# DL-Series

1W Unregulated Single & Dual output

Features
7 Pin SIL Package
6000 VDC High Isolation
Physical Clearance of Isolation Barrier 2.5mm
Low Ripple and Noise
Efficiency up to 81%
Long Term Short Circuit Protection
-40 ~ 85°C Operation Temperature Range
100% safety production test
Rated working voltage for 250Vrms
Low coupling capacity



The DL series is a family of cost effective 1W single & dual output DC-DC converters. These converters achieve low cost and miniature SIP size without compromising performance. The bigger case ensures the physical clearance of isolation barrier of 2.5mm, which increases the reliability under hipot from 6KVDC. Devices are encapsulated with flame retardant resin. Input voltages are 5V,9V,12V,15V,24Vdc. with output voltage of 3.3V,5V,9V,12V,15V, ±3.3V, ±5V, ±9V, ±12V, ±15Vdc. Special featuring long term output short circuit protection. Standard features include an input range of ±10% tolerance and low output noise and ripple.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS	
Voltage Accuracy	±3%
Line Regulation	±1.2% / Per 1% Vin Change
Load Regulation	(From 10% to 100% Load) ±10%
Ripple & Noise(1) (20 Mhz bandwidth)	200mV pk-pk
Short Circuit Protection	Indefinite (Automatic Recovery)
Temperature Coefficient	<b>±0.03%/°</b> C
Capacitor Load(2)	See Table
INPUT SPECIFICATIONS	
Voltage Range	±10% ,max.
Input Current	See Table
No-Load Input Current	See Table
Input Filter	Capacitor
Input Reflected Ripple(3)	20 mA rms
rms thru 12uH inductor,5Hz to20MI	Hz
GENERAL SPECIFICATIONS	
Efficiency	See table
I/O Isolation V oltage(60 sec)	6000Vdc
I/O Isolation Capacitance	10 pF
I/O Isolation Resistance	1000M Ohm
Switching Frequency	Typical 20~50KHz
Humidity	95% rel H
Reliability Calculated MTBF (MIL-H	HDBK-217 F) >2.39 Mhrs
Safety Standard : (designed to meet)	IEC 60950-1
ENVIRONMENT SPECIFICATIONS	
Operating Temperature	<b>40°C~85°</b> C
Maximum Case Temperature	_ <b>100</b> °C

Storage Temperature

Cooling

PHYSICAL SPECIFICATIONS	
Clearance Distance	(Input to Output) 2.5 mm
Case Material	Epoxy encapsulated(UL94V-0 rated)
Pin Material	0.5mm Alloy 42 Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	4.2g
Dimensions	0.77"x0.39"x0.49"

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

Input	S	ur	g	e	Voltage(100mS)	
_		-				

5 Models	7 Vdc ,max.
9 Models	12 Vdc ,max.
12 Models	15 Vdc ,max.
15 Models	18 Vdc ,max.
24 Models	28 Vdc ,max.
Soldering Temperature	260°C ,max.
(1.5mm from case 10 sec. max.)	

EMC SPECIFICATIONS		
Conducted Emissions(6)	EN55022	CLASS B
Radiated Emissions	EN55022	CLASS B
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT(7)	IEC 61000-4-4	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

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-40 °C~125 °C

Nature Convection

DL - 1W Unregulated Single & Dual output







## MODEL SELECTION GUIDE

		Ουτι	PUT	EFFICIENC Y	Capacitor
MODELNUMBER	(Vdc)	Voltage(Vdc)	Current(mA)	@FL(%)	Load(uF)
DL-XX3R3SSH6	5, 9, 12, 15, 24	3.3	303	69 - 75	220
DL-XX05SSH6	5, 9, 12, 15, 24	5	200	70 - 77	220
DL-XX09SSH6	5, 9, 12, 15, 24	9	111.1	70 - 80	220
DL-XX12SSH6	5, 9, 12, 15, 24	12	83.3	70 - 80	220
DL-XX15SSH6	5, 9, 12, 15, 24	15	66.7	70 - 80	220
DL-XX3R3SH6	5, 9, 12, 15, 24	±3.3	±151.5	68 - 75	±100
DL-XX05SH6	5, 9, 12, 15, 24	±5	±100	70 - 78	±100
DL-XX09SH6	5, 9, 12, 15, 24	±9	±55.6	70 - 81	±100
DL-XX12SH6	5, 9, 12, 15, 24	±12	±41.7	72 - 81	±100
DL-XX15SH6	5, 9, 12, 15, 24	±15	±33.3	70 - 81	±100
DL-XX1509SH6	5, 9, 12, 15, 24	±15/-9	±33/-55	70 - 80	±100

XX=Input Voltage

#### TEST CONFIGURA TIONS

#### EMI Filter

Input filter components (C1, L, C2, C3) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : info@zimtec-electronics.de



#### NOTE

- 1. Ripple/Noise measured with 20MHz bandwidth.
- 2. Tested by minimal V in and constant resistive load.
- 3. Measured Input reflected ripple current with a simulated source inductance of 12uH.
- 4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
- 5. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
- 6. Input filter components are be required to help meet conducted emission class B,
- which application refer to the EMI Filter of design & feature configuration.
- 7. An external filter capacitor is required if the module has to meet IEC61000-4-4. The filter capacitor ZimTec Electronics suggest: Nippon - chemi - con KY series, 470uF/100V.
- 8. For reduce converter's ripple & noise, it is recommended to add a 4.7 µF~100 µF(±4.7 µF~±68 µF for dual output) capacitor in output end. For EMI performance improvement, it is recommended to add a 12 µH inductor and a 10 µF~100 µF capacitor in input end.



#### **MECHANICAL SPECIFICATIONS**



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DUAL

+V Input

-V Input

Common