https://product.tdk.com/en/power/rgf
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20A and 40A, 80VDC Input Board Mount EMC Filters

Industrial COTS Test COMM Broadcast Robotics

RGF filter modules are designed to help reduce differential mode conducted emissions in switching power supplies with high input current requirements. Leveraging advanced TDK component technology, these modules streamline system-level compliance to CISPR and other compliance standards. Encapsulated for protection in harsh environments, RGF filter modules feature a robust 5-sided metal case. This design includes two threaded and two non-threaded mounting holes, ensuring easy installation and enhanced cooling in both conduction and convection-cooled systems. Additionally, the RGF filter modules pair exceptionally well with TDK-Lambda's industrial non-isolated DC-DC converters, enhancing overall system performance and compatibility.

Features	Benefits
• Exceptional differential mode filtering	• Simplifies end-system compliance
• Encapsulated in 5-sided metal case	• Suitable for harsh environment
• Low Power Loss	• Improves system-level efficiency and eases thermal management
• Compact 2 x 1 inch package	• Saves space and offers flexible deployment

Model Selector

Model	Input Voltage (V)	Maximum Current (A)	Resistance, Positive Leg (typical, mΩ)	Resistance, Negative Leg (typical, mΩ)	Differential Mode Attenuation @ 300 kHz (dB)
RGF48020A-001	0 - 80V	20	5.4	0.7	45
RGF48040A-001	0 - 80V	40	2.3	0.7	40

Related Products

Type	Part Number(s)	Size (mm) / Description
MIL-COTS Active Filter Module	FQB	MIL-COTS 20A, 40V Active EMC Filter
MIL-COTS Passive Filter Module	FQA	MIL-COTS 20A, 40V Passive EMC Filter
Filter Module	iDQ	10A, 75V EMC Filter
Ruggedized DC-DC Buck Converter	RGA	250W, Input 9-40V and Output 3.3-24V or, 9-53V Input and 3.3V up to 40V Output
Ruggedized DC-DC Buck Converter	RGB	400-750W, Input 9-18V, 18-32V, 18-60V; Output 0.8-8V 60A, 3.3-18V 45A, 3.3-24V 33A
Ruggedized DC-DC Buck-Boost Converter	RGC	300W, Input 9-53V, Output 9.6-48V 8A or 5-28V 12.5A
DC-DC Buck-Boost Converter	i7C	300W, Input 9-53V or 9-36V, Output 9.6-48V 8A, 5-28V 12.5A or 8-24V 20A
DC-DC Buck Converter	i7A	400-750W, Input 9-18V, 18-32V, 18-60V, 28-60V; Output 0.8-8V 60A, 3.3-18V 45A, 3.3-24V 33A, 3.3-32V 20A
DC-DC Buck Converter	i6A4W	250W, Input 9 -53V, Output 3.3-40V 10A or 3.3-15V 20A
DC-DC Buck-Boost Converter	i1C	200W, Input 9-36V or 18-75V, Output 9.6-28V, 10A max

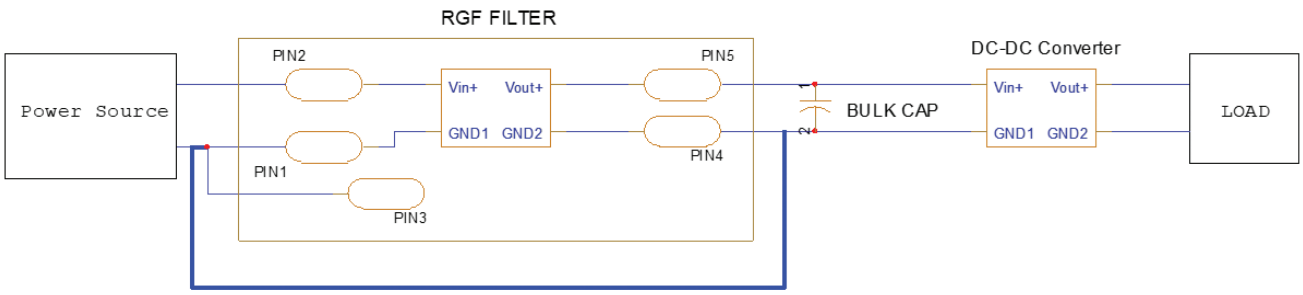
Specifications

Model		RGF48020A-001	RGF48040A-001
Input			
Input Voltage Range	Vdc	0 - 80	
Input Transient (t<100 ms)	Vdc	100	
Inrush Transient (max)	A^2s	0.4	
Maximum Current	A	20	40
Resistance (Positive Leg)	-	5.4	2.3
Resistance (Negative Leg)	-	0.7	0.7
Differential Mode Attenuation @ 300 kHz, 50Ω Source/load impedance	dB	45	40
Safety Certifications and Markings	-	CE Mark and UKCA Mark	
Environmental			
Operating Temperature (Tcase)	°C	-40 to 120	
Storage Temperature	°C	-55 to 125	
Humidity (non condensing)	%RH	10 - 95	
Cooling	-	Conduction Cooling	
Shock	-	MIL-STD-810G 516.6 Procedure I & IV	
Vibration	-	MIL-STD-810G 514.6 Procedure I, Cat 10	
Thermal Cycling Test (TCT)	-	Qualified to 700 cycles / -40 to 125°C, 60°C/minute ramp, 30minute dwell time	
Other			
Weight (max)	g	48	
Size (LxWxH)	mm	52.8 x 35.2* x 12.7 [*includes side mounting tabs)	
Size (LxWxH)	Inches	2.08 x 1.39* x 0.50 [*includes side mounting tabs)	
MTBF - Telcordia SR-332 (100% Load, 40°C)	MHrs	> 60	
Warranty	yrs	3	

Notes

(1) Typical specification unless otherwise indicated. See website for detailed product specifications.

Simplified Block Diagram



Notes:

(1) When paired with a DC-DC converter module, the RGF filter module produces a significant amount of differential mode attenuation over a broad frequency range which reduces system noise and simplifies compliance to typical EMI standards. The RGF filter module does not contain common-mode noise filtering elements, so it is most appropriate for filtering non-isolated DC-DC converters. For isolated converters, the RGF filter module can still be used in conjunction with appropriate common-mode noise reducing components.

(2) To ensure system stability, it is crucial to include the recommended input bulk capacitance (BULK CAP) for the DC-DC converter module at its input.

(3) TDK capacitor technology and the internal damping in the RGF filter module will help users avoid input filter oscillations, a common issue with other competitive solutions' highly inductive filter designs.

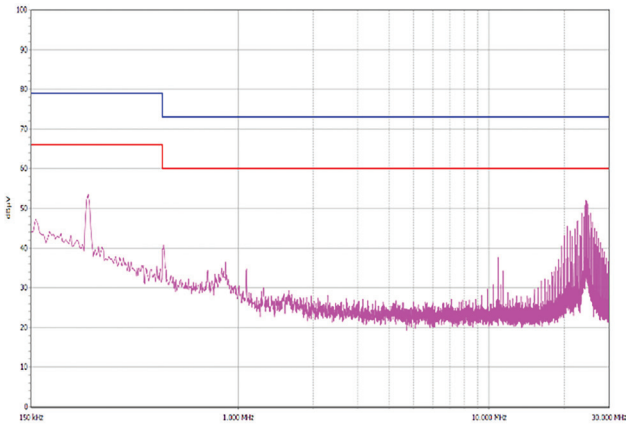
(4) Although Pin 1 and Pin 4 are internally connected, these pins must also be externally connected via a copper trace or plane capable of carrying the load current to ensure proper thermal performance.

(5) The RGF filter module will not be damaged by reverse input voltage or by applying voltage at the output pins.

(6) RGF filter modules can be connected in series to achieve ultra-low noise levels. However, they should not be connected in parallel as there is no mechanism to ensure current sharing between parallel filter modules.

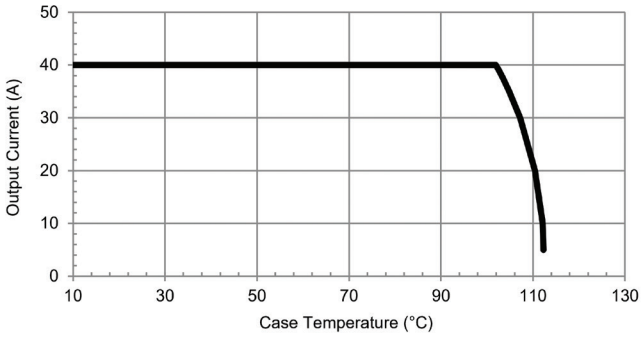
(7) In all applications, especially those with high current, it is essential to confirm both thermal and electrical performance in the end application.

Typical Performance Data



RGF48040A typical conducted emissions with RGC4W300W008A-001 at 24Vin, 48Vo and 100% load.

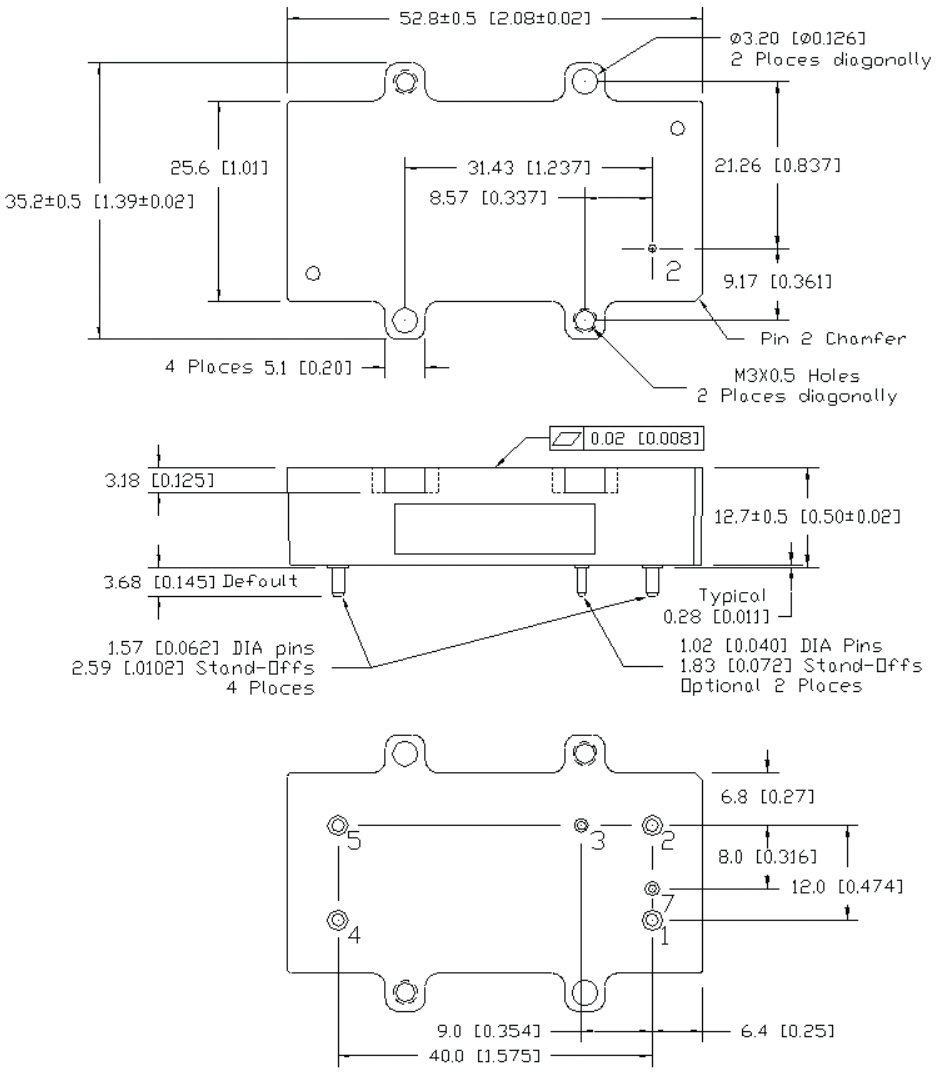
Typical Performance Data



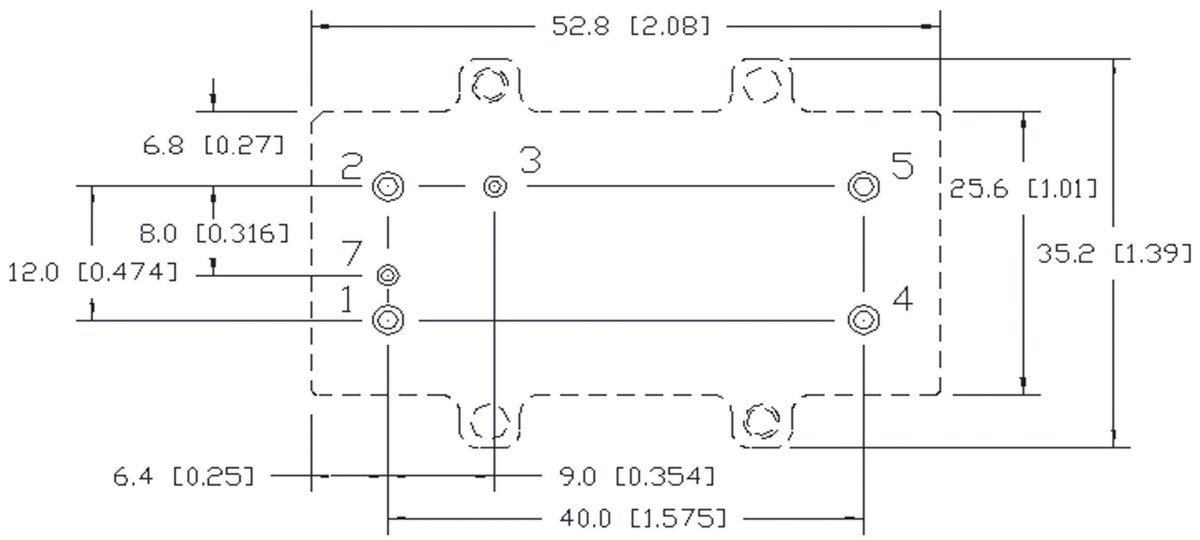
RGF48040A typical maximum output current versus case temperature in an enclosed environment with Vin = 24V.

Mechanical Specification

Dimensions are in mm [in]. Unless otherwise specified, tolerances are: x.x ± 0.5 [0.02] / x.xx ± 0.25 [0.010]



Recommended PCB Hole Pattern



Pinout

PIN	Function	PIN	Function
1	GND / Vin(-), connect to power source	4	GND / Vout(-), connect to Vin(-) terminal of power module to be filtered
2	Vin (+), conncet to power source	5	Vout(+), connect to Vin(+) terminal of power module to be filtered
3	CASE	7	Not present

1) Pin 1 and Pin 4 are internally connected. However, they must also be connected by an external copper trace or place sufficient to carry the load current to ensure proper performance.
2) Pin base material is brass or copper with tin gold over nickel plating.

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