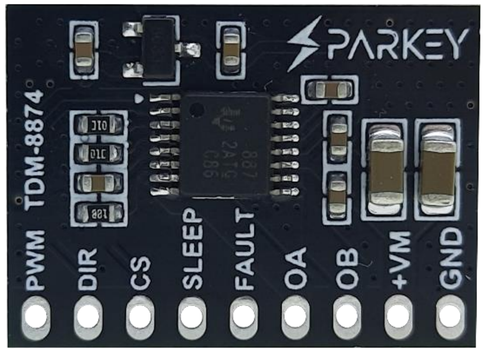


Introduction

The TDM-8874 is a DC brushed motor driver module based on the DRV8874PWPR TI Brand. The DRV8874 is an integrated motor driver with N channel H-bridge, charge pump, current sensing and proportional output, current regulation, and protection circuitry. The charge pump improves efficiency by supporting N-channel MOSFET half bridges and 100% duty cycle driving.

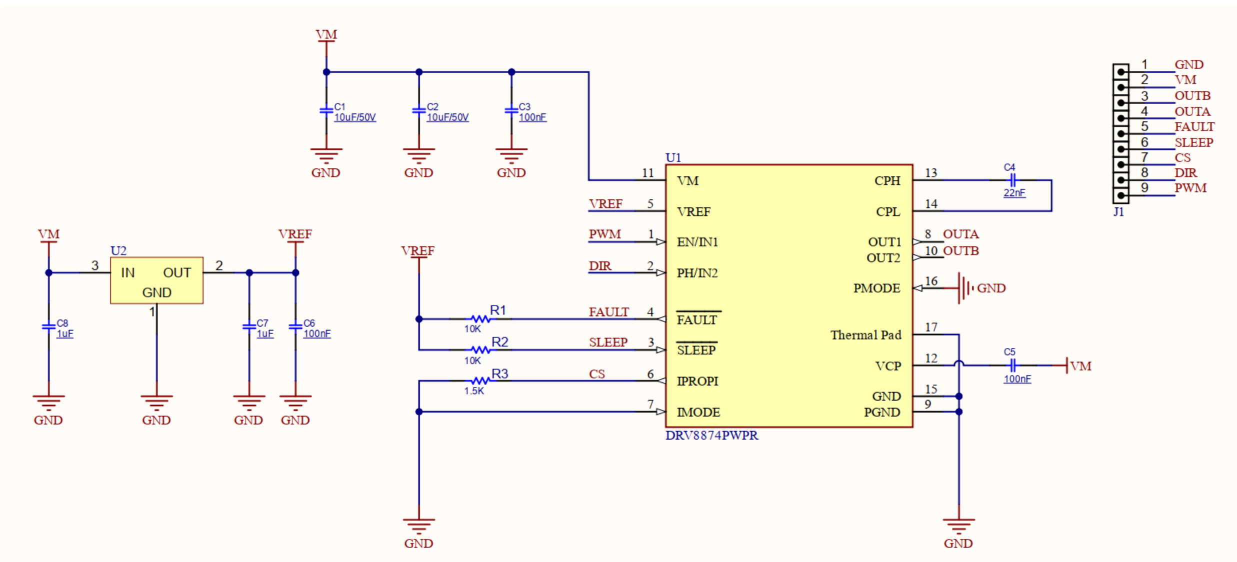
Features

- Drives one brushed DC motor or other resistive and inductive loads
- VM operating supply voltage range : 4.5V to 37V
- Logic Input Voltage: 0V to 5.5V
- RDS(on) 200-mΩ (High-Side + Low-Side)
- output current capability 6A Peak (with heatsink)
- PWM Frequency: 0~100KHz
- Integrated current sensing and regulation, and the possibility of measuring the output current from the CS Pin.
- VM Active mode current: Max 7mA
- Ultra low-power sleep mode: <1-µA @ VM = 24V, TJ = 25°C
- Integrated protection features: Undervoltage lockout, Charge pump undervoltage, Overcurrent protection, Thermal shutdown, and show on FAULT Pin.
- Compact size, 23.5 x 17 x 3.5 mm
- Module weight: 1.6 g

Note: There are two 10uF capacitors on the module to power the VM. If necessary, place a larger capacitor (≥100uF) close to the VM and GND pins. Otherwise, power fluctuation will damage the DRV8874.

Schematic

In TDM-8874 the PMODE pin is grounded and DRV8874 is latched into PH/EN mode. VREF pin is supplied by 3.3V on board regulator, and it does not need to be fed separately from the outside. Also, the CS pin is grounded with a 1.5 KΩ resistor to set the output to a maximum current of 4.83A. By changing this resistor, the output can be increased up to 6A.

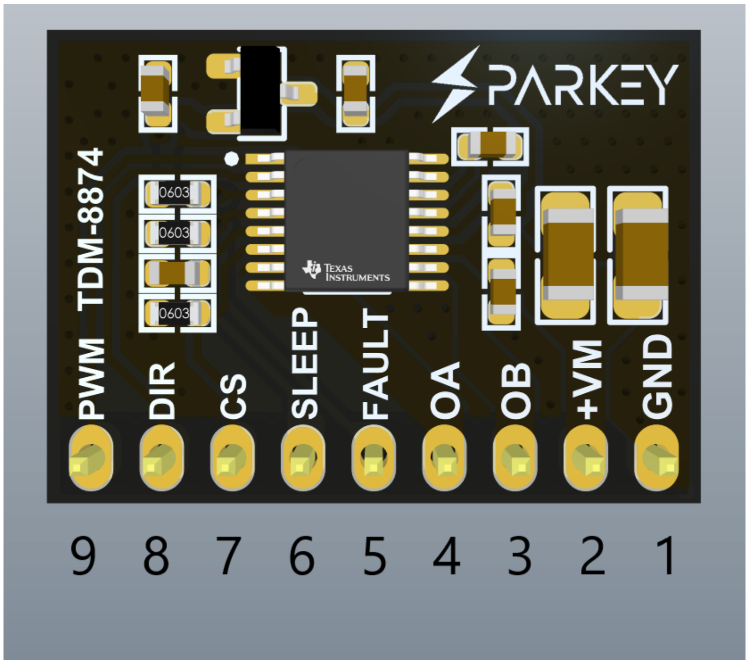


PH/EN mode:

When the PMODE pin is logic low on power up, the device is latched into PH/EN mode. PH/EN mode allows for the H-bridge to be controlled with a speed and direction type of interface. The truth table for PH/EN mode is shown in Table:

nSLEEP	EN	PH	OUT1	OUT2	DESCRIPTION
0	X	X	Hi-Z	Hi-Z	Sleep, (H-Bridge Hi-Z)
1	0	X	L	L	Brake, (Low-Side Slow Decay)
1	1	0	L	H	Reverse (OUT2 → OUT1)
1	1	1	H	L	Forward (OUT1 → OUT2)

Pinout



1) **GND**
2) **VM: 4.5-V to 37-V**
3) **OB: H-Bridge output B**
4) **OA: H-Bridge output A**
5) **FAULT: Fault indicator output, Active Low**
6) **SLEEP: Sleep mode input. Active Low**
7) **CS: IPROPI Pin on DRV8874, Analog current output proportional to load current**
8) **DIR: PH Pin on DRV8874, Direction of output current**
9) **PWM: EN Pin on DRV8874**

FAULT output

When any of the following conditions occur, FAULT becomes Low:

- Undervoltage lockout
- Charge pump undervoltage
- Overcurrent protection
- Thermal shutdown

SLEEP Input

This mode is entered by setting the SLEEP pin logic low and waiting for tSLEEP to elapse. In sleep mode, the H-bridge, charge pump, internal 5-V regulator, and internal logic are disabled. The device relies on a weak pulldown to ensure all of the internal MOSFETs remain disabled. The device will not respond to any inputs besides nSLEEP while in low-power sleep mode.

Temperature vs output current test:

Can use the pad under the module to install the heatsink and measure the IC temperature. In a test without heatsink, with an initial temperature of 25 °C and an output of 2A, after 120 seconds the temperature reached 90 °C and after 180 seconds the temperature reached 115 °C, and the overtemperature protection cut off the output for a few seconds.

So, according to your conditions and required output current, Use the appropriate heatsink and install it to the pad under the module with silicon paste.

Current Analog Output:

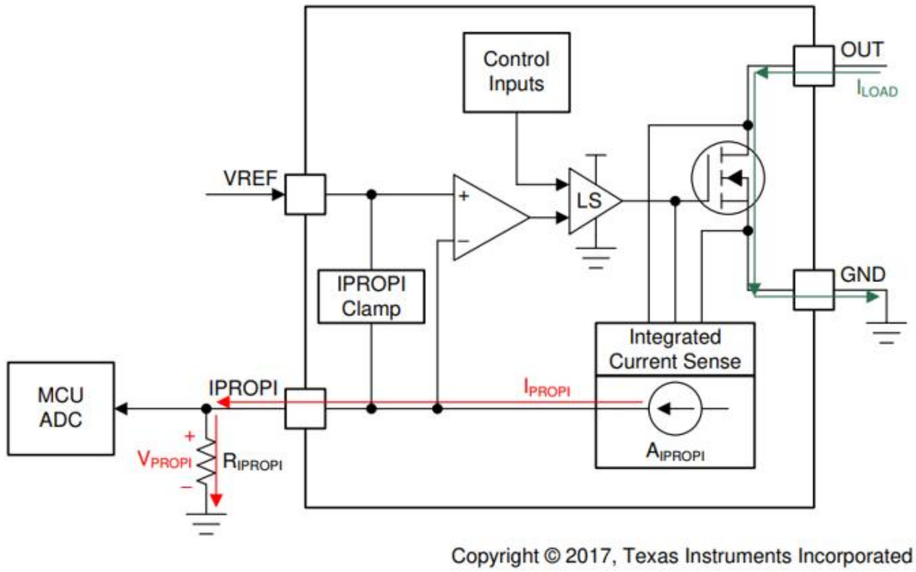
The IPROPI pin outputs an analog current proportional to the current flowing through the low-side power MOSFETs in the H-bridge scaled by AIPROPI. The IPROPI output current can be calculated by Equation 1. The ILSx in Equation 1 is only valid when the current flows from drain to source in the low-side MOSFET. If current flows from source to drain, the value of ILSx for that channel is zero. For instance, if the bridge is in the brake, slow-decay state, then the current out of IPROPI is only proportional to the current in one of the low-side MOSFETs.

$$\text{IPROPI } (\mu\text{A}) = (\text{ILS1} + \text{ILS2}) \text{ (A) x AIPROPI } (\mu\text{A/A})$$

AIPROPI is 455 μA/A

The IPROPI pin should be connected to an external resistor (RIPROPI) to ground in order to generate a proportional voltage (VIPROPI) on the IPROPI pin with the IIPROPI analog current output. This allows for the load current to be measured as the voltage drop across the RIPROPI resistor with a standard analog to digital converter (ADC). The RIPROPI resistor can be sized based on the expected load current in the application so that the full range of the controller ADC is utilized. Additionally, the DRV887x devices implement an internal IPROPI voltage clamp circuit to limit VIPROPI with respect to VVREF on the VREF pin and protect the external ADC in case of output overcurrent or unexpected high current events. The corresponding IPROPI voltage to the output current can be calculated by this Equation:

$$\text{VIPROPI (V) = IPROPI (A) x RIPROPI } (\Omega)$$



Integrated Current Sensing of DRV8874

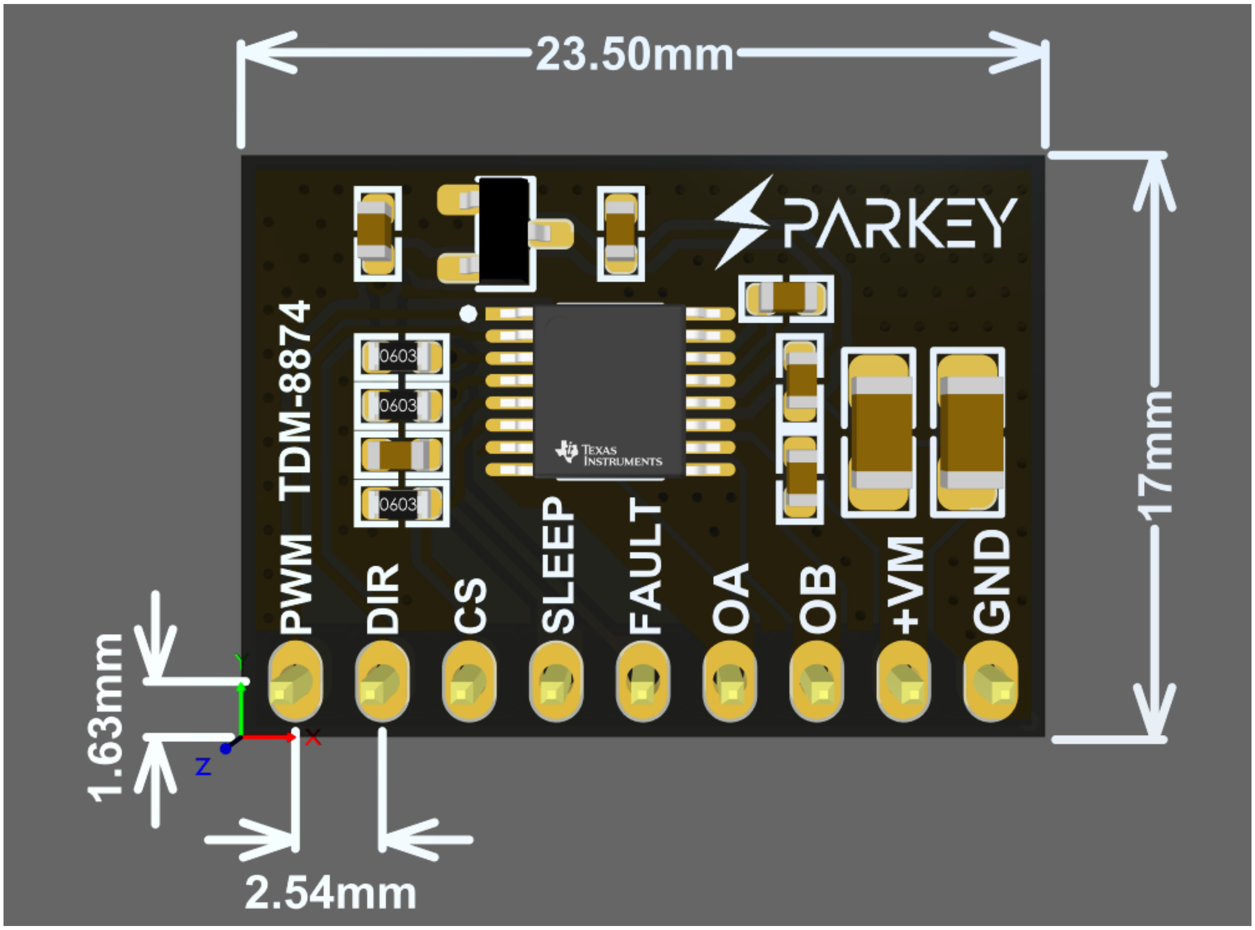
The current chopping threshold (ITRIP) is set through a combination of the VREF voltage (VVREF) and IPROPI output resistor (RIPROPI). This is done by comparing the voltage drop across the external RIPROPI resistor to VVREF with an internal comparator.

ITRIP (A) x AIPROPI (µA/A) = VVREF (V) / RIPROPI (Ω)

For example, if VVREF = 3.3 V, RIPROPI = 1500 Ω, and AIPROPI = 455 µA/A, then ITRIP will be approximately 4.83 A.

For more information, refer to the DRV8874PWPR datasheet

Dimensions:



23.50mm
17mm
1.63mm
2.54mm
PARKEY
TDM-8874
PWM
DIR
CS
SLEEP
FAULT
OA
OB
+VM
GND

Contact Us

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