



Description

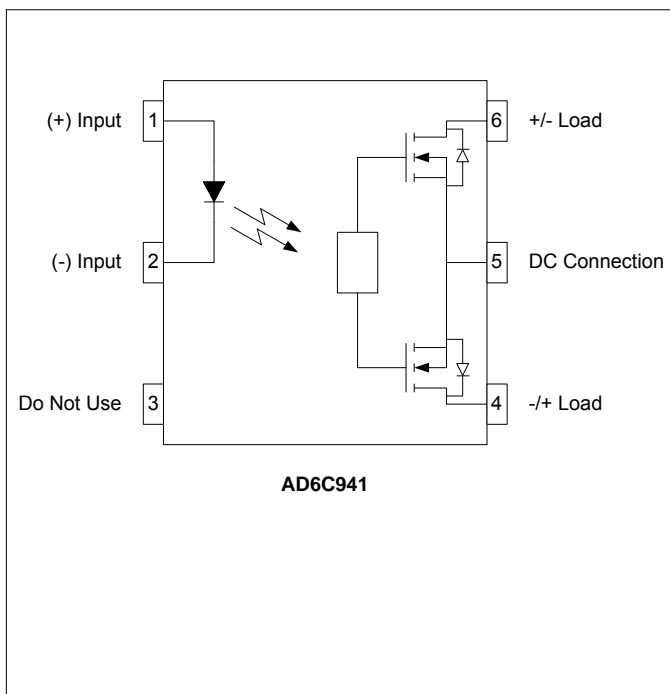
The AD6C941 is a bi-directional, single-pole, single-throw, normally open multipurpose relay. It is designed to replace electro-mechanical relays in general purpose switching applications. The relay consists of an integrated circuit that drives two rugged drain-to-drain enhancement type DMOS transistors - optically coupled to a light emitting diode. The output MOS transistors have extremely low on resistance allowing the relay to high continuous load currents of up to 2.2 amps.

The AD6C941 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 (75mΩ TYP)
- Low Input Control Current (1mA TYP)
- High Maximum Continuous Load Current (2.2 Amps)
- High Isolation Voltage (3.75kV_{RMS}, 5kV_{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 Current.....50mA
 Transient Input Current.....500mA
 Reverse Input Control Voltage5V
 Input Power Dissipation.....40mW
 Output Power Dissipation800mW
 Solder Temperature – Wave (10sec).....260°C
 Solder Temperature – IR Reflow (10sec).....260°C

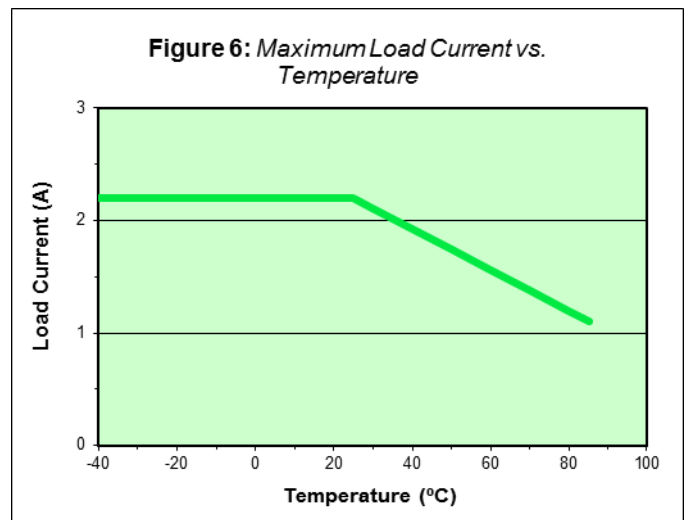
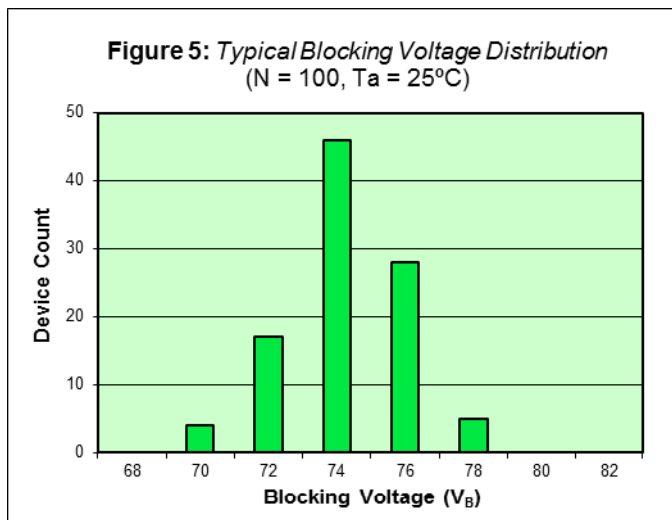
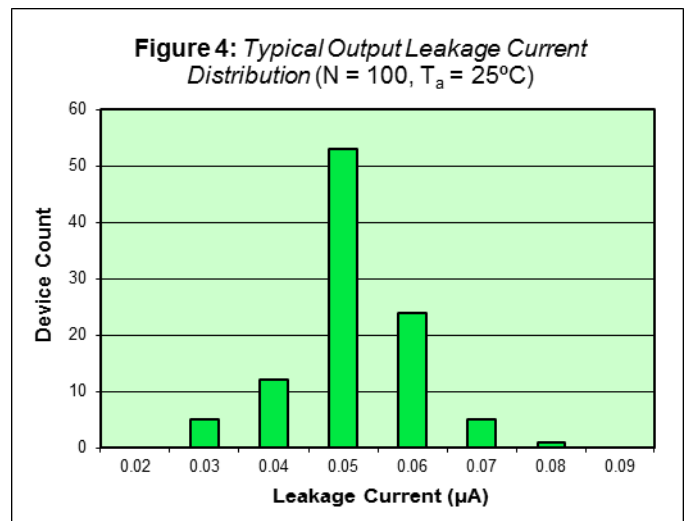
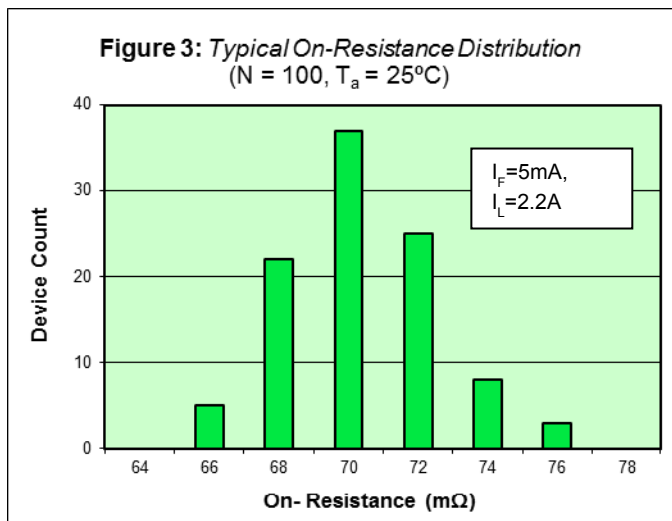
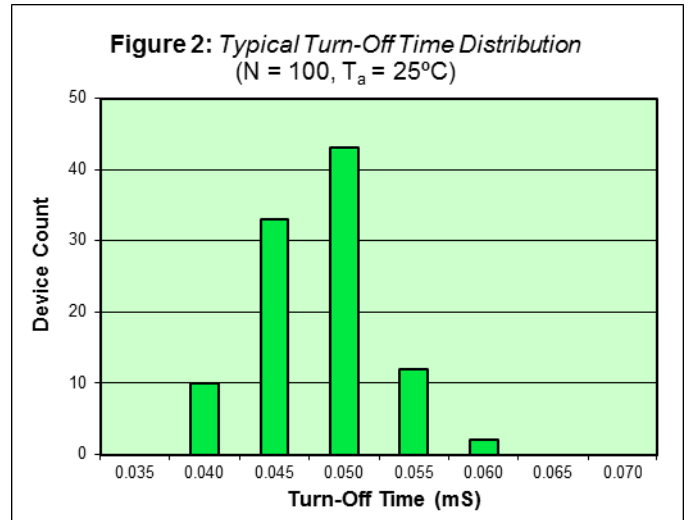
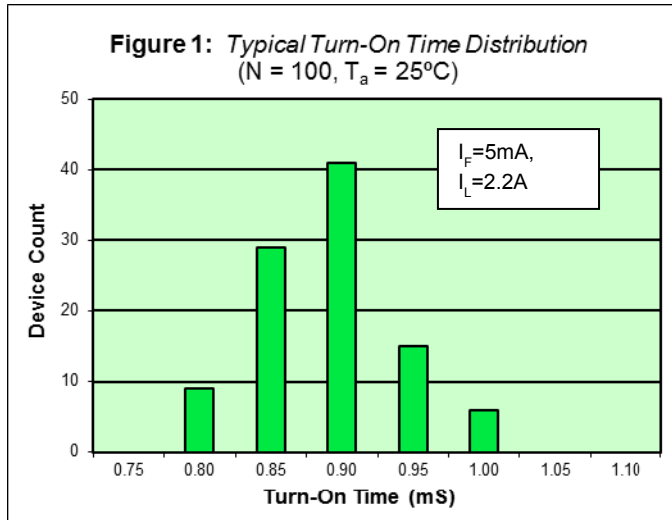
Ordering Information

Part Number	Description
AD6C941	6 pin DIP, (50/Tube)
AD6C941-H	5kV _{RMS} V _{ISO} , 6 pin DIP, (50/Tube)
AD6C941-S	6 pin SMD, (50/Tube)
AD6C941-HS	5kV _{RMS} , 6 pin SMD, (50/Tube)
AD6C941-STR	6 pin SMD, Tape and Reel (1000/Reel)
AD6C941-HSTR	5kV _{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	-	1.4	1.8	V	$I_F = 10\text{mA}$
LED Reverse Voltage	BV_R	5	-	-	V	$I_R = 10\mu\text{A}$
Input Reverse Current	I_R	-	-	10	μA	$V_R = 5\text{V}$
Turn-On Current	I_F	-	1	5	mA	$V_O = 20\text{V}$, $I_O = 2.2\text{A}$, within 20mS
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	-	-	2.2	A	$I_F = 5\text{mA}$
On Resistance	R_{ON}	-	75	250	mΩ	$I_F = 5\text{mA}$, $I_O = 2.2\text{A}$
Leakage Current	I_{leak}	-	0.05	1	μA	$I_F = 0\text{mA}$, $V_O = 60\text{V}$
Output Capacitance	C_{OUT}	-	25	-	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	$I_F = 5\text{mA}$, $I_O = 2.2\text{A}$
Turn-Off Time	T_{OFF}	-	0.05	0.5	mS	$I_F = 0\text{mA}$, $I_O = 2.2\text{A}$
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}	3,750	-	-	V_{RMS}	$\text{RH} \leq 50\%$, $t = 1\text{min}$
-H Option	V_{ISO}	5,000	-	-	V_{RMS}	$\text{RH} \leq 50\%$, $t = 1\text{min}$
Input-Output Resistance	$R_{\text{I-O}}$	-	10^{12}	-	Ω	$V_{\text{I-O}} = 500V_{\text{DC}}$

AD6C941 Performance & Characteristics Plots, $T_A = 25^\circ\text{C}$ (unless otherwise specified)


AD6C941 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:

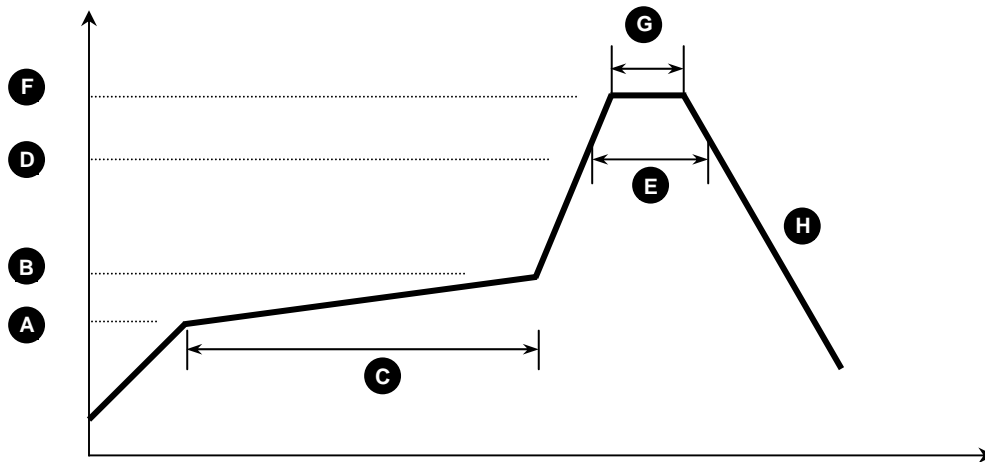


Figure 1

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

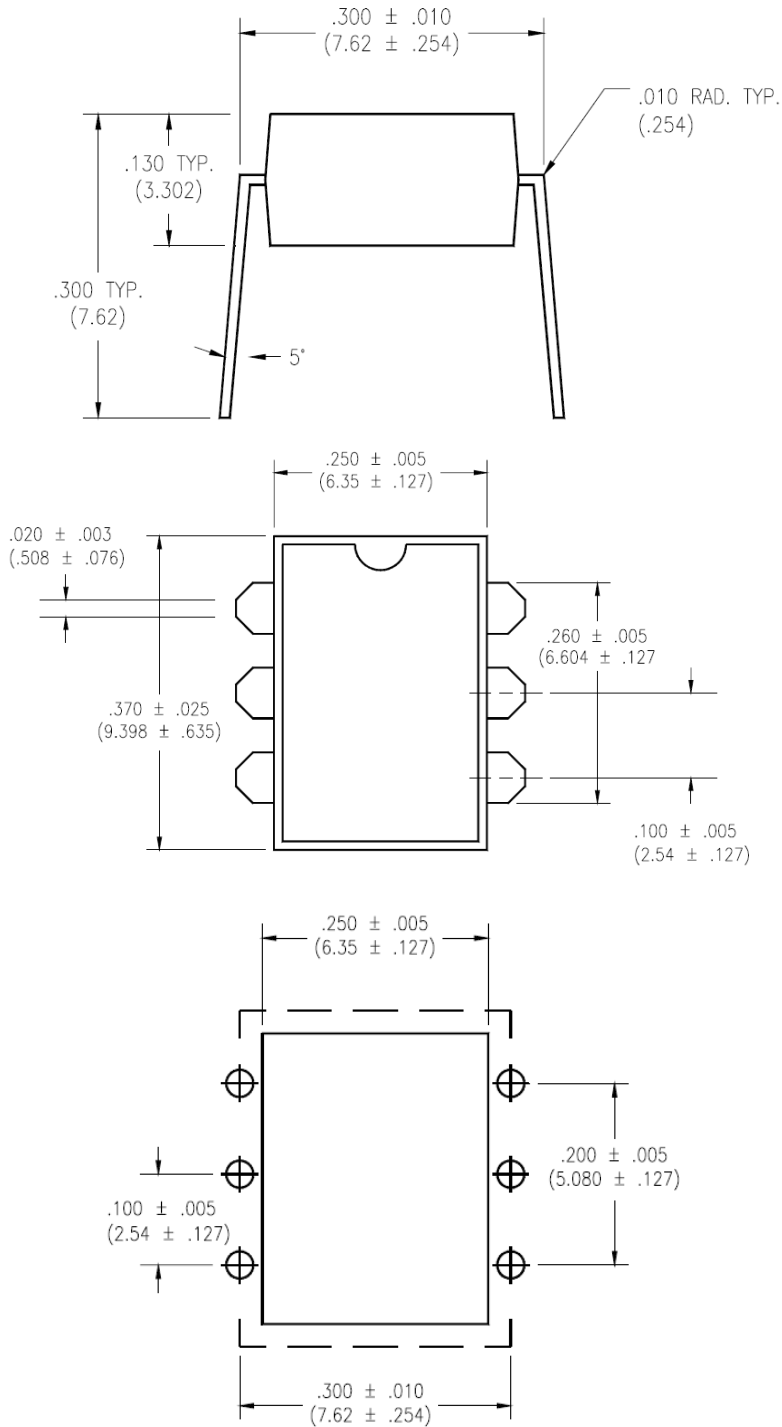
(3) *Hand Solder:*

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

AD6C941 Package Dimensions

6 PIN DIP Package

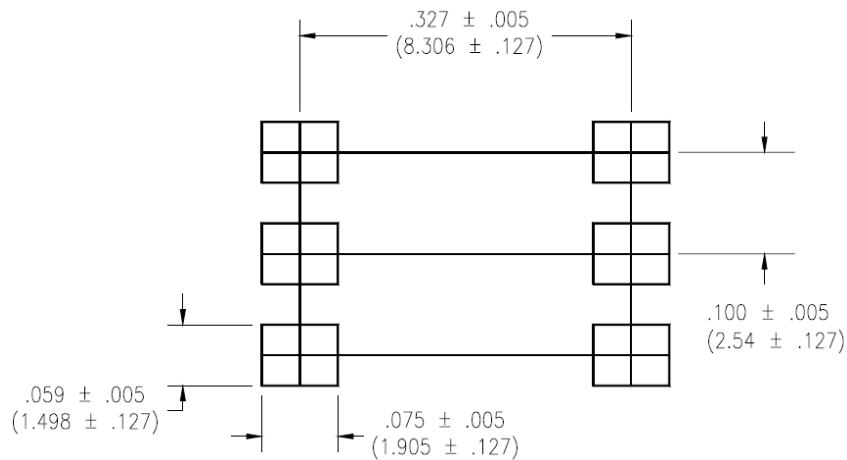
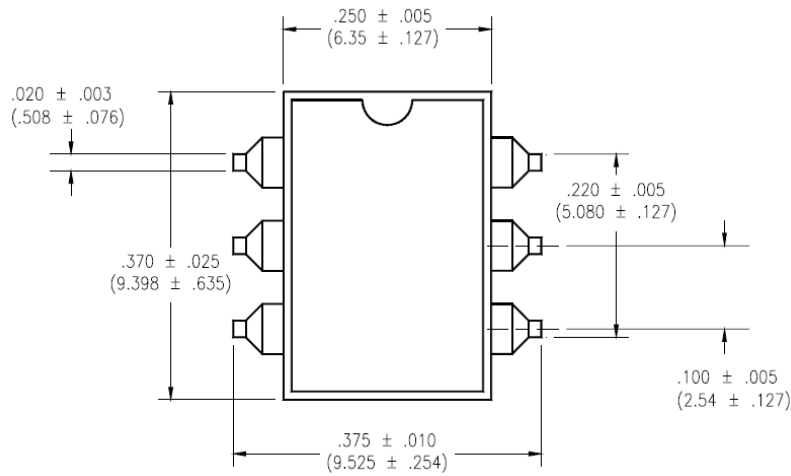
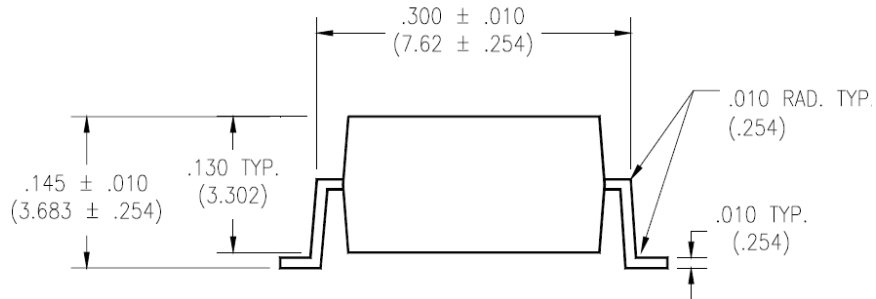
Note: All dimensions in inches ["] with millimeters in parenthesis ()



AD6C941 Package Dimensions

6 PIN SMD Surface Mount Package (-S)

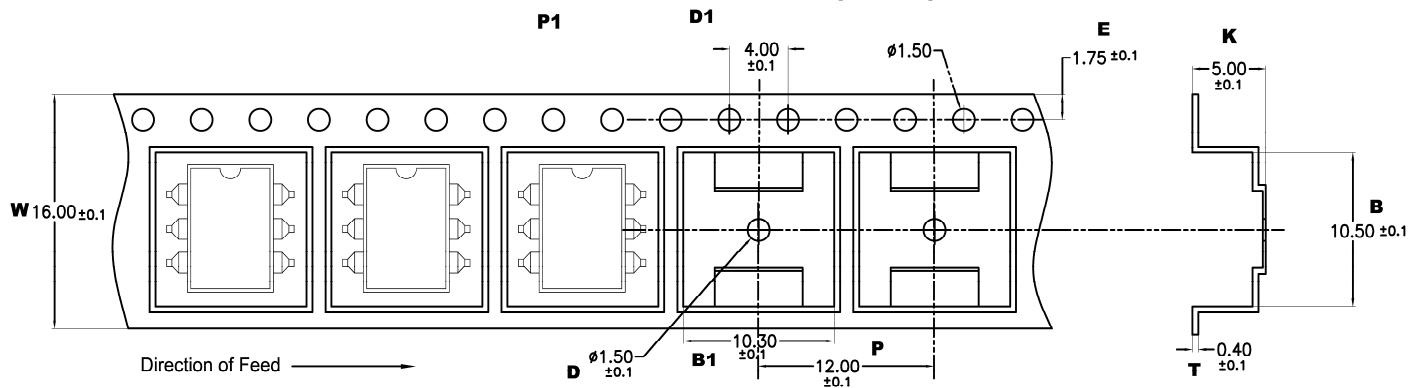
Note: All dimensions in inches ["] with millimeters in parenthesis ()



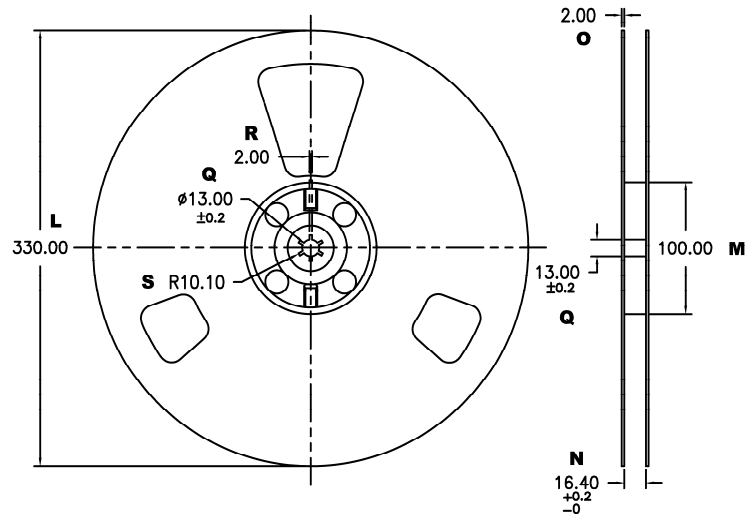
AD6C941 Package Dimensions

6 PIN SMD Tape & Reel (-STR)

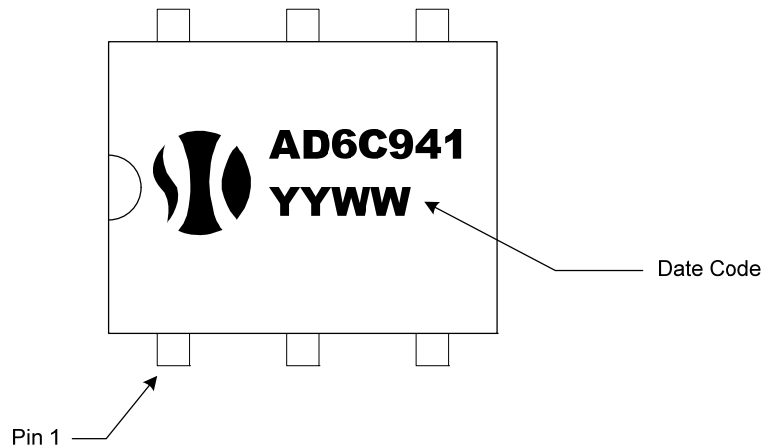
Note: All dimensions in millimeters

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

AD6C941 Package Marking

AD6C941 Package Weights

Device	Single Unit	Full Tube (50pcs)	Full Pouch (10 tubes)	Full Reel (1000pcs)
AD6C941	0.45	48	490	-
AD6C941-S	0.44	46	470	-
AD6C941-STR	0.44	-	-	884

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

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