AXA 25W Series

25 Watts

DC/DC Converter

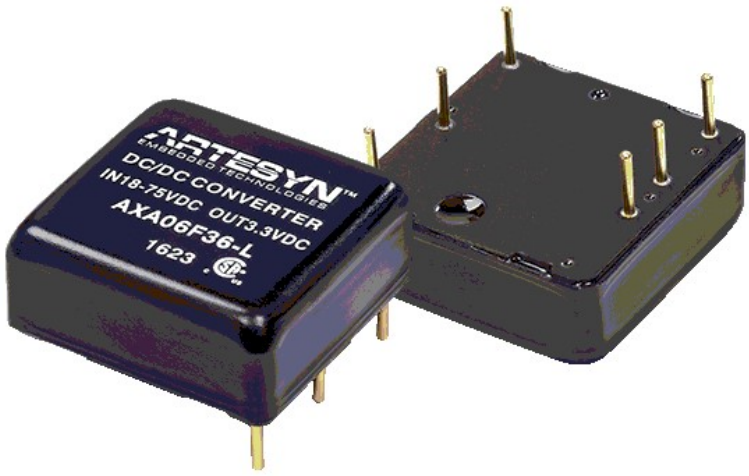
Total Power: 25 Watts
Input Voltage: 9 to 36 Vdc
18 to 75 Vdc
# of Outputs: Single /Dual

Special Features

- Package size 1.0” x 1.0” x 0.4”
- Ultra-wide 4:1 input range
- High efficiency up to 90%
- Operating temperature range: -40 ^{O}C to +80 ^{O}C
- Output Voltage Adjustable
- I/O isolation voltage 1500Vdc
- Remote ON/OFF control
- Metal case with isolated base plate

Safety

cUL/UL 60950-1
IEC/EN 60950-1



Product Descriptions

The AXA 25W series are single and dual output DC/DC converter modules with industry standard pin configuration. All models feature ultra-wide 4:1 input range with excellent output voltage regulation. The AXA 25W series can deliver up to 25W output power from the single or dual output module with high 90% typical efficiency and excellent thermal performance over an operating ambient temperature range of -40 ^{O}C ~ +80 ^{O}C.

Suitable for a wide range of applications in nearly any industry, the AXA 25W was particularly designed with battery operated equipment, instrumentation and distributed power applications and other space critical applications in mind. The AXA 25W series can be ordered with optional heatsink attached to optimize thermal management.

ARTESYN
An Advanced Energy Company

Model Numbers

Model	Input Voltage	Output Voltage	Maximum Load	Efficiency
AXA06F18-L	9-36Vdc	3.3Vdc	6A	87%
AXA05A18-L	9-36Vdc	5Vdc	5A	89%
AXA02B18-L	9-36Vdc	12Vdc	2.09A	89%
AXA02C18-L	9-36Vdc	15Vdc	1.67A	90%
AXA01BB18-L	9-36Vdc	±12Vdc	±1.04A	89%
AXA01CC18-L	9-36Vdc	±15 Vdc	±0.84A	89%
AXA06F36-L	18-75 Vdc	3.3Vdc	6A	88%
AXA05A36-L	18-75 Vdc	5Vdc	5A	90%
AXA02B36-L	18-75 Vdc	12Vdc	2.09A	90%
AXA02C36-L	18-75 Vdc	15Vdc	1.67A	90%
AXA01BB36-L	18-75 Vdc	±12 Vdc	±1.04A	89%
AXA01CC36-L	18-75 Vdc	±15 Vdc	±0.84A	89%

Options

Heatsink (-HS)

Electrical Specifications

Absolute Maximum Ratings

Stress in excess of those listed in the “Absolute Maximum Ratings” may cause permanent damage to the power supply. These are stress ratings only and functional operation of the unit is not implied at these or any other conditions above those given in the operational sections of this TRN. Exposure to any absolute maximum rated condition for extended periods may adversely affect the power supply’s reliability.

Table 1. Absolute Maximum Ratings:

Parameter	Model	Symbol	Min	Typ	Max	Unit
Input Voltage Operating -Continuous	 24V input Models 48V input Models	$V_{IN,DC}$	 9 18	 - -	 36 75	 Vdc Vdc
Maximum Output Power	All models	$P_{O,max}$	-	-	25	W
I/O Isolation Voltage 60 Seconds 1 Second	All models		 1500 1800	 - -	 - -	 Vdc Vdc
I/O Isolation Resistance 500Vdc	All models		 1000	 -	 -	 Mohm
I/O Isolation Capacitance 100KHz, 1V	All models		 -	 -	 2000	 pF
Operating Ambient Temperature	All models	T_A	-40	-	+80	^{O}C
Storage Temperature	All models	T_{STG}	-50	-	+125	^{O}C
Humidity (non-condensing) Operating Non-operating	 All models All models		 5 5	 - -	 95 95	 % %

Input Specifications

Table 2. Input Specifications:

Parameter		Condition	Symbol	Min	Nom	Max	Unit
Operating Input Voltage, DC	24V Input Models 48V Input Models	All	$V_{IN,DC}$	9 18	24 48	36 75	Vdc
Input Surge Voltage	24V Input Models 48V Input Models	1 sec, max	$V_{IN,surge}$	-0.7 -0.7	- -	50 100	Vdc
Start-up Threshold Voltage	24V Input Models 48V Input Models	All	$V_{IN,ON}$	- -	- -	9 18	Vdc
Maximum Input Current	AXA06F18-L AXA05A18-L AXA02B18-L AXA02C18-L AXA01BB18-L AXA01CC18-L AXA06F36-L AXA05A36-L AXA02B36-L AXA02C36-L AXA01BB36-L AXA01CC36-L	$V_{IN,DC}=V_{IN,nom}$	$I_{IN,full\ load}$	- - - - - - - - - - - -	950 1170 1175 1160 1170 1180 470 580 580 580 585 590	- - - - - - - - - - - -	mA mA mA mA mA mA mA mA mA mA mA mA
No Load Input Current (V_O =On, I_O = 0A)	AXA06F18-L AXA05A18-L AXA02B18-L AXA02C18-L AXA01BB18-L AXA01CC18-L AXA06F36-L AXA05A36-L AXA02B36-L AXA02C36-L AXA01BB36-L AXA01CC36-L	$V_{IN,DC}=V_{IN,nom}$	$I_{IN,no\text{-}load}$	- - - - - - - - - - - -	85 85 85 85 85 85 45 45 45 45 45 45	- - - - - - - - - - - -	mA mA mA mA mA mA mA mA mA mA mA mA

Input Specifications

Table 2. Input Specifications con't:

Parameter		Condition	Symbol	Min	Nom	Max	Unit
Efficiency @Max. Load	AXA06F18-L	$V_{IN,DC}=V_{IN,nom}$ $I_O=I_{O,max}$ $T_A=25\ ^oC$	η	-	87	-	%
	AXA05A18-L			-	89	-	%
	AXA02B18-L			-	89	-	%
	AXA02C18-L			-	90	-	%
	AXA01BB18-L			-	89	-	%
	AXA01CC18-L			-	89	-	%
	AXA06F36-L			-	88	-	%
	AXA05A36-L			-	90	-	%
	AXA02B36-L			-	90	-	%
	AXA02C36-L			-	90	-	%
	AXA01BB36-L			-	89	-	%
	AXA01CC36-L			-	89	-	%
Remote On/OFF Control		Remote ON Remote OFF		3.5 0	- -	12 1.2	Vdc Vdc

Output Specifications

Table 3. Output Specifications:

Parameter		Condition	Symbol	Min	Nom	Max	Unit
Output Voltage Set-Point	AXA06F18-L	$V_{IN,DC}=V_{IN,nom}$ $I_O=I_{O,max}$ $T_A=25\ ^oC$	V_O	3.267	3.30	3.333	Vdc
	AXA05A18-L			4.95	5.00	5.05	Vdc
	AXA02B18-L			11.88	12.00	12.12	Vdc
	AXA02C18-L			14.85	15.00	15.15	Vdc
	AXA01BB18-L			±11.88	±12.00	±12.12	Vdc
	AXA01CC18-L			±14.85	±15.00	±15.15	Vdc
	AXA06F36-L			3.267	3.267	3.267	Vdc
	AXA05A36-L			4.95	4.95	4.95	Vdc
	AXA02B36-L			11.88	11.88	11.88	Vdc
	AXA02C36-L			14.85	14.85	14.85	Vdc
	AXA01BB36-L			±11.88	±11.88	±11.88	Vdc
	AXA01CC36-L			±14.85	±14.85	±14.85	Vdc
Output Current	AXA06F18-L	Convection cooling	I_O	-	-	6.0	A
	AXA05A18-L			-	-	5.0	A
	AXA02B18-L			-	-	2.09	A
	AXA02C18-L			-	-	1.67	A
	AXA01BB18-L			-	-	±1.04	A
	AXA01CC18-L			-	-	±0.84	A
	AXA06F36-L			-	-	6.0	A
	AXA05A36-L			-	-	5.0	A
	AXA02B36-L			-	-	2.09	A
	AXA02C36-L			-	-	1.67	A
	AXA01BB36-L			-	-	±1.04	A
	AXA01CC36-L			-	-	±0.84	A
V_O Load Capacitance[1]	AXA06F18-L	All		-	-	10300	uF
	AXA05A18-L			-	-	1800	uF
	AXA02B18-L			-	-	1200	uF
	AXA02C18-L			-	-	750	uF
	AXA01BB18-L			-	-	680#	uF
	AXA01CC18-L			-	-	380#	uF
	AXA06F36-L			-	-	10300	uF
	AXA05A36-L			-	-	1800	uF
	AXA02B36-L			-	-	1200	uF
	AXA02C36-L			-	-	750	uF
	AXA01BB36-L			-	-	680#	uF
	AXA01CC36-L			-	-	380#	uF

Note1 - # for each output

Output Specifications

Table 3. Output Specifications con't:

Parameter		Condition	Symbol	Min	Nom	Max[1]	Unit
Output Ripple, pk-pk	3.3V&5V Models	20MHz bandwidth, measured with a 1uF MLCC and a 10uF Tantalum Capacitor	V_O	-	-	100	mV
	12V,15V&Dual Models			-	-	150	
Line Regulation		$V_{IN,DC}=V_{IN,min}$ to $V_{IN,max}$	$\pm\%V_O$	-	-	0.2	%
Load Regulation	Single Output	I_O=0 to $I_{O,max}$	$\pm\%V_O$	-	-	0.2	%
	Dual Output		$\pm\%V_O$	-	-	1.0	%
V_O Dynamic Response Peak Deviation Settling Time		25% load change, slew rate = 1A/uS	$\pm\%V_O$ t_s	- -	3 250	5 -	% uSec
Output Voltage Overshoot		All	$\%V_O$	-		5	%
Temperature Coefficient		All	$\%/^OC$	-	0.01	0.02	%
Switching Frequency		All	f_{SW}	-	285	-	KHz
Output Over Current Protection		All		-	150	-	$\%I_{O,max}$
Output Short Circuit Protection		All		Hiccup Mode 0.6Hz typ, Auotmatic Recovery			

AXA06F18-L Performance Curves

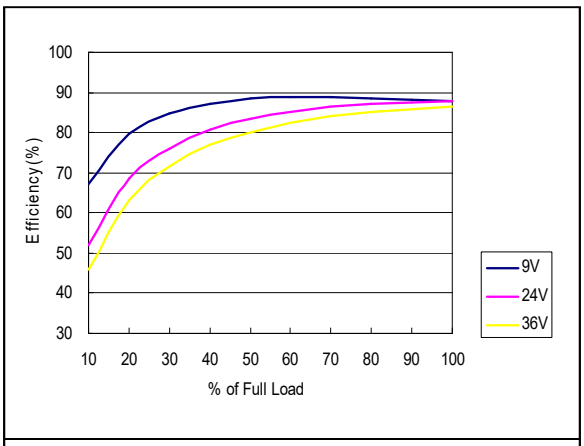


Figure 1: AXA06F18-L Efficiency Versus Output Current Curve
Vin = 9 to 36Vdc Load: Io = 0 to 6.0A

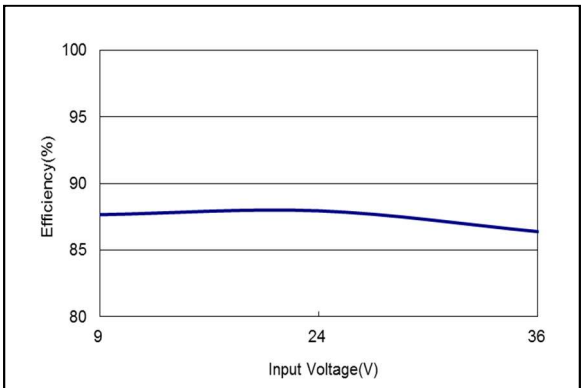


Figure 2: AXA06F18-L Efficiency Versus Input Voltage Curve
Vin = 9 to 36Vdc Load: Io = 6.0A

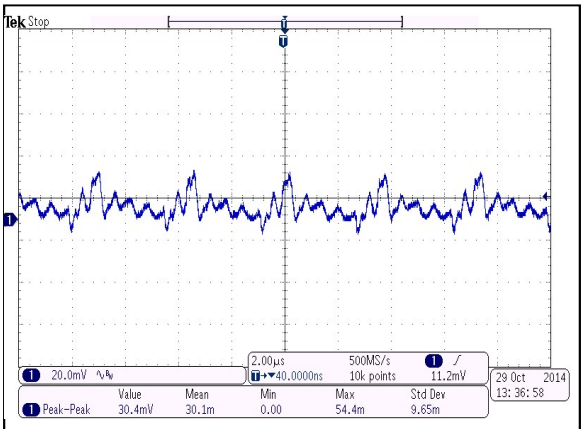


Figure 3 AXA06F18-L Ripple and Noise Measurement
Vin = 24Vdc Load: Io = 6.0A
Ch 1: Vo

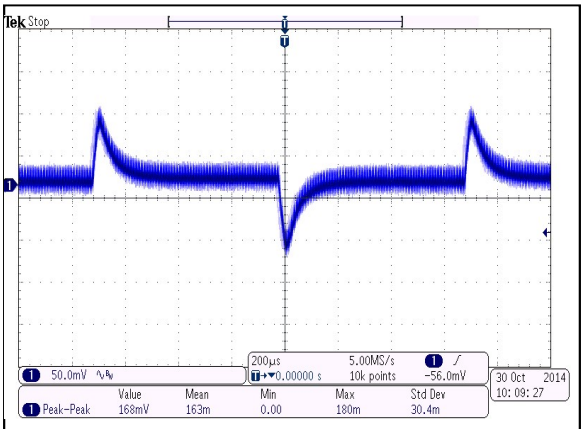


Figure 4: AXA06F18-L Transient Response
Vin = 24Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

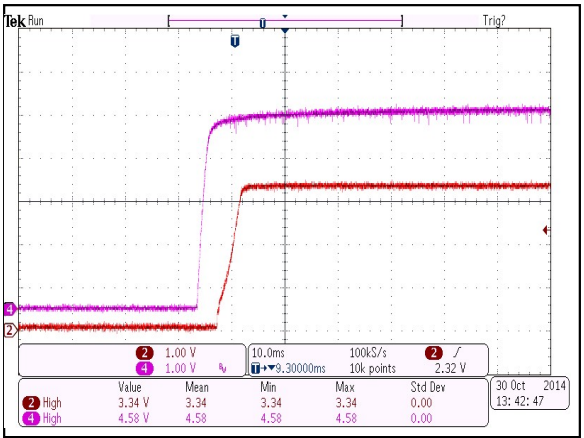


Figure 5: AXA06F18-L Output Voltage Startup Characteristic by ON/OFF
Vin = 24Vdc Load: Io =6.0A
Ch1: Vo Ch2: Remote On/Off

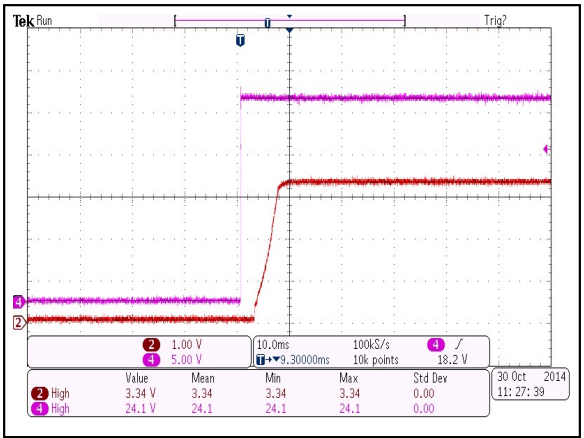


Figure 6: AXA06F18-L Output Voltage Startup Characteristic by Vin
Vin = 24Vdc Load: Io = 6.0A
Ch1: Vo Ch2: Vin

AXA06F18-L Performance Curves

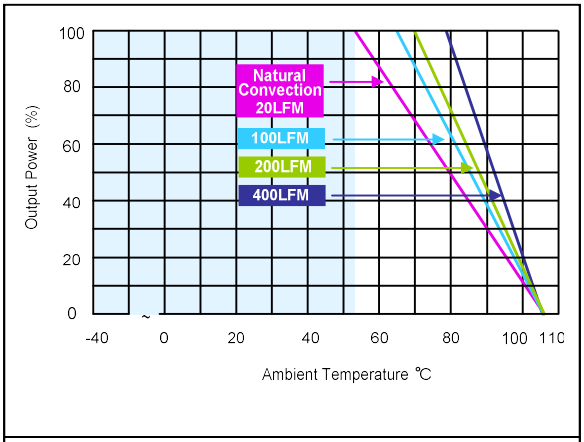


Figure 7: AXA06F18-L Derating Curves (without heatsink)
Vin = 24Vdc Load: Io = 0 to 6A

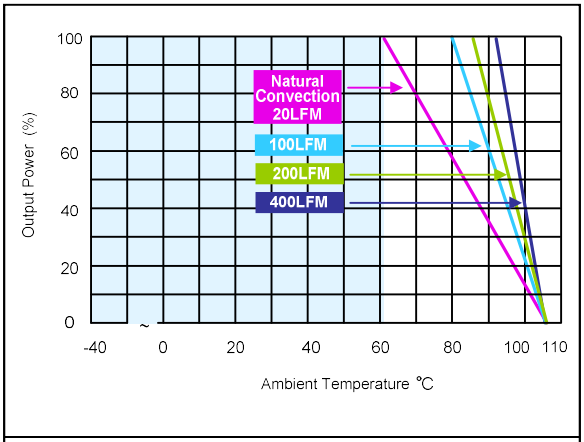


Figure 8: AXA06F18-L Derating Curves (with heatsink)
Vin = 24Vdc Load: Io = 0 to 6A

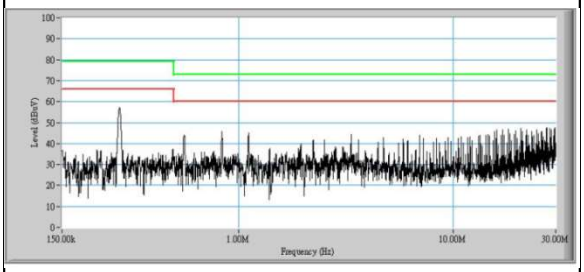


Figure 9: AXA06F18-L Conduction Emission of EN550122 Class A
Vin = 24Vdc Load: Io = 6A need external filter

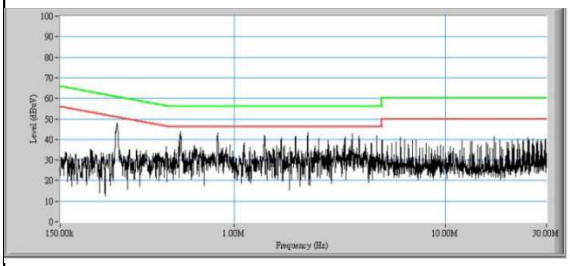


Figure 10: AXA06F18-L Conduction Emission of EN550122 Class B
Vin = 24Vdc Load: Io = 6A need external filter

Note - All test conditions are at 25 ^{O}C

AXA05A18-L Performance Curves

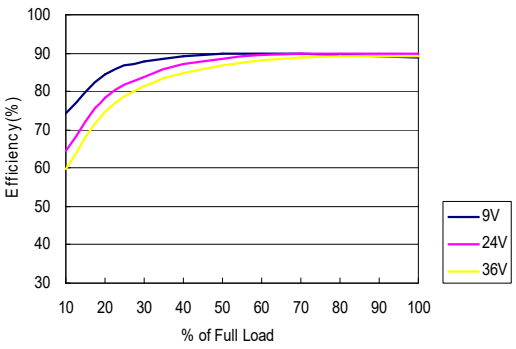


Figure 11: AXA05A18-L Efficiency Versus Output Current Curve
Vin = 9 to 36Vdc Load: Io = 0 to 5A

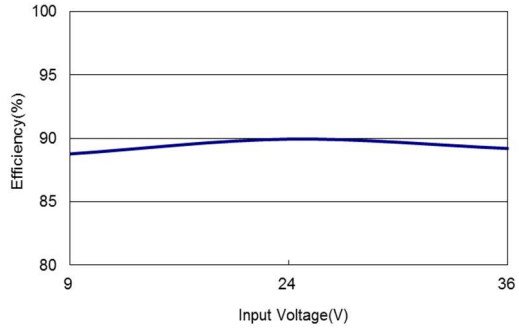


Figure 12: AXA05A18-L Efficiency Versus Input Voltage Curve
Vin = 9 to 36Vdc Load: Io = 5A

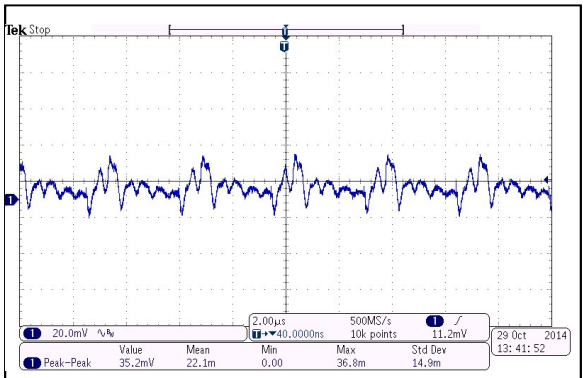


Figure 13: AXA05A18-L Ripple and Noise Measurement
Vin = 24Vdc Load: Io = 5A
Ch 1: Vo

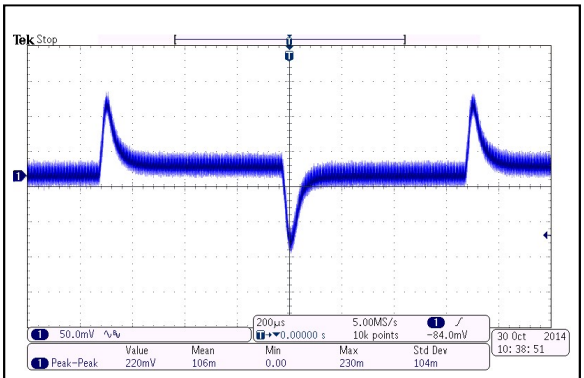


Figure 14: AXA05A18-LTransient Response
Vin = 24Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

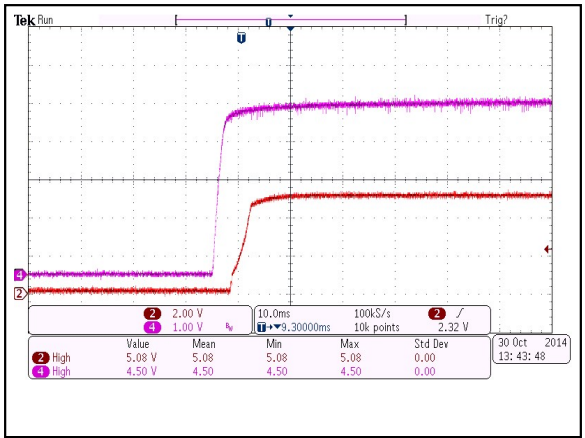


Figure 15: AXA05A18-L Output Voltage Startup Characteristic by ON/OFF
Vin = 24Vdc Load: Io = 5A
Ch1: Vo Ch2: Remote On/Off

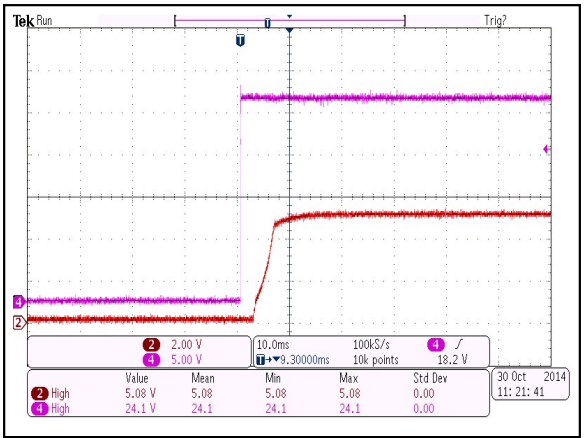


Figure 16: AXA05A18-L Output Voltage Startup Characteristic by Vin
Vin = 24Vdc Load: Io = 5A
Ch1: Vo Ch2: Vin

AXA05A18-L Performance Curves

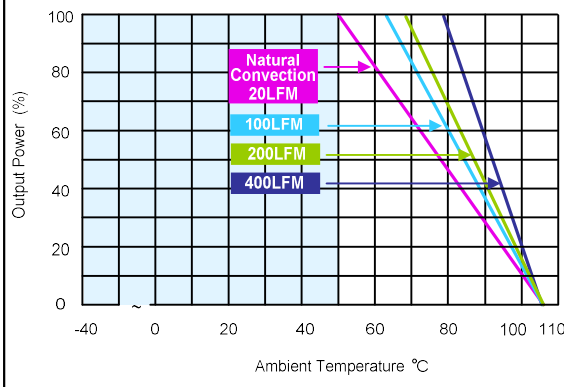


Figure 17: AXA05A18-L Derating Curves (without heatsink)
Vin = 24Vdc Load: Io = 0 to 5A

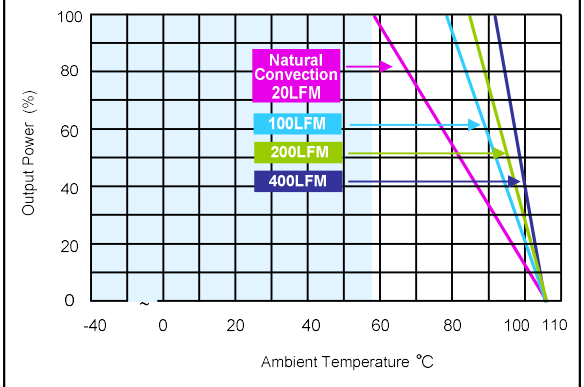


Figure 18: AXA05A18-L Derating Curves (with heatsink)
Vin = 24Vdc Load: Io = 0 to 5A

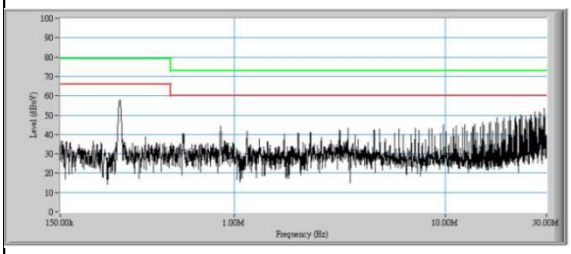


Figure 19: AXA05A18-L Conduction Emission of EN550122 Class A
Vin = 24Vdc Load: Io = 5A need external filter

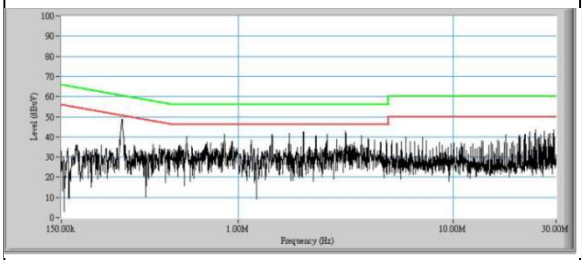


Figure 20: AXA05A18-L Conduction Emission of EN550122 Class B
Vin = 24Vdc Load: Io = 5A need external filter

Note - All test conditions are at 25 ^{O}C

AXA02B18-L Performance Curves

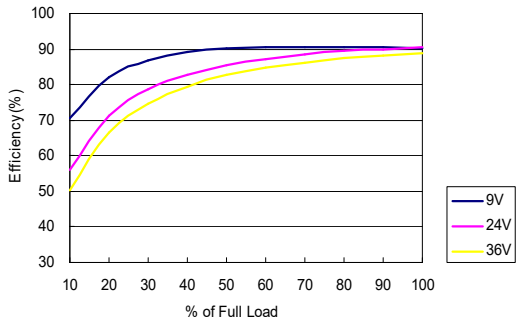


Figure 21: AXA02B18-L Efficiency Versus Output Current Curve
Vin = 9 to 36Vdc Load: Io = 0 to 2.09A

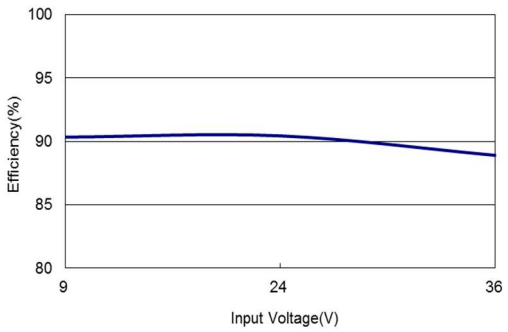


Figure 22: AXA02B18-L Efficiency Versus Input Voltage Curve
Vin = 9 to 36Vdc Load: Io = 2.09A

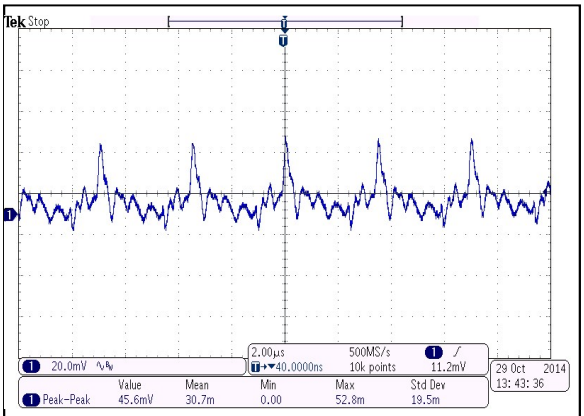


Figure 23: AXA02B18-L Ripple and Noise Measurement
Vin = 24Vdc Load: Io = 2.09A
Ch 1: Vo

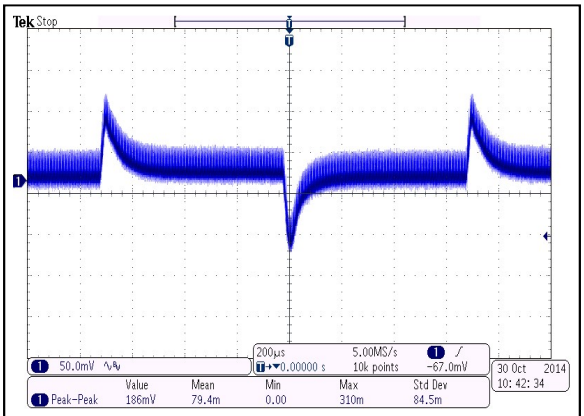


Figure 24: AXA02B18-LTransient Response
Vin = 24Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

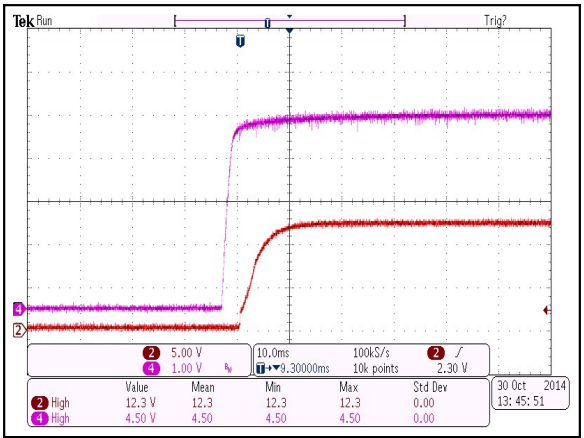


Figure 25: AXA02B18-L Output Voltage Startup Characteristic by ON/OFF
Vin = 24Vdc Load: Io = 2.09A
Ch1: Vo Ch2: Remote On/Off

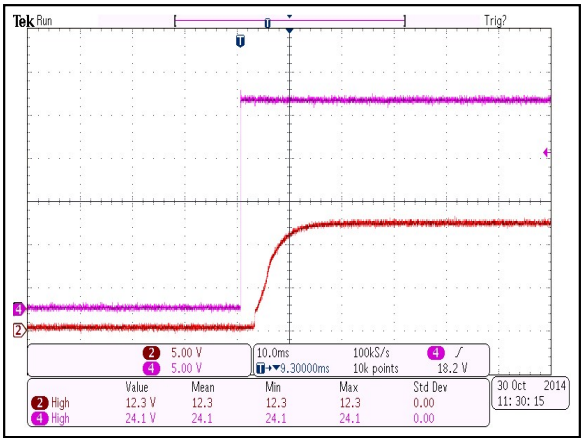


Figure 26: AXA02B18-L Output Voltage Startup Characteristic by Vin
Vin = 24Vdc Load: Io = 2.09A
Ch1: Vo Ch2: Vin

AXA02B18-L Performance Curves

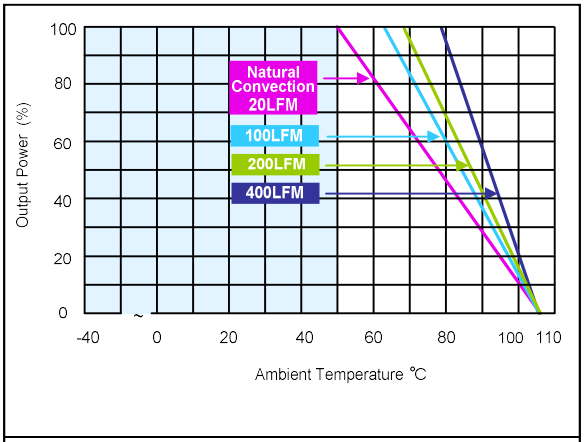


Figure 27: AXA02B18-L Derating Curves (without heatsink)
Vin = 24Vdc Load: Io = 0 to 2.09A

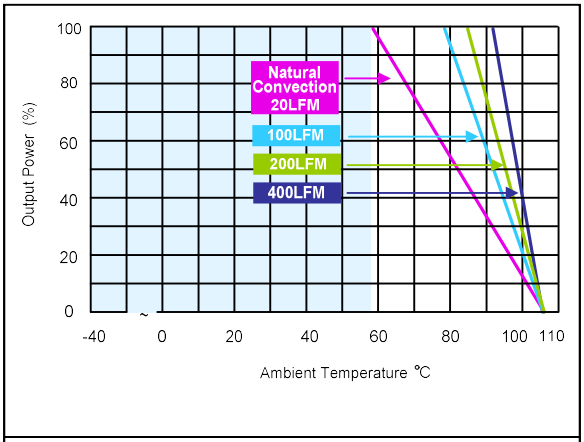


Figure 28: AXA02B18-L Derating Curves (with heatsink)
Vin = 24Vdc Load: Io = 0 to 2.09A

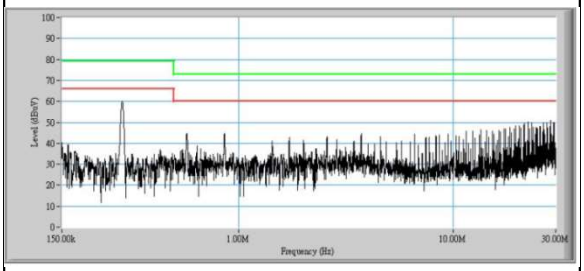


Figure 29: AXA02B18-L Conduction Emission of EN550122 Class A
Vin = 24Vdc Load: Io = 2.09A need external filter

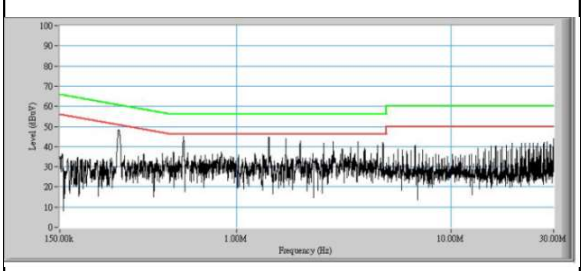


Figure 30: AXA02B18-L Conduction Emission of EN550122 Class B
Vin = 24Vdc Load: Io = 2.09A need external filter

Note - All test conditions are at 25 ^{O}C

AXA02C18-L Performance Curves

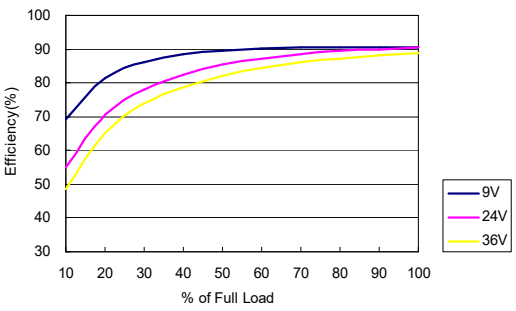


Figure 31: AXA02C18-L Efficiency Versus Output Current Curve
Vin = 9 to 36Vdc Load: Io = 0 to 1.67A

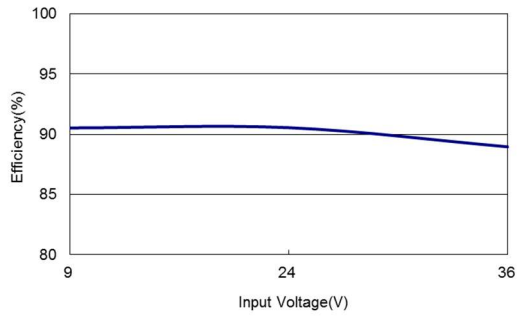


Figure 32: AXA02C18-L Efficiency Versus Input Voltage Curve
Vin = 9 to 36Vdc Load: Io = 1.67A

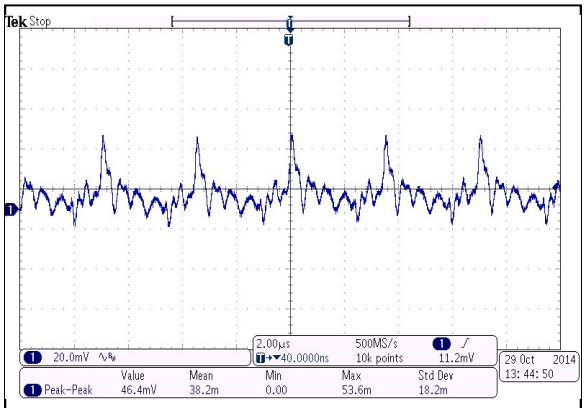


Figure 33: AXA02C18-L Ripple and Noise Measurement
Vin = 24Vdc Load: Io = 1.67A
Ch 1: Vo

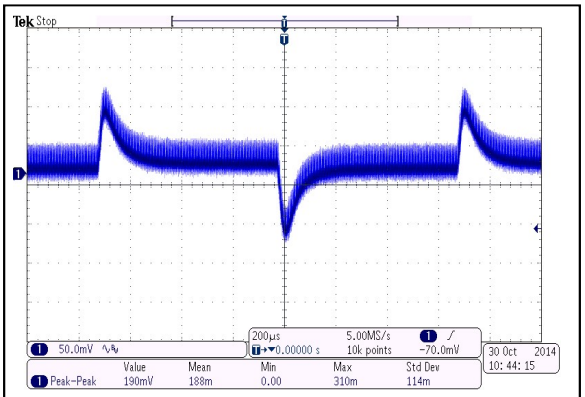


Figure 34: AXA02C18-LTransient Response
Vin = 24Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

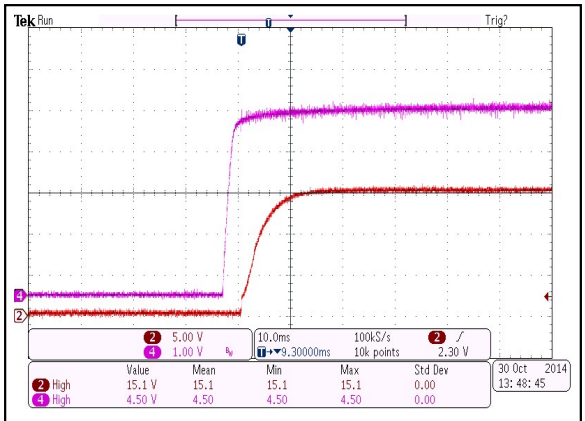


Figure 35: AXA02C18-L Output Voltage Startup Characteristic by ON/OFF
Vin = 24Vdc Load: Io = 1.67A
Ch1: Vo Ch2: Remote On/Off

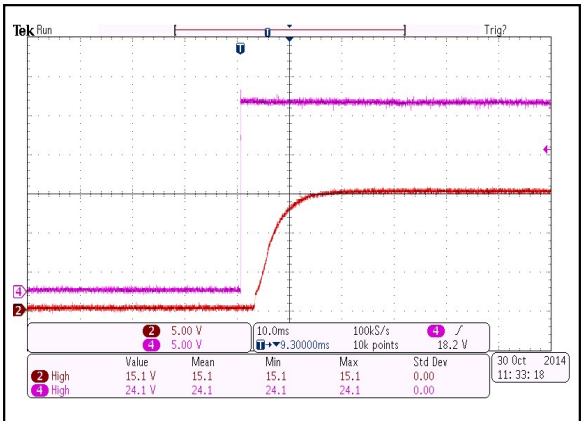


Figure 36: AXA02C18-L Output Voltage Startup Characteristic by Vin
Vin = 24Vdc Load: Io = 1.67A
Ch1: Vo Ch2: Vin

AXA02C18-L Performance Curves

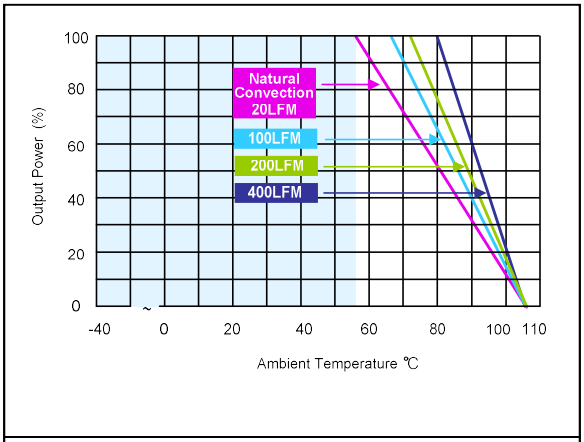


Figure 37: AXA02C18-L Derating Curves (without heatsink)
Vin = 24Vdc Load: Io = 0 to 1.67A

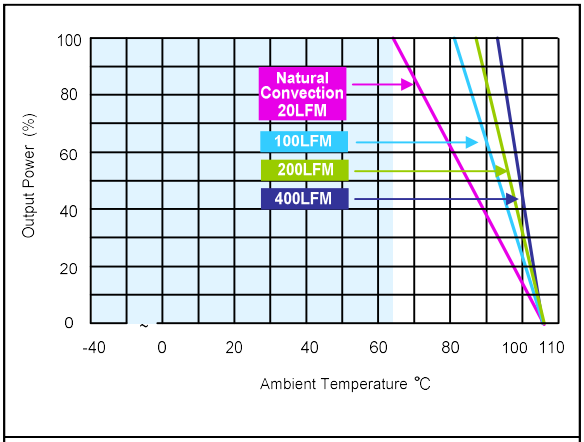


Figure 38: AXA02C18-L Derating Curves (with heatsink)
Vin = 24Vdc Load: Io = 0 to 1.67A

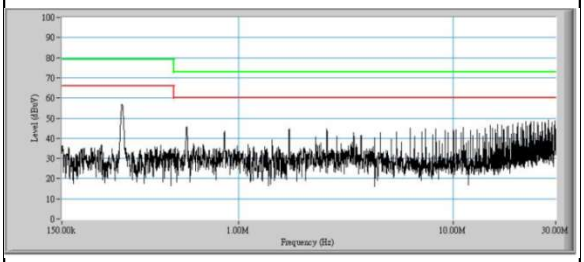


Figure 39: AXA02C18-L Conduction Emission of EN550122 Class A
Vin = 24Vdc Load: Io = 1.67A need external filter

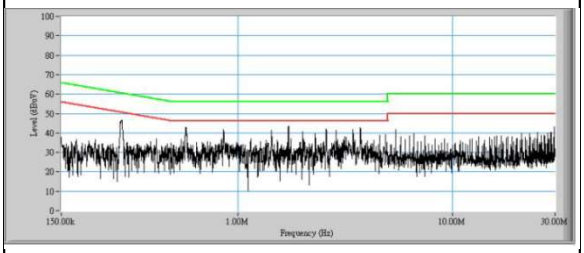


Figure 40: AXA02C18-L Conduction Emission of EN550122 Class B
Vin = 24Vdc Load: Io = 1.67A need external filter

Note - All test conditions are at 25 ^{O}C

AXA01BB18-L Performance Curves

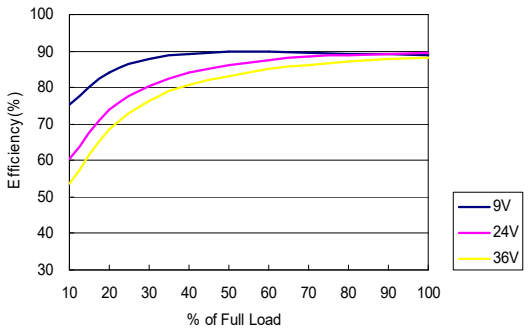


Figure 41: AXA01BB18-L Efficiency Versus Output Current Curve
Vin = 9 to 36Vdc Load: Io = 0 to ± 1.04A

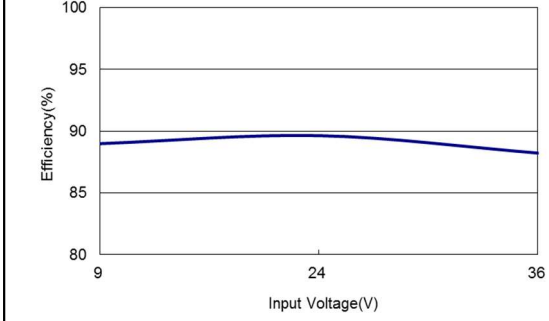


Figure 42: AXA01BB18-L Efficiency Versus Input Voltage Curve
Vin = 9 to 36Vdc Load: Io = ± 1.04A

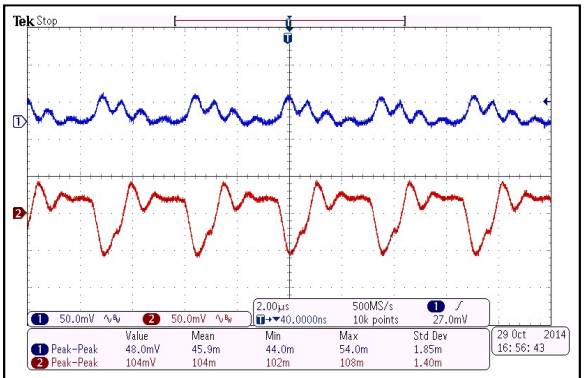


Figure 43: AXA01BB18-L Ripple and Noise Measurement
Vin = 24Vdc Load: Io = ± 1.04A
Ch 1: Vo

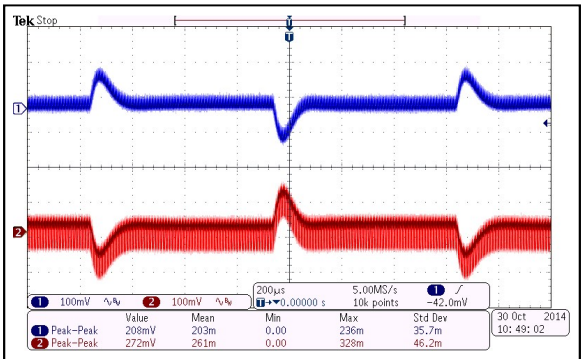


Figure 44: AXA01BB18-L Transient Response
Vin = 24Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

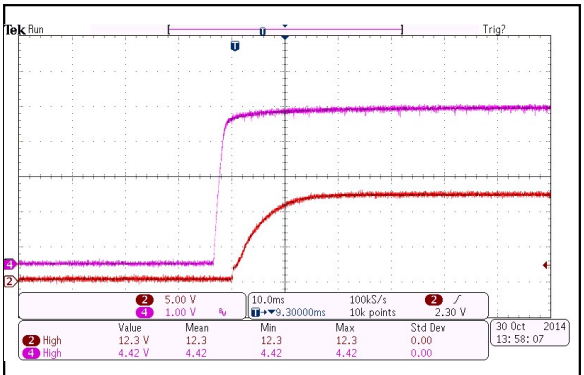


Figure 45: AXA01BB18-L Output Voltage Startup Characteristic by ON/OFF
Vin = 24Vdc Load: Io = ± 1.04A
Ch1: Vo Ch2: Remote On/Off

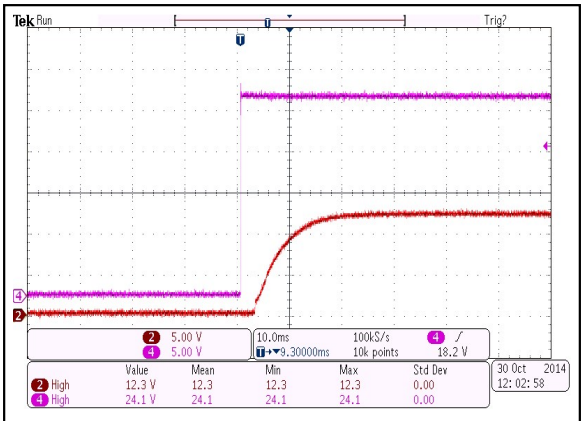


Figure 46: AXA01BB18-L Output Voltage Startup Characteristic by Vin
Vin = 24Vdc Load: Io = ± 1.04A
Ch1: Vo Ch2: Vin

AXA01BB18-L Performance Curves

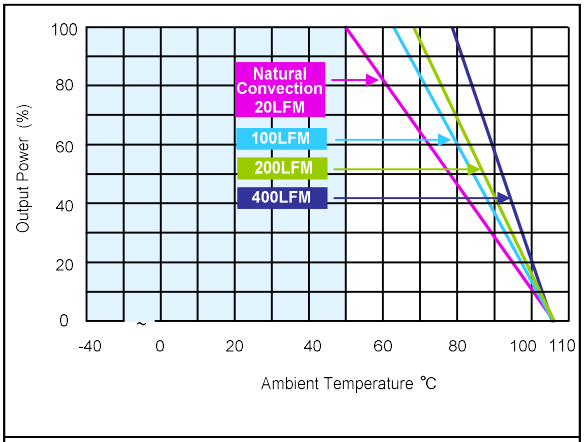


Figure 47: AXA01BB18-L Derating Curves (without heatsink)
Vin = 24Vdc Load: Io = 0 to ± 1.04A

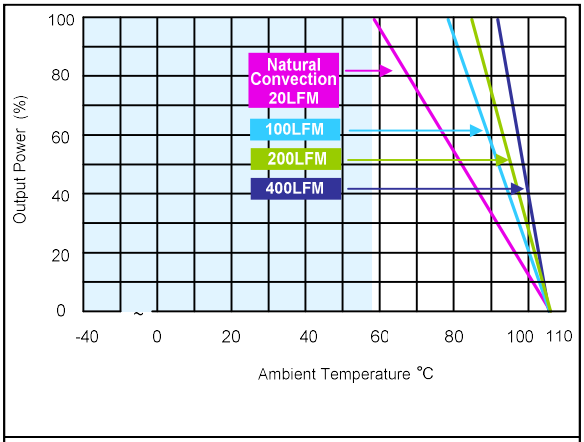


Figure 48: AXA01BB18-L Derating Curves (with heatsink)
Vin = 24Vdc Load: Io = 0 to ±1.04A

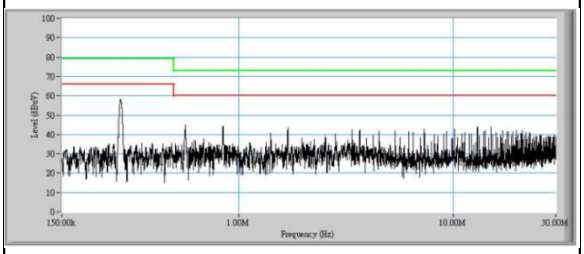


Figure 49: AXA01BB18-L Conduction Emission of EN550122 Class A
Vin = 24Vdc Load: Io = ±1.04A need external filter

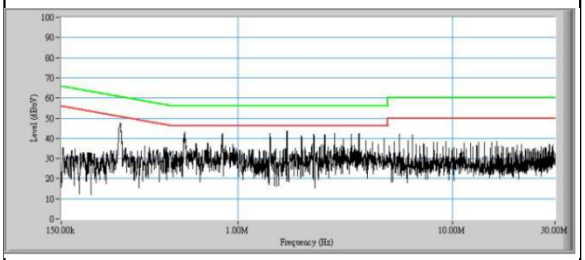


Figure 50: AXA01BB18-L Conduction Emission of EN550122 Class B
Vin = 24Vdc Load: Io = ±1.04A need external filter

Note - All test conditions are at 25 ^{O}C

AXA01CC18-L Performance Curves

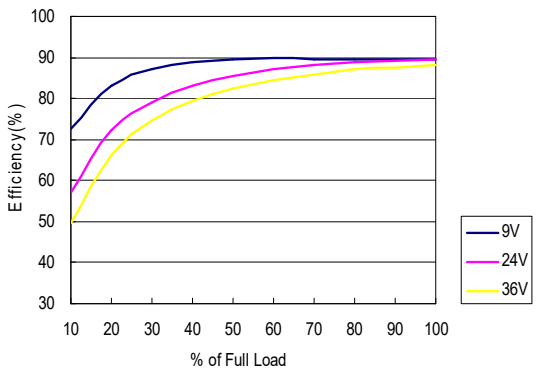


Figure 51: AXA01CC18-L Efficiency Versus Output Current Curve
Vin = 9 to 36Vdc Load: Io = 0 to ±0.84 A

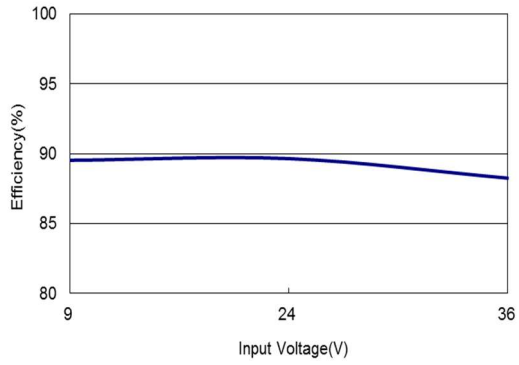


Figure 52: AXA01CC18-L Efficiency Versus Input Voltage Curve
Vin = 9 to 36Vdc Load: Io = ±0.84 A

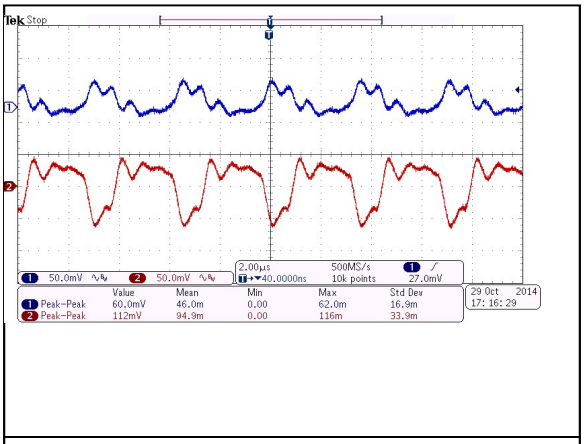


Figure 53: AXA01CC18-L Ripple and Noise Measurement
Vin = 24Vdc Load: Io = ±0.84 A
Ch 1: Vo1 Ch2: Vo2

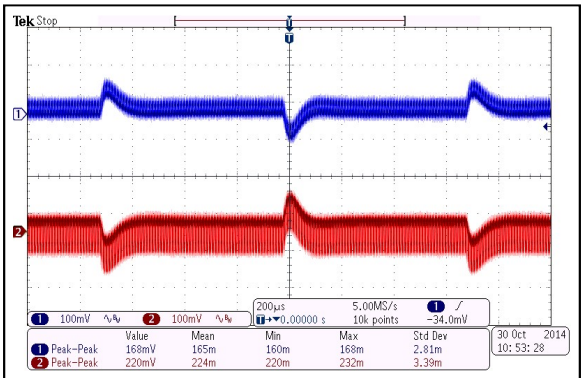


Figure 54: AXA01CC18-L Transient Response
Vin = 24Vdc Load: Io = 100% to 75% load change
Ch 1: Vo1 Ch2: Vo2

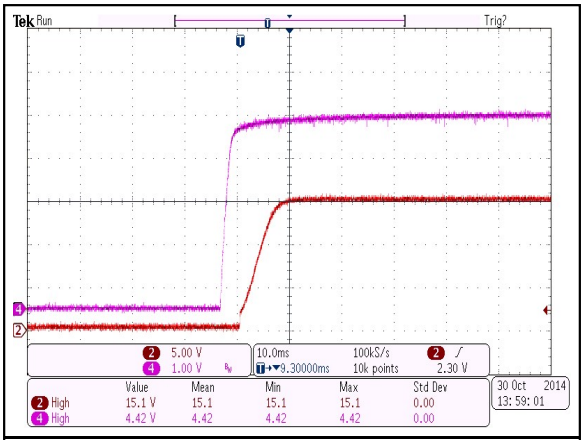


Figure 55: AXA01CC18-L Output Voltage Startup Characteristic by ON/OFF
Vin = 24Vdc Load: Io = ±0.84 A
Ch1: Vo Ch2: Remote On/Off

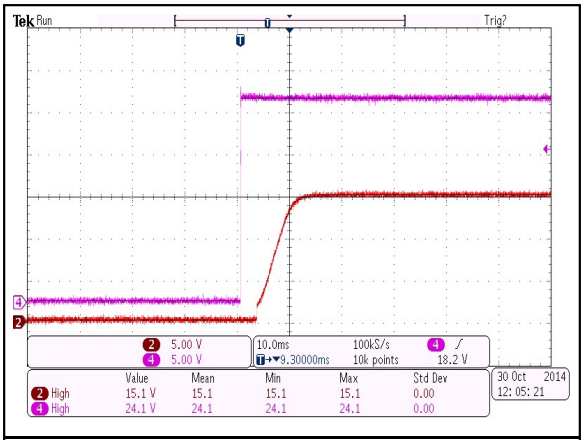


Figure 56: AXA01CC18-L Output Voltage Startup Characteristic by Vin
Vin = 24Vdc Load: Io = ±0.84 A
Ch1: Vo Ch2: Vin

AXA01CC18-L Performance Curves

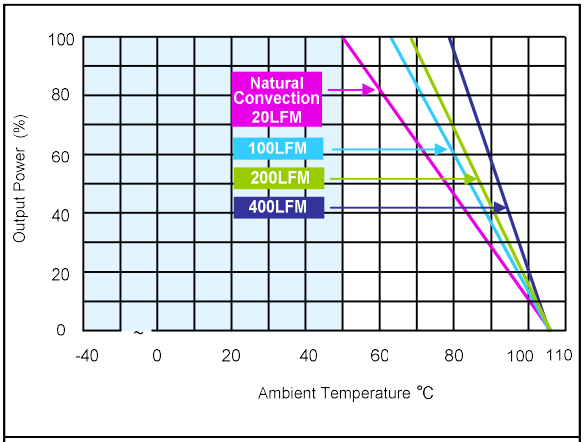


Figure 57: AXA01CC18-L Derating Curves (without heatsink)
Vin = 24Vdc Load: Io = 0 to ±0.84 A

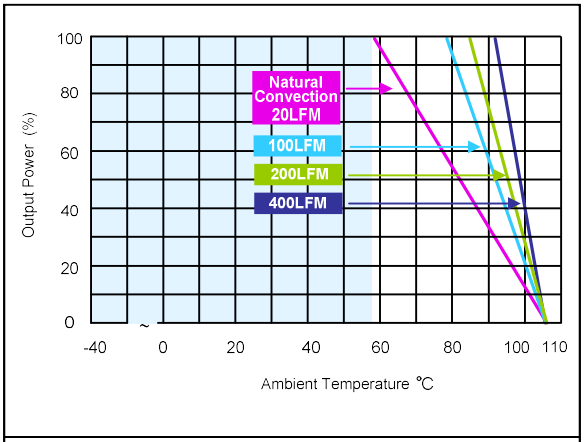


Figure 58: AXA01CC18-L Derating Curves (with heatsink)
Vin = 24Vdc Load: Io = 0 to ±0.84 A

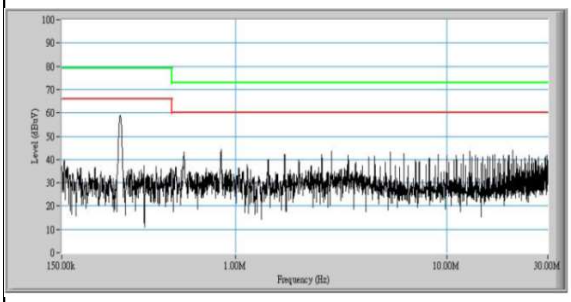


Figure 59: AXA01CC18-L Conduction Emission of EN550122 Class A
Vin = 24Vdc Load: Io = ±0.84 A need external filter

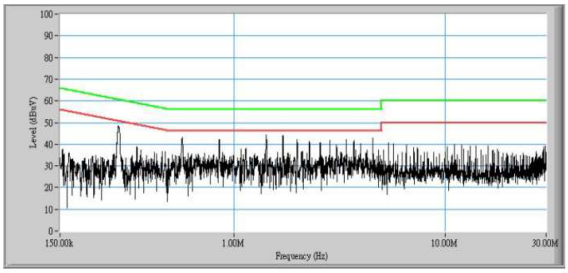


Figure 60: AXA01CC18-L Conduction Emission of EN550122 Class B
Vin = 24Vdc Load: Io = ±0.84 A need external filter

Note - All test conditions are at 25 °C

AXA06F36-L Performance Curves

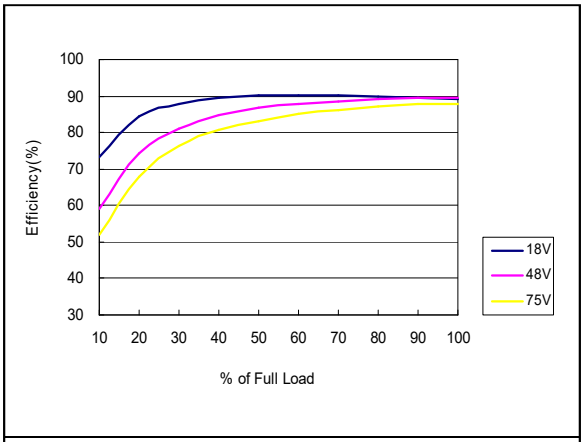


Figure 61: AXA06F36-L Efficiency Versus Output Current Curve
Vin = 18 to 75Vdc Load: Io = 0 to 6.0A

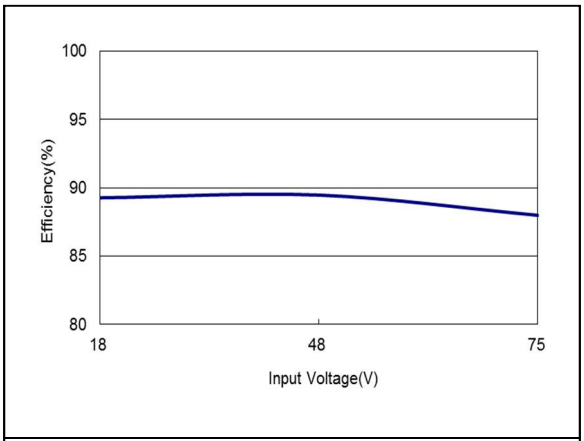


Figure 62: AXA06F18-L Efficiency Versus Input Voltage Curve
Vin = 18 to 75Vdc Load: Io = 6.0A

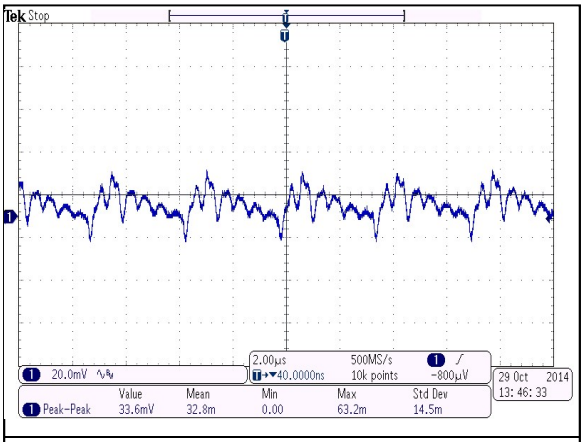


Figure 63 AXA06F36-L Ripple and Noise Measurement
Vin =48Vdc Load: Io = 6.0A
Ch 1: Vo

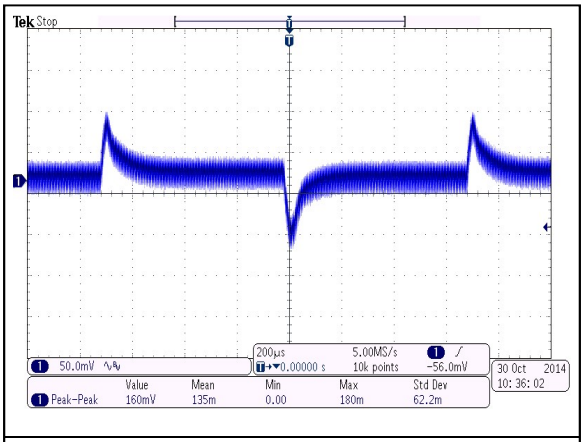


Figure 64: AXA06F36-L Transient Response
Vin = 48Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

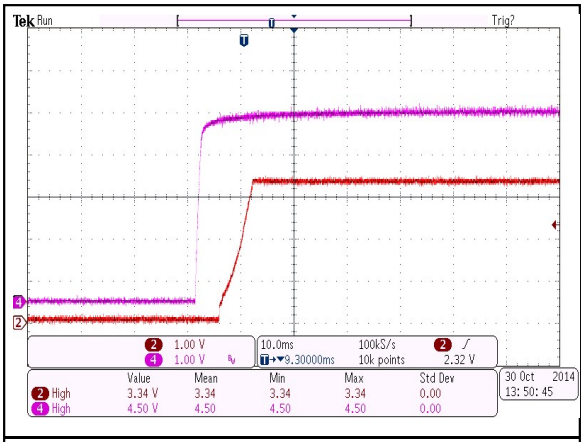


Figure 65: AXA06F36-L Output Voltage Startup Characteristic by ON/OFF
Vin = 48Vdc Load: Io =6.0A
Ch1: Vo Ch2: Remote On/Off

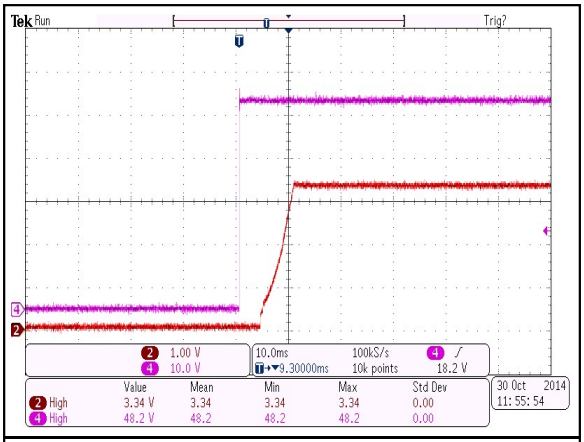


Figure 66: AXA06F36-L Output Voltage Startup Characteristic by Vin
Vin = 48Vdc Load: Io = 6.0A
Ch1: Vo Ch2: Vin

AXA06F36-L Performance Curves

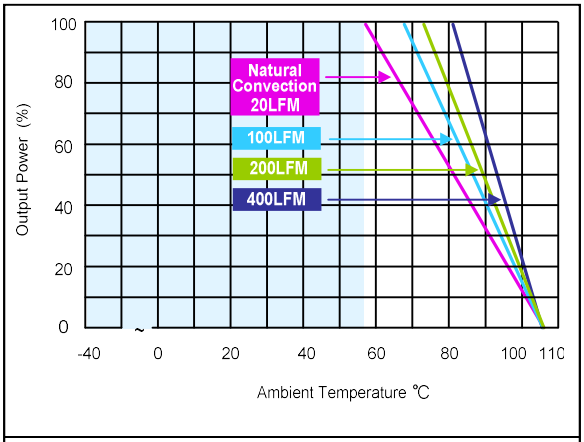


Figure 67: AXA06F36-L Derating Curves (without heatsink)
Vin = 48Vdc Load: Io = 0 to 6A

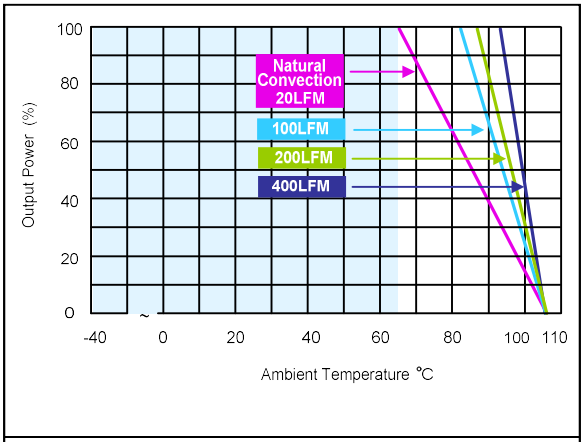


Figure 68: AXA06F36-L Derating Curves (with heatsink)
Vin = 48Vdc Load: Io = 0 to 6A

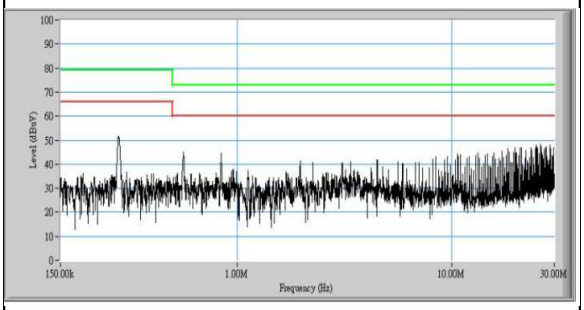


Figure 69: AXA06F36-L Conduction Emission of EN550122 Class A
Vin = 48Vdc Load: Io = 6A need external filter

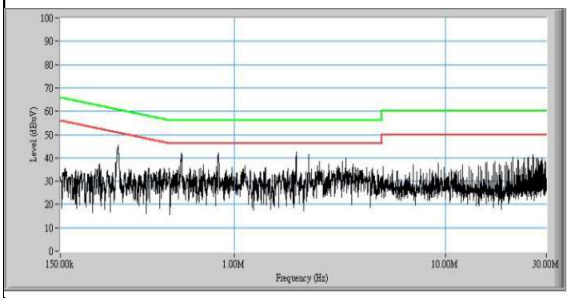


Figure 70: AXA06F36-L Conduction Emission of EN550122 Class B
Vin = 48Vdc Load: Io = 6A need external filter

Note - All test conditions are at 25 ^{O}C

AXA05A36-L Performance Curves

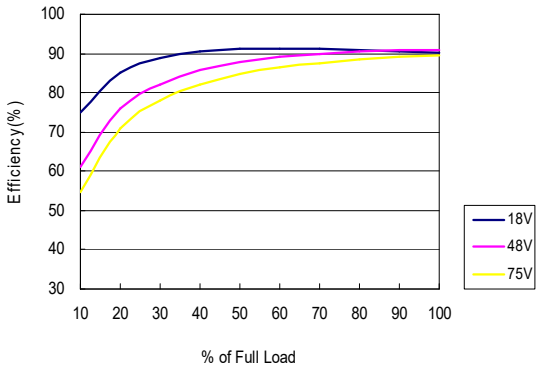


Figure 71: AXA05A36-L Efficiency Versus Output Current Curve
Vin = 18 to 75Vdc Load: Io = 0 to 5A

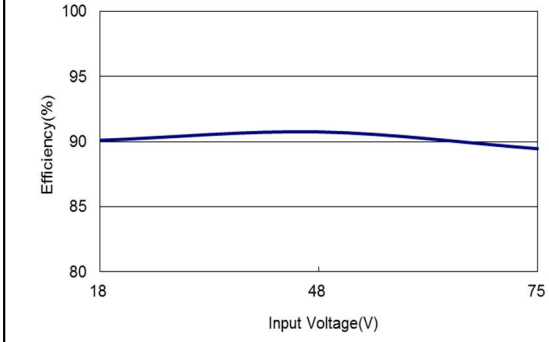


Figure 72: AXA05A36-L Efficiency Versus Input Voltage Curve
Vin = 18 to 75Vdc Load: Io = 5A

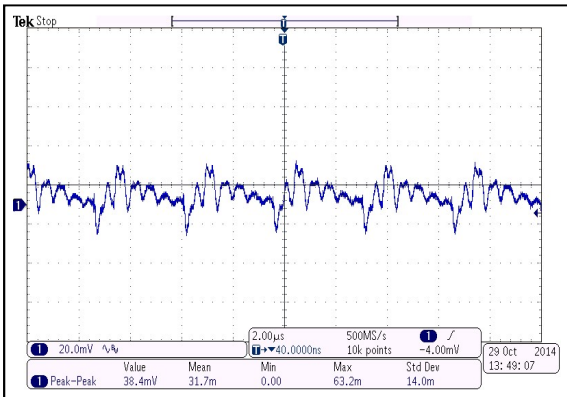


Figure 73: AXA05A36-L Ripple and Noise Measurement
Vin = 48Vdc Load: Io = 5A
Ch 1: Vo

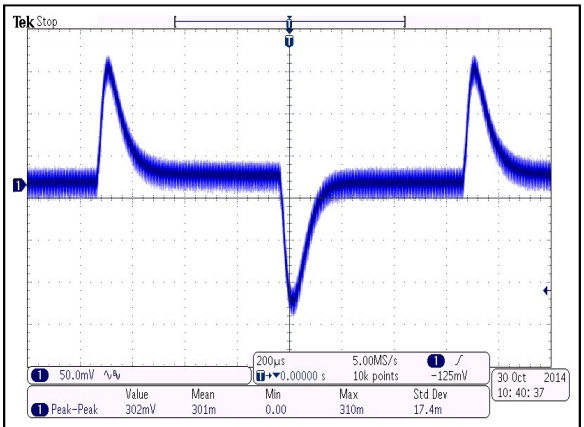


Figure 74: AXA05A36-L Transient Response
Vin = 48Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

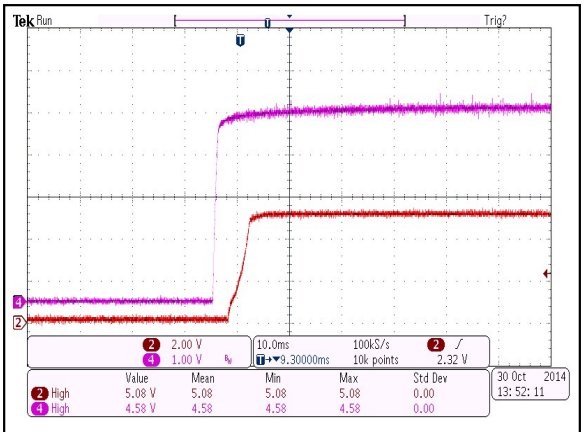


Figure 75: AXA05A36-L Output Voltage Startup Characteristic by ON/OFF
Vin = 48Vdc Load: Io = 5A
Ch1: Vo Ch2: Remote On/Off

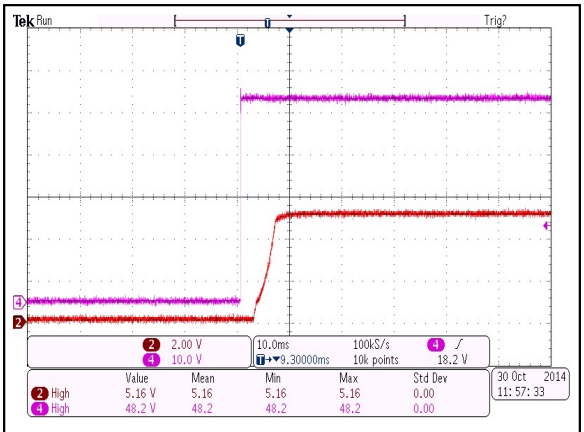


Figure 76: AXA05A36-L Output Voltage Startup Characteristic by Vin
Vin = 48Vdc Load: Io = 5A
Ch1: Vo Ch2: Vin

AXA05A36-L Performance Curves

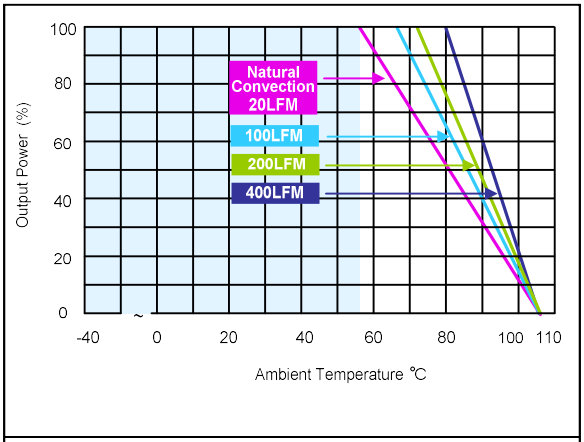


Figure 77: AXA05A36-L Derating Curves (without heatsink)
Vin = 48Vdc Load: Io = 0 to 5A

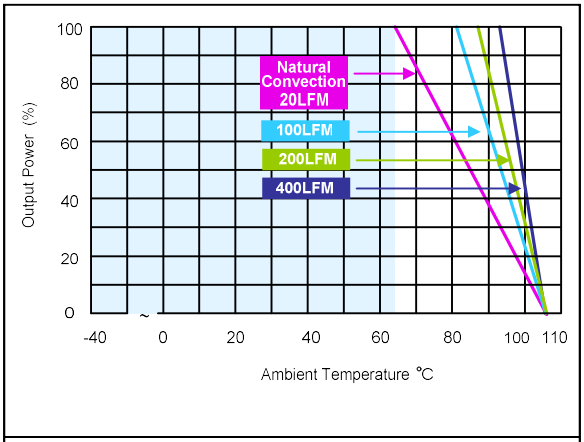


Figure 78: AXA05A36-L Derating Curves (with heatsink)
Vin = 48Vdc Load: Io = 0 to 5A

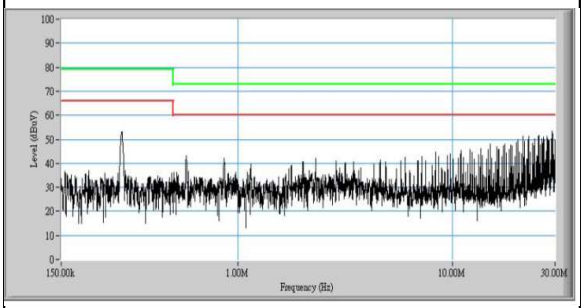


Figure 79: AXA05A36-L Conduction Emission of EN550122 Class A
Vin = 48Vdc Load: Io = 5A need external filter

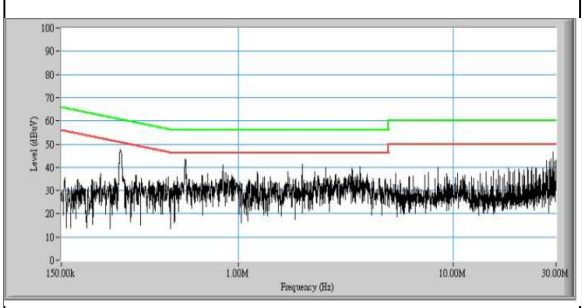


Figure 80: AXA05A36-L Conduction Emission of EN550122 Class B
Vin = 48Vdc Load: Io = 5A need external filter

Note - All test conditions are at 25 ^{O}C

AXA02B36-L Performance Curves

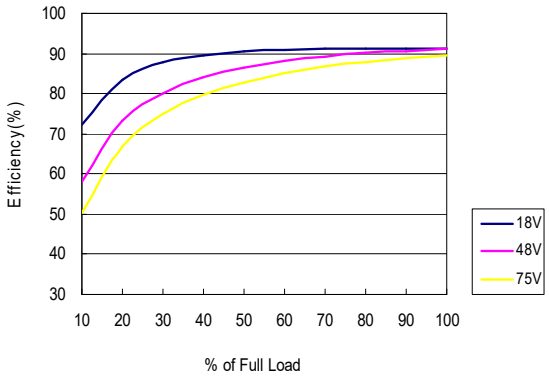


Figure 81: AXA02B36-L Efficiency Versus Output Current Curve
Vin = 18 to 75Vdc Load: Io = 0 to 2.09A

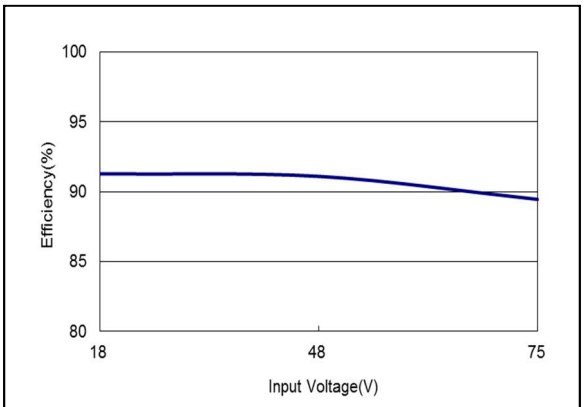


Figure 82: AXA02B36-L Efficiency Versus Input Voltage Curve
Vin = 18 to 75Vdc Load: Io = 2.09A

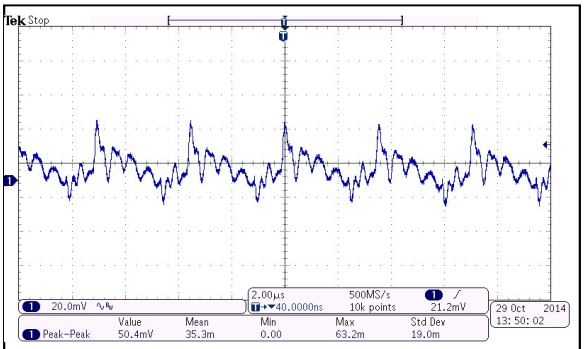


Figure 83: AXA02B36-L Ripple and Noise Measurement
Vin = 48Vdc Load: Io = 2.09A
Ch 1: Vo

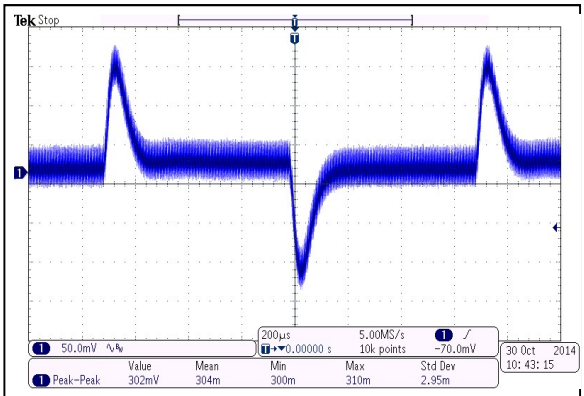


Figure 84: AXA02B36-LTransient Response
Vin = 48Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

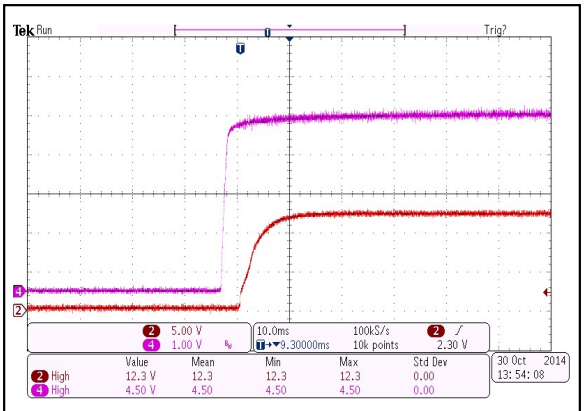


Figure 85: AXA02B36-L Output Voltage Startup Characteristic by ON/OFF
Vin = 48Vdc Load: Io = 2.09A
Ch1: Vo Ch2: Remote On/Off

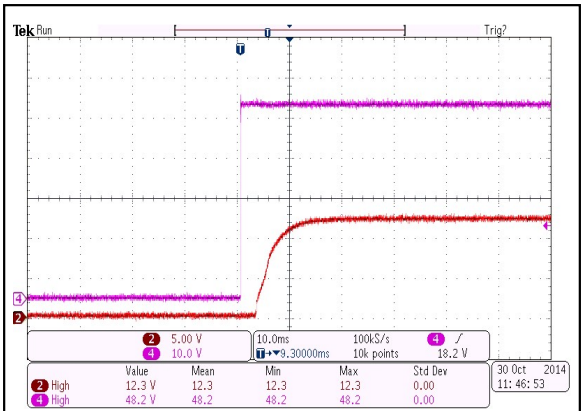


Figure 86: AXA02B36-L Output Voltage Startup Characteristic by Vin
Vin = 48Vdc Load: Io = 2.09A
Ch1: Vo Ch2: Vin

AXA02B36-L Performance Curves

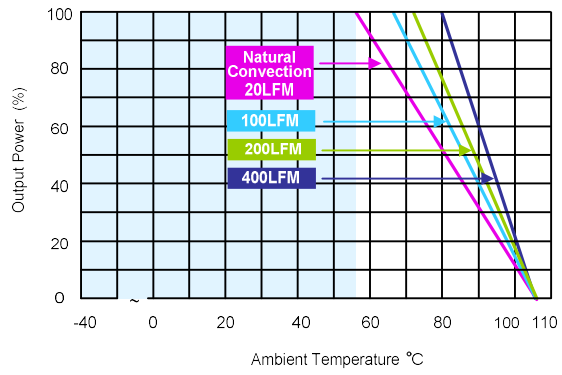


Figure 87: AXA02B36-L Derating Curves (without heatsink)
Vin = 48Vdc Load: Io = 0 to 2.09A

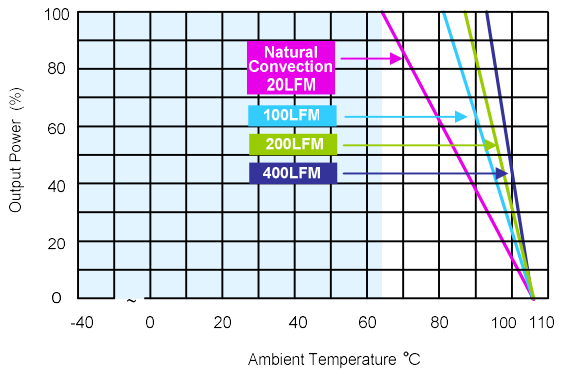


Figure 88: AXA02B36-L Derating Curves (with heatsink)
Vin = 48Vdc Load: Io = 0 to 2.09A

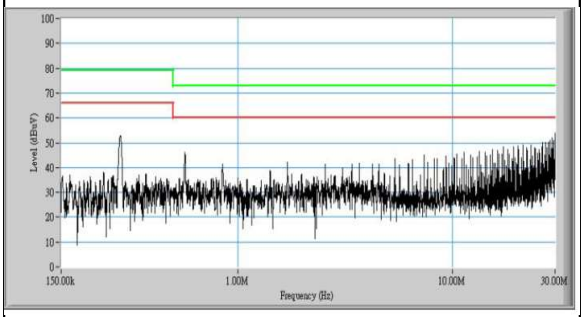


Figure 89: AXA02B36-L Conduction Emission of EN550122 Class A
Vin = 48Vdc Load: Io = 2.09A need external filter

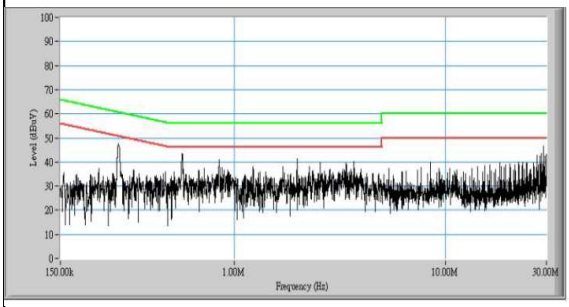


Figure 90: AXA02B36-L Conduction Emission of EN550122 Class B
Vin = 48Vdc Load: Io = 2.09A need external filter

Note - All test conditions are at 25 ^{O}C

AXA02C36-L Performance Curves

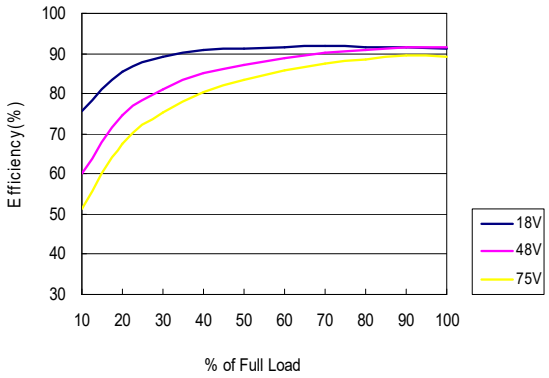


Figure 91: AXA02C36-L Efficiency Versus Output Current Curve
Vin =18to 75Vdc Load: Io = 0 to 1.67A

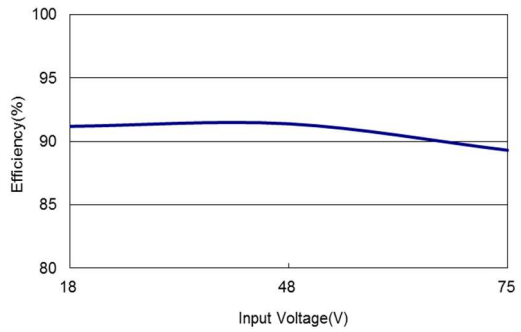


Figure 92: AXA02C36-L Efficiency Versus Input Voltage Curve
Vin = 18 to 75Vdc Load: Io = 1.67A

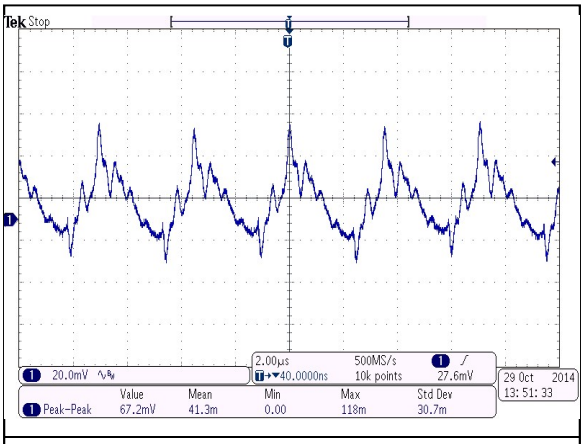


Figure 93: AXA02C36-L Ripple and Noise Measurement
Vin = 48Vdc Load: Io = 1.67A
Ch 1: Vo

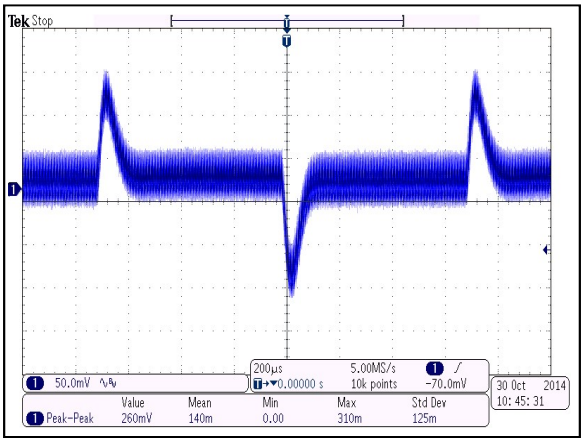


Figure 94: AXA02C36-LTransient Response
Vin = 48Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

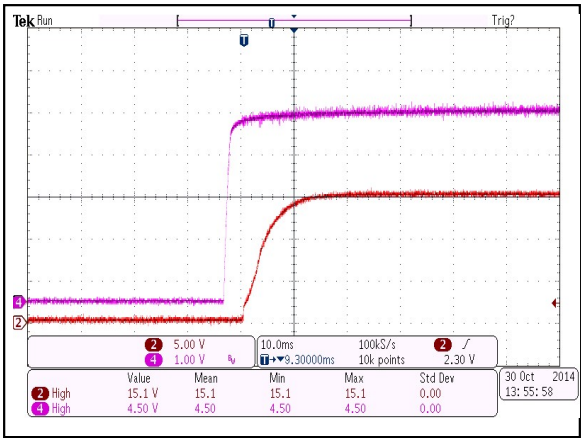


Figure 95: AXA02C36-L Output Voltage Startup Characteristic by ON/OFF
Vin = 48Vdc Load: Io = 1.67A
Ch1: Vo Ch2: Remote On/Off

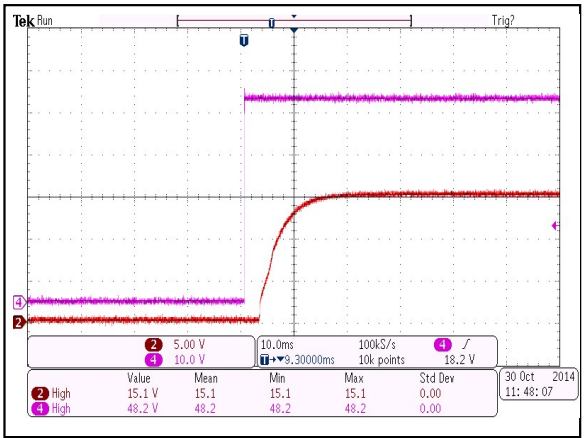


Figure 96: AXA02C36-L Output Voltage Startup Characteristic by Vin
Vin = 48Vdc Load: Io = 1.67A
Ch1: Vo Ch2: Vin

AXA02C36-L Performance Curves

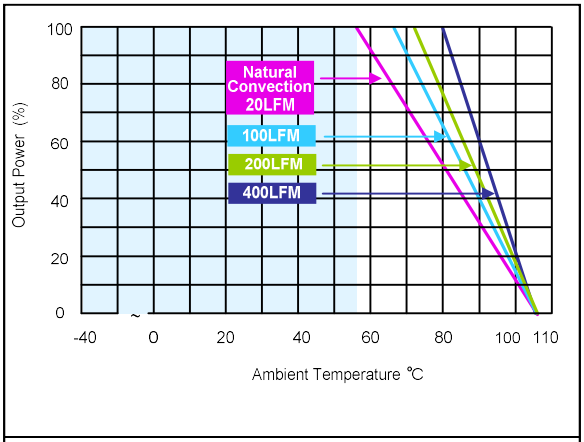


Figure 97: AXA02C36-L Derating Curves (without heatsink)
Vin = 48Vdc Load: Io = 0 to 1.67A

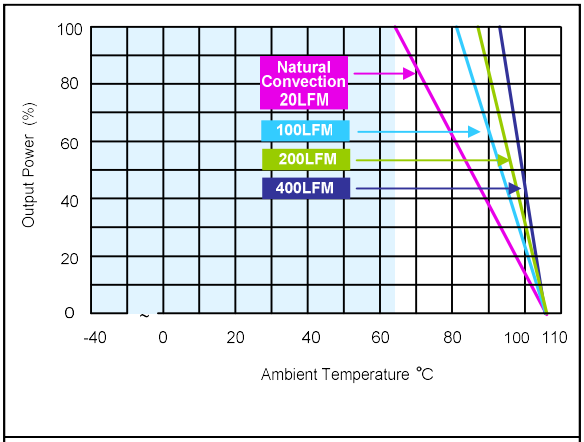


Figure 98: AXA02C36-L Derating Curves (with heatsink)
Vin = 48Vdc Load: Io = 0 to 1.67A

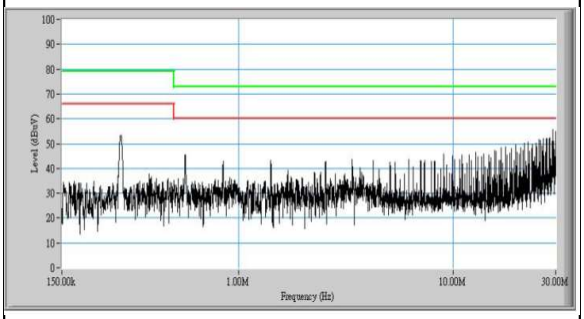


Figure 99: AXA02C36-L Conduction Emission of EN550122 Class A
Vin = 48Vdc Load: Io = 1.67A need external filter

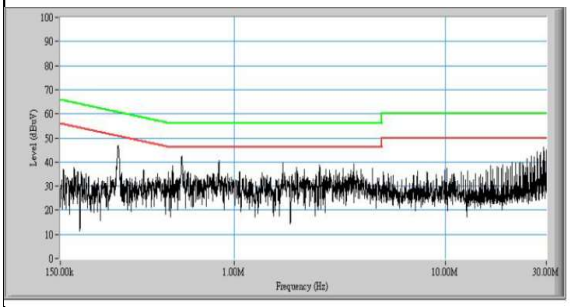


Figure 100: AXA02C36-L Conduction Emission of EN550122 Class B
Vin = 48Vdc Load: Io = 1.67A need external filter

Note - All test conditions are at 25 ^{O}C

AXA01BB36-L Performance Curves

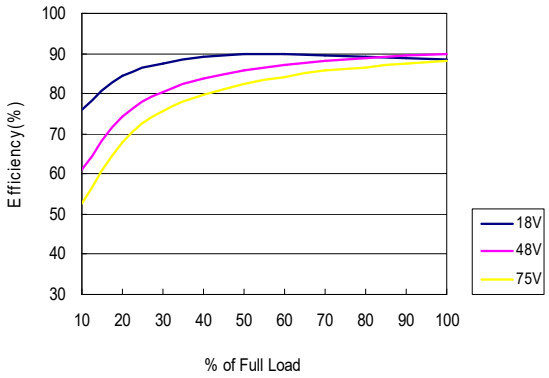


Figure 101: AXA01BB36-L Efficiency Versus Output Current Curve
Vin = 18 to 75Vdc Load: Io = 0 to ± 1.04A

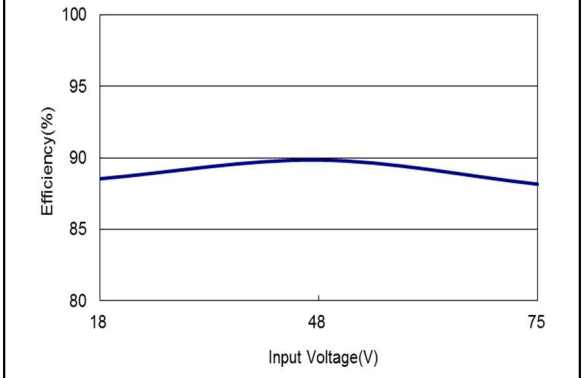


Figure 102: AXA01BB36-L Efficiency Versus Input Voltage Curve
Vin = 18 to 75Vdc Load: Io = ± 1.04A

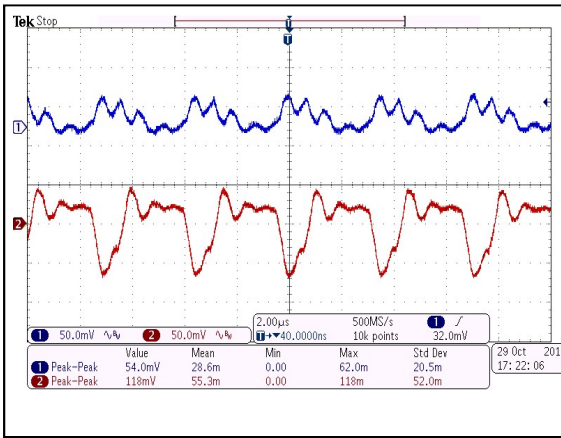


Figure 103: AXA01BB36-L Ripple and Noise Measurement
Vin = 48Vdc Load: Io = ± 1.04A
Ch 1: Vo

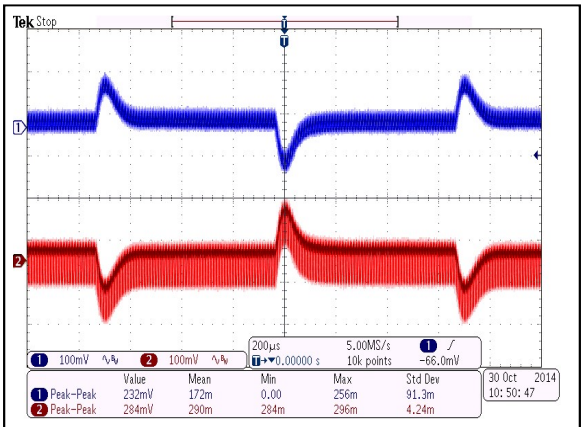


Figure 104: AXA01BB36-L Transient Response
Vin = 48Vdc Load: Io = 100% to 75% load change
Ch 1: Vo

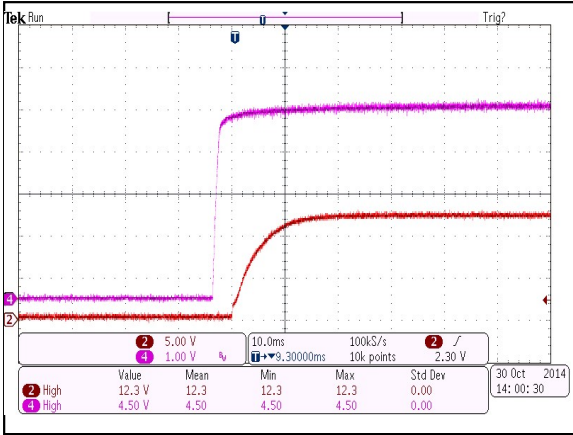


Figure 105: AXA01BB36-L Output Voltage Startup Characteristic by ON/OFF
Vin = 48Vdc Load: Io = ±1.04A
Ch1: Vo Ch2: Remote On/Off

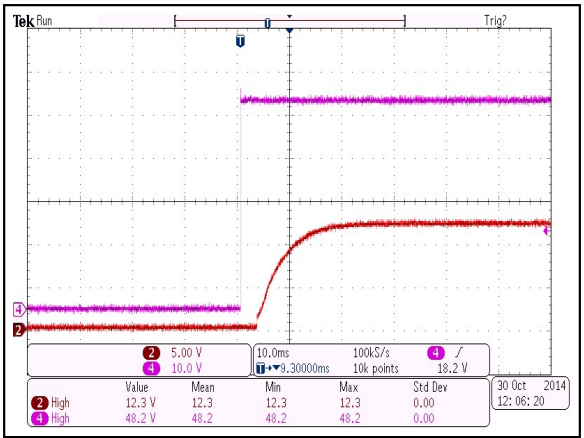


Figure 106: AXA01BB36-L Output Voltage Startup Characteristic by Vin
Vin = 48Vdc Load: Io = ±1.04A
Ch1: Vo Ch2: Vin

AXA01BB36-L Performance Curves

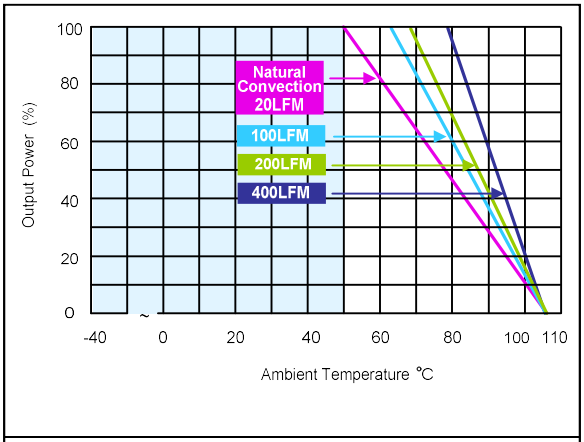


Figure 107: AXA01BB36-L Derating Curves (without heatsink)
Vin = 48Vdc Load: Io = 0 to ±1.04A

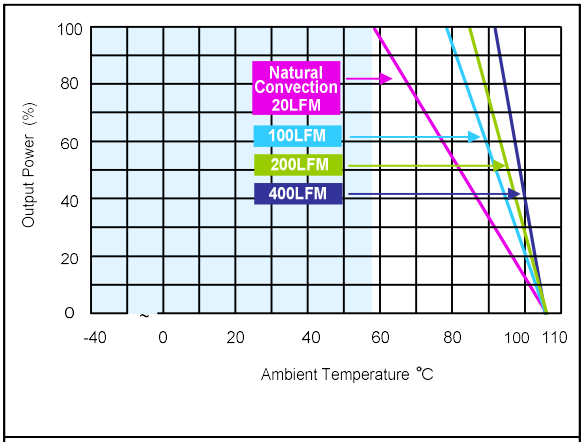


Figure 108: AXA01BB36-L Derating Curves (with heatsink)
Vin = 48Vdc Load: Io = 0 to±1.04A

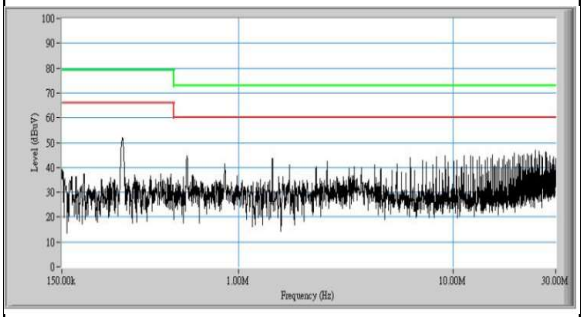


Figure 109: AXA01BB36-L Conduction Emission of EN550122 Class A
Vin = 48Vdc Load: Io =±1.04A need external filter

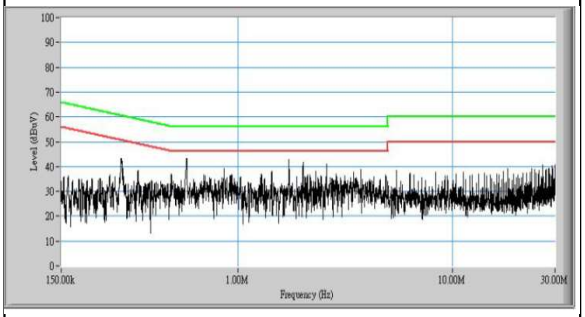


Figure 110: AXA01BB36-L Conduction Emission of EN550122 Class B
Vin = 48Vdc Load: Io = ±1.04A need external filter

Note - All test conditions are at 25 ^{O}C

AXA01CC36-L Performance Curves

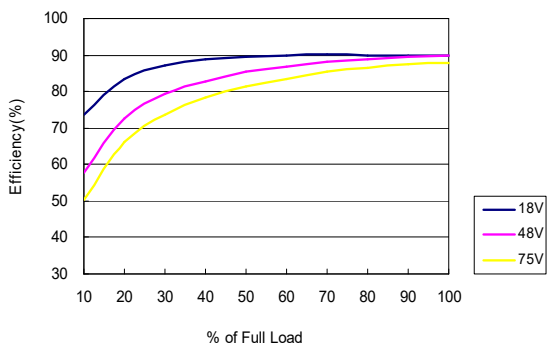


Figure 111: AXA01CC36-L Efficiency Versus Output Current Curve
Vin = 18 to 75Vdc Load: Io = 0 to ±0.84 A

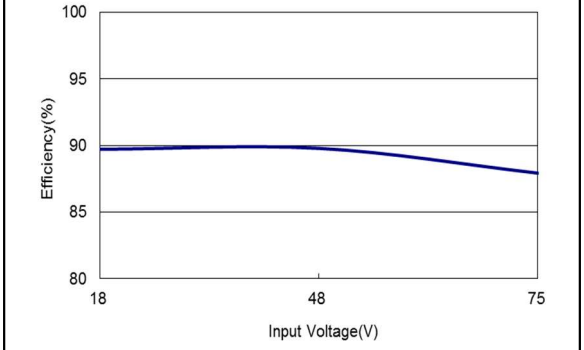


Figure 112: AXA01CC36-L Efficiency Versus Input Voltage Curve
Vin = 18 to 75Vdc Load: Io = ±0.84 A

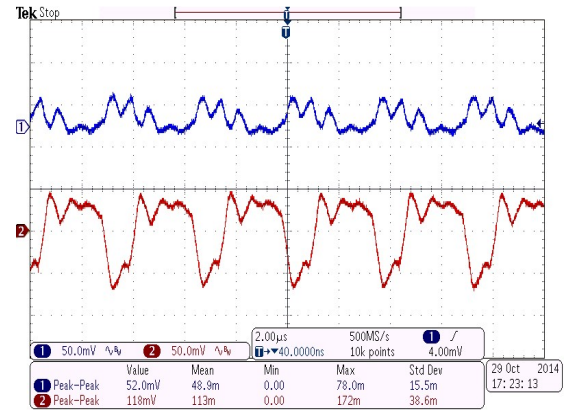


Figure 113: AXA01CC36-L Ripple and Noise Measurement
Vin = 48Vdc Load: Io = ±0.84 A
Ch 1: Vo1 Ch2: Vo2

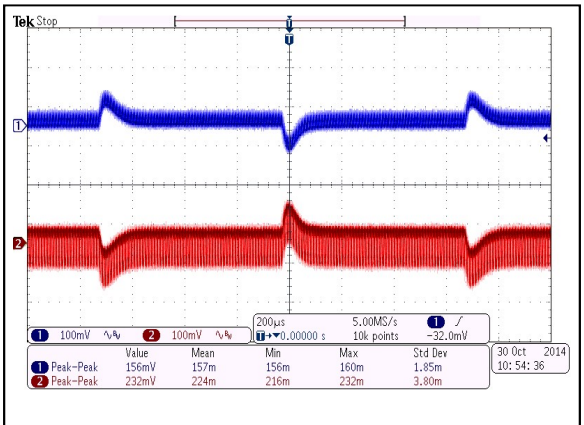


Figure 114: AXA01CC36-L Transient Response
Vin = 48Vdc Load: Io = 100% to 75% load change
Ch 1: Vo1 Ch2: Vo2

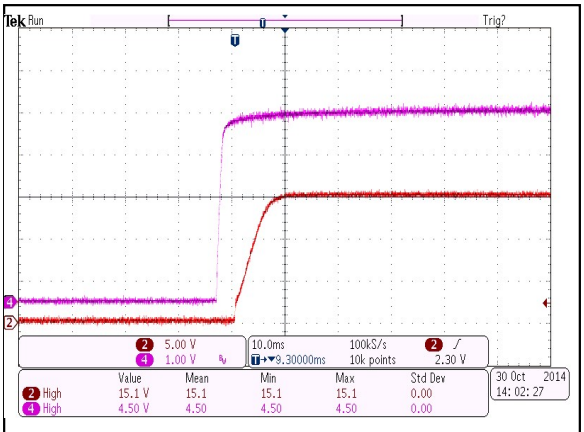


Figure 115: AXA01CC36-L Output Voltage Startup Characteristic by ON/OFF
Vin = 48Vdc Load: Io = ±0.84 A
Ch1: Vo Ch2: Remote On/Off

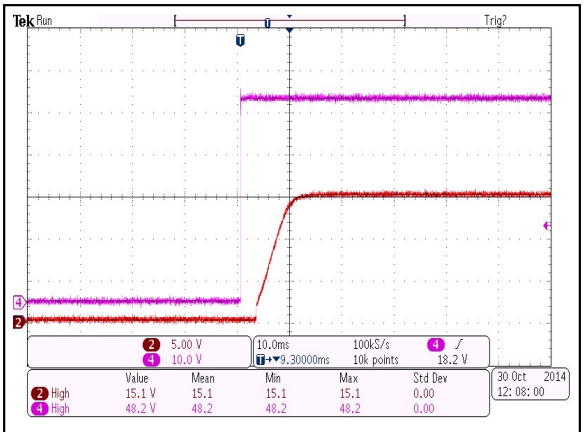


Figure 116: AXA01CC36-L Output Voltage Startup Characteristic by Vin
Vin = 48Vdc Load: Io = ±0.84 A
Ch1: Vo Ch2: Vin

AXA01CC36-L Performance Curves

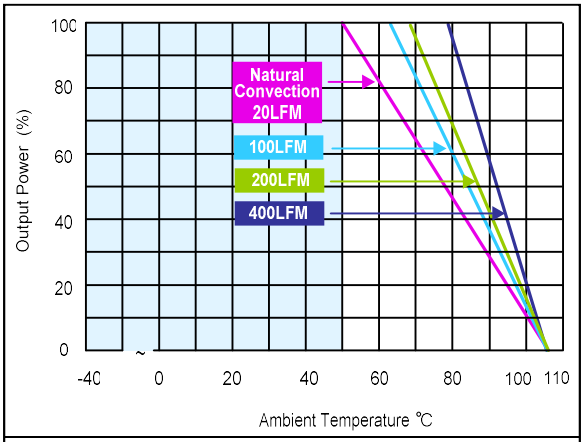


Figure 117: AXA01CC36-L Derating Curves (without heatsink)
Vin = 48Vdc Load: Io = 0 to ±0.84 A

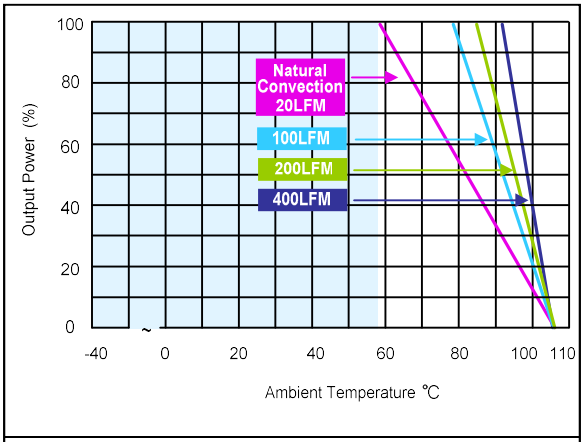


Figure 118: AXA01CC36-L Derating Curves (with heatsink)
Vin = 48Vdc Load: Io = 0 to ±0.84 A

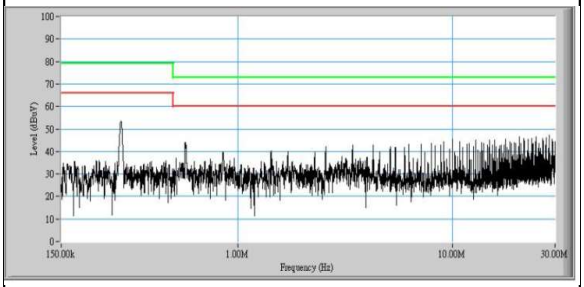


Figure 119: AXA01CC36-L Conduction Emission of EN550122 Class A
Vin = 48Vdc Load: Io = ±0.84 A need external filter

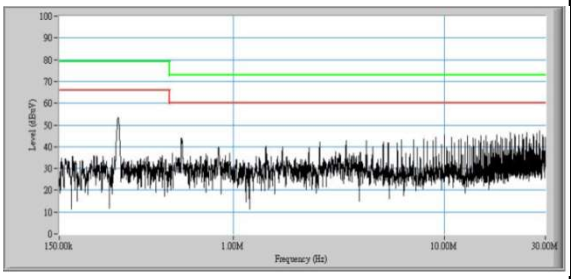
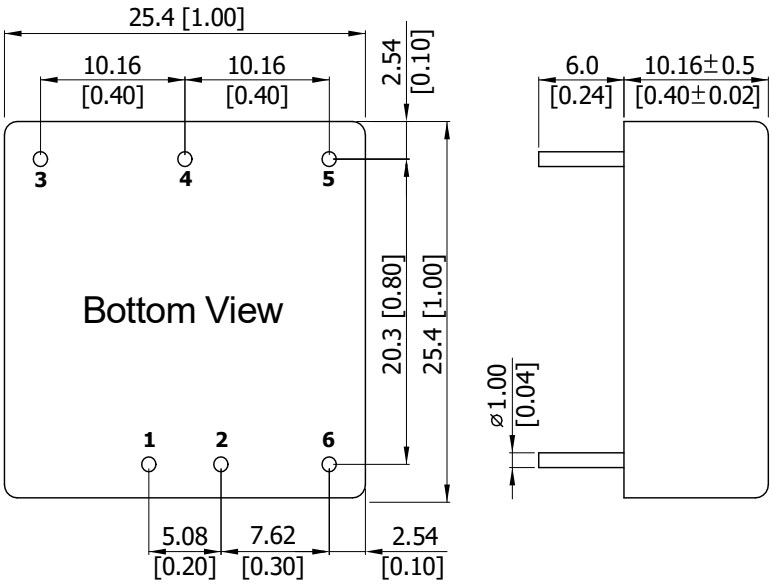


Figure 120: AXA01CC36-L Conduction Emission of EN550122 Class B
Vin = 48Vdc Load: Io = ±0.84 A need external filter

Note - All test conditions are at 25 °C

Mechanical Specifications

Mechanical Outlines



Note:
1.All dimensions in mm (inches)
2.Tolerance: X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.01)
3..Pin diameter 1.0 ±0.05 (0.04±0.002)

Pin Connections

Single output

Pin 1 – +Vin
Pin 2 – -Vin
Pin 3 – +Vout
Pin 4 – Trim
Pin 5 – -Vout
Pin 6 – Remote On/Off

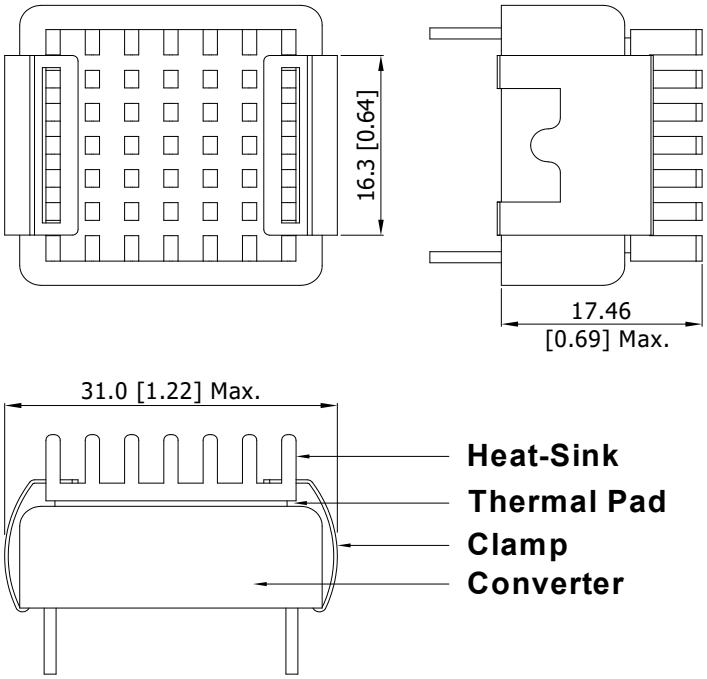
Dual Output

Pin 1 – +Vin
Pin 2 – -Vin
Pin 3 – +Vout
Pin 4 – Common
Pin 5 – -Vout
Pin 6 – Remote On/Off

Physical Characteristics

Case Size	25.4x25.4x10.16mm (1.0x1.0x0.4 inches)
Case Material	Aluminium Alloy, Black Anodized Coating
Base Material	FR4 PCB (flammability to UL 94V-0 rated)
Pin Material	Copper Alloy with Gold Plate Over Nickel Subplate
Weight	16.5g

Heatsink (Option –HS)



Heatsink Material: Aluminum

Finish: Anodic treatment (Black)

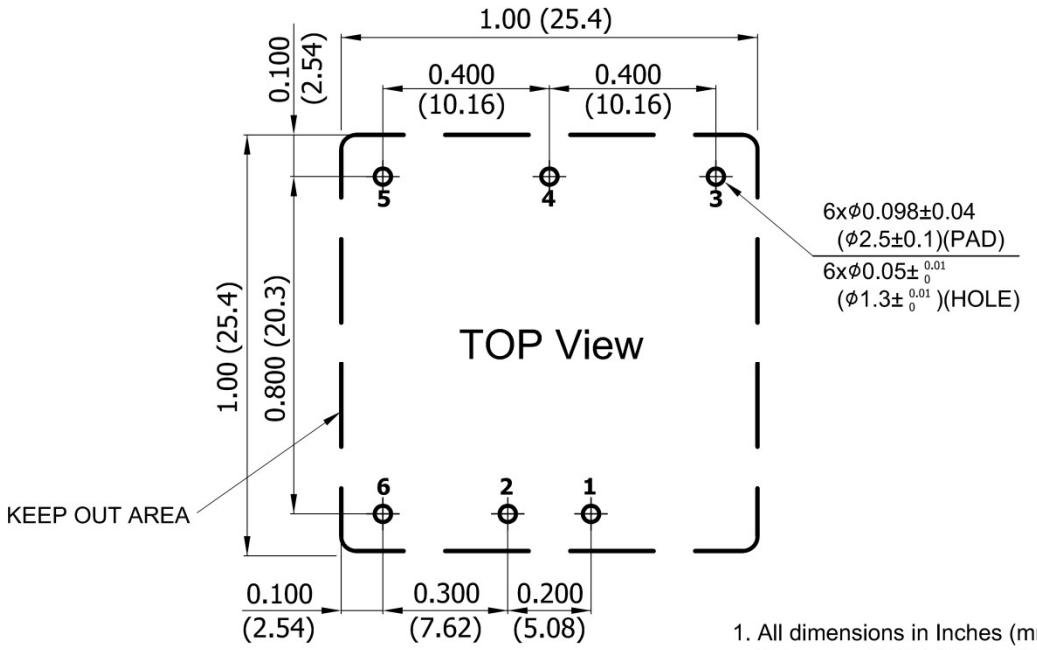
Weight: 2g

The advantages of adding a heatsink are:

1. To improve heat dissipation and increase the stability and reliability of the DC/DC converters at high operating temperatures.

2. To increase operating temperature of the DC/DC converter, please refer to derating curve.

Recommended Pad Layout for Single & Dual Output Converter



1. All dimensions in Inches (mm)
   Tolerance: X.XX±0.02" (X.X±0.5)
   X.XXX±0.01" (X.XX±0.25mm)
2. Pin pitch tolerance:±0.01" (±0.25mm)
3. Pin dimension tolerance:±0.004" (±0.1mm)

Environmental Specifications

EMC Immunity

AXA 25W series power supply is designed to meet the following EMC immunity specifications.

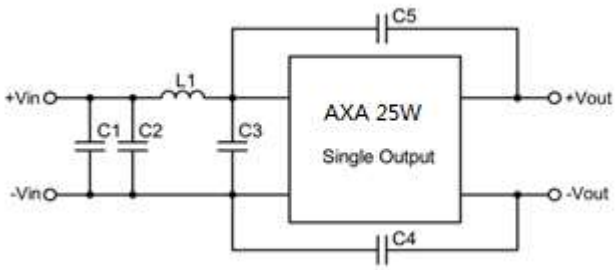
Table 4. EMC Specifications

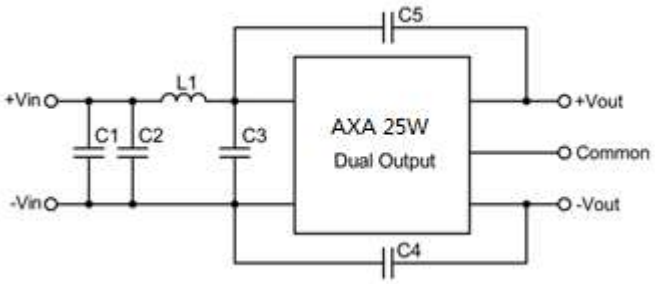
Parameter	Standards & Level	Performance
EMI	EN55022	Class A & Class B
ESD	EN61000-4-2 Air ± 8KV , Contact ± 6KV	A
Radiated Immunity	EN61000-4-3 10V/M	A
Fast transient	EN61000-4-4 ±2KV	A
Surge	EN61000-4-5 ±1KV	A
Conducted Immunity	EN61000-4-6 10Vrms	A

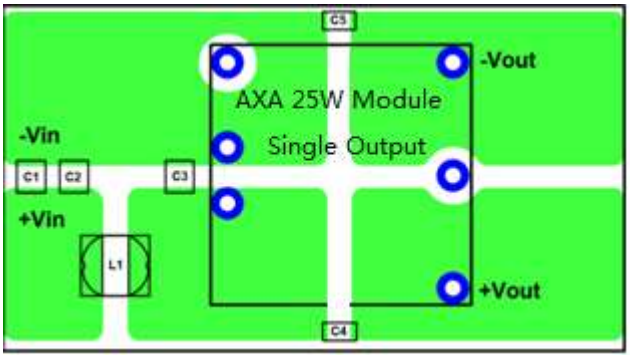
EMC Considerations

External filter meets EN 55022, class A, class B, FCC part 15, level A, level B

Conducted and radiated emissions EN55022 Class B







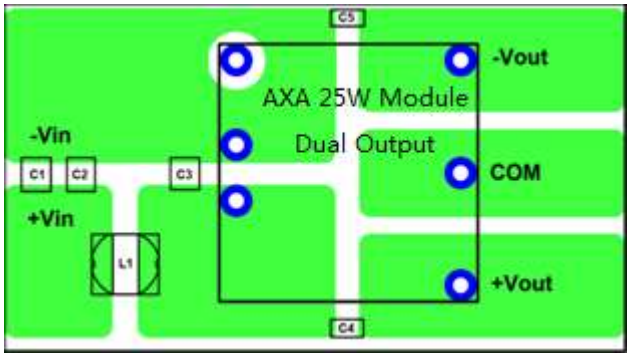


Table 5. Class A specifications

Model	Component	Value
AXAXXX18-L	C1	None
	C2	3.3μF/50V 1210 MLCC
	C3	None
	C4&C5	None
	L1	2.2uH
AXAXXX36-L	C1	None
	C2	3.3μF/100V 1210 MLCC
	C3	None
	C4&C5	None
	L1	4.7uH

Table 6. Class B specifications

Model	Component	Value
AXAXXX18-L	C1	3.3μF/50V 1210 MLCC
	C2	3.3μF/50V 1210 MLCC
	C3	3.3μF/50V 1210 MLCC
	C4&C5	1800 pF/2KV 1206 MLCC
	L1	2.2uH
AXAXXX36-L	C1	3.3μF/100V 1210 MLCC
	C2	3.3μF/100V 1210 MLCC
	C3	3.3μF/100V 1210 MLCC
	C4&C5	1800 pF/2KV 1206 MLCC
	L1	4.7uH

Safety Certifications

The AXA 25W power supply is intended for inclusion in other equipment and the installer must ensure that it is in compliance with all the requirements of the end application. This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.

Table 7. Safety Certifications for AXA 25W series power supply system

Document	Description
cUL/UL 60950-1 (CSA certificate)	US and Canada Requirements
IEC/EN 60950-1 (CB-scheme)	European Requirements

Operating Temperature

Table 8. Environmental Specifications:

Parameter	Model / Condition	Min	Max		Unit
			Without Heatsink	With Heatsink	
Operating Ambient Temperature Range Natural Convection[1] Nominal Vin, Load 100% ·Inom	AXA06F18-L AXA05A18-L AXA02B18-L AXA02C18-L AXA01BB18-L AXA01CC18-L AXA06F36-L AXA05A36-L AXA02B36-L AXA02C36-L AXA01BB36-L AXA01CC36-L	-40	57 56 56 56 56 53 50 50 50 50 50 50	65 64 64 64 64 61 59 59 59 59 59 59	°C
Thermal Impedance	Natural Convection without Heatsink	17.6	-	-	°C/W
	Natural Convection with Heatsink	14.8	-	-	
	100LFM Convection without Heatsink	13.6	-	-	
	100LFM Convection with Heatsink	8.5	-	-	
	200LFM Convection without Heatsink	11.8	-	-	
	200LFM Convection with Heatsink	6.5	-	-	
	400LFM Convection without Heatsink	8.8	-	-	
	400LFM Convection with Heatsink	4.3	-	-	
Case Temperature		-	+105		°C
Storage Temperature Range		-50	+125		°C
Humidity (non condensing)		-	95		%
Cooling	Natural Convection				
RFI	Six-Sided shielded, Metal Case				
Lead Temperature (1.5mm from case for 10Sec.)		-	260		°C

Note1 - The “natural convection” is about 20LFM but is not equal to still air (0 LFM).

MTBF and Reliability

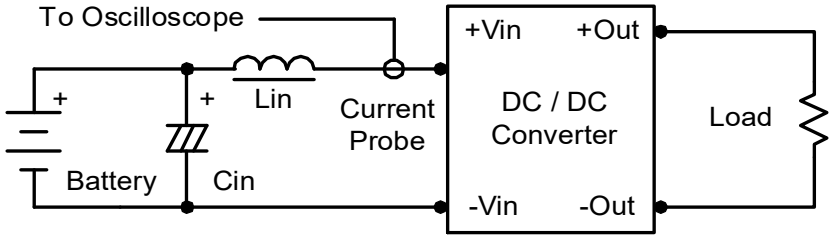
The MTBF of AXA 25W series of DC/DC converters has been calculated using MIL-HDBK 217F NOTICE2, Operating Temperature 25 ^{O}C, Ground Benign.

Model	MTBF	Unit
AXA06F18-L	552000	Hours
AXA05A18-L	454000	
AXA02B18-L	511000	
AXA02C18-L	611000	
AXA01BB18-L	507000	
AXA01CC18-L	444000	
AXA06F36-L	645000	
AXA05A36-L	548000	
AXA02B36-L	617000	
AXA02C36-L	613000	
AXA01BB36-L	518000	
AXA01CC36-L	453000	

Application Notes

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with a inductor Lin (4.7μH) and Cin (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance. Capacitor Cin, offsets possible battery impedance. Current ripple is measured at the input terminals of the module, measurement bandwidth is 0-500 KHz.

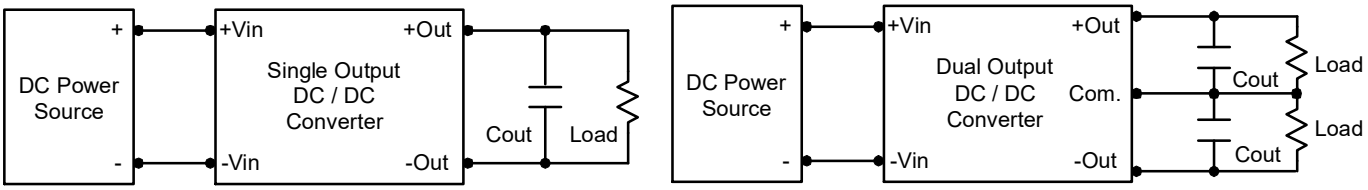


Component	Value	Reference
Lin	4.7μH	-
Cin	220uF (ESR<1.0Ω at 100KHz)	Aluminum Electrolytic Capacitor

.

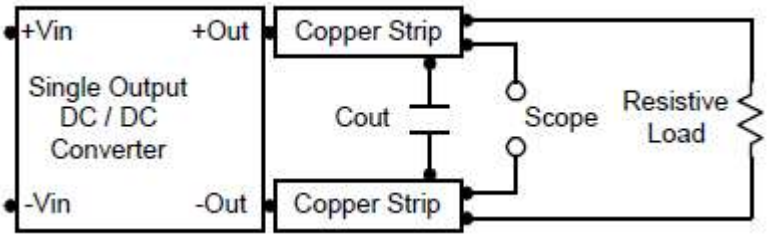
Output Ripple Reduction

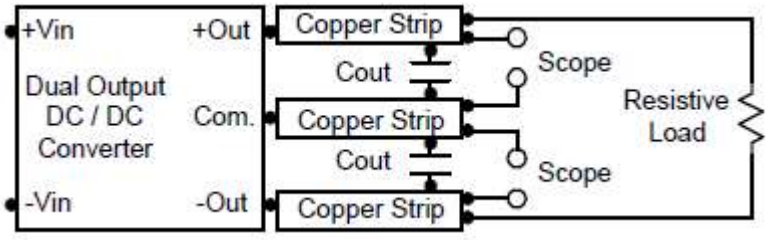
A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 4.7uF capacitors at the output.

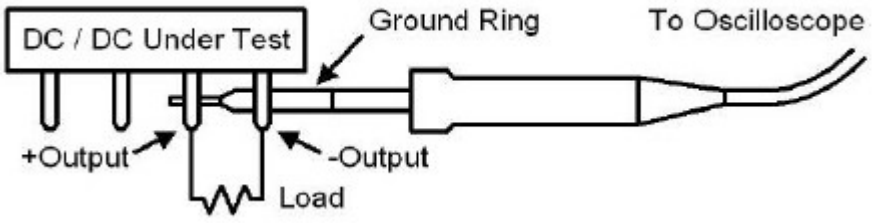


Peak-to-Peak Output Noise Measurement Test

Use a 1uF ceramic capacitor and a 10uF tantalum capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20MHz. Position the load between 50 mm and 75 mm from the DC/DC Converter

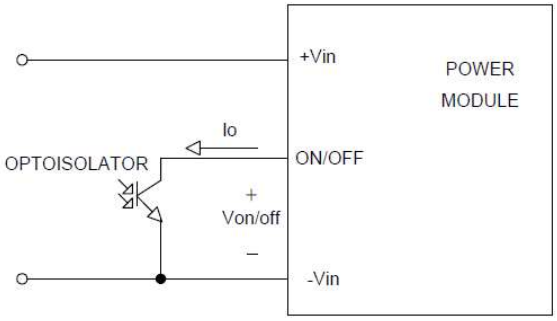




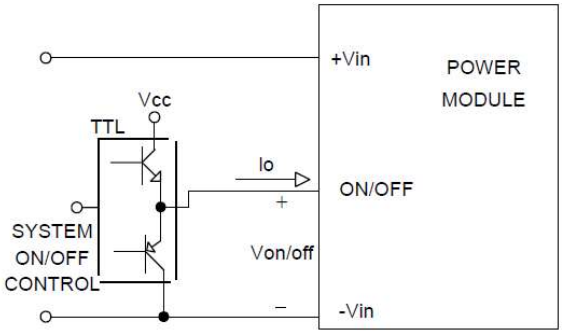


Remote ON/OFF

Positive logic remote on/off turns the module on during a logic high voltage on the remote on/off pin, and off during a logic low. To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. The switch can be an open collector or equivalent. A logic low is 0V to 1.2V. A logic high is 3.5V to 12V. The maximum sink current at the on/off terminal (Pin 6) during a logic low is -500µA. The maximum allowable leakage current of a switch connected to the on/off terminal (Pin 6) at logic high (3.5V to 12V) is 10mA



Isolated-Closure Remote ON/OFF



Level Control Using TTL Output

Over Current Protection

The AXA 25W series converters contain hiccup mode output over current protection that prevents damage to the product in the event of an overload or a short circuit

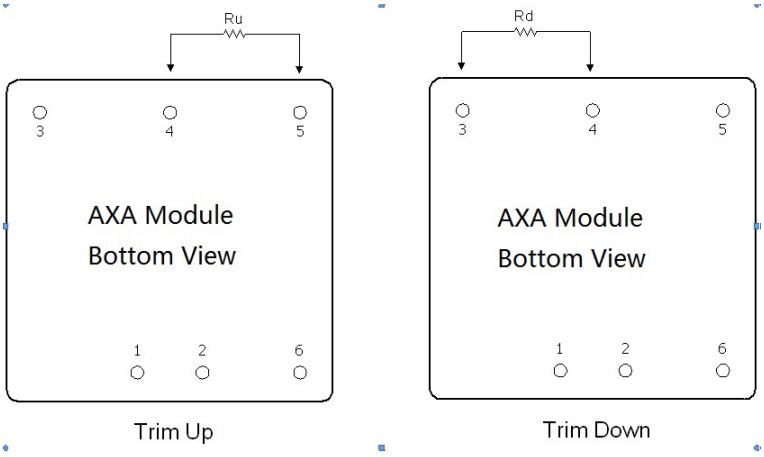
Over Voltage Protection

The output overvoltage clamp consists of control circuitry, which is independent of the primary regulation loop, that monitors the voltage on the output terminals.

The control loop of the clamp has a higher voltage set point than the primary loop. This provides a redundant voltage control that reduces the risk of output overvoltage. The OVP level can be found in the output data.

External Output Trimming

Output can be externally trimmed by using the method shown below. The trim up/down range is ±10% minimum of the nominal output voltage



AXA06FXX-L Trim Table

Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	Vox0.99	Vox0.98	Vox0.97	Vox0.96	Vox0.95	Vox0.94	Vox0.93	Vox0.92	Vox0.91	Vox0.90	Volts
Rd=	72.61	32.55	19.20	12.52	8.51	5.84	3.94	2.51	1.39	0.50	KOhms
Trim up	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**%**
Vout=	Vox1.01	Vox1.02	Vox1.03	Vox1.04	Vox1.05	Vox1.06	Vox1.07	Vox1.08	Vox1.09	Vox1.10	Volts
Ru=	60.84	27.40	16.25	10.68	7.34	5.11	3.51	2.32	1.39	0.65	KOhms

AXA05AXX-L Trim Table

Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	Vox0.99	Vox0.98	Vox0.97	Vox0.96	Vox0.95	Vox0.94	Vox0.93	Vox0.92	Vox0.91	Vox0.90	Volts
Rd=	138.88	62.41	36.92	24.18	16.53	11.44	7.79	5.06	2.94	1.24	KOhms
Trim up	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**%**
Vout=	Vox1.01	Vox1.02	Vox1.03	Vox1.04	Vox1.05	Vox1.06	Vox1.07	Vox1.08	Vox1.09	Vox1.10	Volts
Ru=	106.87	47.76	28.06	18.21	12.30	8.36	5.55	3.44	1.79	0.48	KOhms

AXA02BXX-L Trim Table

Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	Vox0.99	Vox0.98	Vox0.97	Vox0.96	Vox0.95	Vox0.94	Vox0.93	Vox0.92	Vox0.91	Vox0.90	Volts
Rd=	413.55	184.55	108.22	70.05	47.15	31.88	20.98	12.80	6.44	1.35	KOhms
Trim up	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**%**
Vout=	Vox1.01	Vox1.02	Vox1.03	Vox1.04	Vox1.05	Vox1.06	Vox1.07	Vox1.08	Vox1.09	Vox1.10	Volts
Ru=	351.00	157.50	93.00	60.75	41.40	28.50	19.29	12.37	7.00	2.70	KOhms

AXA02CXX-L Trim Table

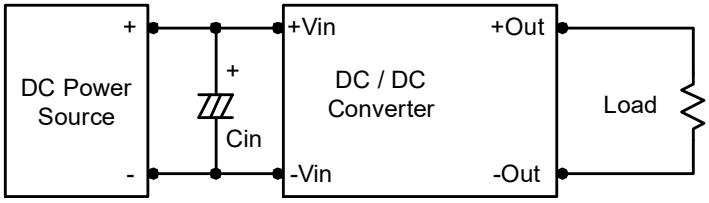
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	Vox0.99	Vox0.98	Vox0.97	Vox0.96	Vox0.95	Vox0.94	Vox0.93	Vox0.92	Vox0.91	Vox0.90	Volts
Rd=	530.73	238.61	141.24	92.56	63.35	48.37	29.96	19.53	11.41	4.92	KOhms
Trim up	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**%**
Vout=	Vox1.01	Vox1.02	Vox1.03	Vox1.04	Vox1.05	Vox1.06	Vox1.07	Vox1.08	Vox1.09	Vox1.10	Volts
Ru=	422.77	189.89	112.26	73.44	50.15	34.63	23.54	15.22	8.75	3.58	KOhms

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.

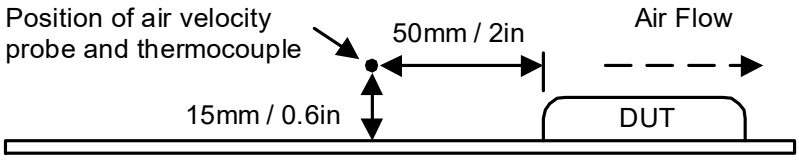
In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.

Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 KHz) capacitor of a 10μF for the 24V and 48V devices



Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 105^{O}C. The derating curves are determined from measurements obtained in a test setup.



Maximum Capacitive Load

The AXA 25W series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the data sheet.

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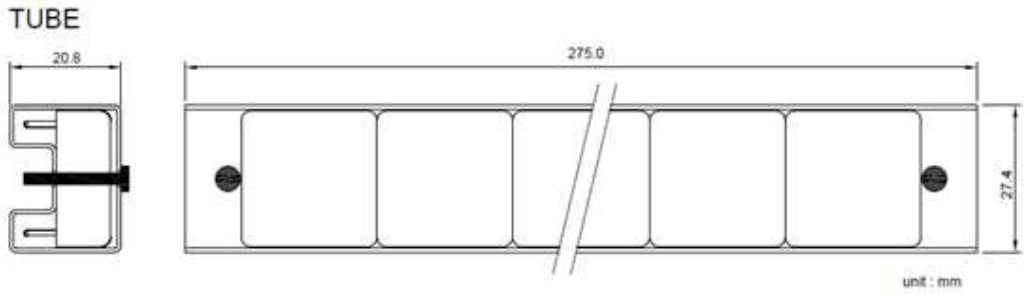
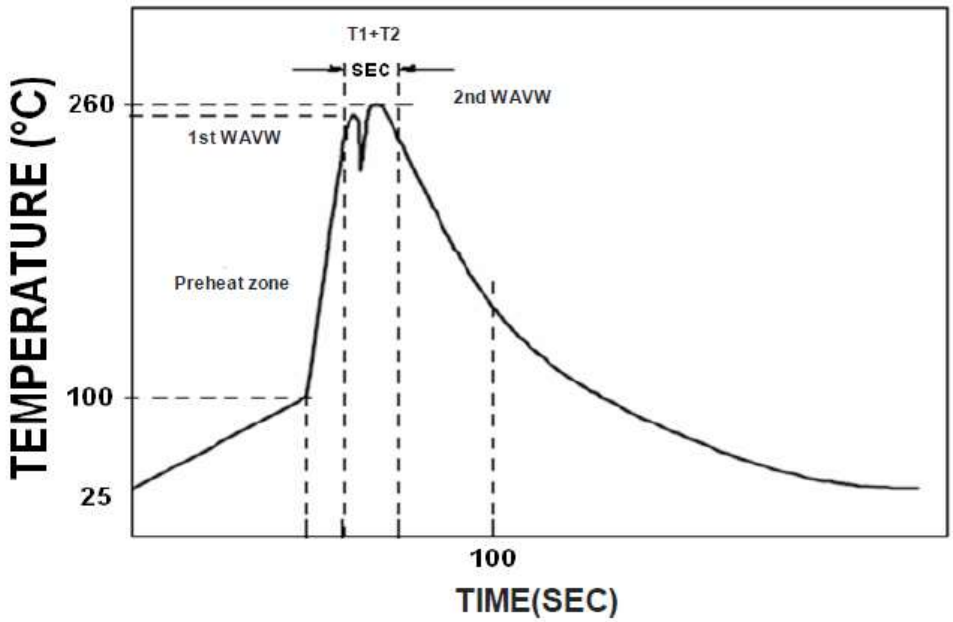
Packaging Information



10 PCS per TUBE

Soldering and Reflow Considerations

Lead free wave solder profile for AXA 25W Series



Zone	Reference Parameter
Preheat zone	Rise temp speed：3^{O}C/sec max.
	Preheat temp : 100~130^{O}C
Actual heating	Peak temp: 250~260^{O}C Peak Time
	Peak time(T1+T2)：4~6 sec

Reference Solder: Sn-Ag-Cu：Sn-Cu：Sn-Ag
Hand Welding: Soldering iron：Power 60W
Welding Time: 2~4 sec
Temp.: 380~400 ^{O}C

Weight

The AXA 25W series weight is 16.5g maximum.

Record of Revision and Changes

Issue	Date	Description	Originators
1.0	08.02.2016	First Issue	K. Wang
1.1	09.13.2016	Update the 80degC to 85degC at first page	K. Wang
1.2	11.12.2018	Update the typo error	K. Wang
1.3	08.24.2020	Update the operating ambient temperature to 80degC	K. Wang

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