



Description

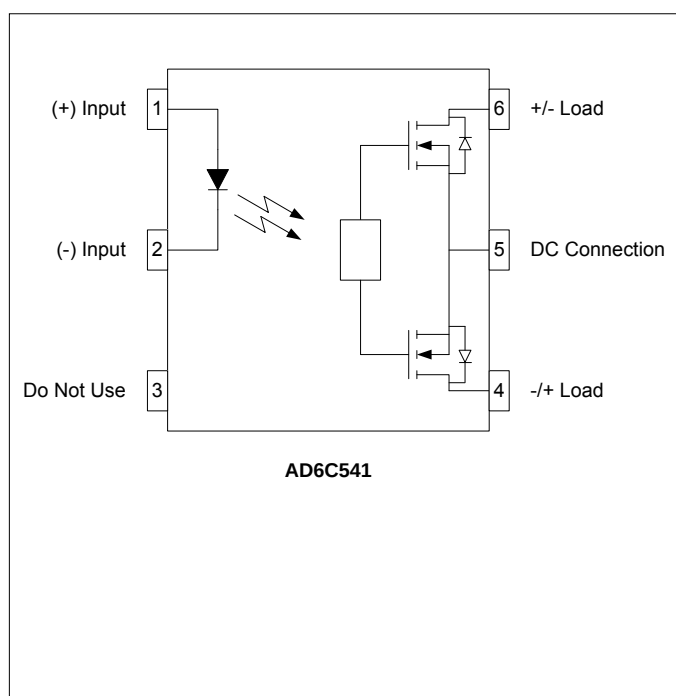
The AD6C541 is a bi-directional, single-pole, single-throw, normally open multipurpose relay. It is designed to replace electro-mechanical relays in general purpose switching applications. The relay consists of an integrated circuit that drives two rugged drain-to-drain enhancement type DMOS transistors - optically coupled to a light emitting diode. The output MOS transistors have extremely low on resistance making the relays ideal where minimal signal attenuation is desired.

The AD6C541 comes standard in a miniature 6 pin DIP package making it ideal for high-density board applications.

Applications

- Reed Relay Replacement
- Meter Reading Systems
- Data Acquisition
- Medical Equipment
- Battery Monitoring
- Safety Systems

Schematic Diagram



Features

- Low On Resistance (1 Ω Max)
- Low Input Control Current (2.5mA TYP)
- 700mA Maximum Continuous Load Current
- High Isolation Voltage (2.5kV_{RMS}, 3.75kV_{RMS} -H Option)
- 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 Current50mA
Transient Input Current500mA
Reverse Input Control Voltage5V
Input Power Dissipation40mW
Output Power Dissipation800mW
Solder Temperature – Wave (10sec)260°C
Solder Temperature – IR Reflow (10sec)260°C

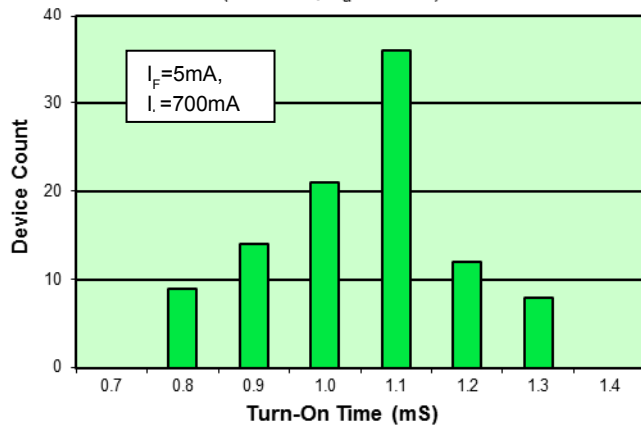
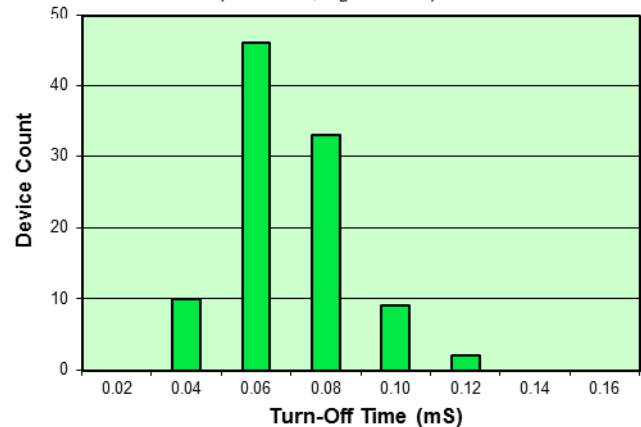
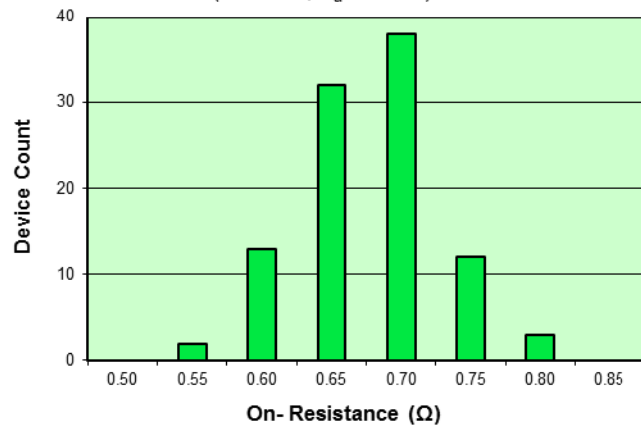
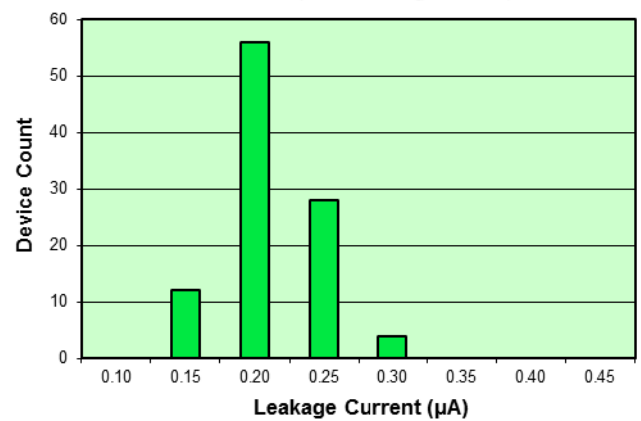
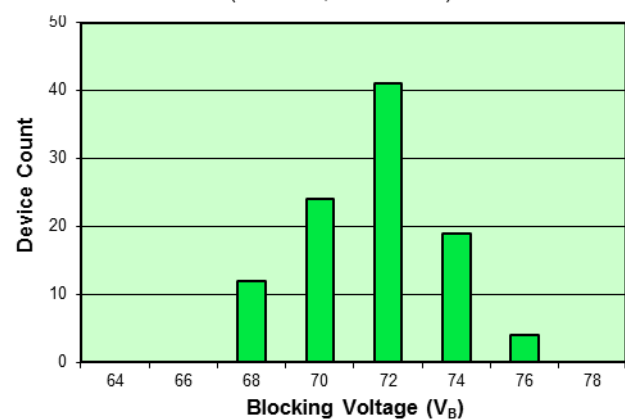
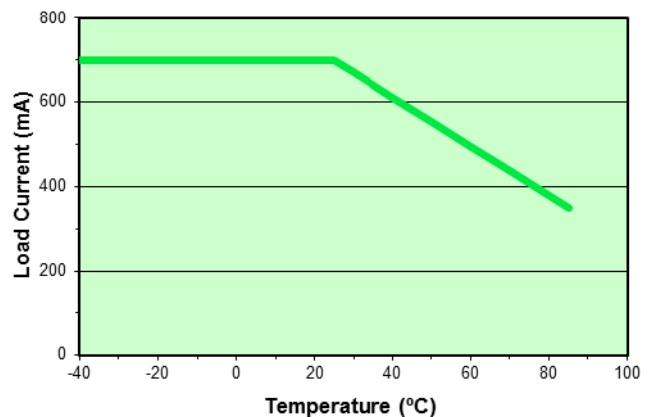
Ordering Information

Part Number	Description
AD6C541	6 pin DIP, (50/Tube)
AD6C541-H	3.75kV _{RMS} Viso, 6 pin DIP, (50/Tube)
AD6C541-S	6 pin SMD, (50/Tube)
AD6C541-HS	3.75kV _{RMS} , 6 pin SMD, (50/Tube)
AD6C541-STR	6 pin SMD, Tape and Reel (1000/Reel)
AD6C541-HSTR	3.75kV _{RMS} , 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	5	-	-	V	$I_R = 10\mu\text{A}$
Turn-On Current	I_F	-	2.5	5.0	mA	$I_O = 700\text{mA}$
Turn-Off Current	I_{FOFF}	-	0.5	-	mA	-
Output Specifications						
Blocking Voltage	V_B	60	-	-	V	$I_O = 1\mu\text{A}$
Continuous Load Current	I_O	-	-	700	mA	$I_F = 5\text{mA}$
On Resistance	R_{ON}	-	0.7	1	Ω	$I_F = 5\text{mA}$, $I_O = 700\text{mA}$
Leakage Current	I_{leak}	-	0.2	1	μA	$I_F = 0\text{mA}$, $V_O = 60\text{V}$
Output Capacitance	C_{OUT}	-	125	200	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	mS	$I_F = 5\text{mA}$, $I_O = 700\text{mA}$
Turn-On Time	T_{ON}	-	0.5	-	mS	$I_F = 5\text{mA}$, $I_O = 100\text{mA}$
Turn-Off Time	T_{OFF}	-	0.5	1.0	mS	$I_F = 0\text{mA}$, $I_O = 700\text{mA}$
Coupled Capacitance	C_{COUPLED}	-	3	-	pF	
Contact Transient Ratio	-	2,000	7,000	0	V/ μS	$dV = 50\text{V}$
Offset Voltage	V_{OFFSET}	-	-	0.2	mV	$I_F = 5\text{mA}$
Isolation Specifications						
Isolation Voltage	V_{ISO}	2,500	-	-	V_{RMS}	$\text{RH} \leq 50\%$, $t = 1\text{min}$
-H Option	V_{ISO}	3,750	-	-	V_{RMS}	$\text{RH} \leq 50\%$, $t = 1\text{min}$
Input-Output Resistance	$R_{\text{I-O}}$	-	10^{12}	-	Ω	$V_{\text{I-O}} = 500V_{\text{DC}}$

AD6C541 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


AD6C541 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:

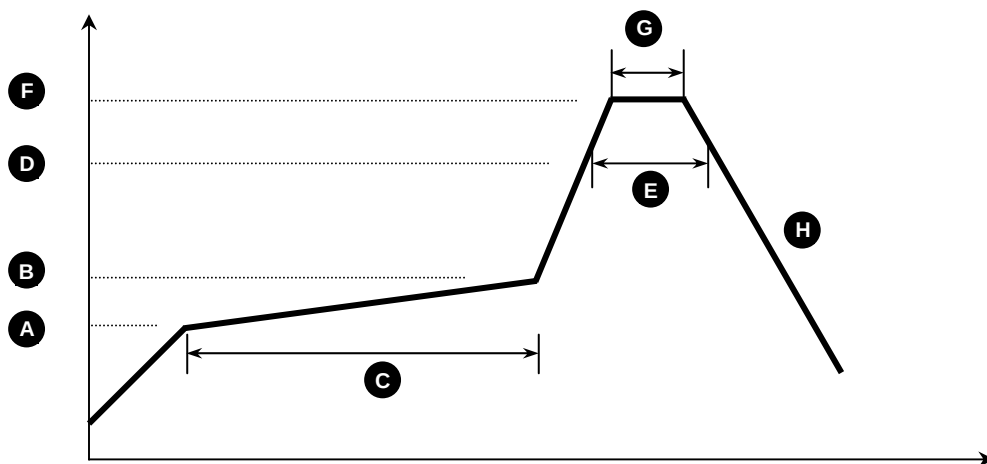


Figure 1

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

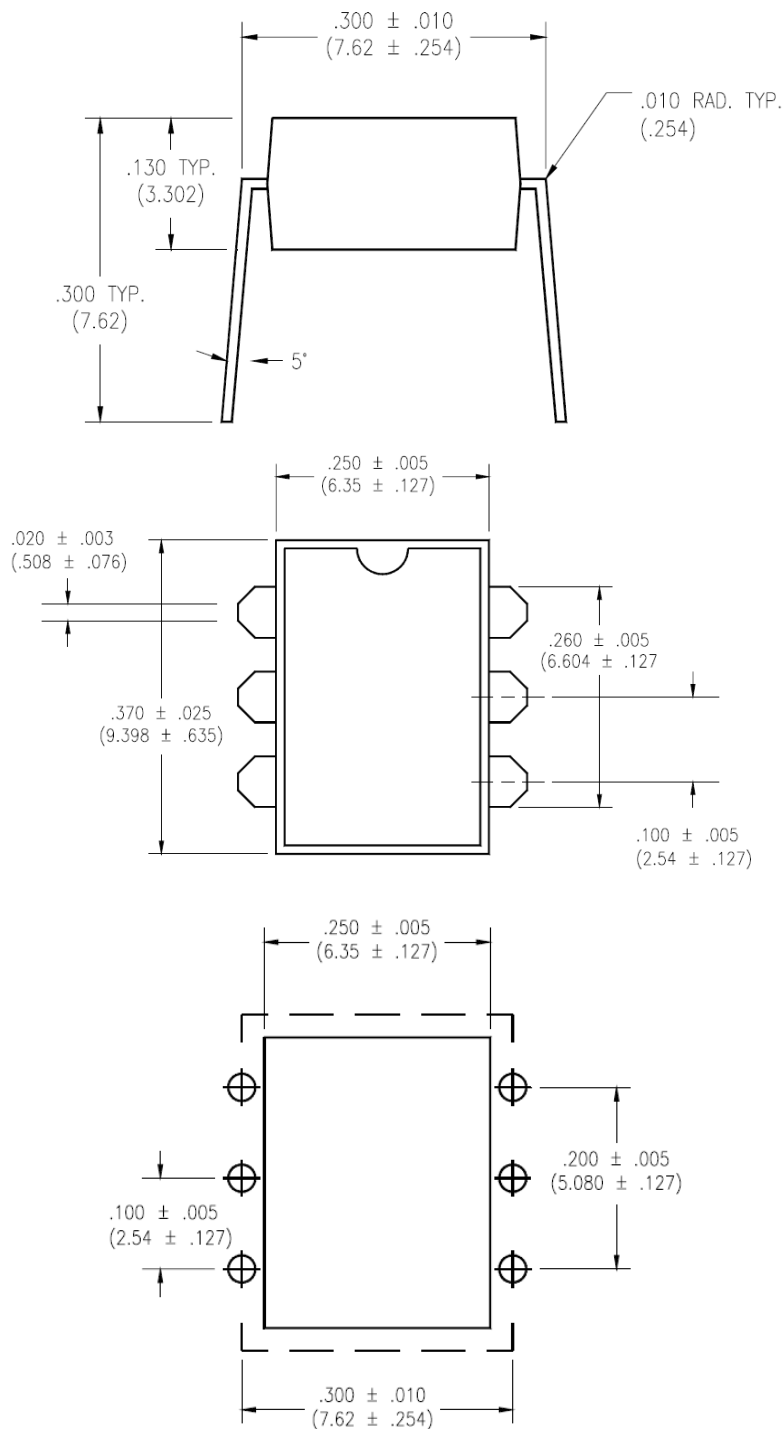
(2) Wave Solder:

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

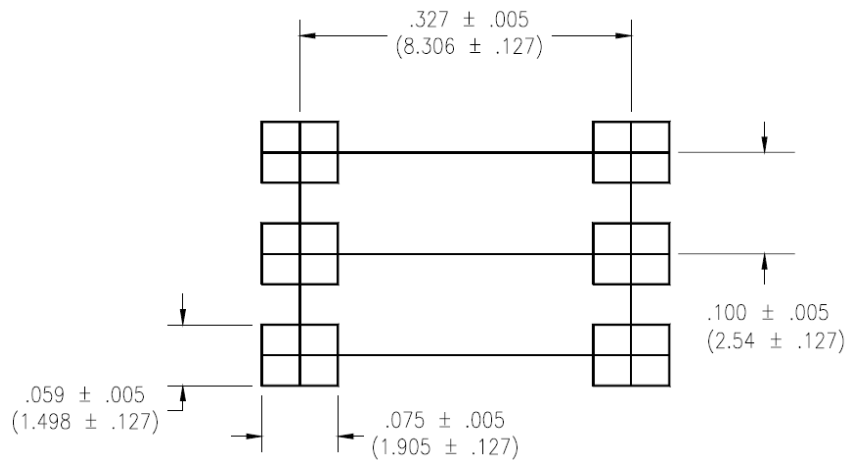
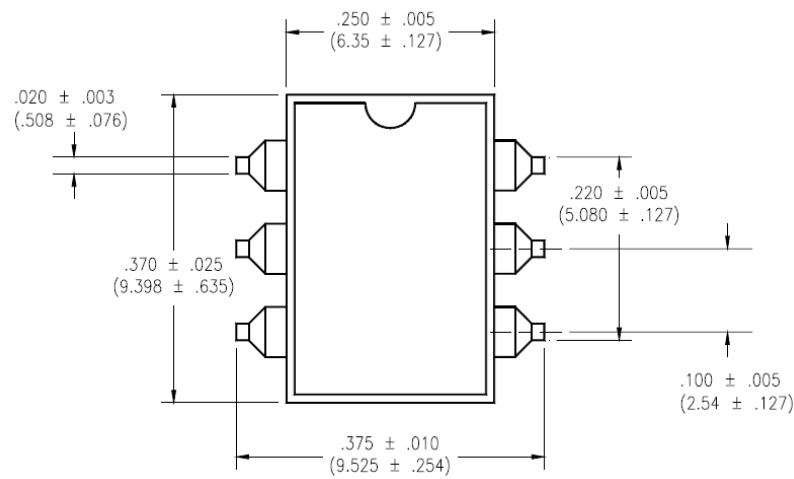
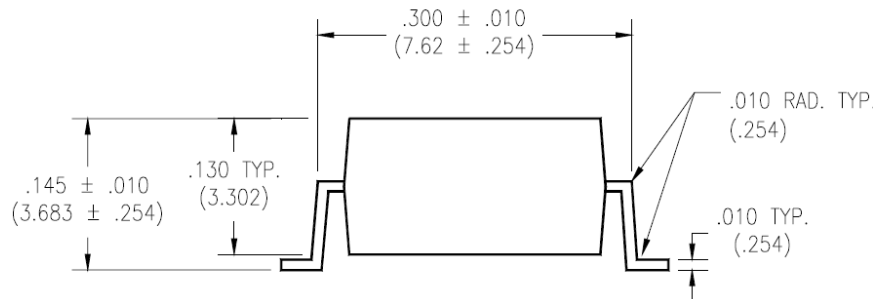
AD6C541 Package Dimensions
6 PIN DIP Package
Note: All dimensions in inches ["] with millimeters in parenthesis ()

Device Weight: 0.45g


AD6C541 Package Dimensions

6 PIN SMD Surface Mount Package (-S)

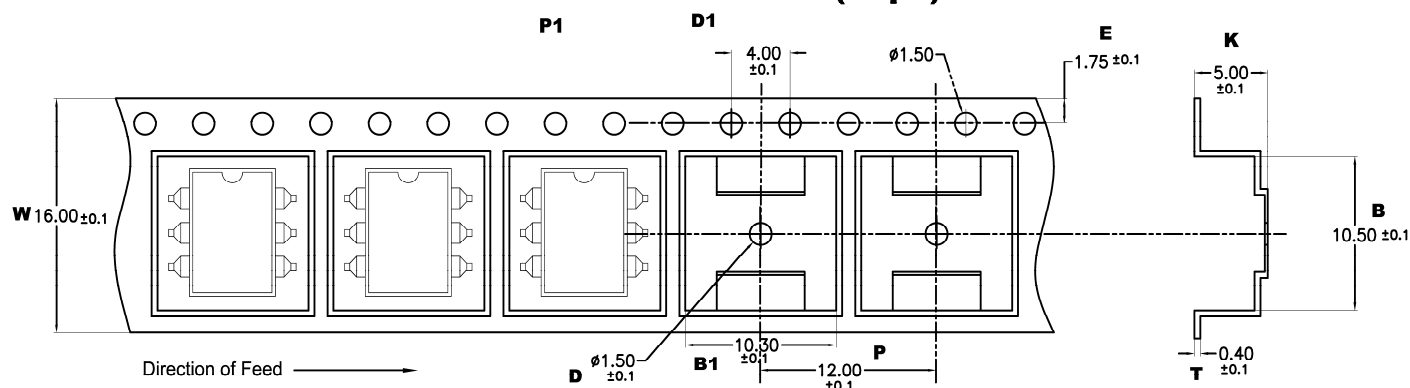
Note: All dimensions in inches ["] with millimeters in parenthesis ()

Device Weight: 0.45g


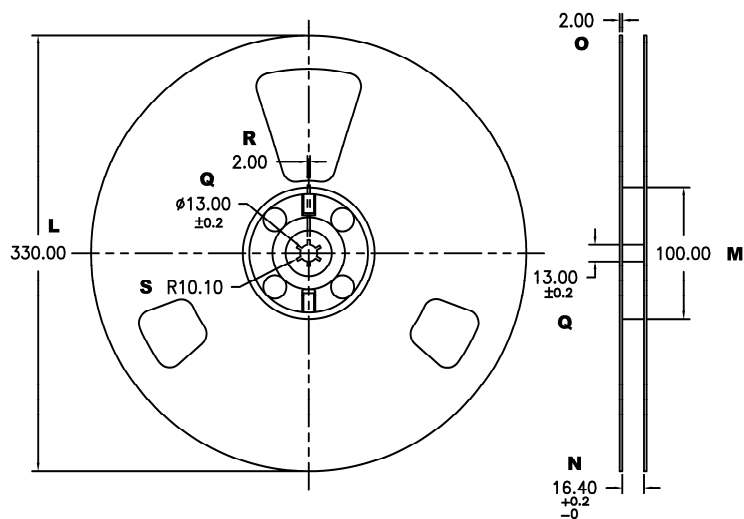
AD6C541 Package Dimensions

6 PIN SMD Tape & Reel (-STR)

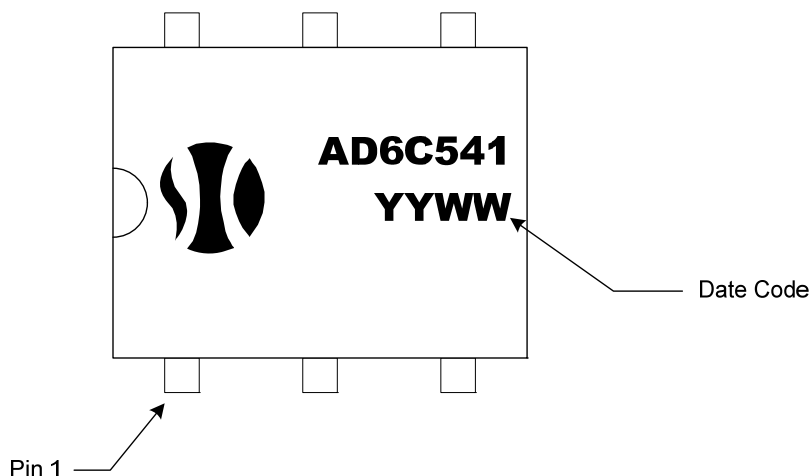
Note: All dimensions in millimeters

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

AD6C541 Package Marking**DISCLAIMER**

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