



Parameter	Rating	Units
Blocking Voltage	350	V <sub>p</sub>
Load Current	100	mA
Max On-resistance	35	Ω

### Features

- Three Functions in One Package
- Small 16 Pin SOIC Package (PCMCIA Compatible)
- Bidirectional Current Sensing
- Bidirectional Current Switching
- 3750V<sub>rms</sub> Input/Output Isolation
- FCC Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

### Applications

- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment-Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

### Description

The IAA110P Multifunction Telecom switch combines two 350V Form A relays and one optocoupler in a single package. The relay uses optically coupled MOSFET technology to provide 3750V<sub>rms</sub> of input to output isolation. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS architecture. The optically coupled input uses highly efficient GaAlAs infrared LEDs. The IAA110P allows telecom circuit designers to combine three discrete functions in a single component. The IAA110P's small package uses less space than traditional discrete component solutions.

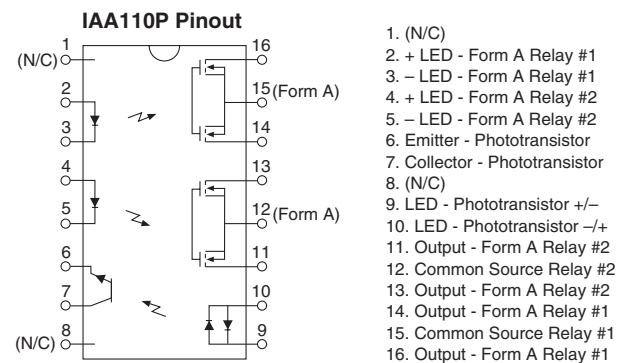
### Approvals

- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-12
- VDE Compatible
- EN/IEC 60950-1 compliant

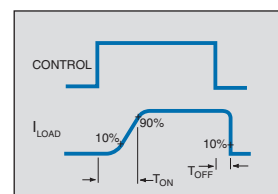
### Ordering Information

Part #	Description
IAA110P	16 Pin SOIC (50/Tube)
IAA110PTR	16 Pin SOIC (1000/Reel)

### Pin Configuration



### Switching Characteristics of Normally Open (Form A) Devices



### Absolute Maximum Ratings (@ 25° C)

Parameter	Min	Typ	Max	Units
Total Package Dissipation <sup>1</sup>	-	-	1	W
Isolation Voltage Input to Output	3750	-	-	V <sub>rms</sub>
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C

<sup>1</sup> Above 25°C derate linearity 1.67mw/°C

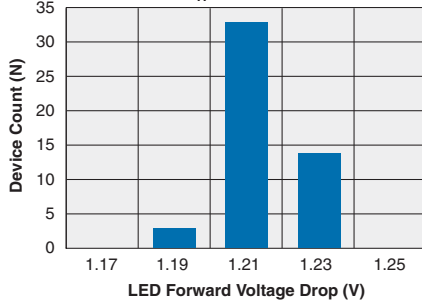
*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and affect its reliability.*

### Electrical Characteristics

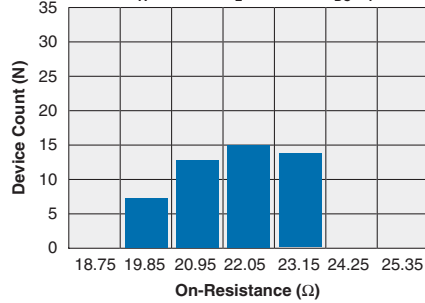
Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Relay Portion</b>						
<b>Output Characteristics @ 25°C</b>						
Blocking Voltage (Peak)	I <sub>L</sub> = 1μA	V <sub>L</sub>	-	-	350	V
Load Current (Continuous)	-	I <sub>L</sub>	-	-	100	mA
Peak Load Current	10ms	I <sub>LPK</sub>	-	-	350	mA
On-Resistance	I <sub>L</sub> = 100mA	R <sub>ON</sub>	-	-	35	Ω
Off-State Leakage Current	V <sub>L</sub> = 350V; T <sub>J</sub> = 25°C	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> = 5mA, V <sub>L</sub> = 10V	T <sub>ON</sub>	-	-	3	ms
Turn-Off	I <sub>F</sub> = 5mA, V <sub>L</sub> = 10V	T <sub>OFF</sub>	-	-	3	ms
Output Capacitance	V <sub>I</sub> = 50V, f = 1MHz	-	-	25	-	pF
<b>Relay Portion</b>						
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>L</sub> = 100mA	I <sub>F</sub>	5	-	50	mA
Input Dropout Current	I <sub>L</sub> = 1mA	I <sub>F</sub>	0.4	-	-	mA
Input Voltage Drop	I <sub>F</sub> = 5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Voltage	-	V <sub>R</sub>	-	-	5	V
Reverse Input Current	V <sub>R</sub> = 5V	I <sub>R</sub>	-	-	10	μA
<b>Detector Portion</b>						
<b>Output Characteristics @ 25°C</b>						
Phototransistor Blocking Voltage	I <sub>C</sub> = 10μA	BV <sub>CEO</sub>	20	50	-	V
Phototransistor Dark Current	V <sub>CE</sub> = 5V, I <sub>F</sub> = 0mA	I <sub>CEO</sub>	-	50	500	nA
Saturation Voltage	I <sub>C</sub> = 2mA, I <sub>F</sub> = 16mA	V <sub>SAT</sub>	-	0.3	0.5	V
Current Transfer Ratio	I <sub>F</sub> = 6mA, V <sub>CE</sub> = 0.5V	CTR	33	-	-	%
<b>Detector Portion</b>						
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>C</sub> = 2mA, V <sub>CE</sub> = 0.5V	I <sub>F</sub>	6	2	-	mA
Input Voltage Drop	I <sub>F</sub> = 5mA	I <sub>CEO</sub>	0.9	1.2	1.4	V
Input Current (Detector must be off)	I <sub>C</sub> = 1μA, V <sub>CE</sub> = 5V	-	5	25	-	μA
Input to Output Capacitance	V <sub>L</sub> = 50V, f = 1MHz	C <sub>I/O</sub>	-	3	-	pF
Input to Output Isolation	-	V <sub>I/O</sub>	3750	-	-	V <sub>rms</sub>

**PERFORMANCE DATA\***

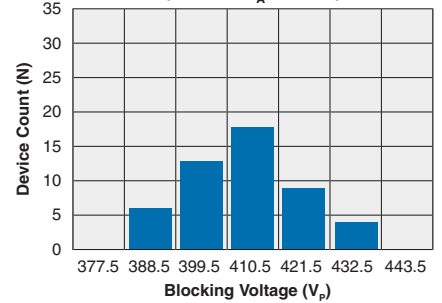
**IAA110P**  
Typical LED Forward Voltage Drop  
(N = 50, T<sub>A</sub> = 25°C, I<sub>F</sub> = 5mA)



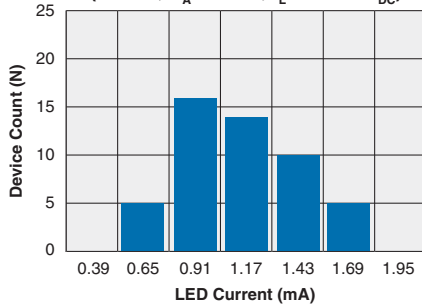
**IAA110P**  
Typical On-Resistance Distribution  
(N = 50, T<sub>A</sub> = 25°C, I<sub>L</sub> = 100mA<sub>DC</sub>, I<sub>F</sub> = 5mA)



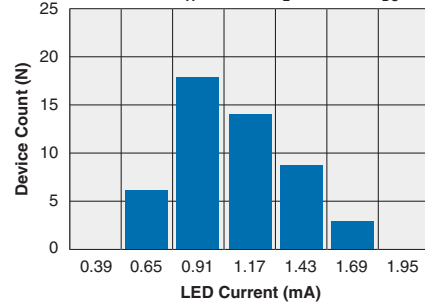
**IAA110P**  
Typical Blocking Voltage Distribution  
(N = 50, T<sub>A</sub> = 25°C)



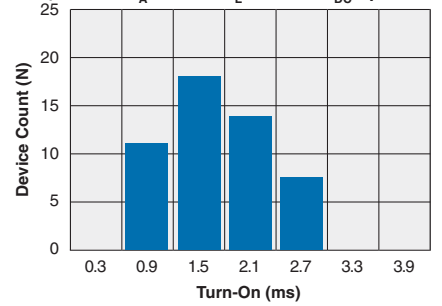
**IAA110P**  
Typical I<sub>F</sub> for Switch Operation  
(N = 50, T<sub>A</sub> = 25°C, I<sub>L</sub> = 100mA<sub>DC</sub>)



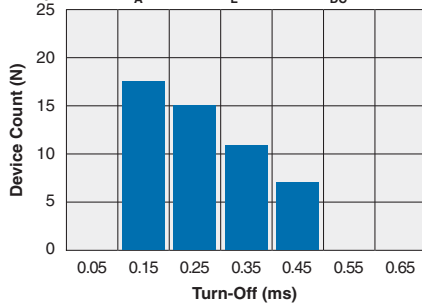
**IAA110P**  
Typical I<sub>F</sub> for Switch Dropout  
(N = 50, T<sub>A</sub> = 25°C, I<sub>L</sub> = 100mA<sub>DC</sub>)



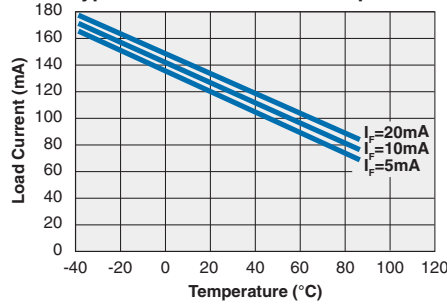
**IAA110P**  
Typical Turn-On Time  
(N = 50, T<sub>A</sub> = 25°C, I<sub>L</sub> = 100mA<sub>DC</sub>, I<sub>F</sub> = 5mA)



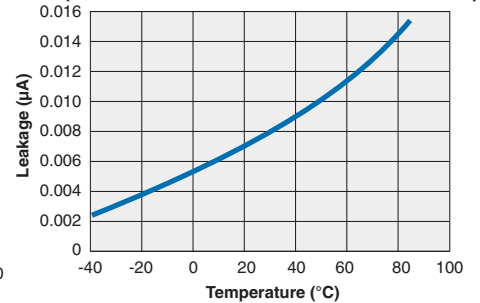
**IAA110P**  
Typical Turn-Off Time  
(N = 50, T<sub>A</sub> = 25°C, I<sub>L</sub> = 100mA<sub>DC</sub>, I<sub>F</sub> = 5mA)



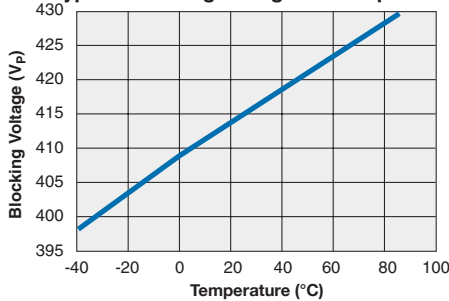
**IAA110P**  
Typical Load Current vs. Temperature



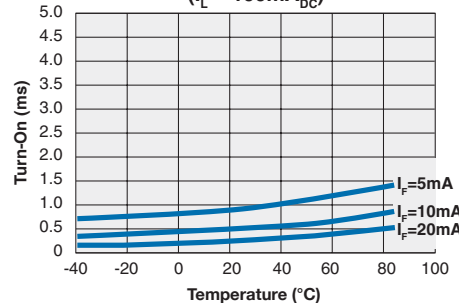
**IAA110P**  
Typical Leakage vs. Temperature  
(Measured across Pins 14 & 16 or 11 & 13)



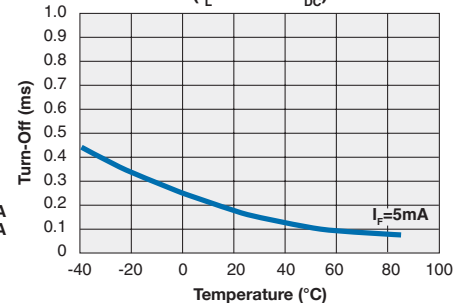
**IAA110P**  
Typical Blocking Voltage vs. Temperature



**IAA110P**  
Typical Turn-On vs. Temperature  
(I<sub>L</sub> = 100mA<sub>DC</sub>)

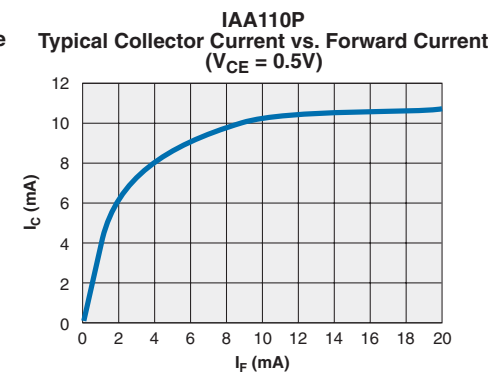
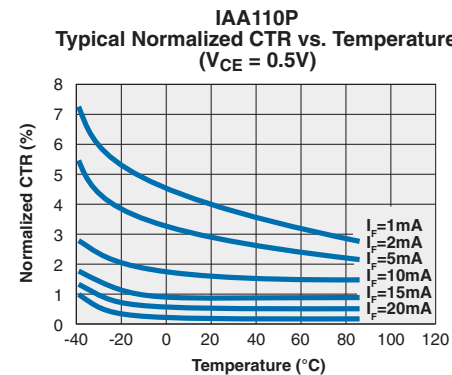
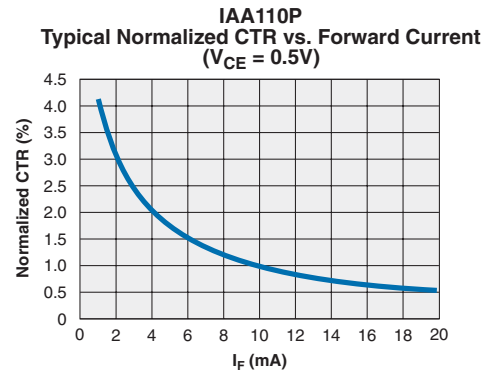
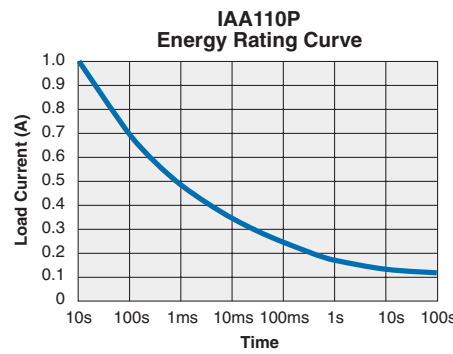
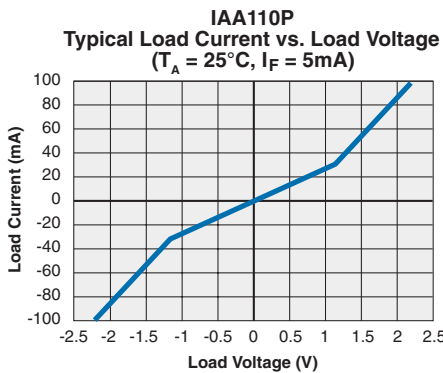
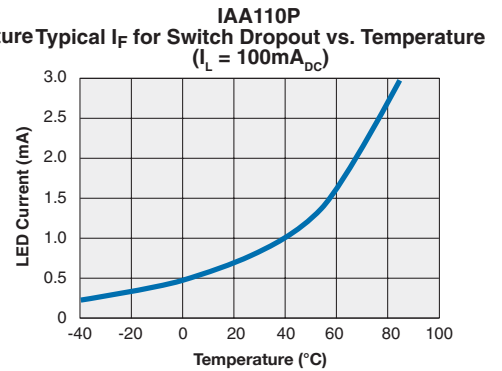
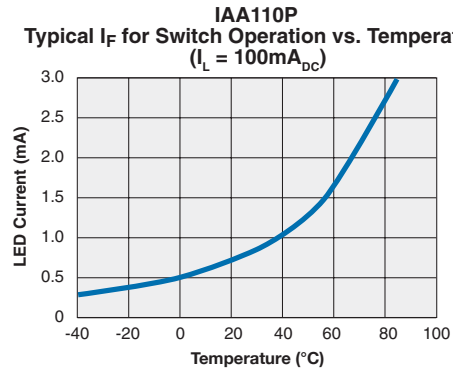
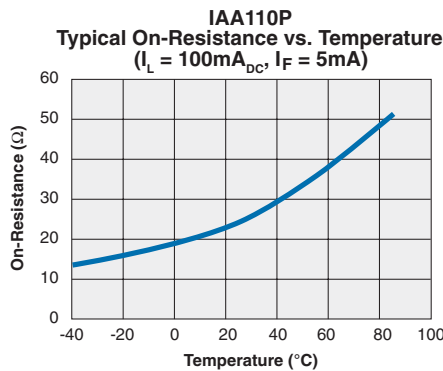
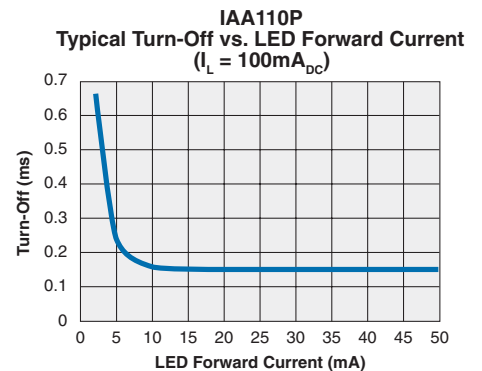
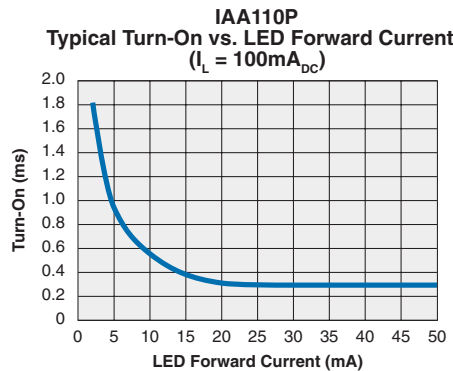
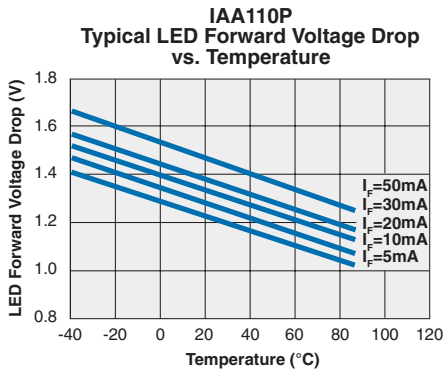


**IAA110P**  
Typical Turn-Off vs. Temperature  
(I<sub>L</sub> = 100mA<sub>DC</sub>)



\* 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.

PERFORMANCE DATA\*



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**MANUFACTURING INFORMATION**

**Soldering**

For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

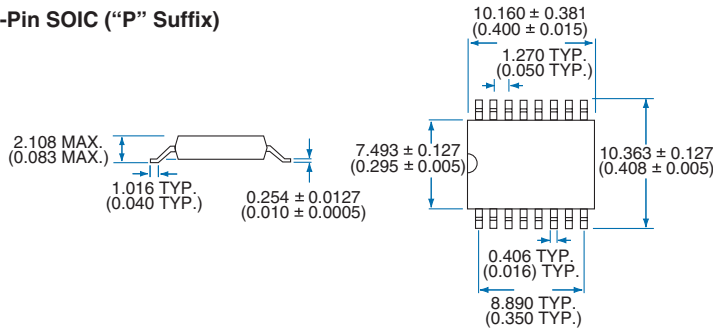
**Washing**

Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

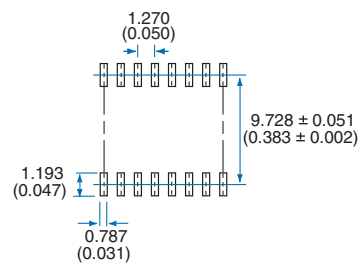


**MECHANICAL DIMENSIONS**

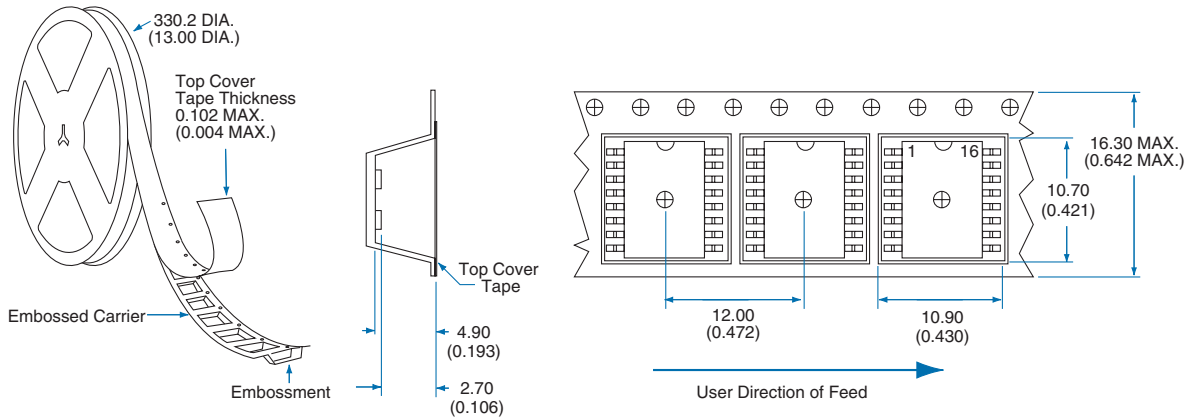
**16-Pin SOIC ("P" Suffix)**



**PC Board Pattern (Top View)**



**Tape and Reel Packaging for 16-Pin SOIC Package**



Dimensions  
mm  
(inches)

For additional information please visit our website at: [www.clare.com](http://www.clare.com)

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