IAD110P

Integrated Telecom Circuits



	IAD110P	Units
Load Voltage	350	V
Load Current	100	mA
Max R_{ON}	35	Ω

Features

- Three Functions in One Package
- Small 16 Pin SOIC Package (PCMCIA Compatible)
- Bi-Directional Current Sensing
- Bi-Directional Current Switching
- Replaces up to Three or Four Components
- 3750V_{RMS} Input/Output Isolation
- FCC Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Versions Available

Applications

- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hookswitch
  - Dial Pulsing
  - Ground Start
  - Ringer 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 IAD110P Multifunction Telecom switch combines a 350V Form A relay and two optocouplers in a single package. The relay uses optically coupled MOSFET technology to provide 1500V of input to output isolation. The efficient MOSFET switch and photovoltaic die uses Clare's patented OptoMOS architecture. The optically coupled input uses highly efficient GaAlAs infrared LEDs. IAD110P's allow telecom circuit designers to combine three discrete functions in a single component. The IAD110P's small package uses less space than traditional discrete component solutions.

Approvals

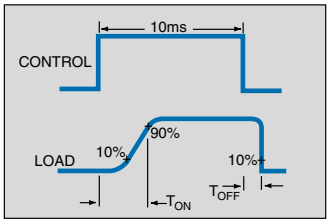
- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-12
- VDE Compatible
- BSI Certified:
  - BS EN 60950:1992 (BS7002:1992) Certificate #:7969
  - BS EN 41003:1993 Certificate #:7969

Ordering Information

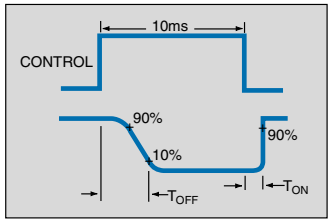
Part #	Description
IAD110P	**16 Pin SOIC (50/Tube)**
IAD110PR	**16 Pin SOIC (1000/Reel)**

Pin Configuration

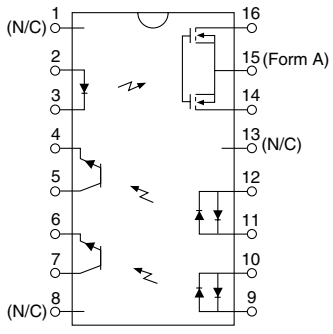
Switching Characteristics of Normally Open (Form A) Devices



Switching Characteristics of Normally Closed (Form B) Devices



IAD110 Pinout



1. (N/C)
2. + LED - Relay Input
3. – LED - Relay Input
4. Emitter - Phototransistor #1
5. Collector - Phototransistor #1
6. Emitter - Phototransistor #2
7. Collector - Phototransistor #2
8. (N/C)
9. LED - Phototransistor +/– #2
10. LED - Phototransistor –/+ #2
11. LED - Phototransistor +/– #1
12. LED - Phototransistor –/+ #1
13. (N/C)
14. Output - Relay
15. Common - Relay
16. Output - Relay

Absolute Maximum Ratings (@ 25° C)

Parameter	Min	Typ	Max	Units
Total Package Dissipation	-	-	1[1]	W
Isolation Voltage Input to Output	3750	-	-	V_{RMS}
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature (10 Seconds Max.)	-	-	+220	°C

[1] Above 25° derate linerity 1.67mw/°C

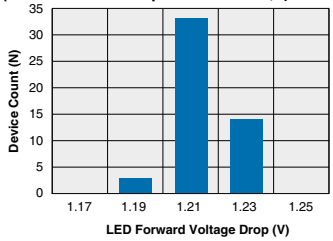
Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to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

Electrical Characteristics

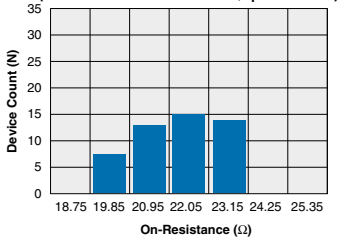
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Relay Portion Output Characteristics @ 25°C						
Load Voltage (Peak)	I_L= 1µA	V_L	-	-	350	V
Load Current (Continuous)	-	I_L	-	-	100	mA
Peak Load Current	10ms	I_{LPK}	-	-	350	mA
On-Resistance	I_L=100mA	R_{ON}	-	-	35	Ω
Off-State Leakage Current	V_L=350V; T_J=25°C	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L =10V	T_{ON}	-	-	3	ms
Turn-Off	I_F=5mA, V_L=10V	T_{OFF}	-	-	3	ms
Output Capacitance	V_L=50V, f=1MHz	-	-	25	-	pF
Relay Portion Input Characteristics @ 25°C						
Input Control Current	I_L=100mA	I_F	5	-	50	mA
Input Dropout Current	I_L=1mA	I_F	0.4	-	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Reverse Input Voltage	-	V_R	-	-	5	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Detector Portion Output Characteristics @ 25°C						
Phototransistor Blocking Voltage	I_C =10µA	BV_{CEO}	20	50	-	V
Phototransistor Dark Current	VCE=5V, I_F =0mA	I_{CEO}	-	50	500	nA
Saturation Voltage	I_C=2mA, I_F=16mA	V_{SAT}	-	0.3	0.5	V
Current Transfer Ratio	I_F=6mA, V_{CE}=0.5V	C_{TR}	33	-	-	%
Detector Portion Input Characteristics @ 25°C						
Input Control Current	I_C=2mA,VCE=0.5V	I_F	6	2	-	mA
Input Voltage Drop	IF=5mA	I_{CEO}	0.9	1.2	1.4	V
Input Current (Detector must be off)	I_C=1µA, VCE=5V	-	5	25	-	µA
Input to Output Capacitance	V_L=50V, f=1MHz	$C_{I/O}$	-	3	-	pF
Input to Output Isolation	-	$V_{I/O}$	3750	-	-	V_{RMS}

PERFORMANCE DATA*

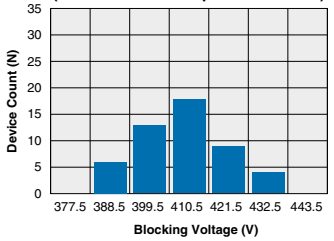
IAD110P
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C; I_F = 5mADC)



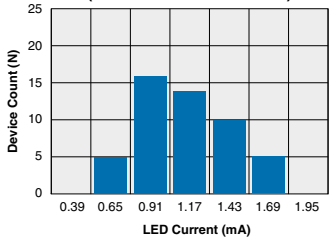
IAD110P
Typical On-Resistance Distribution
(N=50 Ambient Temperature = 25°C)
(Load Current = 100mADC, I_F = 5mADC)



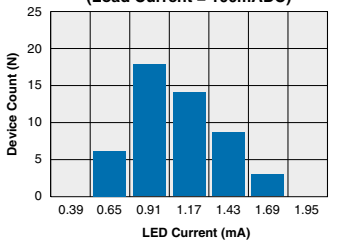
IAD110P
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



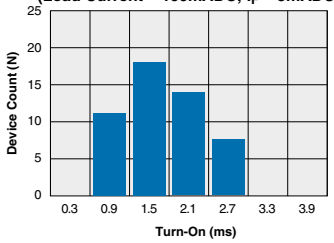
IAD110P
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(Load Current = 100mADC)



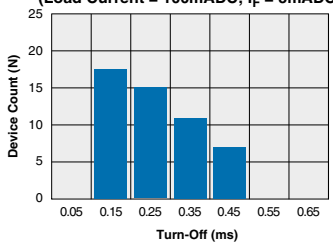
IAD110P
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(Load Current = 100mADC)



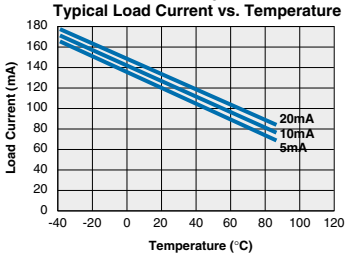
IAD110P
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 100mADC; I_F = 5mADC)



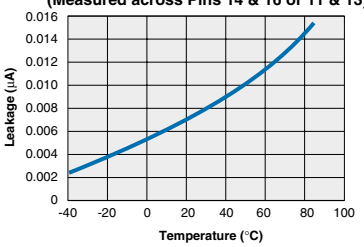
IAD110P
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 100mADC; I_F = 5mADC)



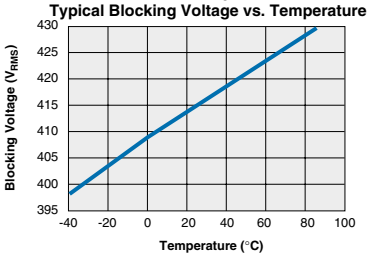
IAD110P
Typical Load Current vs. Temperature



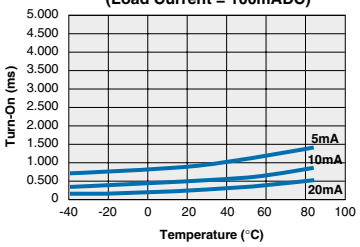
IAD110P
Typical Leakage vs. Temperature
(Measured across Pins 14 & 16 or 11 & 13)



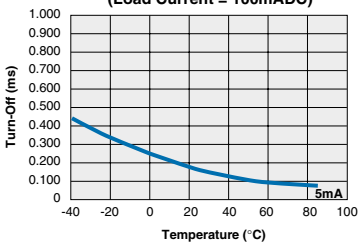
IAD110P
Typical Blocking Voltage vs. Temperature



IAD110P
Typical Turn-On vs. Temperature
(Load Current = 100mADC)



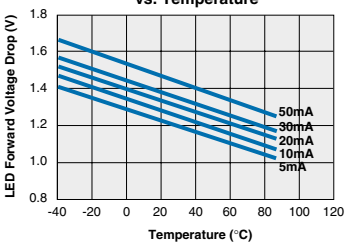
IAD110P
Typical Turn-Off vs. Temperature
(Load Current = 100mADC)



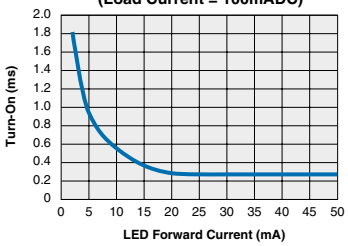
The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

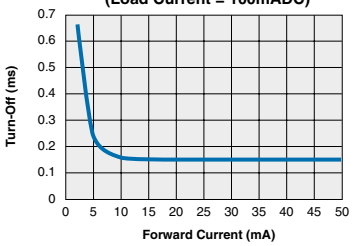
IAD110P
Typical LED Forward Voltage Drop vs. Temperature



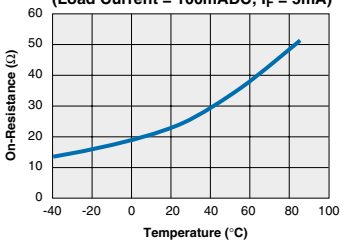
IAD110P
Typical Turn-On vs. LED Forward Current (Load Current = 100mADC)



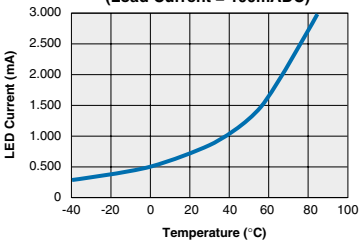
IAD110P
Typical Turn-Off vs. LED Forward Current (Load Current = 100mADC)



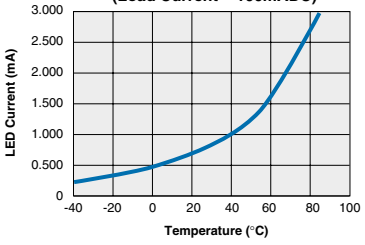
IAD110P
Typical On-Resistance vs. Temperature (Load Current = 100mADC; I_F = 5mA)



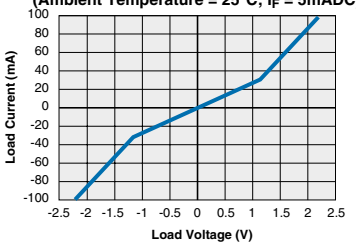
IAD110P
Typical I_F for Switch Operation vs. Temperature (Load Current = 100mADC)



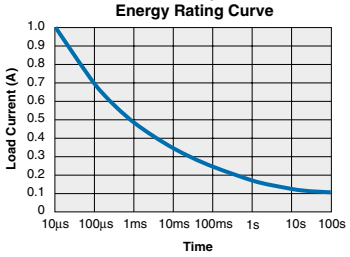
IAD110P
Typical I_F for Switch Dropout vs. Temperature (Load Current = 100mADC)



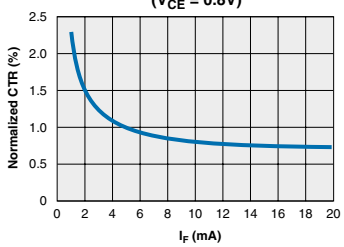
IAD110P
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C; I_F = 5mADC)



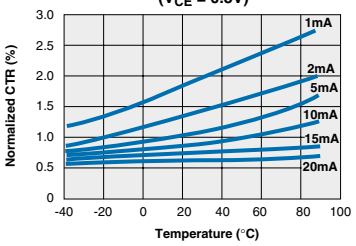
IAD110P
Energy Rating Curve



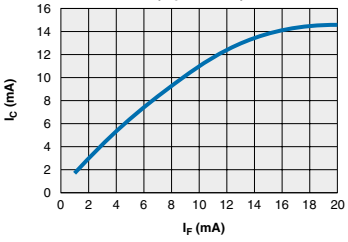
IAD110P
Typical Normalized CTR vs. Forward Current (V_{CE} = 0.8V)



IAD110P
Typical Normalized CTR vs. Temperature (V_{CE} = 0.8V)



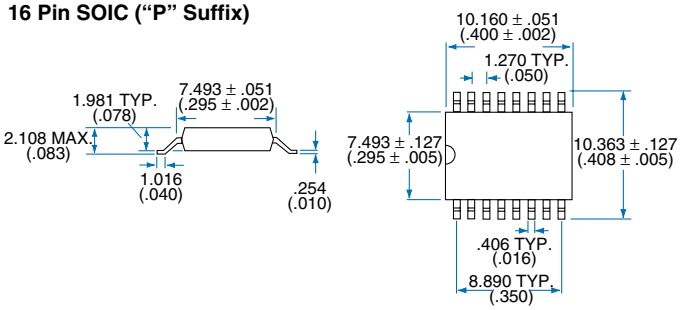
IAD110P
Typical Collector Current vs. Forward Current (V_{CE} = 0.8V)



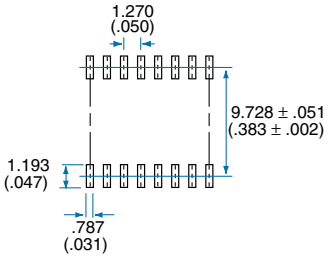
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Mechanical Dimensions

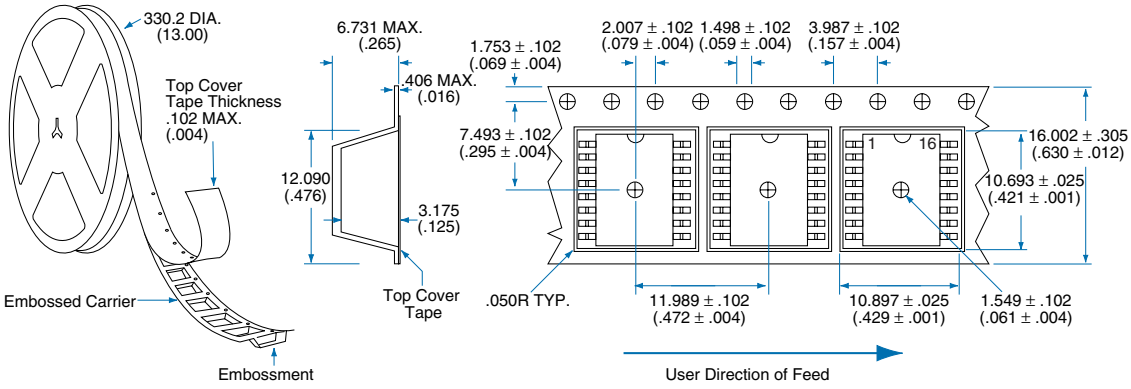
16 Pin SOIC (“P” Suffix)



PC Board Pattern (Top View)



Tape and Reel Packaging for 16 Pin SOIC Package



Dimensions
mm
(inches)

CLARE

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Macro Solutions.

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Fax: 886-2-2523-6369

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Specification: DS-IAD110P-R2
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3/23/01