



CFM40D/T SERIES 40W DUAL/TRIPLE OUTPUT AC-DC MODULES

Features

- Universal Input Range 90~264V_{ac}
- Efficiency to 81%
- 2"x 4" Size
- Meets Class I
- Approval IEC/EN/UL 62368-1
- Approval EN 61204-3 Class B and CISPR/FCC Class B
- Continuous Short Circuit Protection



MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT			VOLTAGE ACCURACY NOTE1	RIPPLE& NOISE NOTE2	LINE REGULATION NOTE3	LOAD REGULATION NOTE4	O/P POWER Max.	%EFF. (Typ.) NOTE5
		Min.	Rated	Max.						
CFM40D-01	5 V(V1)	0.4 A	3.2 A	5.0 A	±3%	50 mV	±1%	±3%	40.0W	80%
	12 V(V2)	0.2 A	2.0 A	2.5 A	±4%	120 mV	±2%	±5%		
CFM40D-02	5 V(V1)	0.4 A	3.2 A	5.0 A	±3%	50 mV	±1%	±3%	40.0W	81%
	24 V(V2)	0.2 A	1.0 A	1.5 A	±4%	240 mV	±2%	±5%		
CFM40T-01	5 V(V1)	0.4 A	3.0 A	5.0 A	±3%	50 mV	±1%	±3%	40.5W	78%
	12 V(V2)	0.2 A	2.0 A	2.5 A	±4%	120 mV	±2%	±5%		
	-5 V(V3)	0 A	0.3 A	0.5 A	±3%	50 mV	±1%	±1%		
CFM40T-02	5 V(V1)	0.4 A	3.0 A	5.0 A	±3%	50 mV	±1%	±3%	42.6W	78%
	12 V(V2)	0.2 A	2.0 A	2.5 A	±4%	120 mV	±2%	±5%		
	-12 V(V3)	0 A	0.3 A	0.5 A	±3%	120 mV	±1%	±1%		
CFM40T-03	5 V(V1)	0.4 A	3.0 A	5.0 A	±3%	50 mV	±1%	±3%	42.0W	78%
	15 V(V2)	0.2 A	1.5 A	2.3 A	±4%	150 mV	±2%	±5%		
	-15 V(V3)	0 A	0.3 A	0.5 A	±3%	150 mV	±1%	±1%		
CFM40T-04	5 V(V1)	0.4 A	3.0 A	5.0 A	±3%	50 mV	±1%	±3%	42.6W	78%
	24 V(V2)	0.2 A	1.0 A	1.5 A	±4%	240 mV	±2%	±5%		
	-12 V(V3)	0 A	0.3 A	0.5 A	±3%	120 mV	±1%	±1%		
CFM40T-05	5 V(V1)	0.4 A	3.0 A	5.0 A	±3%	50 mV	±1%	±3%	40.5W	78%
	24 V(V2)	0.2 A	1.0 A	1.5 A	±4%	240 mV	±2%	±5%		
	-5 V(V3)	0 A	0.3 A	0.5 A	±3%	50 mV	±1%	±1%		
CFM40T-06	5 V(V1)	0.4 A	3.0 A	5.0 A	±3%	50 mV	±1%	±3%	42.6W	78%
	24 V(V2)	0.2 A	1.0 A	1.5 A	±4%	240 mV	±2%	±5%		
	12 V(V3)	0 A	0.3 A	0.5 A	±3%	120 mV	±1%	±1%		
CFM40T-07	3.3 V(V1)	0.4 A	5.0 A	7.0 A	±3%	100 mV	±1%	±3%	30.0W	71%
	5 V(V2)	0.2 A	2.0 A	3.5 A	±4%	100 mV	±3%	±5%		
	-12 V(V3)	0 A	0.3 A	0.5 A	±3%	120 mV	±1%	±1%		

Note:

1. Voltage accuracy is set at rated load and 25°C Ta.
2. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measuring @20MHz B.W.
3. Line regulation is measured from 100V_{ac} to 240V_{ac} with rated load.
4. Load regulation is defined by changing ±40% of measured output load from 60% rated load at other outputs set to 60% rated load.
5. Typical efficiency at 230 V_{ac} and rated load at 25°C.
6. Safety approvals do not apply to the covered versions, only to the open-frame versions.



CFM40D/T Series

PART NUMBER

Series	Number of Outputs	Nominal Output Voltage	Type
CFM40	D/T	-XX	-X (Option)
CFM40	D : Double Output	01 : V1 : 5V V2 : 12V	None : Wafer CA : Cover
		02 : V1 : 5V V2 : 24V	
	T : Triple Output	V1 : 5V 01 : V2 : 12V V3 : -5V	
		V1 : 5V 02 : V2 : 12V V3 : -12V	
		V1 : 5V 03 : V2 : 15V V3 : -15V	
		V1 : 5V 04 : V2 : 24V V3 : -12V	
		V1 : 5V 05 : V2 : 24V V3 : -5V	
		V1 : 5V 06 : V2 : 24V V3 : 12V	
		V1 : 3.3V 07 : V2 : 5V V3 : -12V	

Part Number Example:

CFM40D-01: Open Frame Type, 40W, Double Output V1 : 5V, V2 : 12V

CFM40T-01-CA: Cover Type, 40W, Triple Output V1 : 5V, V2 : 12V, V3 : -5V



CFM40D/T Series

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, 100% full load at 25°C unless otherwise noted.)

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Safety approvals only to the AC input	All	90		264	V_{ac}
			120		370	V_{dc}
Operating Temperature	See Derating Curve	All	0		70	°C
Storage Temperature		All	-20		85	°C
Operating Altitude		All			2000	m

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Voltage Range		All	100		240	V_{ac}
Input Frequency Range		All	47		63	Hz
Maximum Input Current	100% full load, $V_{in}=100V_{ac}$	All			1	A
Leakage Current		All			3.5	mA
Inrush Current	$V_{in}=240V_{ac}$, Cold start at 25°C	All			60	A

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device		Min.	Typ.	Max.	Units
Output Voltage Set Point	V_{in} =Nominal V_{in} , $I_o=I_o$ rated, $T_c=25^\circ\text{C}$	CFM40D-01	V1	4.85	5.0	5.15	V_{dc}
			V2	11.52	12.0	12.48	
		CFM40D-02	V1	4.85	5.0	5.15	
			V2	23.04	24.0	24.96	
		CFM40T-01	V1	4.85	5.0	5.15	
			V2	11.52	12.0	12.48	
			V3	-5.15	-5.0	-4.85	
		CFM40T-02	V1	4.85	5.0	5.15	
			V2	11.52	12.0	12.48	
			V3	-12.36	-12.0	-11.64	
		CFM40T-03	V1	4.85	5.0	5.15	
			V2	14.4	15.0	15.6	
			V3	-15.45	-15.0	-14.55	
		CFM40T-04	V1	4.85	5.0	5.15	
			V2	23.04	24.0	24.96	
			V3	-12.36	-12.0	-11.64	
		CFM40T-05	V1	4.85	5.0	5.15	
			V2	23.04	24.0	24.96	
			V3	-5.15	-5.0	-4.85	
		CFM40T-06	V1	4.85	5.0	5.15	
			V2	23.04	24.0	24.96	
			V3	11.64	12.0	12.36	
		CFM40T-07	V1	3.2	3.3	3.4	
			V2	4.8	5.0	5.2	
			V3	-12.36	-12.0	-11.64	



CFM40D/T Series

PARAMETER	NOTES and CONDITIONS	Device		Min.	Typ.	Max.	Units
Operating Output Current Range	V _{in} =90V _{ac} ~264V _{ac} , See Derating Curve	CFM40D-01	V1	0.4	3.2	5.0	A
			V2	0.2	2.0	2.5	
		CFM40D-02	V1	0.4	3.2	5.0	
			V2	0.2	1.0	1.5	
		CFM40T-01	V1	0.4	3.0	5.0	
			V2	0.2	2.0	2.5	
			V3	0	0.3	0.5	
		CFM40T-02	V1	0.4	3.0	5.0	
			V2	0.2	2.0	2.5	
			V3	0	0.3	0.5	
		CFM40T-03	V1	0.4	3.0	5.0	
			V2	0.2	1.5	2.3	
			V3	0	0.3	0.5	
		CFM40T-04	V1	0.4	3.0	5.0	
			V2	0.2	1.0	1.5	
			V3	0	0.3	0.5	
		CFM40T-05	V1	0.4	3.0	5.0	
			V2	0.2	1.0	1.5	
			V3	0	0.3	0.5	
		CFM40T-06	V1	0.4	3.0	5.0	
			V2	0.2	1.0	1.5	
			V3	0	0.3	0.5	
		CFM40T-07	V1	0.4	5.0	7.0	
			V2	0.2	2.0	3.5	
			V3	0	0.3	0.5	
Holdup Time	V _{in} =115V _{ac}	All		20			ms
Output Voltage Regulation							
Load Regulation	Defined by changing ±40% of measured output load from 60% rated load at other output set to 60% rated load	CFM40D-01	V1	±3			%
			V2	±5			
		CFM40D-02	V1	±3			
			V2	±5			
		CFM40T-01	V1	±3			
			V2	±5			
			V3	±1			
		CFM40T-02	V1	±3			
			V2	±5			
			V3	±1			
		CFM40T-03	V1	±3			
			V2	±5			
			V3	±1			
		CFM40T-04	V1	±3			
			V2	±5			
			V3	±1			
		CFM40T-05	V1	±3			
			V2	±5			
			V3	±1			
		CFM40T-06	V1	±3			
			V2	±5			
			V3	±1			



CFM40D/T Series

PARAMETER	NOTES and CONDITIONS	Device		Min.	Typ.	Max.	Units
Load Regulation	Defined by changing $\pm 40\%$ of measured output load from 60% rated load at other output set to 60% rated load.	CFM40T-07	V1 V2 V3			± 3 ± 5 ± 1	%
Line Regulation	$V_{in} = 100V_{ac}$ to $240V_{ac}$	CFM40D-01	V1 V2			± 1 ± 2	%
		CFM40D-02	V1 V2			± 1 ± 2	
		CFM40T-01	V1 V2 V3			± 1 ± 2 ± 1	
		CFM40T-02	V1 V2 V3			± 1 ± 2 ± 1	
		CFM40T-03	V1 V2 V3			± 1 ± 2 ± 1	
		CFM40T-04	V1 V2 V3			± 1 ± 2 ± 1	
		CFM40T-05	V1 V2 V3			± 1 ± 2 ± 1	
		CFM40T-06	V1 V2 V3			± 1 ± 2 ± 1	
		CFM40T-07	V1 V2 V3			± 1 ± 3 ± 1	
Over Current Protection	Hiccup mode (auto recovery)	All		110		180	%
Short Circuit Protection	Hiccup mode (auto recovery)	All					
Over Voltage Protection	Hiccup mode (Auto recovery)	CFM40D-01	V1 V2			6 16	V_{dc}
		CFM40D-02	V1 V2			6 30	
		CFM40T-01	V1 V2			6 16	
		CFM40T-02	V1 V2			6 16	
		CFM40T-03	V1 V2			6 20	
		CFM40T-04	V1 V2			6 30	
		CFM40T-05	V1 V2			6 30	
		CFM40T-06	V1 V2			6 30	
		CFM40T-07	V1 V2			6 9	



CFM40D/T Series

PARAMETER	NOTES and CONDITIONS	Device		Min.	Typ.	Max.	Units
Output Ripple and Noise	1. Add a 0.1uF ceramic capacitor and a 10uF aluminum electrolytic capacitor to output 2. Oscilloscope is 20MHz bandwidth 3. Ambient temperature=25°C	CFM40D-01	V1			50	mV
			V2			120	
		CFM40D-02	V1			50	
			V2			240	
		CFM40T-01	V1			50	
			V2			120	
			V3			50	
		CFM40T-02	V1			50	
			V2			120	
			V3			120	
		CFM40T-03	V1			50	
			V2			150	
			V3			150	
		CFM40T-04	V1			50	
			V2			240	
			V3			120	
CFM40T-05	V1			50			
	V2			240			
	V3			50			
CFM40T-06	V1			50			
	V2			240			
	V3			120			
CFM40T-07	V1			100			
	V2			100			
	V3			120			
Efficiency	1. V _{in} =230V _{ac} 2. Output is 100% full load 3. Ambient temperature=25°C	CFM40D-01				80	%
		CFM40D-02				81	
		CFM40T-01				78	
		CFM40T-02				78	
		CFM40T-03				78	
		CFM40T-04				78	
		CFM40T-05				78	
		CFM40T-06				78	
		CFM40T-07				71	

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 Minute	All			4242	V_{dc}
Isolation Resistance	Input to output	All	100			MΩ

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	P_{out} =max. rated power	All		65		kHz

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$; $T_a=25^\circ\text{C}$ per MIL-HDBK-217F $I_o=100\%$; $T_a=25^\circ\text{C}$ Telcordia SR332	All	280			k hours
Humidity	Non-condensing	All			93	% RH



CFM40D/T Series

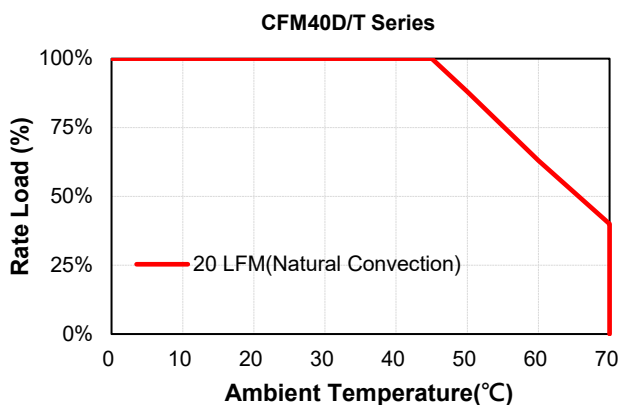
GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times($\pm X$ 、 $\pm Y$ 、 $\pm Z$ axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X、Y、Z axis, 1 hour (each axis), Total 3 hrs.	All		4		g
Weight	Open frame versions	All		160		grams
	Covered versions			220		
Dimensions	Open frame (Wafer)		4.000x2.000x1.224 Inches (101.60x50.80x31.10 mm)			
	CA (Cover)		4.606x2.480x1.575 Inches (117.00x63.00x40.00 mm)			
Safety	Class I, IEC/EN/UL 62368-1					Ed.3.0
EMC Emission	EN 61204-3:2000, Class B, FCC Part 15 Subpart B EN 61000-3-2:2014, EN 61000-3-3:2013					
Conducted Disturbance	EN 61204-3:2000, FCC Part 15 Subpart B					Class B
Radiated Disturbance	EN 61204-3:2000, FCC Part 15 Subpart B					Class B
Harmonic Current Emissions	EN 61000-3-2:2014					Class A
Voltage Fluctuations & Flicker	EN 61000-3-3:2013					
EMC Immunity	EN 61204-3:2020, IEC 61000-4-2, 3, 4, 5, 6, 11					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: ± 8 kV Contact, Discharge: ± 4 kV					Criterion A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2010					Criterion A
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, ± 1 kV					Criterion A
Surge	IEC 61000-4-5:2014, L-N: ± 1 kV					Criterion A
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2013					Criterion A
Voltage Dips	IEC 61000-4-11:2004, Dips: 30% Reduction, Dips: >95% Reduction					Criterion A
Voltage Interruptions	IEC 61000-4-11:2004, >95% Reduction					Criterion B
Application Note Link	CFM40D/T Series App Notes					

CHARACTERISTIC CURVE

Power Derating Curve

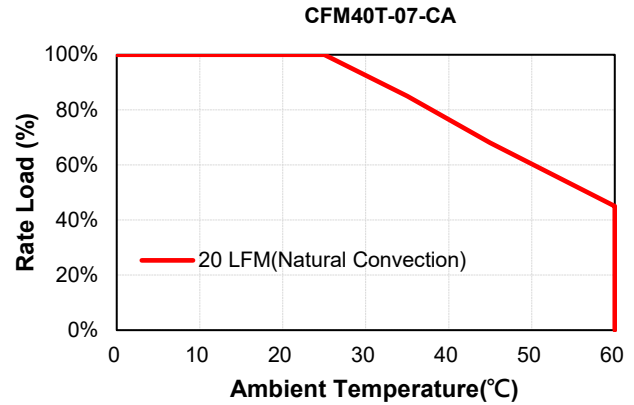
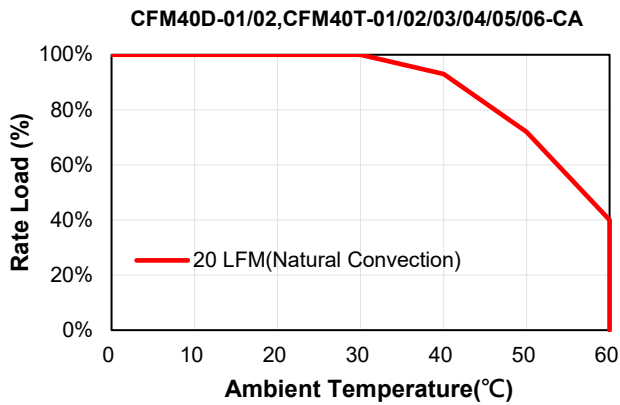
Open Frame versions



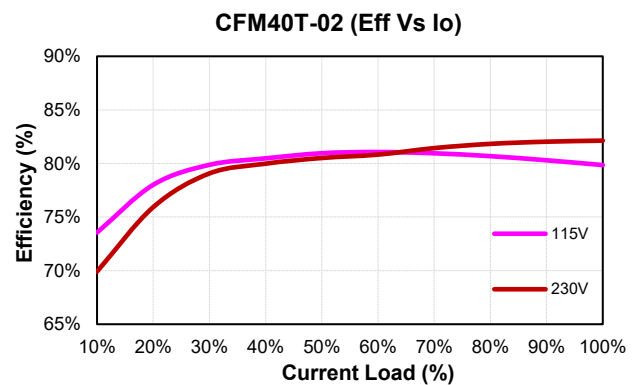
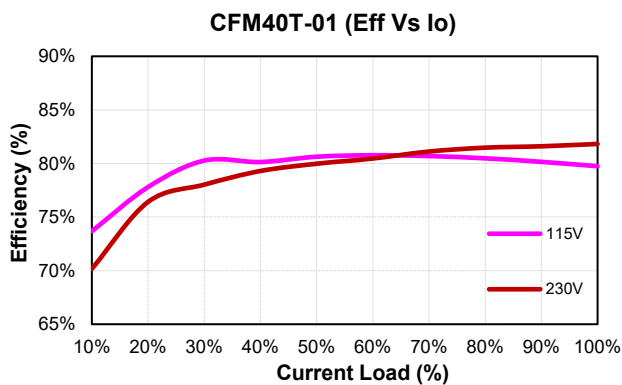
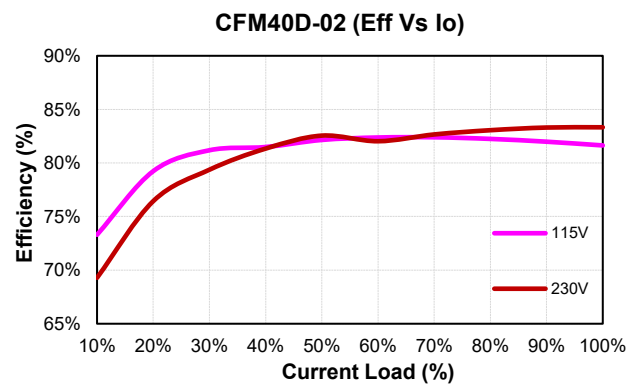
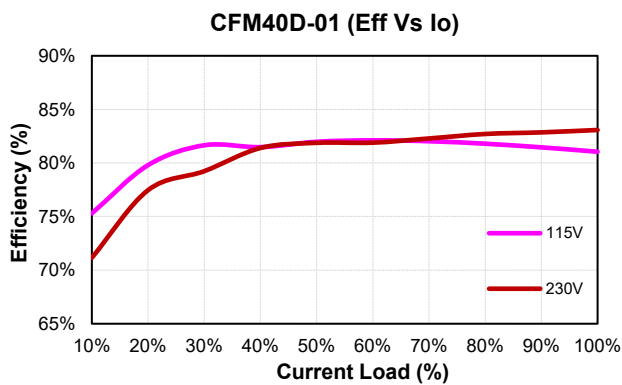


CFM40D/T Series

Covered versions:



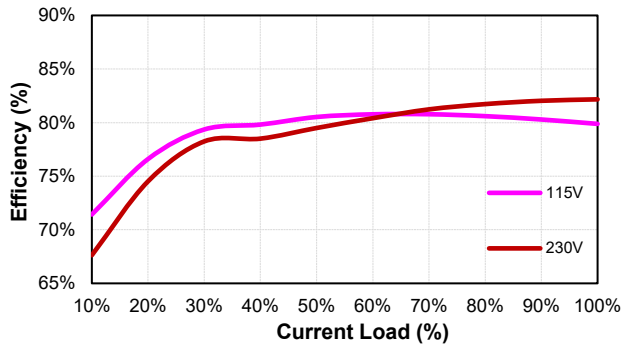
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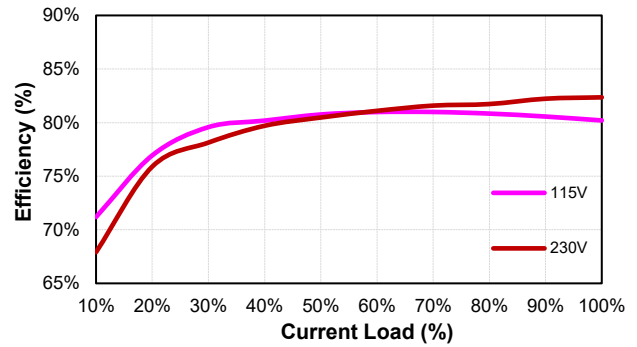


CFM40D/T Series

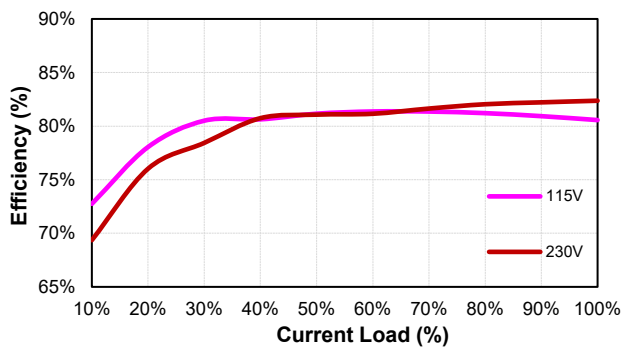
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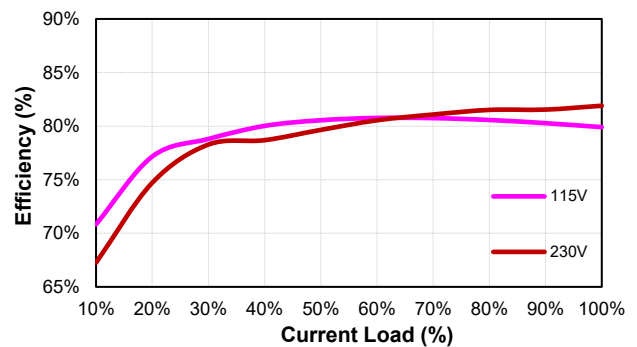
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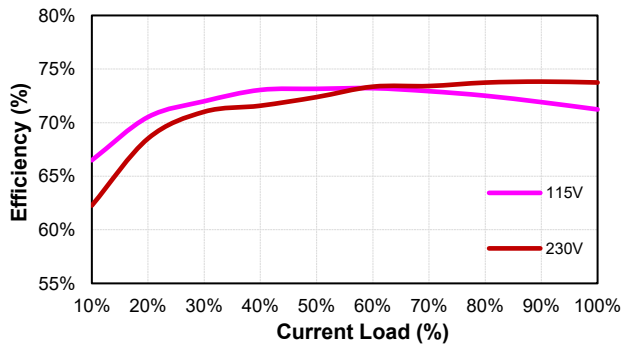
CFM40T-05 (Eff Vs Io)



CFM40T-06 (Eff Vs Io)



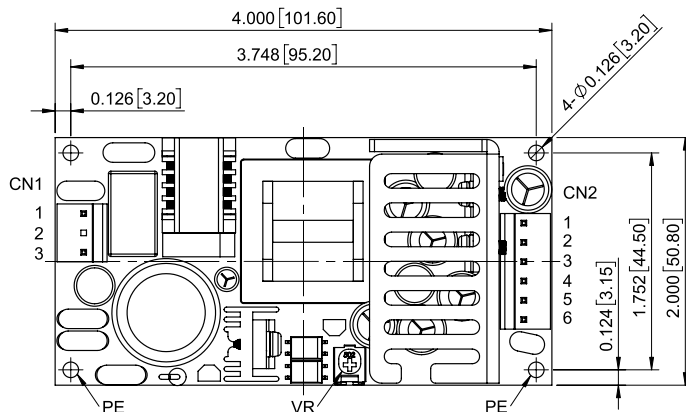
CFM40T-07 (Eff Vs Io)





CFM40D/T Series

MECHANICAL SPECIFICATION



CFM40D/T Open Frame

All Dimensions in Inches[mm]

Tolerance Inches: x.xxx=±0.020

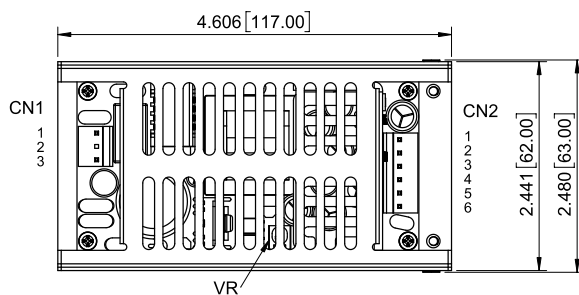
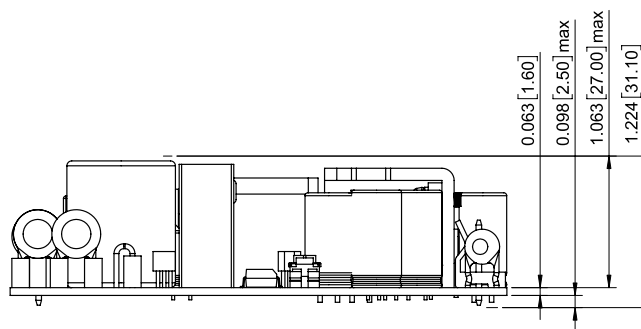
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AC Input Connector(CN1):LCU P3060-03-2-S2 or equivalent

Pin	Function	Mating Housing	Terminal
1	ACN	MOLEX 09501031 or equivalent	MOLEX 08701031 or equivalent
2	-		
3	ACL		

DC Output Connector(CN2):LCU P3060-06-S2 or equivalent

Pin	Function	Mating Housing	Terminal
1	V2	MOLEX 09501061 or equivalent	MOLEX 08701031 or equivalent
2	V1		
3	V1		
4	GND		
5	GND		
6	V3		



CFM40D/T with Cover

All Dimensions in Inches[mm]

Tolerance Inches: x.xxx=±0.020

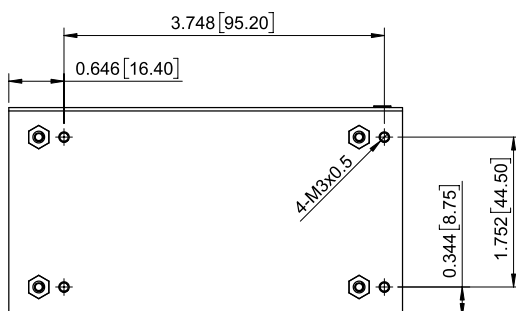
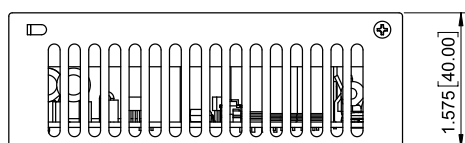
Millimeters: x.xx=±0.50

AC Input Connector(CN1):LCU P3060-03-2-S2 or equivalent

Pin	Function	Mating Housing	Terminal
1	ACN	MOLEX 09501031 or equivalent	MOLEX 08701031 or equivalent
2	-		
3	ACL		

DC Output Connector(CN2):LCU P3060-06-S2 or equivalent

Pin	Function	Mating Housing	Terminal
1	V2	MOLEX 09501061 or equivalent	MOLEX 08701031 or equivalent
2	V1		
3	V1		
4	GND		
5	GND		
6	V3		



BOTTOM VIEW

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