



LKC05W SERIES

TINY-RIPPLE DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE
UP TO 5 WATTS



FEATURES

- ULTRA LOW RIPPLE AND NOISE
- STANDARD 1.25 X 0.80 X 0.40 INCH
- BUILT-IN EN55022 CLASS B FILTER
- SIX SIDE SHIELDING
- 1600VDC INPUT TO OUTPUT ISOLATION
- SAFETY MEETS UL60950-1, EN60950-1, & IEC60950-1
- CE MARKED
- COMPLIANT TO RoHS II & REACH

APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- MEASUREMENT EQUIPMENT
- SEMICONDUCTOR EQUIPMENT

1600VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP	LOW STANDBY POWER
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TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

Model Number	Input Range	Output Voltage	Output Current @ Full Load	Input Current @ No Load	Output Ripple & Noise	Efficiency	Maximum Capacitor Load
	VDC	VDC	mA	mA			
LKC05-24S3P3W	9 ~ 36	3.3	1515	6	10	81	2200
LKC05-24S05W	9 ~ 36	5	1000	6		83	1000
LKC05-24S12W	9 ~ 36	12	416	9		88	220
LKC05-24S15W	9 ~ 36	15	333	10		88	150
LKC05-24S24W	9 ~ 36	24	208	10		89	100
LKC05-24D05W	9 ~ 36	±5	±500	6		84	± 680
LKC05-24D12W	9 ~ 36	±12	±208	9		85	± 150
LKC05-24D15W	9 ~ 36	±15	±166	10		86	± 150
LKC05-24D24W	9 ~ 36	±24	±104	10		87	± 100
LKC05-24DS05W	9 ~ 36	Vout1: 5 Vout2: 5	500 500	6		84	680 680
LKC05-24DS12W	9 ~ 36	Vout1: 12 Vout2: 12	208 208	9		85	150 150
LKC05-24DS15W	9 ~ 36	Vout1: 15 Vout2: 15	166 166	10		86	150 150
LKC05-24DS24W	9 ~ 36	Vout1: 24 Vout2: 24	104 104	10		86	100 100
LKC05-48S3P3W	18~ 75	3.3	1515	4		80	2200
LKC05-48S05W	18~ 75	5	1000	4		83	1000
LKC05-48S12W	18~ 75	12	416	4		86	220
LKC05-48S15W	18~ 75	15	333	4		87	150
LKC05-48S24W	18~ 75	24	208	6		88	100
LKC05-48D05W	18~ 75	±5	±500	6		83	± 680
LKC05-48D12W	18~ 75	±12	±208	4		85	± 150
LKC05-48D15W	18~ 75	±15	±166	5		86	± 150
LKC05-48D24W	18~ 75	±24	±104	6		87	± 100
LKC05-48DS05W	18~ 75	Vout1: 5 Vout2: 5	500 500	6		83	680 680
LKC05-48DS12W	18~ 75	Vout1: 12 Vout2: 12	208 208	4		85	150 150
LKC05-48DS15W	18~ 75	Vout1: 15 Vout2: 15	166 166	5		86	150 150
LKC05-48DS24W	18~ 75	Vout1: 24 Vout2: 24	104 104	6		86	100 100

PART NUMBER STRUCTURE

LKC05 -	24	S	05	W -	CS
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Assembly Option
	24:9~36 48:18~75	S:Single	3P3:3.3 05:5 12:12 15:15 24:24	4:1	<input type="checkbox"/> :With Pin3 CS:Without Pin3
		D:Dual	05:±5 12:±12 15:±15 24:±24		
		DS: Dual with output isolation	05:5/5 12:12/12 15:15/15 24:24/24		

INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	24Vin(nom) 48Vin(nom)	9 18	24 48	36 75	VDC
Start-up voltage	24Vin(nom) 48Vin(nom)			9 18	VDC
Shutdown voltage	24Vin(nom) 48Vin(nom)		8.5 16		VDC
Start up time	Constant resistive load Power up Remote ON/OFF		50 50	75 75	ms
Input surge voltage	1 second, max. 24Vin(nom) 48Vin(nom)			50 100	VDC
Input filter		Common Chock			
Remote ON/OFF	Referred to -Vin pin Positive logic DC-DC ON DC-DC OFF Input current of Ctrl pin Remote off input current	-0.5	3	Open or 3 ~ 12VDC Short or 0 ~ 1.2VDC 1	mA mA

OUTPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Voltage accuracy		-1.0		+1.0	%
Minimum load	<input type="checkbox"/> <input type="checkbox"/> DS <input type="checkbox"/> <input type="checkbox"/> W		10		%
Line regulation	Low Line to High Line at Full Load <input type="checkbox"/> <input type="checkbox"/> S <input type="checkbox"/> <input type="checkbox"/> W <input type="checkbox"/> <input type="checkbox"/> D <input type="checkbox"/> <input type="checkbox"/> W <input type="checkbox"/> <input type="checkbox"/> DS <input type="checkbox"/> <input type="checkbox"/> W Vout 2(Main) Vout 1(Aux)	-0.2 -0.2 -0.2 -1.0		+0.2 +0.2 +0.2 +1.0	%
Load regulation	No Load to Full Load <input type="checkbox"/> <input type="checkbox"/> S <input type="checkbox"/> <input type="checkbox"/> W <input type="checkbox"/> <input type="checkbox"/> D <input type="checkbox"/> <input type="checkbox"/> W 10% Full Load to Full Load <input type="checkbox"/> <input type="checkbox"/> DS <input type="checkbox"/> <input type="checkbox"/> W Vout 2(Main) Vout 1(Aux)	-0.5 -1.0 -0.5 -1.0		+0.5 +1.0 +0.5 +1.0	%
Cross regulation	Asymmetrical load 25%/100% FL <input type="checkbox"/> <input type="checkbox"/> D <input type="checkbox"/> <input type="checkbox"/> W <input type="checkbox"/> <input type="checkbox"/> DS05W Vout 2(Main) Vout 1(Aux) Others Vout 2(Main) Vout 1(Aux)	-3.0 -0.5 -6.0 -0.5 -4.0		+3.0 +0.5 +6.0 +0.5 +4.0	%
Voltage adjustability	<input type="checkbox"/> <input type="checkbox"/> S <input type="checkbox"/> <input type="checkbox"/> W <input type="checkbox"/> <input type="checkbox"/> D <input type="checkbox"/> <input type="checkbox"/> W <input type="checkbox"/> <input type="checkbox"/> DS <input type="checkbox"/> <input type="checkbox"/> W	-10 -10 -10		+20 +10 +10	%
Ripple and noise	Measured by 20MHz bandwidth		10	15	mVp-p
Temperature coefficient		-0.02		+0.02	%/°C
Transient response recovery time	50% load step change		250		µs
Over voltage protection	% of Vout(nom)		135		%
Over load protection	% of Iout rated; Hiccup mode		170		%
Short circuit protection		Continuous, automatic recovery			

GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output Input (Output) to Case Vout 1 to Vout 2; <input type="checkbox"/> <input type="checkbox"/> DS <input type="checkbox"/> <input type="checkbox"/> W only	1600 1600 500			VDC
Isolation resistance	500VDC		1		1200	GΩ
Isolation capacitance						pF
Switching frequency				300		kHz
Safety meets						UL60950-1 EN60950-1 IEC60950-1
Case material						Copper
Base material						FR4 PCB
Potting material						Epoxy (UL94 V-0)
Weight						14.8g(0.52oz)
MTBF	MIL-HDBK-217F, Full load					4.446 x 10 ⁶ hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating With derating	-40 +85		+85 +100	°C
Maximum case temperature				+105	°C
Storage temperature range		-55		+125	°C
Thermal impedance	Natural convection		20		°C/W
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

EMC SPECIFICATIONS

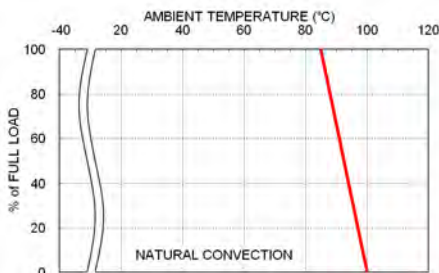
Parameter	Conditions	Level
EMI (1)	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 20 V/m	Perf. Criteria A
Fast transient (2)	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge (2)	EN61000-4-5 ± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

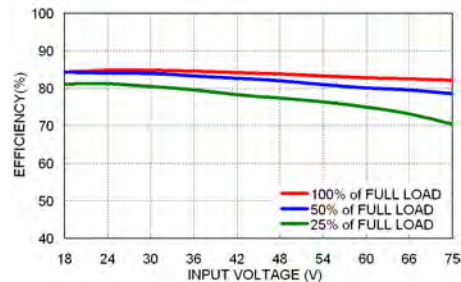
- The standard modules meet EN55022 Class A without external components.
The standard modules meet EN55022 Class B as following information:
LKC05-24□□□W : Do not need any external components.
LKC05-48□□□W : Connect two 4.7μF/100V MLCCs in parallel to input pins.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The LKC05-24□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ70A, 70V, 3000Watt peak pulse power) to connect in parallel.
The LKC05-48□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) to connect in parallel.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

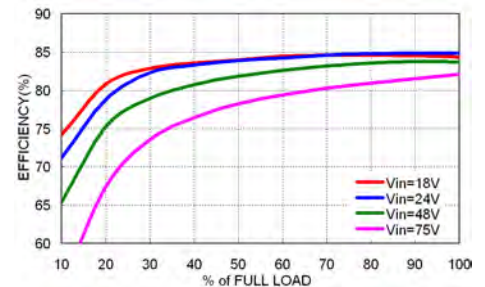
CHARACTERISTIC CURVE



LKC05-48S05W Derating Curve

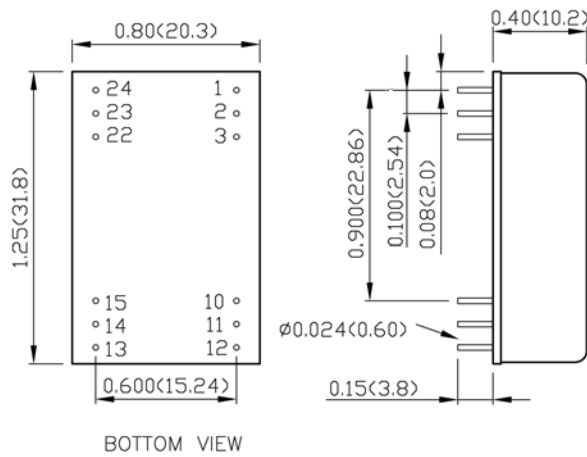


LKC05-48S05W Efficiency vs. Input Voltage



LKC05-48S05W Efficiency vs. Output Load

MECHANICAL DRAWING



1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)

PIN CONNECTION

LKC05-□□S□□W			
PIN	DEFINE	PIN	DEFINE
1	+Vin	24	-Vin
2	+Vin	23	-Vin
3	Case	22	Ctrl
10	No pin	15	+Vout
11	No pin	14	-Vout
12	Case	13	Trim

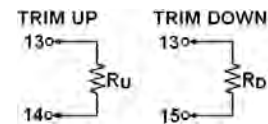
LKC05-□□D□□W			
PIN	DEFINE	PIN	DEFINE
1	+Vin	24	-Vin
2	+Vin	23	-Vin
3	Case	22	Ctrl
10	Com	15	Com
11	+Vout 1	14	-Vout 2
12	Case	13	Trim

LKC05-□□DS□□W			
PIN	DEFINE	PIN	DEFINE
1	+Vin	24	-Vin
2	+Vin	23	-Vin
3	Case	22	Ctrl
10	-Vout 1 ^(Aux)	15	+Vout 2 ^(Main)
11	+Vout 1 ^(Aux)	14	-Vout 2 ^(Main)
12	Case	13	Trim

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.

LKC05-□□S□□W; LKC05-□□DS□□W



LKC05-□□D□□W

