SOLID STATE OPTRONICS

AD6C010

1 Form A
1200V / 65 Ω
MOSFET Output Solid State Relay

Description

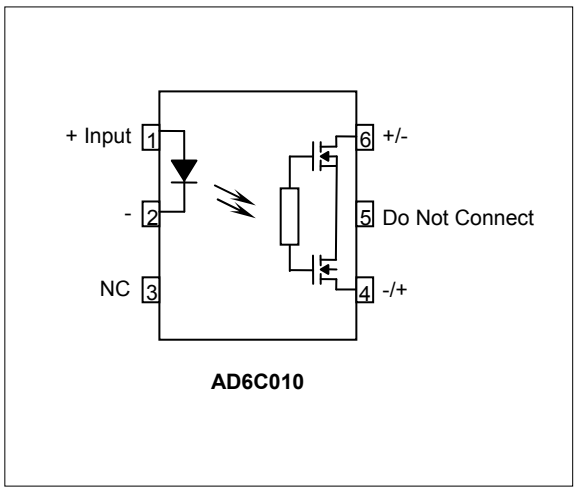
The AD6C010 is a bi-directional, single-pole, single-throw, normally open solid-state relay. The relay consists of an IR LED optically coupled to a Photo Diode Array, which in turn drives a back-to-back normally open MOSFET output structure. The AD6C010 provides high load voltage (1200V) and high input-to-output isolation (2.5kV).

The AD6C010 comes standard in a miniature 6 pin DIP package, making it ideal for high-density board applications.

Applications

- Multiplexers
- Meter Reading Systems
- Data Acquisition
- Medical Equipment
- Battery Monitoring
- Home Security Systems
- Safety Systems

Schematic Diagram



AD6C010

Features

- High Blocking Voltage (1200V)
- 100mA Maximum Continuous Load Current
- Small 6 pin DIP/SMD Package
- High Isolation Voltage (2500V_{RMS})
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Agency Approvals

UL:	File # E201932
C-UL:	File # E201932

Absolute Maximum Ratings

The values indicated are absolute stress ratings. Functional operation of the device is not implied at these or any conditions in excess of those defined in electrical characteristics section of this document. Exposure to absolute Maximum Ratings may cause permanent damage to the device and may adversely affect reliability.

Storage Temperature .....-55 to +125°C
Operating Temperature .....-40 to +85°C
Continuous Input Current.....50mA
Transient Input Current.....500mA
Reverse Input Control Voltage 5V
Input Power Dissipation.....40mW
Output Power Dissipation 800mW
Solder Temperature – Wave (10sec).....260°C
Solder Temperature – IR Reflow (10sec).....260°C

Ordering Information

Part Number	Description
AD6C010	6 pin DIP, (50/Tube)
AD6C010-S	6 pin SMD, (50/Tube)
AD6C010-STR	6 pin SMD, Tape and Reel (1000/Reel)

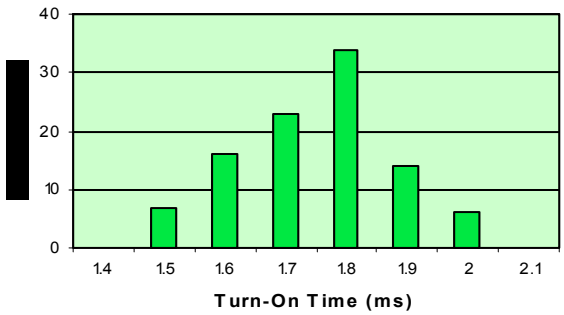
NOTE: Suffixes listed above are not included in marking on device for part number identification

Electrical Characteristics, T_A = 25°C (unless otherwise specified)

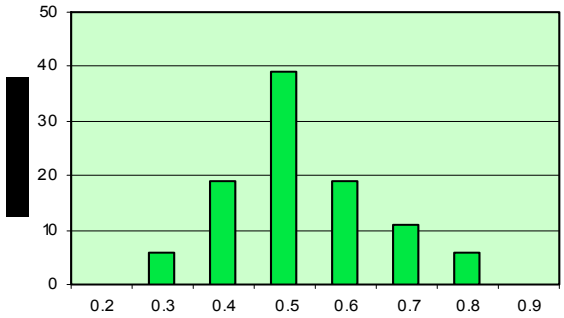
Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.2	1.5	V	I_F = 10mA
LED Reverse Voltage	BV_R	5	-	-	V	I_R = 10μA
Turn-On Current	I_F	-	3.2	5.0	mA	I_O = 100mA
Turn-Off Current	I_{FOFF}	0.2	-	-	mA	-
Output Specifications						
Blocking Voltage	V_B	1200	-	-	V	I_O=1μA
Continuous Load Current	I_O	-	-	100	mA	I_F=5mA
On Resistance	R_{ON}	-	65	100	Ω	I_F=5mA, I_O=100mA
On Resistance	R_{ON}	-	90	120	Ω	I_F=5mA, I_O=10mA
Leakage Current	I_{Oleak}	-	0.2	1	μA	I_F=0mA, V_O=1200V
Output Capacitance	C_{OUT}	-	25	50	pF	I_F=0mA, f=1.0MHz
Offset Voltage	V_{OFFSET}	-	-	0.2	mV	I_F=5mA
Coupled Specifications						
Turn-On Time	T_{ON}	-	1.7	5.0	mS	I_F=5mA, I_O=100mA
Turn-Off Time	T_{OFF}	-	0.5	2.0	mS	I_F=0mA, I_O=100mA
Coupled Capacitance	$C_{COUPLED}$	-	3	-	pF	
Contact Transient Ratio	-	2,000	7,000	0	V/μS	dV = 50V
Isolation Specifications						
Isolation Voltage	V_{ISO}	2,500	-	-	V_{RMS}	RH ≤ 50%, t=1min
Input-Output Resistance	R_{I-O}	-	10^{12}	-	Ω	V_{I-O} = 500V_{DC}

AD6C010 Performance & Characteristics Plots, T_A = 25°C (unless otherwise specified)

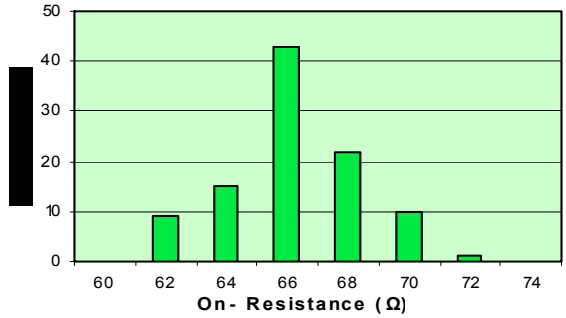
AD6C010: Typical Turn-On Time Distribution
(N = 100, T_a = 25°C)



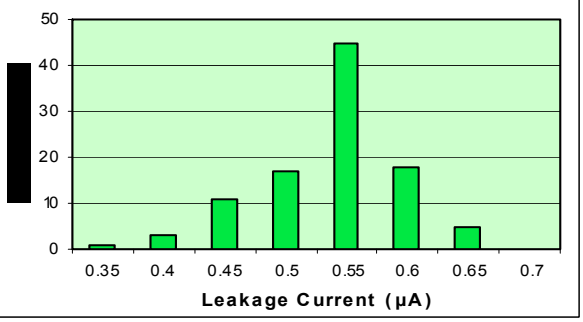
AD6C010: Typical Turn-Off Time Distribution
(N = 100, T_a = 25°C)



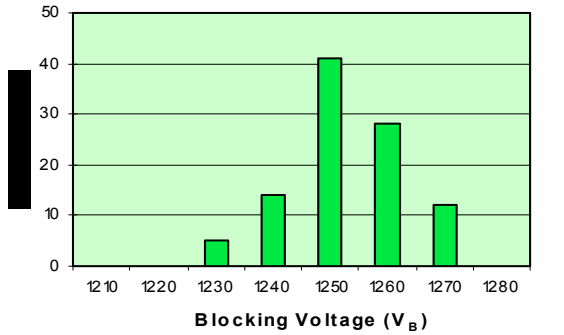
AD6C010: Typical On-Resistance Distribution
(N = 100, T_a = 25°C)



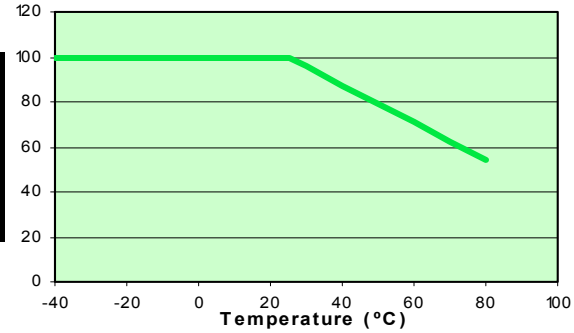
AD6C010: Typical Output Leakage Current Distribution
(N = 100, T_a = 25°C)



AD6C010: Typical Blocking Voltage Distribution
(N = 100, Ta = 25°C)



AD6C010: Maximum Load Current vs. Temperature



AD6C010 Solder Temperature Profile Recommendations

(1) *Infrared Reflow:*

Refer to the following figure as an example of an optimal temperature profile for single occurrence infrared reflow. Soldering process should not exceed temperature or time limits expressed herein. Surface temperature of device package should not exceed 250ºC:

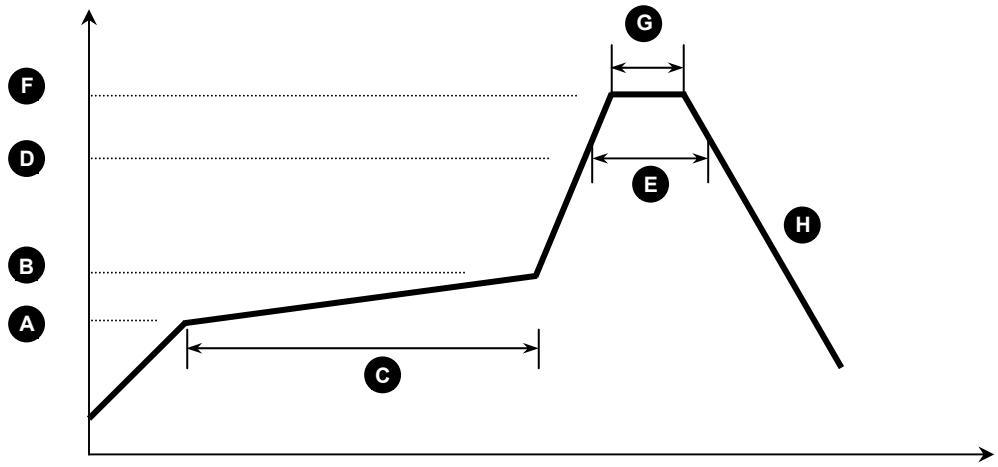


Figure 1

Process Step	Description	Parameter
A	Preheat Start Temperature (ºC)	150ºC
B	Preheat Finish Temperature (ºC)	180ºC
C	Preheat Time (s)	90 - 120s
D	Melting Temperature (ºC)	230ºC
E	Time above Melting Temperature (s)	30s
F	Peak Temperature, at Terminal (ºC)	260ºC
G	Dwell Time at Peak Temperature (s)	10s
H	Cool-down (ºC/s)	<6ºC/s

(2) *Wave Solder:*

Maximum Temperature:	260ºC (at terminal)
Maximum Time:	10s
Pre-heating:	100 - 150ºC (30 - 90s)
Single Occurrence	

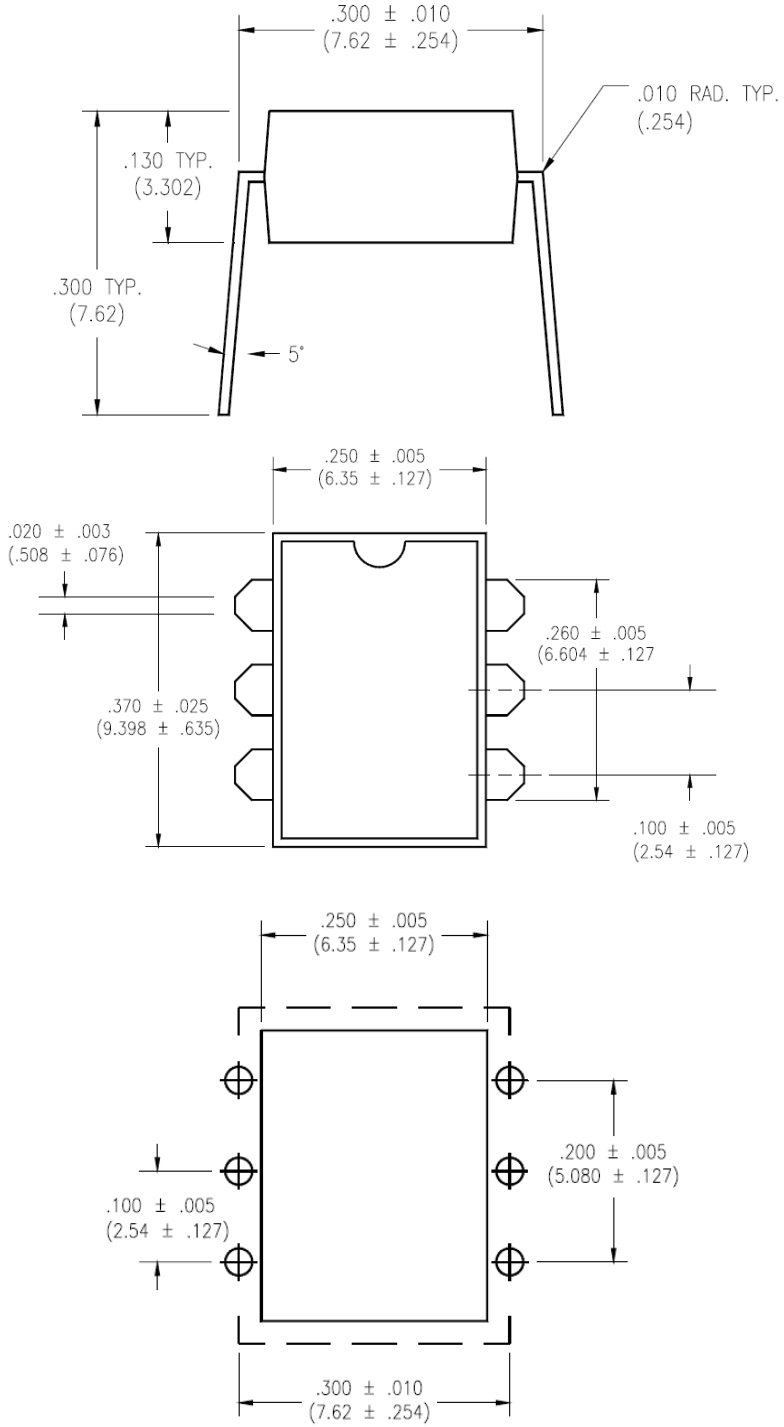
(3) *Hand Solder:*

Maximum Temperature:	350ºC (at tip of soldering iron)
Maximum Time:	3s
Single Occurrence	

AD6C010 Package Dimensions

6 PIN DIP Package

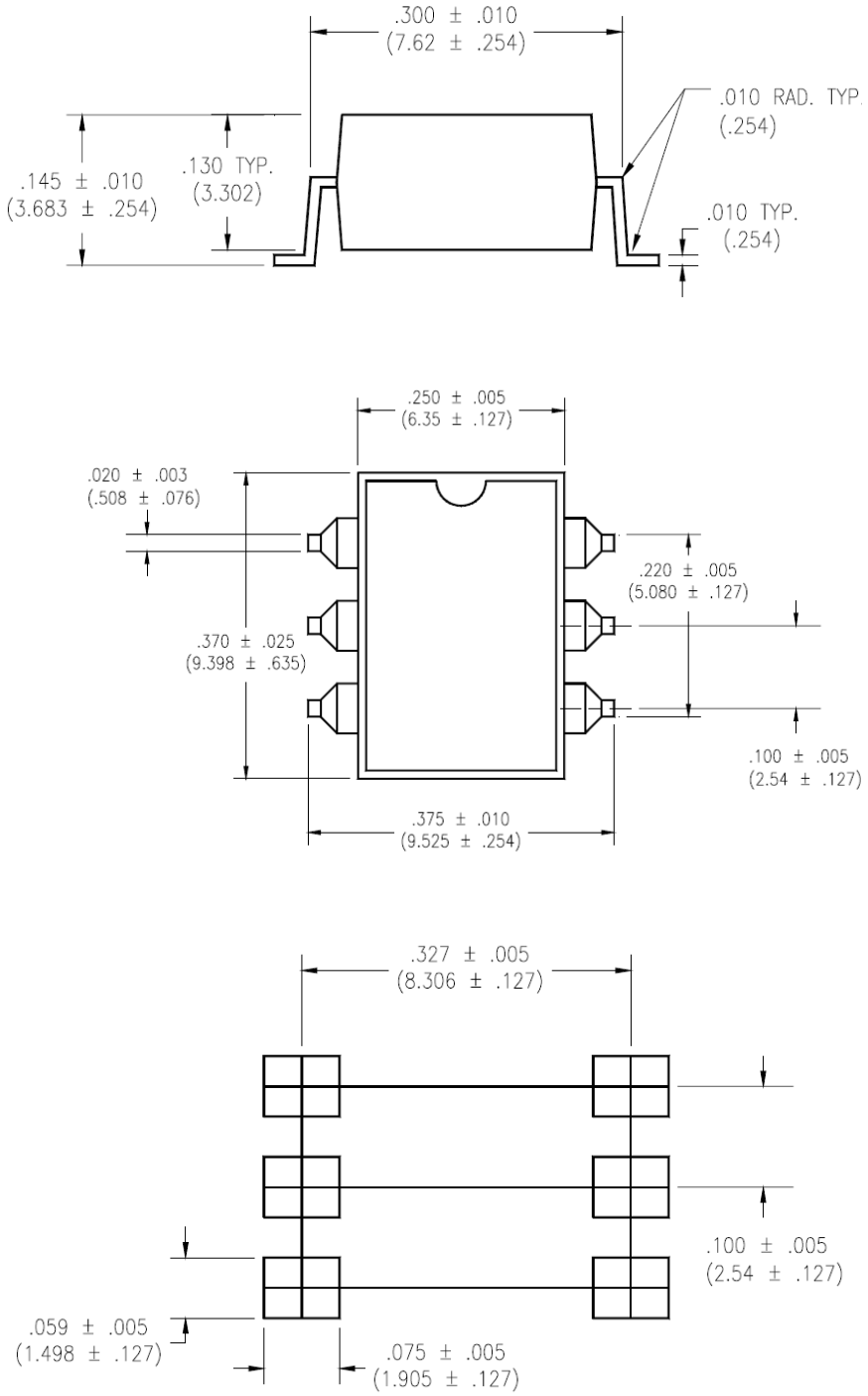
Note: *All dimensions in inches ["] with millimeters in parenthesis ()*
Device Weight: 0.45g



AD6C010 Package Dimensions

6 PIN SMD Surface Mount Package (-S)

Note: *All dimensions in inches ["] with millimeters in parenthesis ()*
Device Weight: 0.45g



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