



SPECIFICATION FOR APPROVAL

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KES-5W SERIES

INTERNAL AC-DC POWER SUPPLY

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KES-5W SERIES

Manufacturer Part No.: KS251465

Customer Name KTEC

Customer Part NO. _____

Project Modify List

Item	Content	Rev.	Date	Prepared By	Checked By
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1. FEATURES

1.1 Highlight & Features

- Wide input range (85 ~ 305 Vac)
- Wide operating temperature range (-40 to +85°C)
- Meet IEC/EN/UL 62368
- Designed to meet 61558 & 60335 safety standards
- 1,000,000 hour MTBF
- Flexible implementations to power a wide array of applications



MODEL	Output voltage	Output current		Output power	Ripple and noise ¹	efficiency ²
		min (A)	max (A)			
	(Vdc)			max (W)	typ (mVp-p)	typ (%)
KES-5W-033FP	3.3	0.1	1.0	3.3	150	69.0
KES-5W-050FP	5.0	0.1	1.0	5.0	150	76.0
KES-5W-090FP	9.0	0.056	0.56	5.0	150	77.0
KES-5W-120FP	12.0	0.042	0.42	5.0	150	79.0
KES-5W-150FP	15.0	0.034	0.34	5.0	150	79.0
KES-5W-240FP	24.0	0.021	0.21	5.0	150	81.0

Note: 1. At full load, nominal input, 20 MHz bandwidth oscilloscope, see Application Circuit 10% -100% load.
2. At 230Vac input.

1.2 Chemical Substance Control Laws

PAHS 6P NP REACH ROHS NOP

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2. INPUT

Parameter	Conditions/description	Min	Typ	Max	Units
Voltage	AC input	85		305	Vac
	DC input	70		430	Vdc
frequency		47		63	Hz
current	at 115Vac			0.2	A
	at 230Vac			0.1	A
inrush current	at 115Vac		20		A
	at 230Vac		40		A
no load power consumption	at 230Vac			0.1	W

3. OUTPUT

Parameter	Conditions/description	Min	Typ	Max	Units
capacitive load	3.3Vdc output models			2200	μF
	5Vdc output models			1500	
	9Vdc output models			680	
	12Vdc output models			470	
	15Vdc output models			330	
	24Vdc output models			100	
initial set point accuracy	10% ~ 100% load		±5		%
line regulation	at rated load		±1.5		%
load regulation	10% ~ 100% load		±3		%
temperature coefficient			±0.15		%/°C

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4. PROTECTIONS

Parameter	Conditions/description	Min	Typ	Max	Units
Over current protection	auto recovery	110			%
Short circuit protection	continuous, auto recovery, hiccup				

5. SAFETY & COMPLIANCE

Parameter	Conditions/description	Min	Typ	Max	Units
isolation voltage	input to output for 1 minute, leakage current <5mA	3,600			Vac
safety approvals	certified to 62368: IEC, EN, UL/cUL designed to meet 61558: IEC, EN designed to meet 60335: IEC, EN				
safety class	class II				
EMI/EMC	CISPR32/EN55032 CLASS A (Recommended circuit 1, 4) CISPR32/EN55032 CLASS B (Recommended circuit 2, 3)				
ESD	IEC/EN 61000-4-2 Contact ± 6 KV perf. Criteria B				
radiated immunity	IEC/EN61000-4-3 10V/m perf. Criteria A				
EFT/burst	IEC/EN61000-4-4 ± 2 KV(Recommended circuit 1, 2) perf. Criteria B IEC/EN61000-4-4 ± 4 KV (Recommended circuit 3, 4) perf. Criteria B				
surge	IEC/EN61000-4-5 line to line ± 1 KV (Recommended circuit 1, 2) perf. CriteriaB IEC/EN61000-4-5 line to line ± 2 KV (Recommended circuit 3, 4) perf. CriteriaB				
conducted immunity	IEC/EN61000-4-6 10Vr.m.s perf. Criteria A				
voltage dips and interruptions	IEC/EN61000-4-11 0%, 70% perf. CriteriaB				
MTBF	as per MIL-HDBK-217F at 25°C	1,000,000			hours
RoHS	yes				

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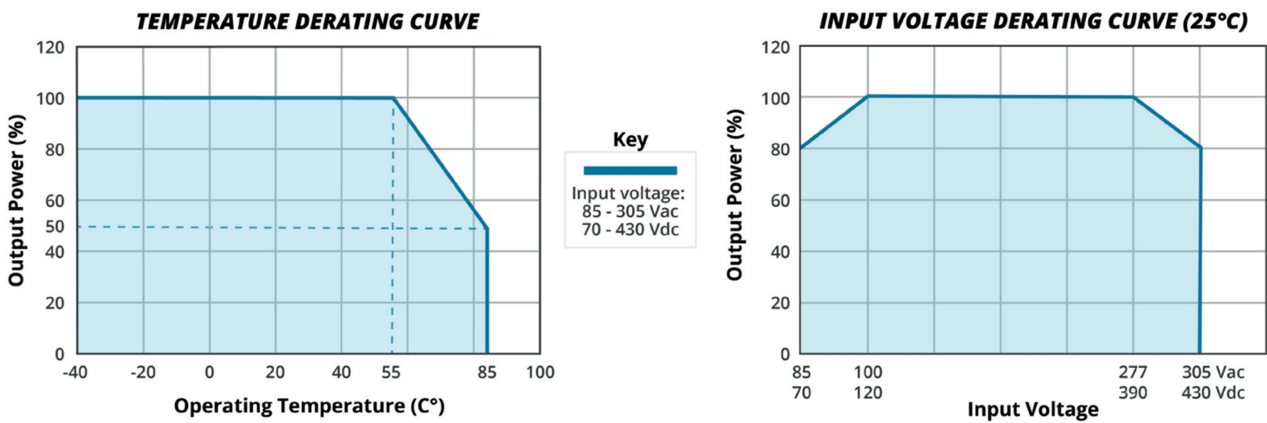
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6. ENVIROMENTAL

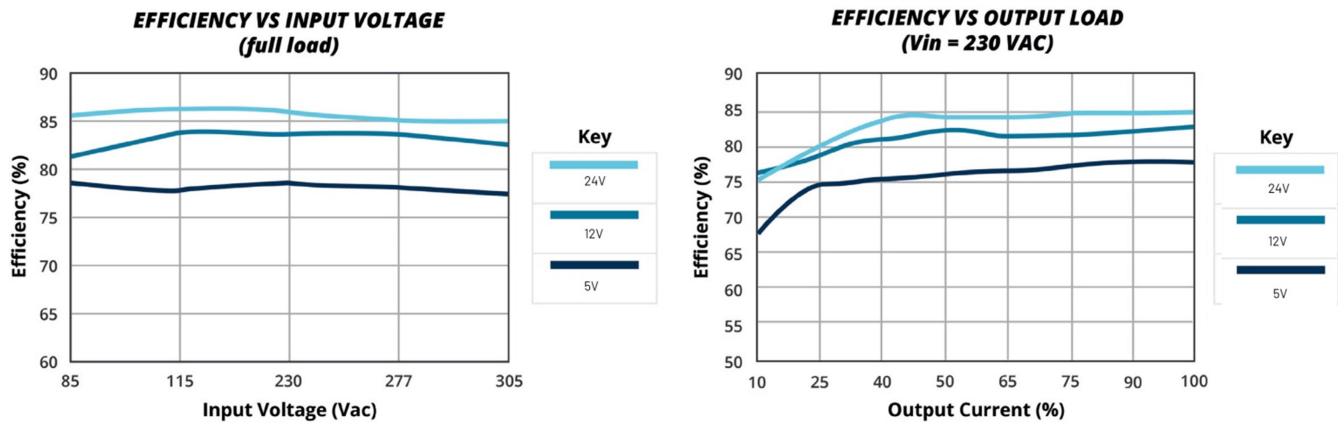
Parameter	Conditions/description	Min	Typ	Max	Units
operating temperature		-40		85	°C
storage temperature		-40		105	°C
storage humidity				95	%

6.1 DERATING CURVES



Note: For input voltages of 85-100VAC/277-305VAC/70-120VDC/390-430VDC, voltage derating should be performed on the basis of temperature derating.

6.2 EFFICIENCY CURVES



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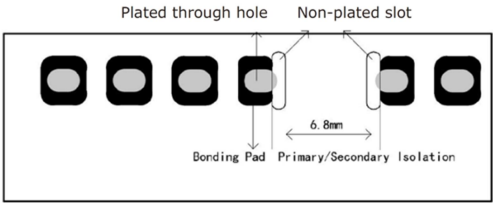
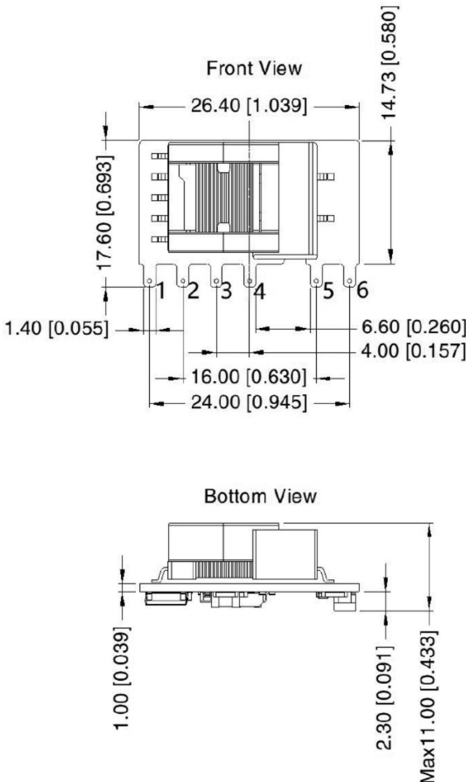
7. MECHANICAL DRAWING: (UNIT: MM)

parameter	conditions/description	min	typ	max	units
dimensions	26.40 x 14.73 x 11.00 (1.039 x 0.579 x 0.433 inches)				mm
weight			5.2		g
cooling	free air convection				

MECHANICAL DRAWING

units: mm [inch]
general tolerance: ±1.00 [±0.039]

PIN CONNECTIONS	
PIN	Function
1	AC (L)
2	AC (N)
3	+V (cap)
4	-V (cap)
5	-Vo
6	+Vo



Note: There are two, non-metallic/non-plated, slots located between pins 4 and 5 that are required to maintain proper creepage distance and isolation between primary and secondary circuits.

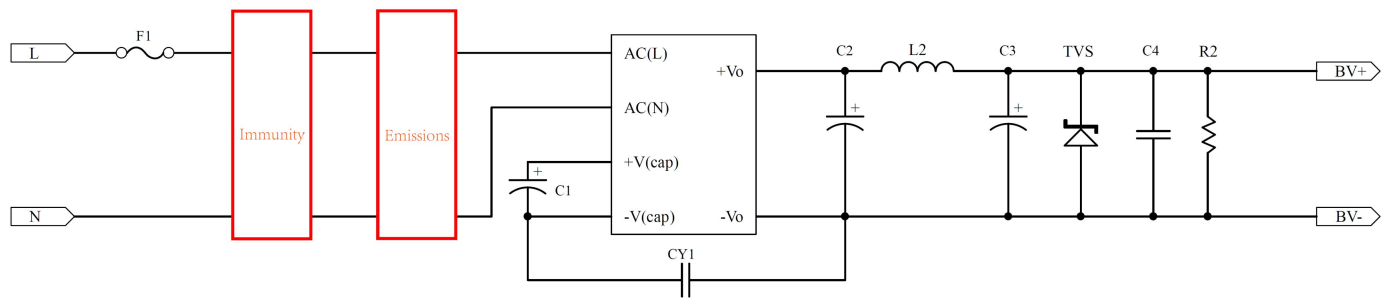
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8. APPLICATION DESIGN REFERENCE



KSE-5W Series additional component selection guide (no EMC devices)

Part no.	C1 ¹ (required)	C2 (required)	L2 (required)	C3 ² (required)	C4	CY1 (required)	TVS ³
KSE-5W-033FP	22μF/450V (-40°C to 85°C with 85-305Vac input)	820μF/6.3V (solid-state capacitor)		100μF/ 35V			SMBJ7.0A
KSE-5W-050FP	10μF/450V (-25°C to 85°C with 85-305Vac input, or -40°C to 85°C with 165-305Vac input)	470uF/16V (solid-state capacitor)	4.7μH max 60mΩ/ 2.2A		0.1μF/ 50V (ceramic capacitor)	1.0nF/ 400Vac	SMBJ7.0A
KSE-5W-090FP		270uF/16V (solid-state capacitor)		47μF/ 35V			SMBJ12A
KSE-5W-120FP							SMBJ20A
KSE-5W-150FP		220uF/35V					SMBJ20A
KSE-5W-240FP							SMBJ30A

- Note: 1. Recommended to use a capacitor with ripple current >200 mA at 100 kHz.
2. Recommended to use a high frequency, low ESR, electrolytic capacitor ($\leq 1.1\Omega$ at -40 C) with at least 20% margin on voltage rating.
3. A suppressor diode (TVS) is recommended to protect the downstream application in case of converter failure and should be rated for a minimum of 1.2 times the converter's output voltage.

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KSE-5W Series Environmental and EMC selection guide

Recommended circuit	Application environmental	Typical industry	Input voltage range	Environment temperature	Emissions	Immunity
1	Basic	None	85~305Vac	-40°C to 85°C	Class A	Class III
2	Indoor civil environment	Smart home/Home appliances (2Y-caps)		-25°C to 55°C	Class B	Class III
	Indoor general environment	Intelligent building/ Intelligent agriculture				
3	Indoor industrial environment	Manufacturing workshop		-25°C to 55°C	Class B	Class IV
4	Outdoor general environment	ITS/Video monitoring/ Charging point/ Communication/Security and protection		-40°C to 85°C	Class A	Class IV

Immunity design circuits reference		Emissions design circuits reference	
Class III	Class IV	Class A	Class B

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Circuit 1

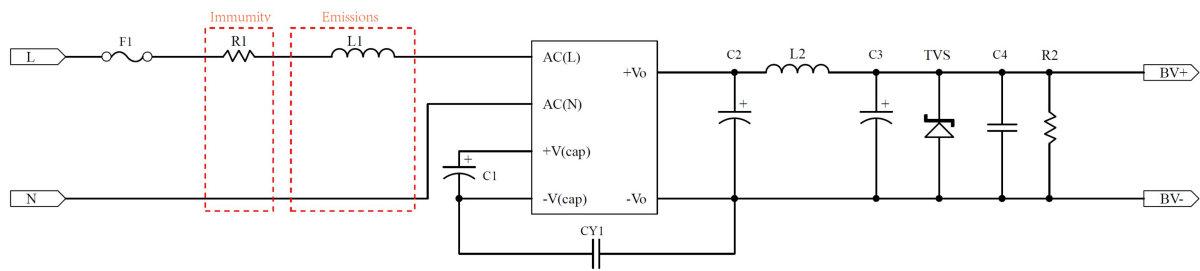


Table 1

Application	Ambient temperature	Immunity Class	Emissions Class
Basic application	-40°C ~ 85°C	Class III	Class A

Component	Recommended value
F1 (required)	T1A/300V
R1 (wire-wound resistor, required)	12Ω/2W
L1	4.7mH/15Ω max/0.2A min

Note: R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

Circuit 2

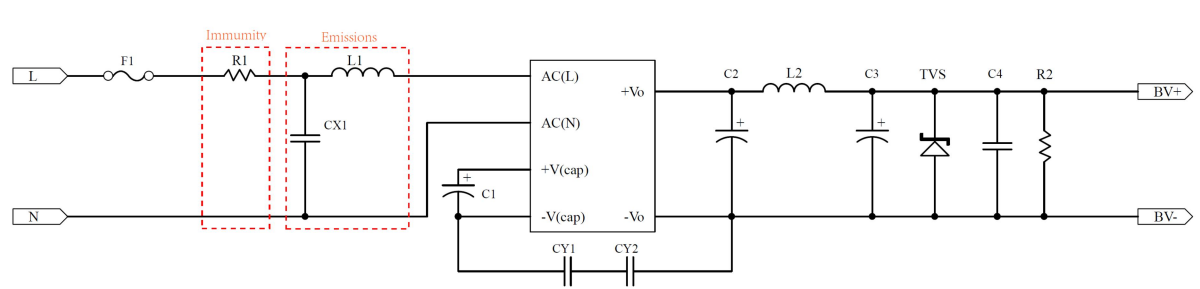


Table 2

Application	Ambient temperature	Immunity Class	Emissions Class
Indoor civil / general	-25°C ~ 55°C	Class III	Class B

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Component	Recommended value
R1 (wire-wound resistor, required)	12Ω/2W
L1	1.2mH/ 4Ω/0.2A
CX1	0.1μF/310Vac
F1 (required)	T1A/300V

- Note: 1. For Smart Home and Home Appliance applications two Y-capacitors are required in series (2.2nF/250Vac each) to meet 60335 household safety requirements.
2. Many safety standards require a bleeder resistor no greater than 3.8MΩ in parallel with the X-capacitor.
3. R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

Circuit 3

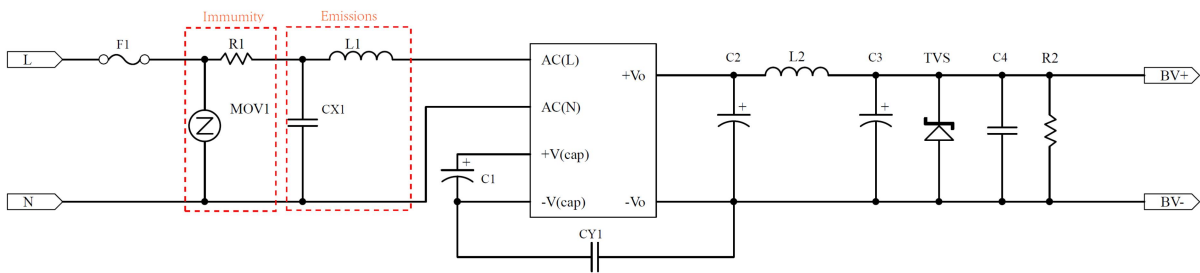


Table 3

Application environmental	Ambient temperature	Immunity Class	Emissions Class
Indoor industrial	-45°C ~ 55°C	Class III	Class A

Component	Recommended value
MOV1	14D621
CX1	0.1μF/310Vac
L1	1.2mH/ 4Ω/0.2A
R1 (wire-wound resistor, required)	12Ω/2W
F1 (required)	T2A/300V,Slow-bolw

- Note: 1. Many safety standards require a bleeder resistor no greater than 3.8MΩ in parallel with the X-capacitor.
2. R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

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Circuit 4

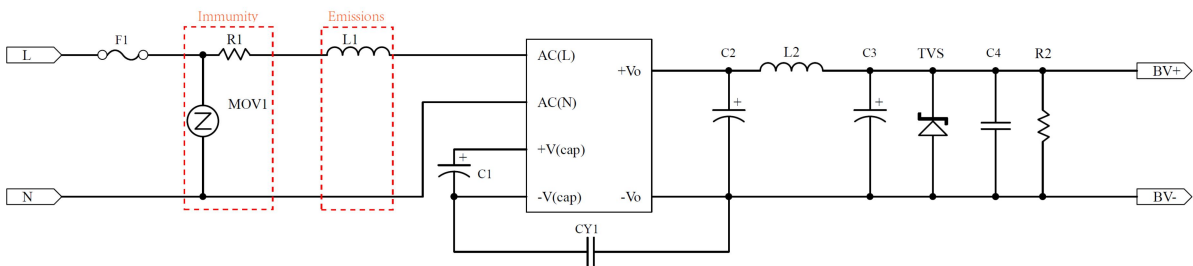


Table 4

Application environmental	Ambient temperature range	Immunity Class	Emissions Class
Outdoor general environment	-40°C ~ 85°C	Class IV	Class A

Component	Recommended value
MOV1	14D621
L1	4.7mH/15Ω /0.2A
R1 (wire-wound resistor, required)	12Ω/2W
F1 (required)	T2A/300V

Note: R1 must be a wire-wound resistor; do not use a chip or carbon film resistor.

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9. PACKING (UNIT: MM)

