ZWQ130/A

SPECIFICATIONS (CONVECTION COOLING)

A191-01-01/A-D

	MODEL / ITEMS			ZWQ130-5223/A				ZWQ130-5225/A			
				V1	V2	V3	V4	V1	V2	V3	V4
1	Nominal Output Voltage		V	+5	+12	-12	+3.3	+5	+12	-12	+5
2	Minimum Output Current (Convection) (*1)		A	1.5	0	0	0	1.5	0	0	0
3	Minimum Output Current (Peak Applica(*1)		A	2.1	0	0	0	2.1	0	0	0
4	Maximum Output Current		A	15.0	4.0	4.0	10.0	15.0	4.0	4.0	10.0
5	Total Allowable Output Power (*2)		W	130							
6	Maximum Peak Output Current (*3)		A	19.0	5.0	5.0	12.0	19.0	5.0	5.0	12.0
7	Total Allowable Peak Output Power (*2)		W	149.6				170			
8	Efficiency (Typ) (*4)		%	72							
9	Input Voltage Range (*5)		-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC							
10	Input Current (100/200VAC) (Typ) (*4)		A	2.0/1.0							
11	Inrush Current (Typ) (*6)		-	14A at 100VAC, 28A at 200VAC, Ta=25°C, Cold Start							
12	PFHC		-	Designed to meet IEC61000-3-2							
13	Power Factor (100/200VAC) (Typ) (*4)		-	0.99 / 0.93							
14	Output Voltage Range		V	5.0-5.25	+12/+15	-12/-15	2.0-3.63	5.0-5.25	+12/+15	-12/-15	2.0-5.25
15	Output Voltage Accuracy		-	-	±5%	±5%	-	-	±5%	±5%	-
16	Maximum Ripple & Noise(*7	0°C ≤Ta≤ +50°C	mV	120	150	150	120	120	150	150	120
		-10 ≤Ta< 0°C	mV	160	180	180	160	160	180	180	160
17	Maximum Line Regulation (*7,8)		mV	20	48	48	20	20	48	48	20
18	Maximum Load Regulation (*7,9)		mV	100	300	300	100	100	300	300	100
19	Temperature Coefficient		-	Less than 0.02% /°C							
20	Over Current Protection (*10)		-	More than 152W of Total Output Power				More than 173W of Total Output Power			
21	Over Voltage Protection (*11)		V	5.7 - 7.0	16.5 - 22.5	-22.5 - -16.5	3.79 - 4.95	5.7 - 7.0	16.5 - 22.5	-22.5 - -16.5	5.7 - 7.0
22	Hold-Up Time (Typ) (*12)		-	20 ms							
23	Leakage Current (*13)		-	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 (*14)		-	-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^2 Constant, X, Y, Z 1h each.							
35	Shock (In package)		-	Less than 196.1 m/s^2							
36	Safety (*15)		-	Approved by UL60950-1, CSA C22.2 No.60950-1, EN60950-1 Designed to meet DENAN							
37	EMI		-	Designed to meet EN55011/EN55022-B, FCC-ClassB, VCCI-B							
38	Immunity (*16)		-	Designed to meet EN61000-4-2, -3, -4, -5, -6, -8, -11							
39	Weight (Typ)		-	1000g							
40	Size (WxHxD)		mm	108.5 x 44.5 x 250 (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. Allowable output power is changed according to V4 voltage refer to derating table (A191-01-05/A-_).

*3. Operating period at peak current is less than 10sec. (Duty ≤ 0.35)

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

*5. For cases where conformance to various safety specs (UL, CSA, EN) are required, to be described as 100 - 240VAC(50/60Hz).

*6. Not applicable for the inrush current to Noise Filter for less than 0.2ms.

*7. Refer to output measuring (A191-01-07/A-_) for line & load regulation and ripple voltage.

*8. 85 - 265VAC , constant load.

*9. Minimum load - Full load, constant input voltage.

*10. Constant current limit with automatic recovery. Refer to test data (A191-53-01_). Not operate at over load or dead short condition for more than 30 seconds.

*11. OVP circuit will shut down all outputs, manual reset (Line recycle).

*12. At 100/200VAC, nominal output voltage and total allowable output power.

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

*14. 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 (A191-01-05/A-_).

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

*16. Refer to test data(A191-58-01_).

ZWQ130/A

SPECIFICATIONS (FORCED AIR COOLING)

A191-01-02/A-D

	ITEMS \ MODEL			ZWQ130-5223/A				ZWQ130-5225/A			
				V1	V2	V3	V4	V1	V2	V3	V4
1	Nominal Output Voltage		V	+5	+12	-12	+3.3	+5	+12	-12	+5
2	Minimum Output Current	(*1)	A	2.1	0	0	0	2.1	0	0	0
3	Maximum Output Current		A	19.0	5.0	5.0	12.0	19.0	5.0	5.0	12.0
4	Total Allowable Output Power	(*2)	W	149.6				170			
5	Input Current (100/200VAC) (Typ)	(*3)	A	2.6/1.3							
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 (A191-01-01/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 (A191-01-06/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 (A191-01-06/A-_).

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

ZWQ130/A

SPECIFICATIONS (CONVECTION COOLING)

A191-01-03/A-C

	ITEMS \ MODEL			ZWQ130-5222/A				ZWQ130-5224/A			
				V1	V2	V3	V4	V1	V2	V3	V4
1	Nominal Output Voltage		V	+5	+12	-12	+12	+5	+12	-12	+24
2	Minimum Output Current (Convection)	(*1)	A	1.5	0	0	0	1.5	0	0	0
3	Minimum Output Current (Peak Applicati	(*1)	A	2.1	0	0	0	2.1	0	0	0
4	Maximum Output Current		A	15.0	4.0	4.0	4.0	15.0	4.0	4.0	2.0
5	Total Allowable Output Power		W	130							
6	Maximum Peak Output Current	(*2)	A	19.0	5.0	5.0	5.0	19.0	5.0	5.0	2.5
7	Total Allowable Peak Output Power		W	170							
8	Efficiency (Typ)	(*3)	%	72							
9	Input Voltage Range	(*4)	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC							
10	Input Current (100/200VAC) (Typ)	(*3)	A	2.0 / 1.0							
11	Inrush Current (Typ)	(*5)	-	14A at 100VAC, 28A at 200VAC, Ta=25°C, Cold Start							
12	PFHC		-	Designed to meet IEC61000-3-2							
13	Power Factor (100/200VAC) (Typ)	(*3)	-	0.99 / 0.93							
14	Output Voltage Range		-	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%	-
16	Maximum Ripple & Noise (*6)	0°C ≤Ta≤ +50°C	mV	120	150	150	150	120	150	150	200
		-10 ≤Ta< 0°C	mV	160	180	180	180	160	180	180	200
17	Maximum Line Regulation	(*6,7)	mV	20	48	48	48	20	48	48	96
18	Maximum Load Regulation	(*6,8)	mV	100	300	300	300	100	300	300	400
19	Temperature Coefficient		-	Less than 0.02% / °C							
20	Over Current Protection	(*9)		More than 173W of Total Output Power							
21	Over Voltage Protection	(*10)	V	5.7 - 7.0	16.5 - 22.5	-22.5 - -16.5	13.8 - 16.2	5.7 - 7.0	16.5 - 22.5	-22.5 - -16.5	27.6 - 32.4
22	Hold-Up Time (Typ)	(*11)	-	20 ms							
23	Leakage Current	(*12)	-	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	(*13)	-	-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^2 Constant, X, Y, Z 1h each.							
35	Shock (In package)		-	Less than 196.1 m/s^2							
36	Safety	(*14)	-	Approved by UL60950-1, CSA C22.2 No.60950-1, EN60950-1 Designed to meet DENAN							
37	EMI		-	Designed to meet EN55011/EN55022-B, FCC-ClassB, VCCI-B							
38	Immunity	(*15)	-	Designed to meet EN61000-4-2, -3, -4, -5, -6, -8, -11							
39	Weight (Typ)		-	1000g							
40	Size (WxHxD)		mm	108.5 x 44.5 x 250 (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. Operating period at peak current is less than 10sec. (Duty≤0.35)

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

*4. For cases where conformance to various safety specs (UL, CSA, EN) are required, to be described as 100 - 240VAC(50/60Hz).

*5. Not applicable for the inrush current to Noise Filter for less than 0.2ms.

*6. Refer to output measuring (A191-01-07/A-_) for line & load regulation and ripple voltage.

*7. 85 - 265VAC , constant load.

*8. Minimum load - Full load, constant input voltage.

*9. Constant current limit with automatic recovery. Refer to test data (A191-53-01_). Not operate at over load or dead short condition for more than 30 seconds.

*10. OVP circuit will shut down all outputs, manual reset (Line recycle).

*11. At 100/200VAC, nominal output voltage and total allowable output power.

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

*13. 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 (A191-01-05/A-_).

*14. As for DENAN, designed to meet at 100VAC.

*15. Refer to test data(A191-58-01_).

ZWQ130/A

SPECIFICATIONS (FORCED AIR COOLING)

A191-01-04/A-C

	ITEMS \ MODEL			ZWQ130-5222/A				ZWQ130-5224/A			
				V1	V2	V3	V4	V1	V2	V3	V4
1	Nominal Output Voltage		V	+5	+12	-12	+12	+5	+12	-12	+24
2	Minimum Output Current	(*1)	A	2.1	0	0	0	2.1	0	0	0
3	Maximum Output Current		A	19.0	5.0	5.0	5.0	19.0	5.0	5.0	2.5
4	Total Allowable Output Power		W	170							
5	Input Current (100/200VAC) (Typ)	(*2)	A	2.6 / 1.3							
6	Operating Temperature	(*3)	-	-10 ~ +60°C (-10 ~+40°C : 100%, +60°C : 50%)							
7	Cooling	(*4)	-	Forced Air Cooling							

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

=NOTES=

*For other items, refer to convection cooling specifications (A191-01-03/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. At 100/200VAC, Ta=25°C total allowable output power.

*3. 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 (A191-01-06/A-_).

*4. Air flow $\geq$ 0.85m^3/min(30cfm)

ZWQ130/A

OUTPUT DERATING (CONVECTION COOLING)

A191-01-05/A

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

Allowable output power

5225/A

A	B	C
5V	170W	130W
3V	146W	130W
2V	134W	130W

5223/A

A	B	C
3.3V	149.6W	130W
3V	146W	130W
2V	134W	130W

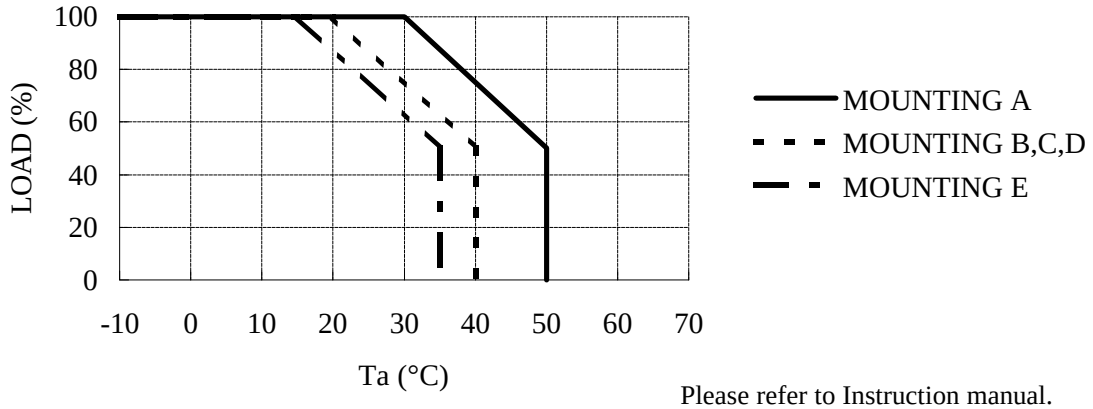
A : V4 setting voltage

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 (A191-01-07/A_).

OUTPUT DERATING CURVE FOR CONVECTION COOLING

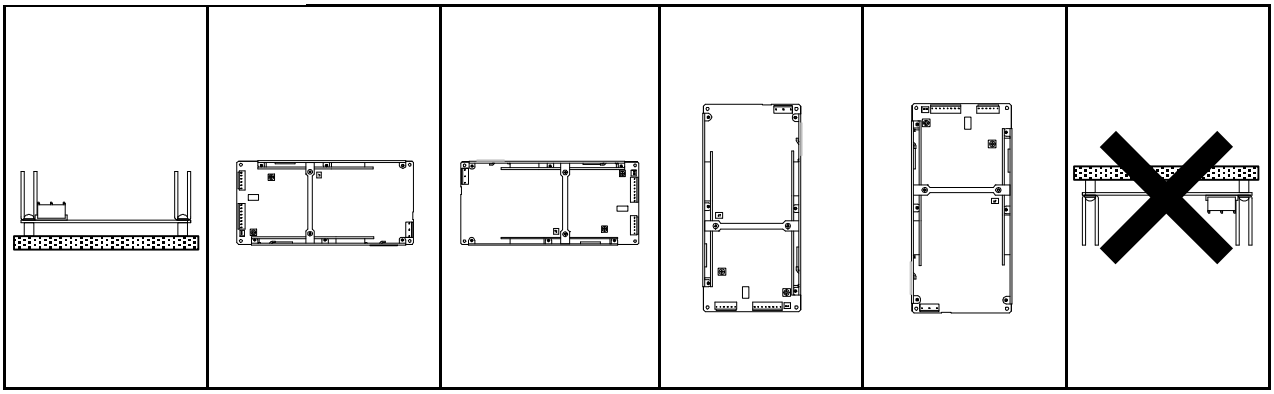


Please refer to Instruction manual.

* 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)



ZWQ130/A

OUTPUT DERATING (FORCED AIR COOLING)

A191-01-06/A-A

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

Allowable output power

5225/A

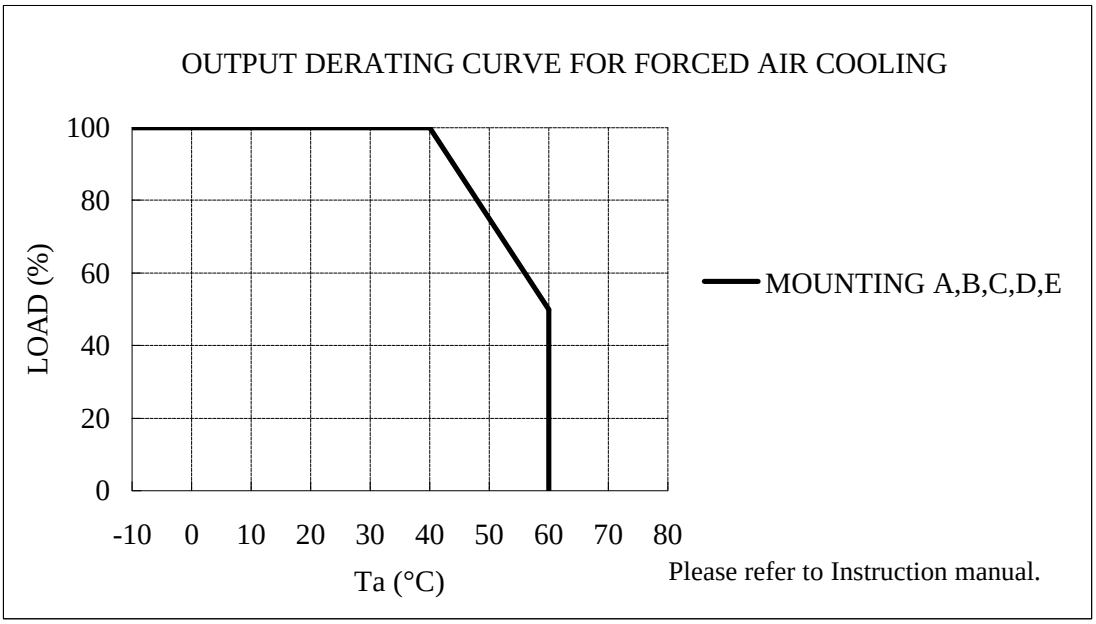
A	B
5V	170W
3V	146W
2V	134W

5223/A

A	B
3.3V	149.6W
3V	146W
2V	134W

A : V4 setting voltage
B : Total Allowable Output Power

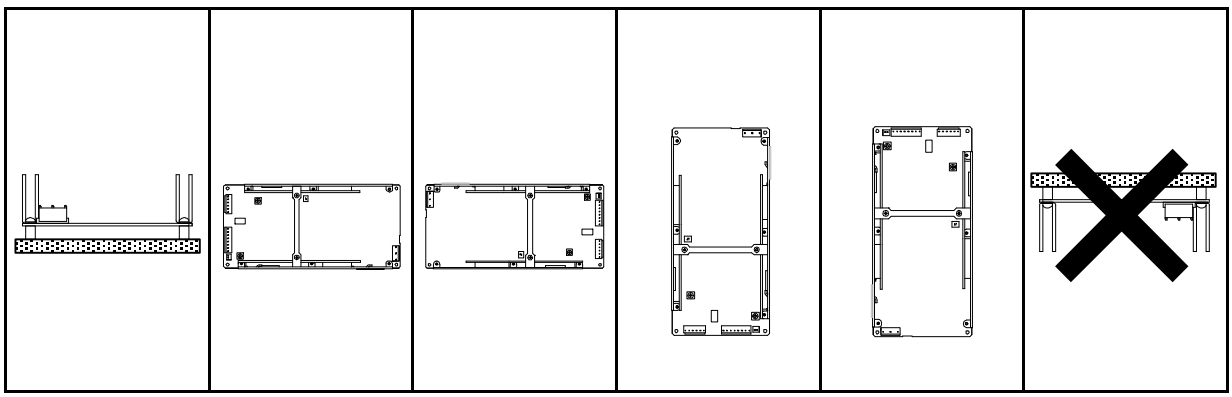
* Air flow $\geq$ 0.85m^3/min(30cfm)
Air must flow through component side.



* 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)

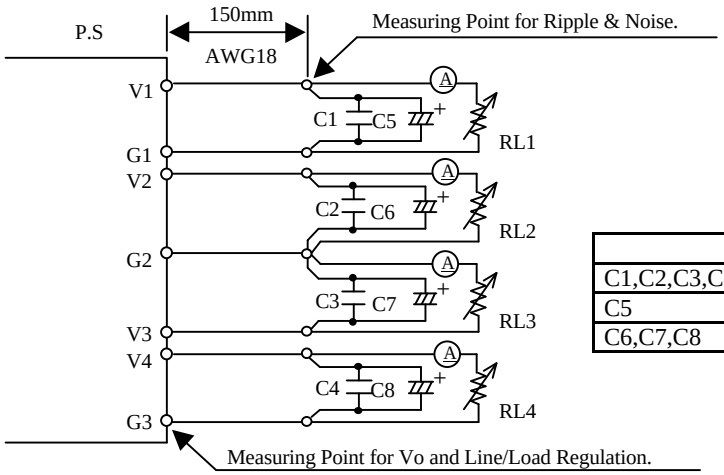


ZWQ130/A

NOTE

A191-01-07/A

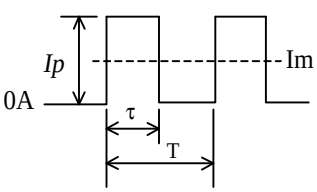
Output Measuring



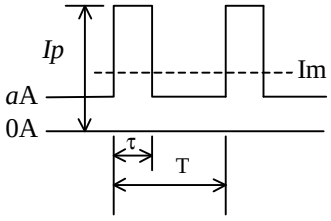
Measure with EIAJ RC-9131 probe.
Bandwidth of scope : 100MHz

		Capacitance
C1,C2,C3,C4	: Film Cap.	0.1 μF
C5	: Elec. Cap.	1000 μF
C6,C7,C8	: Elec. Cap.	100 μF

Peak Output Current (Convection Cooling)



$$Iav \geq \mathrm{Im} = \frac{Ip \times t}{\mathrm{T}}$$



$$Iav \geq \mathrm{Im} = \frac{(Ip - a) \times t}{\mathrm{T}} + a$$

Ip : Peak output current (A)
Iav : Average output current (A)
(Maximum output current (Convection) in Spec.)
Im : Average output current (A)
t : 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 minmum output current more than 2.1A.

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