

MIL-COTS 20A, 40Vdc Active EMC Filters







The FQB filter modules have been designed to reduce differential and common mode conducted emissions from dc-dc switching converters. In addition, the series contains active suppression circuitry to block input voltage surges and transients. The FQB takes advantage of TDK technologies to simplify system level compliance to MIL-STD-461, MIL-STD-1275, RTCA/DO-160 and MIL-STD-704 per MIL-HDBK-704-8. The encapsulated rugged package design and a choice of baseplate options make the modules suitable for use in a wide variety of harsh and demanding environments, including MIL-COTS.

Features	Benefits
• Filtering for Compliance to MIL-STD-461(F,G)	Simplifies the system EMC filter
• Input Spike and Surge Suppression per MIL-STD-1275(D,E), MIL-STD-704(A-F) and RTCA/DO-160G (Sec 16-18)	Suitable for vehicle and airborne use
High Differential and Common Mode Noise Attenuation	Reduces system EMI
• -55 to 115°C Temperature Range (M-Grade)	For operation in harsh environments
Standard (S-Grade) or Enhanced Screening (M-Grade) Options	Reduces cost for COTS applications
Quarter Brick Size	Industry standard mounting and heatsinks

Model Selector						
Model	Operating Input Voltage (Vdc)	Maximum Current (A)	Flanged Baseplate	Non-Flanged Baseplate	Standard Screening (-S)	Enhanced Screening (-M)
FQB020ADC-007-S	8.5 to +40	20	Х		Х	
FQB020ADC-N07-S	8.5 to +40	20		Χ	Χ	
FQB020ADC-007-M	8.5 to +40	20	Χ			Χ
FQB020ADC-N07-M	8.5 to +40	20		Χ		Χ

Screening Options		
Operation	S-Grade (Standard Screening)	M-Grade (Enhanced Screening)
Functional Test	Room and Hot Test	Cold, Room, and Hot Test
Burn in	Yes	Extended, 96 hour
Temperature Cycling	No	10 Cycles
Hi-Pot	2250VDC	2250VDC
Visual Inspection	Yes	Yes

FQB Series



Specifications				
Model	FQB			
Input/Output				
Input Voltage range	Vdc	Continuous: -40 to +40V.		
		Transient: -50 to +210V (t < 1s. Varies with load, refer to input surge voltage suppression		
Input Voltage Spike Suppression	V	Typically 5V deviation for a ±250V, 100μs, 15mJ surge per MIL-STD-1275E		
(Vin 28V, 280W)		Typically 5V deviation for a ±600V, 10μs, 50Ω source impedance per RTCA/DO-16		
Input Voltage Surge Suppression	V	ut with a 60V, 550ms surge per MIL-HDBK-704-8 (Po = 280W)		
(Vin 28V)			ut with an 80V, 80ms surge per MIL-HDBK-704-8 (Po = 280W)	
		•	with an 100V, 50ms surge per MIL-STD-1275(D,E) (Po = 280W)	
		47V maximum output w	ith an 174V, 350ms surge per DEF-STAN 61-5 Part 6, (Po < 75W)"	
Turn On/Off Voltage (Typical)	Vdc		Turn on: 8.5V, turn off: 8.3V	
Input Under & Over Voltage Protection	-		vn if an input or over voltage condition occurs. Auto recovery.	
Reverse Polarity Protection	-	Internal series N	MOSFET is held in an off state to avoid reverse current flow	
Input Current (Maximum)	Α		20A	
Overcurrent Protection	-	•	rrent, with timed shutdown to allow module to cool. Auto restart.	
No Load Input Current (Typical at 28V Input)	mA	3mA. 1.	5mA if module is turned off using the remote on/off.	
DC Resistance (Typical)	mΩ		Positive leg: $25m\Omega$, negative leg: $5m\Omega$	
Power Loss	W	Typically 12.5W at 20A		
Remote On/Off	-	Module is ON when Pin 2 is left open; off when Pin 2 is connected to Pin 3 (-Vin)		
DC Good / Fault Signal	-	Open collector signal, low = Good		
Output Capacitance	uF	3,000uF maximum. Contact factory for higher values.		
Differential Mode Attenuation at 300kHz	dB	50dB (typical with a 50Ω source & load impedance)		
Common Mode Attenuation at 1MHz	dB	30dB (typical with a 50Ω source & load impedance)		
Qualification Methods	-	Consistent with MIL-STD-883F and MIL-STD-202G		
	D !: (DE404	(Tested to the most stringent listed)	
	Radiate		Navy	
	Emissio		10kHz to 18GHz Fixed Wing internal, >25m Nose to Tail	
Operation of Tooking (0)	Conduct		Surface ships and submarines	
Compliance Testing (2)	Emissio	ns CE102 CS101	Basic Curve	
	Conduct		Curve 2, Imax=10A Curve 5	
	Susceptik			
	Suscepiii	CS116	Basic Test Signal 10kHz to 100MHz	
Safaty Aganay Cartifications			EC/UL/CSA/EN62368-1, 60950-1, CE Mark	
Safety Agency Certifications Environmental	-		EC/OL/CSA/EN02300-1, 00930-1, GE Mark	
Operating Baseplate Temperature (max) (1)	°C	Standard screening (-	S): -/10°C to +115°C. Enhanced screening (-M): -55°C to +115°C	
Storage Temperature	°C	Standard screening (-S): -40°C to +115°C, Enhanced screening (-M): -55°C to +115°C -65 to 125°C		
Operating Humidity (non condensing)	%RH	-65 to 125 C MIL-STD 883 Method 1004.7		
Cooling	-	Conduction, convection or forced air		
Withstand Voltage (For 1 minute)	VAC	Terminals to Case: 2250Vdc		
Vibration Village (1 of 1 minute)	-	MIL-STD-202G, Method 201A, Unpowered, sweep 1: 5 to 50 Hz at 0.5g, sweep 2: 50 to 500 Hz at 1.5g, three axis		
Shock	-	MIL-STD-202G, Method 201A, Onpowered, sweep 1.5 to 50 nz at 0.50, sweep 2.50 to 500 nz at 1.5g, three axis		
		Test Condition I, Unpowered, 50G half sine 6ms, three axis		
Other			· · · · · · · · · · · · · · · · · · ·	
Weight (Typ)	g	100g (Flanged version)		
Size (LxWxH)	mm	Flanged version: 60.6 x 55.9 x 12.7, Non-flanged version: 60.6 x 39 x 12.7		
Size (LxWxH)	Inches	Flanged version: 2.39 x 2.2 x 0.5", Non-flanged version: 2.39 x 1.54 x 0.5"		
MTBF - Telcordia SR-332 issue 3	Hours			
Warranty	Years			

Notes

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See website for detailed specifications, test methods and installation manual

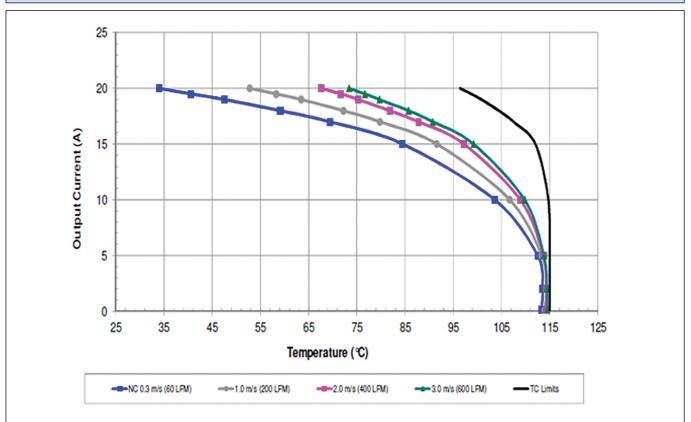
FQB Series

^{1.} See thermal performance section

^{2.} Tested using TDK-Lambda evaluation kit containing FQB020ADC-007-S transient filter, combined with HQA2W120W280V-007-S and HQA2W120W050V-007-S power modules and a 200W resistive load.

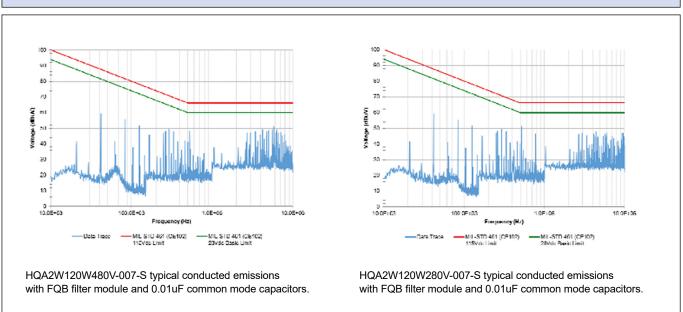


Thermal Performance



Maxmum output current vs. ambient temperature at nominal input voltage for natural convection (60 LFM) to 400 LFM with airflow from pin 1 to pin 3.

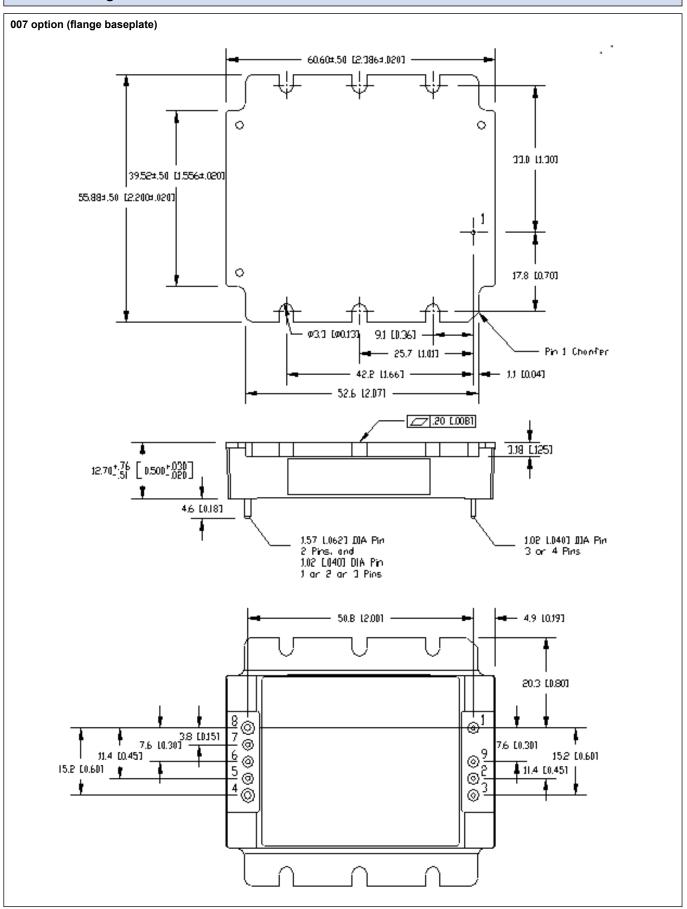
Attenuation Characteristics



FQB Series 3

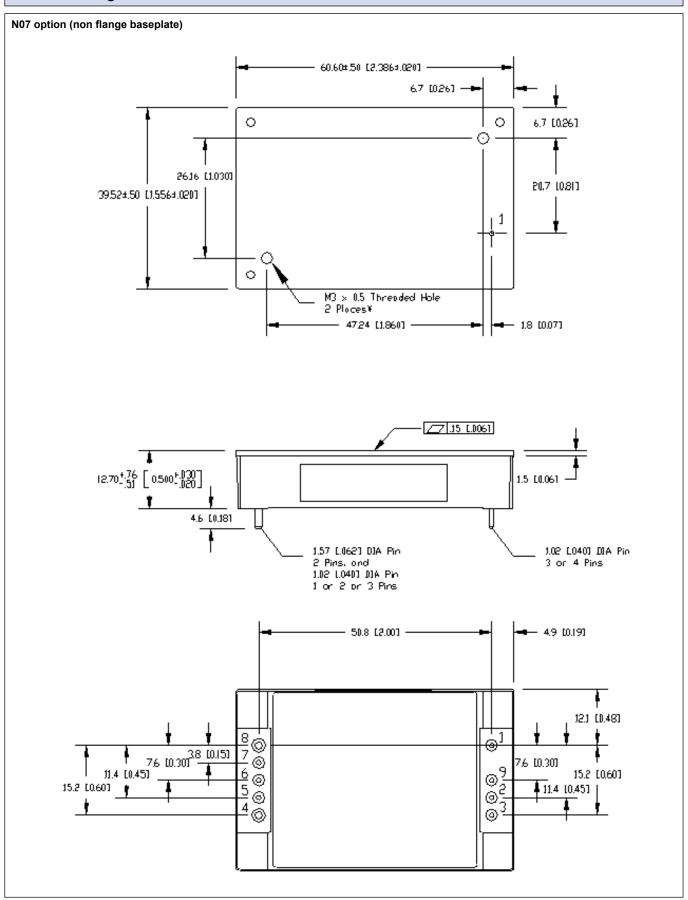


Outline Drawing





Outline Drawing





Pinout			
PIN	Function		
1	VIN (+)		
2	ON / OFF		
3	VIN (-)		
4	VOUT (-)		
5	No connection		
6	Common mode out*		
7	DC Good / Fault		
8	VOUT (+)		
9	COM (IN)*		

Evaluation Board		
Evaluation Board Part #	Content	
FQX-HQA-EVK-D0	Evaluation PCB that can accommodate FQA or FQB filters plus two (2) HQA DC-DC Quarter Brick Modules. Filters and DC-DC bricks are not included.	

 $^{^{\}star}$ In a typical application pin 6 would be connected to the Vout-/ground plane and pin 9 to chassis/ground for EMI measurement

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