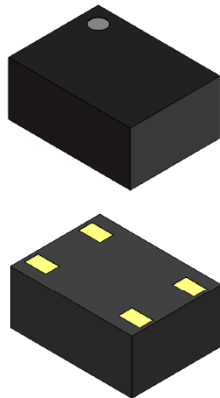


MIH[®] Photonic Isolated Power Supply

YMH-HL2A40

Datasheet



Key Features:

- Output Voltage: 10V (min)
- Output Current: 2.5mA (min)
- Isolation Voltage: 3,000V (min)
- Low Isolation capacitance (0.7pF)
- 4 pin DFN: 5 mm high, 5.08 mm pitch

Applications:

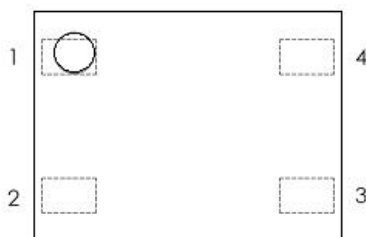
- Switch Mode Power Supply
- Inverter / Converter
- Motor Driving Module
- MOSFET Driver Module

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 (PSDs) such as MOSFETs. The YMH-HL2A40's low isolation capacitance (0.7pF) reduces common mode noise levels, a critical benefit for designers of high frequency or high speed switching devices.

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

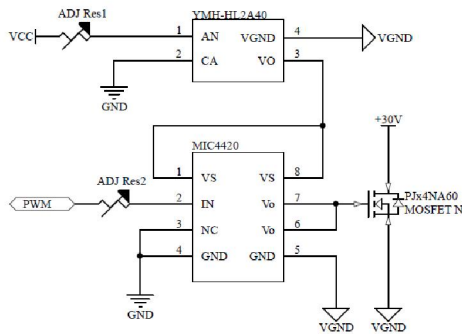
Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively.

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
I/O Isolation Capacitance		–	C_{IO}	–	0.7	–	pF

Typical Application Schematic

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

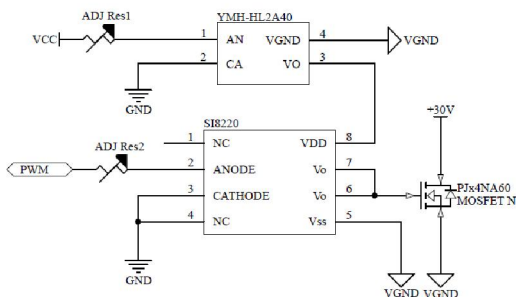


I _f (mA)	MOSFET-N V _{gs} (V)		
	@ 30kHz	@ 65kHz	@ 120kHz
50	6.7	4.1	3.2
100	11.5	9.5	4.6
150	11.7	10.9	8.6
200	11.7	10.9	10.0

T_a = 25°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 @ 150mA and V_{gs} @ > 8V.

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

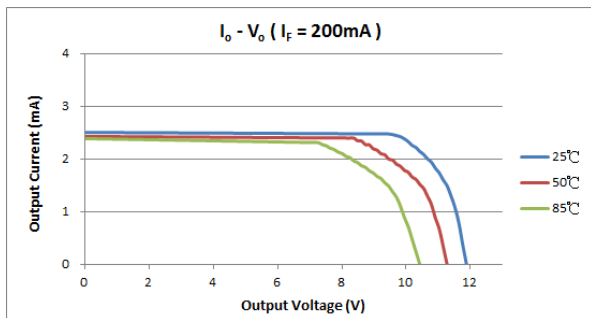
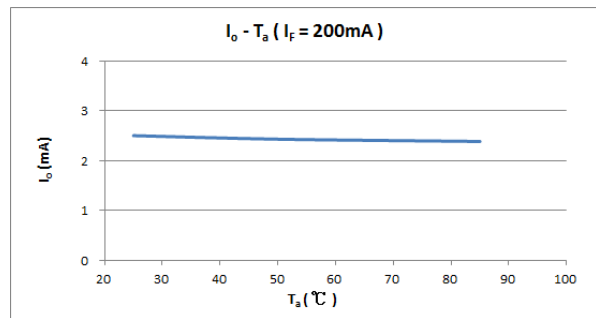
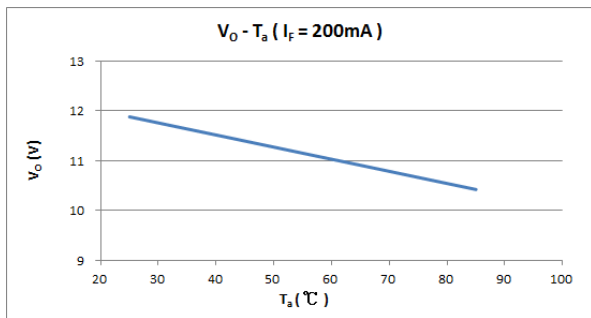
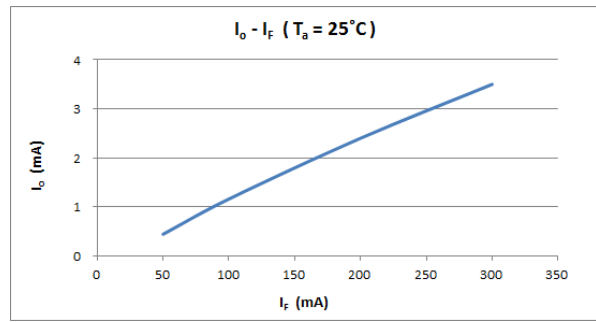
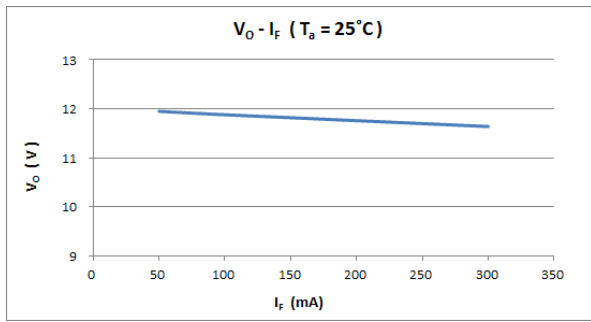
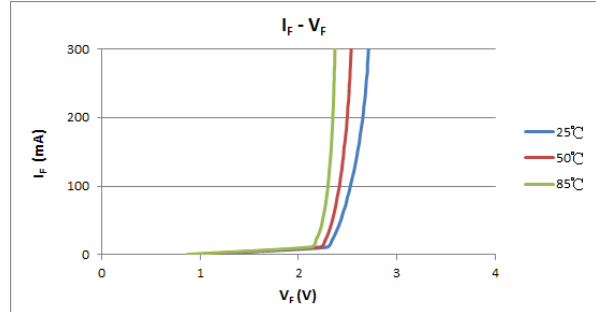
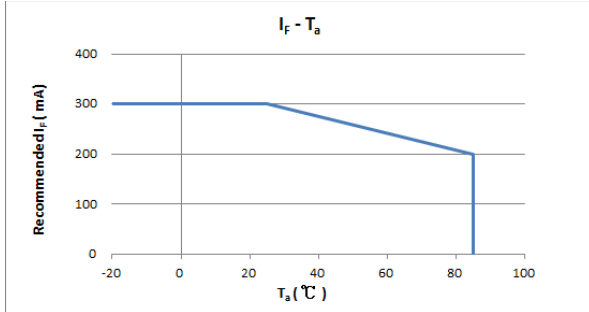
T_a = 25°C, all T_r & T_f < 15 ns

- 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} > 8V.

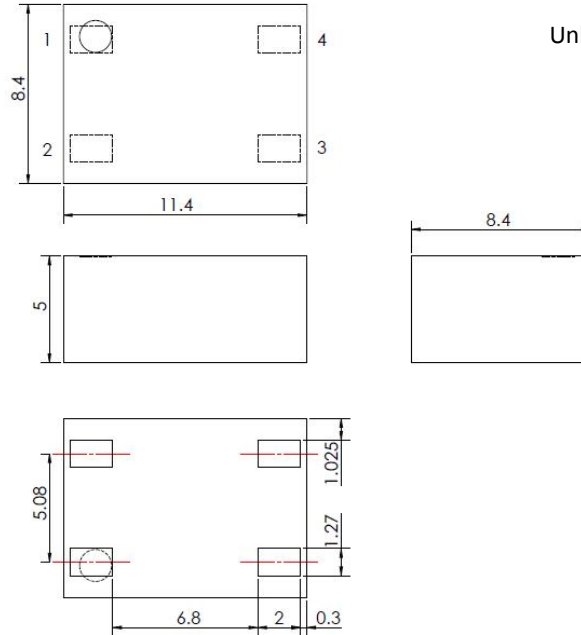
Precautions

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: ± 0.1
 Net weight: 0.77g

Recommended Land Pattern

