



**THE DATASHEET OF
AM100QB-2424SH22-NZ**



AM100QB-NZ

FEATURES:



- Wide Input Range up to 160V
- Low no-load Power
- Efficiency up to 93%
- Up to 3000VDC I/O Isolation
- Remote ON/OFF Control
- Meet Railway Standard: EN50155
- Industry Standard: 1/4 Brick
- Operating temperature -40°C to +100°C
- Over Current, Over Voltage, Over Temperature & Continuous Short Circuit Protection

Models Single output



Model	Input Voltage (VDC)	Input Current No load/Full load (mA)	Output Voltage (VDC)	Output Current max (A)	Max Capacitive load (µF)	Efficiency (%)
AM100QB-2405SH22-NZ	24 (9-36)	160/4789	5	20	6000	89
AM100QB-2412SH22-NZ	24 (9-36)	160/4789	12	8.3	2000	90
AM100QB-2415SH22-NZ	24 (9-36)	160/4789	15	6.7	2000	90
AM100QB-2424SH22-NZ	24 (9-36)	160/4789	24	4.2	1000	90
AM100QB-2428SH22-NZ	24 (9-36)	160/4789	28	3.6	1000	90
AM100QB-2448SH22-NZ	24 (9-36)	160/4789	48	2.1	470	90
AM100QB-4805SH22-NZ	48 (18-75)	80/2341	5	20	6000	91
AM100QB-4812SH22-NZ	48 (18-75)	80/2341	12	8.3	2000	92
AM100QB-4815SH22-NZ	48 (18-75)	80/2341	15	6.7	2000	93
AM100QB-4824SH22-NZ	48 (18-75)	80/2341	24	4.2	1000	92
AM100QB-4848SH22-NZ	48 (18-75)	80/2341	48	2.1	470	92

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity < 75%, nominal input voltage and at rated output load unless otherwise specified.

Input Specifications

Parameters	Nominal	Typical	Maximum	Units
Voltage range	24V models	9-36	40	VDC
	48V models	18-75	80	VDC
Filter	π(Pi) Network			
Absolute Maximum Rating	24V models		50	VDC
	48V models		90	VDC
Peak Input Voltage time			1,000	ms
Input reflected ripple current*	Nominal input voltage	30		mA p-p
Under Voltage Lockout (On/Off)	24V models	7.5		VDC
	48V models, 5V/15V output	16.5		VDC
	48V models, others	15.5		VDC
Remote On / OFF Control	ON: 3.5 ~ 12Vdc or Open Circuit OFF: 0 ~ 1.2Vdc or Ctrl connected to -Vin, Idle current: 2-10mA			

* The input reflected ripple current should be measured with a 4.7µH inductor and a 220µF input capacitor (ESR < 1Ω at 100 KHz).

Isolation Specifications

Parameters	Conditions	Typical	Rated	Units
Tested I/O voltage	24V models, 60s, leakage ≤ 1mA		2250	VDC
	48V models, 60s, leakage ≤ 5mA		2250	VDC
Input to Case	24V models, 60s, leakage ≤ 1mA		1600	VDC
	48V models, 60s, leakage ≤ 5mA		1500	VDC
Output to Case	24V models, 60s, leakage ≤ 1mA		500	VDC
	48V models, 60s, leakage ≤ 5mA		500	VDC
Resistance	24V models, 500VDC	>100		MOhm
	48V models, 500VDC	>1000		MOhm
Capacitance	100KHz/0.1V	2200		pF

Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy		±1	±3	%
Over voltage protection		110~160		% of Vout
Over load protection	24Vin models	110~150		% of Iout
	48Vin models	110~190		% of Iout
Short Circuit protection	Hiccup, Continuous, Auto-recovery			
Thermal shutdown	24Vin models, On Case	115	120	°C
	48Vin models, On Case	105	115	°C
Line voltage regulation	LL-HL	±0.2	±0.5	
Load voltage regulation	5% to 100% Full Load	±0.5	±0.75	%
Temperature coefficient			±0.03	%/°C
Ripple & Noise	20MHz Bandwidth, 12V/15V Vout	100	200	mV p-p
	20MHz Bandwidth, others	130	250	mV p-p
Transient Response Deviation	25% load step change, 5V Vout	±3	±7.5	% of Max
	25% load step change, Others	±3	±5	% of Max
Transient Recovery	25% load step change	200	500	µsec
Voltage adjustment range*	24Vin, 5V/15V Vout models	-9/+10		%
	24Vin, other models	±10		%
	48Vin models	-5/+10		%
Sense*	24Vin models	+10		%
	48Vin models	+5		%

* For 48Vin, 5/15Vout models, input voltage must be higher than 20VDC when trim adjustment or sense compensation is at their maximum spec range.

General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	100% load	250		KHz
Operating temperature	With derating	-40 to +85		°C
Storage temperature		-55 to +125		°C
Cooling	Free Air Convection or Forced Convection 200-1000 LFM airflow			
Humidity			95	% RH
Case material	Aluminum alloy or non-conductive Black Plastic (UL94V-0 rated)			
Weight	24V models	86		g
	48V models	89		g
	24V models, with -K option	117		g
	48V models, with -K option	120		g
	24V models, with -M option	106		g
	48V models, with -M option	109		g
Dimensions (L x W x H)	24V/48V models	2.43 x 1.65 x 0.50 inches (61.8 x 40.2 x 12.7 mm)		
	24V/48V models, with -K option	2.43 x 1.65 x 1.09 inches (61.8 x 40.2 x 27.7 mm)		
	24V/48V models, with -M option	2.44 x 2.20 x 0.57 inches (62.0 x 56.0 x 14.6 mm)		
MTBF	>500,000 hrs (MIL-HDBK-217 F at +25 °C)			
Maximum soldering temperature	Manual 1.5mm from case for 10 sec		300	°C
	Wave soldering		260	°C

Environment Approval

Parameters	Conditions
Shock and Vibrations	IEC/EN61373 category 1 class B on all models

Safety Specifications

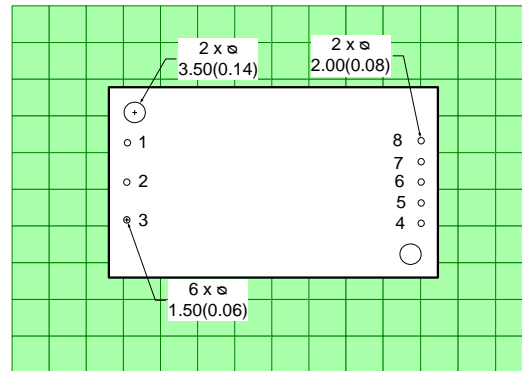
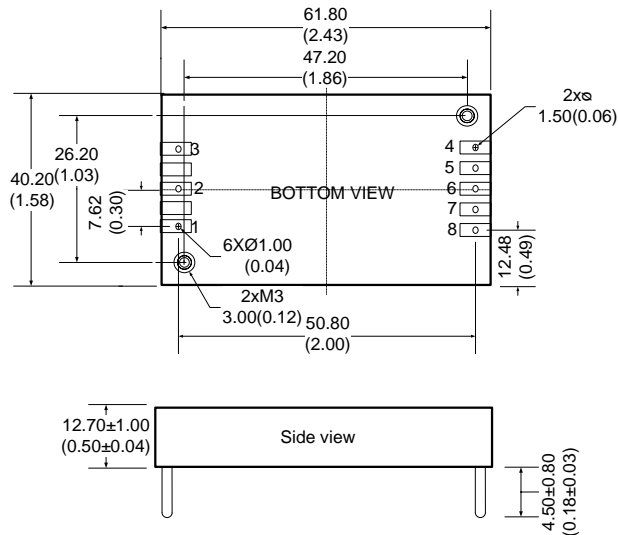
Parameters			
Standards	EMI - Conducted and radiated emission	24V	CISPR32/EN55032, class A and class B with the recommended EMC circuit 2 Meet EN50121-3-2, CE&RE with the recommended EMC circuit 2 Meet EN55016-2-1
		48V	CISPR32/EN55032, class A and class B with the recommended EMC circuit 3 Meet EN50121-3-2, CE & RE with the recommended EMC circuit 3

Electrostatic Discharge Immunity	24V/48V	IEC 61000-4-2, Contact ± 6 KV Air ± 8 KV, Criteria B Meet EN50121-3-2, Contact ± 6 KV Air ± 8 KV
RF, Electromagnetic Field Immunity	24V/48V	IEC 61000-4-3, 20V/m, Criteria A Meet EN50121-3-2, 20V/m
Electrical Fast Transient/Burst Immunity	24V/48V	IEC 61000-4-4, ± 2 kV with the recommended EMC circuit 1 or 3, Criteria B Meet EN50121-3-2, ± 2 kV
Surge Immunity	24V	Meet EN50121-3-2, L to L ± 1 KV (42 Ω 0.5 μ F) with the recommended EMC circuit 1
	48V	Meet EN50121-3-2, L to L ± 1 KV (42 Ω 1.2/50 μ s) with the recommended EMC circuit 3
RF, Conducted Disturbance Immunity	24V/48V	IEC 61000-4-6, 10Vrms, Criteria A Meet EN50121-3-2, 10Vrms

Pin Out Specifications

Pin	Single
1	+V Input
2	On/Off Control
3	-V Input
4	Vo -
5	Sense -
6	Trim
7	Sense +
8	Vo +

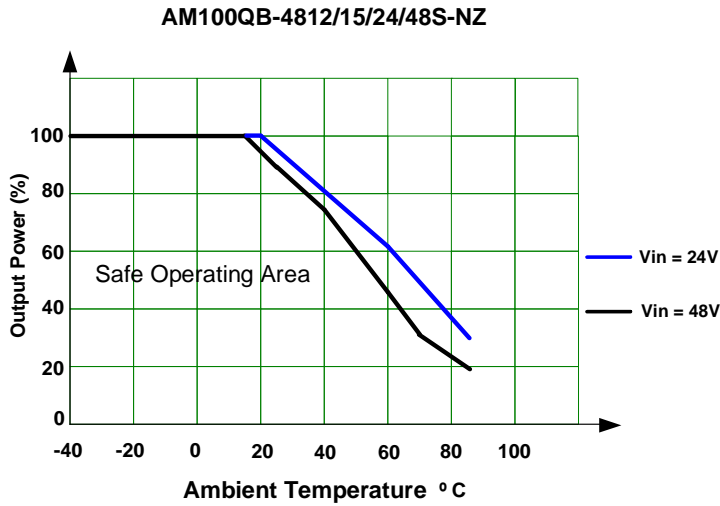
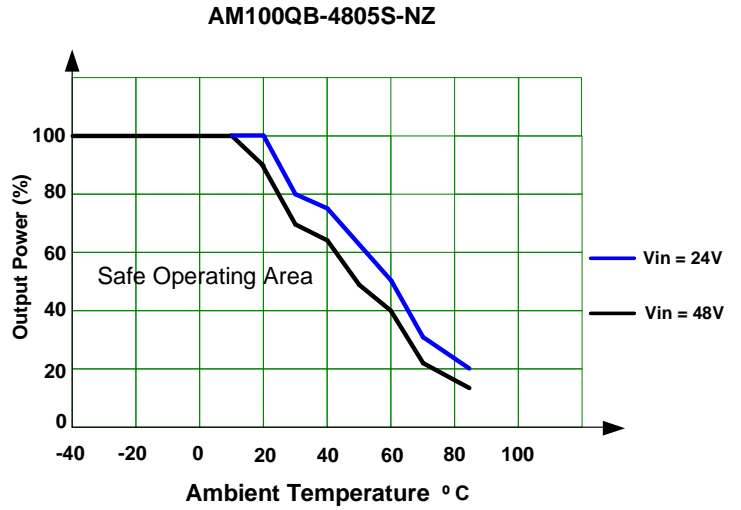
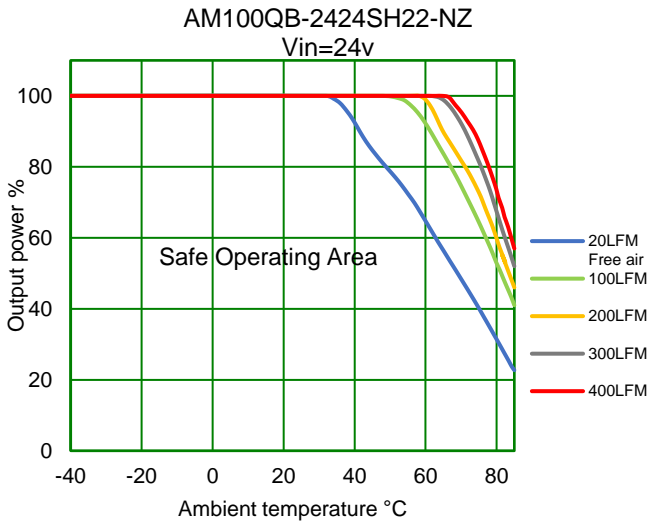
Dimensions



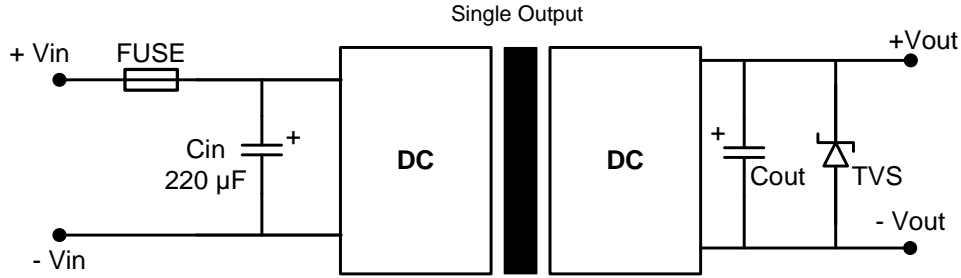
DIV: 2.54 x 2.54

Dimensions: mm (inch)
 Case Tolerance: ± 0.50 (0.02)
 Pin Tolerance: ± 1.50 (0.06)
 Pin diameter Tolerance: ± 0.10 (0.004)
 Pin 1, 2, 3, 5, 6 & 7 diameter: 1.00 (0.04)
 Pin 4 & 8 diameter: 1.50 (0.06)
 Mounting hole screw torque: max 0.4 N m

Derating



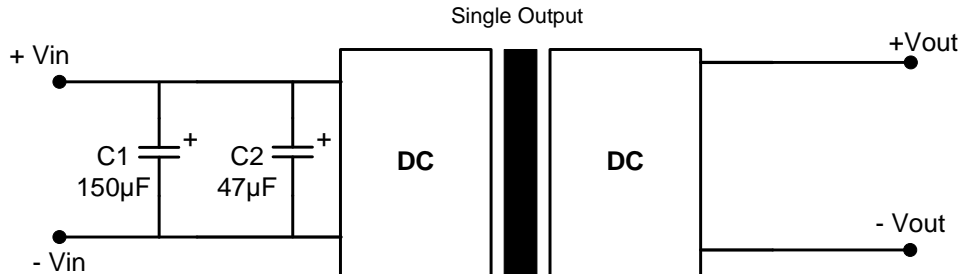
Typical Application Circuits
24V & 48V Models



Output	5V	12V	15V	24V	28V	48V
Cout	470 μF	220 μF	220 μF	100 μF	100 μF	100 μF
TVS	7V	15V	18V	30V	36V	64V
FUSE	Slow-blow, 20A for 24V models, 10A for 48V models					

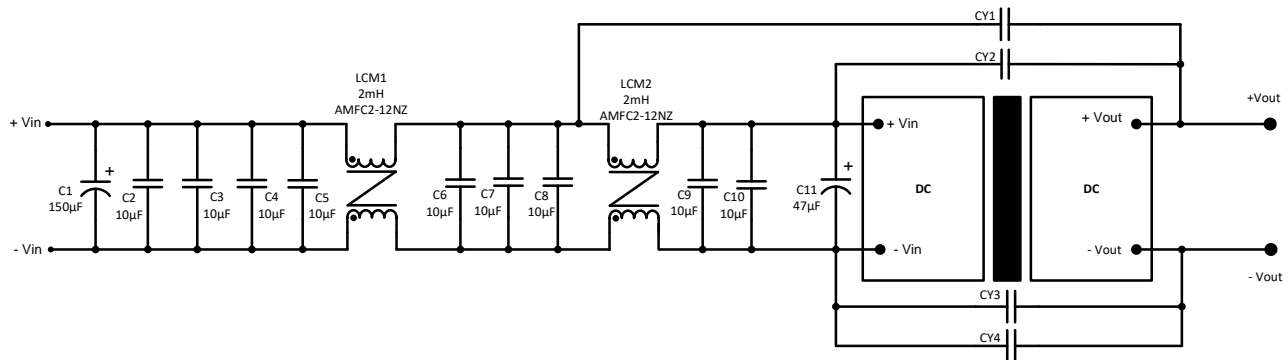
- Note:
1. Cin is recommended use electrolytic type capacitor with $\geq 220\mu\text{F}$ capacitance to suppress input surge.
 2. Under low temperature application environment, the capacitance of the external electrolytic capacitors should be increased to 1.5 times of the recommended value.
 3. When not using the sense function, connect the +sense to +Vout and -sense to -Vout with the shortest possible traces to avoid interference and minimize the voltage drop.
 4. When using the sense function, connect the sense pins to the load with the shortest possible traces, twisted pair wire or shielded wire and make sure the voltage drop is less than 0.3V.

Recommended EMC Circuit 1
24V Models



1. C1 and C2 are recommended use electrolytic type capacitors to suppress input surge.

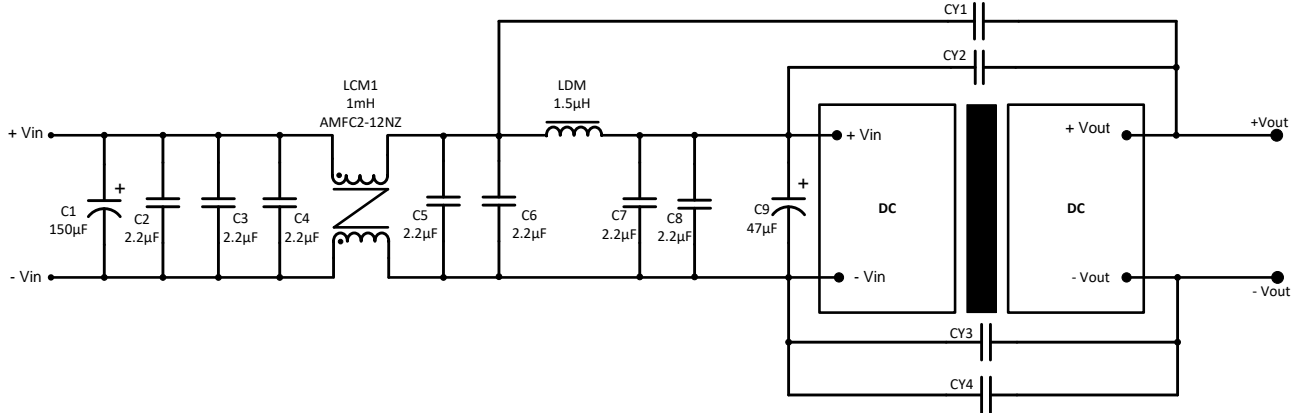
Recommended EMC Circuit 2
24V Models



EMI	CY1	CY2	CY3	CY4
Class A	-	-	1nF	-
Class B	2.2nF	2.2nF	1nF	1nF

1. C1 and C11 are recommended use electrolytic type capacitors.

Recommended EMC Circuit 3
48V Models



	EMI	CY1	CY2	CY3	CY4
Class A		1nF	1nF	1nF	-
Class B		1nF	1nF	1nF	1nF

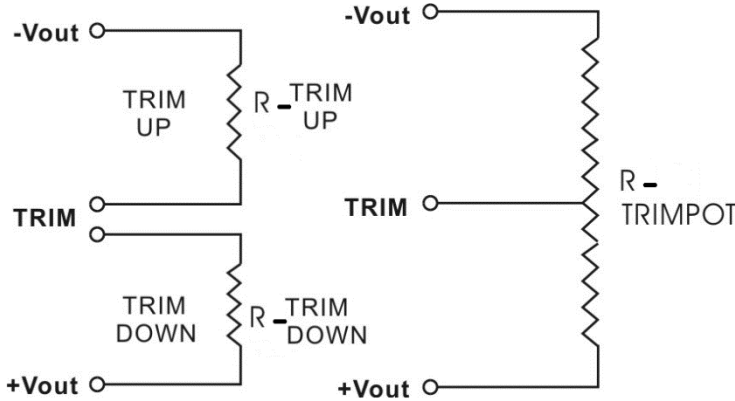
1. C1 and C9 are recommended use electrolytic type capacitors to suppress input surge.

Trimming

Output voltage can be externally trimmed by utilizing the methods as shown below

Fixed Resistor

Variable Potentiometer



Leave open if not used.

AM100QB-xx05SH22-NZ, xx can be 24 or 48, 24V model can only be trimmed down to -9%, 48V model can only be trimmed down to -5%

Trim down %	1	2	3	4	5	6	7	8	9	-
Vout (VDC)	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	-
Rt down (KΩ)	82.978	46.049	29.637	20.360	14.396	10.240	7.177	4.827	2.966	-
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5
Rt up (KΩ)	369.500	98.429	53.250	34.647	24.500	18.111	13.719	10.514	8.071	6.149

AM100QB-xx12SH22-NZ, xx can be 24 or 48, 48V model can only be trimmed down to -5%

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8
Rt down (KΩ)	496.092	301.452	212.527	161.585	128.573	105.442	88.332	75.164	64.716	56.223
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	12.12	12.24	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.2
Rt up (KΩ)	706.435	158.920	83.879	54.075	38.077	28.095	21.274	16.317	12.552	9.595

AM100QB-xx15SH22-NZ, xx can be 24 or 48, 24V model can only be trimmed down to -9%, 48V model can only be trimmed down to -5%

Trim down %	1	2	3	4	5	6	7	8	9	-
Vout (VDC)	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	-
Rt down (KΩ)	965.116	508.787	339.586	251.370	197.224	160.605	134.188	114.231	98.623	-
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5
Rt up (KΩ)	269.667	113.379	67.878	46.190	33.499	25.168	19.279	14.896	11.507	8.808

AM100QB-xx24SH22-NZ, xx can be 24 or 48, 48V model can only be trimmed down to -5%

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Rt down (KΩ)	1289.000	794.923	568.667	438.904	354.754	295.763	252.115	218.514	191.847	170.170
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	24.24	24.48	24.72	24.96	25.2	25.44	25.68	25.92	26.16	26.4
Rt up (KΩ)	819.689	182.714	97.138	63.264	45.107	33.788	26.057	20.440	16.176	12.827

AM100QB-2428SH22-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	27.72	27.44	27.16	26.88	26.6	26.32	26.04	25.76	25.48	25.2
Rt down (KΩ)	1893.257	1078.622	746.260	565.720	452.316	374.471	317.728	274.529	240.544	213.107
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	28.28	28.56	28.84	29.12	29.4	29.68	29.96	30.24	30.52	30.8
Rt up (KΩ)	404.380	145.773	84.449	56.989	41.413	31.378	24.374	19.208	15.240	12.097

AM100QB-2448SH22-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	47.52	47.04	46.56	46.08	45.6	45.12	44.64	44.16	43.68	43.2
Rt down (KΩ)	3048.697	1860.498	1328.208	1026.195	831.601	695.770	595.575	518.620	457.658	408.174
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	48.48	48.96	49.44	49.92	50.4	50.88	51.36	51.84	52.32	52.8
Rt up (KΩ)	717.550	185.538	101.170	66.769	48.087	36.354	28.301	22.432	17.963	14.448

AM100QB-4848SH22-NZ can only be trimmed down to -5%

Trim down %	1	2	3	4	5	-	-	-	-	-
Vout (VDC)	47.52	47.04	46.56	46.08	45.6	-	-	-	-	-
Rt down (KΩ)	4953.999	2443.889	1606.786	1188.160	936.961	-	-	-	-	-
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	48.48	48.96	49.44	49.92	50.4	50.88	51.36	51.84	52.32	52.8
Rt up (KΩ)	261.328	123.114	77.065	54.045	40.234	31.027	24.451	19.519	15.684	12.615

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