AME270461 Series

PD-94596C

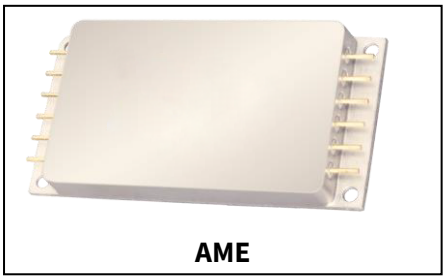
EMI Filter
Hybrid – High Reliability
400V Input, Single and Dual Output

Features

- Up to 1.5A Maximum input current
- Attenuation > 35dB @ 200 KHz
- Low Profile (0.38”) seam welded package
- Ceramic feed thru copper-core pins
- Operation over full military temp. range
- Standard military drawings available

Product Summary

- **Part number**: AME270461W/CH (98026-01HUA/HUC), AME270461X/CH (98026-01HXA/HXC), AME270461Y/CH (98026-01HYA/HYC), AME270461Z/CH (98026-01HZA/HZC)



AME

Potential Applications

- DC-DC converter

Product Validation

Validated according to MIL-PRF-38534 for high-reliability applications

Ordering Information

Table 1 Ordering Information

Part number	Package	Screening Level
AME270461W/CH	AME	COTS
AME270461X/CH	AME	COTS
AME270461Y/CH	AME	COTS
AME270461Z/CH	AME	COTS
98026-01HUA/HUC	AME	MIL-PRF-38534
98026-01HXA/HXC	AME	MIL-PRF-38534
98026-01HYA/HYC	AME	MIL-PRF-38534
98026-01HZA/HZC	AME	MIL-PRF-38534

Description

The AME Series of EMI filters have been designed to provide full compliance with the input line reflected ripple current requirement specified by CE03 of MILSTD-461C over the full military temperature range while operating in conjunction with the corresponding AFL series of DC-DC converters. These filters are offered as part of a complete family of conversion products providing single and dual output voltages while operating from nominal +270 input line voltage. Other converters operating with a similar switching frequency will also benefit by use of this device

These EMI filters are hermetically packaged in two enclosure variations, utilizing copper-core pins to minimize resistive DC losses. Three lead styles are available, each fabricated with IR HiRel's rugged ceramic lead-to-package seal assuring long term hermetic seal integrity in harsh environments.

Manufactured in a facility fully qualified to MIL-PRF-38534, these converters are available in four screening grades to satisfy a wide range of applications. The CH grade is fully compliant to the requirements of MILPRF- 38534 for class H. The HB grade is fully processed and screened to the class H requirement, but does not include element evaluation to the class H requirement.

Both grades are tested to meet the complete group "A" test specification over the full military temperature range with no derating. Two grades with more limited screening are also available for use in less demanding applications. Variations in electrical, mechanical and screen requirements can be accommodated. Contact IR San Jose for special requirements.

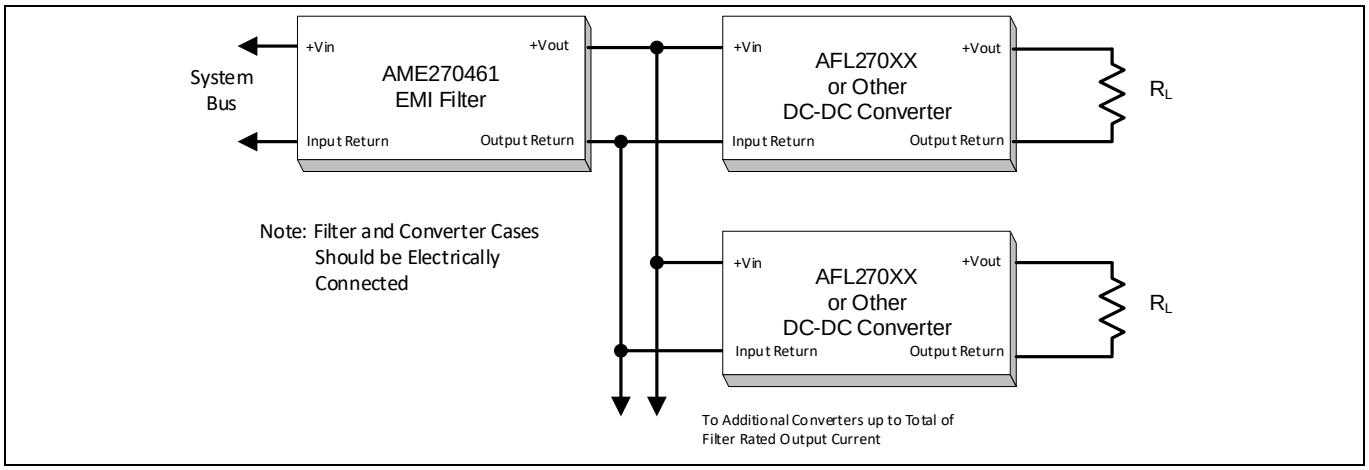


Figure 1 Typical Application Block Diagram

Table of contents

1 Block Diagram

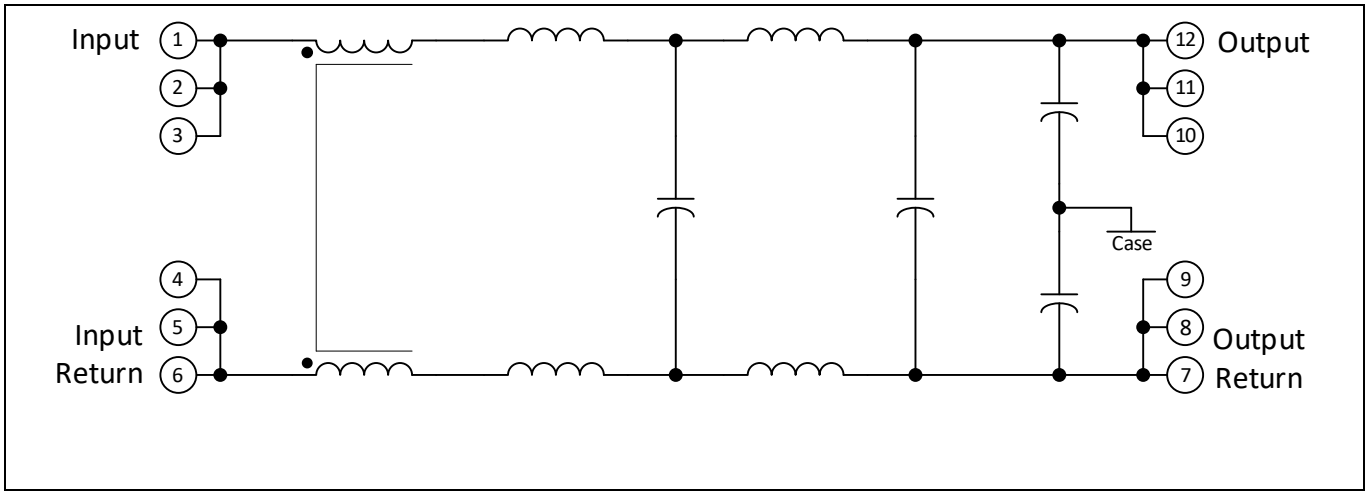


Figure 2 Block Diagram

Refer to page 5 for Pin Designation Table

Circuit Operation and Application Information

The AME series of filters employ three stages of filtering in a low pass configuration designed to attenuate the higher frequency components of ripple currents generated by high frequency switching DC-DC converters. The Block Diagram describes the general arrangement of the principal elements which have been connected to provide both differential and normal mode buffering between the input and output terminals.
Employing only passive elements, AME filter operation is initiated simply by insertion into the input power path between one or more DC-DC converters and their input DC voltage bus. In this connection, output pins of the filter will be connected to input pins of the converters. When a single AME filter is used in conjunction with multiple DC-DC converters, the use will be limited to the maximum output current capability specified in the AME electrical table [1]. A typical connection utilizing one filter to drive two converters is illustrated on page 1.

[1] To calculate the input current (i_{in}) requirement of any one converter, first determine the maximum output power by multiplying output voltage by maximum load current, divide this power by the efficiency to obtain input power and then divide input power by input voltage to obtain the input current (i_{in}). Note that to obtain worst case input current, you must use maximum load current, minimum efficiency and minimum line voltage in this calculation.

2 Pin Designation

2.1 Pin Configuration

Table 2 Designation

Pin Number	Designation
1	+ Input
2	+ Input
3	+ Input
4	Input Return
5	Input Return
6	Input Return
7	Output Return
8	Output Return
9	Output Return
10	+ Output
11	+ Output
12	+ Output

3 Specification

3.1 Absolute Maximum Rating Table

Table 3 Absolute Maximum Rating Note 1

Input voltage	-720V to +720V, Note 2
Input current	3.0A
Lead Soldering Temperature	+300°C for 10 seconds
Case Temperature-Operating	-55°C to +125°C
Case Temperature-Storage	-65°C to +135°C

3.2 Electrical Characteristics Table

Table 4 Electrical Characteristics -55°C ≤ T_{CASE} ≤ +125°C, -400V ≤ V_{IN} ≤ +400V unless otherwise specified

Parameter	Group A Subgroups	Conditions	Min	Max	Unit
Input voltage	1, 2, 3		160	400	V
Leakage current	1, 2, 3	± 500V DC Input Voltage Note 3	0	50	µA
DC Resistance (RDC)	4, 5, 6	T_C = -55°C Note 4 T_C = 25°C Note 4 T_C = 125°C Note 4		350 400 700	mΩ
Noise Reduction	1	200 KHz - 500 KHz 500 KHz - 1 MHz 1 MHz – 10 MHz	35 60 65		dB
Isolation	1	Any Pin to Case, Tested @ 500V_{DC}	100		M Ω
Capacitance	1 2, 3	Measured Between Any Pin and Case	34 30	56 62	nF

Notes to Specifications:

1. Operation above maximum ratings may cause permanent damage to the device. Operation at maximum ratings may degrade performance and affect reliability
2. Device can tolerate ± 720 Volt transient whose duration is ≤ 100 ms when R_S ≥ 0.5 Ω
3. Derate Output Current linearly from 100% at 125°C to 0 at 135°C
4. DC resistance is the total resistance of the device and includes the sum of the input to output resistance and the return in to return out resistance paths

3.3 Available Standard Military Drawing (SMD) Cross Reference

Table 5 Available Standard Military Drawing (SMD) Cross Reference

Standard military drawing number	Vendor cage code	Standard Part number
98026-01HUA	52467	AME270461W/CH
98026-01HUC	52467	AME270461W/CH
98026-01HXA	52467	AME270461X/CH
98026-01HXC	52467	AME270461X/CH
98026-01HYA	52467	AME270461Y/CH
98026-01HYC	52467	AME270461Y/CH
98026-01HZA	52467	AME270461Z/CH
98026-01HZC	52467	AME270461Z/CH

4 Mechanical Outlines

Note: For the most updated package outline, please see the website

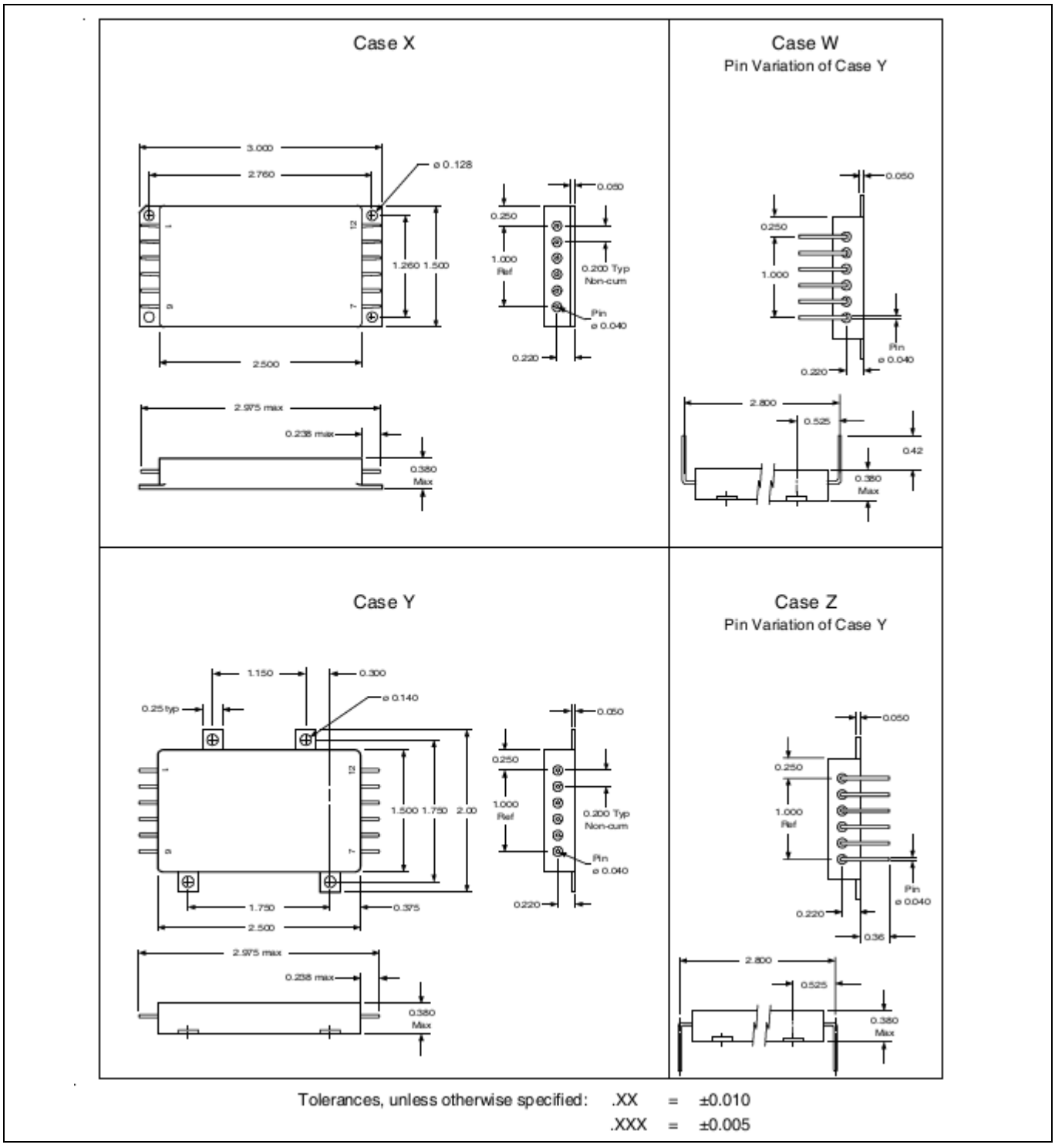


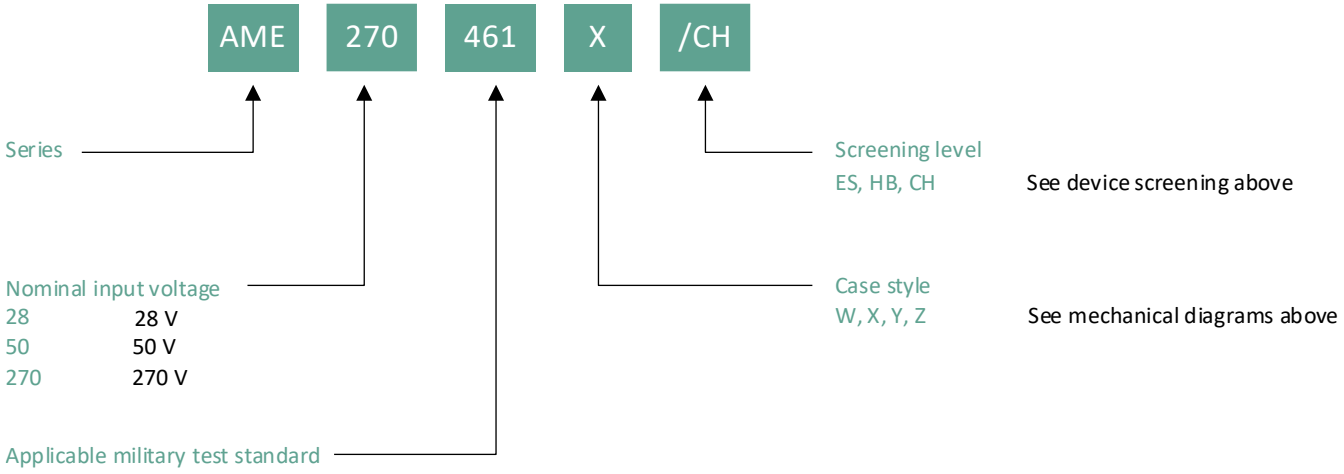
Figure 3 Package outline

5 Device Screening

Requirement	MIL-STD-883 Method	No Suffix	ES②	HB	CH
Temperature range		-20 to +85°C	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C
Element evaluation	MIL-PRF-38534		NA	NA	Class H
Internal Visual	2017	①	Yes	Yes	Yes
Temperature cycle	1010	NA	Cond B	Cond C	Cond C
Constant acceleration	2001	NA	500Gs	Cond A	Cond A
Burn-in	1015	48hrs @ 85°C	48hrs @ 125°C	160hrs @ 125°C	160hrs @ 125°C
Final electrical (Group A)	MIL-PRF-38534 & Specification	25°C	25°C	-55, +25, +125°C	-55, +25, +125°C
Seal, Fine & Gross	1014	Cond A	Cond A, C	Cond A, C	Cond A, C
External visual	2009	①	Yes	Yes	Yes

Notes:
① Best commercial practice
② Sample tests at low and high temperatures

6 Part Numbering



Revision history

Document version	Date of release	Description of changes
	12/13/2002	Datasheet (PD-94596)
Rev A	08/13/2004	Updated Case outline
Rev B	02/16/2010	Updated based on ECO-22375
Rev C	05/05/2022	Updated based on ECO-30588