ specified f _(max)				800 15	800	mADC VDC
	Opt. HFS, Ext. Supply Voltage V1 Opt. HFS, Ext. Supply Voltage V2	V _{HFS(V1)}	Stability ±3%, current consumption <0.4 mA/kHz @ 25°C Stability ±3%, current consumption <0.5 mA/kHz @ 25°C				190	210	280	VDC
	Intrinsic Diode Forward Voltage	V _F	T _{case} = 25°C, I _F = 0.3 x I _{P(max)}				32	40	52	VDC
	Diode Reverse Recovery Time	t _{rrc}	$T_{case} = 25^{\circ}\text{C}, I_F = 0.3 \text{ x } I_{P(max)}$ $T_{case} = 25^{\circ}\text{C}, I_F = 0.3 \text{ x } I_{P(max)}, di/dt = 100 \text{ A/µs}$				<u> </u>	<250ns		ns
	Dimensions	LxWxH	Standard housing				350x150x68	400x150x68	375x300x70	
S			Devices with option ILC & DLC				400x200x90	425x200x90	400x325x130	
HOUSING	Weight	Standard housing					5300	5500	10600	mm ³
9	VVeignt	Standard housing Devices with option ILC & DLC				6200	6500	14200		
		·							g	
	Control Signal Input Pin 1 / Yellow (LS-C: Pin 1). TTL compatible (LS-C: With 100Ω termination). Schmitt-Trigger characteristics. Control voltage 2-10 V (3-5 V for low jitter).									
	Logic GND / 5V Return Pin 2 / E	Black (LS-	C: Shielding). The	ground pin	is interna	lly connected with the	safety earthings terr	ninals (threaded inserts)	on bottom side.	
FUNCTIONS	5V Auxiliary Supply Pin 3 / Red (LS-C: Pin 4). 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 Pin 4 / Orange (LS-C: Pin 3). TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault.									
			ternal safety circuits. L =							
	LED Indicators GREEN: "Auxiliary power good, switch OFF". YELLOW: "Control signal received Temperature Protection A) Standard switches and switches with opt. FC, CF, GCF: Thermo trigger 75°C, r									
	' '			esponse time < 60 s @ $3xPd(max)$, $\Delta T=25K$ (50 to $75^{\circ}C$). Separate driver $T=25K$ (40 to $65^{\circ}C$), coolant flow > $3I$ / min. Separate driver protection.						
ORDERING	HTS 401-10-GSM Fast HV Push-Pull Switch, 4		Option I-PC Integrated part components according to customer specification.							
	TS 501-10-GSM Fast HV Push-Pull Switch, 50kV, 100 A Option HFB High Frequency Burst (improved capability by external capa						itors) Option UL-94	Flame retardant casting resi	n, UL94-V0	
	HTS 651-10-GSM Fast HV Push-Pull Switch, 6	Option HFS High Frequency Switching (two auxiliary supply inputs V1 & V Option I-HFS Integrated High Frequency Burst				(2) Option I-FWD Option I-FWDN		le. In connection with inductive lo		
		Option S-TT Soft Transition Time dec					Option PT-C		Network. In connection with indi lexible leads (I=75mm) with lemo	
			Option Min-On Inc	dividually increa	sed "Min. On	-Time" to avoid unwanted trigg		Separated control unit. Control	unit with LED indicators in a sep	
						-Time" to avoid unwanted triggombined with custom specific p		Tubular Housing Copper Cooling Fins. Pd(max)	can be increased by the factor	or 3 to 10.
0			Option ISO-80 80kV Isolation. Isolation Voltage increased to 80kV.			e increased to 80kV.	Option GCF	Grounded Cooling Flange. Pd(n	nax) can be increased by the factor	or 3 to 15.
			Option ISO-120 120kV Isolation. Isolation Voltage increased to 120kV.				Option ILC		er). P _{d(max)} can be increased by the	
			Option ISO-160 160kV Isolation. Isolation Voltage increased to 160kV. Option ISO-200 200kV Isolation. Isolation Voltage increased to 200kV.				Option DLC FOR FURTHER	PRODUCT OPTIONS PLEAS	an be increased by the factor 10 to E REFER TO THE OPTIONS	
Cus	comized switching units are available on reque	est. All data				•			evision 21-11-2017 ©2012	