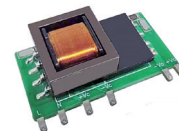


10ACFE1W_4R series

10W - AC-DC converter



AC-DC Converter

10 Watt

- ⊕ Input range: 85–528 VAC / 100–745 VDC
- ⊕ No-load power: ≤0.3W (230VAC)
- ⊕ Up to 83% efficiency
- ⊕ Operating temperature: -40°C to +85°C
- ⊕ Switching frequency: 50 kHz
- ⊕ Short circuit protection (SCP), Overcurrent protection
- ⊕ Isolation voltage: 4200VAC/DC6000V
- ⊕ Designed in accordance with IEC62368, UL62368, and EN62368 standards.
- ⊕ Ultra-compact design
- ⊕ Through-hole mounting on PCB
- ⊕ OVCIII category
- ⊕ Max. operating altitude 5,000 m

Introducing our latest 10ACFE1W_4R series, designed to deliver exceptional performance and reliability with a wide input voltage range of 85-528VAC/100-745VDC, ensuring compatibility with diverse power systems. It features low no-load power consumption, optimized for efficiency with a no-load power of ≤0.3W at 230VAC. The unit achieves a transfer efficiency of up to 82% at 230VAC and operates at a switching frequency of 50kHz (typical). It includes robust protections against short circuits and overcurrent, and offers an isolation voltage of 4200VAC. Designed for convenience and versatility, this power supply unit is suitable for PCB mounting.



Common specifications

Short circuit protection	Full input voltage range - continuous, self-recovery hiccup
Switching frequency	50 kHz
Operating temperature	-40°C - +85°C (with derating)
Storage temperature	-40°C - +105°C
Soldering temperature	Wave soldering, 260°C (±4°C), duration 5–10 s Manual soldering, 360°C (±8°C), duration 4–7 s
Relative humidity	10–95% RH
Hot Plug	N/A
Remote control (CNT)	N/A
Safety standard	Complies with IEC/UL 62368-1, IEC/EN62477-1, EN61010-1
Vibration	10–55 Hz, 10G, 30 min, along X, Y, Z
Safety standard	CLASS II
MTBF (MIL-HDBK-217F@25°C)	>500,000 Hours
Weight	10g (typ.)
Dimensions	38.0 x 23.0 x 15.0mm

Input specifications

Item	Operating condition	Min	Typ	Max	Units
Input voltage range	AC input	85	230	528	VAC
	DC input	100	-	745	VDC
Certified input voltage range	AC Input	100		480	VAC
Input frequency range		47	50	63	Hz
Input current	115 VAC			0.30	A
	230 VAC			0.15	
	380 VAC			0.10	
Inrush current	115 VAC		15	20	A
	230 VAC		30	40	
	380 VAC		50	60	
No-load power consumption	230 VAC			0.3	W
	380 VAC			0.5	
Leakage current	480 VAC/50 Hz	0.5 mA RMA Max			
Recommended fuse rating	2A, time-lag fuse (Required)				

Isolation specifications

Item	Operating conditions	Min	Typ	Max	Units
Isolation voltage	IP-OP - I/P-O/P, Test 1min, leakage current <5mA	4300			VAC
Ins. resistance	IP-OP @500VDC	50			MΩ

Output specifications

Item	Operating condition	Min	Typ	Max	Units
Voltage accuracy	Full input voltage range, 10–100% load (stable operation achievable at 0%–10% load) 3.3V		±6.0	±7.0	%
	Full input voltage range, 10–100% load (stable operation achievable at 0%–10% load) 5V/9V/12V/15V/24V		±5.0	±6.0	%
Line regulation (nominal load)	3.3V 5V/9V/12V/15V/24V		±2.0 ±1.5	±4.0 ±3.0	%
Load regulation	10%–100% of nominal input voltage load - Vo		±3.0	±4.0	%
Ripple & noise	5%–100% load, 20 MHz bandwidth - Vo			180	mVp-p
Dynamic Response	Overshoot 25%–50%–25%	-5.0	-	+5.0	%
	Recovery time 50%–75%–50%	-	-	+5.0	ms
Minimum load	Single-channel output	10			%
Temp. coefficient	-		±0.03		%/°C
Start-up delay time	Input 115 VAC (full load)			2000	ms
	Input 230 VAC (full load)			1000	
	Input 380 VAC (full load)			700	
Power-off hold time	Input 115 VAC (full load)	5	8		mS
	Input: 230 VAC (full load)	30	35		
	Input 380 VAC (full load)	70	80		
Output startup overshoot	Full input voltage range		≤10		%Vo
Output over-current protection (OCP)	Input 230 VAC		110%–200%		Hiccup

Example:

10ACFE1W_05S4R

10 = 10Watt; AC = AC-DC; F = Open Frame; E1 = Cost effective; W = Wide input; 05 = 5Vout; S = Single output; 4 = 4 kVAC isolation; R = Revised version

- The product must be operated within the specified parameters; otherwise, permanent damage may occur.
- If the product operates below the minimum load requirement, we cannot guarantee that all performance specifications in this datasheet will be met.
- If the product operates beyond its specified load range, we cannot guarantee that all performance specifications in this datasheet will be met.
- Unless otherwise specified, all specifications are measured at Ta = 25°C, humidity < 75%, nominal input voltage, and rated output load (resistive load).
- All testing methods for the specifications listed above are based on our corporate standards.
- For specific needs, please contact our technical support team.

10ACFE1W_4R series

10W - AC-DC converter

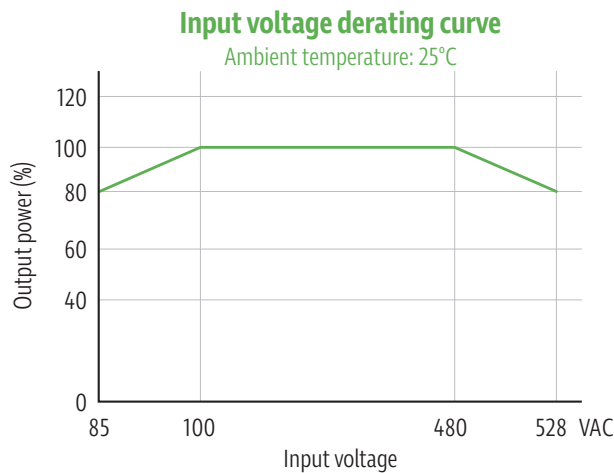
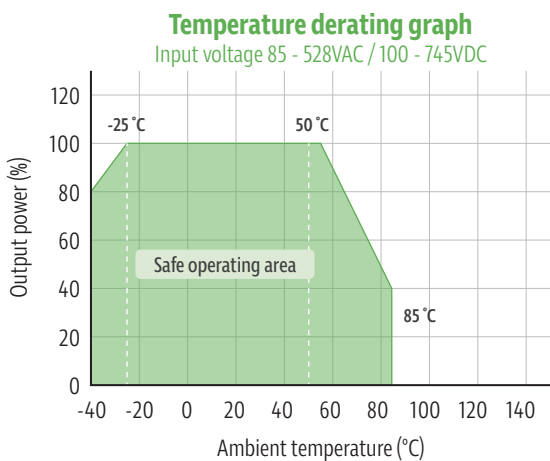
EMC specifications				
EMC	EMI	CE	CISPR 32/EN 55032	CLASS A (recommended circuit shown in figures 2 and 4) CLASS B (see Figure 3 for recommended circuit)
EMC	EMI	RE	CISPR 32/EN 55032	CLASS A (recommended circuits shown in figures 2 and 4) CLASS B (see Figure 3 for recommended circuit)
EMC	EMS	Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Contact ±6 kV / Air ±8 kV Performance criteria B
EMC	EMS	Radiated immunity	IEC/EN 61000-4-3	10 V/m Performance Criteria A
EMC	EMS	Burst immunity (EFT)	IEC/EN 61000-4-4	±4 kV perf. Criteria B
EMC	EMS	Surge immunity	IEC/EN 61000-4-4	Line-to-line ±2 kV (see figures 2 and 3 for recommended circuit) Line-to-line ±2 kV / Line-to-ground ±4 kV (see figure 4 for recommended circuit) Line-to-line ±4 kV (see figure 5 for recommended circuit)
EMC	EMS	CS	IEC/EN 61000-4-5	10 V rms, Performance Criteria A

Product Selection Guide

Approval	Part number	Input Voltage Nom. (VAC)	Input Voltage Range (VAC)	Output Power P (W)	Output Voltage Vo (VDC)	Output Current Io (mA)	Max. Capacitive Load @230VAC (uF)	Ripple & Noise 20MHz (Max)	Efficiency Nom. Input, Full Load (typ.)
	10ACFE1W_03S4R	230	85-528	6.6	3.3	2000	1500	180	73
	10ACFE1W_05S4R	230	85-528	10	5	2000	1500	180	82
	10ACFE1W_09S4R	230	85-528	10	9	1100	1000	180	80
	10ACFE1W_12S4R	230	85-528	10	12	830	680	180	82
	10ACFE1W_15S4R	230	85-528	10	15	670	470	180	82
	10ACFE1W_24S4R	230	85-528	10	24	420	330	180	84

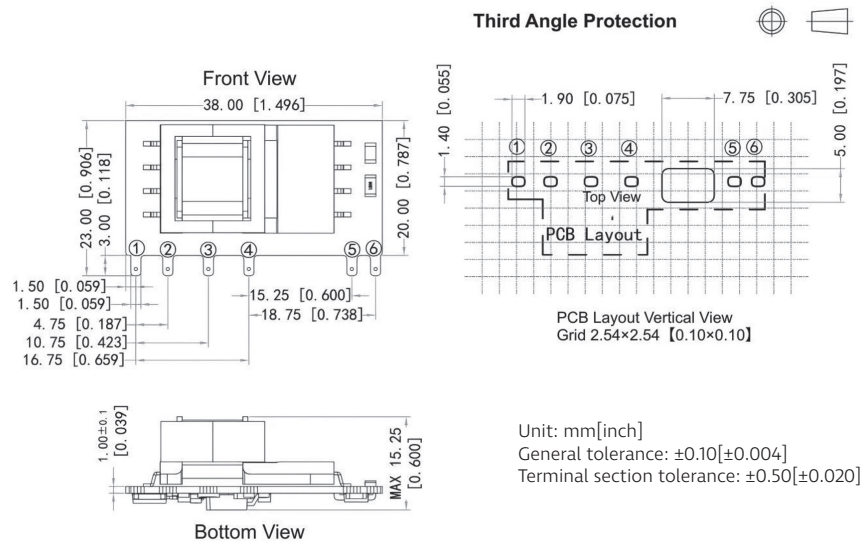
Note
1: Typical output efficiency is measured after 30 minutes of operation at full load (burn-in).
2: The tolerance for typical full-load efficiency (% typ.) is ±2%. Efficiency is calculated as total output power divided by the module's input power.

Product characteristic curve



Notes
1: For input voltages of 85-100VAC or 480-528VAC, the output must be derated according to the Input Voltage Derating Curve.
2: This product is designed for natural convection cooling. Please contact our technical team for applications in enclosed environments

Dimensions and recommended layout



Pin	1	2	3	4	5	6
Function	AC (L)	AC (N)	+V (CAP)	-V (CAP)	-Vo	+Vo
	AC Line	AC Neutral	External Capacitor (+)	External Capacitor (-)	Negative Output	Positive Output

Typical application circuit

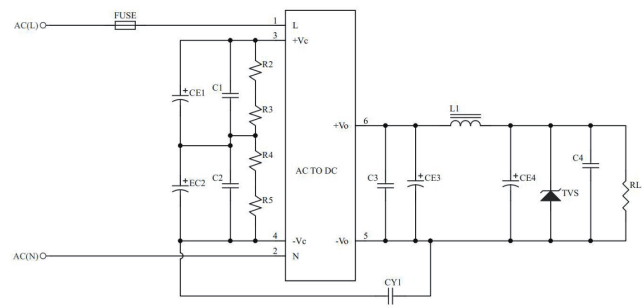


Figure 1

Products Number	CE1, CE2 (*)	R2, R3, R4, R5 (*)	CE3 (*) Solid Cap. Required	L1 (*)	CE4 (Electrolytic capacitor must be connected)	C1, C2	C3, C4	TVS
10ACFE1W_03S4R	47μF/400V	1MΩ/1206	1500μF/6.3V	2.2 μH/5 A	680μF/25V	103/1KV	0.1μF/50 V	SMBJ7.0A
10ACFE1W_05S4R			820μF/16V		330 μF/25 V			SMBJ7.0A
10ACFE1W_09S4R			470μF/16V		1000μF/16V			SMBJ12A
10ACFE1W_12S4R			470μF/16V		330μF/16V			SMBJ20A
10ACFE1W_15S4R			470μF/25V		100μF/35V			SMBJ20A
10ACFE1W_24S4R			470μF/35V		100μF/35V			SMBJ30A

Note:

- * Mandatory component / connection
- FUSE refers to a fuse; the recommended rating is 2A/600Vac, time-lag (required);
- CE1 and CE2 are electrolytic capacitors; we recommend using a series with high ripple current and low ESR, 47μF/400V (required);
- R2, R3, R4, and R5 are voltage-balancing resistors, 1MΩ/1206 (required);
- CY1 is a Y-capacitor, 1nF/400V (required).

Recommended EMC circuit: basic application environment

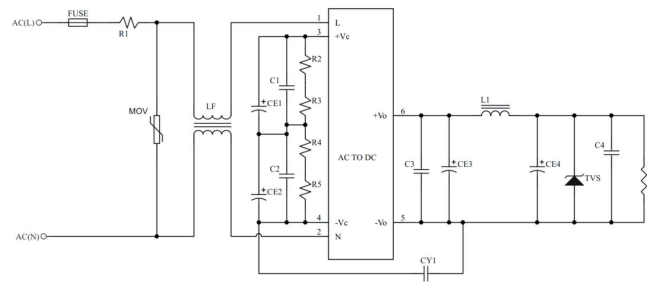


Figure 2

Recommended Parameters:

1. FUSE is a fuse; recommended rating is 2A/600Vac, slow-blow (required);
2. MOV is a varistor, 14D911K (required);
3. R1 is a wire-wound resistor, 6.8Ω/3W (required);
4. CY1 is a Y-capacitor, 1nF/400VAC (required);
5. LF is a Common Mode Choke, 35 mH/0.5 A (required);

Note: Recommended values for other components should be determined based on the specific application, referring to Typical Application Circuits.

EMC recommended circuit: indoor industrial environment

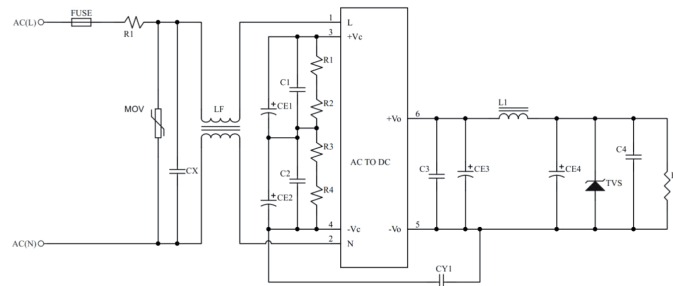


Figure 3

Recommended Parameters:

1. FUSE refers to a fuse; the recommended specification is 2A/600Vac, time-lag fuse (mandatory);
2. MOV is a varistor, 14D911K (required);
3. R1 is a wire-wound resistor, 6.8Ω/3W (required);
4. CY1 is a Y-capacitor, 1nF/400VAC (required);
5. CX1 is an X-capacitor, 0.22μF/530VAC (required);
6. LF is a Common Mode Choke, 35mH/0.5 A (required);

Note: For recommended values of other components, refer to Typical Application Circuits based on actual usage.

Recommended EMC circuit: outdoor industrial environment

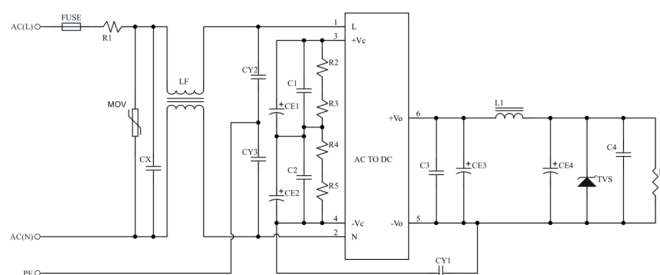


Figure 4

Recommended Parameters:

1. FUSE refers to a fuse; the recommended specification is 2A/600Vac, time-lag fuse (mandatory);
2. MOV is a varistor, 14D911K (required);
3. R1 is a wire-wound resistor, 6.8Ω/3W (required);
4. CY1 is a Y-capacitor, 1nF/400VAC (required);
5. CX1 is an X-capacitor, 0.22μF/530VAC (required);
6. LF is a Common Mode Choke, 35mH/0.5 A (required);

Note: For recommended values of other components, refer to Typical Application Circuits based on actual usage.

Recommended EMC circuit: severe lightning surge environment

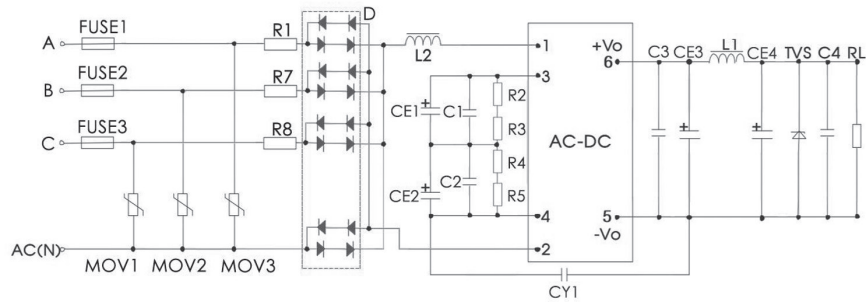


Figure 5.1: Recommended External Circuit for 4kV Differential Mode Surge (Full-wave Rectification)

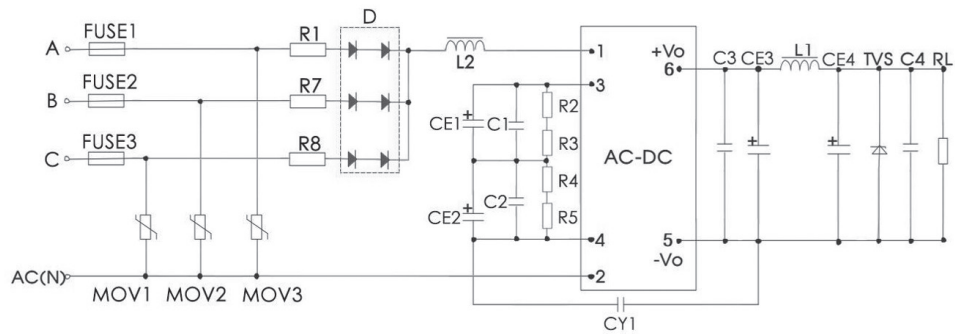


Fig. 5.2 4kV Differential Mode Surge Circuit (Half-wave)

Component Part Number	Recommended Value
MOV1, MOV2, MOV3	14D911K
R1, R7, R8 (Wirewound resistors, required)	12Ω/5W
L2	2.2 mH / Max: 4.81 Ω / Min: 0.31 A
D	2A/1000V
FUSE 1, FUSE 2, FUSE 3 (Required)	6.3A/600V, time-lag
Note: R1, R7, and R8 must be external through-hole wire-wound resistors. Do not use SMD or carbon film resistors.	