

Features & Benefits

- -55°C Operating Temperature
- Passive EMI Filter - Quarter Brick Module
- 30 A Output Current
- Wide Input Voltage Range
- 36 dB Differential-Mode Attenuation at 250 kHz
- 41 dB Common-Mode Attenuation at 250 kHz
- Bulk Capacitors and Damping Resistors are Included for Input Stability
- All Capacitors are X7R Multi-Layer Ceramic
- Designed to Meet MIL-STD-461G EMI Requirements
- Designed to Meet MIL-STD-810G
- Flanged Baseplate Version Available

Compliance

- MIL-STD-461G
- MIL-STD-810G

Typical Applications

- Military/Defense Power Systems
- Armored Vehicles
- Land Platforms
- Aerospace Platforms
- Communications and Radar Systems
- Medical Systems

Product Ratings

V_{IN}	9 - 70 V
I_{OUT_MAX}	30 A

Product Description

KRFL02-DC28WE-C30-P-QB is a 30 A passive EMI filter in quarter-brick size that operates from nominal 28 V input. It is designed to meet MIL-STD-461G EMI requirements for the KMBM08 DC/DC Converter module. Baseplate is designed and manufactured in house to provide efficient cooling and safe operation at 100 °C base plate temperature.



Size: 58.4 x 36.8 x 12.7 mm
[2.3" x 1.45" x 0.5"]

Weight: 85 ± 5 g

Electrical Characteristics

All data are obtained at nominal line and full load unless otherwise specified. (Ta = 25 °C)

General Characteristics					
Parameters	Notes & Conditions	Min	Typ	Max	Unit
Operating Input Voltage Range		9	28	70	V
Input Voltage Range		-75	28	75	V
Input Voltage Transient	1s	-100		100	V
Output Current		-30		30	A
Efficiency	Full load, 9 Vdc low line		92.22		%
	Full load, 28 Vdc nominal line		98		%
	Full load, 70 Vdc high line		99.02		%
Voltage Drop			0.56		V
Total differential-mode capacitance			235		μF
Total common-mode capacitance			0.35		μF
Bulk capacitor			160		μF
Damping resistor			1		Ω
Noise attenuation					
Differential-mode	@250kHz		36		dB
Common-mode	@250kHz		41		dB
MTBF	Ground Begin, 30°C Ta		30200		10 ³ Hrs.
	Ground Fixed, 40°C Ta		2670		10 ³ Hrs.
	Ground Mobile, 45°C Ta		551		10 ³ Hrs.

Isolation Characteristics					
Parameters	Notes & Conditions	Min	Typ	Max	Unit
Insulation Resistance	500V _{DC}				
Input/Output to CM Pins			>4		GΩ
Isolation Voltage	60s dwell, 1mA trip current				
Input/Output to CM Pins			750		V _{DC}

Environmental Characteristics						
Parameters	Standard	Min	Typ	Max	Unit	Status
Operational Baseplate Temperature	MIL-STD-810G_CHG-1 Method 501.6/502.6 Procedure II	-55	-	+100	°C	Passed*
Storage / Transport Temperature	MIL-STD-810G_CHG-1 Method 501.6/502.6 Procedure I	-55	-	+125	°C	Passed*
Operational Low Pressure	MIL-STD-810G_CHG-1 Method 500.6 Procedure II	-	-	3000	m	Passed*
Storage / Transport Low Pressure	MIL-STD-810G_CHG-1 Method 500.6 Procedure I	-	-	9000	m	Designed to Meet
Parameters	Standard	Waveform	Peak Value	Pulse Duration	Axis	Status
Shock	MIL-STD-810G_CHG-1 Method 516.7 Procedure I	Half-Sine	10g	11 ms	±X, ±Y, ±Z	Passed*
Parameters	Standard	Category	Figure	Platform	Vehicle	Status
Vibration	MIL-STD-810G_CHG-1 Method 514.7 Procedure I	Category 4	514.7C-2	Secured Cargo	Truck Transportation and Composite Wheeled Vehicles	Passed*
		Category 8	514.7C-8	Aircraft	Propeller	Passed*
		Category 11	514.7C-11	Railroad	Train	Passed*
		Category 20	514.7C-4	Ground	Wheeled Vehicles	Passed*
		Category 21	514.7D-9	Watercraft	Marine Vehicles	Passed*
Parameters	Standard	Condition				Status
Salt Fog	MIL-STD-810G_CHG-1 Method 509.6	24 hours spray, 24 hours dry, applied 2 times				Designed to Meet
Sand and Dust	MIL-STD-810G_CHG-1 Method 510.6 Procedure I/II	<150 µm Dust 150-850 µm Sand				Designed to Meet
Fungus	MIL-STD-810G_CHG-1 Method 508.7	Analysis of the degree of inertness to fungus growth of the components.				Analysis
Solar Radiation	MIL-STD-810G_CHG-1 Method 505.6 Procedure I	A2				Passed*
Humidity	MIL-STD-810G_CHG-1 Method 507.6 Procedure II	≥ %95 Relative @30°C				Passed*
Parameters	Standard	Test				Status
EMI/EMC	MIL-STD-461G Ground Army	CE102	CS101 CS114 CS115 CS116 CS118	RE102	RS103	Passed*

* Verified in a multi-channel power supply with a KMBM08 converter.

Basic Operation and Features

Following EMI measurements have been performed in KOLT's EMI test laboratory using Rohde&Schwarz FPC1000 Spectrum Analyzer. The output of the KRFL02 is connected to KMBM08 Brick Module, which is loaded to supply 300 W to a resistive load at 28 V input. KRFL02 filter module complies with the CE102 28V limits.

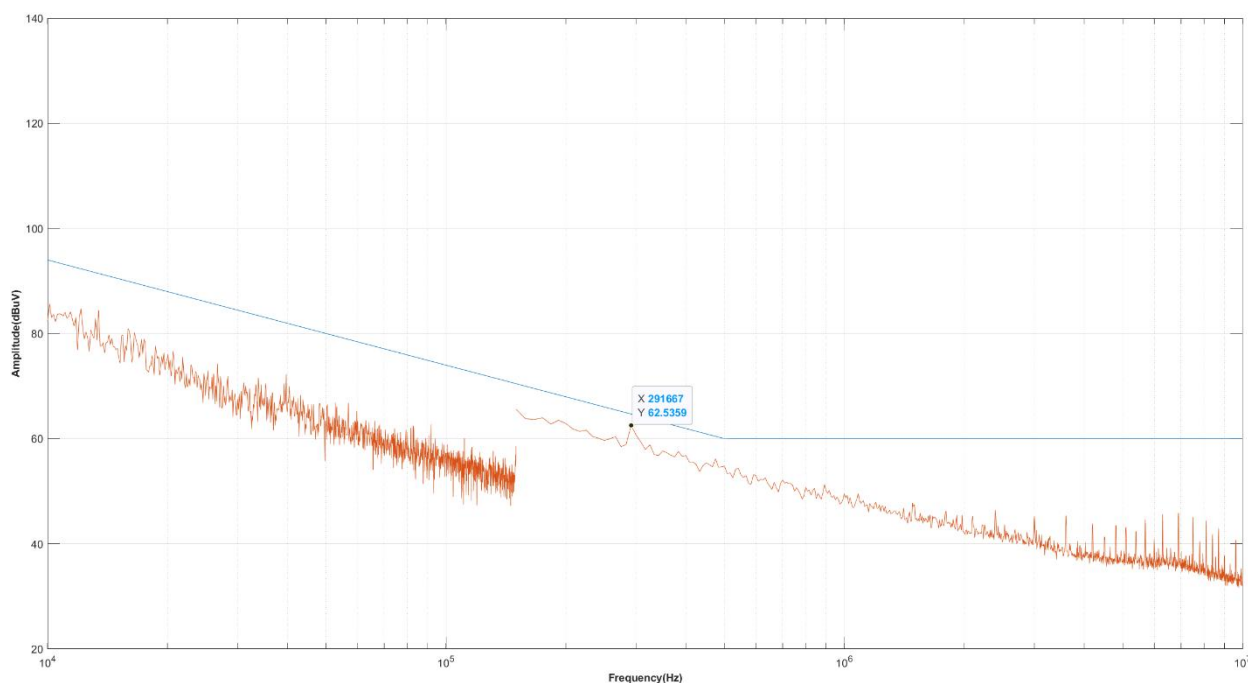


Figure 1. MIL-STD-461G CE102 Positive Line with KMBM08 Converter at 28V Input

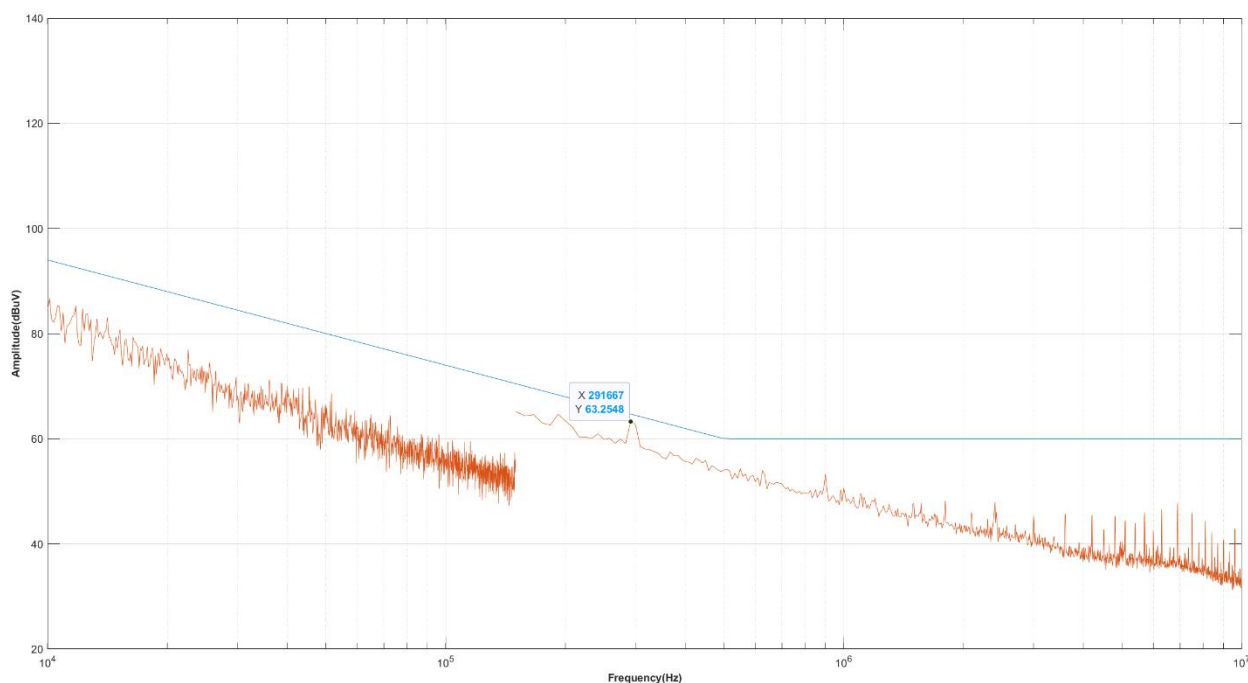


Figure 2. MIL-STD-461G CE102 Negative Line with KMBM08 Converter at 28V Input

Soldering and Cleaning

Hand Soldering

1. Mounting of brick module should not put mechanical stress on the pins and solder joints. If the brick module will be fixed to an immovable surface, soldering should be done after the brick module is screwed to surface.
2. Tip temperature of soldering iron should not exceed 430 °C. Recommended soldering durations and soldering iron temperature are detailed in table below.

Pin Type	Soldering Duration (range)	Soldering Temperature °C (range)
PMBUS	3-5	330-390
Power	5-8	330-430
Remote ON/OFF, TRIM, SENSE ±	4-6	330-410

3. Soldering the brick module longer periods of time and at higher temperatures may result in damage to the brick module.

Wave Soldering Profile

1. Bottom side preheaters: Zone 1: 180 °C, Zone 2: 150 °C, Zone 3: 360 °C
2. Top side preheaters: Zone 1: 105-115 °C
3. Wave Temperature: 265 °C
4. Wave type: 108 mm standard laminar wave

Cleaning

1. Brick modules are not sealed and exposure to liquid may result in damage to the brick module.
2. If PCB needs to be exposed aqueous wash after soldering, surface mount or through-hole sockets are recommended for mounting the brick modules after cleaning process.

De-soldering

1. Brick modules should not be re-used after de-soldering. De-soldering may cause mechanical and thermal stresses to damage brick module. KOLT does not guarantee reusability of brick modules after de-soldering

Application Consideration

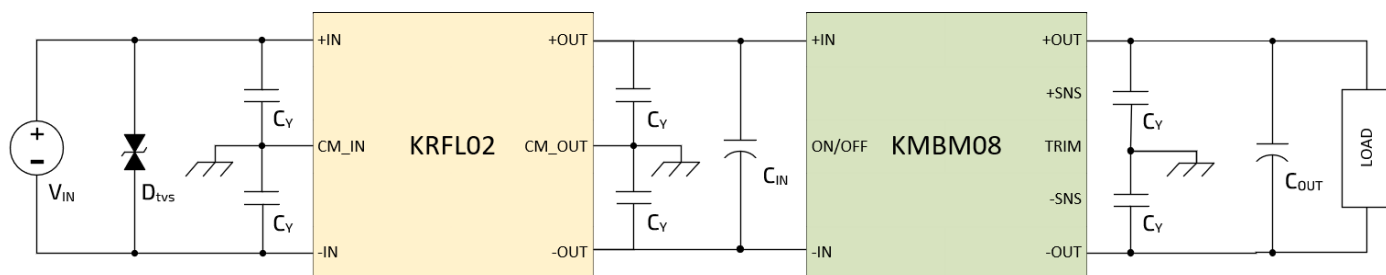


Figure 3. Recommended Application for better EMI/EMC compliance

CM_IN and CM_OUT of KRFL02 should be connected to the chassis.

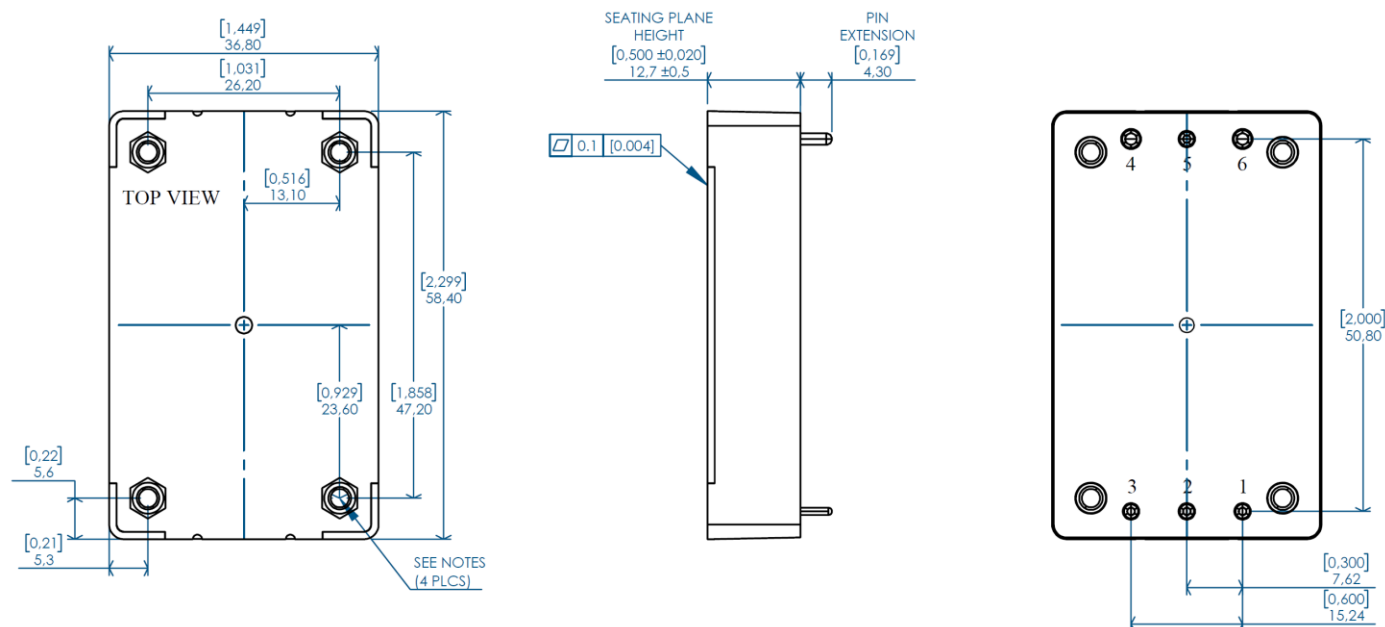
C_Y: CHV1206N2K0472KXT (4700 pF 2kV X7R Ceramic Capacitor)

C_{IN}: A759KS476M1KAAE045 (47uF 80V Aluminum-Polymer Capacitor)

C_{OUT}: EEH-ZS1H181UP (180uF 50V Aluminum-Polymer Capacitor)

D_{TVS}: 5.0SMDJ40CA (Bi-directional 40Vwm TVS Diode)

Mechanical Drawing – Threaded



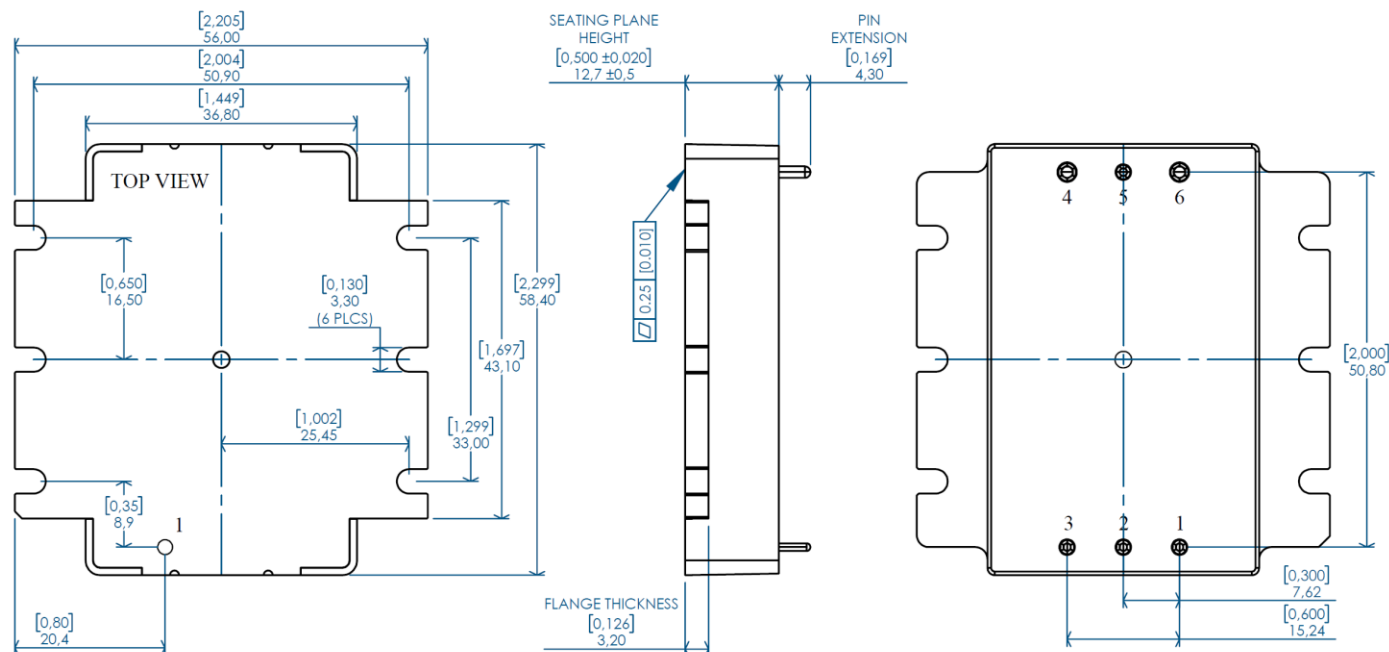
NOTES:

- APPLIED TORQUE PER M3 SCREW 0.36Nm (3in-lb) RECOMMENDED [0.4Nm (3.5in-lb) LIMIT]. M3 SCREW SHOULD NOT EXCEED 3mm (0.118") DEPTH BELOW THE SURFACE OF THE BASEPLATE.
- BASEPLATE FLATNESS TOLERANCE IS 0.1mm (0.004") TIR FOR SURFACE.
- PINS 1-3 AND 5 ARE 1.02mm DIA. (0.040") WITH 2.03mm DIA. (0.080") STANDOFFS.
- PINS 4 AND 6 ARE 1.57mm DIA. (0.062") WITH 2.54mm DIA. (0.100") STANDOFFS.
- PINS 1-6
MATERIAL: BRASS ALLOY
FINISH: 10µ" GOLD OVER NICKEL
- WEIGHT: 85 g (2.99 oz)
- ALL DIMENSIONS IN MILLIMETERS [inches]
- TOLERANCES: X.Xmm ±0.5mm (X.XXIN ±0.020)
X.XXmm ±0.25mm (X.XXXIN ±0.010)

Pin	Name	Function
1	+IN	Positive input voltage
2	COM IN	Input-side common-mode
3	-IN	Input return
4	-OUT	Output return
5	COM OUT	Output-side common-mode
6	+OUT	Positive output voltage



Mechanical Drawing – Flanged



NOTES:

- APPLIED TORQUE NOT TO EXCEED 0.7Nm (6in-lb).
- BASEPLATE FLATNESS TOLERANCE IS 0.25mm (0.010") TIR FOR SURFACE.
- PINS 1-3 AND 5 ARE 1.02mm DIA. (0.040") WITH 2.03mm DIA. (0.080") STANDOFFS.
- PINS 4 AND 6 ARE 1.57mm DIA. (0.062") WITH 2.54mm DIA. (0.100") STANDOFFS.
- PINS 1-6
MATERIAL: BRASS ALLOY
FINISH: 10µ" GOLD OVER NICKEL
- WEIGHT: 95.0 g (3.35 oz)
- ALL DIMENSIONS IN MILLIMETERS [inches]
- TOLERANCES: X.Xmm ±0.5mm (X.XXIN ±0.020)
X.XXmm ±0.25mm (X.XXXIN ±0.010)

Pin	Name	Function
1	+IN	Positive input voltage
2	COM IN	Input-side common-mode
3	-IN	Input return
4	-OUT	Output return
5	COM OUT	Output-side common-mode
6	+OUT	Positive output voltage



Part Ordering Information

Family	Input Voltage	Current	Filter Type	Package	Option Field
KRFL02	DC28WE 9-70 VDC	C30 30A	P Passive	QB Quarter Brick	F: Flanged

Ordering Number	Baseplate
KRFL02-DC28WE-C30-P-QB	Threaded
KRFL02-DC28WE-C30-P-QB -F	Flanged

Revision History

Document Number	Revision	Date	Description	Page Number(s)
109372	01	18.10.2024	Initial Release	-
109372	02	20.03.2025	Second Release	-

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