SOLID STATE OPTRONICS



AD4C201

Dual 1 Form A
600V / 20 Ω
MOSFET Output Solid State Relay

Description

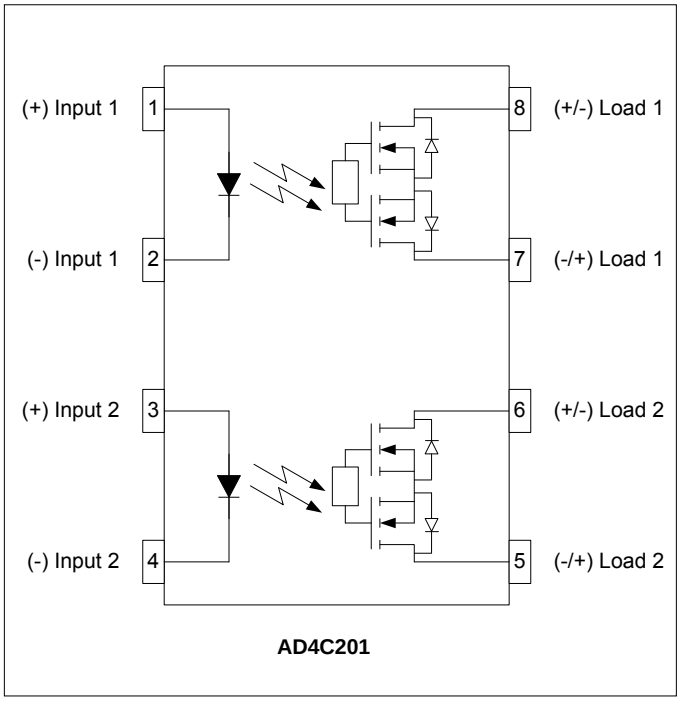
The AD4C201 is a bi-directional, double-pole, single-throw, normally open MOSFET output solid-state relay. This device offers two discrete and independently controlled optically isolated SSRs in one miniature 8 pin package. Each discrete relay consists of an infrared LED, optically coupled to a Photo Diode Array, which in turn drives a pair of back-to-back enhancement MOSFETs. Its high blocking voltage (600V) and the integration of two devices in one package make the AD4C201 ideal in high load voltage applications where board space is limited.

The AD4C201 comes standard in a compact 8 pin DIP package making it ideal for high-density board applications.

Applications

- EMR Replacement
- Meter Reading Systems
- Medical Equipment
- Battery Monitoring
- Multiplexers

Schematic Diagram



AD4C201

Features

- High Blocking Voltage (600V)
- Low Input Control Current (2.5mA TYP)
- 150mA Maximum Continuous Load Current
- Low On Resistance (17Ω TYP)
- High Isolation Voltage (3.75kV$_{RMS}$, Optional 5kV$_{RMS}$)
- 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	400mA
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
AD4C201	8 pin DIP, (50/Tube)
AD4C201-H	5kV$_{RMS}$ Viso, 8 pin DIP, (50/Tube)
AD4C201-S	8 pin SMD, (50/Tube)
AD4C201-HS	5kV$_{RMS}$, 8 pin SMD, (50/Tube)
AD4C201-STR	8 pin SMD, Tape and Reel (1000/Reel)
AD4C201-HSTR	5kV$_{RMS}$, 8 pin SMD, Tape and Reel (1000/Reel)

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

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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 (LED Trigger)	I_F	-	2.5	5	mA	I_O = 150mA
Turn-Off Current	I_{FOFF}	-	0.5	-	mA	I_O = 150mA
Terminal Capacitance	C_t	-	30	-	pF	V=0, f=1MHz
Output Specifications						
Blocking Voltage	V_B	600	-	-	V	I_F=0mA, I_O=1µA
Continuous Load Current	I_O	-	-	150	mA	I_F=5mA
On Resistance	R_{ON}	-	17	20	Ω	I_F=5mA, I_O=150mA
Leakage Current	I_{Oleak}	-	0.2	1	µA	V_O=600V
Output Capacitance	C_{OUT}	-	20	-	pF	I_F=0mA, f=1.0MHz
Offset Voltage	V_{OFFSET}	-	-	0.2	mV	I_F=5mA
Coupled Specifications						
Turn-On Time	T_{ON}	-	2	5	mS	I_F=5mA, I_O=150mA
Turn-Off Time	T_{OFF}	-	0.05	1	mS	I_F=0mA, I_O=150mA
Input to Output Capacitance	C_S	-	0.6	-	pF	V=0, f=1MHz
Contact Transient Ratio	-	2,000	7,000	0	V/µS	dV = 50V
Isolation Specifications						
Isolation Voltage	V_{ISO}	3750	-	-	V_{RMS}	RH ≤ 50%, t=1min
(-H Option)		5000	-	-		
Input-Output Resistance	R_{I-O}	-	10^{12}	-	Ω	RH ≤ 50%, V_{I-O} = 500V_{DC}

AD4C201 Performance & Characteristics Plots, T_A = 25°C (unless otherwise specified)

Figure 1: *Typical Turn-On Time Distribution* (N = 100, T_a = 25ºC)

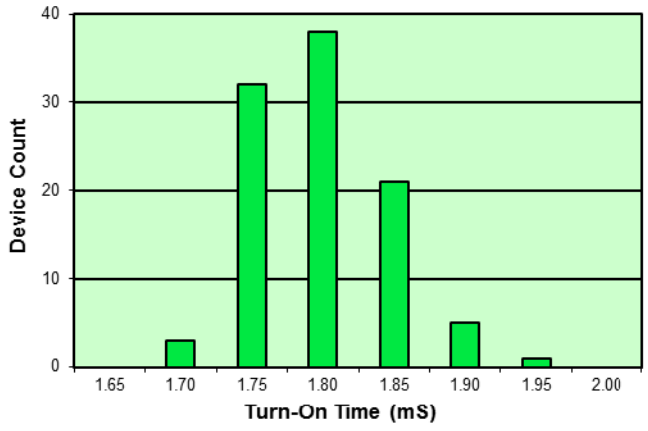


Figure 2: *Typical Turn-Off Time Distribution* (N = 100, T_a = 25ºC)

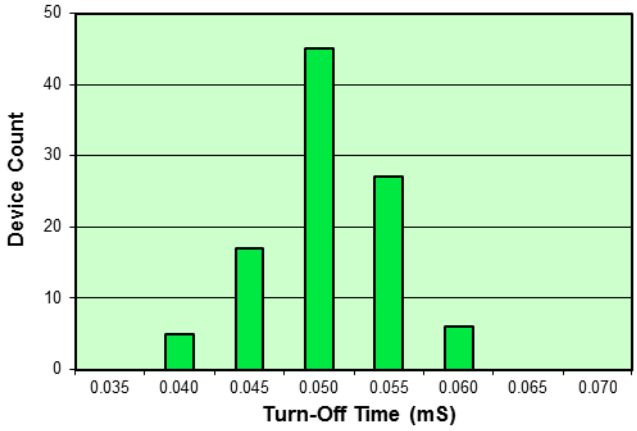


Figure 3: *Typical On-Resistance Distribution* (N = 100, T_a = 25ºC)

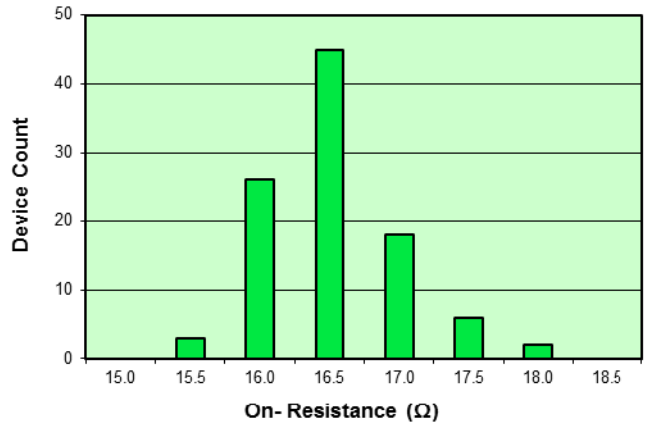


Figure 4: *Typical Output Leakage Current Distribution* (N = 100, T_a = 25ºC)

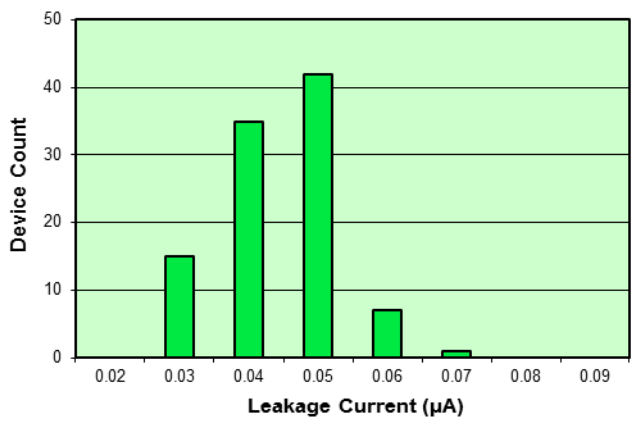


Figure 5: *Typical Blocking Voltage Distribution* (N = 100, Ta = 25ºC)

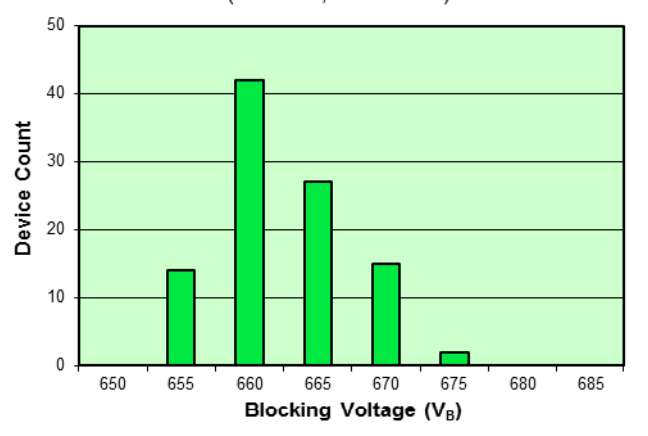
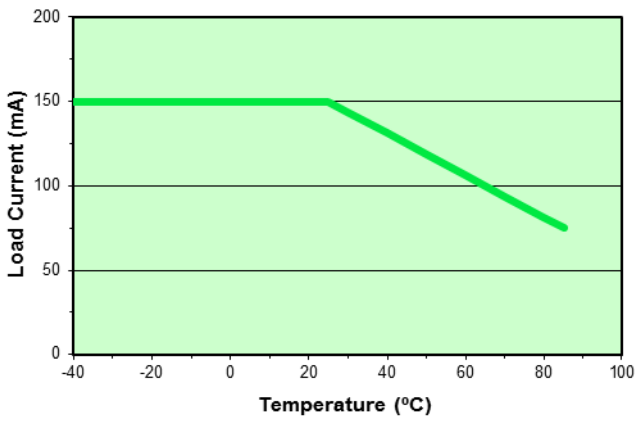


Figure 6: *Maximum Load Current vs. Temperature*



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AD4C201 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:

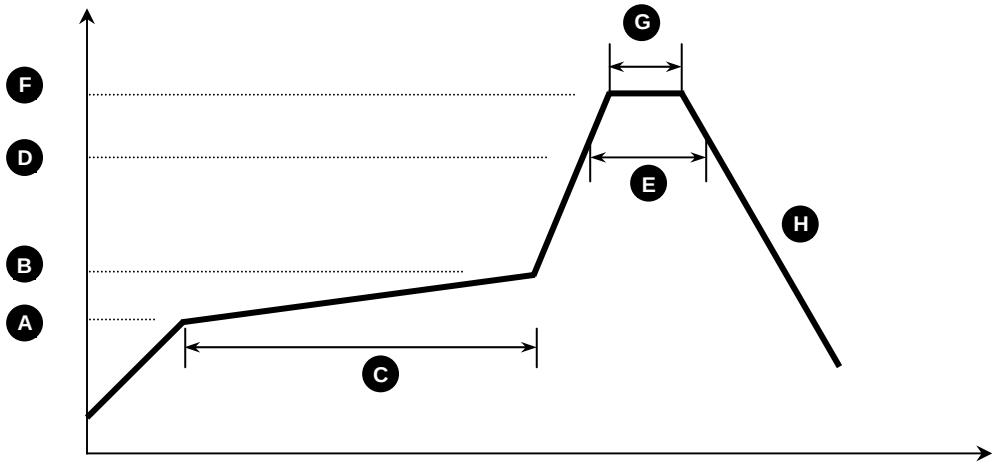


Figure 1

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:*

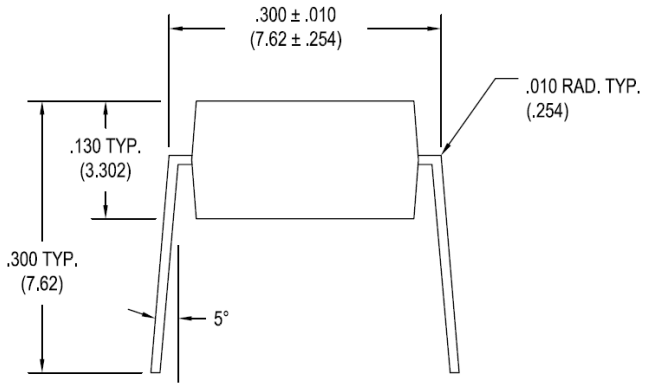
Maximum Temperature:	350ºC (at tip of soldering iron)
Maximum Time:	3s
Single Occurrence	

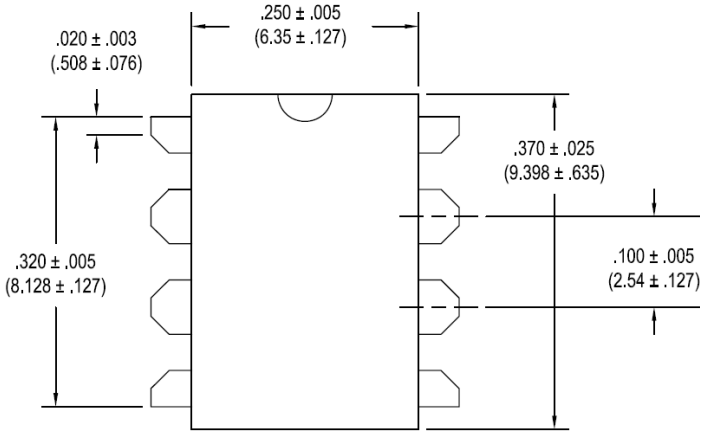
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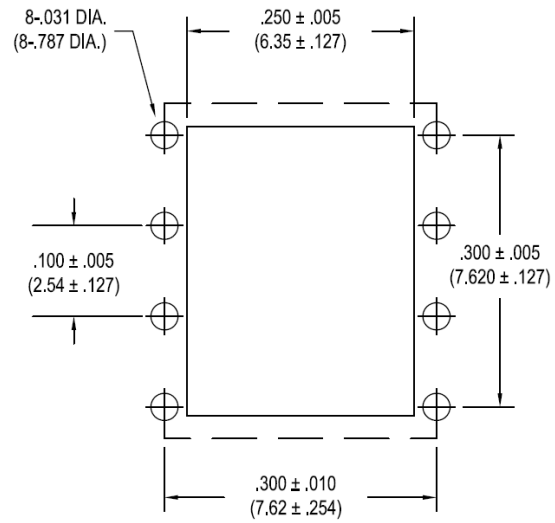
AD4C201 Package Dimensions

8 PIN DIP Package

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





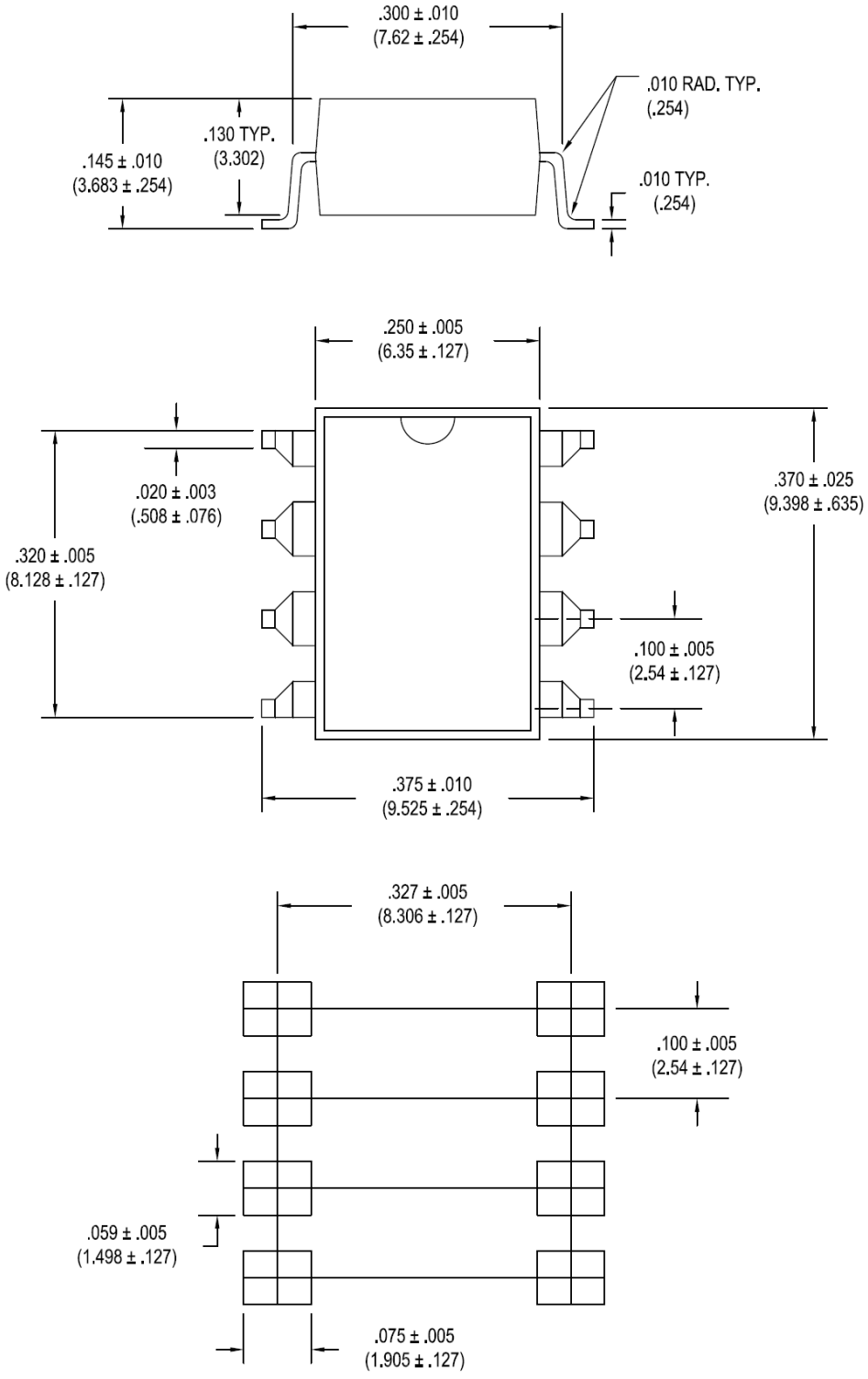


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AD4C201 Package Dimensions

8 PIN SMD Surface Mount Package (-S)

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

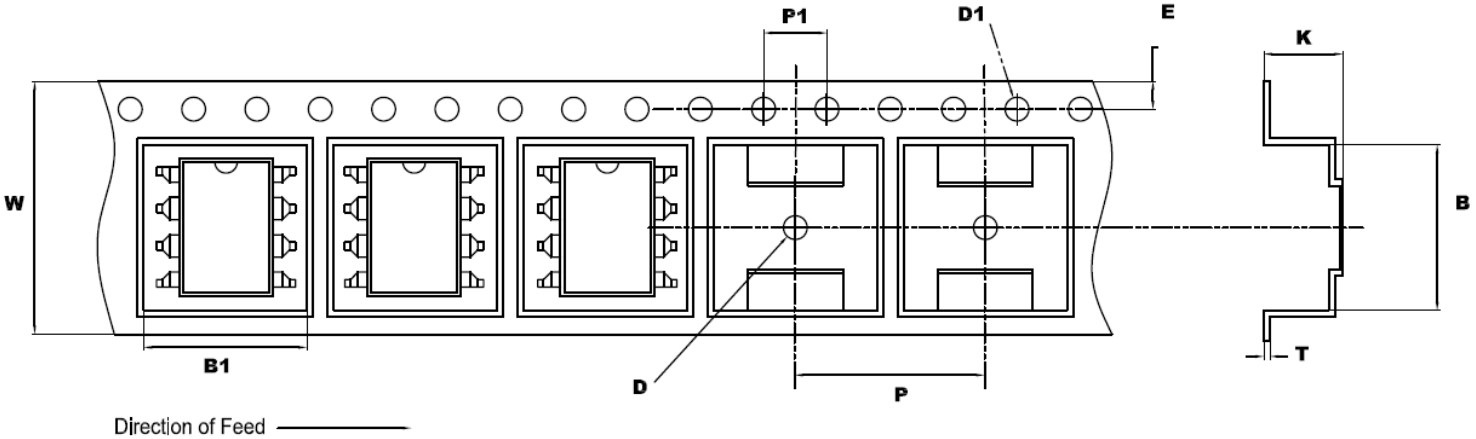


AD4C201 Package Dimensions

8 PIN SMD Tape & Reel (-STR)

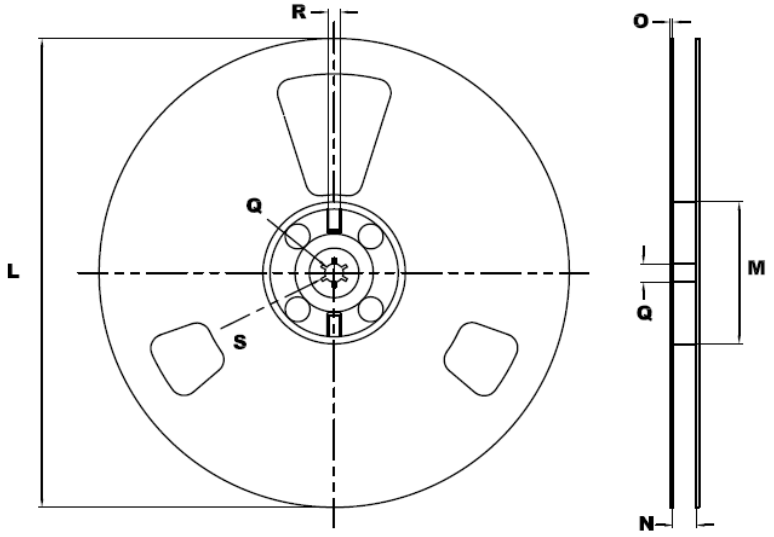
Note: *All dimensions in millimeters*

Outline and Dimension (Tape)



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

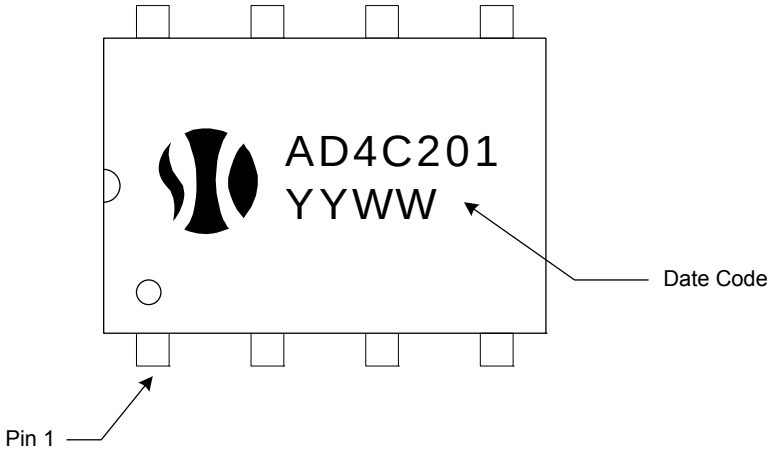
Outline and Dimensions (Reel)



Packaging: 1,000 pcs / reel

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

AD4C201 Package Marking



AD4C201 Package Weights

Device	Single Unit	Full Tube (50pcs)	Full Pouch (10 tubes)	Full Reel (1000pcs)
AD4C201-(H)	0.54	42	420	-
AD4C201-(H)S	0.53	44	440	-
AD4C201-(H)STR	0.53	-	-	950

Note: *All weights above are in GRAMS, and include packaging materials where applicable*

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