

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## DRV8837DSGR-MS

Product specification

## GENERAL DESCRIPTION

DRV8837DSGR-MS are low voltage DC IC.motor driver Internal integration 650mΩ(HS+LS typical) H bridge N MOS switch, whichcan support the 1.8V~11V input voltage range.The Peak current capacityis up to1.5A,support for ultra-low power sleep mode; built-inUVLO, Thermal Shutdown, OCP protectioncircuit. DRV8837DSGR-MS can be used in camera, toys and consumer products.


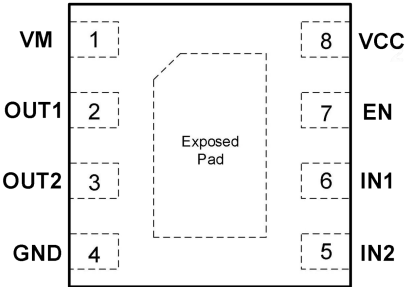
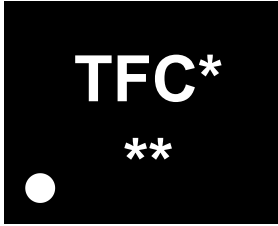
## FEATURES

- Support the input voltage range:  
Motor power: 1.8V~11V  
Control power supply: 1.8V~7V
- LDMOS  $R_{DS(ON)}$  (HS+LS) 650mΩ (typical)
- Ultra-low power sleep mode
- 45nA (typical) VM sleep mode current
- 17nA (typical) VCC sleep mode current
- Up to 1.5A Peak current output capacity
- Built-in UVLO Protection
- Built-in Over Temperature Protection
- Built-in Short Circuit Protection
- Built-in Over Current Protection
- Built-in Charge Pump
- WSON-8-EP(2\*2) package

## APPLICATION

- Cameras
- Toys
- Consumer Products

## Reference News

| WSON-8-EP(2*2)  | Pin Configuration   | MARKING   |
|---|---|---|
|  |  |  |

## Order information

| P/N            | PKG            | QTY     |
|----------------|----------------|---------|
| DRV8837DSGR-MS | WSON-8-EP(2*2) | 3000PCS |

## PIN FUNCTIONS

| Pin | Name | Function   |
|-----|------|--|
| 1   | VM   | Power Supply for Driver. Connect a 0.1 $\mu$ F bypass ceramic capacitor to GND. A bulk capacitor with at least 22 $\mu$ F capacitance on VM to GND is needed and helpful to stabilize VM voltage during motor operation. |
| 2   | OUT1 | Motor Driver output 1  |
| 3   | OUT2 | Motor Driver output 2  |
| 4   | GND  | Ground pin   |
| 5   | IN2  | PWM input2   |
| 6   | IN1  | PWM input1   |
| 7   | EN   | Chip Enable Input Pin. When this pin is in logic low, the device enters low-power sleep mode. The device operates normally when this pin is logic high. The pin has an internal pull-down resistor to GND.               |
| 8   | VCC  | Power Supply for Logic Input. Connect a 0.1 $\mu$ F bypass ceramic capacitor to GND  |

## YPICAL APPILCATION

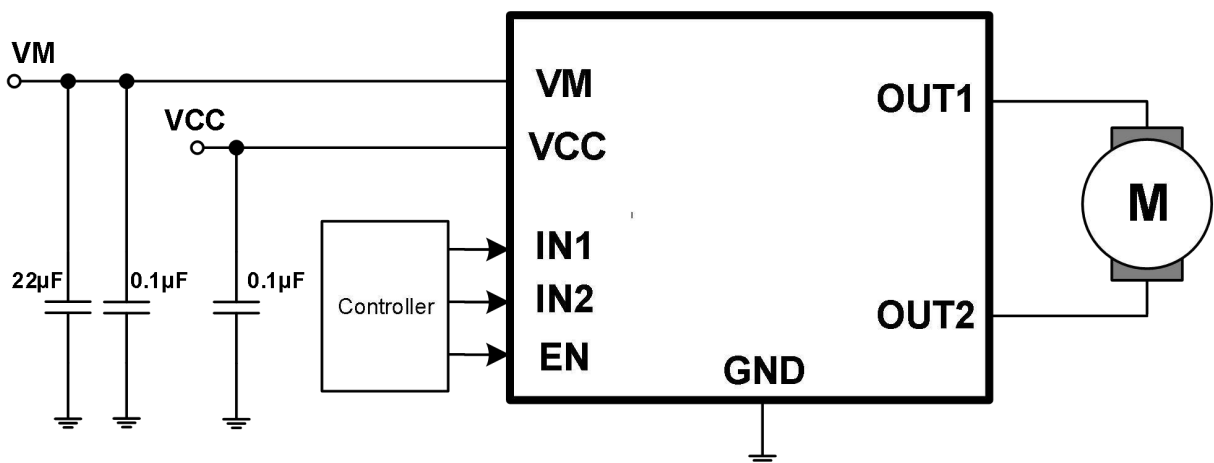


Figure 1. Basic Application Circuit

## ABSOLUTE MAXIMUM RATINGS

| Parameter  | Value        | Unit |
|--|--------------|------|
| VM Voltage Range                                     | -0.3~ 11     | V    |
| VCC, IN1, IN2, EN Voltages Range                     | -0.3~7       | V    |
| OUT1, OUT2 Voltage Range                             | -0.3~Vin+0.3 | V    |
| Storage Temperature Range                            | -50~ 150     | °C   |
| Junction Temperature                                 | -40~ 150     | °C   |
| Package Thermal Resistance $\theta_{JA}$ of DFN2x2-8 | 70           | °C/W |
| Package Thermal Resistance $\theta_{JA}$ of SOP8     | 90           | °C/W |

## ESD RATING

| Items     | Description                   | Value | Unit |
|-----------|-------------------------------|-------|------|
| $V_{ESD}$ | Human Body Model for all pins | ±2000 | V    |

JEDEC specification JS-001

## RECOMMENDED OPERATING CONDITIONS

| Items         | Description                          | Min | Max | Unit |
|---------------|--------------------------------------|-----|-----|------|
| Voltage Range | VM                                   | 1.8 | 11  | V    |
| $T_J$         | Operating Junction Temperature Range | -40 | 125 | °C   |

## ELECTRICAL CHARACTERISTICS

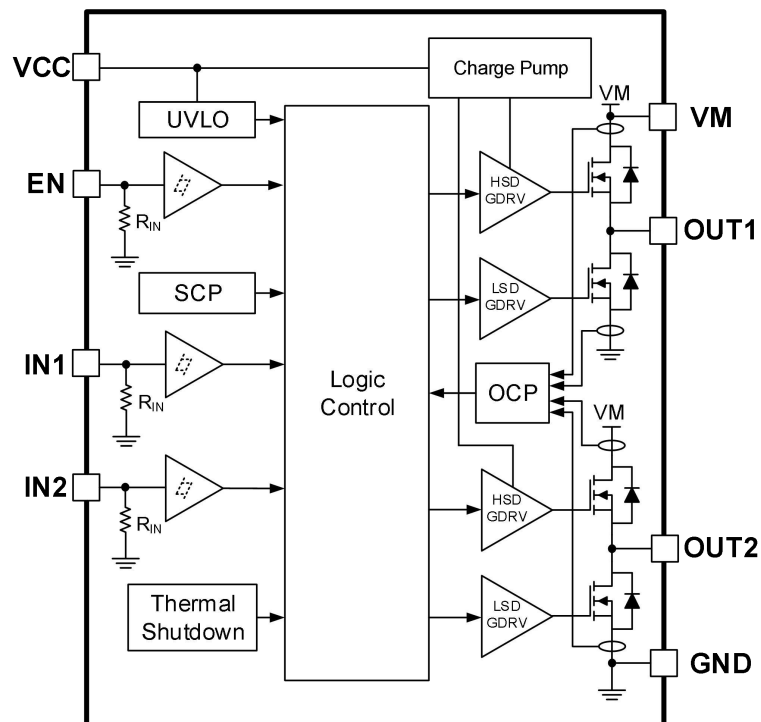
( $V_M=5V$ ,  $T_A = 25^{\circ}C$ , unless otherwise noted.)

| Parameter   | Symbol         | Conditions                  | Min          | Typ         | Max         | Unit        |
|---|----------------|-----------------------------|--------------|-------------|-------------|-------------|
| <b>Input Power Supplies (VM and VCC)</b>          |                |                             |              |             |             |             |
| VM Voltage Range                                  | $V_{VM}$       |                             | 1.8          |             | 11          | V           |
| VM Supply Current                                 | $I_{VM}$       | VM=5V, VCC=3V<br>No PWM     |              | 124         |             | $\mu A$     |
|   |                | VM=5V, VCC=3V<br>50kHz PWM  |              | 0.53        |             | mA          |
| VM sleep mode supply current                      | $I_{VMQ}$      | VM=5V, VCC=3V<br>Sleep Mode |              | 45          | 95          | nA          |
| VCC Voltage Range                                 | $V_{VCC}$      |                             | 1.8          |             | 7           | V           |
| VCC Supply Current                                | $I_{VCC}$      | VM=5V, VCC=3V<br>No PWM     |              | 180         |             | $\mu A$     |
|   |                | VM=5V, VCC=3V<br>50kHz PWM  |              | 0.32        |             | mA          |
| VCC sleep mode supply current                     | $I_{VCCQ}$     | VM=5V, VCC=3V<br>Sleep Mode |              | 17          | 35          | nA          |
| <b>PWM Control Logic Inputs (IN1, IN2 and EN)</b> |                |                             |              |             |             |             |
| Input Logic Low Voltage Falling Threshold         | $V_{IL\_F}$    |                             | 0.25x<br>VCC | 0.4x<br>VCC |             | V           |
| Input Logic High Voltage Rising Threshold         | $V_{IH\_R}$    |                             |              | 0.5x<br>VCC | 0.6x<br>VCC | V           |
| Input logic Hysteresis                            | $V_{HYS}$      |                             |              | 0.1x<br>VCC |             | V           |
| Input Logic Low Current                           | $I_{IL}$       |                             | -5           |             | 5           | $\mu A$     |
| Input Logic High Current                          | $I_{IH}$       |                             |              |             | 40          | $\mu A$     |
| Input Pull Down Resistor                          | $R_{IN}$       |                             |              | 100         |             | k $\Omega$  |
| <b>Motor Driver Outputs (OUT1 and OUT2)</b>       |                |                             |              |             |             |             |
| Output Switch<br>On-Resistance (HS+LS)            | $R_{ON}$       |                             |              | 0.65        |             | $\Omega$    |
| Output Switch Leakage Current                     | $I_{LEAK}$     |                             | -200         |             | 200         | nA          |
| <b>Protection Function</b>                        |                |                             |              |             |             |             |
| VCC UVLO Voltage                                  | $V_{UVLO}$     |                             |              | 1.7         |             | V           |
| UVLO Hysteresis                                   | $V_{UVLO\_HY}$ |                             |              | 100         |             | mV          |
| Over Current Protection                           | $I_{OCP}$      |                             | 1.6          | 1.75        |             | A           |
| Over Current Retry Time                           | $T_{OCP\_RT}$  |                             |              | 1           |             | ms          |
| Thermal Shutdown Threshold                        | $T_{SDN}$      |                             |              | 160         |             | $^{\circ}C$ |
| Thermal Shutdown Hysteresis                       | $T_{SDN\_HY}$  |                             |              | 20          |             | $^{\circ}C$ |

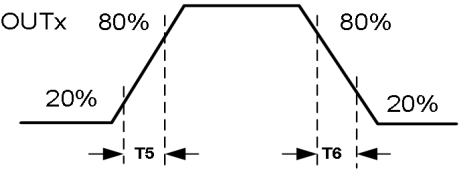
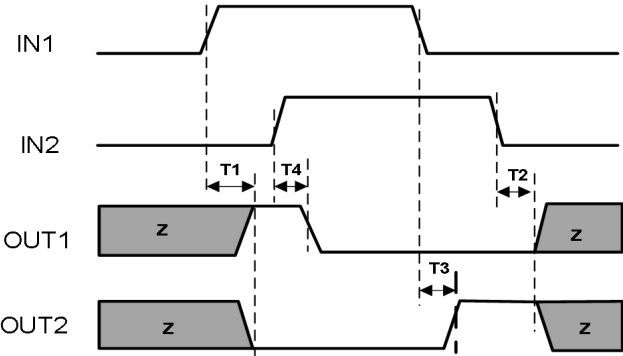
**ELECTRICAL CHARACTERISTICS(continued)**

( $V_{IN}=5V$ ,  $T_A = 25^{\circ}C$ , unless otherwise noted.)

| Parameter  | Symbol | Conditions | Min | Typ | Max | Unit |
|--|--------|------------|-----|-----|-----|------|
| Output Enable time   | $T_1$  |            |     | 180 | 265 | ns   |
| Output Disable time  | $T_2$  |            |     | 70  | 100 | ns   |
| Delay Time<br>IN1 low to OUT2 high<br>IN2 low to OUT1 high | $T_3$  |            |     | 140 | 215 | ns   |
| Delay Time<br>IN2 high to OUT1 low<br>IN1 high to OUT2 low | $T_4$  |            |     | 160 | 240 | ns   |
| Output rise time   | $T_5$  |            |     | 60  | 120 | ns   |
| Output fall time   | $T_6$  |            |     | 38  | 100 | ns   |

**FUNCTIONAL BLOCK DIAGRAM**

**Figure 2. DRV8837DSGR-MS Block Diagram**

INPUT OUTPUT LOGIC



| EN | IN1 | IN2 | OUT1 | OUT2 | Function |
|----|-----|-----|------|------|----------|
| 0  | X   | X   | Z    | Z    | Coast    |
| 1  | 0   | 0   | Z    | Z    | Coast    |
| 1  | 1   | 0   | H    | L    | Forward  |
| 1  | 0   | 1   | L    | H    | Reverse  |
| 1  | 1   | 1   | L    | L    | Brake    |





## Attention

■ Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.

■ MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specification of any and all MSKSEMI Semiconductor products described or contained herein.

■ Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all MSKSEMI Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringement of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the MSKSEMI Semiconductor product that you intend to use.