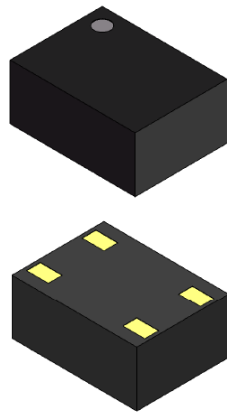


# Photonic Isolated Power Supply

## YMH-HL2A40

## Datasheet



### Key Features:

- 4 pin DFN: 5 mm high, 5.08 mm pitch
- Output Voltage: 10V (min)
- Output Current: 2.5mA (min)
- Isolation Voltage: 3,000V (min)

### Applications:

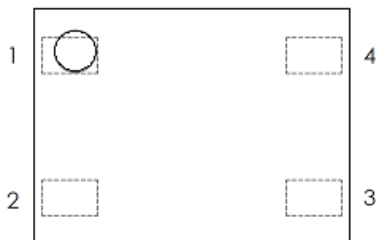
- Switch Mode Power Supply
- Inverter / Converter
- Motor Driving Module
- MOSFET Driver Module

### Product Description

MHGP's YMH-HL2A40 is a small footprint, photonic isolated power supply, suitable for surface mount assembly. The YMH-HL2A40 consists of a GaAs light emitting diode, optically coupled to a silicon-based MIH™ vertical multi-junction photovoltaic cell, providing sufficient power and voltage isolation to serve as the isolated power source for gate drivers of power semiconductor devices such as MOSFETs.

The YMH-HL2A40 can replace traditional isolated power supplies, providing better noise immunity, reduced cost, higher voltage isolation, and a smaller footprint.

### Pin Configuration (top view)



Pin #	Name	Description
1	Anode	LED Anode
2	Cathode	LED Cathode
3	Vo	Voltage Output
4	VGND	Voltage Output GND

### Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward Current	$I_F$	300	mA
	Reverse Voltage	$V_R$	18	V
	Junction Temperature	$T_j$	125	°C
PV	Output Current	$I_o$	3.5	mA
	Output Voltage	$V_o$	12	V
	Reverse Voltage	$V_{RD}$	> 1,000	V
	Junction Temperature	$T_j$	150	°C
Power Dissipation		$P_D$	850	mW
Storage Temperature Range		$T_{stg}$	-40 to 85	°C
Operating Temperature Range		$T_{opr}$	-20 to 85	°C
Lead Soldering Temperature (10 s)		$T_{sol}$	260	°C
Isolated Voltage ( Ta = 25°C, R.H. < 50%, t = 60 sec )		$V_{iso}$	3,000	V

### Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Forward Current	$I_F$	50	–	200	mA
Operating Temperature	$T_{opr}$	-20	–	65	°C

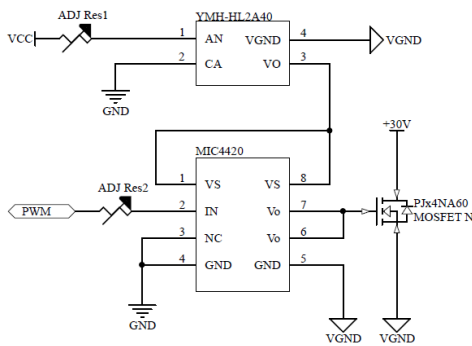
Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively.

### Electrical Characteristics (Ta = 25°C)

Characteristic		Test Condition	Symbol	Min	Typ.	Max	Unit
LED	Forward Current	–	$I_F$	50	–	300	mA
	Forward Voltage	–	$V_F$	2.6	–	2.9	V
PV	Output Current	$I_F = 200\text{mA}$	$I_o$	2.5	–	–	mA
	Output Voltage	$I_F = 200\text{mA}$	$V_o$	10	–	–	V

## Typical Application Schematic

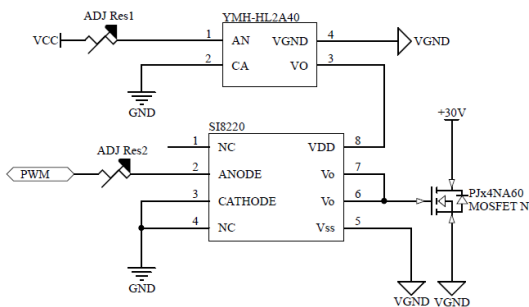
Example 1: PJx4NA60 MOSFET-N with MIC4420 un-isolated signal source



$I_f$ (mA)	MOSFET-N $V_{gs}$ (V)		
	@ 30kHz	@ 65kHz	@ 120kHz
50	6.7	4.1	3.2
100	11.5	9.5	4.6
150	11.7	10.9	8.6
200	11.7	10.9	10.0
$T_a = 25^\circ\text{C}$ , all $T_r$ & $T_f < 15$ ns			

- The lower the switching frequency, the lower the  $I_f$  that is needed. YMH-HL2A40 can drive MOSFET at 120kHz with  $I_f @ 150\text{mA}$  and  $V_{gs} @ > 8\text{V}$ .

Example 2: PJx4NA60 MOSFET-N with Si8220 isolated signal source



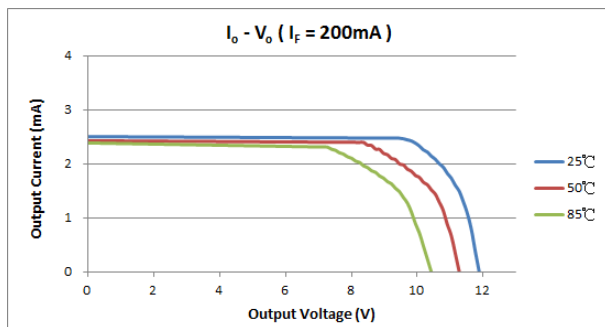
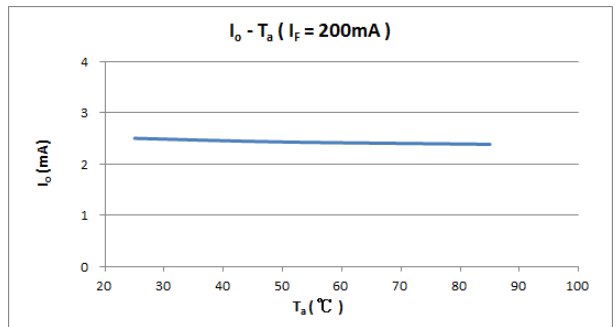
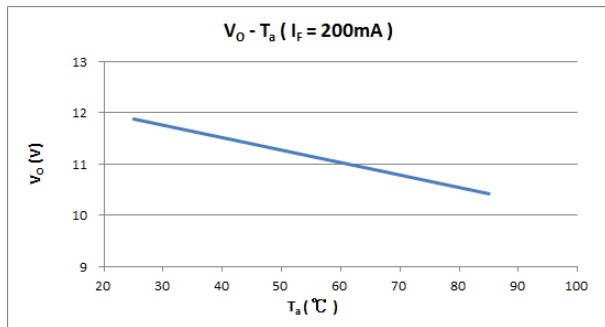
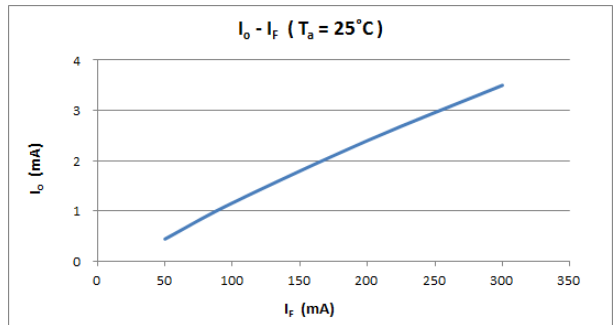
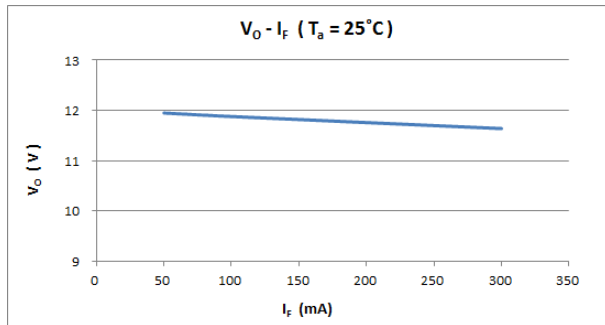
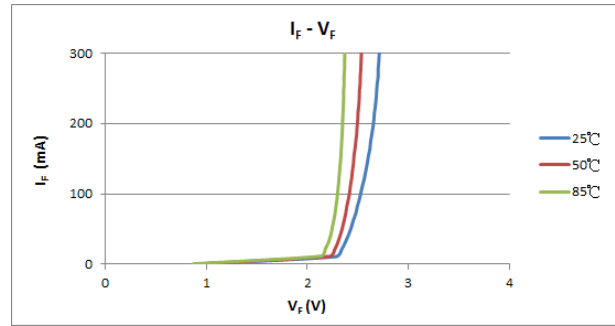
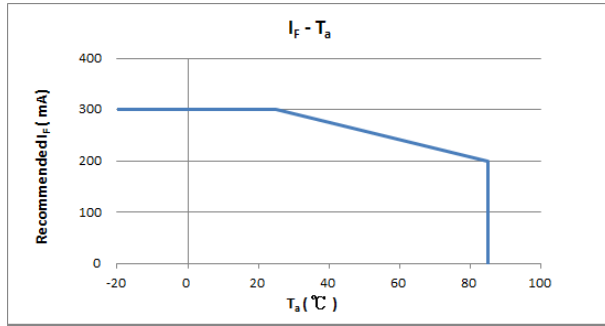
$I_f$ (mA)	MOSFET-N $V_{gs}$ (V)	
	@ 30kHz	@ 65kHz
130	8.8	-
160	10.0	8.6
180	10.4	9.2
200	10.8	9.8
$T_a = 25^\circ\text{C}$ , all $T_r$ & $T_f < 15$ ns		

- Si8220 has under-voltage lockout protection at 8V. It has 1.2 ~ 1.4mA of high-level & low-level supply current, which increases the  $I_f$  needed to drive MOSFET. Min 130mA  $I_f$  to drive at 30kHz with  $V_{gs} > 8\text{V}$ .

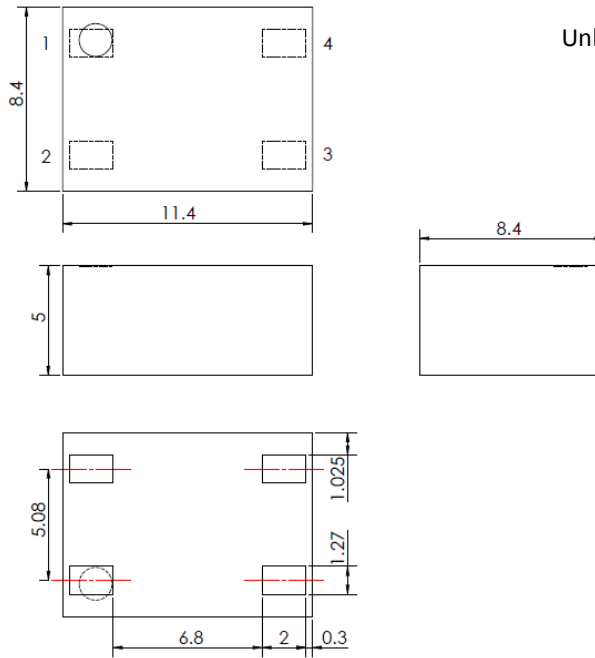
### Precautions

YMH-HL2A40 has 1.5V voltage overshoot on  $V_{gs}$  when driving MOSFET, and the voltage overshoot is limited up to 12.5V only.

### Typical Characteristics

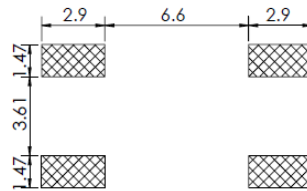


### Mechanical Dimensions



Unit: mm  
 Unless otherwise specified:  $\pm 0.1$   
 Net weight: 0.77g

### Recommended Land Pattern



**MAKE it HAPPEN**