

	Specification	Symbol	Condition / Comment		121-20 GSM	Unit	
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	V _{O(max)}	I _{off} < 20 μADC, T _{case} = 70°C		± 12	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°C	t _p < 200 μs, 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 72 54	ADC	
	Maximum Continuous Load Current	I _{L(max)}	T _{case} = 25°C	Standard devices Devices with option DLC	1.7 28.1	ADC	
	Max. Continuous Power Dissipation	P _{d(max)}	T _{case} = 25°C	Standard devices & FC, forced air 4 m/s Opt. CF, cooling fins (air>4m/s) Devices with option DLC	10 100 2000	Watt	
	Linear Derating		Above 25°C	Standard devices & FC, forced air 4 m/s Devices with option DLC	0.265 40	W/K	
	Operating Temperature Range	T _O	Standard devices & options ILC, DLC		-40...70 (60)	°C	
	Storage Temperature Range	T _S	Switches with option ILC may require frost protection!		-40...90	°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... +/- 12 0... ± 6	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	13	kVDC	
	Typical Off-State Current	I _{off}	0.8xV _O , T _{case} =25...70°C, reduced I _{off} on request		< 20	μADC	
	Typical Turn-On Resistance	R _{stat}	Each switching path t _p < 1 μs, duty cycle < 1%	0.1 x I _{P(max)} , T _{case} =25°C 1.0 x I _{P(max)} , T _{case} =25°C 1.0 x I _{P(max)} , T _{case} =70°C	2.5 4.5 10.1	Ohm	
	Typical Propagation Delay Time	t _{d(on)}	Resistive load, 0.1 x I _{P(max)} , 0.8 x V _{O(max)} , 50-50%		200	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 x V _{O(max)} , I _L = 0.1 x I _{P(max)} 0.8 x V _{O(max)} , I _L = 0.1 x I _{P(max)} 0.8 x V _{O(max)} , I _L = 1.0 x I _{P(max)}	40 60 90	ns	
	Maximum Turn-On Time	t _{on(max)}	No limitation		∞	ns	
	Minimum Turn-On Time	t _{on(min)}	can be customized. Please consult factory		180	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	2 40 90 For more capabilities, please contact the manufactured!	kHz	
	Maximum Burst Frequency	f _{b(max)}	Use option HFB for >10 pulses within 20μs or less		500	kHz	
	Maximum Number of Pulses / Burst	N _(max)	f _b =1MHz (1μs spacing). Switch shutdown if N _(max) is exceeded.		20 Use burst option HFB for >20 pulses	Pulses	
	Coupling Capacitance	C _C	Switch against control side	Standard devices & options CF, DLC Devices with options GCF, ILC	<30 70 ... 200	pF	
	Natural Capacitance	C _N	Between switch poles, @ 0.5 x V _{O(max)}		< 30	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°C. Active current limitation above 1A.	0.01 x f _(max) @ specified f _(max)	200 500	mADC	
	Opt. HFS, Ext. Supply Voltage V1	V _{HFS(V1)}	Stability ±3%, current consumption <0.4 mA/kHz @ 25°C		15	VDC	
	Opt. HFS, Ext. Supply Voltage V2	V _{HFS(V2)}	Stability ±3%, current consumption <0.5 mA/kHz @ 25°C		85	VDC	
	Intrinsic Diode Forward Voltage	V _F	T _{case} = 25°C, I _F = 0.3 x I _{P(max)}		< 20	VDC	
	Diode Reverse Recovery Time	t _{rr}	T _{case} = 25°C, I _F = 0.3 x I _{P(max)} , di/dt = 100 A/μs		< 250	ns	
	HOUSING	Dimensions	LxWxH	Standard housing, without pigtails Devices with option ILC & DLC		Please contact the manufactured!	mm ³
Weight			Standard housing Devices with option ILC & DLC		Please contact the manufactured!	g	
FUNCTIONS	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). Pin 2 / Black (LS-C: Shielding). The ground pin is internally connected with the safety earthings terminals (threaded inserts) on bottom side. 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. Pin 4 / Orange (LS-C: Pin 3). TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault. Pin 5 / Green (LS-C: Pin 2). TTL compatible, Schmitt-Trigger characteristics for the connection of external safety circuits. L = Switch Inhibited. GREEN: "Auxiliary power good, switch OFF". YELLOW: "Control signal received, switch ON". RED: "Fault condition, switch OFF" A) Standard switches and switches with opt. FC, CF, GCF: Thermo trigger 75°C, response time < 60 s @ 3xPd(max), ΔT=25K (50 to 75°C). Separate driver protection. B) Switches with option DLC: 65°C, response time < 3 s @ 3xPd(max), ΔT=25K (40 to 65°C), coolant flow > 3l / min. Separate driver protection.					
	Logic GND / 5V Return						
5V Auxiliary Supply							
Fault Signal Output							
Inhibit Signal Input							
LED Indicators							
ORDERING	Temperature Protection						
	HTS 121-20-GSM	Fast HV Push-Pull Switch, 12 kV, 200 A	Option LP	Low Pass. Input filter for increased noise immunity.	Option I-PC	Integrated part components according to customer specification.	
			Option HFB	High Frequency Burst (improved capability by external capacitors)	Option UL-94	Flame retardant casting resin, UL94-V0	
			Option HFS	High Frequency Switching (two auxiliary supply inputs V1 & V2)	Option I-FWD	Integrated Free-Wheeling Diode. In connection with inductive load only.	
			Option I-HFS	Integrated High Frequency Burst	Option I-FWDN	Integrated Freewheeling Diode Network. In connection with inductive load.	
			Option S-TT	Soft Transition Time decrease the rise and fall time by 20%	Option PT-C	Pigtail for control connection: Flexible leads (l=75mm) with lermo connector.	
			Option Min-On	Individually increased "Min. On-Time" to avoid unwanted triggering	Option SEP-C	Separated control unit. Control unit with LED indicators in a separate	
			Option Min-Off	Individually increased "Min. Off-Time" to avoid unwanted triggering	Option TH	Tubular Housing	
			Option PCC	Pulsar Configuration. Switch combined with custom specific parts.	Option CF	Copper Cooling Fins. P _{d(max)} can be increased by the factor 3 to 10.	
			Option ISO-80	80kV Isolation. Isolation Voltage increased to 80kV.	Option GCF	Grounded Cooling Flange. P _{d(max)} can be increased by the factor 3 to 15.	
			Option ISO-120	120kV Isolation. Isolation Voltage increased to 120kV.	Option ILC	Indirect Liquid Cooling (for water). P _{d(max)} can be increased by the factor 3 to 15.	
			Option ISO-160	160kV Isolation. Isolation Voltage increased to 160kV.	Option DLC	Direct Liquid Cooling. P _{d(max)} can be increased by the factor 10 to 100.	
			Option ISO-200	200kV Isolation. Isolation Voltage increased to 200kV.	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 www.behlke.com for up-dates.						
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