50DAW_1.5R1 series

50W - Single Output DC-DC Converter - Wide Input - Isolated & Regulated

DC-DC Converter 50 Watt

- 2:1 input range
- 50W output power
- Only 9.5mm height
- Up to 90% efficiency
- Stand-by power consumption as low as 0.3W
- Output start up as low as 20ms
- Short circuit protection
- Input under voltage, output over voltage and over current protection
- Switching frequency 350kHz
- 1500VDC isolation voltage
- Operating temperature: -40°C up to +85°C
- International standard pin-out

Introducing our new ultra-slim and efficient 50DAW_1.5R1 series, designed for high-performance applications in compact spaces! This advanced converter offers a 2:1 input range with a powerful 50W output, all within an exceptionally slim profile of just 9.5mm in height. With up to 90% efficiency and stand-by power consumption as low as 0.3W, it ensures optimized energy usage. The fast output start-up time of only 20ms enhances operational efficiency. Safety and reliability are at the forefront with features like short circuit protection, as well as safe-guards against input under-voltage, output over-voltage, and over-current conditions. The converter operates at a switching frequency of 350kHz and provides 1500VDC isolation voltage. Its robust design allows it to perform seamlessly across a wide temperature range of -40°C to +85°C, making it ideal for challenging environments. With its international standard pin-out, this converter simplifies integration and delivers exceptional performance in a compact, reliable package.

Common specifications

Short circuit protection	Hiccup, continuous, self-recovery
Over voltage protection	110%~200%Vo
Over current protection	110%~200%Io (150% Io - typ.)
Switching frequency	350 kHz (typ.)
Operation temperature	-40°C ~+85°C (with derating)
Storage temperature	-55°C ~+125°C
Max case temperature	+105°C (within operating curve)
Pin welding resistance temperature	+300°C (distance to case 1.5mm, 10seconds)
Humidity	5-95% RH (non condensing)
MTBF: (MIL-HDBK-217F@25°C)	2,000,000 hours
Case material	Aluminum metal case
Weight	28g (typ.)

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input surge voltage (1 sec.)	24VDC Input 48VDC input			50 100	VDC
Under-voltage turn-off	24VDC Input 48VDC input		16 32		VDC
Start-up Time			20		ms
Input Filter	Pi filter				
CTRL	Module turn-on, suspended or connect to high level (3.5V -12VDC) module turn-off, connect to -Vin or connect to low level (0 - 1.2VDC) input current when switched off, 1mA (typ.)				
Reflected ripple current	Input full range, connect to test tools		150		mA

Note: *The voltage of CTRL pin is relative to -Vin pin.

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	Full voltage full load, Vo			≤±2.0	%
Line regulation	Nominal load, full voltage range, Vo			≤±1.0	%
Load regulation	10%~100% nominal load, Vo			≤±2.0	%
Ripple & noise	Nominal load, nominal voltage (20MHz band-width)			≤100	mVp-p
Output voltage adjustment	Trim-pin function		±10		%
Dynamic Response	25% nominal load step change ΔVo/Δt		≤±8.0%/500μs		

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input to output ≤ 0.5mA / 1min	1500			VDC
Isolation capacitor			2000		pF

Example:
50DAW_2405S1.5R1
50 = 50Watt; D = DIP; A = Series; W = Wide input; 24 = 24Vin; 05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation; R1 = Revised version

1. The recommended minimum load is 10% or high frequency low resistance electrolytic capacitor above 470uF, or output ripple will rise;
2. Recommend the unbalance loads of dual output to be ≤±5%;
3. The maximum capacitive load is tested under pure resistance and full load condition;
4. Our company could provide whole power supply solution, or customized made items;
5. Due to space limitation, please contact our team for more information;
6. If no special specified, all parameters tested under nominal input voltage, pure resistance rated load and Ta = 25°C conditions.

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EMC specifications				
EMC	EMI	CE	CISPR22/EN55032 CLASSB (external circuit is needed)	
EMC	EMI	RE	CISPR22/EN55032 CLASSB (external circuit is needed)	
EMC	EMS	ESD	IEC/EN61000-4-2 Contact ±4kV	perf. Criteria B
EMC	EMS	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
EMC	EMS	EFT	IEC/EN61000-4-4 ±2kV (external circuit is needed)	perf. Criteria B
EMC	EMS	Surge	IEC/EN61000-4-5 ±2kV (external circuit is needed)	perf. Criteria B
EMC	EMS	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-6 3Vr.m.s	perf. Criteria A

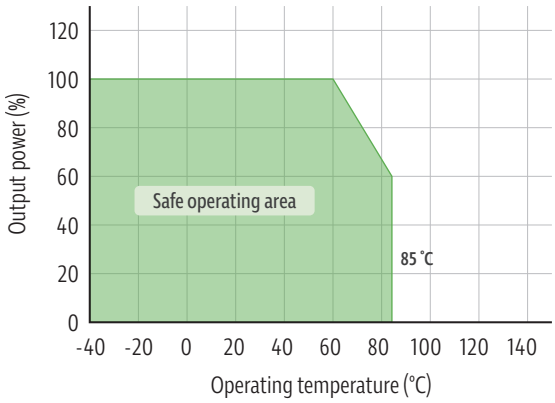
Product Selection Guide

Approval	Part number	Input Voltage Nominal (VDC)	Input Voltage Range (VDC)	Output Voltage Vo/Io (VDC)	Output Current Vo/Io (mA) Max./Min.	Input Current(mA) Nominal Voltage Full load (typ.)	Input Current(mA) Nominal Voltage No load (typ.)	Max. Capacitive Load (uF)	Ripple & Noise (mVp-p)	Efficiency (%)@full load, nominal input voltage (typ.)
	50DAW_2403S1.5R1	24	18-36	3.3	12	1885	50	10000	100	87
	50DAW_2405S1.5R1	24	18-36	5	10	2315	50	8000	100	90
	50DAW_2412S1.5R1	24	18-36	12	4.16	2350	2	2000	100	89
	50DAW_2415S1.5R1	24	18-36	15	3.33	2315	2	1000	100	90
	50DAW_2424S1.5R1	24	18-36	24	2.08	2315	2	500	100	90
	50DAW_4803S1.5R1	48	36-75	3.3	10	790	50	10000	100	87
	50DAW_4805S1.5R1	48	36-75	5	10	1158	50	8000	100	87
	50DAW_4812S1.5R1	48	36-75	12	4.16	1158	2	2000	100	89
	50DAW_4815S1.5R1	48	36-75	15	3.33	1158	2	1000	100	90
	50DAW_4824S1.5R1	48	36-75	24	2.08	1158	2	500	100	90

Note:
1. Please add suffix /C for CTRL option; without "C" means no CTRL; with control function use /C (50DAW_4824S1.5R1/C);
2. Please use suffix /H for heatsink option and suffix /CM for chassis mounting; please use suffix /DR for DIN-Rail mounting (50DAW_4824S1.5R1/CM/DR). DIN-Rail width is: 35mm;
3. Max capacitive load is, when the power supply is fully loaded, the max capacity could be connected to output, if exceed, the power supply cannot start-up;
4. To reduce no load power consumption and improve efficiency of light-load, IC will be flitter frequency under no-load and light-load Operating;
5. Output cannot be no load, at least with 5% load or above 470uF high frequency low resistance electrolytic capacitor, otherwise the output ripple will rise.

Typical characteristics

Temperature derating graph



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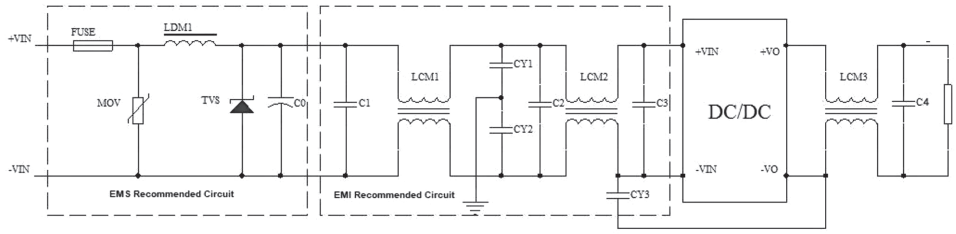
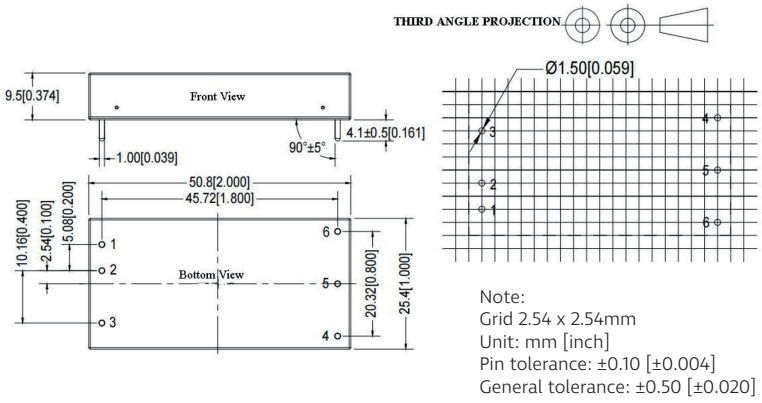
EMC external recommended circuit



Recommended Parameter:

Vin (VDC)	48V Input	24V Input
FUSE	According to customer's request	
MOV	14D101K	14D470K
LDM1	56uH	56uH
TVS	SMCJ80A	SMCJ40A
C0	560uF/100V	680uF/100V
C1, C2, C3	4.7uF/100V	4.7uF/100V
LCM1	15mH	15mH
LCM2	56uH	56uH
LCM3	20uH~30uH	20uH~30uH
C4	47uF/50V	47uF/50V
CY1, CY2, CY3	1nF/2KV	1nF/2KV

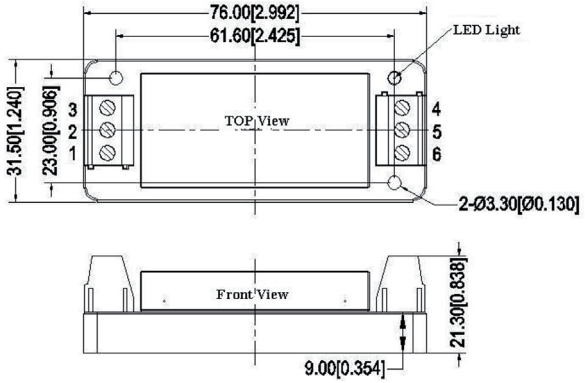
Standard package dimensions



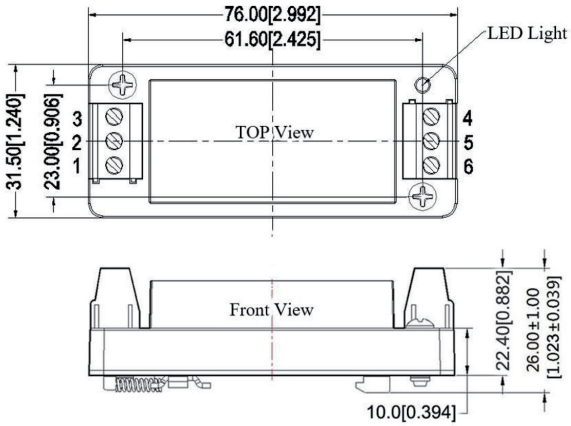
Note:
Grid 2.54 x 2.54mm
Unit: mm [inch]
Pin tolerance: ±0.10 [±0.004]
General tolerance: ±0.50 [±0.020]

Pin	1	2	3	4	5	6
Single (S)	+Vin	-Vin	CTRL	Trim	-Vo	+Vo

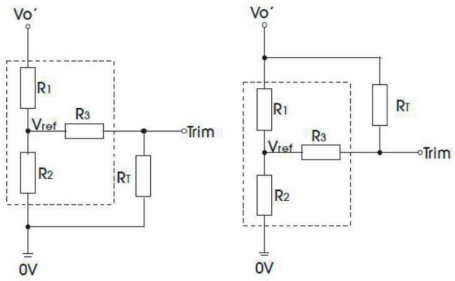
Chassis mounting package dimensions



DIN rail package dimensions



Trim



Trim up Trim down

The usage circuit of the Trim circuit (dashed line shows inside of product)

Vout (VDC)	R1 (KΩ)	R2 (KΩ)	R3 (KΩ)	Vref (V)
3.3	24	14.53	68	1.25
5	24	24	68	2.5
9	12.1	4.62	30	2.5
12	18	4.7	30	2.5
15	24	4.78	30	2.5
24	25.5	2.955	18	2.5

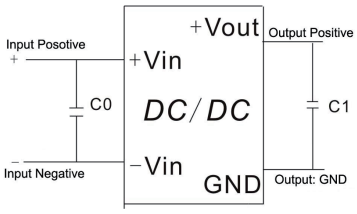
$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

RT= Trim Resistor value;
a= self-defined parameter, no actual meaning;
Vo' is the actula voltage to increas or desearse;

Recommended circuit

1. DC-DC test circuit:
Normal recommended capacitors: C0: 47-100uF; C1:10-22uF.



2. Input reflecting ripple current test circuit:
Capacitor C choose low ESR ones, withstand voltage value should be bigger than max input voltage;