

	Specification	Symbol	Condition / Comment		HTS 201-60 SiC	Unit
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 270 \mu ADC$, $T_{case} = 70^{\circ}C$		20	kVDC
	Maximum Isolation Voltage	V_I	Between HV switch and control / GND, continuously		± 25	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 $< 1\%$	600 360 115 60	ADC
	Maximum Continuous Load Current	$I_{L(max)}$	$T_{case} = 25^{\circ}C$	Standard devices Devices with option DLC	2.52 60	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	50 2500	Watt
	Linear Derating		Above $25^{\circ}C$	Standard devices & FC, forced air 4 m/s Devices with option DLC	0.12 160	W/K
	Operating Temperature Range	T_O	Standard devices & options CF, GCF, ILC. (Option DLC)		-40...70	$^{\circ}C$
	Storage Temperature Range	T_S	Switches with option ILC may require frost protection!		-40...80	$^{\circ}C$
	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)		$0... \pm 20$
Typical Breakdown Voltage		V_{br}	NOTE: V_{br} is a test parameter for quality control purposes only. Not applicable in $I_{off} > 0.5 mA$		22	kVDC
Typical Off-State Current		I_{off}	$0.8 \times V_O$, $T_{case} = 25...70^{\circ}C$, reduced I_{off} on request		< 270	μADC
Typical Turn-On Resistance		R_{stat}	Each switching path $t_p < 1 \mu s$, duty cycle $< 1\%$	$0.1 \times I_{P(max)}$, $T_{case} = 25^{\circ}C$ $1.0 \times I_{P(max)}$, $T_{case} = 25^{\circ}C$ $1.0 \times I_{P(max)}$, $T_{case} = 70^{\circ}C$	0.2 0.54 0.60	Ohm
Typical Propagation Delay Time		$t_{d(on)}$	Resistive load, $0.1 \times I_{P(max)}$, $0.8 \times V_{O(max)}$, 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%	$0.1 \times V_{O(max)}$, $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$, $I_L = 0.1 \times I_{P(max)}$ $0.8 \times V_{O(max)}$, $I_L = 1.0 \times I_{P(max)}$	20 43 50	ns
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		150	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 Standard devices with HFS supply Opt. HFS + sufficient cooling option	5.8 30 70	kHz
Maximum Burst Frequency		$f_b(max)$	Use option HFB for > 10 pulses within $20 \mu s$ or less		500	kHz
Maximum Number of Pulses / Burst		$N_{(max)}$	@ $f_b(max)$ Note: Option HFB requires external buffer capacitors with a voltage rating of $> 630VDC$ and a capacitance of $100nF$ per additional pulse	Standard Option I-HFB Option HFB	> 10 Use option HFB for > 10 > 100 > 1000	Pulses
Coupling Capacitance		C_C	HV side against control side		< 100	pF
Natural Capacitance		C_N	Between switch poles, @ $0.5 \times V_{O(max)}$		< 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}	$V_{aux} = 5.00 VDC$, $T_{case} = 25^{\circ}C$. Active current limitation above 1A.	$0.01 \times f_{(max)}$ @ $f_{(max)}$	180 800	mADC
Fault Signal Output			Switch will be turn off, if $f > f_{(max)}$, $V_{aux} < 4.75V$ or $T_{case} > 75^{\circ}C$ Fault condition is indicated by a logical "L"		H=4V, L=0.5V	VDC
Opt. HFS, Ext. Supply Voltage V1		$V_{HFS(V1)}$	Stability $\pm 3\%$, 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 $< 10 mA/kHz$ @ $25^{\circ}C$		159	VDC
Intrinsic Diode Forward Voltage		V_f	$T_{case} = 25^{\circ}C$, $I_f = 0.3 \times I_{P(max)}$		< 60	VDC
Diode Reverse Recovery Time		t_{rr}	$T_{case} = 25^{\circ}C$, $I_f = 0.3 \times I_{P(max)}$, $di/dt = 100 A/\mu s$		< 50	ns
HOUSING		Dimensions	LxWxH Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC		Please contact the manufacturer!	mm ³
	Weight	Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC		Please contact the manufacturer!	g	
FUNCTION	Control Signal Input Logic GND / 5V Return 5V Auxiliary Supply Fault Signal Output Inhibit Signal Input LED Indicators Temperature Protection	Pin 1 / Yellow. TTL compatible with Schmitt-Trigger characteristics. Control voltage 2-10 V (3-5 V recommended for low jitter). Pin 2 / Black. The ground pin is internally connected with the safety earthing terminal (threaded insert) on bottom side. 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. Pin 4 / Orange. TTL output, short circuit proof. Indicating switch & driver over-heat, over-frequency, low auxiliary voltage. L = Fault. Pin 5 / Green. 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 option CF, GCF: Thermo trigger $75^{\circ}C$, response time $< 60 s$ @ $3 \times P_{d(max)}$, $\Delta T = 25K$ (50 to $75^{\circ}C$). Separate driver protection. B) 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 201-60 SiC	Transistor Switch, 20 kVDC, 600 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 lermo 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.

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