

	Specification	Symbol	Condition / Comment		HTS 401-60 SiC	Unit
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	V _{O(max)}	I _{off} < 320 μADC, T _{case} = 70°C		40	kVDC
	Maximum Isolation Voltage	V _I	Between HV switch and control / GND, continuously		± 50	kVDC
	Max. Housing Insulation Voltage	V _{INS}	Between switch and housing surface, 3 minutes		± 70	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%	600 360 115 60	ADC
	Maximum Continuous Load Current	I _{L(max)}	T _{case} = 25°C	Standard devices Devices with option DLC	2.52 60	ADC
	Max. Continuous Power Dissipation	P _{d(max)}	T _{case} = 25°C	Standard devices & FC, forced air 4 m/s Devices with option DLC	38 3600	Watt
	Linear Derating		Above 25°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	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)		0... ± 40	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		44	kVDC
	Typical Off-State Current	I _{off}	0.8xV _O , T _{case} =25...70°C, reduced I _{off} on request		< 320	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 1.0 x I _{P(max)} , T _{case} =25°C 1.0 x I _{P(max)} , T _{case} =70°C	0.36 0.75 0.80	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 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)} 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)}	35 90 130	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		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 Standard devices with HFS supply Opt. HFS + sufficient cooling option	TBD 50 100	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(max)} Note: Option HFB requires external buffer capacitors with a voltage rating of > 630VDC and a capacitance of 100nF per additional	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 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. Active current limitation above 1A.	0.01 x f _(max) @ f _(max)	TBD 800	mADC
	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)}		<30	VDC
	Diode Reverse Recovery Time	t _{rr}	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 manufacturer!
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°C, response time < 60 s @ 3xP _{d(max)} , ΔT=25K (50 to 75°C). Separate driver protection. B) Switches with option DLC: 65°C, response time < 3 s @ 3xP _{d(max)} , ΔT=25K (40 to 65°C), coolant flow > 3 l/min. Separate driver protection.				
ORDERING	HTS 401-60 SiC	Transistor Switch, 40 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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