

**2 Watt****7 Pin SIL Package Z**

- o Ultra-Miniature Size
- o Unregulated Output
- o 1000 VDC Isolation
  - 3000 VDC Isolation add Suffix „H3“, 4000 VDC Isolation add Suffix „H4“
  - 5200 VDC Isolation add Suffix „H5“, 6000 VDC Isolation add Suffix „H6“
- o Efficiency up to 82%

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		%EFF		
				NO-LOAD	FULL LOAD			
2ZUS5N3.3M	5 VDC	3.3 VDC	400 mA	30 mA	367 mA	72		
2ZUS5N5M		5 VDC			512 mA	78		
2ZUS5N7.2M		7.2 VDC	277.7 mA		500 mA	80		
2ZUS5N9M		9 VDC	222.2 mA					
2ZUS5N12M		12 VDC	166.7 mA		487 mA	82		
2ZUS5N15M		15 VDC	133.3 mA					
2ZUS5N18M		18 VDC	111.1 mA					
2ZUS5N24M		24 VDC	83.3 mA					
2ZUD5N3.3M		±3.3 VDC	±200 mA				406 mA	65
2ZUD5N5M		±5 VDC					555 mA	72
2ZUD5N7.2M		±7.2 VDC	±138.8 mA	519 mA	77			
2ZUD5N9M		±9 VDC	±111.1 mA	512 mA	78			
2ZUD5N12M		±12 VDC	±83.3 mA	500 mA	80			
2ZUD5N15M		±15 VDC	±66.67 mA					
2ZUD5N18M		±18 VDC	±55.55 mA					
2ZUD5N24M		±24 VDC	±41.67 mA					
2ZUS12N3.3M		12 VDC	3.3 VDC	400 mA	36 mA	169 mA	65	
2ZUS12N5M			5 VDC		20 mA	216 mA	77	
2ZUS12N7.2M			7.2 VDC	277.7 mA		208 mA	80	
2ZUS12N9M			9 VDC	222.2 mA		203 mA	82	
2ZUS12N12M	12 VDC		166.7 mA					
2ZUS12N15M	15 VDC		133.3 mA	208 mA		80		
2ZUS12N18M	18 VDC		111.1 mA					
2ZUS12N24M	24 VDC		83.3 mA					
2ZUD12N3.3M	±3.3 VDC		±200 mA				164 mA	67
2ZUD12N5M	±5 VDC			222 mA		75		
2ZUD12N7.2M	±7.2 VDC		±138.8 mA	219 mA		76		
2ZUD12N9M	±9 VDC		±111.1 mA	216 mA	77			
2ZUD12N12M	±12 VDC		±83.3 mA	203 mA	82			
2ZUD12N15M	±15 VDC		±66.67 mA					
2ZUD12N18M	±18 VDC		±55.55 mA					
2ZUD12N24M	±24 VDC		±41.67 mA					

**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF		
				NO-LOAD	FULL LOAD			
2ZUS24N3.3M	24 VDC	3.3 VDC	400 mA	10 mA	76 mA	72		
2ZUS24N5M		5 VDC			105 mA	79		
2ZUS24N7.2M		7.2 VDC	277.7 mA		104 mA	80		
2ZUS24N9M		9 VDC	222.2 mA					
2ZUS24N12M		12 VDC	166.7 mA		102 mA	82		
2ZUS24N15M		15 VDC	133.3 mA		101 mA			
2ZUS24N18M		18 VDC	111.1 mA		104 mA	80		
2ZUS24N24M		24 VDC	83.3 mA					
2ZUD24N3.3M		±3.3 VDC	±200 mA		80 mA	68		
2ZUD24N5M		±5 VDC			111 mA	75		
2ZUD24N7.2M		±7.2 VDC	±138.8 mA		104 mA	80		
2ZUD24N9M		±9 VDC	±111.1 mA					
2ZUD24N12M		±12 VDC	±83.3 mA		101 mA	82		
2ZUD24N15M		±15 VDC	±66.67 mA					
2ZUD24N18M		±18 VDC	±55.55 mA		±41.67 mA			
2ZUD24N24M		±24 VDC	±41.67 mA					
2ZUS48N3.3M		48 VDC	3.3 VDC		400 mA	6 mA	45 mA	60
2ZUS48N5M			5 VDC				54 mA	77
2ZUS48N7.2M			7.2 VDC		277.7 mA			
2ZUS48N9M			9 VDC		222.2 mA			
2ZUS48N12M	12 VDC		166.7 mA	55 mA	75			
2ZUS48N15M	15 VDC		133.3 mA					
2ZUS48N18M	18 VDC		111.1 mA	45 mA	60			
2ZUS48N24M	24 VDC		83.3 mA					
2ZUD48N3.3M	±3.3 VDC		±200 mA	45 mA	60			
2ZUD48N5M	±5 VDC			57 mA	73			
2ZUD48N7.2M	±7.2 VDC		±138.8 mA	54 mA	77			
2ZUD48N9M	±9 VDC		±111.1 mA					
2ZUD48N12M	±12 VDC		±83.3 mA	52 mA	80			
2ZUD48N15M	±15 VDC		±66.67 mA					
2ZUD48N18M	±18 VDC		±55.55 mA	±41.67 mA				
2ZUD48N24M	±24 VDC		±41.67 mA					

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**INPUT SPECIFICATIONS**

Input Voltage Range	±10%
Input Filter	Capacitor Type
Input Reflected Ripple Current <sup>1)</sup>	20 mA p-p

**OUTPUT SPECIFICATIONS**

Voltage Accuracy	±3%
Temperature Coefficient	±0.02%/°C
Ripple and Noise, 20MHz BW <sup>2)</sup>	75 mV p-p max.
Capacitive Load <sup>3)</sup>	Single 470 µF Dual ±220 µF
Short Circuit Protection	No
Line Regulation	±1.2%/1% of Vin Change
Load Regulation (20% - 100%)	3.3 V ±10% ±20%

## NOTE:

1. Measured Input reflected ripple current with a simulated source inductance of 12 µH.
2. Ripple and Noise is measured with 20 MHz bandwidth.
3. Tested by minimal Vin and constant resistive load.

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**GENERAL SPECIFICATION**

Efficiency		see table
Isolation Voltage (3 sec)		1000 VDC
add Suffix "H3"		3000 VDC
add Suffix "H4"	Input/Output	4000 VDC
add Suffix "H5"		5200 VDC
add Suffix "H6"		6000 VDC
Isolation Capacitance		60 pF
Isolation Resistance		1000 Mohms
Capacitive Load	Single Output Dual Output	470 µF max. ±220 µF max.
Switching Frequency		variable 80 kHz
Operating Temperature Range		-40°C to +85°C (see Derating Curve)
Case Temperature		+100°C max.
Storage Temperature Range		-40°C to +125°C
Derating		see diagram
Humidity		95% rel H
Cooling		Natural Convection
Reliability Calculated MTBF (MIL-HDBK-217F)		>1.121 Mhrs
Safety Standard (designed to meet)		IEC60950-1
Case Material		Non-Conductive Black Plastic (UL94V-0 rated)
Pin Material		0.5 mm Alloy42 Solder-coated
Potting Material		Epoxy (UL94V-0 rated)
Weight		2.3 g
Case Dimensions		19.5 x 6.00 x 10.0 mm (0.76 x 0.24 x 0.39 Inches)

**ABSOLUTE SPECIFICATIONS**

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Voltage (100 mS)	5 V	0 VDC to 7 VDC
	12 V	0 VDC to 15 VDC
	24 V	0 VDC to 28 VDC
	48 V	0 VDC to 54 VDC
Lead Soldering Temperature (1.5 mm from case 10 sec.)		+260°C

## NOTE:

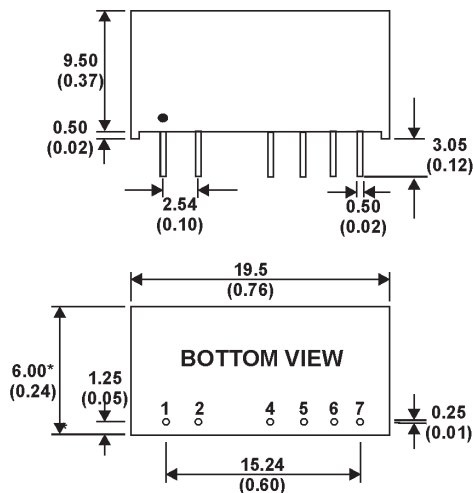
Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.  
Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

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**MECHANICAL SPECIFICATIONS**

Case "Z"



PIN CONNECTIONS				
Pins	Single	Dual	Single-H	Dual-H
1	+INPUT	+INPUT	+INPUT	+INPUT
2	-INPUT	-INPUT	-INPUT	-INPUT
4	-OUTPUT	-OUTPUT	NO PIN	NO PIN
5	NO PIN	COMMON	-OUTPUT	-OUTPUT
6	+OUTPUT	+OUTPUT	NO PIN	COMMON
7	NO PIN	NO PIN	+OUTPUT	+OUTPUT

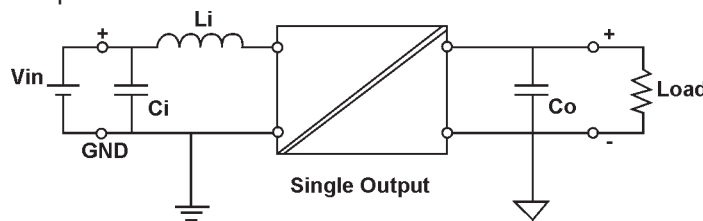
All Dimensions in mm (Inches).  
 Tolerance:  
 Pin diameter:  $0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )  
 Pin pitch tolerance:  $\pm 0.35$  ( $\pm 0.014$ )  
 Case Tolerance:  $\pm 0.5$  ( $\pm 0.02$ )

\*The thickness of 48V input voltage Model is 7.20 (0.28).

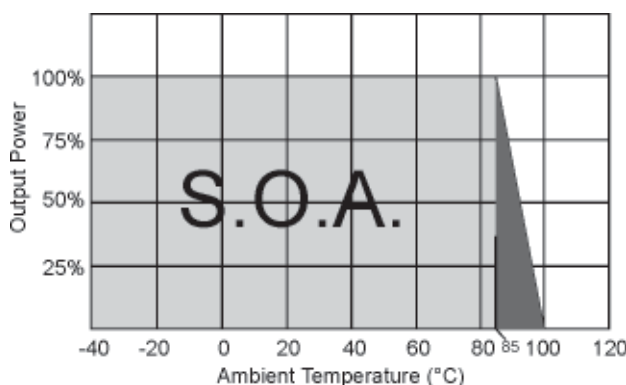
**APPLICATION NOTES & DIAGRAMS**

**Ripple & Noise Filter**

For reduce converter's ripple & noise, it is recommended to add a 4.7  $\mu$ F to 220  $\mu$ F ( $\pm 4.7 \mu$ F to  $\pm 100 \mu$ F for dual output) capacitor in output end. For EMI performance improvement, it is recommended to add a 12  $\mu$ H inductor and a 10  $\mu$ F to 100  $\mu$ F capacitor in input end.



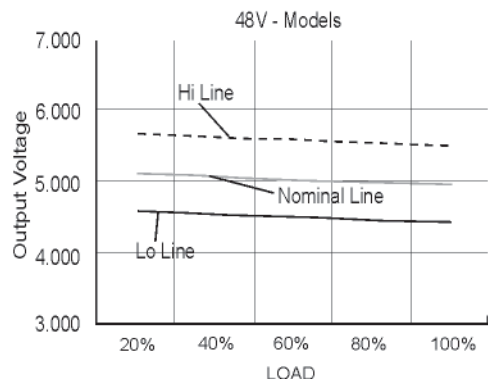
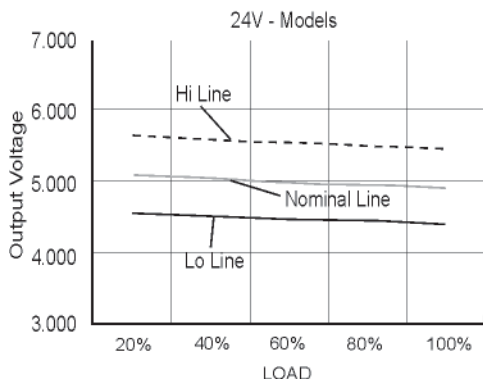
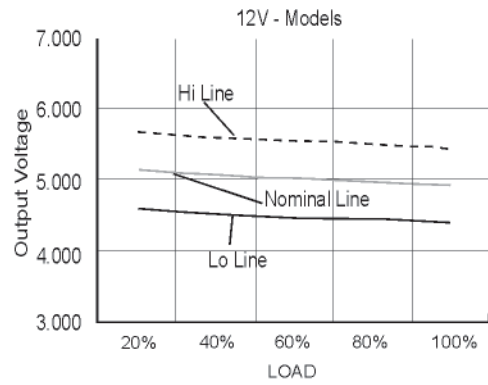
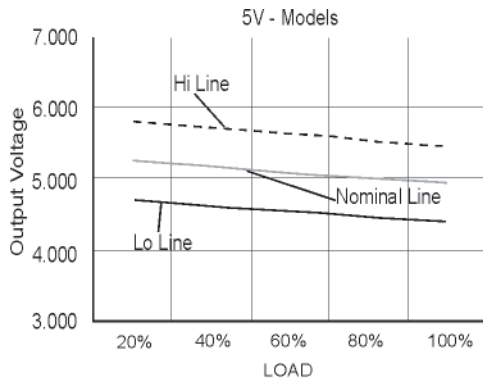
**Derating Curve**



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**Loading vs Output Voltage**



**NOTICE:**  
 The information in this document has been carefully checked. However, no responsibility is assumed for inaccuracies!  
 Specifications can be changed without notice. The latest and most complete information can be found on our website.