



**THE DATASHEET OF  
AM50E-2415S-NZ**





**FEATURES:**

- Wide Input range 2:1
- High Efficiency up to 93%
- Remote On/Off Control
- Trim Adjustment
- Input to Output Isolation of 1500VDC
- Input Over Voltage and Under Voltage Lockout
- Output OVP, OCP & SCP
- Operating Temperature -40 to +85°C

**Models**  
**Single output**



Model	Input Voltage (VDC)	Output Voltage (VDC)	Output Current max (A)	Full load/No load Input Current (mA)	Max Capacitive Load(uF)	Efficiency (%)
AM50E-2403S-NZ	18-36	3.3	10	1545/55	27000	91
AM50E-2405S-NZ	18-36	5	10	2341/105	18900	91
AM50E-2412S-NZ	18-36	12	4.167	2290/105	3700	93
AM50E-2415S-NZ	18-36	15	3.333	2290/105	2000	93
AM50E-2424S-NZ	18-36	24	2.083	2341/65	1000	91
AM50E-4805S-NZ	36-75	5	10	1171/55	18900	91
AM50E-4812S-NZ	36-75	12	4.167	1145/55	3700	93
AM50E-4815S-NZ	36-75	15	3.333	1145/70	2000	93
AM50E-4824S-NZ	36-75	24	2.083	1158/50	1000	92

*\*Add suffix “-ST” for optional screw terminal bottom plate or “-STD” for optional DIN Rail screw terminal bottom plate.*

*\*\*Add suffix “-K” for optional heatsink, “-K-ST” for optional heatsink and screw terminal bottom plate or “-K-STD” for optional heatsink and DIN Rail screw terminal bottom plate.*

The AM50E-NZ series will be discontinued (EOL) by December 30, 2020; for new designs, please refer to AM50E-Z series.

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	24	18-36		VDC
	48	36-75		
Filter	π(Pi) Network			
Start up time		10		ms
Absolute Maximum Rating	24		-0.7 ~ 50	VDC
	48		-0.7 ~ 100	
Peak Input Voltage time			1	s
On/Off control*	ON – open or TTL high (3 - 12VDC) ; OFF – connected to GND or TTL low (0 - 1.2VDC)			
Over Voltage Lockout	24		41	VDC
	48		83	
Under Voltage Lockout	24		15	VDC
	48		31	
Input reflected current	24	40		mA
	48	30		

\*The voltage on the On/Off Control pin is relative to input Ground.

**Isolation Specifications**

Parameters	Conditions	Typical	Rated	Units
Tested I/O voltage	1 min, ≤1mA	1500	1500	VDC
Resistance	Isolation 500VDC	>1000		MOhm
Capacitance	100kHz, 0.1V	2000		pF

## Output Specifications

Parameters	Conditions	Typical	Maximum	Units	
Voltage accuracy		±1	±3	%	
Over voltage protection*	3.3V output		3.9	VDC	
	5V output		6.2		
	12V output		15		
	15V output		18		
	24V output		30		
Over current protection		135		%	
Short Circuit protection	Hiccup, continuous				
Short circuit restart	Auto-restart				
Line voltage regulation	LL-HL	±0.2	±0.5	% of Vin	
Load voltage regulation	10-100% load	±0.5	±1	%	
Temperature coefficient			±0.03	%/°C	
Ripple & Noise	20MHz Bandwidth	3.3V/5V Vout	100	250	mV p-p
		AM50E-4824S-NZ	200	350	
		Others	200	300	
Voltage adjustment range		±10		%	
Transient recovery time	25% load step	24V Vout	500	<b>1000</b>	µS
		Others	200	<b>500</b>	
Transient recovery deviation	25% load step	±3	±5	%	

\*Restart needed to function properly

## General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	100% load	300		KHz
Operating temperature	See derating curve	-40 to +85		°C
Storage temperature		-55 to +125		°C
Maximum case temperature			105	°C
Cooling	Free Air Convection			
Humidity			95	% RH
Case material	Aluminum alloy			
Weight	Pin mountable		35	g
	With optional -ST mounting plate		57	
	With optional -STD mounting plate		77	
	With optional -K Pin mountable		43	
	With optional -ST-K mounting plate		65	
	With optional -STD-K mounting plate		85	
Dimensions (L x W x H)	Pin mountable	2.00 x 1.00 x 0.46inches	50.80 x 25.40 x 11.80mm	
	With optional -ST mounting plate	2.99 x 1.24 x 0.84inches	76.00 x 31.50 x 21.20mm	
	With optional -STD mounting plate	2.99 x 1.24 x 1.02inches	76.00 x 31.50 x 25.80mm	
	With optional -K Pin mountable	2.02 x 1.03 x 0.65inches	51.40 x 26.20 x 16.50mm	
	With optional -ST-K mounting plate	2.99 x 1.24 x 1.00inches	76.00 x 31.50 x 25.30mm	
	With optional -STD-K mounting plate	2.99 x 1.24 x 1.18inches	76.00 x 31.50 x 29.90mm	
MTBF	>1 000 000 hrs (MIL-HDBK-217 F at +25 °C)			
Maximum soldering temperature	10sec, 1.5mm from case		300	°C

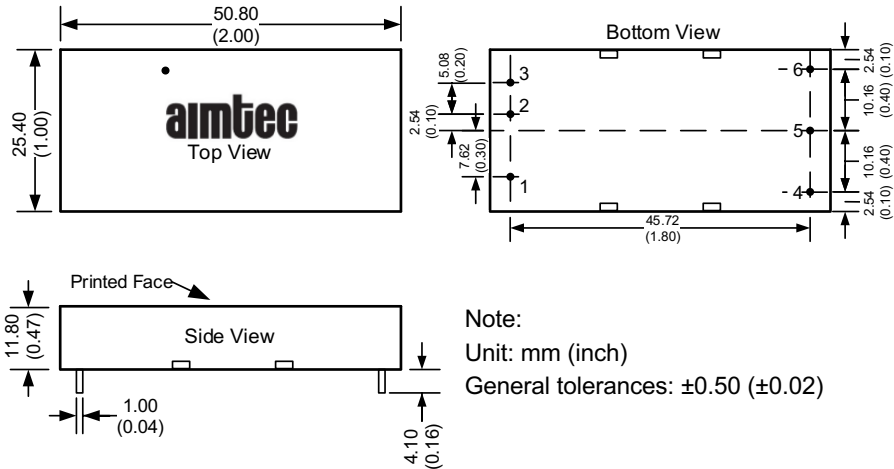
## Environmental Specifications

Parameters		
Vibration	Test mode	10-55Hz
	Acceleration	10G, 30min one cycle, every axis tested
	Converter operation	Before and after test, body mounted (on chassis)

## Safety Specifications

Parameters		
Approval	UL (AM50E-4812S-NZ only)	UL60950-1
Standards	Information Technology Equipment	CISPR32/EN55032 Class B, with the EMC recommended circuit
	Electrostatic Discharge Immunity	IEC 61000-4-2, Contact $\pm 4$ KV, Criteria B
	RF, Electromagnetic Field Immunity	IEC 61000-4-3, 10V/m, Criteria A
	Electrical Fast Transient / Burst Immunity	IEC 61000-4-4, $\pm 2$ KV, Criteria B, with the EMC recommended circuit
	Surge Immunity	IEC 61000-4-5, L-L $\pm 2$ KV, Criteria B, with the EMC recommended circuit
	RF, Conducted Disturbance Immunity	IEC 61000-4-6, 3 Vrms, Criteria A

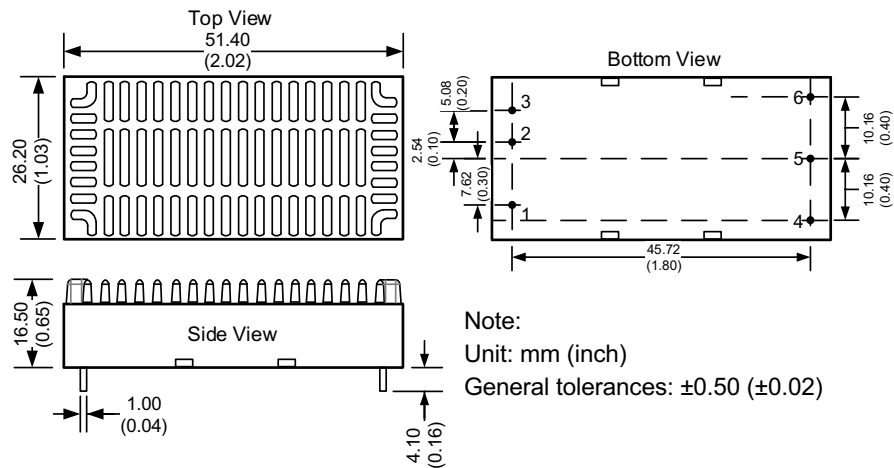
## Dimensions



## Pin Out Specifications

Pin	Single
1	On/Off Control
2	-Vin
3	+Vin
4	Trim
5	-Vout
6	+Vout

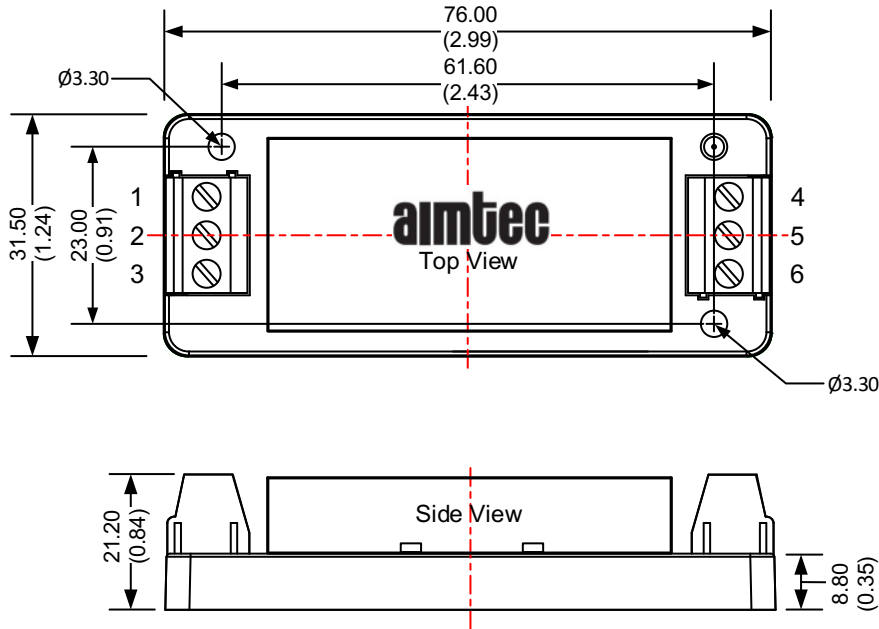
## Heatsink Option: AM50E-NZ-K



**Screw Terminal Option: AM50E-NZ-ST**

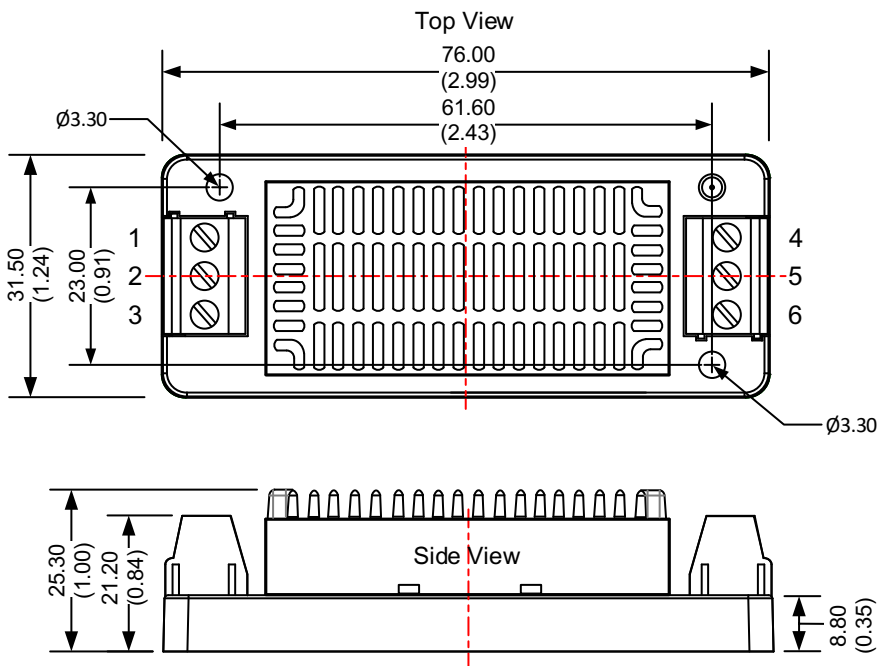
**Pin Out Specifications**

Pin	Single
1	On/Off Control
2	-Vin
3	+Vin
4	Trim
5	-Vout
6	+Vout



Note:  
Unit: mm (inch)  
Wire range: 24-12 AWG  
Tightening torque: Max 0.4 N\*m  
General tolerances:  $\pm 0.50$  ( $\pm 0.02$ )

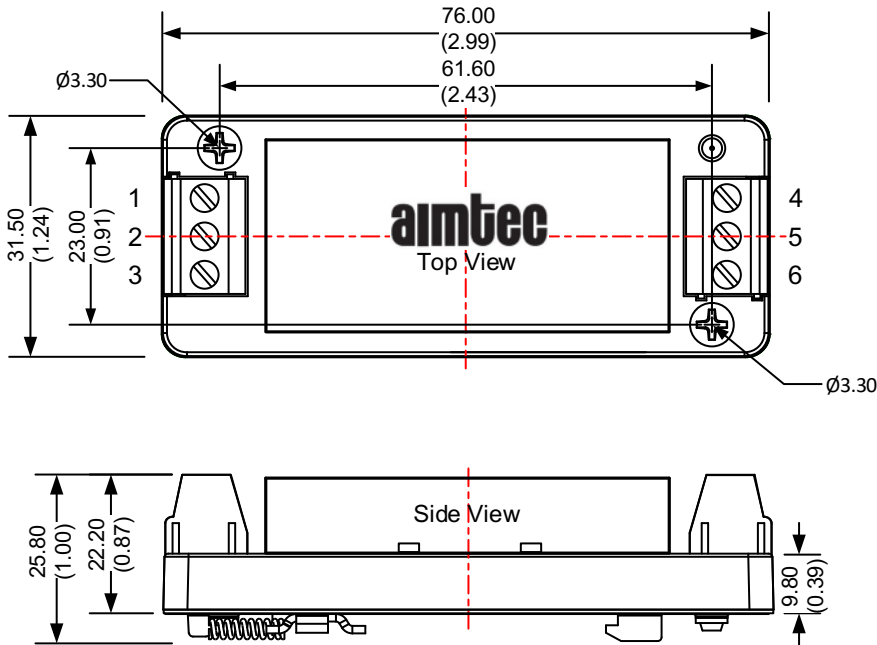
**Screw Terminal with Heatsink Option: AM50E-NZ-K-ST**



Note:  
Unit: mm (inch)  
Wire range: 24-12 AWG  
Tightening torque: Max 0.4 N\*m  
General tolerances:  $\pm 0.50$  ( $\pm 0.02$ )

**DIN-RAIL Option: AM50E-NZ-K-STD**

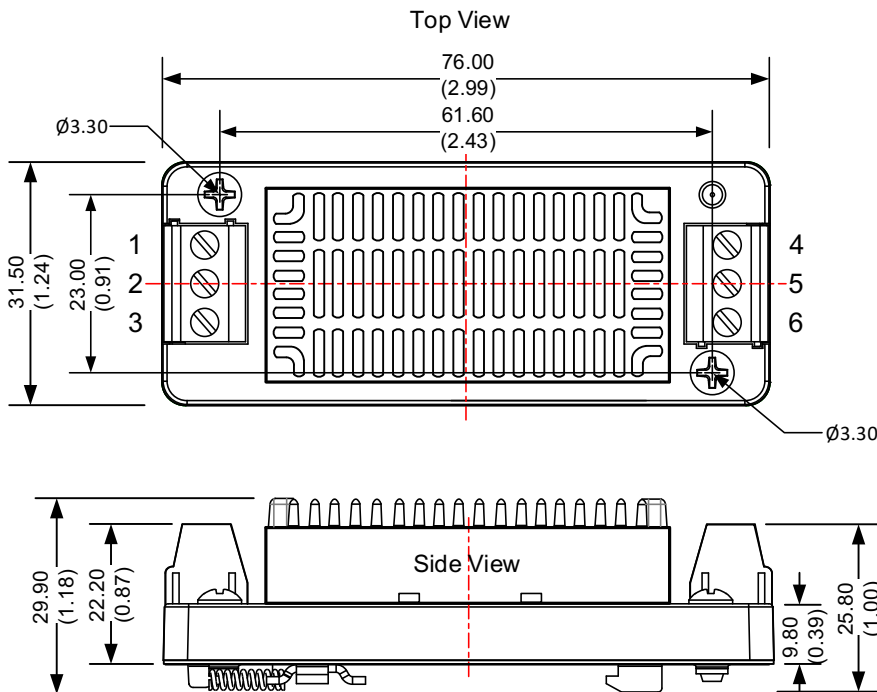
**Pin Out Specifications**



Pin	Single
1	On/Off Control
2	-Vin
3	+Vin
4	Trim
5	- Vout
6	+ Vout

Note:  
Unit: mm (inch)  
Mounting rail: TS35  
Wire range: 24-12 AWG  
Tightening torque: Max 0.4 N\*m  
General tolerances: ±0.50 (±0.02)

**DIN-RAIL with heatsink Option: AM50E-NZ-K-STD**

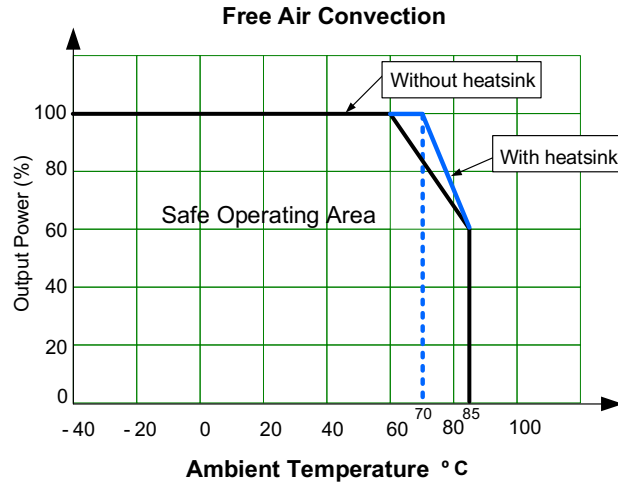
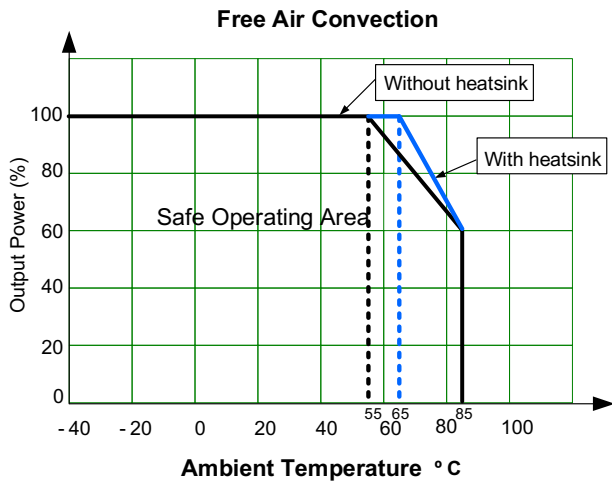


Note:  
Unit: mm (inch)  
Mounting rail: TS35  
Wire range: 24-12 AWG  
Tightening torque: Max 0.4 N\*m  
General tolerances: ±0.50 (±0.02)

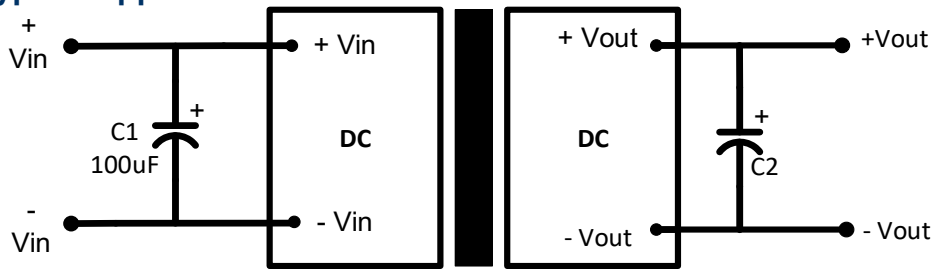
## Derating

For 3.3 & 5V output models

For 12, 15 & 24V output models

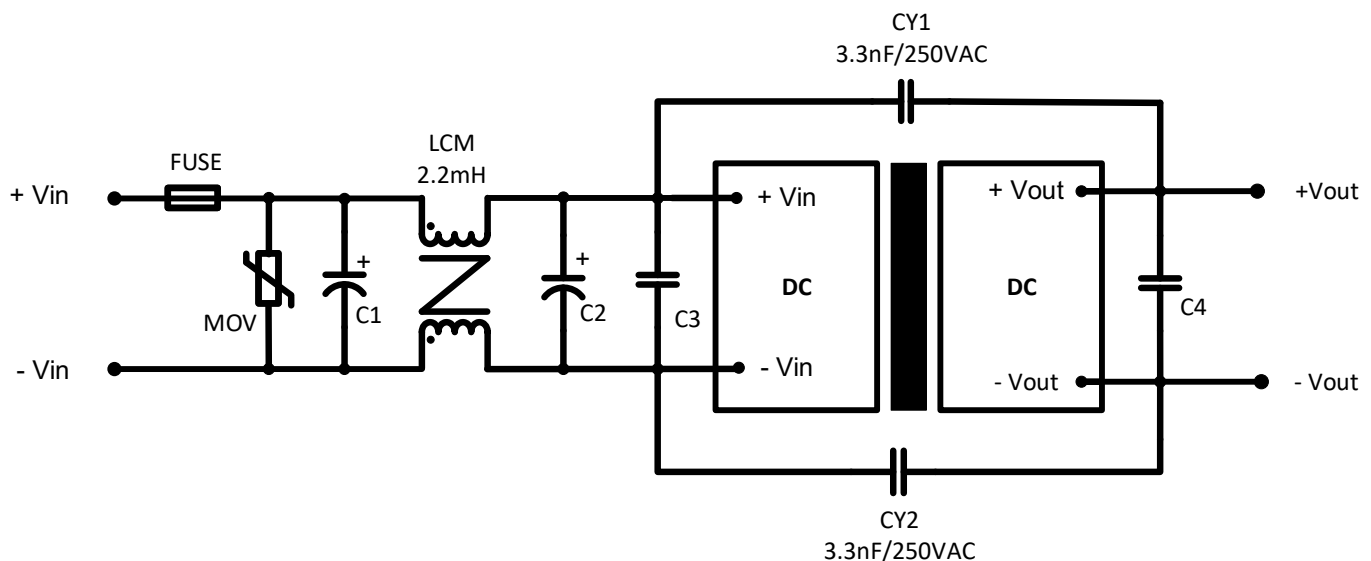


## Typical Application Circuit



Model	Single output models		
	3.3V/5V Vout	12V/15V Vout	24V Vout
C2	470µF	100µF	47µF

## EMC Recommended Circuit

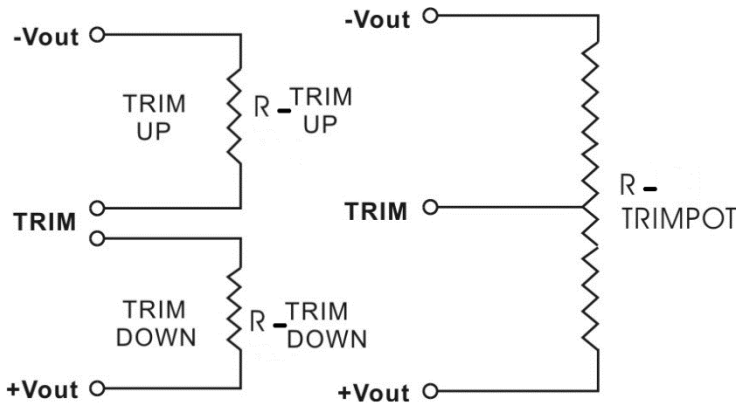


Model	24V Vin	48V Vin
FUSE	Choose based on actual input current	
MOV	S20K30	S14K60
C1	680μF/50V	330μF/100V
C2	330μF/50V	330μF /100V
C3	4.7μF/50V	2.2μF/100V
C4	Refer to the C2 in typical application circuit	

## Trimming

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

### Fixed Resistor      Variable Potentiometer



Leave open if not used.

#### AM50E-xx03S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	3.27	3.23	3.20	3.17	3.14	3.10	3.07	3.04	3.00	2.97
Rt down (KΩ)	236.27	106.095	71.347	51.633	38.931	27.676	21.71	17.076	12.299	9.457
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	3.33	3.37	3.40	3.43	3.47	3.50	3.53	3.56	3.60	3.63
Rt up (KΩ)	263.512	81.826	50.017	33.939	21.804	16.033	11.826	8.624	5.38	3.447

#### AM50E-xx05S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5
Rt down (KΩ)	128.53	56.78	32.863	20.905	13.73	8.947	5.53	2.968	0.974	-0.62
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)	131.399	59.65	35.733	23.775	16.6	11.817	8.4	5.838	3.844	2.25

AM50E-xx12S-NZ

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)	489.091	294.452	205.527	154.585	121.573	98.442	81.332	68.164	57.716	49.223
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)	699.444	151.922	76.879	47.075	31.077	21.095	14.274	9.317	5.552	2.595

AM50E-xx15S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5
Rt down (KΩ)	1213	588	379.667	275.5	213	171.333	141.571	119.25	101.889	88
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)	228	103.001	61.333	40.5	28	19.667	13.714	9.25	5.778	3

AM50E-xx24S-NZ

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)	1038.04	638.01	455.25	350.55	282.70	235.15	199.99	172.92	151.45	133.99
	8	5	6	3	2	9	3	8	3	9
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)	640.98	143.11	74.892	47.797	33.252	24.178	17.977	13.47	10.047	7.359
		6								

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