Features & Benefits

- 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

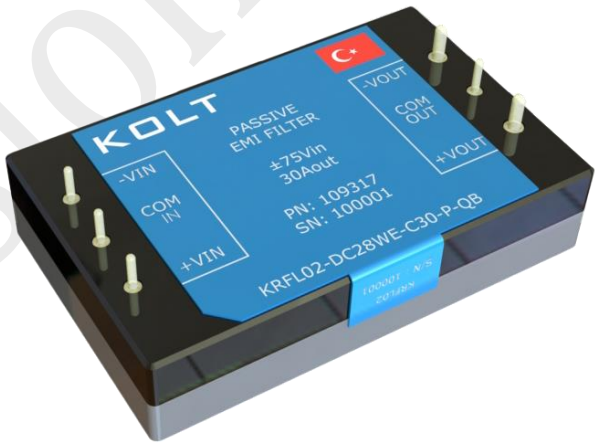
Typical Applications

- 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: 53 ± 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	-40	-	+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.

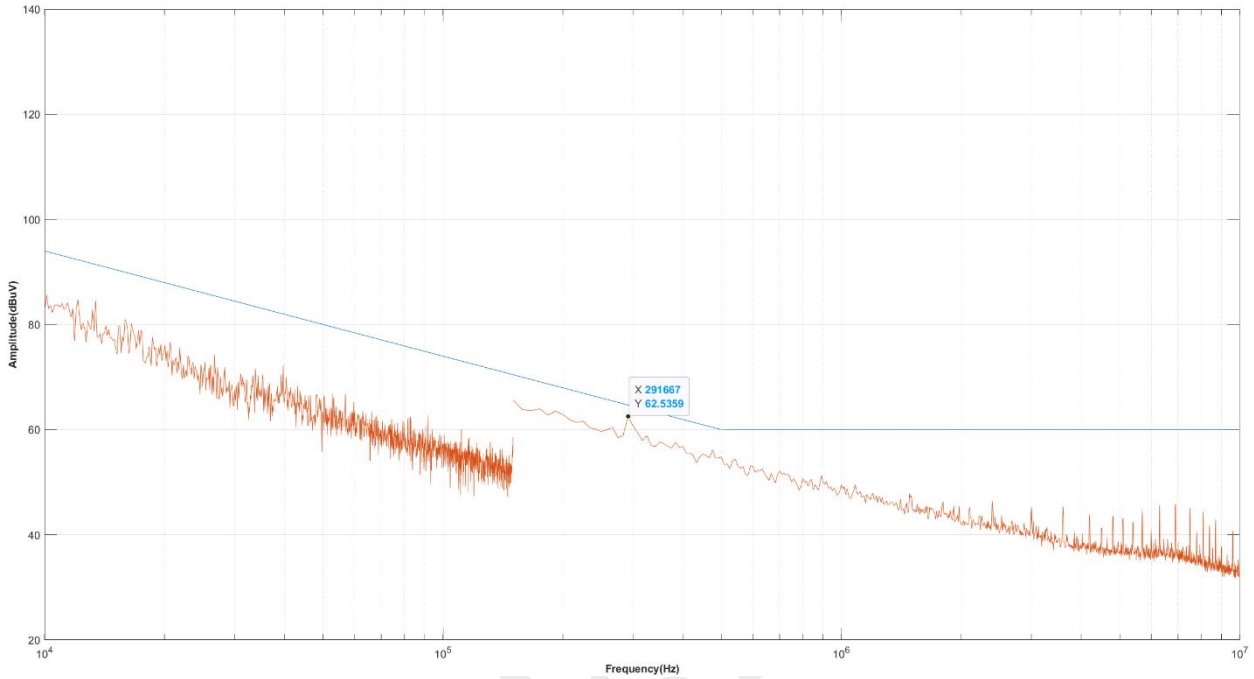


Figure 1. MIL-STD-461G CE102 Positive Line with KMBM08 Converter at 28V Input

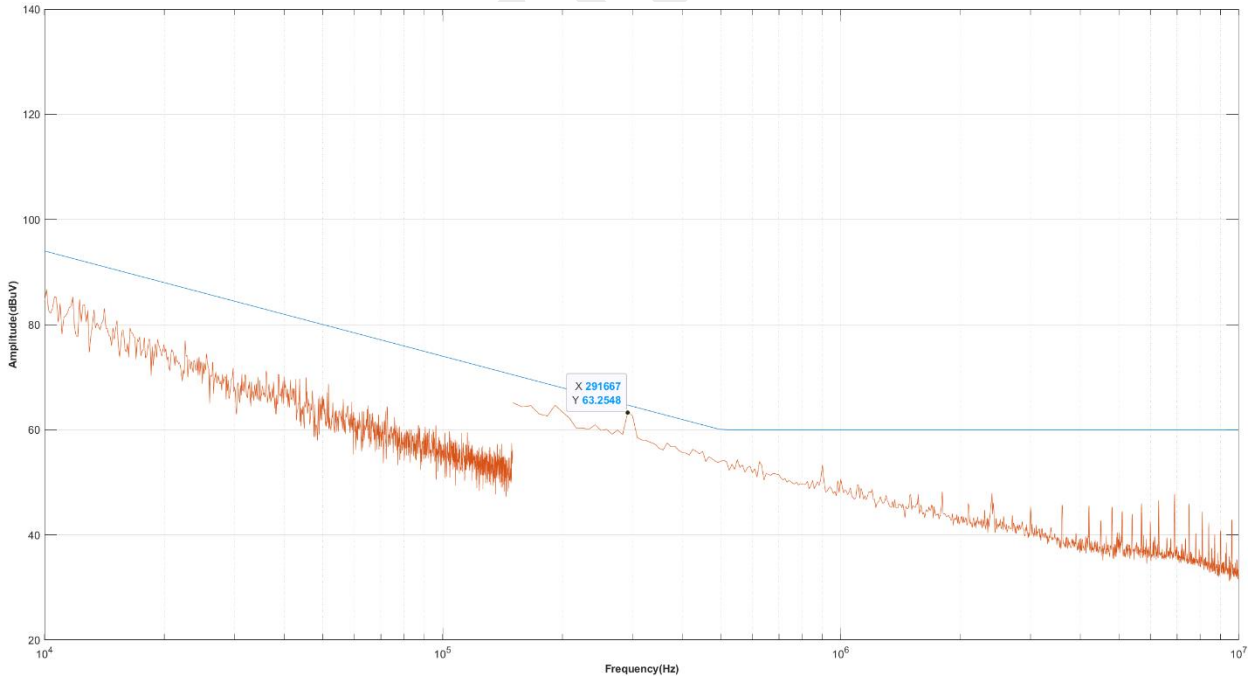


Figure 2. MIL-STD-461G CE102 Negative Line with KMBM08 Converter at 28V Input

Application Consideration

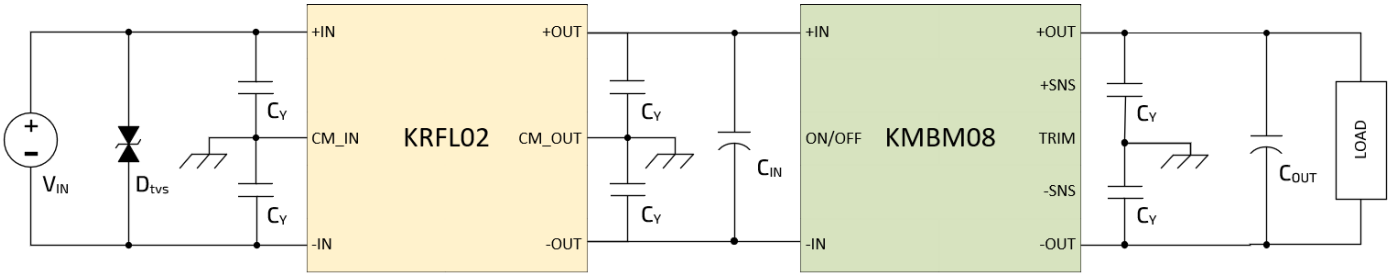
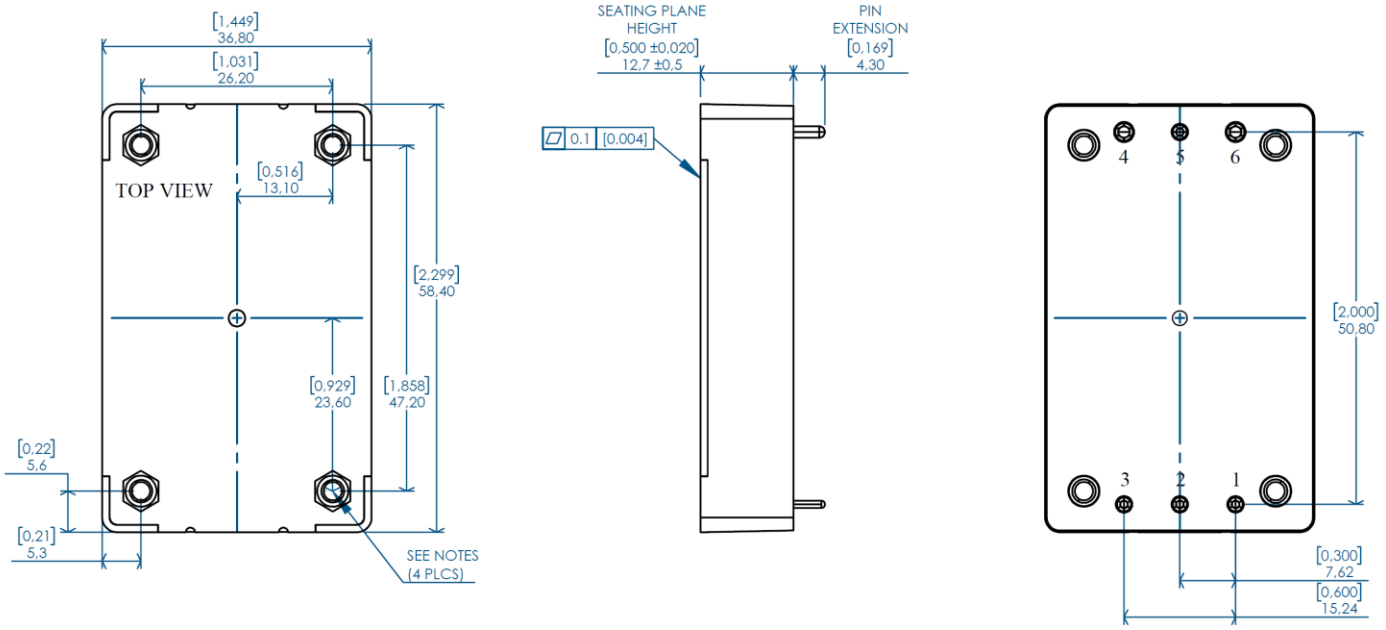


Figure 3. Recommended Application for better EMI/EMC compliance

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

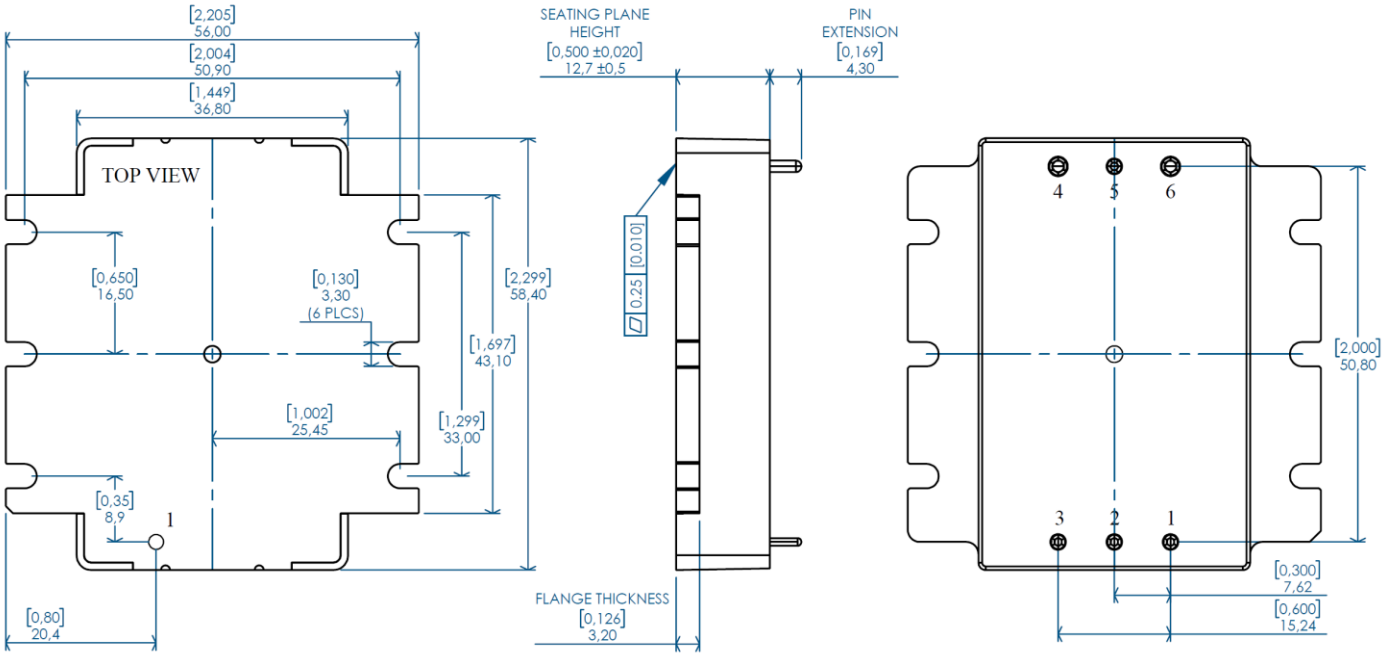


NOTES:

- 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: 53 g (1.87 oz)
- ALL DIMENSIONS IN MILIMETERS [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: 62.0 g (2.19 oz)
- ALL DIMENSIONS IN MILIMETERS [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	-

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