Ordering number : EN7101

SANYO Semiconductors
DATA SHEET

Monolithic Digital IC

LB1943N — VCR Loading Motor Variable Output Forward/Reverse Motor Driver

Overview

The LB1943N is a variable output forward/reverse motor driver that is optimal for driving motors such as the loading motor in VCR decks.

Functions

- Variable output forward/reverse motor driver
- Built-in thermal protection circuit
- Built-in reference voltage circuit (6.35V, typical)

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		18	V
Maximum input voltage	V_{IN} max	$V_{CC} > V_{IN}$	-0.3 to +6	V
Maximum output current	I_{OUT} max		±1.6	A
Allowable power dissipation	Pd max		1.2	W
Operating temperature	Topr		-25 to +75	°C
Storage temperature	Tstg		-55 to +125	°C

Allowable Operating Range at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage range	$V_{CC}1$		8.0 to 18	V
	$V_{CC}2$	$V_{CC}1 \geq V_{CC}2$	5 to 18	V
Forward to reverse operation disallowed period	Toff		20 or more	μs

Electrical Characteristics at Ta = 25°C, V_{CC} = 12V

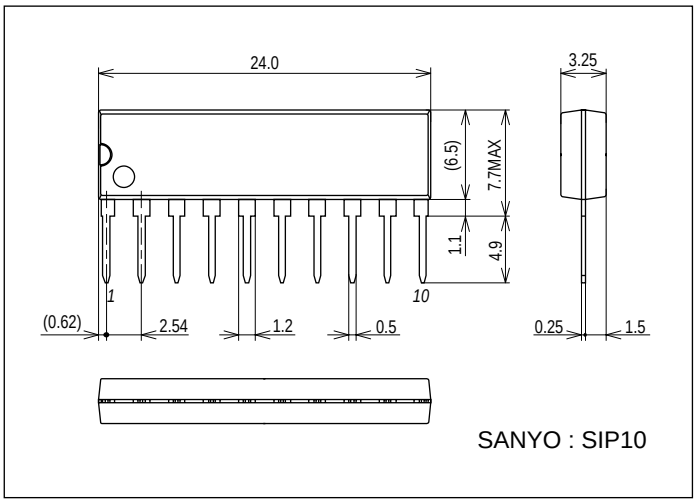
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Low-level input voltage	V_{IN} L		0		1.0	V
High-level input voltage	V_{IN} H		4.2		6.0	V
Mid-level input voltage	V_{IN} M		2.0		3.0	V
Intput impedance	Z_{IN}			75		kΩ
Current consumption	I_{CC}			5.5	10	mA
Output voltage 1	$V_{OUT}1$	R_L = 60Ω, VC = 2.5V, $V_{IN}1$ = 2.5V, $V_{IN}2$ = 0V	4.4	4.95	5.4	V
Output voltage 2	$V_{OUT}2$	R_L = 60Ω, VC = 2.5V, $V_{IN}1$ = 2.5V, $V_{IN}2$ = 5.0V	4.4	4.95	5.4	V
Output leakage current	I_O L	R_L = ∞		0.01	1.0	mA
Saturation voltage (high side)	V sat11	V_{CC} = 12V, I_{OUT} = 300mA		1.9	2.2	mV
	V sat12	V_{CC} = 12V, I_{OUT} = 500mA		1.9	2.3	V
Saturation voltage (low side)	V sat21	V_{CC} = 12V, I_{OUT} = 300mA		0.25	0.5	V
	V sat22	V_{CC} = 12V, I_{OUT} = 500mA		0.4	0.65	V
Reference supply voltage	Vref		6.0	6.35	6.8	V
Reference voltage load characteristics	ΔVref/ΔIref	Iref = 0mA to -2.0mA		0.05	0.1	V/mA
Control to output gain		V_{OUT}/VC, VC = 2.5V, R_L = 60Ω	1.5	1.9	2.4	Time
Thermal shutdown temperature	T_{TSD}	Design target*	150	180		°C

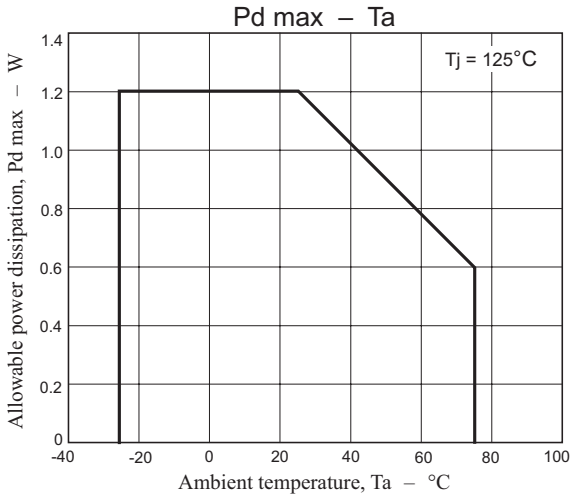
*: The design specification items are design guarantees and are not measured.

Package Dimensions

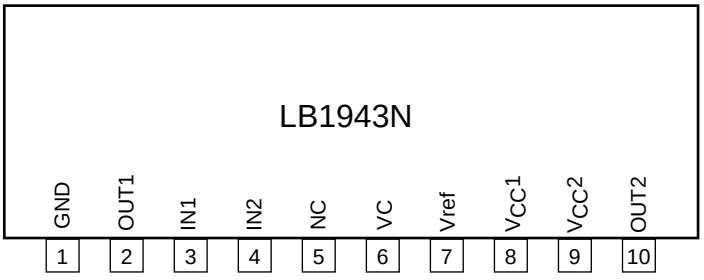
unit:mm (typ)

3043C



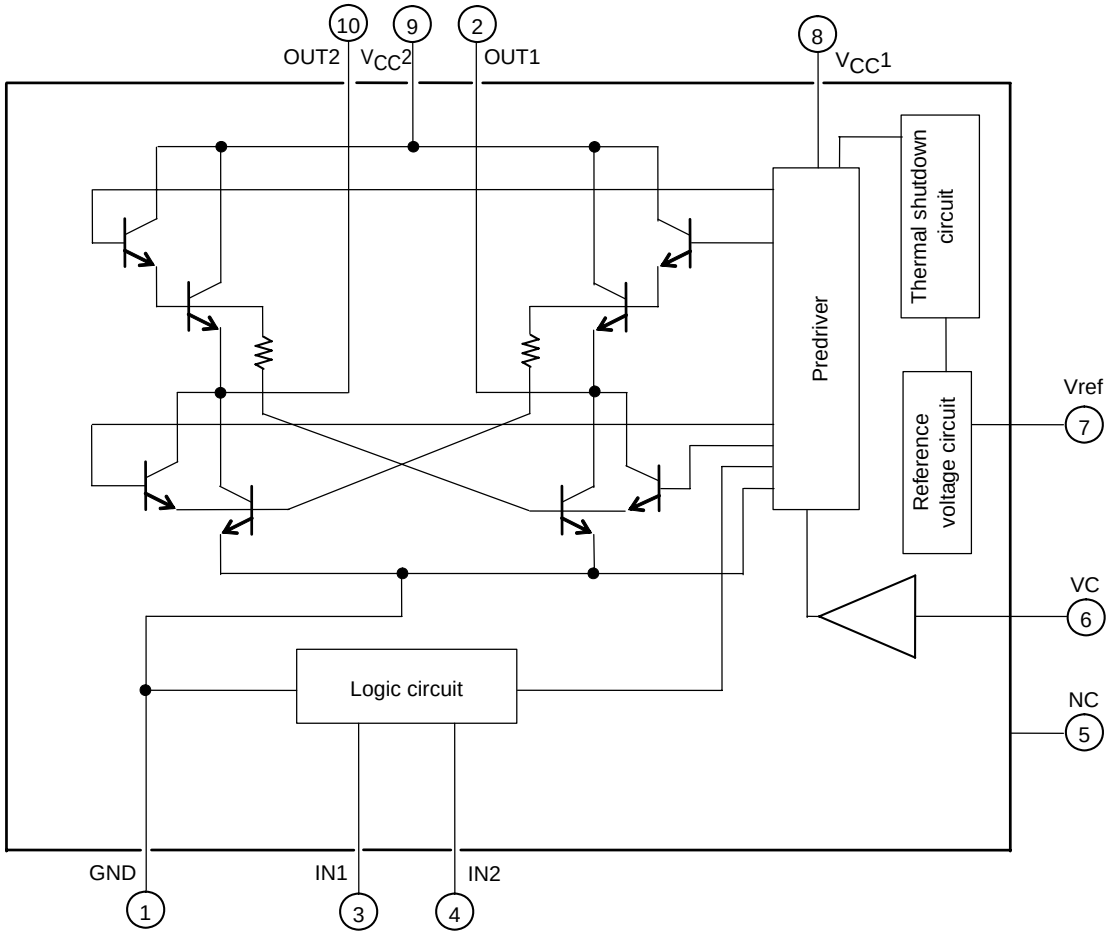


Pin Assignment



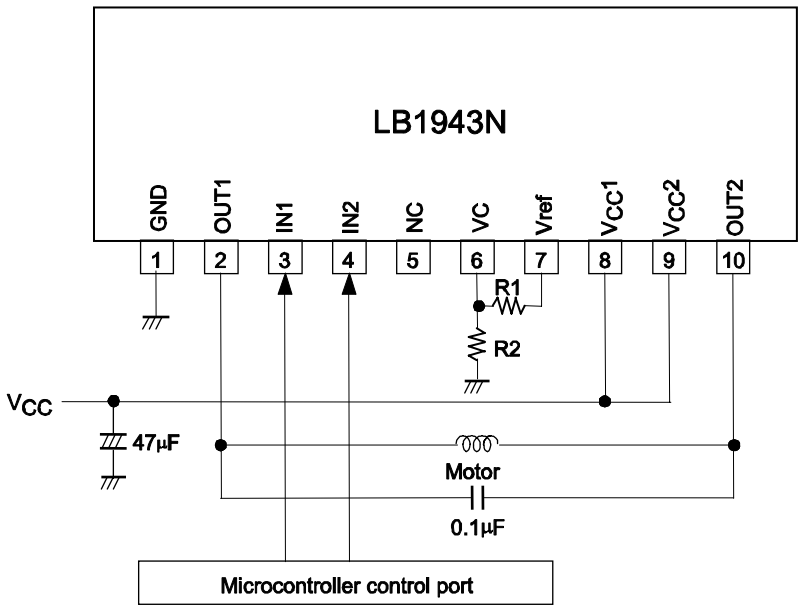
Top view

Block Diagram



Application Circuit Example

V_{CC} = 12V



Note: Microcontroller output ports must be CMOS outputs and must be used in the high, low, or open state.

Truth Table

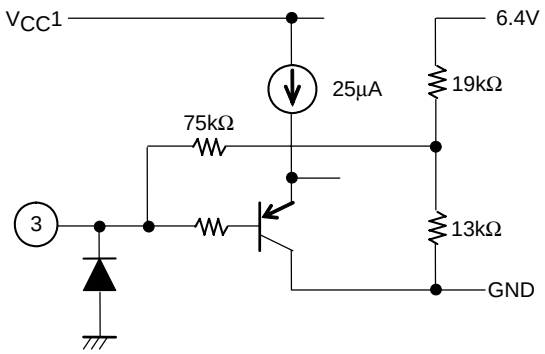
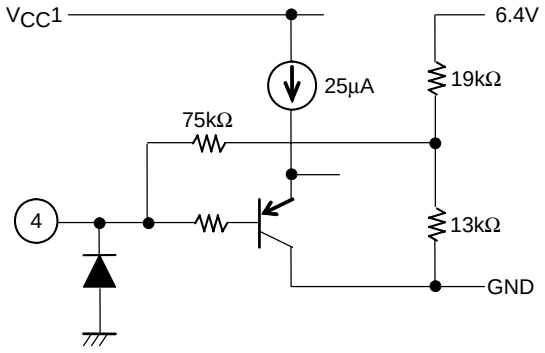
Input		Output voltage		Operation
IN1	IN2	OUT1	OUT2	
H	H	L	Full	Forward (reverse) mode
M	H	L	VC × 2	Forward (reverse) mode
L	H	L	VC × 2	Forward (reverse) mode
H	M	off	off	Break
M	M	off	off	Break
L	M	off	off	Break
H	L	Full	L	Reverse (forward) mode
M	L	VC × 2	L	Reverse (forward) mode
L	L	VC × 2	L	Reverse (forward) mode

H: high level, M: mid level, L: low level

Input levels VH: 4.2V or higher
VM: 2.0V to 3.0V
VL: Under 1.0V

When IN1 or IN2 is open, that input will go to the 2.5V level. Operation is equivalent to that of the LB1641.

Pin Functions

Pin No.	Pin	Description	Equivalent Circuit
1	GND	• Common ground for the power signal systems	
3	IN1	• Output voltage switching input • When the input is open, VM will become about 2.5V.	
4	IN2	• Forward/reverse/brake switching input • When the input is open, VM will become about 2.5V.	

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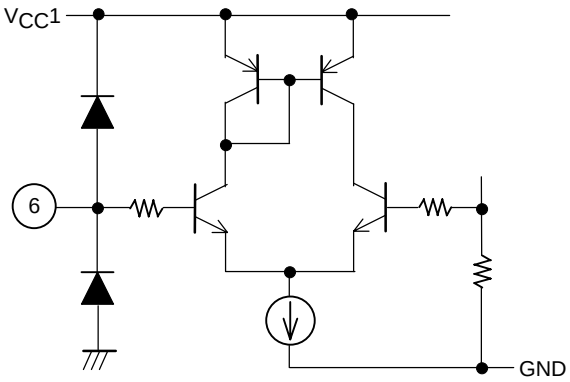
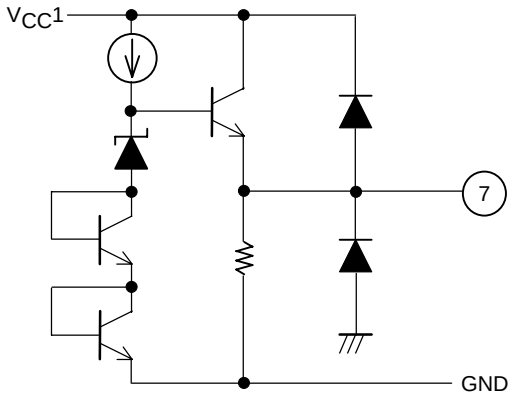
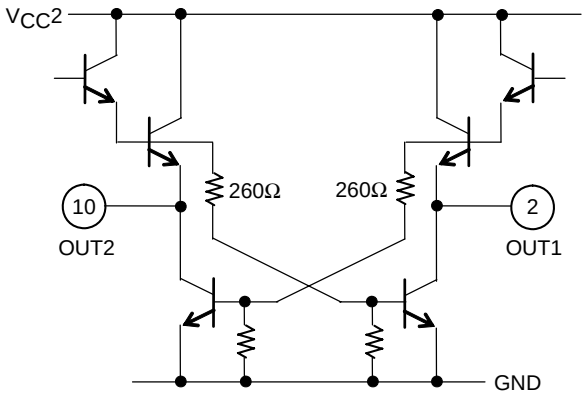
Pin No.	Pin	Description	Equivalent Circuit
6	VC	• Output voltage setting	
7	Vref	• Reference voltage output Vref = 6.4V	
8	$V_{CC}1$	• Signal system power supply	
9	$V_{CC}2$	• Power system power supply	
2 10	OUT1 OUT2	• Motor coil connection	

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