	Specification	Symbol	Condition / Comment		HTS 1401-30 SiC GSM	HTS 1401-15 SiC GSM	Unit
ABSOLUTE MAXIMUM RATINGS	Maximum Operating Voltage	$V_{O(max)}$	I_{off} < 40 µADC, T_{case} = 70°C		140		kVDC
	Maximum Isolation Voltage	V_I	Between HV switch and control / GND, continuously		± 150		kVDC
	Max. Housing Insulation Voltage	V_{INS}	Between switch and housing surface, 3 minutes		± 160		kVDC
	Maximum Turn-On Peak Current	$I_{P(max)}$	T_{case} = 25°C	t_p< 200 µs, duty cycle <1%	300	150	ADC
				t_p< 1 ms, duty cycle <1%	190	90	
				t_p< 10 ms, duty cycle <1%	58	26	
				t_p< 100 ms, duty cycle <1%	30	15	
	Maximum Continuous Load Current	$I_{L(max)}$	T_{case} = 25°C	Standard devices	2.52	1.25	ADC
				Devices with option DLC	35	16	
	Max. Continuous Power Dissipation	$P_{d(max)}$	T_{case} = 25°C	Standard devices & FC, forced air 4 m/s	80	60	Watt
				Devices with option DLC	4000	4000	
	Linear Derating		Above 25°C	Standard devices & FC, forced air 4 m/s	0.06	0.12	W/K
				Devices with option DLC	40	80	
	Operating Temperature Range	T_O	Standard devices & options CF, GCF, ILC. (Option DLC)		-40...75		C°
	Storage Temperature Range	T_S	Switches with option ILC may require frost protection!		-50...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		VDC
ELECTRICAL CHARACTERISTICS	Permissible Operating Voltage Range	V_O			± 140		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	154		kVDC
	Typical Off-State Current	I_{off}	0.8xV_O, T_{case} =25...70°C, reduced I_{off} on request		< 40		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	2.8	5.6	Ohm
				1.0 x $I_{P(max)}$, T_{case} =25°C	4.5	8.8	
				1.0 x $I_{P(max)}$, T_{case} =70°C	8	17	
	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/Off Rise Time	$t_{r(on)}$/ $t_{r(off)}$	Resistive load, 10-90%	0.1 x $V_{O(max)}$, I_L = 0.1 x $I_{p(max)}$	55		ns
				0.8 x $V_{O(max)}$, I_L = 0.1 x $I_{p(max)}$	68		
				0.8 x $V_{O(max)}$, I_L = 1.0 x $I_{p(max)}$	88		
	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		220		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		220		ns
	Max. Continuous Switching Frequency	$f_{(max)}$	@ V_{aux}= 5.00 V Sw. shutdown if $f_{(max)}$ is exceeded	Standard devices without HFS option	< 2		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		400		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 cpacitance of 100nF per additional pulse	Standard	>10 Use option HFB for >10		Pulses
				Option I-HFB	>100		
				Option HFB	>1000		
	Coupling Capacitance	C_C	HV side against control side		<50		pF
	Natural Capacitance	C_N	Between switch poles, @ 0.5 x $V_{O(max)}$		<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.		5		VDC
	Typical Auxiliary Supply Current	I_{aux}	V_{aux} = 5.00 VDC, T_{case} = 25°C.	0.01 x $f_{(max)}$	>450		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 $I_{P(max)}$		126		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!		mm^3
	Weight		Standard housing Devices with option CF, non-isolated cooling fins Devices with option DLC		Please contact the manufactured!		g

FUNCTIONS	
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.

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HTS 141-30 SiC GSM	Transistor Switch, 140 kVDC, 300	**Option LP**	Low Pass. Input filter for increased noise immunity.	**Option CCS**	Ceramic Cooling Surface. $P_{d(max)}$ can be increased by the factor 2 to 3.
HTS 1401-15 SiC GSM	Transistor Switch, 140 kVDC, 150	**Option S-TT**	Soft Transition Time. Slower switching speed for simplified EMC.	**Option CCF**	Ceramic Flange Housing. $P_{d(max)}$ can be increased by the factor 3 to 15.
		Option HFB	High Frequency Burst, Improved burst capability by driver.	**Option CF**	Copper Cooling Fins. $P_{d(max)}$ can be increased by the factor 3 to 10.
		Option HFS	High Frequency Switching (two auxiliary supply inputs V1 & V2)	**Option GCF**	Grounded Cooling Flange (copper). $P_{d(max)}$ can be increased by the factor 3 to 15.
		Option UFTR	Ultra Fast Thermotrigger. Response time for shut down < 5s.	**Option ILC**	Indirect Liquid Cooling (for water). $P_{d(max)}$ can be increased by the factor 3 to 15.
		Option UFTS	Ultra Fast Thermosensor. Response time < 5s. NTC 10k / ± 1%	**Option DLC**	Direct Liquid Cooling (for FPE/PFC). $P_{d(max)}$ can be increased by the factor 10 to 100.

FOR FURTHER PRODUCT OPTIONS PLEASE REFER TO THE OPTIONS PAGE.