DHA® QJ/DHA 01.70-2019 **LDA355**

High precision inductive proximity switch IC

Introduction

The LDA355 (instead of TCA355) is an ASIC developed for inductive proximity switch applications. It can be used in a wide range of proximity sensors or proximity control systems. It can also be used to make a variety of inductive instrumentation such as inductive tachometers.

LDA355 has the characteristics of high integration, wide working voltage, large output current, adjustable control distance, few peripheral circuits, convenient application and stable and reliable operation. Compared with the inductive proximity switch scheme composed of general discrete components, the LDA355 integrated chip solution has better consistency and stability, so it is especially suitable for high reliability and high reliability.

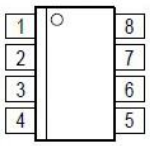
Feature

- Low current consumption: < 0.7mA
- Wide supply voltage: 4.0~40V
- Low saturation pressure drop
- Built-in temperature compensation
- High sensitivity and low inductance requirements
- Hysteresis is not related to temperature, voltage and distance
- Output tube switching frequency is high
- Output tube drive current >70mA
- Range of working temperature -40~+125℃

Order information

Package	Remarks
SOP8	Tubed, Reeled, Pb-free

Pin Configurations



Typical application

- Inductive proximity switch
- Contactless switch
- Position control
- Isolation detection
- Speed measurement

Pin	Symbol	Function
1	GND	Ground
2	RDI	Distance setting resistor
3	CI	Integral capacitor
4	Q2	Output 2
5	Q1	Output 1
6	VCC	Voltage
7	LC	Oscillator
8	RHY	Backlash setting resistor

Recommended working conditions

Parameter	Symbol	Value	Unit
Voltage	Vcc	4.0 ~ 40	V
Range of working temperature	Top	-40 ~ +125	℃

Limit parameter

Parameter	Symbol	Value	Unit
Voltage	Vcc	-0.3 ~ +50	V
Output voltage	$V_{OUT(OFF)}$	-1 ~ +45	V
Output low level current	$I_{OUT(SINK)}$	70	mA
VREF pin current	-IVREF	100	μA
RDI pin current	-IRDI	2	mA
RHYS pin current	IRHYS	2	mA
Maximum junction temperature	Tj(max)	+150	℃
Storage temperature	Tst	-55 ~ +160	℃

Electrical parameters

Typical test conditions V_{CC}=12V and T_A=25℃, unless otherwise indicated.

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Minimum starting voltage	Output start action	V_{TON}	-	3.64	4	V
Shutdown voltage	Output from action to no action	V_{TOFF}	3.0	3.6	-	V
Hysteresis		ΔV_{HY}	-	0.04	-	V
Quiescent Current		I_{CC}	-	0.55	0.70	mA
Oscillating frequency		f_{OSC}	-	-	3	MHz
Oscillation amplitude		A_{OSC}	-	0.8	-	V_{PP}
CI pin threshold		V_{CI}	-	2	-	V
CI pin hysteresis		V_{HYCI}	-	7	-	V
CI pin sink current		I_{CI}	-	7	-	μA
CI pin pull current		$-I_{CI}$	-	6	-	μA
On-off level frequency	CI<50pF, L=70μH	f_S	-	5	-	kHz
Reference voltage	I_{VREF}=0~100μA	V_{REF}	2.65	3.00	3.10	V
Switch tube conduction voltage drop	I_Q=5mA	V_{QR}	-	0.10	0.14	V
	I_Q=70mA		-	0.50	0.99	

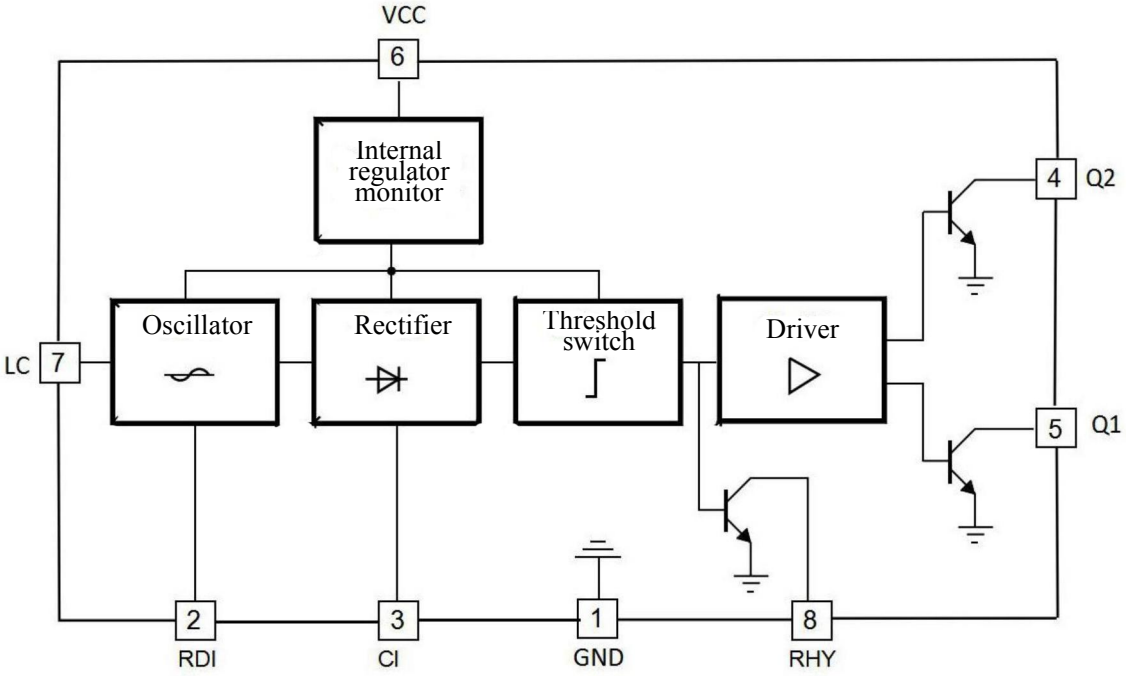


Figure 1. Internal block diagram

Working principle

The LC oscillator produces an alternating magnetic field. When the metal target approaches this magnetic field and reaches the sensing distance, eddy currents are generated in the metal target, causing the oscillation to decay and even stop. The oscillation and oscillation of the oscillator are processed by the post-amplifier circuit and converted into a switching signal to trigger the drive control device to achieve the non-contact detection purpose. The LDA355 works only by externally connected inductor L and resonant capacitor C to generate oscillations and generate alternating magnetic fields. The other peripheral components are shown in Figure 2. Two resistors, RDI and RHY, are used to set the sensing distance and hysteresis. In addition, the integrating capacitor CI is connected to pin 3 for internal signal sampling.

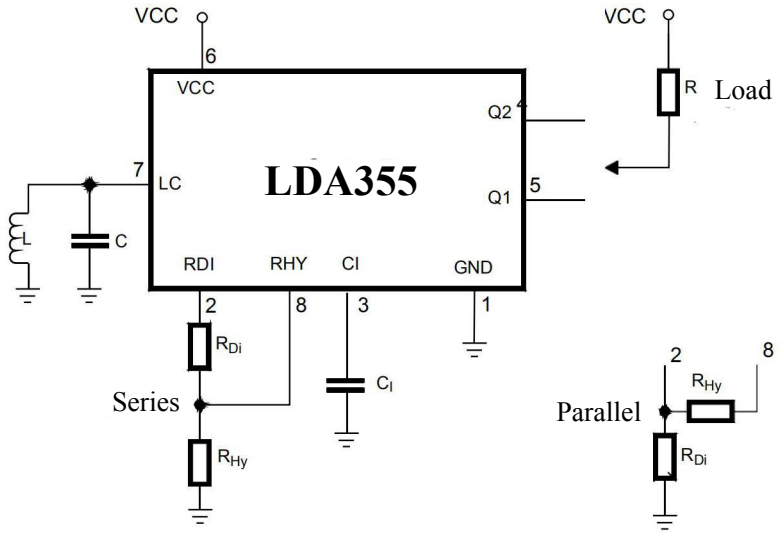


Figure 2. Working principle diagram

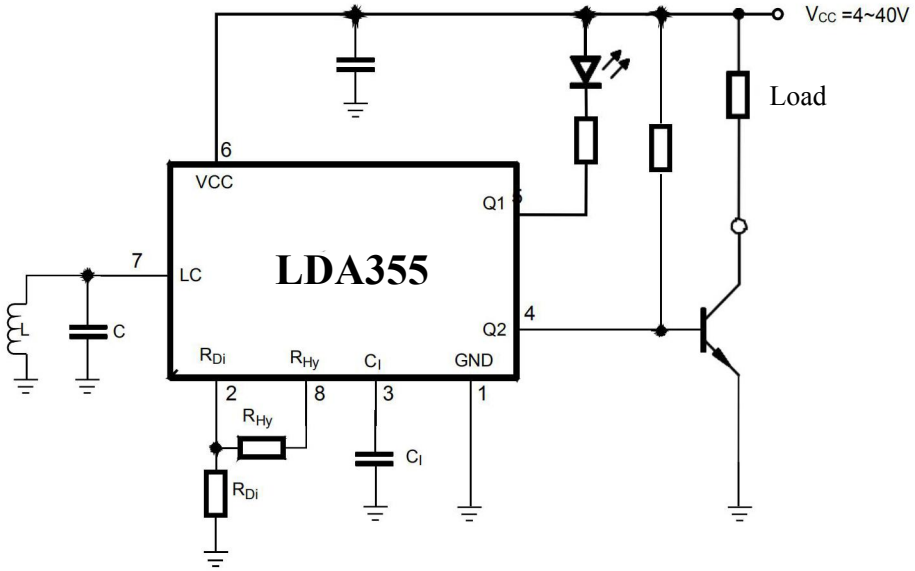
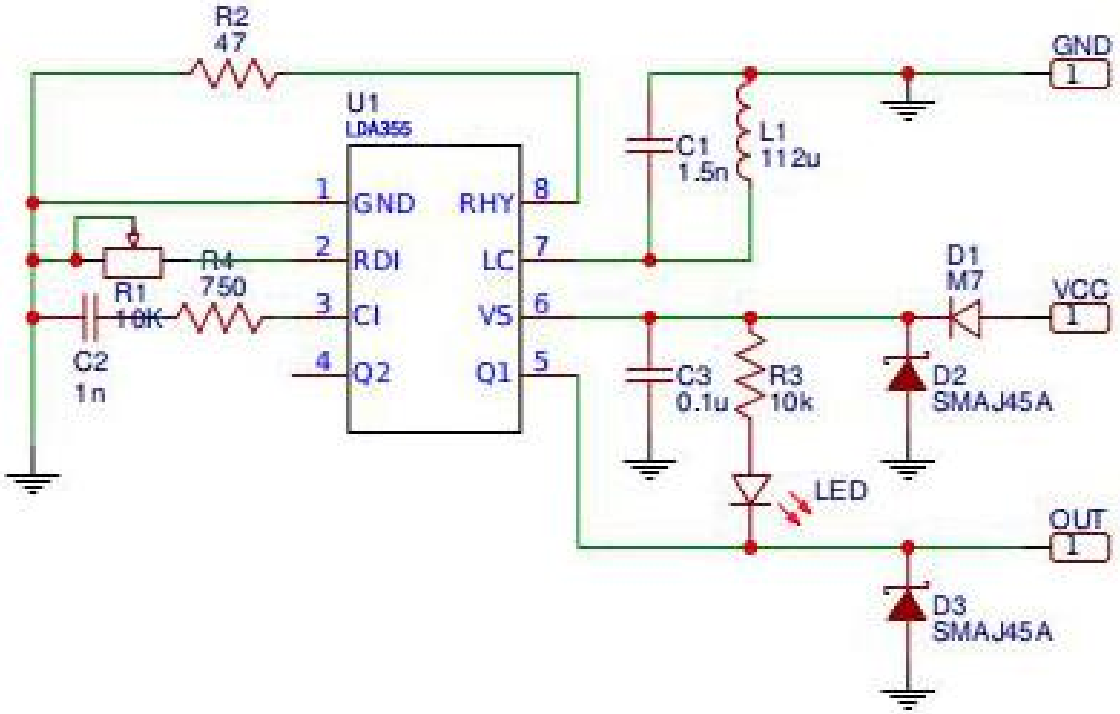


Figure 3. Three-wire NPN normally open application circuit diagram

Application circuit diagram



Package Information

SOP8

Dimensions in mm