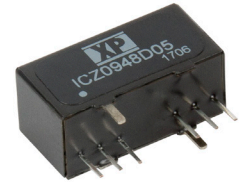


The ICZ09 series offers 9 Watts in an ultra-compact metal SIP8 package that measures only 21.9 x 9.6 x 11.2mm (0.86 x 0.38 x 0.44"). They are fully regulated to within $\pm 0.2\%$ of line variations and $\pm 0.5\%$ for load changes from 0 to 100%. (dual outputs $\pm 1.0\%$), they require no minimum load to maintain these specifications.

There are 3 input ranges of 9 to 18VDC for nominal 12Vin, 18 to 36VDC for 24Vin applications or 36-75VDC for nominal 48Vin applications. Each input range offers the choice of six single outputs from 3.3 to 24VDC, and three dual output voltages with ± 5 , ± 12 or ± 15 VDC.

Providing 1.6kVDC isolation, all models include a remote on/off pin to facilitate external control or sequencing. The ICZ09 range meet class A conducted emissions with external components and has protection features for input surge voltage, overload and short circuit conditions.



Features

- ▶ Regulated single & dual outputs
- ▶ 2:1 input range
- ▶ Single outputs 3.3 to 24VDC
- ▶ Dual outputs ± 5.0 to ± 15 VDC
- ▶ SIP8 package
- ▶ 1.6kVDC isolation
- ▶ Remote On/Off
- ▶ No minimum load
- ▶ -40°C to $+85^{\circ}\text{C}$ operating temperature
- ▶ Full power to $+60^{\circ}\text{C}$
- ▶ 3 year warranty

Applications



Dimensions

21.8 x 9.6 x 11.2mm (0.86" x 0.38" x 0.44")

Models & ratings

Model number	Input voltage	Output voltage	Output current	Efficiency	Input current ⁽¹⁾		Maximum capacitive load ⁽²⁾
					No load	Full load	
ICZ0912S3V3	9-18VDC	3.3VDC	2000mA	81%	15mA	679mA	2600 μ F
ICZ0912S05		5.0VDC	1600mA	85%		784mA	1300 μ F
ICZ0912S09		9.0VDC	1000mA	87%		862mA	800 μ F
ICZ0912S12		12.0VDC	750mA	88%		852mA	560 μ F
ICZ0912S15		15.0VDC	600mA	89%		843mA	470 μ F
ICZ0912S24		24.0VDC	375mA	89%		843mA	200 μ F
ICZ0912D05		± 5.0 VDC	± 800 mA	85%		784mA	± 800 μ F
ICZ0912D12		± 12.0 VDC	± 375 mA	88%		852mA	± 390 μ F
ICZ0912D15		± 15.0 VDC	± 300 mA	89%		843mA	± 200 μ F

Continued on page 2

Notes:

1. Input currents measured at nominal input voltage.
2. Maximum capacitive load is per output.

3. Standard tube quantity = 20

Models & ratings

Model number	Input voltage	Output voltage	Output current	Efficiency	Input current ⁽¹⁾		Maximum capacitive load ⁽²⁾
					No load	Full load	
ICZ0924S3V3	18-36VDC	3.3VDC	2000mA	80%	15mA	344mA	2600μF
ICZ0924S05		5.0VDC	1600mA	85%		392mA	1300μF
ICZ0924S09		9.0VDC	1000mA	88%		426mA	800μF
ICZ0924S12		12.0VDC	750mA	89%		421mA	560μF
ICZ0924S15		15.0VDC	600mA	90%		417mA	470μF
ICZ0924S24		24.0VDC	375mA	90%		417mA	200μF
ICZ0924D05		±5.0VDC	±800mA	86%		388mA	±800μF
ICZ0924D12		±12.0VDC	±375mA	89%		421mA	±390 μF
ICZ0924D15		±15.0VDC	±300mA	87%		431mA	±200μF
ICZ0948S3V3	36-75VDC	3.3VDC	2000mA	82%	10mA	168mA	2600μF
ICZ0948S05		5.0VDC	1600mA	85%		196mA	1300μF
ICZ0948S09		9.0VDC	1000mA	88%		213mA	800μF
ICZ0948S12		12.0VDC	750mA	89%		211mA	560μF
ICZ0948S15		15.0VDC	600mA	89%		211mA	470μF
ICZ0948S24		24.0VDC	375mA	89%		211mA	200μF
ICZ0948D05		±5.0VDC	±800mA	86%		194mA	±800μF
ICZ0948D12		±12.0VDC	±375mA	87%		216mA	±390μF
ICZ0948D15		±15.0VDC	±300mA	87%		216mA	±200μF

Notes:

1. Input currents measured at nominal input voltage.
2. Maximum capacitive load is per output.

3. Standard tube quantity = 20

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	9		18	VDC	12VDC nominal
	18		36		24VDC nominal
	36		75		48VDC nominal
Input filter	Capacitor				
Input reflected ripple			30	mA pk-pk	Through 12μH inductor and 47μF capacitor
Undervoltage lockout	On at >8.9V, Off at <7.1V				12VDC models
	On at >16V, Off at <13.1V				24VDC models
	On at >33V, Off at <30.1				48VDC models
Input surge			25	VDC for 100ms	12VDC models
			50		24VDC models
			100		48VDC models

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	3.3		30	VDC	See models and ratings table
Minimum load	0			%	No minimum load required
Initial set accuracy			±1	%	At full load
Line regulation			±0.2	%	From minimum to maximum input at full load
Load regulation			±0.5	%	Single output from 0 to full load
			±1		3V3 and dual output from 0 to full load
Cross regulation			±5	%	On dual output models when one load is varied between 25% and 100% and other is fixed at 100%
Transient response			±5	%	For 3V3 output models / all other models. Recovery within 2% in less than 250 μs for a 25% load change
			±3		3.3-9V/12-24V. 20 MHz bandwidth. Measured using 1 μF ceramic and 10 μF electrolytic capacitors
Ripple & noise			75	mV pk-pk	20MHz bandwidth, measured using 0.1μF ceramic capacitor
Short circuit protection	Continuous trip & restart (hiccup mode), with auto recovery				
Temperature coefficient			0.02	%/°C	
Overload protection		150		%	
Maximum capacitive load	See models and ratings table				
Remote on/off	Output is ON if remote On Off (pin 3) is an open circuit or if the voltage on pin 3 is ≤0.1VDC Output is OFF if a voltage (max 5VDC) is applied to the remote On / Off (pin 3) with a maximum current of 4mA Note: For correct operation ensure pin 3 current is >11μA.				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		88		%	See models and ratings table
Isolation: input to output	1600			VDC	For 60s, insulation: functional
Isolation: input to case	1000				
Continuous working voltage: input to output			500	VDC	200Vrms
Isolation resistance	10 ⁹			Ω	
Isolation capacitance		50		pF	
Switching frequency		400/500		kHz	12 & 24Vin/48Vin
Power density		3.9 (65.0)		W/cm ³ (W/in ³)	
Mean time between failure	900			khrs	MIL-HDBK-217F, +25°C GB
Case material	Copper				
Potting material	Epoxy UL94V-0				
Pin material	Solder coated phosphor bronze C519R-H				
Solder profile	260°C max, 1.5mm from case 10s max				
Water wash	Use deionized water, do not soak. Dry thoroughly.				
Weight		7.3 (0.016)		g (lb)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+85	°C	Derate from 100% load at +60 °C to no load at +85 °C. Derate from 100% load at +50 °C to no load at +85 °C for 3V3 output models.
Storage temperature	-55		+125	°C	
Case temperature			+100	°C	
Cooling	Natural convection				
Operating humidity			95	%	RH, non condensing

Safety approvals

Safety agency	Standard	Notes & conditions
UL	UL/cUL60950-1, 62368-1	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Emissions - EMC

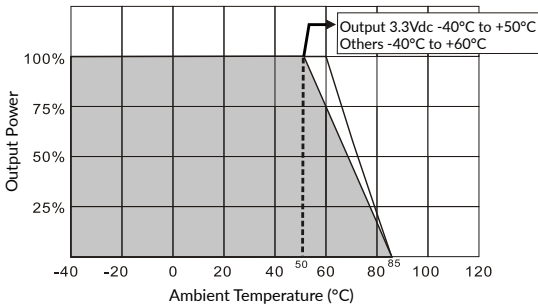
Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032	Class A	See application notes
Radiated	EN55032	Class A	

Immunity - EMC

Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD Immunity	EN61000-4-2	±6kV	A	Contact
		±8kV		Air
Radiated immunity	EN61000-4-3	20V/m	A	
EFT/Burst	EN61000-4-4	±2kV	A	See application notes
Surge	EN61000-4-5	±2kV	A	See application notes
Conducted immunity	EN61000-4-6	10Vrms	A	
Magnetic fields	EN61000-4-8	100A/m	A	

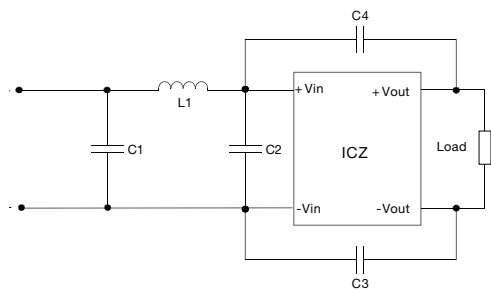
Application notes

Derating curve

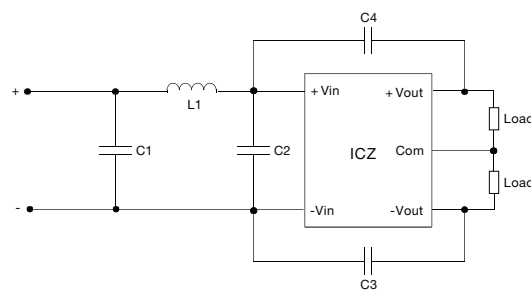


EMI filter

Single output models



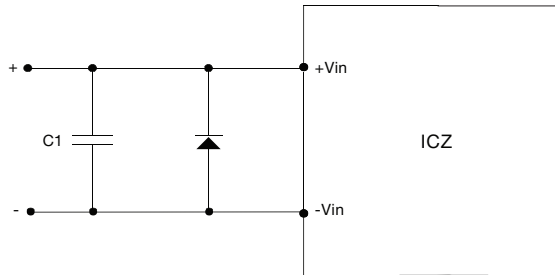
Dual output models



Model	C1	C2	C3, C4	L1
12Vin	1210, 10µF/35V	N/A	1210, 4.7µF/100V	1210, 4.7µF/100V
24Vin & 48Vin	1210, 4.7µF /100V	1210, 4.7µF/100V	2x 133µH	10µH

Application notes

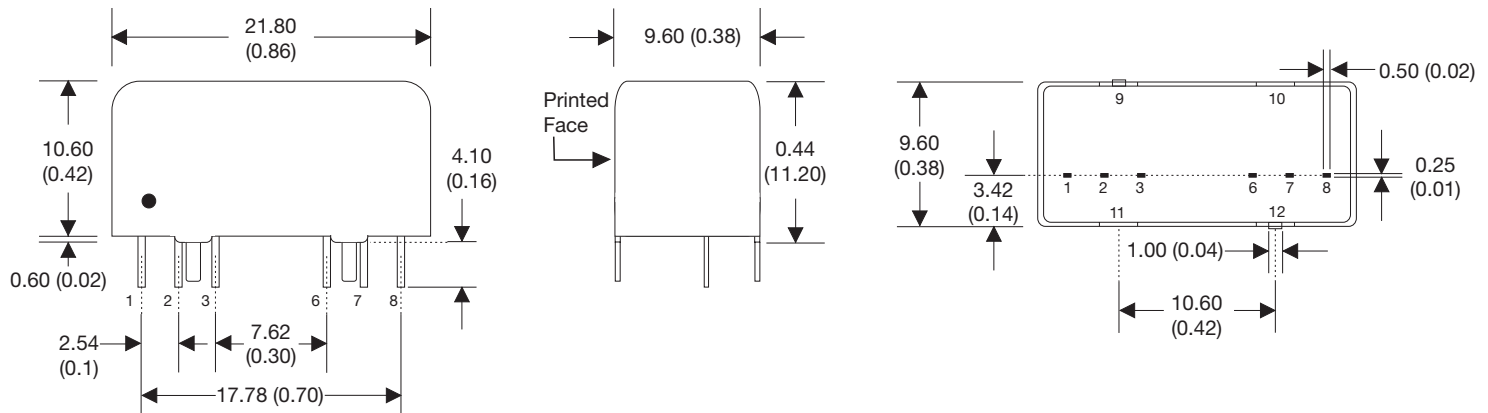
EFT/surge filter



Model	C1	D1
12Vin	330 μ F, 100V	TVS, 3kW, 26V
24Vin	330 μ F, 100V	TVS, 3kW, 70V
48Vin	330 μ F, 100V	TVS, 3kW, 120V

C1 suggested series Nippon Chemicon KY

Mechanical details



Pin connections		
Pin	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	Remote On/Off	Remote On/Off
6	+Vout	+Vout
7	-Vout	Common
8	No Connection	-Vout
9	Case	Case
10	Stand Off	Stand Off
11	Stand Off	Stand Off
12	Case	Case

Notes:

- All dimensions are in mm (inches)
- Weight: 7.3 (0.016) g (lb) approx.
- Case tolerance: ± 0.5 (± 0.02)
- Pin pitch tolerance: ± 0.35 (± 0.014)
- Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)

Specifications subject to change without notice.