

**ZWQ80/A**  
A190-01-01/A-C

**SPECIFICATIONS (CONVECTION COOLING)**

MODEL		ZWQ80-5225/A				ZWQ80-5222/A				ZWQ80-5224/A					
		V1	V2	V3	V4	V1	V2	V3	V4	V1	V2	V3	V4		
1	Nominal Output Voltage	V	+5	+12	-12	+5	+5	+12	-12	+12	+5	+12	-12	+24	
2	Minimum Output Current (Convection) (*1)	A	0.9	0	0	0	0.9	0	0	0	0.9	0	0	0	
3	Minimum Output Current (Peak Application) (*1)	A	1.4	0	0	0	1.4	0	0	0	1.4	0	0	0	
4	Maximum Output Current	A	8.0	2.0	2.0	7.0	8.0	2.0	2.0	3.0	8.0	2.0	2.0	1.5	
5	Total Allowable Output Power (*15)	W	80				80				80				
6	Maximum Peak Output Current (*16)	A	10.0	2.5	2.5	9.0	10.0	2.5	2.5	4.0	10.0	2.5	2.5	2.0	
7	Total Allowable Peak Output Power (*15)	W	104				104				104				
8	Efficiency (Typ) (*2)	%	72												
9	Input Voltage Range (*3)	-	85 ~ 265VAC (47 ~ 63Hz) or 120 ~ 370VDC												
10	Input Current (100/200VAC) (Typ) (*2)	A	1.2 / 0.6												
11	Inrush Current (Typ) (*4)	-	14A at 100VAC, 28A at 200VAC, Ta=25°C, Cold Start												
12	PFHC	-	Built to meet IEC61000-3-2												
13	Power Factor (100/200VAC) (Typ) (*2)	-	0.99 / 0.93												
14	Output Voltage Range	V	5.0-5.25	+12/+15	-12/-15	2.0-5.25	5.0-5.25	+12/+15	-12/-15	11.4-12.6	5.0-5.25	+12/+15	-12/-15	22.8-25.2	
15	Output Voltage Accuracy	-	-	±5%	±5%	-	-	±5%	±5%	-	-	±5%	±5%	-	
16	Maximum Ripple & Noise (*5)	0 ≤ Ta ≤ +50°C	mV	120	150	150	120	120	150	150	150	120	150	150	200
		-10 ≤ Ta < 0°C	mV	160	180	180	160	160	180	180	180	160	180	180	200
17	Maximum Line Regulation (*5,6)	mV	20	48	48	20	20	48	48	48	20	48	48	96	
18	Maximum Load Regulation (*5,7)	mV	100	300	300	100	100	300	300	300	100	300	300	400	
19	Temperature Coefficient	-	Less than 0.02% /°C												
20	Over Current Protection (*8)	-	More than 109.2W of Total Output Power												
21	Over Voltage Protection (*9)	V	5.7 - 7.0	16.5-22.5	16.5-22.5	5.7 - 7.0	5.7 - 7.0	16.5-22.5	16.5-22.5	13.8-16.2	5.7 - 7.0	16.5-22.5	16.5-22.5	27.6-32.4	
22	Hold-Up Time (Typ) (*10)	-	20 ms												
23	Leakage Current (*11)	-	0.75mA MAX,0.2mA(Typ) at 100VAC / 0.44mA(Typ) at 230VAC												
24	Remote ON/OFF Control	-													
25	Parallel Operation	-													
26	Series Operation	-													
27	Operating Temperature (*12)	-	-10 ~ +50°C (-10 ~ +30°C : 100%, +50°C : 50%)												
28	Operating Humidity	-	30 ~ 90%RH (No Dewdrop)												
29	Storage Temperature	-	-30 ~ +85°C												
30	Storage Humidity	-	10 ~ 95%RH (No Dewdrop)												
31	Cooling	-	Convection Cooling												
32	Withstand Voltage	-	Input - FG : 2kVAC(20mA), Input - Output : 3kVAC (20mA) Output - FG : 500VAC(100mA), for 1min.												
33	Isolation Resistance	-	More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC												
34	Vibration	-	At no operating, 10-55Hz (Sweep for 1min) 19.6 m/s <sup>2</sup> Constant, X, Y, Z 1hour each.												
35	Shock (In package)	-	Less than 196.1 m/s <sup>2</sup>												
36	Safety (*13)	-	Approved by UL1950, CSA950, EN60950, EN50178 Built to meet DENAN												
37	EMI	-	Built to meet EN55011/EN55022-B, FCC-ClassB, VCCI-B												
38	Immunity (*14)	-	Built to meet EN61000-4-2, -3, -4, -5, -6, -8, -11												
39	Weight (Typ)	g	800												
40	Size (W x H x D)	mm	97.5 x 44.5 x 225 (Refer to Outline Drawing)												

\*Read instruction manual carefully, before using the power supply unit.

=NOTES=

- \*1. For V2, V3, V4 stability, require minimum output current of V1.
- \*2. At 100/200VAC, Ta=25°C and total allowable output power.
- \*3. For cases where conformance to various safety specs (UL, CSA, EN) are required, to be described as 100 - 240VAC(50/60Hz).
- \*4. Not applicable for the inrush current to Noise Filter for less than 0.2ms.
- \*5. Refer to output measuring (A190-01-05/A-\_) for line & load regulation and ripple voltage.
- \*6. 85 - 265VAC , constant load.
- \*7. Minimum load - Full load, constant input voltage.
- \*8. Constant current limit with automatic recovery. Refer to test data (A190-53-01\_).  
Not operate at over load or dead short condition for more than 30 seconds.
- \*9. OVP circuit will shut down all outputs, manual reset (Line recycle).
- \*10. At 100/200VAC, nominal output voltage and total allowable output power.

\*11. Measured by the each method of UL, CSA, EN and DENAN (at 60Hz), Ta=25°C.

\*12. At standard mounting.

- Load (%) is percent of total allowable output power or each maximum output current, whichever is greater.

For other mountings, refer to derating curve (A190-01-03/A-\_).

\*13. As for DENAN, built to meet at 100VAC.

\*14. Refer to test data (A190-58-01\_).

\*15. Allowable output power is changed according to V4 voltage(Only ZWQ-5225/A-\_), refer to derating table(A190-01-03/A-\_).

\*16. Operating period at peak current is less than 10sec.. (Duty0.35)

**ZWQ80/A**

A190-01-02/A-A

**SPECIFICATIONS (FORCED AIR COOLING)**

ITEMS	MODEL	ZWQ80-5225/A				ZWQ80-5222/A				ZWQ80-5224/A				
		V1	V2	V3	V4	V1	V2	V3	V4	V1	V2	V3	V4	
1	Nominal Output Voltage	V	+5	+12	-12	+5	+5	+12	-12	+12	+5	+12	-12	+24
2	Minimum Output Current (*1)	A	1.4	0	0	0	1.4	0	0	0	1.4	0	0	0
3	Maximum Output Current	A	10.0	2.5	2.5	9.0	10.0	2.5	2.5	4.0	10.0	2.5	2.5	2.0
4	Total Allowable Output Power (*2)	W	104				104				104			
5	Input Current (100/200VAC) (Typ (*3))	A	1.6 / 0.8											
6	Operating Temperature (*4)	-	-10 ~ +60°C (-10 ~ +40°C : 100%, +60°C : 50%)											
7	Cooling (*5)	-	Forced Air Cooling											

\*Read instruction manual carefully, before using the power supply unit.

=NOTES=

\*For other items, refer to convection cooling specifications (A190-01-01/A-).

\*1. For V2, V3, V4 stability, require minimum output current of V1.

When it is using under condition of forced air cooling, V1 minimum output current is same as convection cooling.

\*2. Allowable output power is changed according to V4 voltage(Only ZWQ-5225/A), refer to derating table (A190-01-04/A-).

\*3. At 100/200VAC, Ta=25°C total allowable output power.

\*4. At standard mounting.

- Load (%) is percent of total allowable output power or each maximum output current, whichever is greater.

For other mountings, refer to derating curve (A190-01-04/A-).

\*5. Air flow  $\geq 0.85\text{m}^3/\text{min}$ (30cfm)

OUTPUT DERATING (CONVECTION COOLING)

A190-01-03/A

Ta(°C)	LOAD (%)		
	MOUNT A	MOUNT B,C,D	MOUNT E
-10 ~+15	100	100	100
20	100	100	100
25	100	100	87
30	100	87	75
35	87	75	62
40	75	62	50
45	62	50	
50	50		

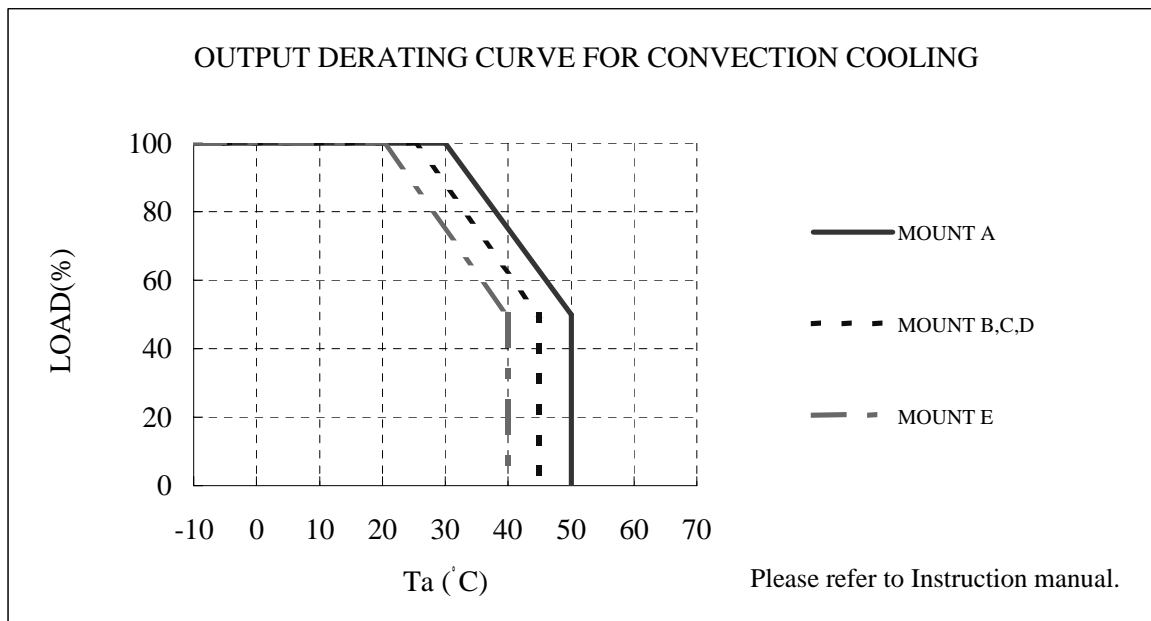
Allowable output power

5225/A		
A	B	C
5V	104W	80W
3V	86W	80W
2V	77W	77W

5223/A		
A	B	C
3.3V	88.7W	80W
3V	86W	80W
2V	77W	77W

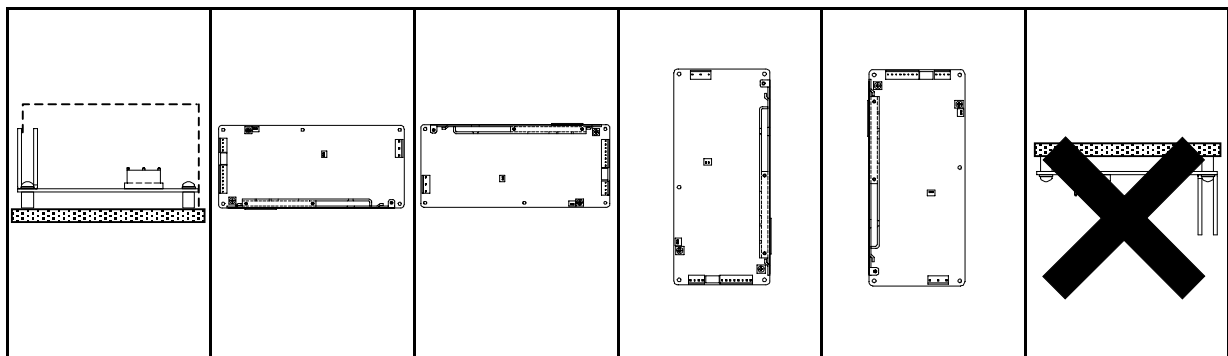
A : V4 setting voltage  
 B : Total Allowable Peak Output Power  
 C : Total Allowable Output Power

\* The period of peak current at Convection Cooling is limited less than 10sec.. (Duty ≤ 0.35)  
 For peak current application, refer to note (A190-01-05/A\_).



\* Load (%) is percent of total allowable output power or each maximum output current, whichever is greater.

MOUNTING A   MOUNTING B   MOUNTING C   MOUNTING D   MOUNTING E   PROHIBIT  
 (STANDARD MOUNTING)



OUTPUT DERATING (FORCED AIR COOLING)

A190-01-04/A

Allowable output power

Ta( )	LOAD (%)
	MOUNT A,B,C,D,E
-10 ~+30	100
35	100
40	100
45	87
50	75
55	62
60	50

5225/A

A	B
5V	104W
3V	86W
2V	77W

5223/A

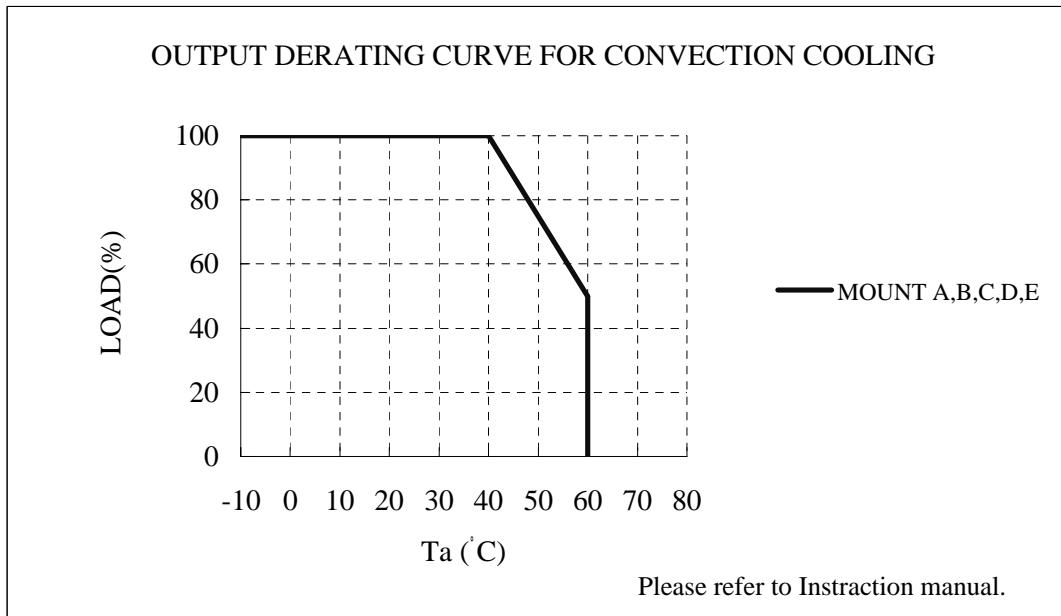
A	B
3.3V	88.7W
3V	86W
2V	77W

A : V4 setting voltage

B : Total Allowable Output Power

\* Air flow  $\geq 0.85\text{m}^3/\text{min}(30\text{cfm})$

Air must flow through component side.



\* Load (%) is percent of total allowable output power or each maximum output current, whichever is greater.

MOUNTING A

MOUNTING B

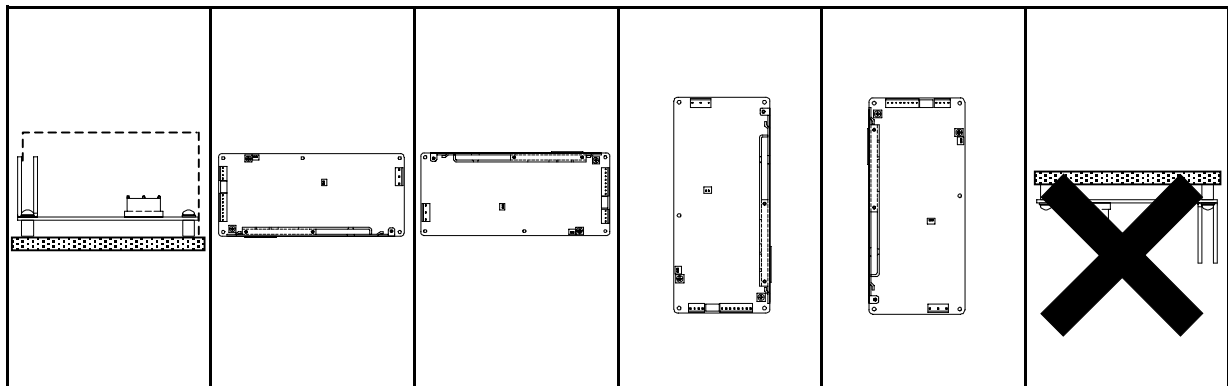
MOUNTING C

MOUNTING D

MOUNTING E

PROHIBIT

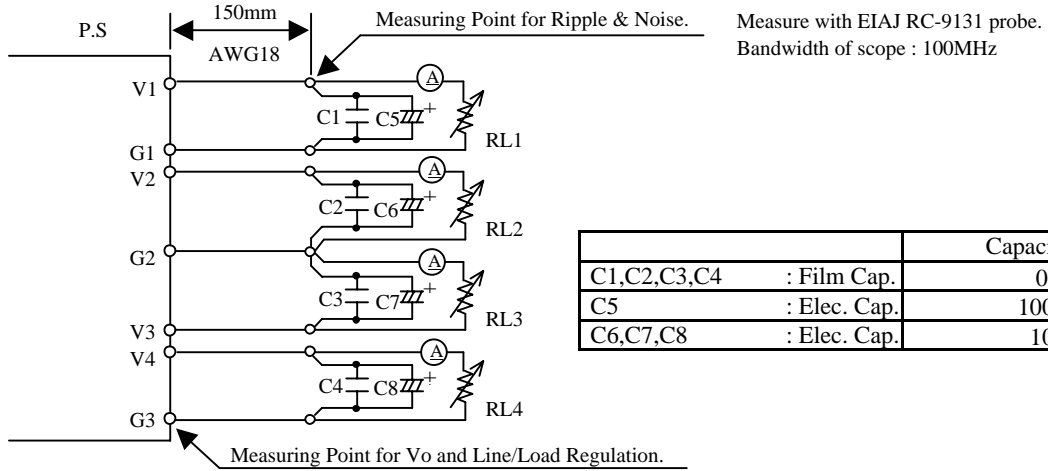
(STANDARD MOUNTING)



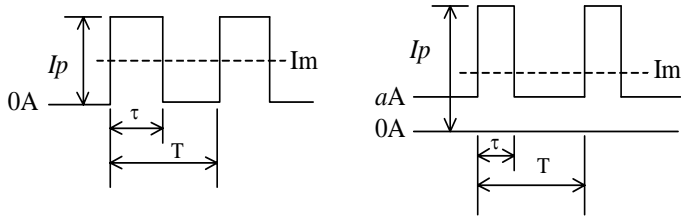
NOTE

A190-01-05/A

Output Measuring



Peak Output Current (Convection Cooling)



$$I_{av} \geq I_m = \frac{I_p \times \tau}{T}$$

$$I_{av} \geq I_m = \frac{(I_p - a) \times \tau}{T} + a$$

- Ip : Peak output current ( A )
- Iav : Average output current ( A )  
( Maximum output current (Convection) in Spec. )
- Im : Average output current ( A )
- τ : Pulse width of peak output current ( sec )  
( Operating time at peak output )
- T : Period ( sec ) : more than 10ms

\* The period of peak current at Convection Cooling is limited less than 10sec.. (Duty ≤ 0.35)  
\* Take V1 minimum output current more than 1.4A.

## ZWQ80/A

A190-01-06/A-C

## SPECIFICATIONS (CONVECTION COOLING)

MODEL		ZWQ80-5223/A					
		V1	V2	V3	V4		
1	Nominal Output Voltage	V	+5	+12	-12	+3.3	
2	Minimum Output Current (Convection) (*1)	A	0.9	0	0	0	
3	Minimum Output Current (Peak Application) (*1)	A	1.4	0	0	0	
4	Maximum Output Current	A	8.0	2.0	2.0	7.0	
5	Total Allowable Output Power (*16)	W	80				
6	Maximum Peak Output Current (*17)	A	10.0	2.5	2.5	9.0	
7	Total Allowable Peak Output Power (*16)	W	88.7				
8	Efficiency (Typ) (*2)	%	72				
9	Input Voltage Range (*3)	-	85 ~ 265VAC (47 ~ 63Hz) or 120 ~ 370VDC				
10	Input Current (100/200VAC) (Typ) (*2)	A	1.2 / 0.6				
11	Inrush Current (Typ) (*4)	-	14A at 100VAC, 28A at 200VAC, Ta=25°C, Cold Start				
12	PFHC	-	Built to meet IEC61000-3-2				
13	Power Factor (100/200VAC) (Typ) (*2)	-	0.99 / 0.93				
14	Output Voltage Range	V	5.0-5.25	+12/+15	-12/-15	2.0-3.63	
15	Output Voltage Accuracy	-	-	±5%	±5%	-	
16	Maximum Ripple & Noise (*5)	0 ≤ Ta ≤ +50°C	mV	120	150	150	120
		-10 ≤ Ta < 0°C	mV	160	180	180	160
17	Maximum Line Regulation (*5,6)	mV	20	48	48	20	
18	Maximum Load Regulation (*5,7)	mV	100	300	300	100	
19	Temperature Coefficient	-	Less than 0.02% /°C				
20	Over Current Protection (*8)	-	More than 93.1W of Total Output Power				
21	Over Voltage Protection (*9)	V	5.7 - 7.0	16.5-22.5	16.5-22.5	3.79 - 4.95	
22	Hold-Up Time (Typ) (*10)	-	20 ms				
23	Leakage Current (*11)	-	0.75mA MAX, 0.2mA(Typ) at 100VAC / 0.44mA(Typ) at 230VAC				
24	Remote ON/OFF Control (*14)	-	Possible				
25	Parallel Operation	-	-				
26	Series Operation	-	-				
27	Operating Temperature (*12)	-	-10 ~ +50°C (-10 ~ +30°C : 100%, +50°C : 50%)				
28	Operating Humidity	-	30 ~ 90%RH (No Dewdrop)				
29	Storage Temperature	-	-30 ~ +85°C				
30	Storage Humidity	-	10 ~ 95%RH (No Dewdrop)				
31	Cooling	-	Convection Cooling				
32	Withstand Voltage		Input - FG : 2kVAC(20mA), Input - Output : 3kVAC (20mA) Output - FG : 500VAC(100mA), for 1min.				
33	Isolation Resistance	-	More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC				
34	Vibration	-	At no operating, 10-55Hz (Sweep for 1min) 19.6 m/s <sup>2</sup> Constant, X, Y, Z 1hour each.				
35	Shock (In package)	-	Less than 196.1 m/s <sup>2</sup>				
36	Safety (*13)	-	Approved by UL1950, CSA950, EN60950, EN50178 Built to meet DENAN				
37	EMI	-	Built to meet EN55011/EN55022-B, FCC-ClassB, VCCI-B				
38	Immunity (*15)	-	Built to meet EN61000-4-2, -3, -4, -5, -6, -8, -11				
39	Weight (Typ)	g	800				
40	Size (W x H x D)	mm	97.5 x 44.5 x 225 (Refer to Outline Drawing)				

\*Read instruction manual carefully, before using the power supply unit.

=NOTES=

- \*1. For V2, V3, V4 stability, require minimum output current of V1.
- \*2. At 100/200VAC, Ta=25°C and total allowable output power.
- \*3. For cases where conformance to various safety specs (UL, CSA, EN) are required, to be described as 100 - 240VAC(50/60Hz).
- \*4. Not applicable for the inrush current to Noise Filter for less than 0.2ms.
- \*5. Refer to output measuring (A190-01-05/A-\_) for line & load regulation and ripple voltage.
- \*6. 85 - 265VAC, constant load.
- \*7. Minimum load - Full load, constant input voltage.
- \*8. Constant current limit with automatic recovery. Refer to test data (A190-53-01\_).  
Not operate at over load or dead short condition for more than 30 seconds.
- \*9. OVP circuit will shut down all outputs, manual reset (Line recycle).
- \*10. At 100/200VAC, nominal output voltage and total allowable output power.
- \*11. Measured by the each method of UL, CSA, EN and DENAN (at 60Hz), Ta=25°C.
- \*12. At standard mounting.  
- Load (%) is percent of total allowable output power or each maximum output current, whichever is greater.  
For other mountings, refer to derating curve (A190-01-03/A-\_).
- \*13. As for DENAN, built to meet at 100VAC.
- \*14. Refer to test data (A190-58-01\_).
- \*15. Allowable output power is changed according to V4 voltage, refer to derating table (A190-01-03/A-\_).
- \*16. Operating period at peak current is less than 10sec.. (Duty0.35)

**ZWQ80/A**

A190-01-07/A-A

**SPECIFICATIONS (FORCED AIR COOLING)**

ITEMS	MODEL	ZWQ80-5223/A				
		V1	V2	V3	V4	
1	Nominal Output Voltage	V	+5	+12	-12	+3.3
2	Minimum Output Current (*1)	A	1.4	0	0	0
3	Maximum Output Current	A	10.0	2.5	2.5	9.0
4	Total Allowable Output Power (*2)	W	88.7			
5	Input Current (100/200VAC) (Typ) (*3)	A	1.6 / 0.8			
6	Operating Temperature (*4)	-	-10 ~ +60°C (-10 ~ +40°C : 100%, +60°C : 50%)			
7	Cooling (*5)	-	Forced Air Cooling			

\*Read instruction manual carefully, before using the power supply unit.

=NOTES=

\*For other items, refer to convection cooling specifications (A190-01-01/A-).

\*1. For V2, V3, V4 stability, require minimum output current of V1.

When it is using under condition of forced air cooling, V1 minimum output current is same as convection cooling.

\*2. Allowable output power is changed according to V4 voltage, refer to derating table (A190-01-04/A-).

\*3. At 100/200VAC, Ta=25°C total allowable output power.

\*4. At standard mounting.

- Load (%) is percent of total allowable output power or each maximum output current, whichever is greater.

For other mountings, refer to derating curve (A190-01-04/A-).

\*5. Air flow  $\geq 0.85\text{m}^3/\text{min}$  (30cfm)