

@ 8 & \$K 'G9 F → G

8 C/DC 7 c bj YfHf 'Single/ '8 i U Output: 80 watts



Features

- Compact 1 x 1 in 20 watt package
- Wide 4:1 input range
- 1600VDC Isolation
- Six Sided Shield
- High Efficiency 90%
- EN55022 class A without external components
- UL60950-1, EN60950-1 safety approvals
- No minimum load required

Model Number	Input Voltage	Output Voltage	Output Current @Full Load mA	Input Current @ No Load mA	Efficiency %	Maximum uF Capacitor Load (1)
LCD20-24S3P3W	9 ~ 36V	3.3V	4500	10	89	7000
LCD20-24S05W	9 ~ 36V	5V	4000	10	89	5000
LCD20-24S12W	9 ~ 36V	12V	1670	6	89	850
LCD20-24S15W	9 ~ 36V	15V	1330	6	89	700
LCD20-24S24W	9 ~ 36V	24V	833	10	91	220
LCD20-24D12W	9 ~ 36V	±12V	±833	6	89	±500
LCD20-24D15W	9 ~ 36V	±15V	±667	6	90	±350
LCD20-24D24W	9 ~ 36V	±24V	±417	12	91	±100
LCD20-48S3P3W	18 ~ 75V	3.3V	4500	10	90	7000
LCD20-48S05W	18 ~ 75V	5V	4000	10	90	5000
LCD20-48S12W	18 ~ 75V	12V	1670	4	89	850
LCD20-48S15W	18 ~ 75V	15V	1330	4	90	700
LCD20-48S24W	18 ~ 75V	24V	833	8	91	220
LCD20-48D12W	18 ~ 75V	±12V	±833	4	89	±500
LCD20-48D15W	18 ~ 75V	±15V	±667	4	90	±350
LCD20-48D24W	18 ~ 75V	±24V	±417	10	91	±100

PART NUMBER STRUCTURE

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Option	Assembly Option
LCD20 - 48 S 05 W - A HS	24: 9~36 48: 18~75	S: Single D: Dual	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 12: ±12 15: ±15 24: ±24	4:1	□: Negative logic remote ON/OFF(Standard) A: Positive logic remote ON/OFF B: Without Ctrl pin C: Negative logic remote ON/OFF without Trim pin D: Without Ctrl & Trim pin E: Positive logic remote ON/OFF without Trim pin	□: None HS: Heat-sink HC: Heat-sink with Clamp

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit	
Operating input voltage range	24Vin(nom)		9	24	36	VDC	
	48Vin(nom)		18	48	75		
Input reflected ripple current	Nominal input and Full load		30			mAp-p	
Start-up voltage	24Vin(nom)		9			VDC	
	48Vin(nom)		18				
Shutdown voltage	24Vin(nom)		8			VDC	
	48Vin(nom)		16				
Start up time	Constant resistive load	Power up	30			ms	
		Remote ON/OFF	30				
Input surge voltage	1 second, max.	24Vin(nom)	50			VDC	
		48Vin(nom)	100				
Input filter			Pi type				
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON	Open or 3 ~ 15VDC			
		(Option)	DC-DC OFF	Short or 0 ~ 1.2VDC			
		Negative logic	DC-DC ON	Short or 0 ~ 1.2VDC			
		(Standard)	DC-DC OFF	Open or 3 ~ 15VDC			
		Input current of Ctrl pin		-0.5	1.0		mA
		Remote off input current		2.0	mA		

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load	Single	-0.2		+0.2	%
		Dual	-0.5		+0.5	
Load regulation	No Load to Full Load	Single	-0.2		+0.2	%
		Dual	-1.0		+1.0	
	10% Load to 90% Load	Single	-0.1		+0.1	
		Dual	-0.8		+0.8	
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0		+5.0	%
Voltage adjustability (2)	Single output	24Vout	-10		+20	%
		Others	-10		+10	
Ripple and noise	Measured by 20MHz bandwidth					mVp-p
	With a 1µF M/C X7R and a 10µF T/C	Single				
		3.3Vout, 5Vout, 12Vout, 15Vout	75			
		24Vout	75			
	With 2 pcs of 6.8µF/50V X7R MLCC	Dual				
12Vout, 15Vout, 24Vout		100				
With a 4.7µF/50V X7R MLCC for each output			100			
			100			
Temperature coefficient			-0.02		+0.02	%/°C
Transient response recovery time	25% load step change		250			µs
Over voltage protection	3.3Vout		3.7		5.4	VDC
	5Vout		5.6		7.0	
	12Vout		13.5		19.6	
	15Vout		16.8		20.5	
	24Vout		29.1		32.5	
Over load protection	% of lout rated; Hiccup mode		150			%
Short circuit protection			Continuous, automatics recovery			

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GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute Input to Output Input(Output) to Case	1600 1000			VDC
Isolation resistance	500VDC	1			GΩ
Isolation capacitance				1500	pF
Switching frequency	3.3Vout, 5Vout Others	248 297	275 330	303 363	kHz
Safety approvals	Pending: LCD20-□□S24W, LCD20-□□D24W				UL60950-1 EN60950-1 IEC60950-1
Case material					Nickel-coated copper
Base material					FR4 PCB
Potting material					Silicone (UL94 V-0)
Weight					15g (0.53oz)
MTBF	MIL-HDBK-217F, Full load				1.469 x 10 ⁶ hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating With derating	-40 +60		+60 +101	°C
Maximum case temperature				105	°C
Storage temperature range		-55		+125	°C
Thermal impedance	Natural convection (20LFM) Without heat-sink With heat-sink		17.6 14.8		°C/W
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

EMC SPECIFICATIONS

Parameter	Conditions	Level
EMI ⁽³⁾	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient ⁽⁴⁾	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge ⁽⁴⁾	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:

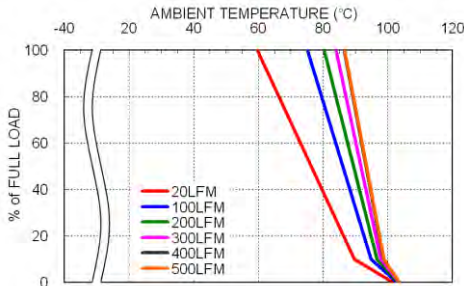
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard module meets EN55022 Class A without external components and meet Class B with external components.
For further information, please contact with P-DUKE.
4. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220µF/100V.

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

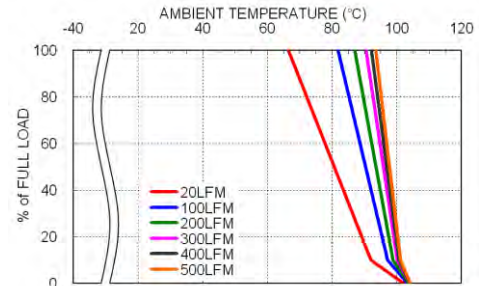
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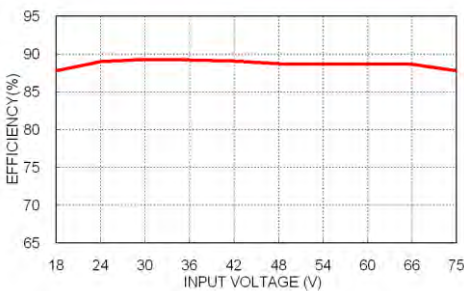
CHARACTERISTIC CURVE



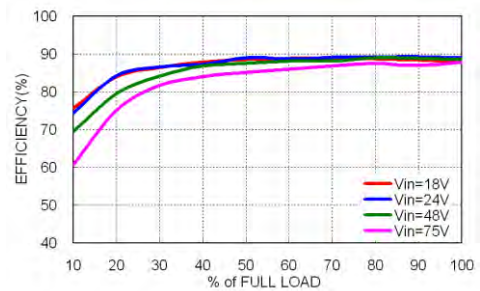
LCD20-48S05W Derating Curve



LCD20-48S05W Derating Curve With Heat-sink

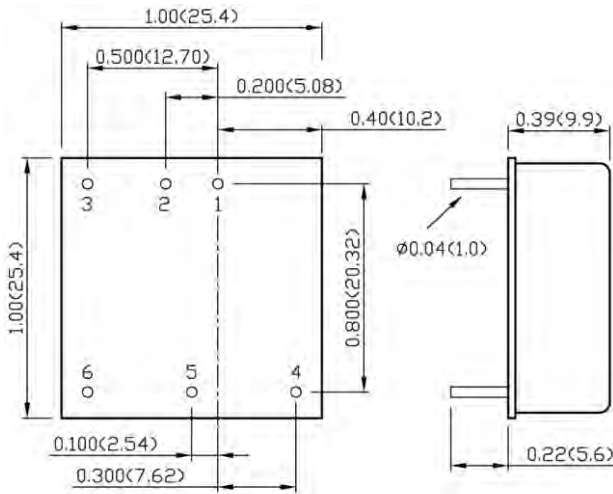


LCD20-48S05W Efficiency vs. Input Voltage



LCD20-48S05W Efficiency vs. Output Load

MECHANICAL DRAWING



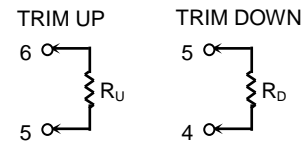
BOTTOM VIEW

PIN CONNECTION

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	Ctrl	Ctrl
4	+Vout	+Vout
5	Trim	Common
6	-Vout	-Vout

EXTERNAL OUTPUT TRIMMING

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



1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.xx±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)