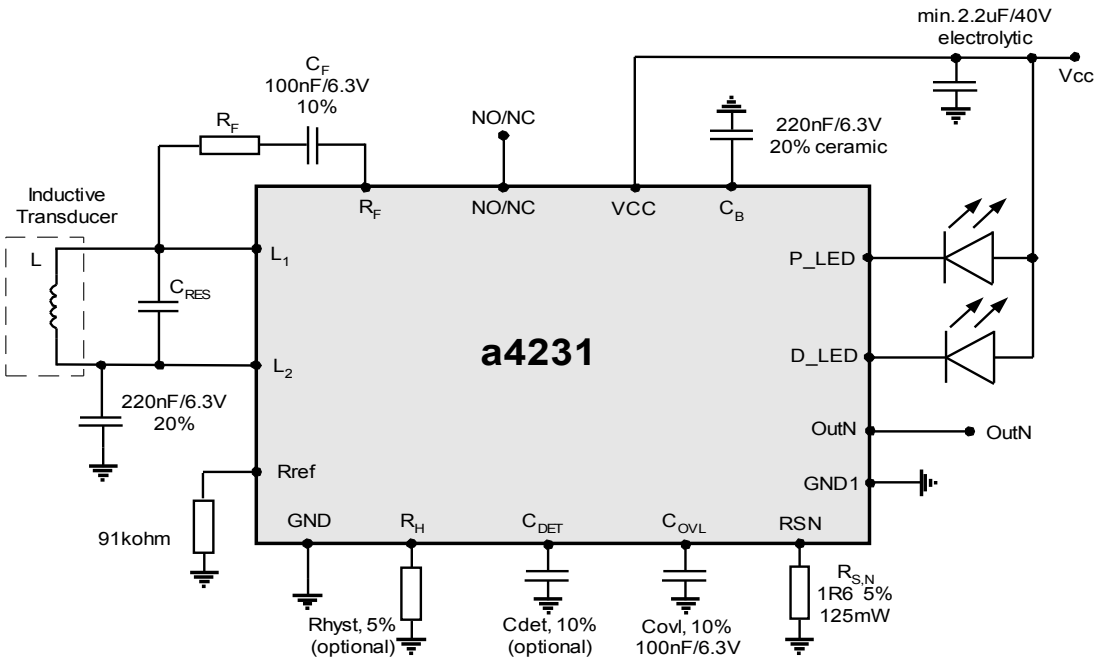
a4231 general features

The a4231 is a proximity sensor integrated circuit to be used with a broad range of inductive single-coiled proximity transducers in proximity detection applications

- ❑ Monolithic IC in bipolar technology
- ❑ User-adjustable sensing range by means of a single external resistor
- ❑ User-adjustable hysteresis (0…15%)
- ❑ 5.5V…35V broad supply voltage range
- ❑ Low-voltage operation possible using stabilised 4.5V…5.5V voltage source
- ❑ Internal voltage regulator to improve immunity against fluctuations of supply voltage
- ❑ Broad operating temperature range: -25°C...90°C
- ❑ Can work with a broad selection of inductive transducers
- ❑ NPN open collector output with guaranteed sink current of 150mA
- ❑ Output overload/over current protection
- ❑ Integrated power-on and detect LED drivers
- ❑ Normally open(NO)/normally closed(NC) select pin
- ❑ Broad range of operating frequencies: 100kHz…1MHz
- ❑ Output over current and short-circuit protection
- ❑ Easy temperature compensation of proximity transducers
- ❑ Package – QFN-24

example application schematic



Typical application schematic of a proximity sensor/detector

electrical characteristics

DC Characteristics

The typical values are given for V_{CC} =24V and T_j = 25°C unless otherwise specified.

#	Symbol	Parameter	Conditions	Min	Typ	Max	Unit
1	$I_{VCC,OFF}$	Supply current	Output inactive (off)		3.8	4.8	mA
2	$I_{VCC,ON}$	Supply current	Output active (on)		8.5	12	mA
3	$V_{SAT,OUT}$	Output saturation voltage	I_{OUT}=150mA		0.50	0.70	V
4	I_{LED}	LED current		1.0	1.2	1.6	mA
5	I_{LKG}	Output leakage current			<1	20	µA
6	$I_{TH,OVL}$	Overload threshold current*1)		158	190	220	mA

*1) –overload threshold current is the level of the output current which triggers the overload protection circuit.

AC and Timing Characteristics

The typical values are given for V_{CC} =24V and Tj = 25°C unless otherwise specified.

#	Symbol	Parameter	Conditions	Min	Typ	Max	Unit
1	f_{OSC}	Operating frequency	Defined by external LC tank	0.1		1.0	MHz
2	R_N	Negative resistance between pin L1 and ground	R_N= –2·R_F +/-3%	-200		-2	kΩ
3	f_{MAX}	Maximum switching frequency*1)	C_{DET}=4.7pF, f_{OSC}=600kHz C_{DET}=33pF f_{OSC}=100kHz		5 2		kHz
4	H_W	Hysteresis width	Depends on R_{HYST}	0		15	%
5	t_R	Output rise time	Load=1kohm		<1.5		µs
6	t_F	Output fall time*2)	Load=1kohm		<1		µs
7	$T_{S,OVL}$	Sampling period in overload mode	Depends on C_{OVL}	50	120	250	ms
8	$T_{STARTUP}$	Startup time*3)		50	120	250	ms
10	C_{IN}	Input capacitance	Measured between Pin L1 and AC ground (Pin L2) for f_{OSC}=0.2…1MHz and $\|R_N\|$ =2…100kohm	6	8.5	13	pF

*1) – these are maximum switching frequencies of the IC itself; switching frequencies of sensors may be higher than those given above,

*2) – the fall time on leaving the start-up interval depends on the load used and can be as long as 10ms,

*3) – this is the maximum start-up time of the chip itself; this parameter does not reflect performance of a sensor; during the start-up interval the output is inactive (OFF) regardless of the state of the NO/NC pin.