Specification	Symbol	Condition / Comment			FQD 60-02	FQD 80-03	Unit
Maximum Operating Voltage	$V_{O(max)}$	$I_{off} < 100$ µADC, $T_{case} = 25°C$			6000	8000	VDC
Maximum Isolation Voltage	V_I	Between HV switch and control / GND, continuously			>10000		VDC
Typical Breakdown Voltage	V_{Br}	$I_{off} > 1$ mADC, $T_{case} = 70°C$			6560	8750	VDC
Maximum Turn-On Peak Current	$I_{P(max)}$	$T_{case} = 25°C$	Peak current is internally limited		20	30	ADC
Maximum Off-State Current	I_{off}	$T_{case} = 25°C$, 0.8 x $V_{O(max)}$, Lower I_{off} on request			10		µADC
Output Impedance	Z_{out}	Standard devices see option M-RS			75		Ohm
Maximum Continuous Power Dissipation	$P_{d(max)}$	Standard devices & FC, T=25°C			5		Watt
		Devices with option DLC/ILC, T liquid=25°C, 1liter/min			60-200 (consult Behlke)		
		With Option GCF, T flange=25°C			200		
Max. Continuous Switching Frequency	$f_{(max)}$	Cooling may be required at higher operating frequency	Standard devices		100		kHz
			with Option HFS supply		150		
			Customized units		up to 500		
Maximum Burst Frequency	$f_{b(max)}$	Use option HFB for >10 pulses within 20µs or less			2		MHz
Operating Temperature Range	T_O	Extended range on request			-40...75		C°
Storage Temperature Range	T_{ST}				-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
Typical Power Dissipation	P_d	@0.8xV_O	f=2kHz	C_L=10 pF	1.8	6.2	Watt
		C_L Pockels cell capacitance		C_L=5 pF	15	62	
		Data valid for cooling option GCF.	f=20kHz	C_L=10 pF	18.5	75	
		Standard device without cooling option		C_L=20 pF	19	89.6	
		have 10% less losses.	f=100kHz	C_L=10 pF	92	300	
Typical Turn-On Jutter	$t_{j(on)}$	V_{aux}/ V_{tr} =5 DC			100		ps
Typical Propagation Delay Time	$t_{d(on)}$	Resistive load, 0.1 x $I_{P(max)}$, 0.8 x $V_{O(max)}$, 50-50%			50		ns
Typical Output Pulse Jitter	t_j	Impedance matched input, V_{aux} / V_{ctrl} = 5.00 VDC			1		ns
Typical Turn-On Rise Time	$t_{r(on)}$	- @ 0.8xV_O Standard		C_L=5 pF	2.8	4.8	
		- Standard Output impedance 75 Ohm		C_L=10 pF	3.6	5.6	
		- Pockels cell connecting leads <100mm (4")		C_L=20 pF	4.5	6.9	ns
Typical Turn-On Time	t_{on}	Switch on-time only. See also option OT-xxxx			100		ns
Effective HV Pulse Width	$t_{p(HV)}$	C_L=10pF, top flatness<3%. See also option M-RL			200		ns
Typical HV Pulse Fall Time	t_f	10-90%, C_L=10pF. See also Option M-RL.			1.2		µs
Switch recovery time	t_{rc}	Driver recovery only. Trigger pulse tp=100ns			500		ns
Maximum Number of Pulses / Burst	$N_{(max)}$	@ $f_{b(max)}$	Standard		150 Use option HFB for >150		Pulses
			Option I-HFB		>1000		
			Option HFB		>10000		
Coupling Capacitance	C_C	HV side against control side			10		pF
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 $f_{(max)}$		80	140	mADC
			@ $f_{(max)}$		400	400	
Fault Signal Output		Indicates over temperature, over frequency (>100kHz) and low aux. voltage (>4.75 V)	"Ready" = H		4.5		VDC
			"Fault" =L		0.8		
Trigger Signal Voltage Range	V_{TR}	3-6 VDC recommended for low jitter			2-10		VDC
Minimum trigger pulse width	$t_{ptr(min)}$	Switching behaviour cannot be influenced by trigger pulse			50		ns
Fault Signal Output Current		Source/sink current, short circuit proof			10		mADC

ABSOLUTE MAXIMUM RATINGS

Dimensions	LxWxH	Standard housing		79x38x18		mm³
		Devices with option GCF, non-isolated cooling fins		Please contact the manufactured!		
		Devices with option DLC				
Weight		Standard housing		Please contact the manufactured!		g
		Devices with option CCF, non-isolated cooling fins				
		Devices with option DLC				

HOUSING

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.
LED Indicators	**Pin 5** / Black. The ground pin is internally connected with the safety earthing terminal (threaded insert) on bottom side.
Temperature Protection	**GREEN**: "Ready, auxiliary power good". **YELLOW**: "Switch triggered". **RED**: "Fault condition, switch OFF"
	A) Standard switches and switches with option 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.

FUNCTIONS

FQD 60-02	Q-Switch driver, on mode, 6.0 kVDC, 20 A	**Option OFF**	OFF mode configuration.	
FQD 80-03	Q-Switch driver, on mode, 8.0 kVDC, 30 A	**Option NEG**	Negative high voltage supply/negative output pulse polarity.	**Option OT-10µ** Switch on-time **10µs**
		Option HFB	High Frequency Burst, Improved burst capability by driver.	**Option OT-100µ** Switch on-time **100µs**
		Option HFS	High Frequency Switching (two auxiliary supply inputs V1 & V2)	**Option PL-HV** Plug connector for high voltage connection
		Option UL94	Flame retardent casting resin according to UL94-VO	**Option SPT-C** Shielded pigtail for control connection, incl. LEMO plug
		Option M-RL	Modified working resistor (customized HV-pulse, tp(HV)&tf)	**Option GCF** Grounded cooling flange (attachment on heatsinks)
		Option M-RS	Modified damping resistor (customized HV-pulse, tr)	**Option ILC** Indirect Liquid Cooling (for water). $P_{d(max)}$ can be increased by the factor 3 to 15.
		Option OT-1µ	Switch on-time **1µs**	**Option DLC** Direct Liquid Cooling (for FPE/PFC). $P_{d(max)}$ can be increased by the factor 10

FOR FURTHER PRODUCT OPTIONS PLEASE REFER TO THE OPTIONS PAGE.

ORDERING

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