Product Manual

Data Sheet

DPxx

IGBT driver power supply

UL 62368-1 EN 62368-1 IEC 62368-1 RoHS

Product Series

Product Series	Temperature Range	Isolated Voltage	Package
DPxx	-40℃～+105℃	4500VAC	SIP

Features

- Efficiency up to 87%
- Strengthen insulation,isolated voltage 4500VAC
- Sustainable short circuit
- No additional radiator
- The shell meet the UL94 V-0 standard

Applications

- Industrial control systems
- Data communication systems
- Distributed power control systems
- Digital and analog hybrid systems
- BMS systems, instrumentation
- Distribution terminal,etc.
- ……

Product Model

Part Number	Certification	Input Voltage (VDC)	Output			Full Load Efficiency (%,Min/Typ)	Maximum Capacitive Load (μF)(2)
		Nominal Voltage (Voltage Range)	Nominal Voltage +Vo/-Vo (VDC)	Output Current +Io/-Io (mA,Min)	Output Current +Io/-Io (mA, Max)		
DP05HB7	--	5 (4.5-5.5)	+15/-8.7	0/0	+80/-40	78/82	1000
DP04HD8	--	12 (11-15)	+18/-9	0/0	+100/-100	80/83	220
DP04HB6	EN	12 (9-15)	+15/-8	0/0	+100/-80	82/87	220
DP12HB3		12 (10.8-13.2)	+15/-3.5	0/0	+111/-111	76/80	220
DP12HB4			+15/-4	0/0	+120/-120	77/80	220
DP12HB5			+15/-5	0/0	+100/-100	77/80	220
DP12HB6			+15/-8	0/0	+100/-100	80/83	220
DP12HD2			+18/-3	0/0	+100/-100	77/80	220
DP12HE5			+20/-5	0/0	+90/-90	80/83	220
DP15HB5	--	15 (13.5-16.5)	+15/-5	0/0	+100/-100	80/83	220
DP15HB7	UL/EN/IEC		+15/-8.7	0/0	+80/-40	80/83	220
DP15HB8	--		+15/-9	0/0	+100/-100	80/83	220
DP15HD2	UL/EN/IEC		+18/-3	0/0	+100/-100	80/83	220
DP15HD8			+18/-9	0/0	+100/-100	82/86	220
DP15HB4			+15/-4	0/0	+100/-100	80/83	220

DP15HD8A	--	15 (13.5-16.5)	+18/-9	0/0	+110/-110	82/86	220
DP15HA	--		+9/--	0/--	+111/--	80/83	220
DP24HB2	EN	24 (21.6-26.4)	+15/-3	0/0	+100/-100	77/80	220
DP24HB4			+15/-4	0/0	+120/-120	77/80	220
DP24HB5			+15/-5	0/0	+120/-120	80/83	220
DP24HB6			+15/-8	0/0	+120/-120	77/80	220
DP24HB8			+15/-9	0/0	+100/-100	77/80	220
DP24HD2			+18/-3	0/0	+100/-100	78/81	220
DP24HD8			+18/-9	0/0	+100/-100	80/83	220
DP24HE4			+20/-4	0/0	+90/-90	80/83	220
DP24HE5			+20/-5	0/0	+90/-90	80/83	220

Note: (1)Capacitive load per output channel is identical.

Limit Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Input Surge Voltage (1s，max)	5VDC input	-0.7	--	9	VDC
	12VDC input	-0.7	--	18	
	15VDC input	-0.7	--	21	
	24VDC input	-0.7	--	30	
Lead Soldering Temperature	1.5mm from case,10s	--	--	300	℃
Hot Plug		Unavailable			

Input Characteristics

Parameter	Conditions		Min	Typ	Max	Unit
Input Voltage Range	DP05HB7		4.5	5	5.5	VDC
	DP04HB6、DP04HD8		9	12	15	
	DP12HB3、DP12HB4、DP12HB5、DP12HB6、DP12HE5、DP12HD2		10.8	12	13.2	
	DP15HB7、DP15HB8、DP15HD2、DP15HD8、DP15HB4、DP15HA、DP15HB5、DP15HD8A		13.5	15	16.5	
	DP24HD2、DP24HB6、DP24HB8、DP24HB2、DP24HB4、DP24HB5、DP24HD8、DP24HE4、DP24HE5		21.6	24	26.4	
No Load/Full Load Input Current	Nominal input voltage	DP05HB7	--	13/382	25/400	mA
		DP04HB6、DP04HD8		16/210	30/230	
		DP12HB3		16/213	30/223	
		DP12HB4		16/230	30/250	
		DP12HB5		16/210	30/220	
		DP12HB6		16/230	30/240	
		DP12HD2		16/220	30/230	
		DP12HE5		18/225	30/235	
		DP15HB7 DP15HB5		9/180	18/240	
		DP15HB8				
		DP15HD2				
		DP15HD8				
		DP15HD8A				

		DP15HB4				
		DP15HA				
		DP24HD2				
		DP24HB6		10/140	15/150	
		DP24HB8		10/120	18/125	
		DP24HB2		10/110	15/115	
		DP24HB4		10/120	15/125	
		DP24HB5		10/125	15/130	
		DP24HD8		10/135	18/140	
		DP24HE4		14/108	20/112	
		DP24HE5		14/113	20/118	
Input Filter			Capacitor filter			

Output Characteristics

Parameter	Conditions			Min	Typ	Max	Unit
Line Regulation	Input voltage changes within ±1%		DP04HB6、DP04HD8	--	±1.1	±1.5	--
			DP24HB6、DP05HB7				
			DP15HB7、DP15HB5				
			DP15HD2、DP24HD2、DP24HE4、DP24HE5、DP12HE5				
			DP15HD8、DP15HD8A、DP24HD8				
			DP15HB8、DP24HB8				
			DP15HA				
			DP12HB3、DP15HB4、DP15HB5、DP24HB4、DP24HB5、、DP24HB2、DP12HB4、DP12HB5、DP12HB6				
Load Regulation	Load varies from 10% to 100%	+Vo	DP05HB7	--	10	15	%
			DP04HB6、DP04HD8				
			DP15HB7、DP24HB6				
			DP15HB8、DP24HB8				
			DP15HD2、DP24HD2、DP24HE4、DP24HE5、DP12HE5				
			DP15HD8、DP15HD8A、DP24HD8				
			DP15HB4、DP15HB5、DP24HB4、DP24HB5、DP24HB2				
			DP15HA				
			DP12HB3、DP12HB4、DP12HB5、DP12HB6		11	15	
			DP12HD2		10	15	
		-Vo	DP04HB6、DP04HD8	--	7	10	
			DP05HB7				
			DP15HB7、DP15HB5、DP24HB6、DP24HB4、DP24HB5、DP24HE4、DP24HE5				
			DP15HD8、DP15HD8A				
			DP15HB8、DP24HB8、DP24HD8				
			DP12HB3、DP12HB4、DP12HB5、DP12HB6、		14	--	

			DP12HE5				
			DP15HB4、DP15HB5				
			DP15HD2、DP24HD2				
			DP12HD2、DP24HB2				
Output Voltage Accuracy(1)	Nominal Input Voltage, Full Load	+Vo	DP04HB6、DP04HD8、DP12HB6、DP12HE5	-5	0	+5	
			DP05HB7				
			DP15HB7、DP24HB6				
			DP15HD2、DP24HD2、DP24HE4、DP24HE5				
			DP15HD8、DP15HD8A、DP24HD8				
			DP15HB8、DP24HB8				
			DP12HB3、DP24HB2	-5	-1	+4	
			DP15HB4、DP15HB5、DP12HB4、DP12HB5、DP24HB4、DP24HB5、				
			DP15HA				
			DP12HD2				
		-Vo	DP04HB6、DP04HD8、DP12HB6、DP12HE5	-8	+1	+8	
			DP05HB7				
			DP15HB7、DP24HB6				
			DP15HD2				
			DP15HD8、DP15HD8A				
			DP15HB8、DP24HB8、DP24HD8				
			DP12HB3、DP12HB4、DP12HB5、DP24HD2、DP24HB2	-10	0	+10	
			DP12HD2、DP24HB4、DP24HB5、DP24HE4、DP24HE5	-10	-3	+5	
			DP15HB4、DP15HB5	-10	0	+10	
Temperature Drift Coefficient	100% load			--	--	±0.03	%/℃
Output Ripple(2)	20MHz bandwidth			--	60	150	mVp-p
Output Noise(2)				--	80	200	mVp-p
Output Short-Circuit Protection				Sustainable short circuit, self-recovery			

Note:(1) Tests shall be conducted at nominal input voltage with single channel at full load. Specifically, when testing the positive output, the positive output shall be operated at full load while the negative output at no load, and vice versa for the negative output test.

(2) The ripple and noise shall be tested by the proximity measurement method.

General Characteristics

Parameter	Conditions		Min	Typ	Max	Unit
Isolation Voltage	Input-output, time 1 minute, leakage current less than 1mA		4500	--	--	VAC
Isolation Resistance	Input-output,isolation voltage 500VDC		1	--	--	GΩ
Isolation Capacitance	Input-output,100kHz,0.1V	DP04HB6、DP04HD8	--	10	--	pF
		DP15HB7、DP12HE5				
		DP15HB8				

		DP15HD2				
		DP15HD8、DP15HD8A				
		DP15HB4、DP15HB5				
		DP15HA				
		DP05HB7				
		DP12HB2、DP12HB3、DP12HB4		6		
		DP12HD2、DP12HB5、DP12HB6				
		DP24HD2、DP24HB2、DP24HB4		15		
		DP24HB5、DP24HB6、DP24HD8				
		DP24HE4、DP24HE5、DP24HB8				
Switching Frequency	Nominal input voltage, 100% load		--	240	--	kHz
MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours
Package Size	--		19.50×9.80×12.50			mm
Package Material	--		Black flame retardant plastic shell, comply with UL94V-0 standard			

Environmental Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Operating Temperature	See the ambient temperature derating curve for details	-40	--	+105	℃
Storage Temperature	--	-55	--	+125	
Casing Temperature Rise	Ta=25℃	--	30	--	
Storage Humidity	No condensation	--	--	95	%
Cooling Method		Natural air cooling			
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			

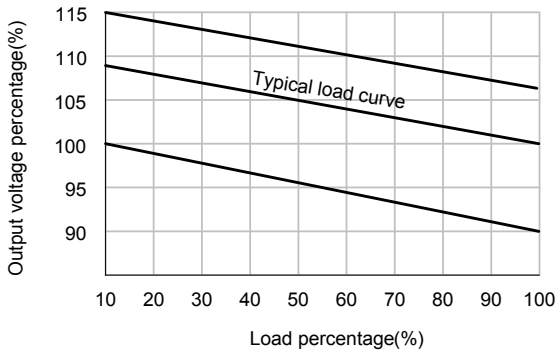
EMC Characteristics

EMI	CE	CISPR32/EN55032 CLASS B (Figure 2-②)	
	RE	CISPR32/EN55032 CLASS B (Figure 2-②)	
EMS	ESD	IEC/EN61000-4-2 Contact±8kV	Perf.Criteria B

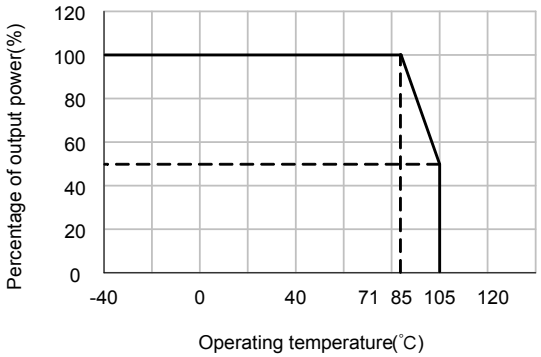
Notes:(1)The input voltage cannot exceed the specified range, otherwise it may cause permanent and irreversible damage.

(2)Unless specified specially, parameters in this manual are measured under the conditions of 25℃, 40%~75% humidity, input nominal voltage and rated output load.

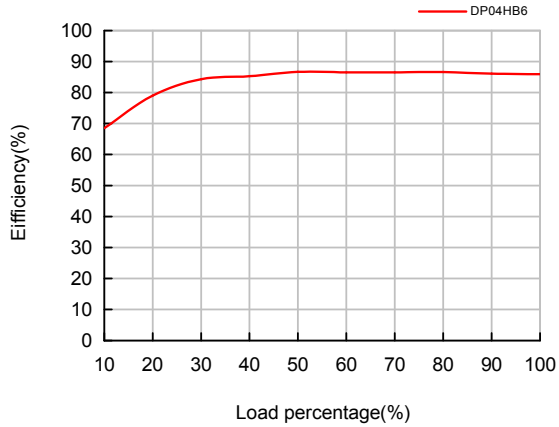
Product Characteristic Graph



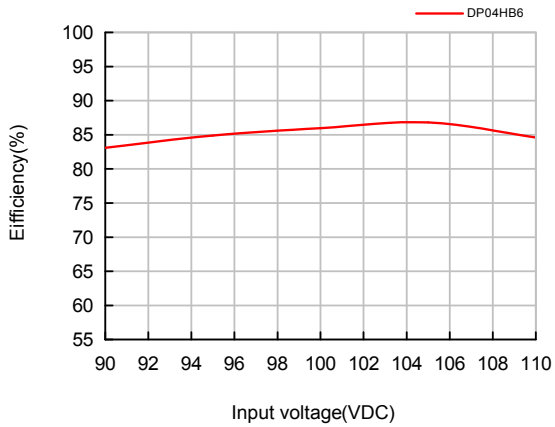
Output voltage VS load graph
(nominal input voltage)



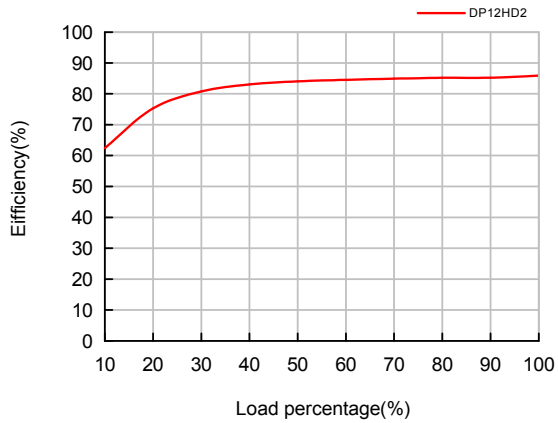
Curve of relationship between output
power and working temperature



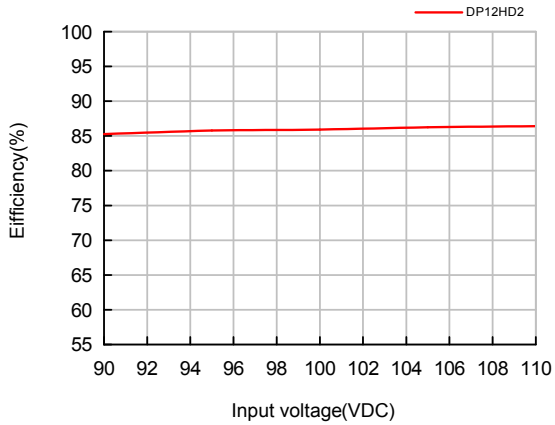
Efficiency VS load(Nominal input voltage)



Eifficiency VS input voltage(Full load)

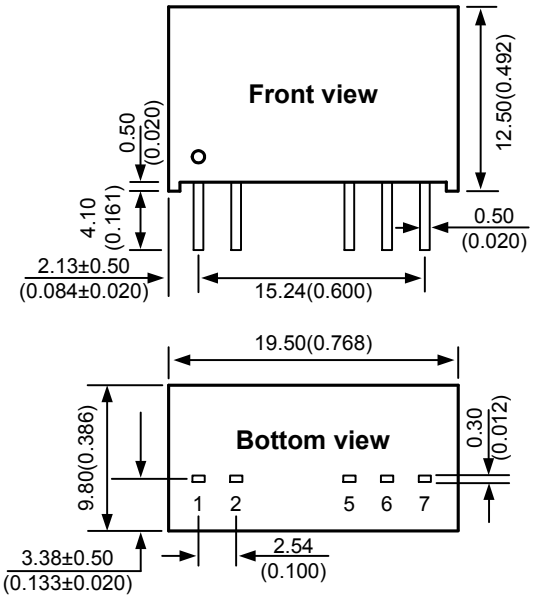


Efficiency VS load(Nominal input voltage)



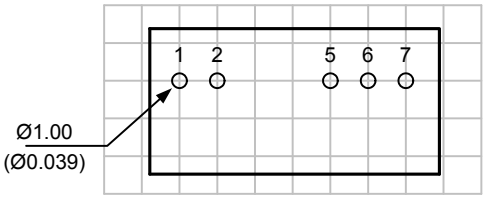
Eifficiency VS input voltage(Full load)

Outline and Footprint Dimensions

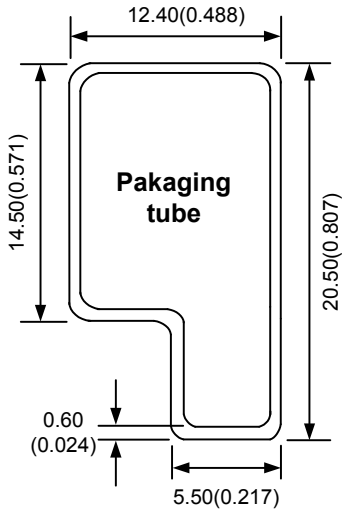


Pin	Function
1	Vin
2	GND
5	-Vo
6	0V
7	+Vo

PCB Silkscreen Diagram
(Top View)



Notes：
Unit：mm(inch)
Unlabeled tolerance：±0.25(±0.010)
Grid distance：2.54×2.54mm



Notes：
Size：mm(inch)
Unlabeled tolerance:±0.50(±0.020)
L=282(11.102)，13pieces/pallet
Carton Size：304×120×40mm
234pieces/carton

Circuit Design and Application

1. Test circuit

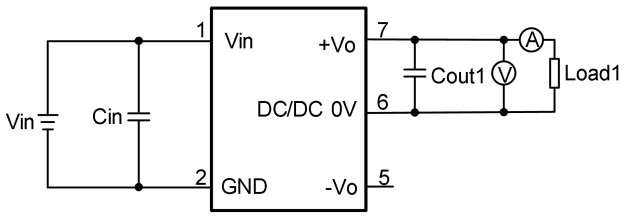


Figure 1 Test Circuit Diagram for Positive Output Data

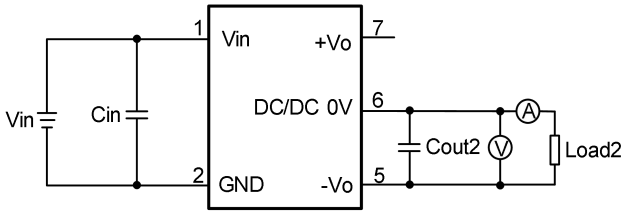


Figure 2 Test Circuit Diagram for Negative Output Data

2. Recommended circuit

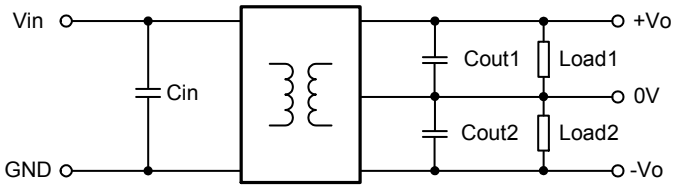


Figure 3 Recommended circuit

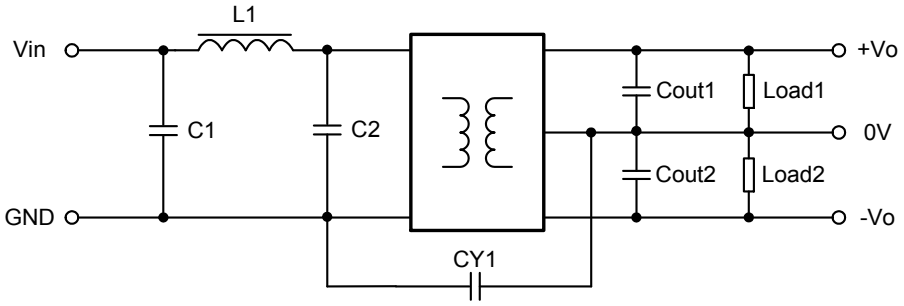


Figure 4 EMC recommended circuit

3. Application circuit parameters

In order to further stabilize the input power supply, a capacitor Cin is added at the input end;In order to reduce the output ripple and noise, it is necessary to increase the capacitor Cout at the output end.Note that the output capacitance cannot exceed the maximum capacitive load. Excessive output capacitance may easily lead to poor startup of the power module. Recommended external capacitance values are shown in Table 1.

Table 1 The reference value of the external capacitor

Vin(VDC)	Cin(μF)	Cout1/Cout2 (μF)
5/12/15/24	100	10

Typical recommended circuit for EMC

Table 2 Recommended EMC external circuit parameters

Model	Vin：5/12/15	Vin：24VDC
C1	4.7μF/50V	4.7μF/50V
C2	4.7μF/50V	4.7μF/50V
Cout1/Cout2	Refer to Table 1	Refer to Table 1
L1	SP43-6R8M ,6.8μH,±20%	SP43-6R8M ,6.8μH,±20%
CY1	--	1nF

4. Load requirements

In order to ensure efficient and reliable operation of the module, it is recommended that the output load should be between 5% and 100% of the rated power. If the output load is too light, place a dummy load resistance on output terminal in parallel. The sum of the fake load resistance power plus the actual load power is greater than 5% of the load.

Guangzhou ZHIYUAN Electronics Co.,Ltd.
Service Hotline: 400-888-4005
E-mail：power.sales@zlg.cn
Website：http://www.zlg.cn
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