LDA111

Optocoupler, Unidirectional Input Darlington-Transistor Output

Parameter	Rating	Units
Breakdown Voltage - BV_{CEO}	30	V_P
Current Transfer Ratio - CTR (typical)	8500	%
Saturation Voltage - $V_{CE(sat)}$	1	V
Input Control Current - I_F	1	mA

Features

- 100mA Continuous Load Rating
- 3750V_{rms} Input/Output Isolation
- Unidirectional Input
- Small 6-Pin Package, Thru-Hole or Surface Mount
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Packaging Available

Applications

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

Description

LDA111 is a unidirectional-input optocoupler with a Darlington-transistor output. The LDA111 has a minimum current transfer ratio (CTR) of 300% with a maximum value of 30,000%.

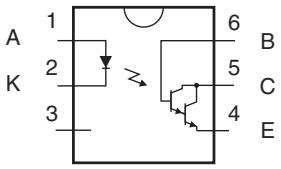
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: TUV Certificate B 09 07 49410 006

Ordering Information

Part Number	Description
LDA111	6-Pin DIP (50/tube)
LDA111S	6-Pin Surface Mount (50/tube)
LDA111STR	6-Pin Surface Mount (1000/Reel)

Pin Configuration



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Breakdown Voltage	30	V_P
Reverse Input Voltage	5	V
Input Control Current	100	mA
Peak (10ms)	1	A
Power Dissipation		
Input Power Dissipation [1]	150	mW
Phototransistor [2]	150	
Isolation Voltage, Input to Output	3750	V_{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33mW / °C
[2] Derate linearly 2mW / °C

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

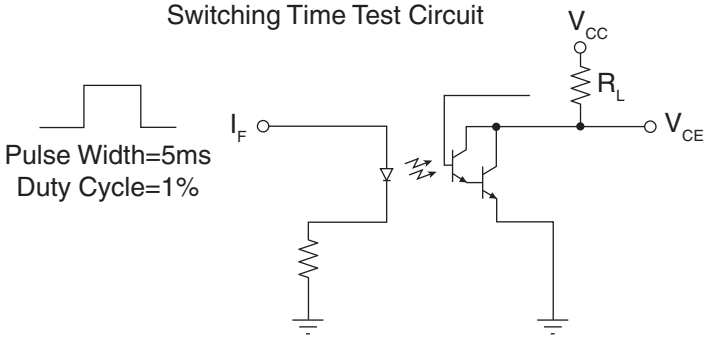
Electrical Characteristics @ 25ºC

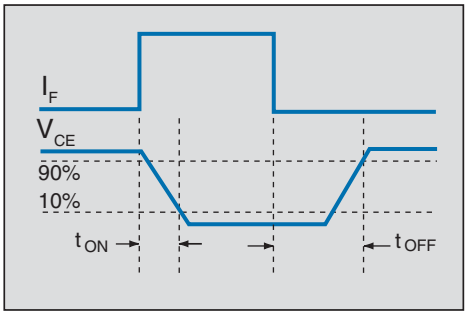
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Phototransistor Breakdown Voltage	I_C = 100µA	BV_{CEO}	30	85	-	V
Phototransistor Dark Current	V_{CEO} = 5V, I_F = 0mA	I_{CEO}	-	50	500	nA
Saturation Voltage	I_C = 3mA, I_F = 1mA	$V_{CE(sat)}$	-	-	1	V
Current Transfer Ratio	I_F = 1mA, V_{CE} = 2V	CTR	300	8500	30000	%
Output Capacitance	25V, f =1MHz	C_{OUT}	-	3	-	pF
Input Characteristics						
Input Control Current	I_C = 3mA, V_{CE} = 2V	I_F	-	0.07	1	mA
Input Voltage Drop	I_F = 5mA	V_F	0.9	1.2	1.4	V
Reverse Input Current	V_R = 5V	I_R	-	-	10	µA
Common Characteristics						
Capacitance, Input to Output	-	$C_{I/O}$	-	3	-	pF

Switching Characteristics @ 25ºC

Characteristic	Symbol	Test Condition	Typ	Units
Turn-On Time	t_{on}	V_{CC}=5V, I_F=1mA, R_L=500Ω	8	µs
Turn-Off Time	t_{off}		345	

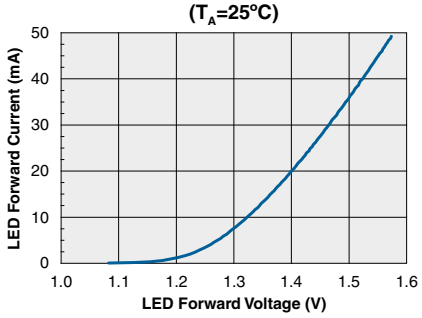
Switching Time Test Circuit



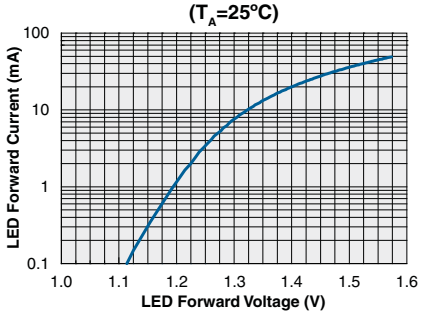


PERFORMANCE DATA*

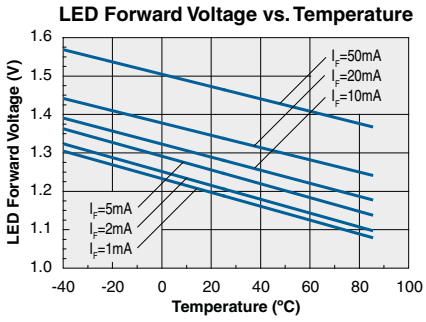
LED Voltage vs. Current
(T_A=25°C)



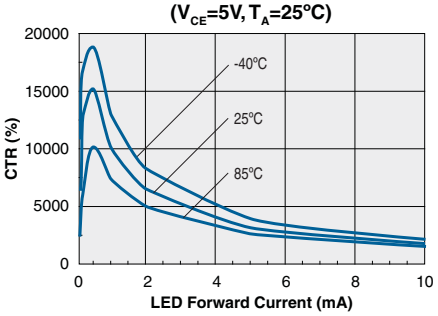
LED Voltage vs. Current (Log)
(T_A=25°C)



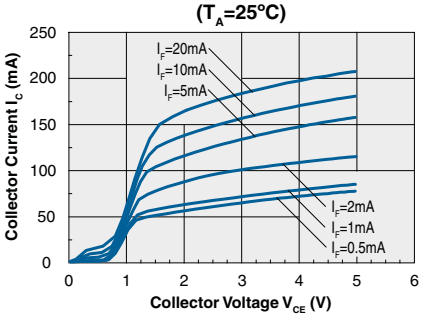
LED Forward Voltage vs. Temperature



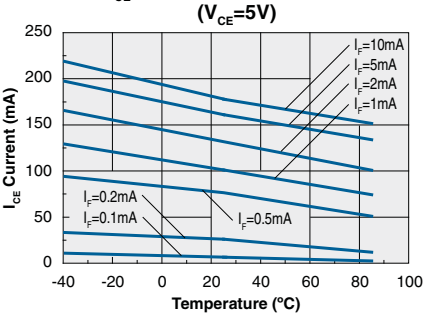
Typical CTR vs. LED Forward Current
(V_{CE}=5V, T_A=25°C)



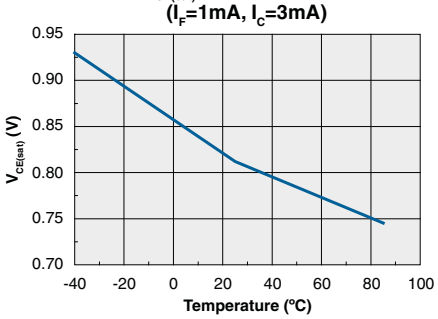
Typical Collector Current
vs. Collector Voltage
(T_A=25°C)



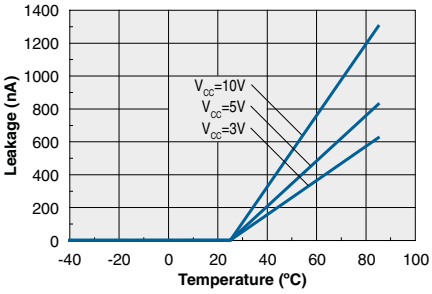
I_{CE} Current vs. Temperature
(V_{CE}=5V)



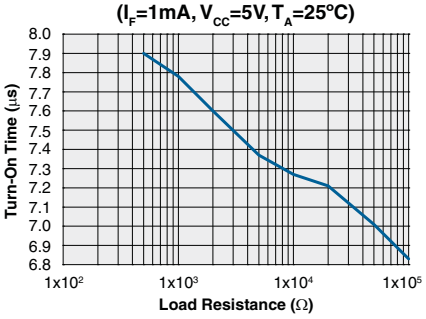
$V_{CE(sat)}$ vs. Temperature
(I_F=1mA, I_C=3mA)



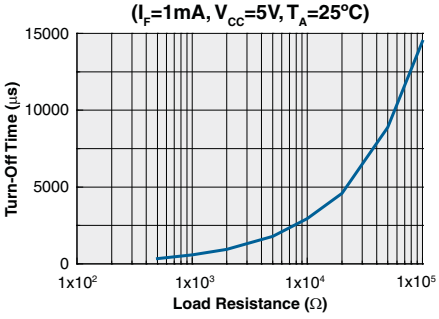
Leakage Current vs. Temperature



Turn-On Time vs. Load Resistance
(I_F=1mA, V_{CC}=5V, T_A=25°C)



Turn-Off Time vs. Load Resistance
(I_F=1mA, V_{CC}=5V, T_A=25°C)



*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. Clare classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Rating
LDA111 / LDA111S	MSL 1

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

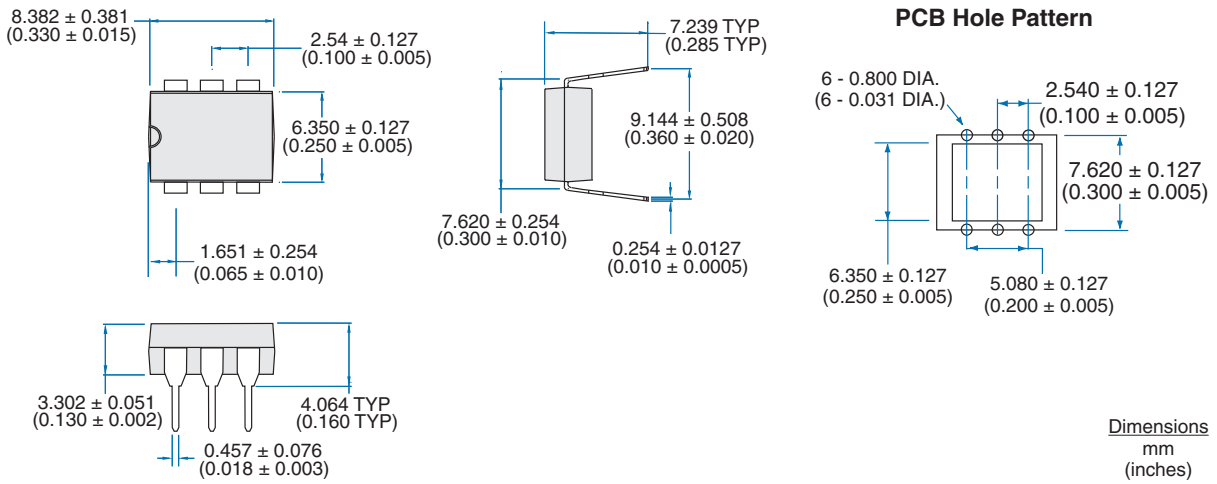
Device	Maximum Temperature x Time
LDA111 / LDA111S	250°C for 30 seconds

Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake may be necessary if a wash is used after solder reflow processes. Chlorine-based or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

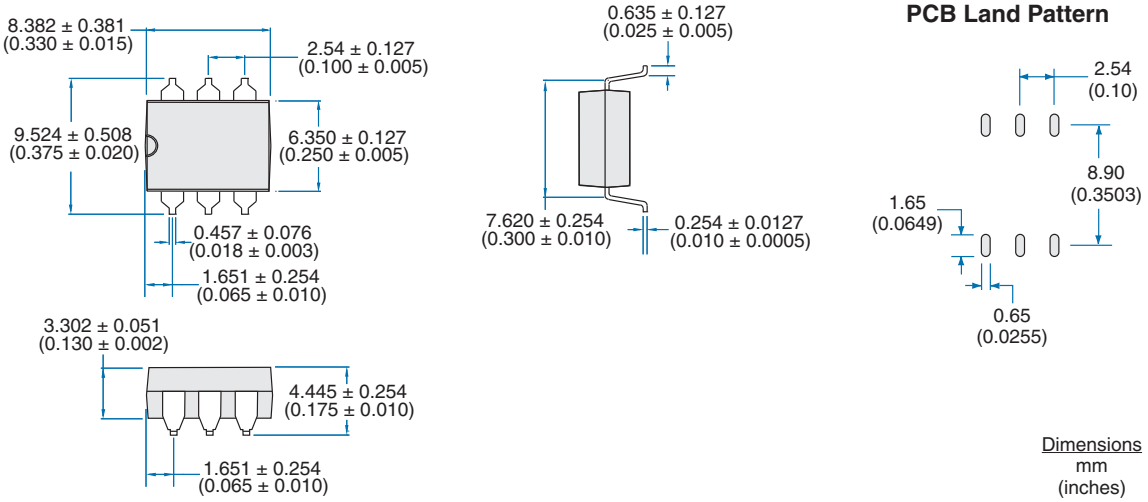
MECHANICAL DIMENSIONS

LDA111



Dimensions
mm
(inches)

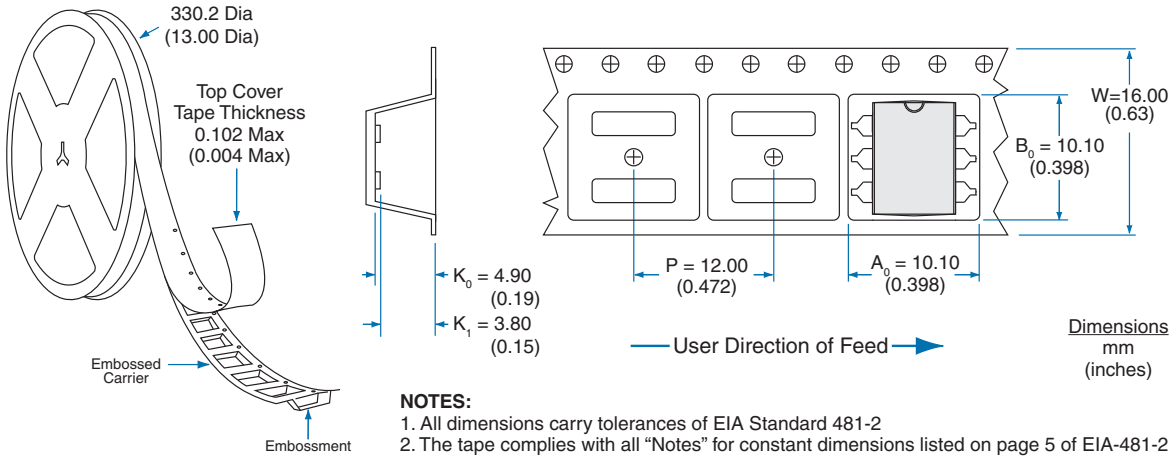
LDA111S



Dimensions
mm
(inches)

MECHANICAL DIMENSIONS (Cont.)

LDA111S Tape & Reel



NOTES:
1. All dimensions carry tolerances of EIA Standard 481-2
2. The tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2

For additional information please visit our website at: www.clare.com

Specification: DS-LDA111-R05

7/15/2011