

	Specification	Symbol	Condition / Comment	301-10-GSM	Unit	
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 40 \mu ADC$, $T_{case} = 70^{\circ}C$	30	kVDC	
	Maximum Isolation Voltage	V_I	Between HV switch and control / GND, continuously	40	kVDC	
	Max. Housing Insulation Voltage	V_{INS}	Between switch and housing surface, 3 minutes	50	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 $< 1\%$	30 17 10 7	ADC	
	Maximum Continuous Load Current	$I_{L(max)}$	$T_{case} = 25^{\circ}C$ Standard devices Option CF, cooling fins Devices with option DLC	0.33 1.29 1.46	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	18 2000	Watt	
	Linear Derating		Above $25^{\circ}C$ Standard devices & FC, forced air 4 m/s Devices with option DLC	0.36 40	W/K	
	Operating Temperature Range	T_O	Standard devices & options ILC, DLC	-40...70 (60)	$^{\circ}C$	
	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. Auxilliary Voltage	V_{aux}	Built-in overvoltage limiter (replaceable)	5.5	VDC		
ELECTRICAL CHARACTERISTICS	Permissible Operating Voltage Range	V_O	Unipolar operation (one switch pole grounded or floated) Bipolar operation (positive & negative voltage applied)	0... ± 30 0... ± 15	kVDC	
	Typical Breakdown Voltage	V_{br}	NOTE: V_{br} is a test parameter for quality control purposes only. Not applicable in normal operation! $I_{off} > 0.5 mA$	± 33	kVDC	
	Typical Off-State Current	I_{off}	$0.8 \times V_O$, $T_{case} = 25...70^{\circ}C$, reduced I_{off} on request	< 40	μADC	
	Typical Turn-On Resistance	R_{stat}	Each switching path $t_p < 1 \mu s$, duty cycle $< 1\%$ $0.1 \times I_{P(max)}$, $T_{case} = 25^{\circ}C$ $1.0 \times I_{P(max)}$, $T_{case} = 25^{\circ}C$ $1.0 \times I_{P(max)}$, $T_{case} = 70^{\circ}C$	14.00 34.00 61.10	Ohm	
	Typical Capacitive Power Dissipation of Switch (Natural Power Dissipation)	P_{dc}	Switch capacitances only- without external load and parasitic capacitances! $0.8 \times V_{O(max)}$, $f = 10Hz$ $0.8 \times V_{O(max)}$, $f = 100Hz$ $0.8 \times V_{O(max)}$, $f = 10000Hz$	0.28 2.80 288.00	Watt	
	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 Output Transition Time (Rise Time & Fall Time)	t_r, t_f	Resistive load, 10-90% $0.1 \times V_{O(max)}$, $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$, $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$, $I_L = 1.0 \times I_{P(max)}$	15 40 60	ns	
	Maximum Turn-On Time	$t_{on(max)}$	No limitation	∞	ns	
	Minimum Turn-On Time	$t_{on(min)}$	can be customized. Please consult factory	250	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	1.8 30 70	kHz	
	Maximum Burst Frequency	$f_{b(max)}$	Use option HFB for > 10 pulses within $20 \mu s$ or less	1	MHz	
	Maximum Number of Pulses / Burst	$N_{(max)}$	f_b -500 kHz ($1 \mu s$ spacing). Switch shutdown if $N_{(max)}$ is exceeded.	10 (Use burst option HFB for > 10 pulses)	Pulses	
	Coupling Capacitance	C_C	Switch against control side	< 100	pF	
	Natural Capacitance	C_N	Between switch poles, @ $0.8 \times V_{O(max)}$	< 20	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	I_{aux}	$V_{aux} = 5.00 VDC$, $T_{case} = 25^{\circ}C$. Active current limitation above 1A. $0.01 \times f_{(max)}$ @ specified $f_{(max)}$	280 600	mADC	
	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 $< 0.5 mA/kHz$ @ $25^{\circ}C$	150	VDC	
	Intrinsic Diode Forward Voltage	V_F	$T_{case} = 25^{\circ}C$, $I_F = 0.3 \times I_{P(max)}$	< 40	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	
HOUSING	Dimensions	$L \times W \times H$	Standard housing, without pigtails Devices with options DLC	Please consult BEHLKE	mm ³	
	Weight		Standard housing Devices with options DLC	Please consult BEHLKE	g	
FUNCTIONS	Control Signal Input	Lemo Pin 1: TTL compatible (LS-C: With 100 Ω termination). Schmitt-Trigger characteristics. Control voltage 2-10 V (3-5 V for low jitter).				
	Logic GND / 5V Return	Lemo Shielding: The logic ground is internally connected with the safety earthing terminal (threaded inserts).				
	5V Auxiliary Supply	Lemo 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	Lemo Pin 3: TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault.				
	Inhibit Signal Input	Lemo Pin 2: TTL compatible, Schmitt-Trigger characteristics for the connection of external safety circuits. L = Switch Inhibited.				
	LED Indicators   	 Green: "Auxiliary power good, switch OFF".  Yellow: "Control signal received, switch ON".  Red: "Fault condition, switch OFF"				
	Temperature Protection Air Cooling	Standard switches and switches with options FC, CF and GCF: Thermotrigger $75^{\circ}C$, response time $< 60 s$ @ $3 \times P_{d(max)}$, $\Delta T = 25K$ (50 to $75^{\circ}C$).				
	Temperature Protection DLC Cooling	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.				
ORDERING	HTS 301-10-GSM Push-Pull Switch, 30 kV, 100 A		Option LP	Low Pass. Input filter for increased noise immunity.	Option FO-I	Fibre Optics Input for the inhibit and PPC signal.
			Option HFB	High Frequency Burst (improved capability by external capacitors).	Option FO-F	Fibre Optics Output for the fault signal.
			Option HFS	High Frequency Switching (two auxiliary supply inputs V1 & V2).	Option UL-94	Flame retardant casting resin, UL94-V0
			Option S-TT	Soft Transition Time decrease the rise and fall time by 20%	Option I-	Integrated Free-Wheeling Diode. In connection with inductive load only.
			Option Min-	Individually increased "Min. On-Time" to avoid unwanted triggering.	Option I-	Integrated Freewheeling Diode Network. In connection with inductive load.
			Option Min-	Individually increased "Min. Off-Time" to avoid unwanted triggering.	Option LC-	Removeable Power Driver, DLC cooling, solid aluminum housing.
			Option PPC	Pulse Pause Control for pauses between pos. and neg. pulses.	Option SEP-	Separated control unit. Control unit with LED indicators in a separate housing.
			Option ISO-	80kV Isolation. Isolation Voltage increased to 80kV.	Option I-PC	Integrated part components according to customer specification.
			Option ISO-	120kV Isolation. Isolation Voltage increased to 120kV.	Option PCC	Pulser Configuration. Switch combined with custom specific parts.
			Option ISO-	160kV Isolation. Isolation Voltage increased to 160kV.	Option CF	Copper Cooling Fins. $P_{d(max)}$ can be increased by the factor 3 to 10
			Option ISO-	200kV Isolation. Isolation Voltage increased to 200kV.	Option GCF	Grounded Cooling Flange. $P_{d(max)}$ can be increased by the factor 3 to 15
			Option FO-C	Fibre Optics Input for the control input.	Option DLC	Direct Liquid Cooling. $P_{d(max)}$ can be increased by the factor 100 to 200
	For further ordering options please refer to our on-line catalog, section C8. https://www.behlke.com/separations/separation_c8.htm					
	 HIGH-TECH IN HIGH VOLTAGE					
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