

50W

EMC FILTER

The MTF50 is a COTS EMC filter which has been developed specifically for the defense and avionics market. This product offers a high end specification while offering the short lead times and cost benefits of COTS components.

The MTF50 is designed to filter the conducted emissions of the MTC series DC-DC converters and protect against conducted susceptibility specified in MIL-STD-461 and surges and spikes specified in MIL-STD-1275 and MIL-STD-704.



Features

- 50W baseplate cooled
- Active surge protection and EMC filter
- Output voltage tracks input voltage and clamps <50VDC
- Input voltage range 10V to 40VDC
- Remote inhibit
- MIL-STD-1275A MIL-STD-461 immunity
- MIL-STD-704A DEF-STAN-61-5 Part 6 Issue 6 immunity
- MIL-STD-461 & DEF-STAN-59-411 EMC emissions
- MIL-STD-810G shock and vibration
- -55°C to +100°C operating temperature (baseplate)
- 3 year warranty

Applications



COTS

Dimensions

40.0 x 26.0 x 12.7mm (1.576" x 1.024" x 0.50")

Models & Ratings

Model Number ⁽¹⁾	Output Voltage	Input Voltage	Efficiency ⁽²⁾	Output Power
MTF50	50VDC max	15.5-40VDC	97%	50W

Notes:

1. Add suffix '-LT' to the part number for extended temperature range version (-55°C).
2. Add suffix '-ESS-' to the part number for extended environmental stress screening.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	15.5	28	40	VDC	Continuous operation
Transient Input Voltage Range	10		50	VDC	10 seconds max
Inrush Current	13.3	24.7	39.4	A	Peak value

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Maximum Output Voltage	44		47.5	VDC	Clamped <50V
Nominal Output Voltage				VDC	Non regulated, output proportional to input: $V_{out} = V_{in} - I_{out} \times R_{series}$
Output Power			50	W	15.5-40.0VDC input 10.0-15.5VDC 10 seconds max 40.0-50.0VDC 10 seconds max
Inhibit	Off = TTL low or short circuit, On = TTL high or open circuit				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		97		%	
Resistance		0.25			Input to output, case to case pin @ 10A
Inhibited Power Dissipation		0.10		W	
Rth Case-Ambient		8.00		°C/W	
Fusing	External fusing required				
Reverse Voltage Protection	Needs to be provided externally, see safe operating area				
Mean Time Between Failure	See MTBF calculations				
Weight		25 (0.88)		g (oz)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+100	°C	Baseplate temperature
Extended Temperature Range	-55		+100	°C	Baseplate temperature ⁽¹⁾
Storage Temperature	-55		+100	°C	Ambient temperature
Cooling	Baseplate-cooled				
Humidity		88		%RH	
Operating Altitude			21336 (70000)	m (ft)	
Shock	MIL-STD 810D Method 516.3 crash hazard for ground equipment, 100g				
Vibration	MIL-STD 810D Method 514.3 3 g basic transportation, 5Hz to 500kHz				
Bump		40		g	2000 bumps in each axes MIL-STD 810D Method 516.3 crash hazard
Salt Atmosphere	48 hours MIL-STD-810E Method 509.1				

Notes:

- For -55°C extended operating range, add suffix '-LT' to the part number, e.g. MTF50-LT.

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	MIL-STD-461G	CE101/CE102	

EMC: Immunity

Phenomenon	Standard	Test Level	Notes & Conditions
ESD Immunity	MIL-STD-1275A-E		Spikes: $\pm 250V$ for $100\mu s$ Surges: $100V$ for $50ms$ at 0.5 Ripple: $14VAC$ pk-pk
	MIL-STD-704A/B-F		$600V$ input transient: $10\mu s$ 50 source impedance
Conducted	MIL-STD-461G	CS101, CS114, CS115, CS116	

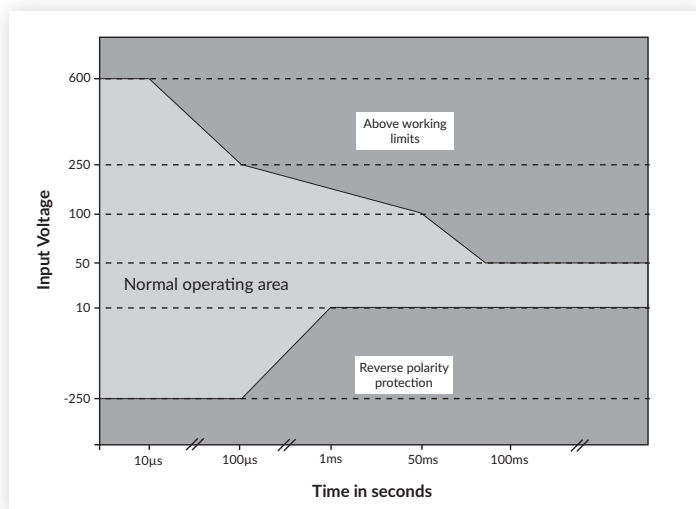
Safety Approvals

Certification	Standard	Notes & Conditions
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

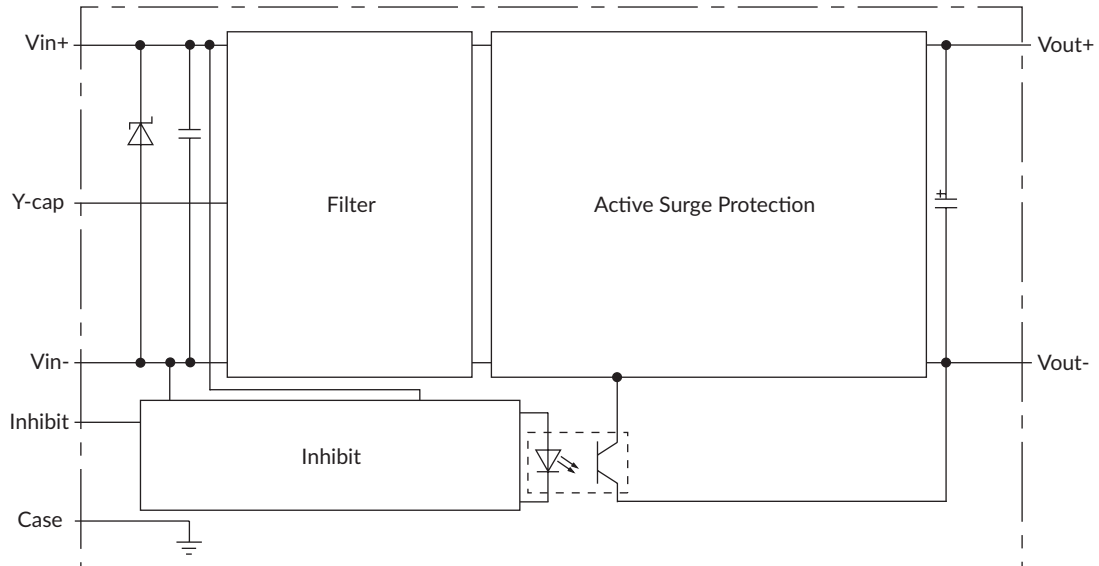
MTBF Calculations

Temperature/Environment	Ground Mobile - GM	Airbourne Inhabited Cargo - AIC	Airbourne Inhabited Fighter - AIF
20°C	693264 hrs	600672 hrs	301882 hrs
40°C	471398 hrs	410083 hrs	203684 hrs
60°C	320466 hrs	284139 hrs	141178 hrs
80°C	218610 hrs	199505 hrs	100179 hrs
100°C	148081 hrs	140201 hrs	72052 hrs

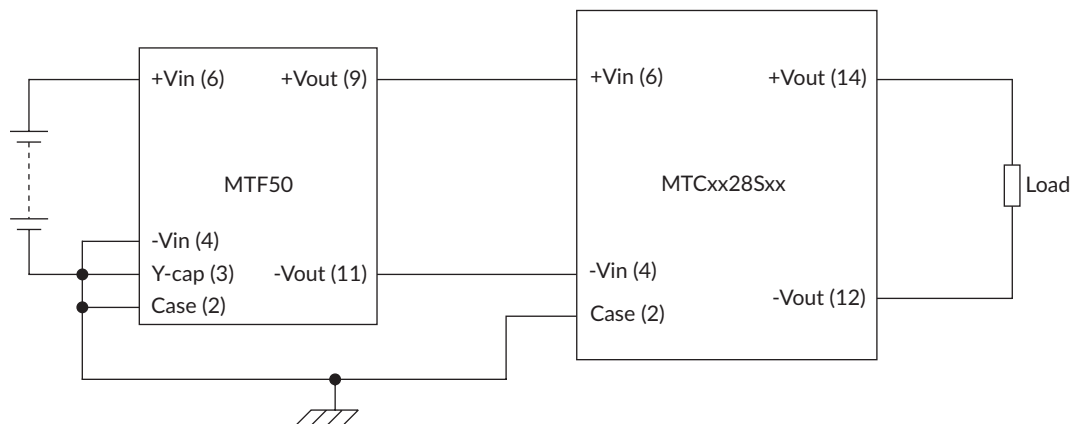
Safe Operating Area



Block Diagram



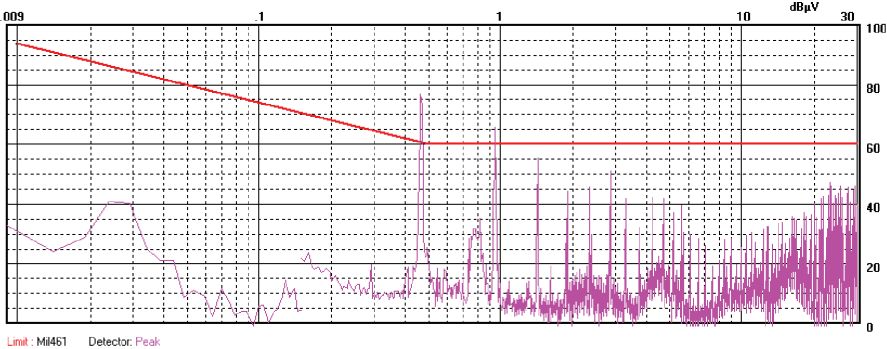
EMC Connection Diagram



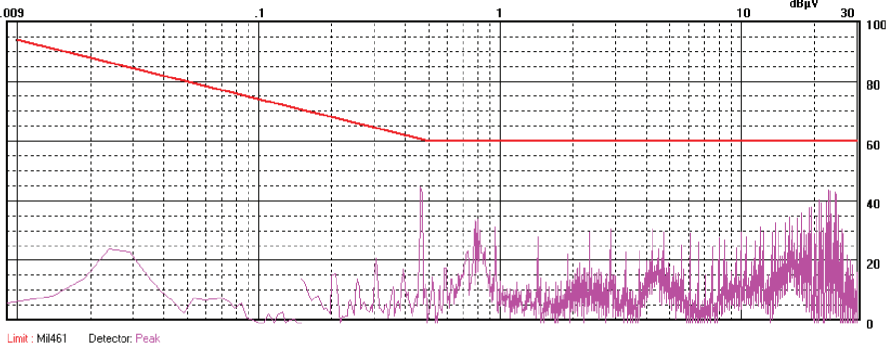
MTF50 Series

Conducted Emissions

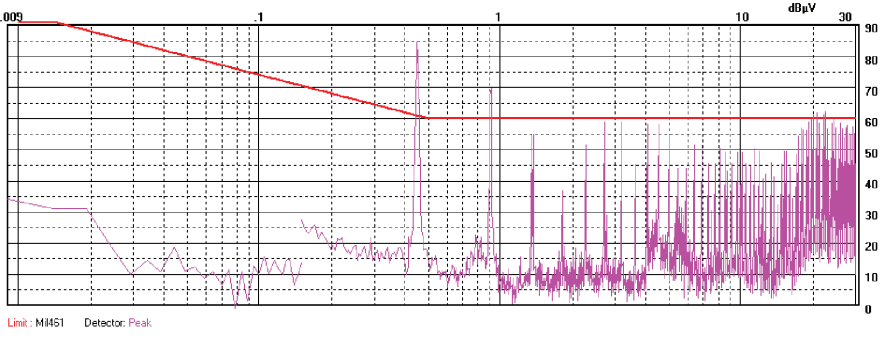
MTC0528S12 without MTF50 filter



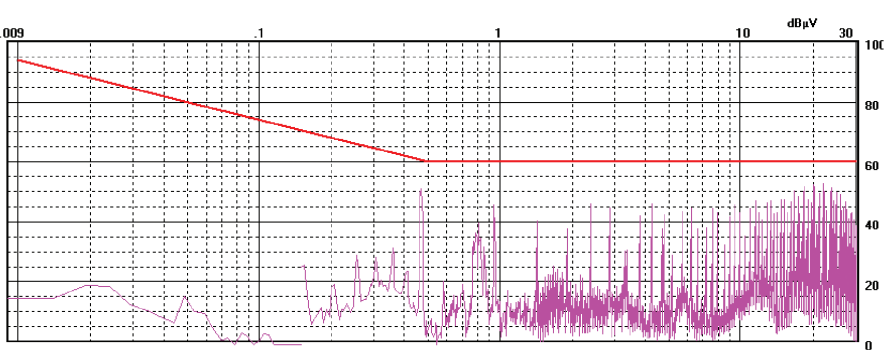
MTC0528S12 with MTF50 filter



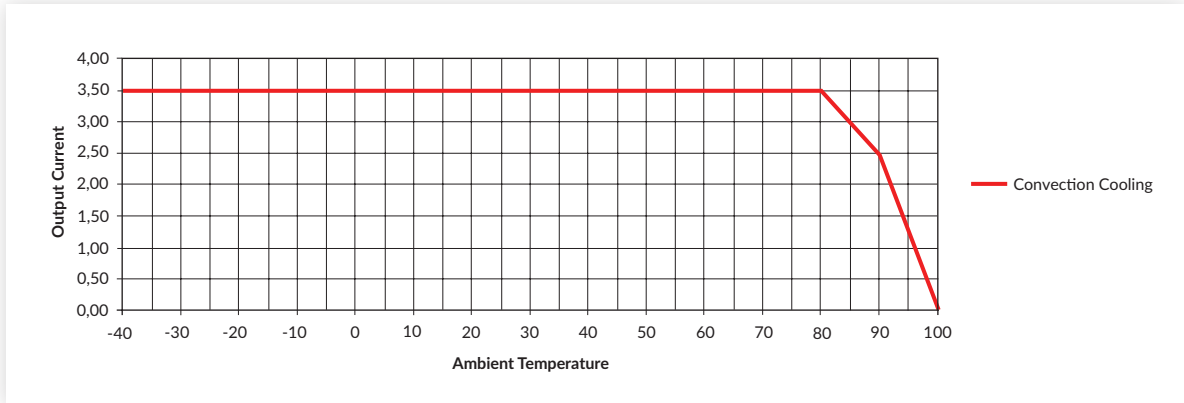
MTC1528S12 without MTF50 filter



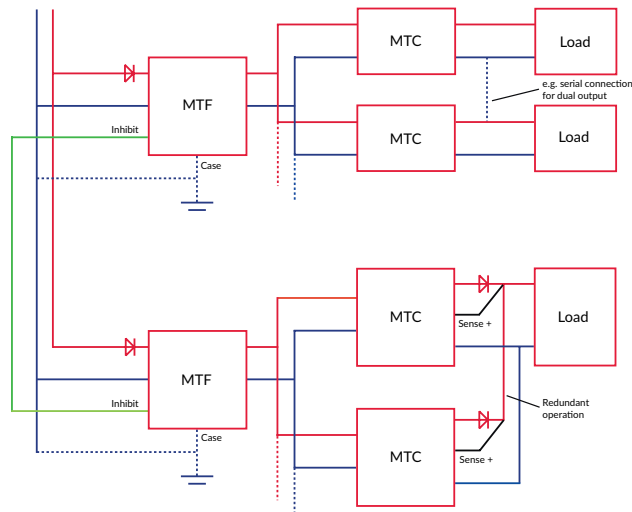
MTC1528S12 with MTF50 filter



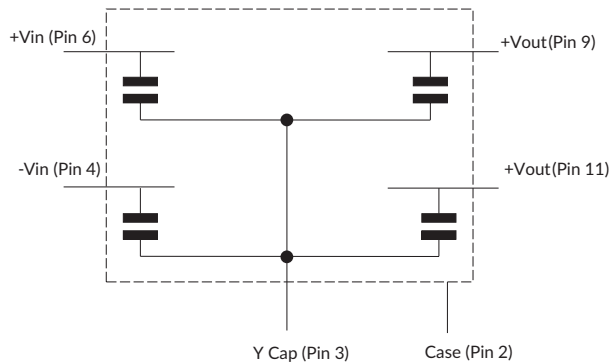
Temperature Derating



Typical Application



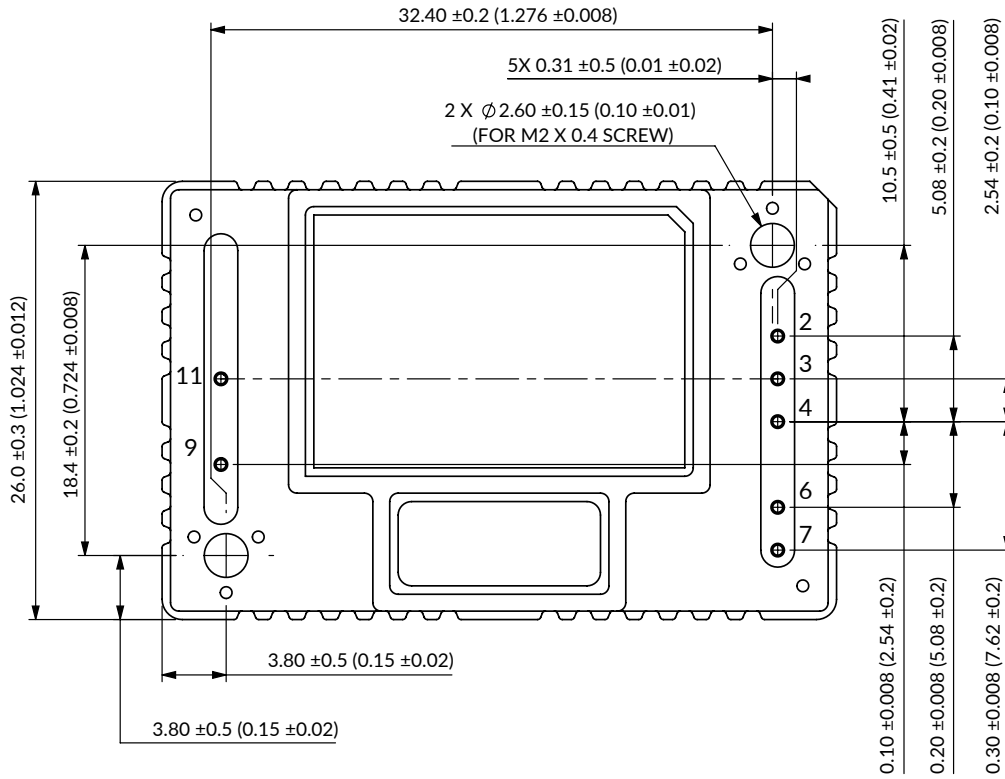
Y Cap Note



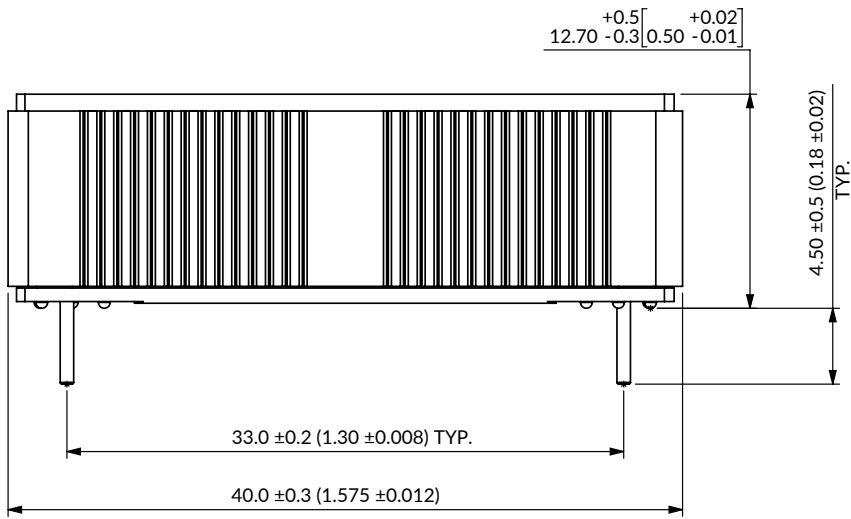
Notes:

The MTF50 has four 'Y' capacitors for EMI filtering connected to Pin 3. Dependant on the application and system configuration this pin can be connected to Case and/or -Vin. Alternatively it can be left not connected if not required.

Mechanical Details



Pin Connections	
Pin	Function
1	(No pin)
2	Case
3	Y-Cap
4	-Vin
5	(No pin)
6	+Vin
7	INH
8	(No pin)
9	+Vout
10	(No pin)
11	-Vout
12	(No pin)
13	(No pin)
14	(No pin)



Materials & Finish

Pin

Diameter: 0.8 (0.032)
 Material: Cu Zn30 2.5Em Ni
 Finish: 0.2-0.5Em AU (HV 170-200)

Case

Material: Aluminium (Al Mg Si 0.5)
 Finish: Chromated

Nameplate

Non-conductive plastic

Notes:

- Dimensions are in mm (inches).
- Tolerance $\pm 0.5\text{mm}$ ($\pm 0.02\text{"}$).
- Weight 25g (0.88oz).
- Wave soldering: 260°C max for 10s.
Soldering gun: 450°C max for 5s.