

# Driver IC for Vibrators

## Monolithic IC MM1426

### Outline

This IC was developed as a driver for vibrator motors, and has an output voltage set at 1.3V. The input voltage is monitored, and if a constant voltage is not input the output is turned off.

### Features

1. Reduces the mounting area using a small package
2. In addition to output control through the input voltage, the IC can be turned on and off through the CONT pin.
3. Excellent ripple rejection
4. Output currents of up to 150mA
5. Operating voltage of up to 12V
6. Output voltage is available from 1.2V to 2.0V by 0.1V step.

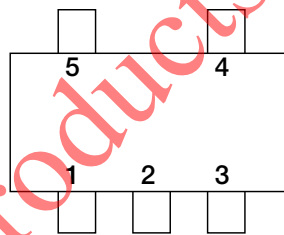
### Package

SOT-25A

### Applications

1. Cellular phones, PHS
2. Game devices
3. Pagers

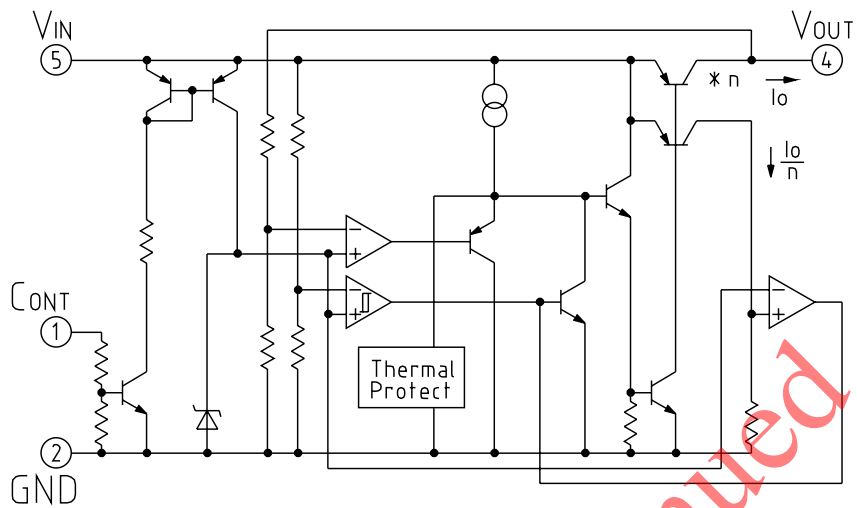
### Pin Assignment



SOT-25  
(TOP VIEW)

1	CONT
2	GND
3	N.C
4	V <sub>OUT</sub>
5	V <sub>IN</sub>

Equivalent Circuit Diagram



Pin Description

Pin No.	Pin name	Functions	Equivalent circuit diagram						
1	CONT	<p>Output voltage on/off-control pin</p> <table border="1"> <tr> <td>V<sub>CONT</sub></td> <td>Output</td> </tr> <tr> <td>L</td> <td>OFF</td> </tr> <tr> <td>H</td> <td>ON</td> </tr> </table> <p>Connect CONT-terminal with V<sub>IN</sub>, when it is not used.</p>	V <sub>CONT</sub>	Output	L	OFF	H	ON	
V <sub>CONT</sub>	Output								
L	OFF								
H	ON								
2	GND	GND pin							
3	N.C								
4	V <sub>OUT</sub>	Regulator Output pin							
5	V <sub>IN</sub>	<p>Voltage-supply input pin</p> <p>Output voltage is not output when input voltage is less than input voltage detection value.</p> <p>Note that consumption current flows even when output voltage is OFF due to input voltage detection. Turn output OFF with the CONT pin in order to suppress consumption current completely.</p>							

## Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Operating temperature	T <sub>OPR</sub>	-20~+75	°C
Storage temperature	T <sub>STG</sub>	-40~+125	°C
Supply voltage	V <sub>CC</sub>	-0.3~+12	V
Output current	I <sub>OUT</sub>	200	mA
Power dissipation	P <sub>d</sub>	150 (Alone)	mW

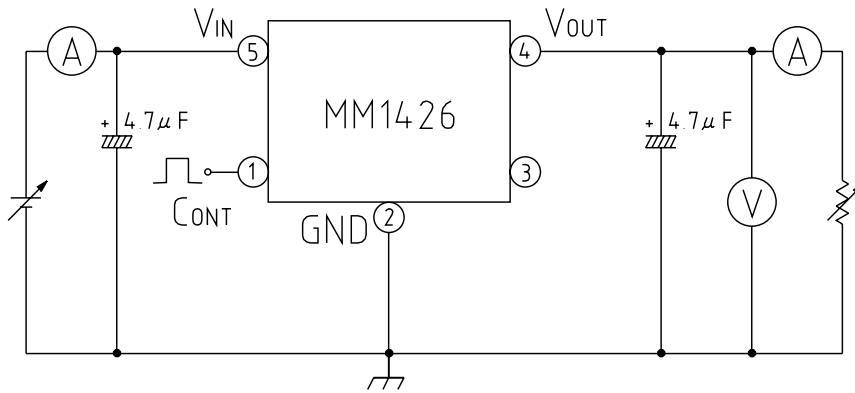
## Recommended Operating Conditions

Item	Symbol	Ratings	Unit
Operating temperature	T <sub>OPR</sub>	-20~75	°C
Output current	I <sub>OP</sub>	0~150	mA
Operating voltage	V <sub>OP</sub>	1.8~12	V

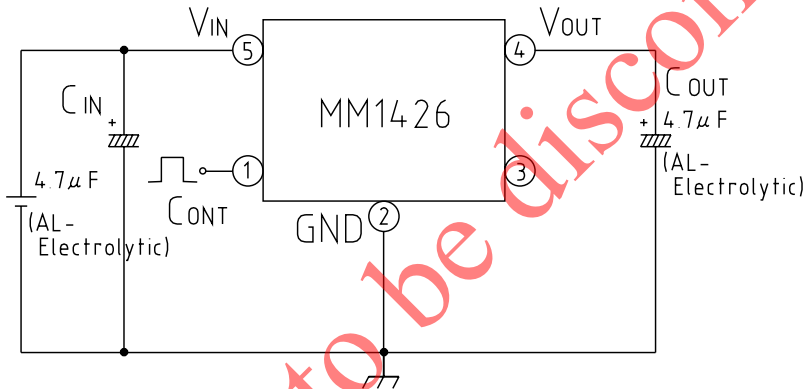
## Electrical Characteristics (Except where noted otherwise, T<sub>a</sub>=25°C)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
Output voltage	V <sub>o</sub>	V <sub>IN</sub> =3.5V I <sub>o</sub> =30mA	-3%	V <sub>o</sub>	+3%	V
No-Load input current	I <sub>ccq1</sub>	V <sub>IN</sub> =3.5V I <sub>o</sub> =0mA		120	240	μA
Input current 1 (OFF)	I <sub>ccq2</sub>	V <sub>IN</sub> =1.8V V <sub>CONT</sub> =1.6V		80	160	μA
Input current 2 (OFF)	I <sub>ccq3</sub>	V <sub>IN</sub> =3.5V V <sub>CONT</sub> =0V			0.1	μA
Line regulation	ΔV <sub>1</sub>	V <sub>IN</sub> =3V~5V I <sub>o</sub> =30mA		10	20	mV
Load regulation	ΔV <sub>2</sub>	V <sub>IN</sub> =3.5V I <sub>o</sub> =0~100mA		30	60	mV
V <sub>o</sub> temperature coefficient	ΔV <sub>o</sub> /ΔT	T <sub>j</sub> =-20~+75°C V <sub>IN</sub> =3.5V I <sub>o</sub> =30mA		100		ppm/°C
Ripple rejection	RR	V <sub>IN</sub> =3.5V f=120Hz V <sub>RIPPLE</sub> =1V <sub>P-P</sub> , I <sub>o</sub> =30mA	55	70		dB
V <sub>IN</sub> low detector voltage	V <sub>sL</sub>	V <sub>IN</sub> =H→L I <sub>o</sub> =30mA	2.0	2.1	2.2	V
V <sub>IN</sub> low detector voltage temperature coefficient	ΔV <sub>sL</sub> /ΔT	T <sub>j</sub> =-20~+75°C V <sub>IN</sub> =H→L I <sub>o</sub> =30mA		200		ppm/°C
V <sub>IN</sub> high detector voltage	V <sub>sH</sub>	V <sub>IN</sub> =L→H I <sub>o</sub> =30mA		2.6	2.8	V
High threshold voltage	V <sub>onh</sub>	V <sub>IN</sub> =H→L, L→H		500		mV
CONT pin current while on	I <sub>ON</sub>	V <sub>CONT</sub> =1.6V		5	10	μA
CONT pin high level	H		1.6		V <sub>IN</sub> +0.3	V
CONT pin low level	L		-0.3		0.4	V

Measuring Circuit



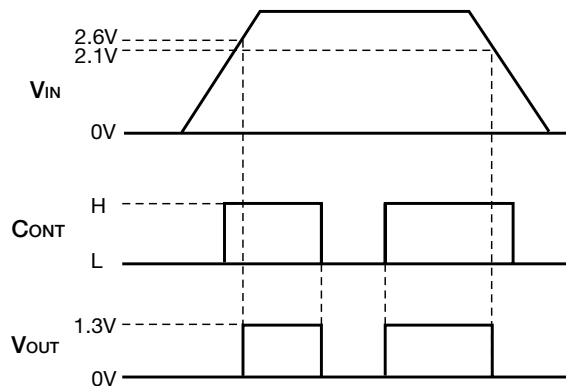
Application Circuits



Note 1: This regulator is not internally compensated and thus requires an external output-capacitor ( $C_{OUT}$ ) for stability.

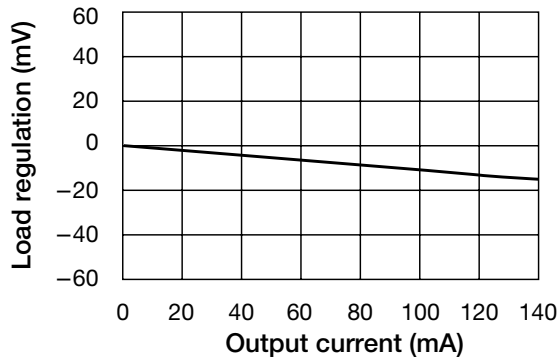
Note 2: The cause of oscillation is due to set wiring and capacitance changes in capacitor caused by temperatures changes, so please take extra care in placing the wires.

Timing Chart

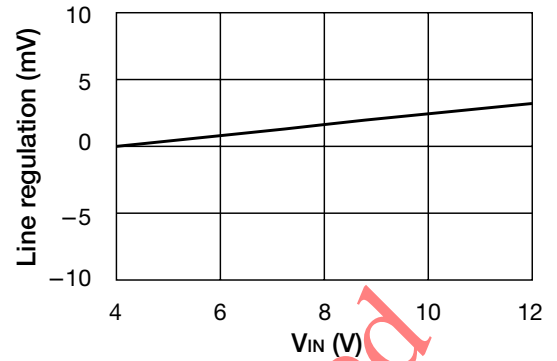


Characteristics

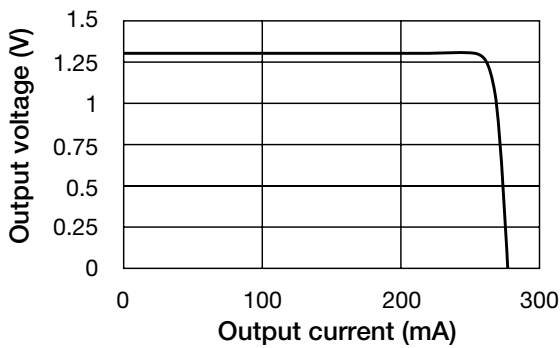
Load regulation



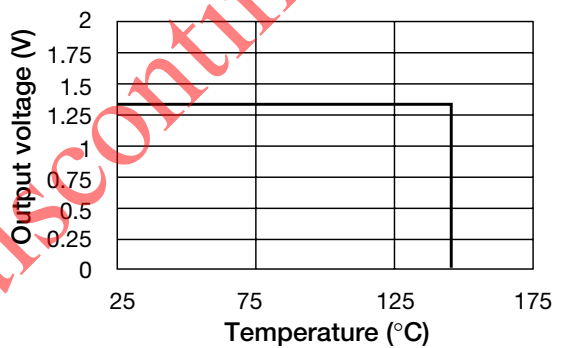
Line regulation



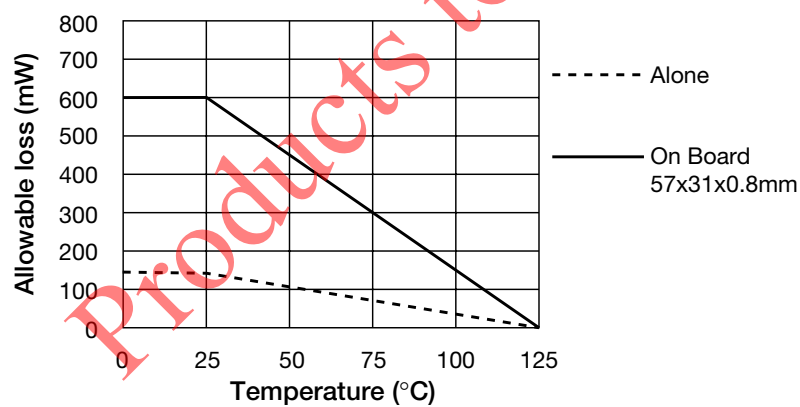
Current limit



Thermal shutdown



Allowable loss



Products to be discontinued