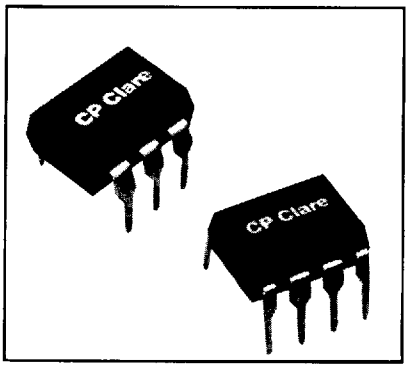
Solid State Current Sensors



DESCRIPTION

CP Clare's LDA series solid state current sensors provide an optically isolated means of switching control circuits. Applications include Telecom, Industrial Control and Instrumentation circuits, where electrical isolation of the control circuitry is critical. Each package contains one or two phototransistors or darlington phototransistors which are optically coupled with LEDs. Shunt resistors can be used to adjust the threshold currents required to activate the output circuitry. The LDA contains sensors which allow for either AC or DC input circuits and single transistor or darlington transistor outputs.

FEATURES

- AC and DC Input Versions Available
- Small 6 or 8 pin DIP Package
- 100mA Continuous Load Rating
- 3750 V_{RMS} Input/Output Isolation
- Machine Insertable, Wave Solderable
- Surface Mount and Tape & Reel Version Available
- UL Recognized: File Number E76270
- CSA, VDE Compatible
- BABT: Certified to BS415: 1990- Certificate Number 7023
- BABT: Certified to BS7002: 1989, EN60950: 1988 Certificate Number 7344
- BABT: Complies with EN41003: 1991 and BS6301: 1989 (Supplementary Insulation) Clause 3.2.3.2

APPLICATIONS

- Telecom Switching
- Tip/Ring Circuits
- Modem Switching (Laptop, Notebook, Pocket Size)
- Loop Detect
- Ring Detect
- Current Sensor

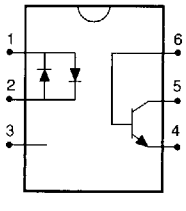
RATINGS (@ 25°C)

Parameter	Min	Typ	Max	Units
Input Power Dissipation	—	—	150[1]	mW
Input Control Current	—	—	100	mA
Peak (10mSec)	—	—	1	A
Reverse Input Voltage	—	—	5	V
Phototransistor	—	—	150[2]	mW
Power Dissipation				
Total Package Dissipation	—	—	800[3]	mW
Capacitance				
Input to Output	—	3	—	pF
Isolation Voltage				
Input to Output	2500	—	—	V_{RMS}
"E" Suffix (Optional)	3750	—	—	V_{RMS}
Operating Temperature	-40	—	85	°C
Storage Temperature	-40	—	125	°C
Soldering Temperature (10 Seconds Max)	—	—	260	°C

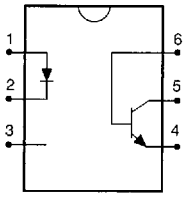
[1] Derate Linearly 1.33 mW/°C.
[2] Derate Linearly 2.0 mW/°C.
[3] Derate Linearly 6.67 mW/°C.

EQUIVALENT CIRCUIT

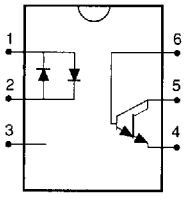
PKG.A: LDA 100



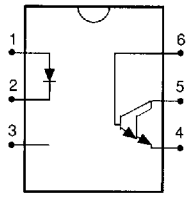
PKG B: LDA 101



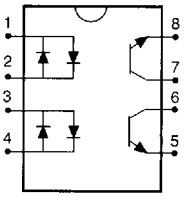
PKG C: LDA 110



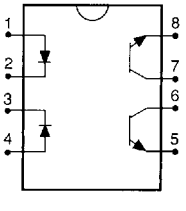
PKG D: LDA 111



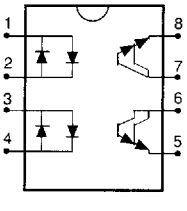
PKG.E: LDA 200



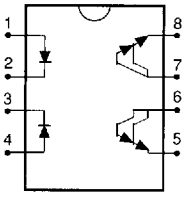
PKG F: LDA 201



PKG G: LDA 210



PKG H: LDA 211



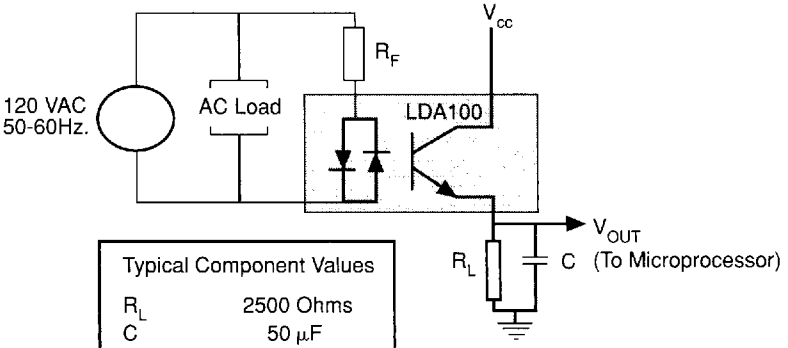
▶ **NOTE:**
For Mechanical Dimensions refer to page 20.

Specifications

Part Number	LDA100	LDA101	LDA110	LDA111	LDA200	LDA201	LDA210	LDA211	Units
Package Style	A	B	C	D	E	F	G	H	
Output Characteristics @ 25°C									
Collector Current	100	100	100	100	100	100	100	100	mA
Phototransistor BV_{CEO} Min	20	20	20	20	20	20	20	20	V
@ I_C = 10µA Typ	50	50	50	50	50	50	50	50	
Phototransistor I_{CEO} Typ	50	50	100	100	50	50	100	100	nA
V_{CE} = 5V, I_{LED} = 0mA Max	500	500	1000	1000	500	500	1000	1000	
Saturation Voltage									
I_C = 2mA, I_{LED} = 16mA Typ	0.3	0.3	0.5[A]	0.5[A]	0.3	0.3	0.5[A]	0.5[A]	V
[A] I_C = .15mA, I_{LED} = .05mA Max	0.5	0.5	0.8[A]	0.8[A]	0.5	0.5	0.8[A]	0.8[A]	
Current Transfer Ratio									
I_{LED} = 6mA, V_{CE} = 0.5V Min	33	33	300[B]	300[B]	33	33	300[B]	300[B]	%
[B] I_{LED} = 0.5mA, V_{CE} = 0.8V Typ	100	100	1000[B]	1000[B]	100	100	1000[B]	1000[B]	
Output Capacitance									
@ 50V, f =1MHz Typ	3	3	3	3	3	3	3	3	pF
Input Characteristics @ 25°C									
Input Control Current									
I_C = 2mA, V_{CE} = 0.5V Typ	2	2	1[C]	1[C]	2	2	1[C]	1[C]	mA
[C] I_C = 20mA, V_{CE} = 0.8V Max	6	6	2[C]	2[C]	6	6	2[C]	2[C]	
Input Voltage Drop Min	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
V_F @ 5mA Typ	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	V
Max	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
Input Capacitance									
@ 0V, f =1MHz Max	50	50	50	50	50	50	50	50	pF
Input to Output Isolation	2500	2500	2500	2500	2500	2500	2500	2500	V_{RMS}
with "E" Suffix (optional)	3750	3750	3750	3750	3750	3750	3750	3750	

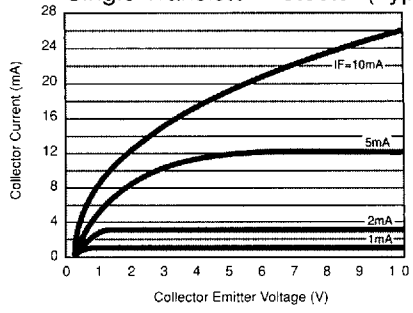
Typical Application Circuit: AC to DC Detector Circuit

Shown below is an AC to DC detector circuit, a typical application for the LDA current sensors. Component values may vary depending upon the details of the actual application. The resistor R_L represents the actual load device. R_F represents the limiting resistor for the input diodes.



Typical Component Values	
R_L	2500 Ohms
C	50 µF
R_F	24 KOhms
V_{CC}	5 Volts
V_{OUT}	4.7 Volts

Transfer Characteristics of Single Transistor Detector (Typical)



Transfer Characteristics of Darlington Transistor Detector (Typical)