# UNISONIC TECHNOLOGIES CO., LTD

F1862

**Preliminary** 

# LINEAR INTEGRATED CIRCUIT

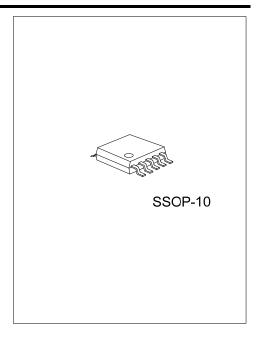
# SINGLE-PHASE FULL-WAVE **FAN MOTOR DRIVER**

#### DESCRIPTION

The UTC F1862 is a Single-phase full-wave motor driver designed specially for small DC fans. For example, CPU cooling fans.

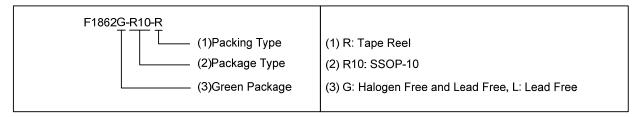
#### **FEATURES**

- \* Wide Operating Voltage 5V or 12V Are Both Acceptable
- \* Built-In Hall Amplifier And Hall Bias Circuit
- \* Built-In Lockup And Thermal Protection With Automatic **Recovery Circuits**
- \* Latch-Type Lockup Detection Output (RD) is Low During Rotation And High During Stop.
- \* Start/Stop Pin For Standby Mode Control

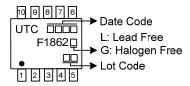


#### **ORDERING INFORMATION**

Ordering	Number	Package	Dealine	
Lead Free	d Free Halogen Free		Packing	
F1862L-R10-R	F1862G-R10-R	SSOP-10	Tape Reel	

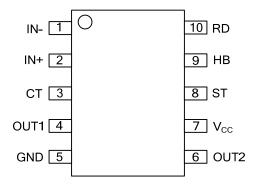


#### **MARKING**



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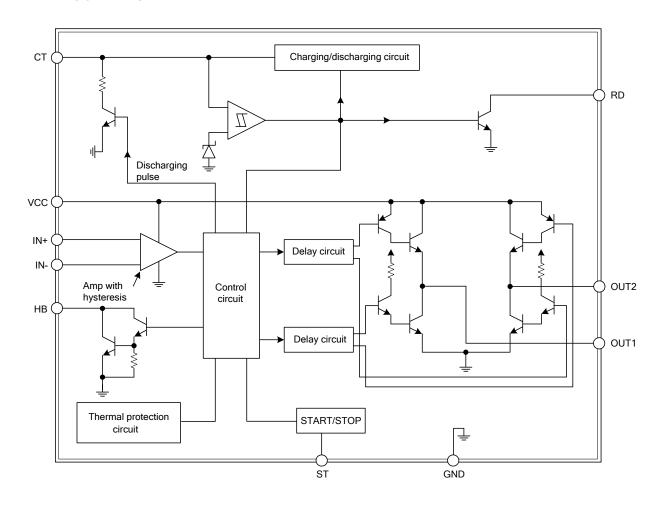
# **■ PIN CONFIGURATION**



# **■** PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	IN-	Hall signal input pin
2	IN+	Hall signal input pin
3	CT	This pin serves timing capacitor connecting pin between CT and GND.
4	OUT1	Single-phase coil output pin
5	GND	Ground
6	OUT2	Single-phase coil output pin
7	$V_{CC}$	Power supply pin for whole I <sub>C</sub> .
8	ST	When input to this pin is High, motor drive is stopped (OUT is high impedance).
9	НВ	Hall bias switching pin.
10	RD	Latch-type lockup detection output (RD) is low during rotation and high during stop.

# **■ BLOCK DIAGRAM**



# ■ **ABSOLUTE MAXIMUM RATING** (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Maximum Supply Voltage	V <sub>CC MAX</sub>	17	V
Maximum Output Current	I <sub>OUT MAX</sub>	0.8	Α
Maximum Output Withstand Voltage	V <sub>OUT MAX</sub>	17	V
RD Maximum Output Withstand Voltage	V <sub>R MAX</sub>	17	V
RD Maximum Output Current	I <sub>R MAX</sub>	5	mA
HB Maximum Output Current	I <sub>B MAX</sub>	10	mA
ST Maximum Input Voltage	V <sub>ST MAX</sub>	15	V
Allowable Power Dissipation (With Specified Substrate (Note 2))	P <sub>D_MAX</sub>	800	mW
Operating Temperature	T <sub>OPR</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>STG</sub>	-55~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

# ■ ALLOWABLE OPERATING RANGE (T<sub>A</sub>=25°C , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	3.8 ~ 16.8	V
ST Input High-Level Voltage	STH	3 ~ 14	V
ST Input Low-Level Voltage	STL	-0.3 ~ 0.4	V
Hall Input Common-Mode Input Voltage Range	V <sub>ICM</sub>	0.2 ~ V <sub>CC</sub> -1.5	V

# ■ **ELECTRICAL CHARACTERISTICS** (V<sub>CC</sub>=5V, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		TYP	MAX	UNIT
		In Drive Mode (CT=[L], ST=[L])		6.5	9.1	mA
Circuit Current	Icc	In Lockup Protecting Mode (CT=[H], ST=[L])		2.2	3.1	mA
		In Standby Mode (ST=[H])		110	150	μΑ
Lock Detection Capacitor Charging Current	I <sub>CT1</sub>		1.9	2.8	3.7	μΑ
Capacitor Discharging Current	I <sub>CT2</sub>		0.32	0.46	0.6	μΑ
Capacitor Charging/Discharging Current Ratio	R <sub>CT</sub>	RCD=ICT1/ICT2	5.0	6.0	7.0	
CT Charging Voltage	$V_{CT1}$		2.55	2.75	2.95	V
CT Discharging Voltage	$V_{CT2}$		1.6	1.8	2.0	V
Output Low-Level Voltage	$V_{OL}$	I <sub>O</sub> =200mA		0.2	0.3	V
Output High-Level Voltage	$V_{OH}$	I <sub>O</sub> =200mA	3.9	4.1		V
Hall Input Sensitivity	$V_{HN}$	Zero Peak Value. (Including Offset, Hysteresis)		7	15	mV
RD Output Pin Low-Level Voltage	$V_{RD}$	I <sub>RD</sub> =5mA		0.1	0.3	V
RD Output Pin Leakage Current	$I_{RDL}$	V <sub>RD</sub> =15V			30	μΑ
HB Output Low-Level Voltage	$V_{HBL}$	I <sub>HB</sub> =5mA		1.0	1.3	V
ST Pin Input Current	I <sub>ST</sub>	V <sub>ST</sub> =5V		75	100	μA

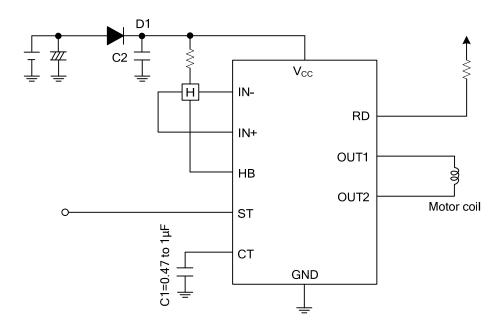
<sup>2.</sup> Specified substrate: 114.3×76.2×1.5mm glass epoxy.

#### **■ TRUTH TABLE**

ST	IN-	IN+	CT	OUT1	OUT2	RD	НВ	MODE
Н				OFF	OFF	OFF	OFF	Standby
	Н	L		Н	L			O
L	L	Н	L	L	Н	L	L	Operating
			Н	OFF	OFF	OFF	L	Lock protection

Note1: The RD output is latched at "L"-level in operating mode and "H"-level in stop mode.

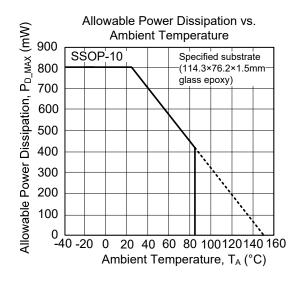
#### **■ TYPICAL APPLICATION CIRCUIT**



Notes: 1. D1 is used to prevent IC destruction caused by reverse-connection. It can be omitted if no problems are expected.

- 2. C2 is used to apply a kickback regenerative current when using the IC with the coil current over 500mA.
- 3. When CT is not used, it should be connected to ground.
- 4. When RD, ST, and HB are not used, they should be left open.

#### ■ TYPICAL CHARACTERISTICS



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