



Description

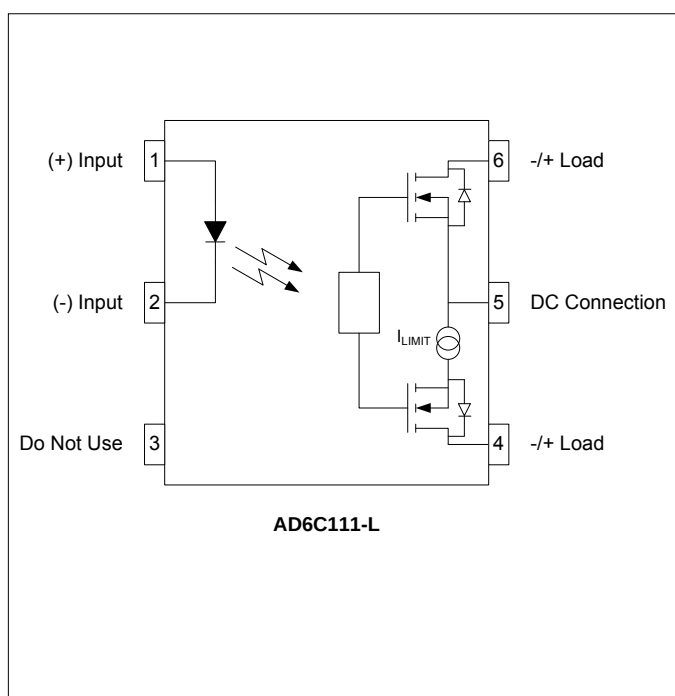
The AD6C111-L is a bi-directional, single-pole, single-throw, normally open solid-state relay. It provides a load current of 110mA, a high blocking voltage of 400V, and current limiting circuitry in a compact 6 pin DIP package. Current limiting circuitry provides a level of protection against increased load currents or transient current spikes by active current reduction across the device, thereby protecting itself and downstream components.

The AD6C111-L comes standard in a miniature 6 pin DIP package making it ideal for high-density board applications.

Applications

- Reed Relay Replacement
- Multiplexers
- Meter Reading Systems
- Medical Equipment
- Battery Monitoring

Schematic Diagram



Features

- High Isolation Voltage (3750V_{RMS})
- Low Input Control Current (2.5mA TYP)
- 110mA Maximum Continuous Load Current
- 40 Ω Maximum On-Resistance
- Active Current Limiting Protection
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Agency Approvals

UL / C-UL: File # E201932
VDE: File # 40035191 (EN 60747-5-2)

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 Voltage6V
Input Power Dissipation.....40mW
Output Power Dissipation800mW
Solder Temperature – Wave (10sec).....260°C
Solder Temperature – IR Reflow (10sec).....260°C

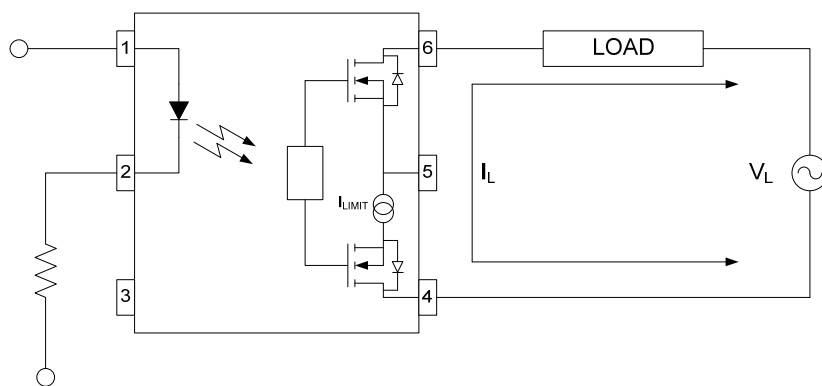
Ordering Information

Part Number	Description
AD6C111-L	6 pin DIP, (50/Tube)
AD6C111-LS	6 pin SMD, (50/Tube)
AD6C111-LSTR	6 pin SMD, Tape and Reel (1000/Reel)

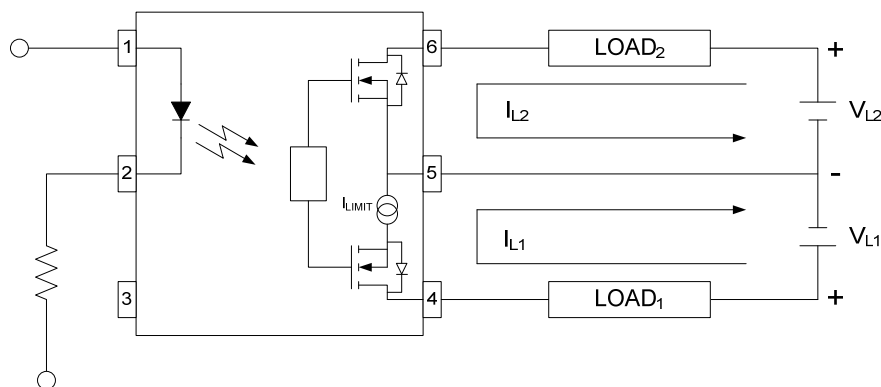
NOTE: Suffixes listed above are not included in marking on device for part number identification

Electrical Characteristics, $T_A = 25^\circ\text{C}$ (unless otherwise specified)

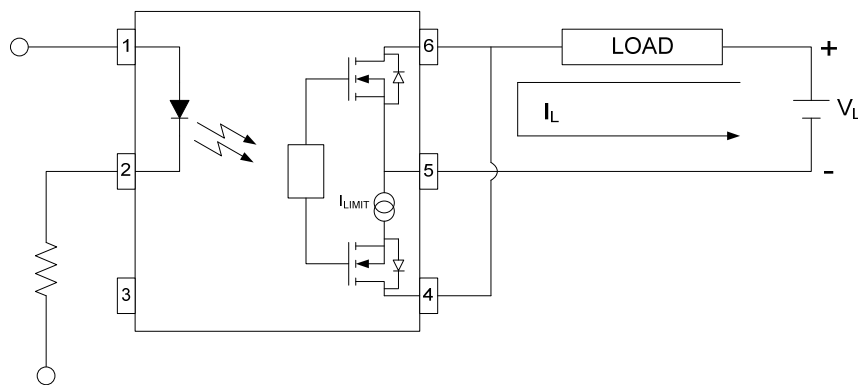
Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.2	1.5	V	$I_F = 10\text{mA}$
LED Reverse Voltage	BV_R	6	-	-	V	$I_R = 10\mu\text{A}$
Turn-On Current	I_F	-	2.5	5.0	mA	$I_O = 110\text{mA}$
Turn-Off Current	I_{OFF}	-	0.5	-	mA	-
Output Specifications						
Blocking Voltage	V_B	400	-	-	V	$I_O = 1\mu\text{A}$
Continuous Load Current	I_O	-	-	110	mA	$I_F = 5\text{mA}$
Current Limit (AC or DC connection)	I_{LIMIT}	160	300	-	mA	$I_F = 5\text{mA}$
On Resistance	R_{ON}	-	30	40	Ω	$I_F = 5\text{mA}, I_O = 110\text{mA}$
Leakage Current	I_{leak}	-	0.2	1	μA	$I_F = 0\text{mA}, V_O = 400\text{V}$
Output Capacitance	C_{OUT}	-	25	50	pF	$I_F = 0\text{mA}, f = 1.0\text{MHz}$
Offset Voltage	V_{OFFSET}	-	-	0.2	mV	$I_F = 5\text{mA}$
Coupled Specifications						
Turn-On Time	T_{ON}	-	1.5	5.0	mS	$I_F = 5\text{mA}, I_O = 110\text{mA}$
Turn-Off Time	T_{OFF}	-	0.5	1.0	mS	$I_F = 0\text{mA}, I_O = 110\text{mA}$
Coupled Capacitance	C_{COUPLED}	-	3	-	pF	
Contact Transient Ratio	-	2,000	7,000	0	V/ μS	dV = 50V
Isolation Specifications						
Isolation Voltage	V_{ISO}	3,750	-	-	V_{RMS}	RH $\leq$ 50%, t=1min
Input-Output Resistance	$R_{\text{I-O}}$	-	10^{12}	-	Ω	$V_{\text{I-O}} = 500V_{\text{DC}}$

AD6C111-L Current Limiting Connection Diagrams, $T_A = 25^\circ\text{C}$ (unless otherwise specified)
Connection Diagrams
Comments
Option A: Normal AC Load Configuration


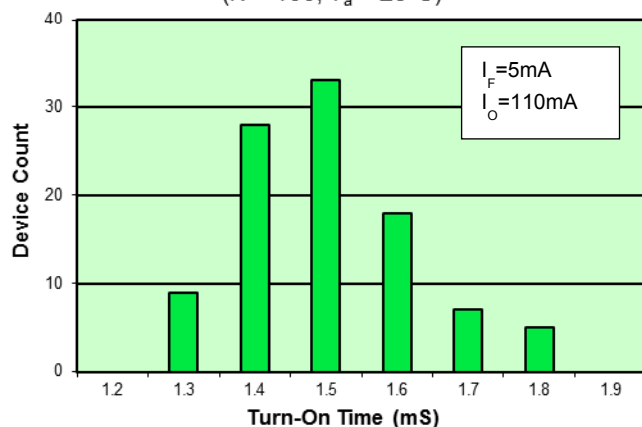
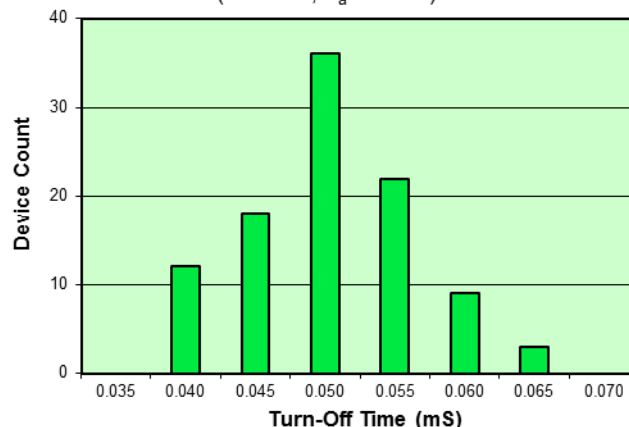
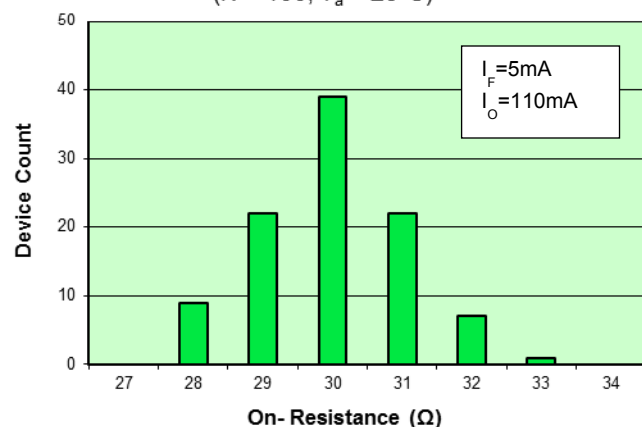
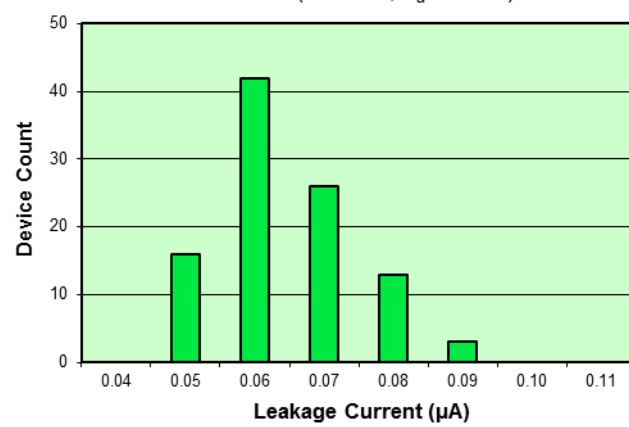
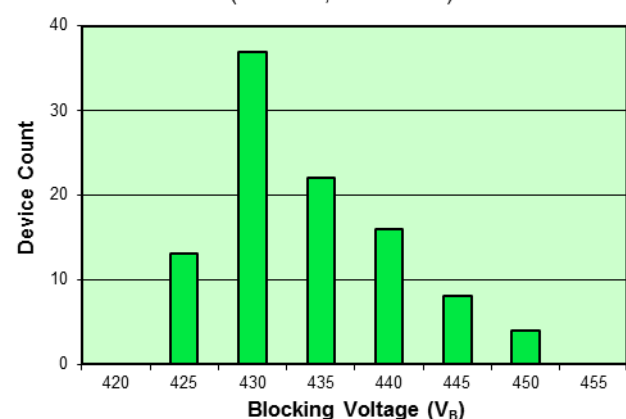
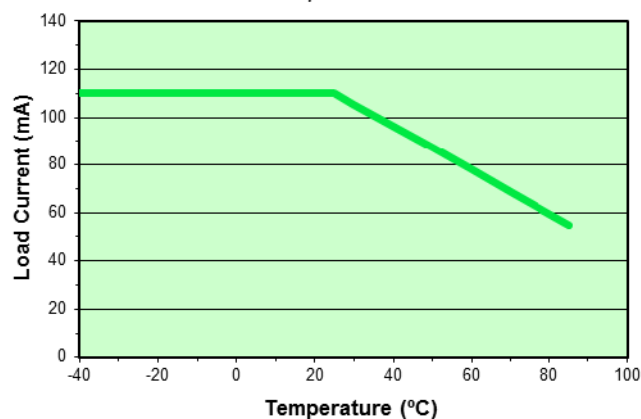
On Resistance: R_{Typ}
Current Limit: I_{Limit}

Option B: Separate Loads & Load Voltages


On Resistance:
Load₁ $\sim (R_{\text{Typ}} / 2) + 3\Omega$
Load₂ $R_{\text{Typ}} / 2$
Current Limit:
Load₁ I_{Limit}
Load₂ N/A
- Sum power of loads not to exceed maximum package power dissipation

Option C: DC Load with Minimal Resistance and No Current Limit


On Resistance: $R_{\text{Typ}} / 4$
Current Limit: None

AD6C111-L Performance & Characteristics Plots, $T_A = 25^\circ\text{C}$ (unless otherwise specified)
Figure 1: Typical Turn-On Time Distribution
(N = 100, $T_A = 25^\circ\text{C}$)

Figure 2: Typical Turn-Off Time Distribution
(N = 100, $T_A = 25^\circ\text{C}$)

Figure 3: Typical On-Resistance Distribution
(N = 100, $T_A = 25^\circ\text{C}$)

Figure 4: Typical Output Leakage Current Distribution
(N = 100, $T_A = 25^\circ\text{C}$)

Figure 5: Typical Blocking Voltage Distribution
(N = 100, $T_A = 25^\circ\text{C}$)

Figure 6: Maximum Load Current vs. Temperature


AD6C111-L 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 250°C:

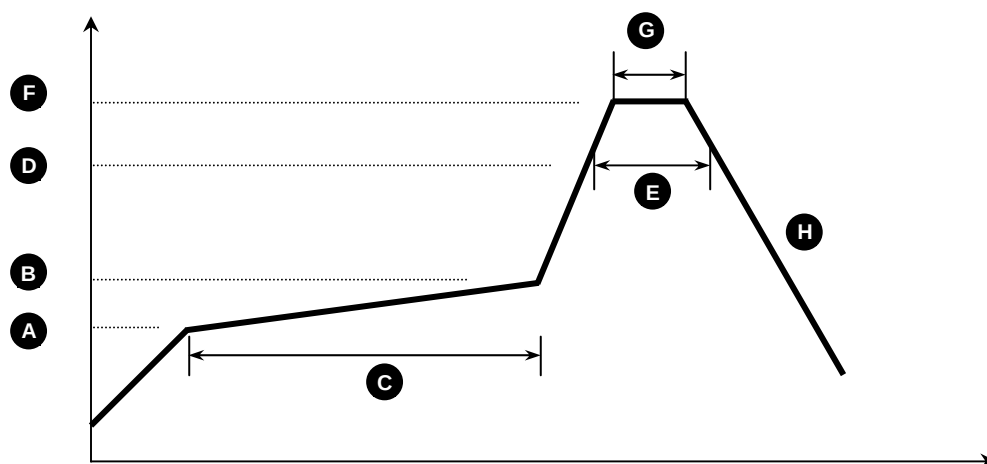


Figure 1

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

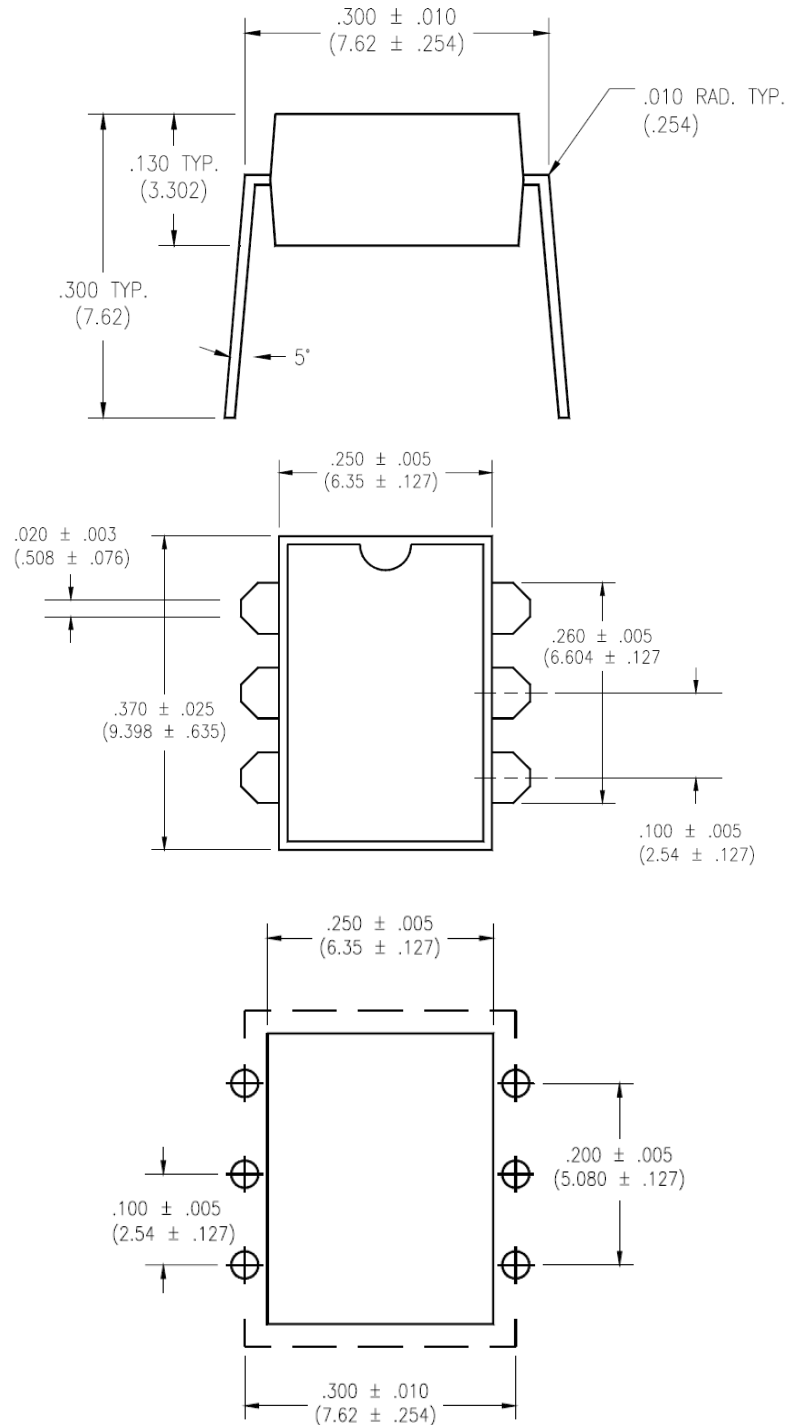
(2) Wave Solder:

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

(3) Hand Solder:

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

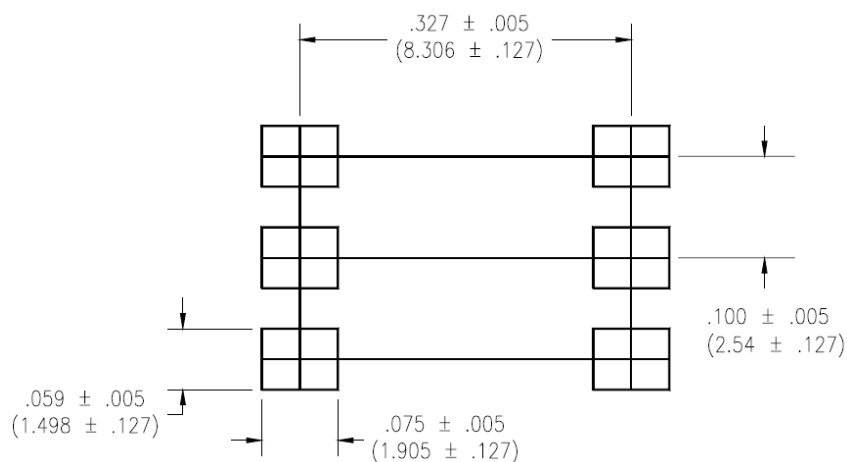
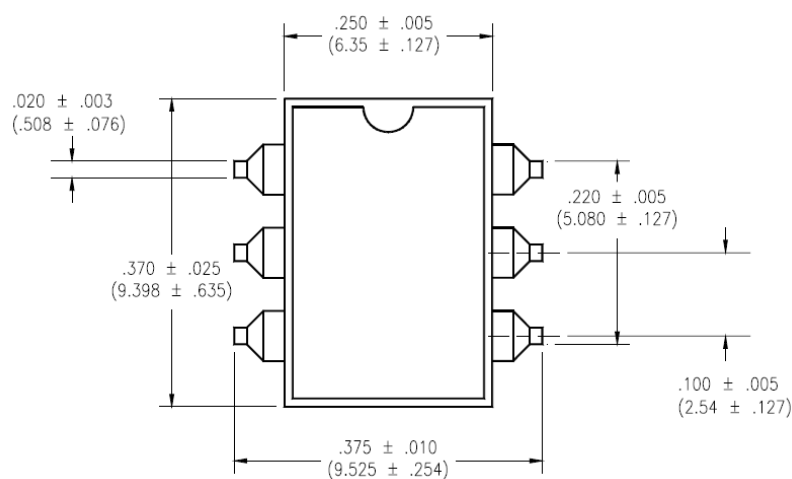
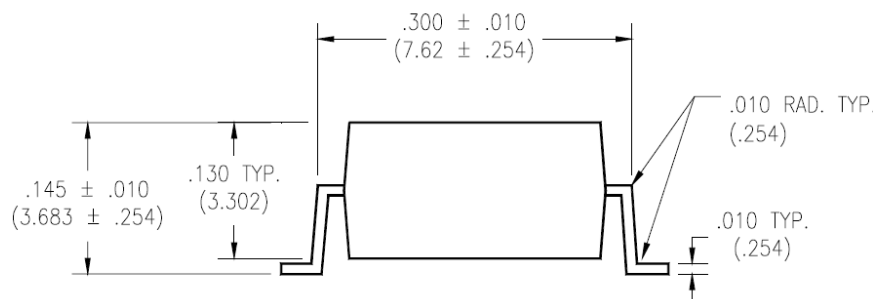
AD6C111-L Package Dimensions
6 PIN DIP Package
Note: All dimensions in inches ["] with millimeters in parenthesis ()

Device Weight: 0.45g


AD6C111-L Package Dimensions

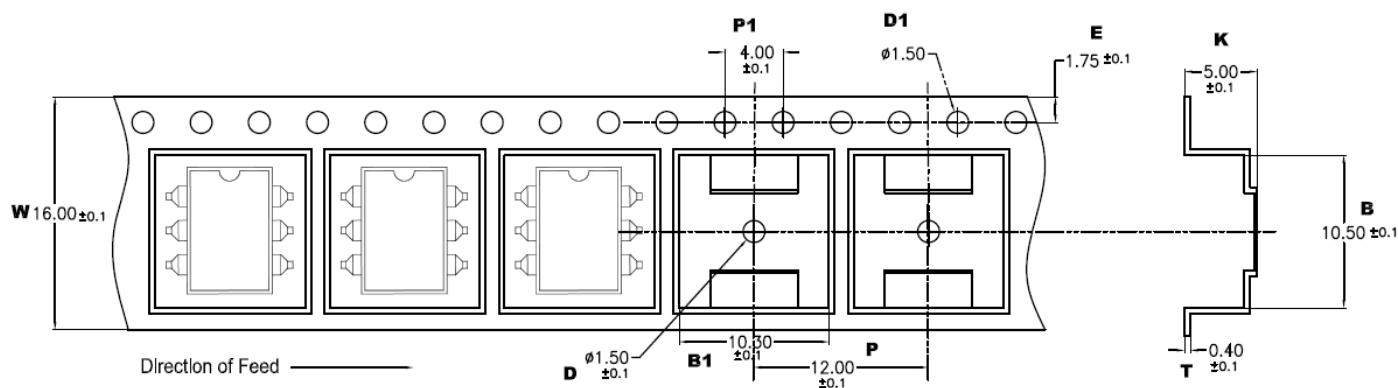
6 PIN SMD Surface Mount Package (-S)

Note: All dimensions in inches ["] with millimeters in parenthesis ()

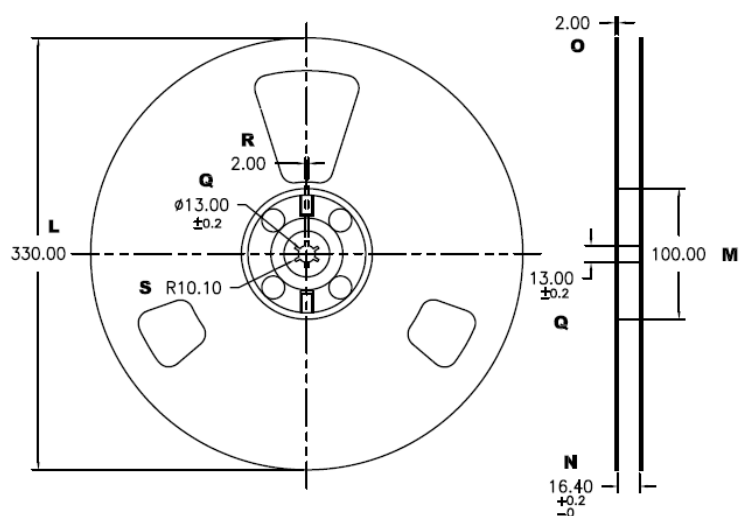
Device Weight: 0.45g


AD6C111-L Package Dimensions

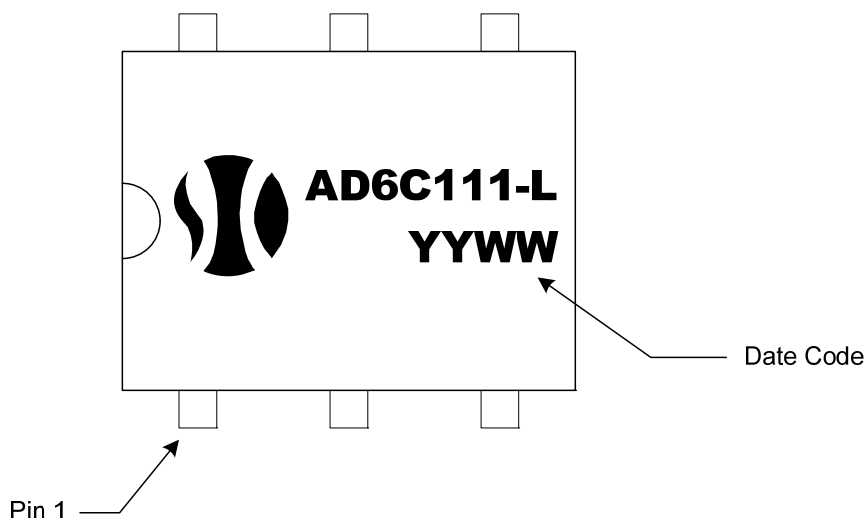
6 PIN SMD Tape & Reel (-STR)

Note: All dimensions in millimeters


W	B	B1	P	P1	K	E	T	D	D1
16.00 ± 0.1	10.50 ± 0.1	10.30 ± 0.1	12.00 ± 0.1	4.00 ± 0.1	5.00 ± 0.1	1.75 ± 0.1	0.40 ± 0.1	1.50 ± 0.1	1.50 ± 0.1



L	M	N	O	Q	R	S
330.00	100.00	16.40 ± 0.2	2.00 ± 0.1	13.00 ± 0.2	2.00	10.00

AD6C111-L Package Marking**DISCLAIMER**

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