	Specification	Symbol	Condition / Comment	HTS 301-60 SiC	Unit
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	$V_{O(max)}$	I_{off} < 270 µADC, T_{case} = 70°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°C: t_p< 200 µs, duty cycle <1%	600	ADC
			t_p< 1 ms, duty cycle <1%	360	
			t_p< 10 ms, duty cycle <1%	115	
			t_p< 100 ms, duty cycle <1%	60	
	Maximum Continuous Load Current	$I_{L(max)}$	T_{case} = 25°C: Standard devices	2.52	ADC
			Devices with option DLC	60	
	Max. Continuous Power Dissipation	$P_{d(max)}$	T_{case} = 25°C: Standard devices & FC, forced air 4 m/s	50	Watt
			Devices with option DLC	2600	
	Linear Derating		Above 25°C: Standard devices & FC, forced air 4 m/s	0.12	W/K
			Devices with option DLC	160	
	Operating Temperature Range	T_O	Standard devices & options CF, GCF, ILC. (Option DLC)	-40...70	C°
	Storage Temperature Range	T_S	Switches with option ILC may require frost protection!	-40...80	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)	0... ± 30	kVDC
	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: 33	kVDC
	Typical Off-State Current	I_{off}	0.8xV_O, T_{case} =25...70°C, reduced I_{off} on request	< 270	µADC
	Typical Turn-On Resistance	R_{stat}	Each switching path, t_p < 1µs, duty cycle < 1%	0.1 x $I_{P(max)}$, T_{case} =25°C: 0.28	Ohm
				1.0 x $I_{P(max)}$, T_{case} =25°C: 0.58	
				1.0 x $I_{P(max)}$, T_{case} =70°C: 0.63	
	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 Turn-On Rise Time	$t_{r(on)}$	Resistive load, 10-90%	0.1 x $V_{O(max)}$, I_L = 0.1 x $I_{p(max)}$: 25	ns
				0.8 x $V_{O(max)}$, I_L = 0.1 x $I_{p(max)}$: 48	
				0.8 x $V_{O(max)}$, I_L = 1.0 x $I_{p(max)}$: 55	
	Maximum Turn-On Time	$t_{on(max)}$	No limitation	∞	
	Minimum Turn-On Time	$t_{on(min)}$	$t_{on(min)}$ can be customized. Please consult factory	200	ns
	Maximum Turn-Off Time	$t_{off(max)}$	No limitation	∞	
	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	<5	kHz
				Standard devices with HFS supply: 30	
				Opt. HFS + sufficient cooling option: 70	
	Maximum Burst Frequency	$f_{b(max)}$	Use option HFB for >10 pulses within 20µs or less	500	kHz
	Maximum Number of Pulses / Burst	$N_{(max)}$	@ $f_{b(max)}$: Standard	> 10 Use option HFB for >10	Pulses
			Note: Option HFB requires external buffer capacitors with a voltage rating of > 630VDC and a cpacitance of 100nF per additional pulse	Option I-HFB: >100	
				Option HFB: >1000	
	Coupling Capacitance	C_C	HV side against control side	<100	pF
	Natural Capacitance	C_N	Between switch poles, @ 0.5 x $V_{O(max)}$	<50	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.	5	VDC
	Typical Auxiliary Supply Current	I_{aux}	V_{aux} = 5.00 VDC, T_{case} = 25°C.	0.01 x $f_{(max)}$: TBD	mADC
			Active current limitation above 1A.	@ $f_{(max)}$: 800	
	Fault Signal Output		Switch will be turn off, if f>$f_{(max)}$, V_{aux}<4.75V or T_{case}>75°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 ±3%, current consumption <0.4 mA/kHz @ 25°C	15	VDC
	Opt. HFS, Ext. Supply Voltage V2	$V_{HFS(V2)}$	Stability ±3%, current consumption <0.9 mA/kHz @ 25°C	TBD	VDC
	Intrinsic Diode Forward Voltage	V_F	T_{case} = 25°C, I_F = 0.3 x $I_{P(max)}$	<60	VDC
	Diode Reverse Recovery Time	t_{rrc}	T_{case} = 25°C, I_F = 0.3 x $I_{P(max)}$, di/dt = 100 A/µs	<50	ns
HOUSING	Dimensions	LxWxH	Standard housing / Devices with option CF, non-isolated cooling fins / Devices with option DLC	Please contact the manufactured!	mm³
	Weight		Standard housing / Devices with option CF, non-isolated cooling fins / Devices with option DLC	Please contact the manufactured!	g

FUNCTION	
Control Signal Input	**Pin 1** / Yellow. TTL compatible with Schmitt-Trigger characteristics. Control voltage 2-10 V (3-5 V recommended for low jitter).
Logic GND / 5V Return	**Pin 2** / Black. The ground pin is internally connected with the safety earthing terminal (threaded insert) on bottom side.
5V Auxiliary Supply	**Pin 3** / Red. 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. TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault.
Inhibit Signal Input	**Pin 5** / Green. 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	**A)** Standard switches and switches with option 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.

ORDERING

HTS 301-60 SiC — Transistor Switch, 30 kVDC, 60 ADC

Option LP	Low Pass. Input filter for increased noise immunity.	**Option UL-94**	Flame retardant casting resin, UL94-V0
Option HFB	High Frequency Burst (improved capability by external	**Option I-FWD**	Integrated Free-Wheeling Diode. In connection with inductive load only.
Option HFS	High Frequency Switching (two auxiliary supply inputs V1 & V2)	**Option I-FWDN**	Integrated Freewheeling Diode Network. In connection with inductive load.
Option I-HFS	Integrated High Frequency Burst	**Option PT-C**	Pigtail for control connection: Flexible leads (l=75mm) with lemo connector.
Option S-TT	Soft Transition Time decrease the rise and fall time by 20%	**Option SEP-C**	Separated control unit. Control unit with LED indicators in a separate housing.
Option Min-On	Individually increased "Min. On-Time" to avoid unwanted	**Option TH**	Tubular Housing
Option Min-Off	Individually increased "Min. Off-Time" to avoid unwanted	**Option CF**	Copper Cooling Fins. $P_{d(max)}$ can be increased by the factor 3 to 10.
Option PCC	Pulser Configuration. Switch combined with custom specific	**Option GCF**	Grounded Cooling Flange. $P_{d(max)}$ can be increased by the factor 3 to 15.
Option ISO-80	80kV Isolation. Isolation Voltage increased to 80kV.	**Option ILC**	Indirect Liquid Cooling (for water). $P_{d(max)}$ can be increased by the factor 3 to 15.
Option I-PC	Integrated part components according to customer specification.	**Option DLC**	Direct Liquid Cooling. $P_{d(max)}$ can be increased by the factor 10 to 100.

Customized switching units are available on request. All data and specifications subject to change without notice. Please visit www.behlke.com for up-dates.