



# LA5636M

## DC/DC Converter Secondary Side Control IC

### Overview

The LA5636M is a DC/DC Converter Secondary Side Control IC that draws power from a car battery and is ideal for use in rechargers for lithium ion batteries, etc. Because this IC incorporates only the basic functions (constant voltage control and constant current control) that are needed in an IC for charging, it can be easily used in combination with other ICs for charging.

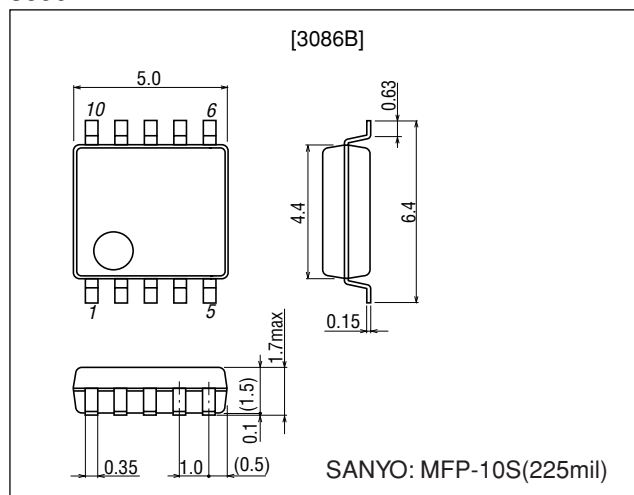
### Features

- Includes integrated circuitry for preventing the malfunction of the system in the event that the input voltage (car battery voltage) drops.
- Produces constant voltage output in proportion to the PWM input signal. (Permits output voltage control by microcontroller.)
- High-precision reference current (current control amp):  $92.5 \mu\text{A} \pm 2.7\%$
- Output voltage can be set through an external resistor.
- Each loop of the voltage amp and current amp is independent.

### Package Dimensions

unit: mm

3086B



### Specifications

Maximum Ratings at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC \text{ max}}$		14.5	V
Allowable power dissipation	$P_d \text{ max}$		350	mW
DOUT terminal current/voltage	$I_{dt\text{max}}/V_{dt\text{max}}$		1/ $-0.2$ to $V_{CC}$	mA/V
PWM input voltage	$V_{\text{pwm}}$		$-0.2$ to $3.0$	V
ICONST terminal voltage	$V_{\text{CONST}}$		$-0.2$ to $V_{CC}$	V
C1 terminal voltage	$V_{C1}$		$-0.2$ to $V_{CC}$	V
Operating temperature	$T_{\text{opr1}}$		$-40$ to $+85$	$^\circ\text{C}$
Performance guaranteed temperature	$T_{\text{opr2}}$		$-25$ to $+75$	$^\circ\text{C}$
Storage temperature	$T_{\text{stg}}$		$-40$ to $+150$	$^\circ\text{C}$

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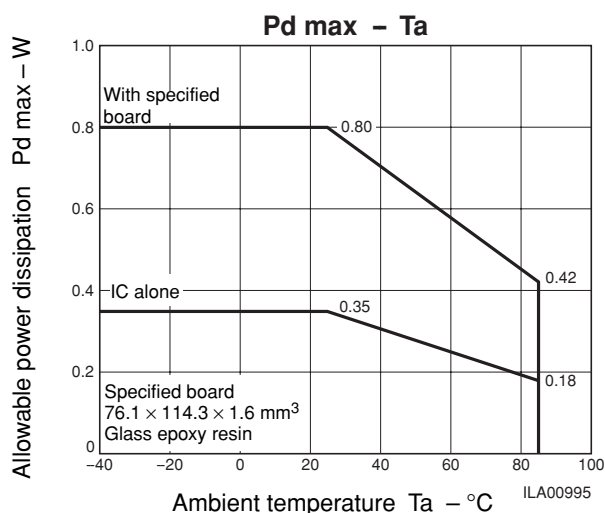
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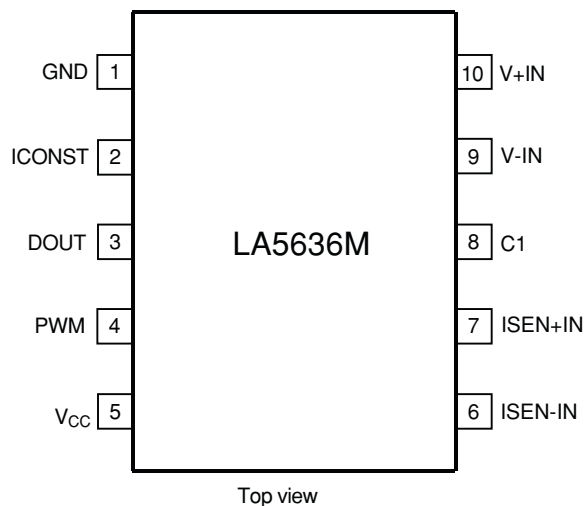
### Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 12\text{V}$

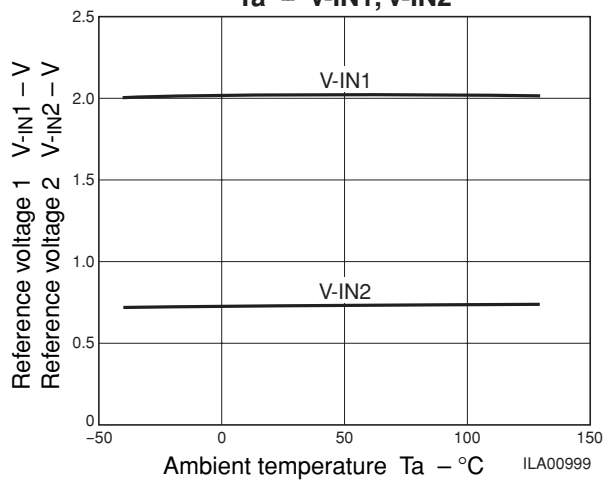
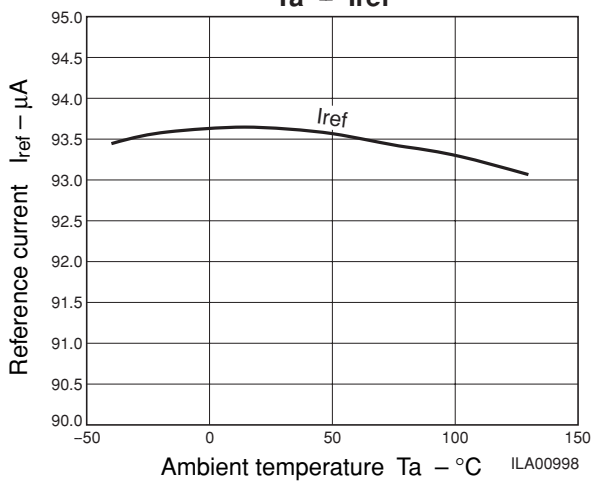
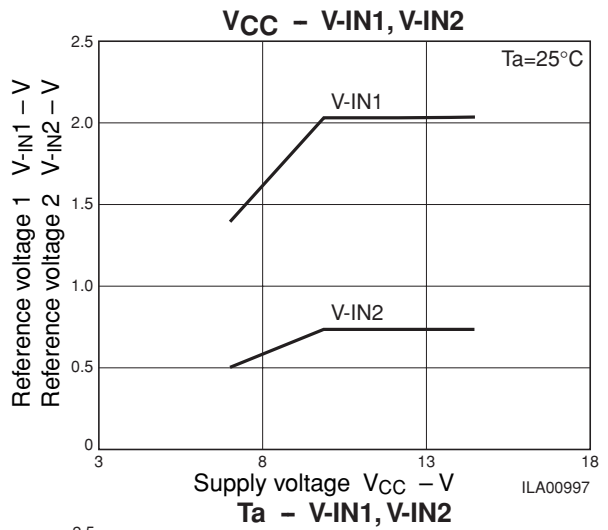
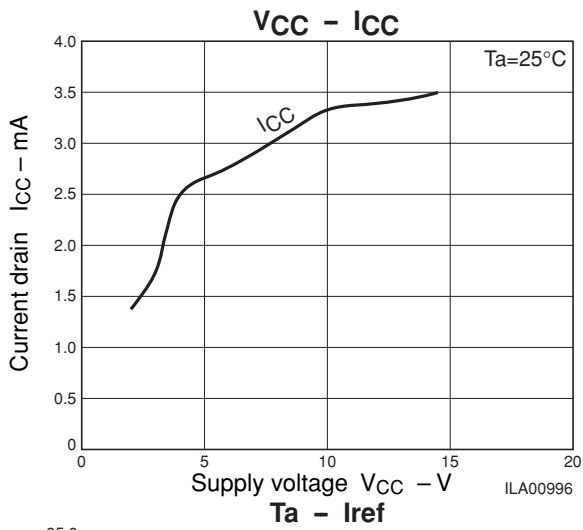
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Operating voltage	$V_{CC}$		10.3		13.0	V
Current drain	$I_{CC}$	Dout = off, $V_{pwm} = \text{off}$ , $R = 27\text{ k}\Omega$		4		mA
PWM input high voltage	$V_{pwmH}$		1.7		2.9	V
PWM input low voltage	$V_{pwmL}$		0		0.8	V
PWM input current	$I_{pwm}$	$V_{pwm} = 0.0\text{ V}$		30		nA
PWM input frequency	$F_{pwm}$		30	32	37	Hz
Reference voltage 1	V-IN1	$V_{CC} = 10.5\text{ to }13\text{ V}$ , PWM = L * $T_a = -25\text{ to }75^\circ\text{C}$	-4 (1.92 V)	2.0 V	+4 (2.08 V)	%
Reference voltage 2	V-IN2	$V_{CC} = 10.5\text{ to }13\text{ V}$ , PWM = H * $T_a = -25\text{ to }75^\circ\text{C}$	-6 (0.68 V)	0.72 V	+6 (0.76 V)	%
Reference voltage 3	V-IN3	$V_{CC} = 8.5\text{ V}$ , PWM = L * $T_a = -25\text{ to }75^\circ\text{C}$	1.56	—	—	V
Reference voltage 4	V-IN4	$V_{CC} = 8.5\text{ V}$ , PWM = H * $T_a = -25\text{ to }75^\circ\text{C}$	0.59	—	—	V
Reference current	IREF	$V_{CC} = 10.5\text{ to }13\text{ V}$ , when $27\text{ k}\Omega$ is connected * $T_a = -25\text{ to }75^\circ\text{C}$	90.0	92.5	95.0	$\mu\text{A}$

\* The design is guaranteed over the temperature range, so the temperature is not measured.

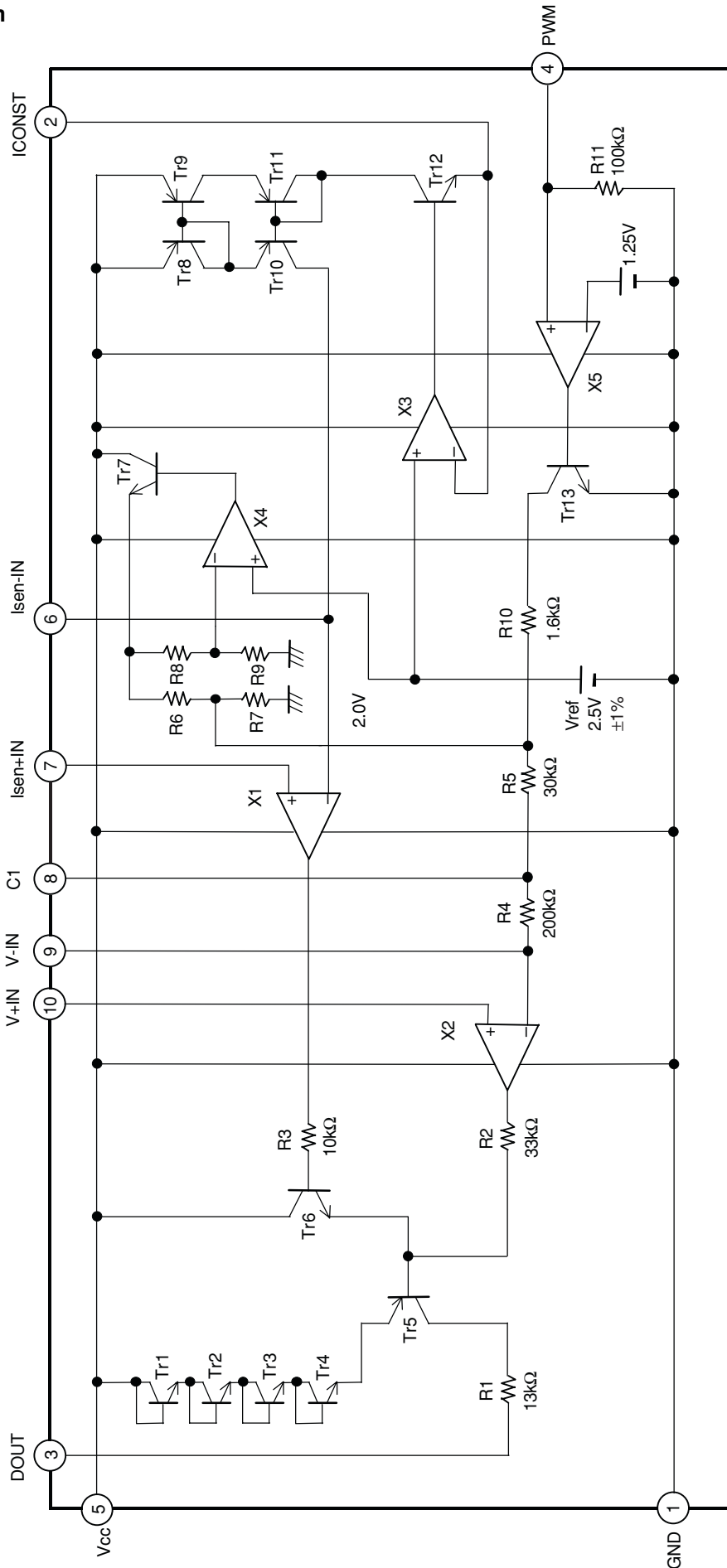


### Pin Assignment



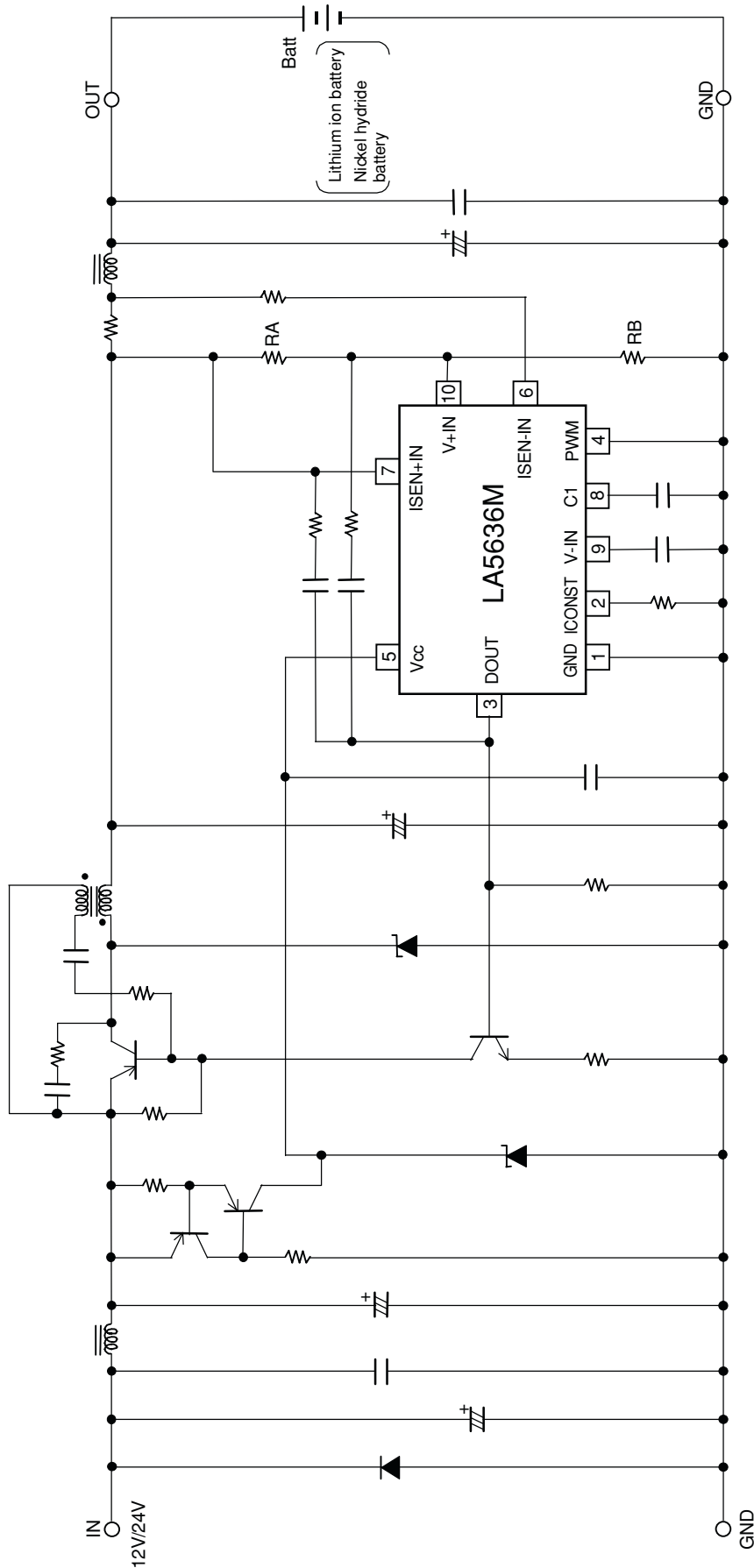


Block Diagram

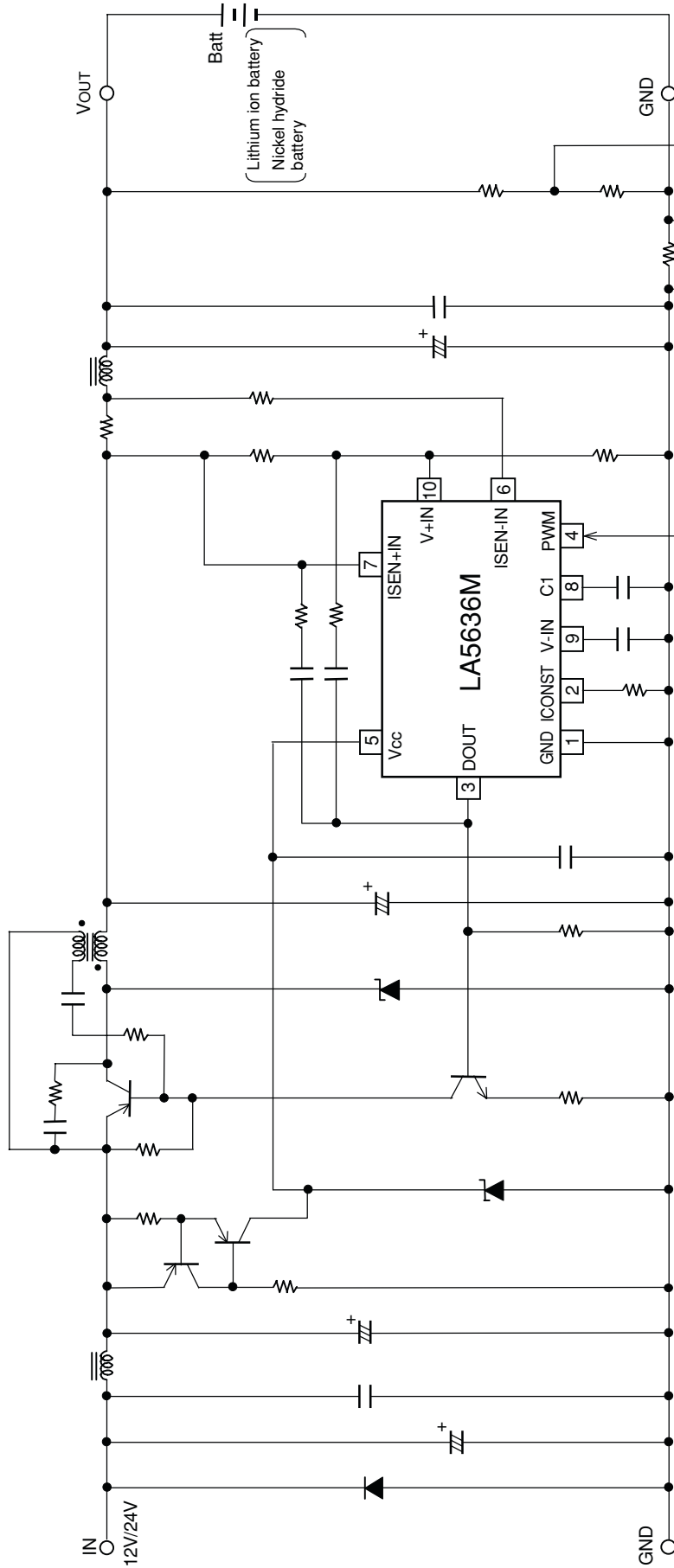


**Application Circuit Diagram 1 (DC Mode)**

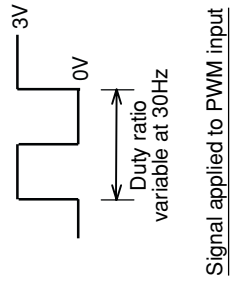
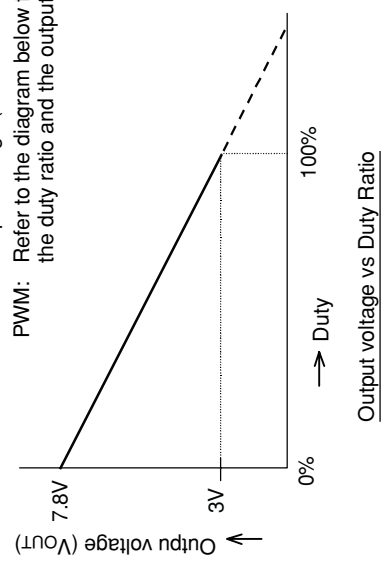
1. OUT voltage can be set as desired by varying RA and RB.



Application Circuit Diagram 2 (PWM Mode)



- A/D1: Output current (Limit value for completion of charging)
- A/D2: Output voltage (Limit value for completion of charging)
- PWM: Refer to the diagram below for the relationship between the duty ratio and the output voltage



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