

Transient Voltage Suppressors / ESD Protectors

Features

- Two, three, four, five, or six transient voltage suppressors
- Compact SMT package saves board space and facilitates layout in space-critical applications
- In-system ESD protection to $\pm 20\text{kV}$ contact discharge, per the IEC 61000-4-2 international standard
- Lead-free packaging

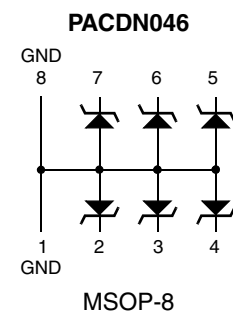
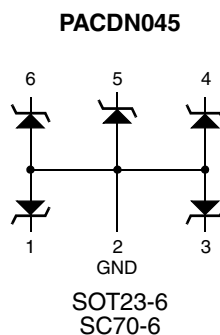
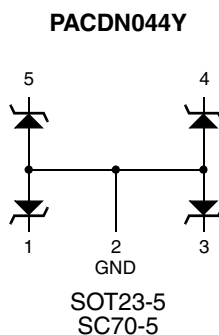
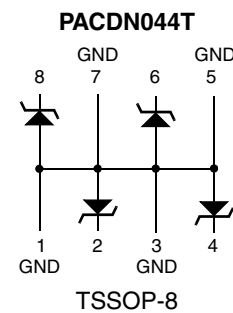
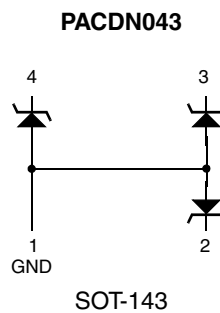
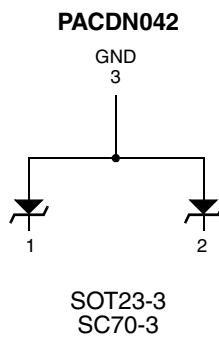
Applications

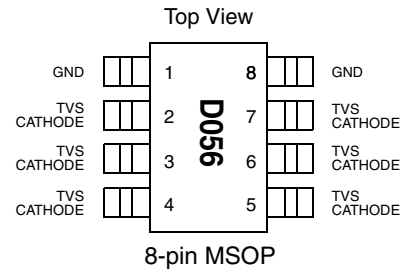
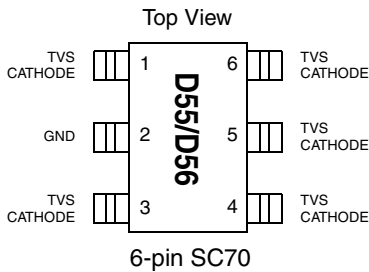
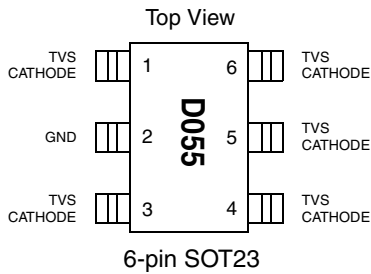
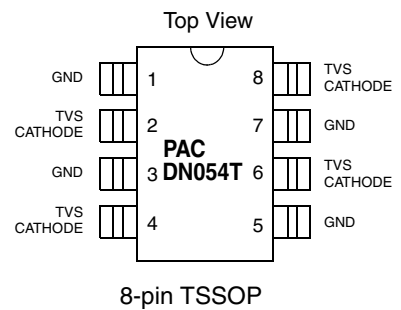
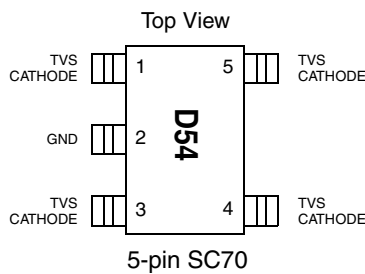
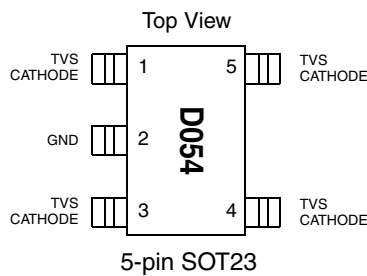
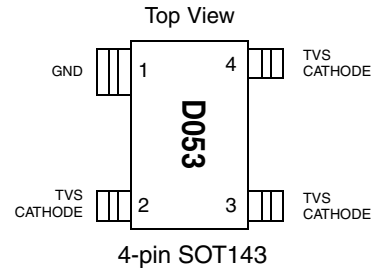
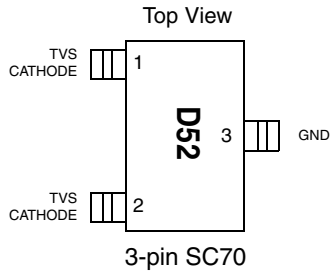
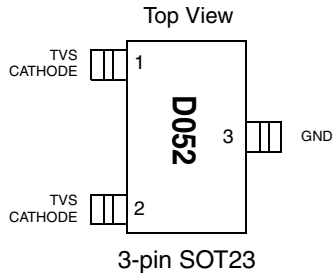
- ESD protection of PC ports, including USB ports, serial ports, parallel ports, IEEE1394 ports, docking ports, proprietary ports, etc.
- Protection of interface ports or IC pins which are exposed to high ESD levels

Product Description

The PACDN042/43/44/45/46 family of transient voltage suppressor arrays provide a very high level of protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). The PACDN042/43/44/45/46 devices safely dissipate ESD strikes, exceeding the IEC 61000-4-2 International Standard, Level 4 ($\pm 8\text{kV}$ contact discharge). All pins are rated to withstand $\pm 20\text{kV}$ ESD pulses using the IEC 61000-4-2 contact discharge method. Using the MIL-STD-883D (Method 3015) specification for Human Body Model (HBM) ESD, all pins are protected from contact discharges of greater than $\pm 30\text{kV}$.

Electrical Schematic



PACKAGE / PINOUT DIAGRAMS


Note: SOT23, SC70, SOT143, TSSOP, and MSOP packages may differ in size. These drawings are not to scale.

PIN DESCRIPTIONS

PINS	NAME	DESCRIPTION
(Refer to package outline drawings)	TVS Cathode	The cathode of the respective TVS diode, which should be connected to the node requiring transient voltage protection.
(Refer to package outline drawings)	GND	The anode of the TVS diodes.

Ordering Information

PART NUMBERING INFORMATION			
Pins	Package	Lead-free Finish	
		Ordering Part Number ¹	Part Marking
3	SOT23-3	PACDN042Y3R	D052
3	SC70-3	PACDN042YB3R	D52
4	SOT143	PACDN043Y4R	D053
5	SOT23-5	PACDN044Y5R	D054
5	SC70-5	PACDN044YB5R	D54
6	SOT23-6	PACDN045Y6R	D055
6	SC70-6	PACDN045YB6R	D55
6	SC70-6	PACDN045YB6R-R	D56
8	TSSOP	PACDN044TR	PACDN054T
8	MSOP	PACDN046MR	D056

Note 1: Parts are shipped in Tape & Reel form unless otherwise specified.

Specifications

ABSOLUTE MAXIMUM RATINGS		
PARAMETER	RATING	UNITS
Storage Temperature Range	-65 to +150	°C
Package Power Dissipation		
SC70	0.2	W
SOT23-3, SOT23-5, SOT23-6, SOT143	0.225	W
TSSOP, MSOP	0.5	W

STANDARD OPERATING CONDITIONS		
PARAMETER	RATING	UNITS
Operating Temperature	-40 to +85	°C

Specifications (cont'd)

ELECTRICAL OPERATING CHARACTERISTICS						
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
C	Capacitance	$T_A = 25^\circ\text{C}$, 2.5VDC, 1MHz		30		pF
V_{RSO}	Reverse Stand-off Voltage	$I_R = 10\mu\text{A}$, $T_A = 25^\circ\text{C}$	5.5			V
		$I_R = 1\text{mA}$, $T_A = 25^\circ\text{C}$	6.1			V
I_{LEAK}	Leakage Current	$V_{\text{IN}} = 5.0\text{VDC}$, $T_A = 25^\circ\text{C}$		1	100	nA
V_{SIG}	Small Signal Clamp Voltage Positive Clamp Negative Clamp	$I = 10\text{mA}$, $T_A = 25^\circ\text{C}$	6.2	6.8	8	V
		$I = -10\text{mA}$, $T_A = 25^\circ\text{C}$	-0.4	-0.8	-1.2	V
V_{ESD}	ESD Withstand Voltage Human Body Model, MIL-STD-883, Method 3015 Contact Discharge per IEC 61000-4-2 standard	Notes 1 & 2	± 30			kV
		Notes 1 & 2	± 20			kV
R_D	Diode Dynamic Resistance Forward Conduction Reverse Conduction			1.0		Ω
				1.4		Ω

Note 1: Guaranteed by design and characterization.

Note 2: ESD voltage applied between channel pins & ground, one pin at a time; all other channel pins open; all GND pins grounded.

Performance Information

Diode Capacitance

Typical diode capacitance with respect to positive TVS cathode voltage (reverse voltage across the diode) is given in Figure 1.

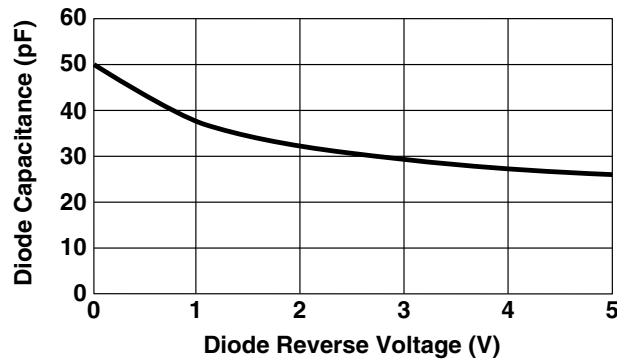
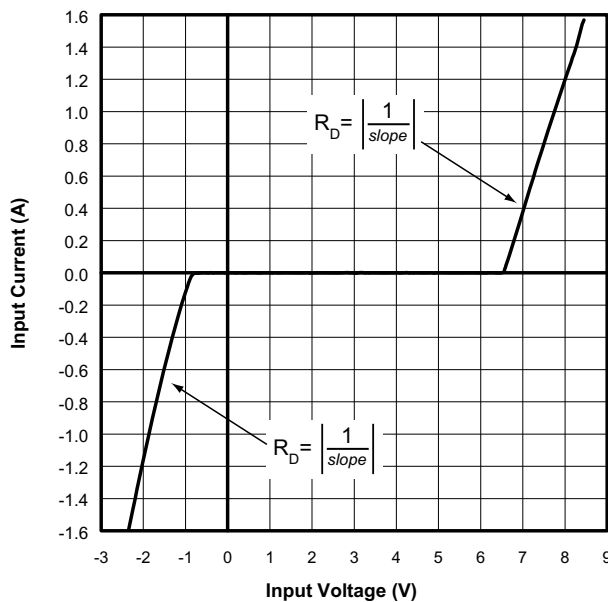


Figure 1. Diode Capacitance vs. Reverse Voltage

Typical High Current Diode Characteristics

Measurements are made in pulse mode with a nominal pulse width of 0.7mS.

Typical Input VI Characteristics
(Pulse-mode measurements, pulse width = 0.7mS nominal)



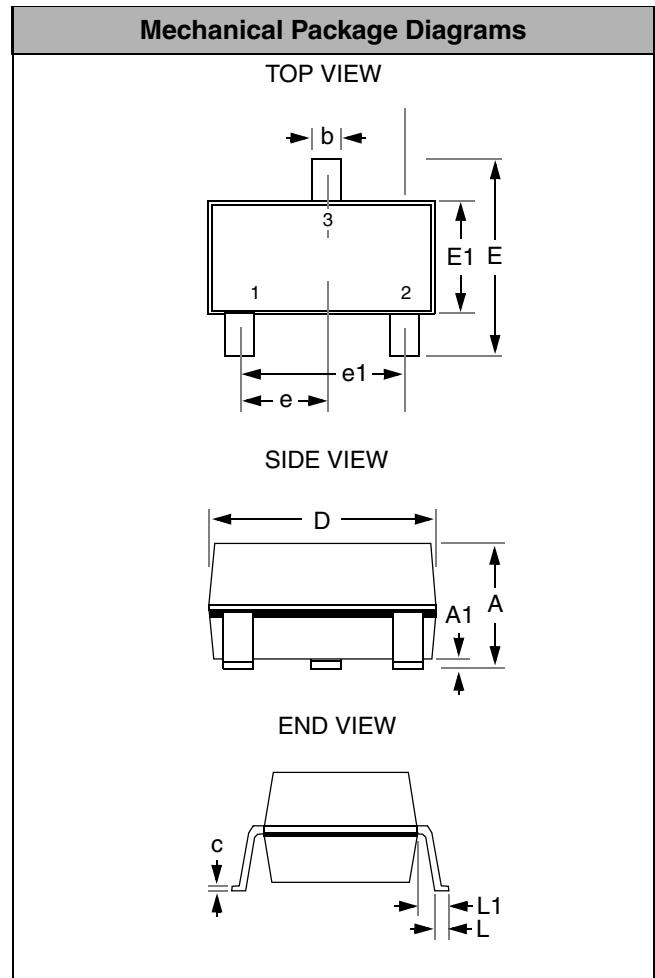
Mechanical Details

The PACDN042/43/44/45/46 devices are available in the following packages: SOT23-3, SOT23-5, SOT23-6, SC70-3, SC70-5, SC70-6, SOT143, TSSOP-8, and MSOP-8.

SOT23-3 Mechanical Specifications

The PACDN042Y3R is supplied in a 3-pin SOT23 package. Dimensions are presented below.

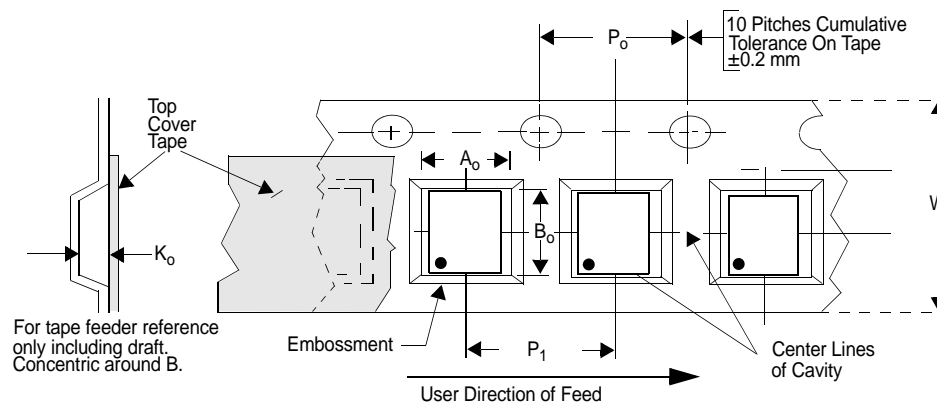
PACKAGE DIMENSIONS				
Package	SOT23-3 (JEDEC name is TO-236)			
JEDEC No.	TO-236 (Var. AB)			
Pins/Leads	3			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	0.89	1.12	0.0350	0.0441
A1	0.01	0.10	0.0004	0.0039
b	0.30	0.50	0.0118	0.0197
c	0.08	0.20	0.0031	0.0079
D	2.80	3.04	0.1102	0.1197
E	2.10	2.64	0.0827	0.1039
E1	1.20	1.40	0.0472	0.0551
e	0.95 BSC		0.0374 BSC	
e1	1.90 BSC		0.0748 BSC	
L	0.40	0.60	0.0157	0.0236
L1	0.54 REF		0.0213 REF	
# per tape and reel	3000 pieces			
Controlling dimension: millimeters				



Package Dimensions for SOT23-3

SOT23-3 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN042Y3R	2.92 X 2.37 X 1.01	2.77 X 3.15 X 1.22	8mm	178mm (7")	3000	4mm	4mm

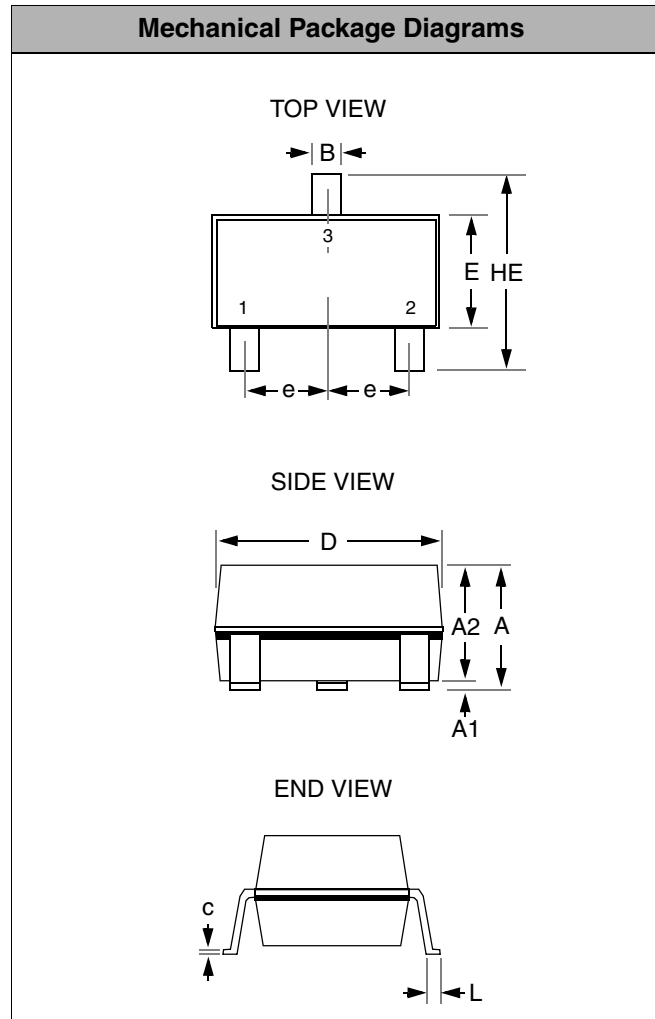


Mechanical Details (continued)

SC70-3 Mechanical Specifications

The PACDN042YB3R is supplied in a 3-pin SC70 package. Dimensions are presented below.

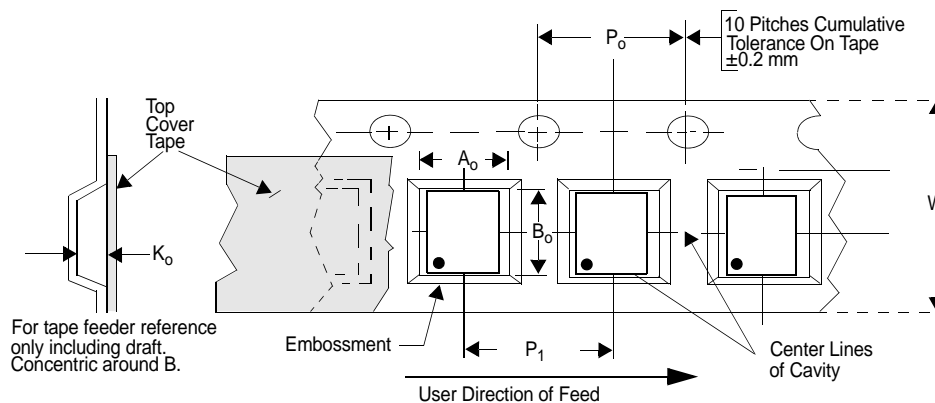
PACKAGE DIMENSIONS		
Package	SC70-3 (JEDEC name is MO-203 Issue A)	
Pins	3	
Dimensions	Millimeters	
	Min	Max
A	0.80	1.10
A1	0.00	0.10
A2	0.70	1.00
B	0.15	0.40
c	0.08	0.25
D	1.85	2.25
E	1.15	1.35
e	0.65 BSC	
HE	2.00	2.40
L	0.26	0.46
# / tape and reel	3000 pieces	
Controlling dimension: millimeters		



Package Dimensions for SC70-3.

SC70-3 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN042YB3R	2.05 X 1.25 X 0.95	2.40 X 2.40 X 1.19	8mm	178mm (7")	3000	4mm	4mm

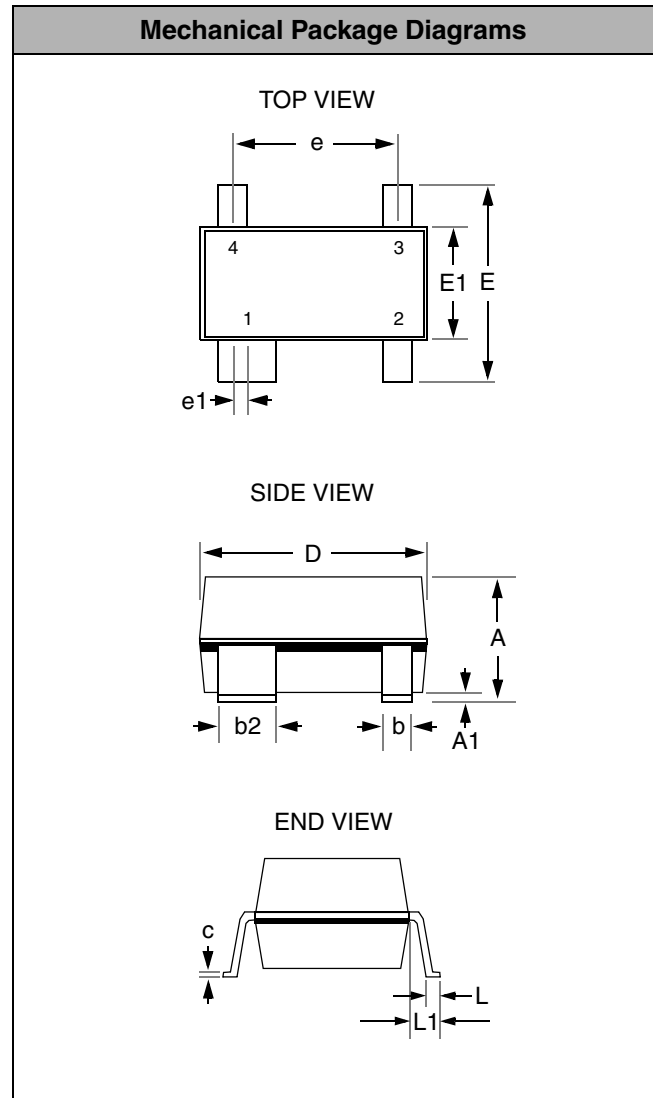


Mechanical Details (continued)

SOT143 Mechanical Specifications

The PACDN043Y4R is packaged in a 4-pin SOT143 package. Dimensions are presented below.

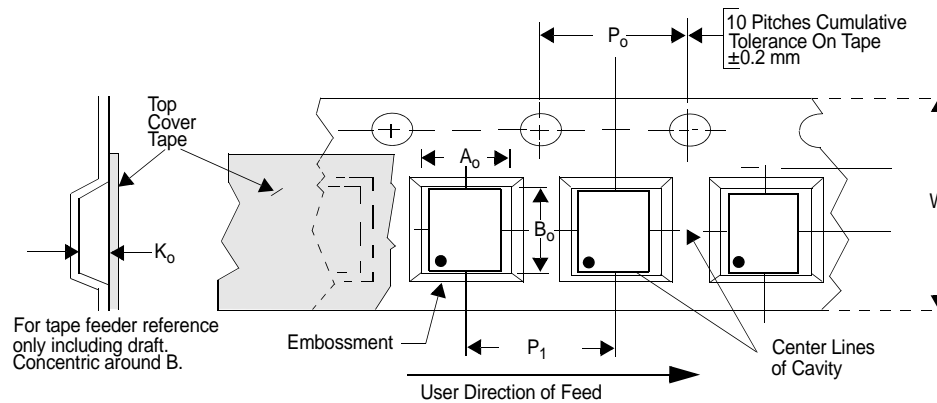
PACKAGE DIMENSIONS				
Package	SOT143			
Pins	4			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	0.80	1.22	0.031	0.048
A1	0.05	0.15	0.002	0.006
b	0.30	0.50	0.012	0.019
b2	0.76	0.89	0.030	0.035
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.119
E	2.10	2.64	0.082	0.103
E1	1.20	1.40	0.047	0.055
e	1.92 BSC		0.075 BSC	
e1	0.20 BSC		0.008 BSC	
L	0.4	0.6	0.016	0.024
L1	0.54 REF		0.021 REF	
# per tape and reel	3000 pieces			
Controlling dimension: millimeters				



Package Dimensions for SOT143.

SOT143 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN043Y4R	2.92 X 2.37 X 1.01	2.60 X 3.15 X 1.20	8mm	178mm (7")	3000	4mm	4mm

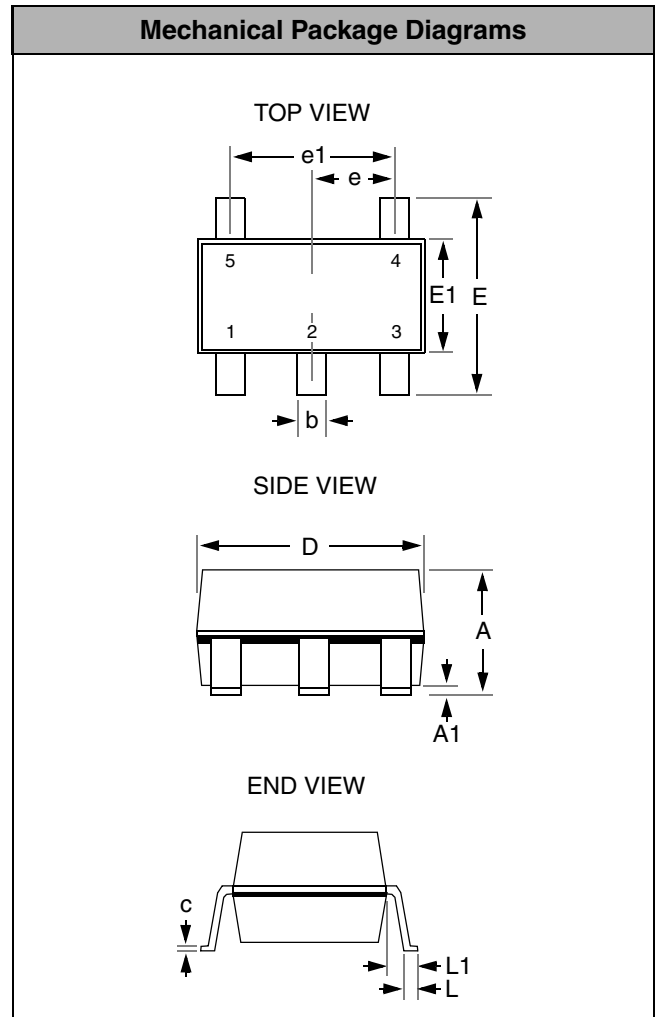


Mechanical Details (continued)

SOT23-5 Mechanical Specifications

The PACDN044Y5R is supplied in a 5-pin SOT23 package. Dimensions are presented below.

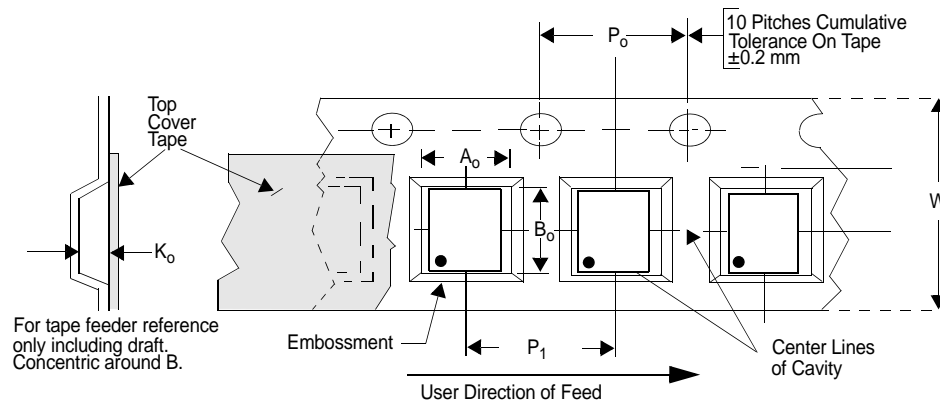
PACKAGE DIMENSIONS				
Package	SOT23-5			
JEDEC No.	MO-178 (Var. AA)			
Pins/Leads	5			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	--	1.45	--	0.0571
A1	0.00	0.15	0.0000	0.0059
b	0.30	0.50	0.0118	0.0197
c	0.08	0.22	0.0031	0.0087
D	2.75	3.05	0.1083	0.1201
E	2.60	3.00	0.1024	0.1181
E1	1.45	1.75	0.0571	0.0689
e	0.95 BSC		0.0374 BSC	
e1	1.90 BSC		0.0748 BSC	
L	0.30	0.60	0.0118	0.0236
L1	0.60 REF		0.0236 REF	
# per tape and reel	3000 pieces			
Controlling dimensions: millimeters				



Package Dimensions for SOT23-5.

SOT23-5 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN044Y5R	2.90 X 2.80 X 1.45	3.20 X 3.20 X 1.40	8mm	178mm (7")	3000	4mm	4mm

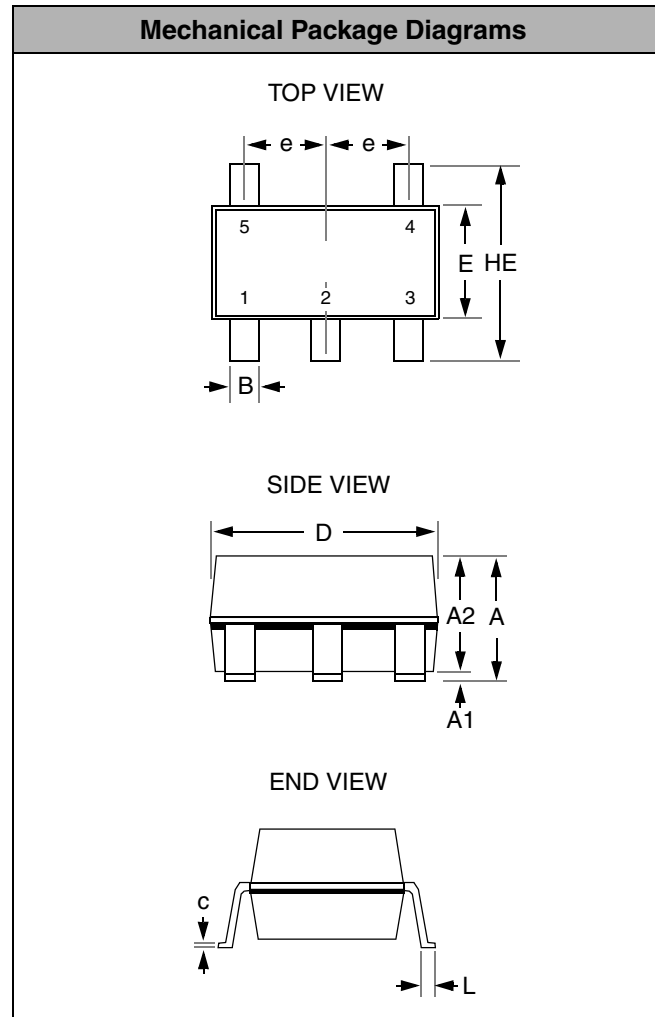


Mechanical Details (continued)

SC70-5 Mechanical Specifications:

The PACDN044YB5R is supplied in a 5-pin SC70 package. Dimensions are presented below.

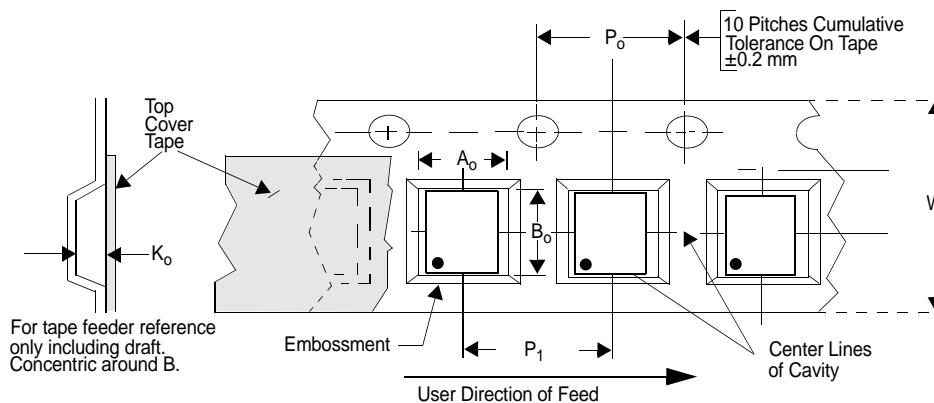
PACKAGE DIMENSIONS		
Package	SC70-5 (JEDEC name is MO-203 Issue A)	
Pins	5	
Dimensions	Millimeters	
	Min	Max
A	0.80	1.10
A1	0.00	0.10
A2	0.70	1.00
B	0.15	0.30
c	0.08	0.25
D	1.85	2.25
E	1.15	1.35
e	0.65 BSC	
HE	2.00	2.40
L	0.26	0.46
# / tape and reel	3000 pieces	
Controlling dimension: millimeters		



Package Dimensions for SC70-5.

SC70-5 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN044YB5R	2.05 X 1.25 X 0.95	2.40 X 2.25 X 1.20	8mm	178mm (7")	3000	4mm	4mm

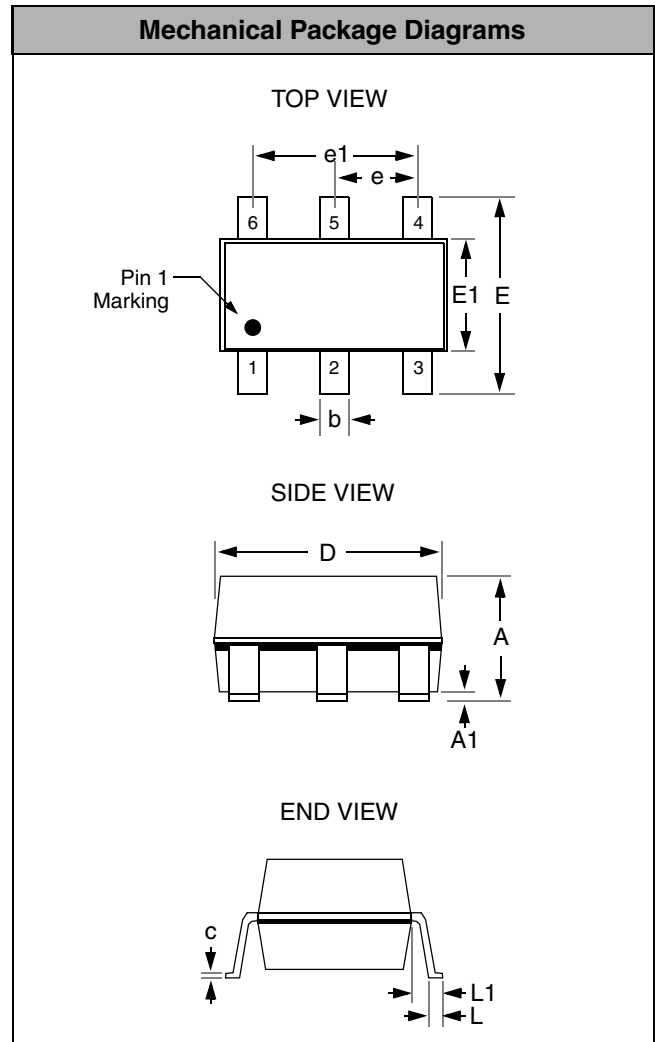


Mechanical Details (continued)

SOT23-6 Mechanical Specifications:

The PACDN045Y6R is supplied in a 6-pin SOT23 package. Dimensions are presented below.

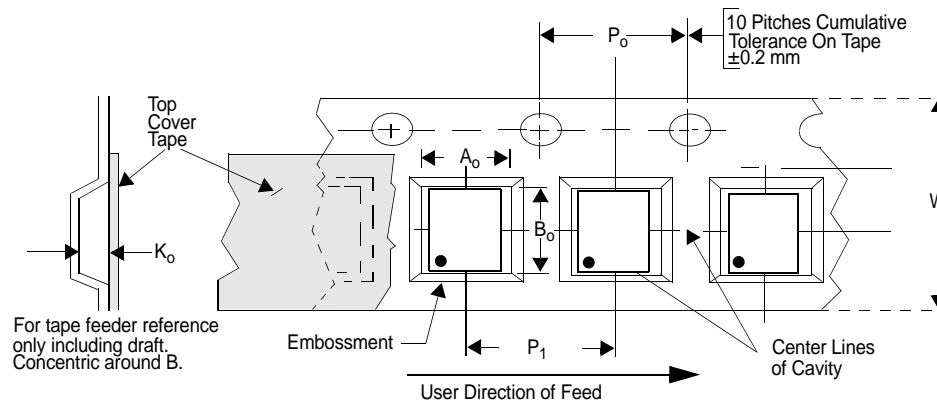
PACKAGE DIMENSIONS				
Package	SOT23-6			
JEDEC No.	MO-178 (Var. AB)			
Pins/Leads	6			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	--	1.45	--	0.0571
A1	0.00	0.15	0.0000	0.0059
b	0.30	0.50	0.0118	0.0197
c	0.08	0.22	0.0031	0.0087
D	2.75	3.05	0.1083	0.1201
E	2.60	3.00	0.1024	0.1181
E1	1.45	1.75	0.0571	0.0689
e	0.95 BSC		0.0374 BSC	
e1	1.90 BSC		0.0748 BSC	
L	0.30	0.60	0.0118	0.0236
L1	0.60 REF		0.0236REF	
# per tape and reel	3000 pieces			
Controlling dimension: millimeters				



Package Dimensions for SOT23-6.

SOT23-6 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN045Y6R	2.90 X 2.80 X 1.45	3.20 X 3.20 X 1.40	8mm	178mm (7")	3000	4mm	4mm



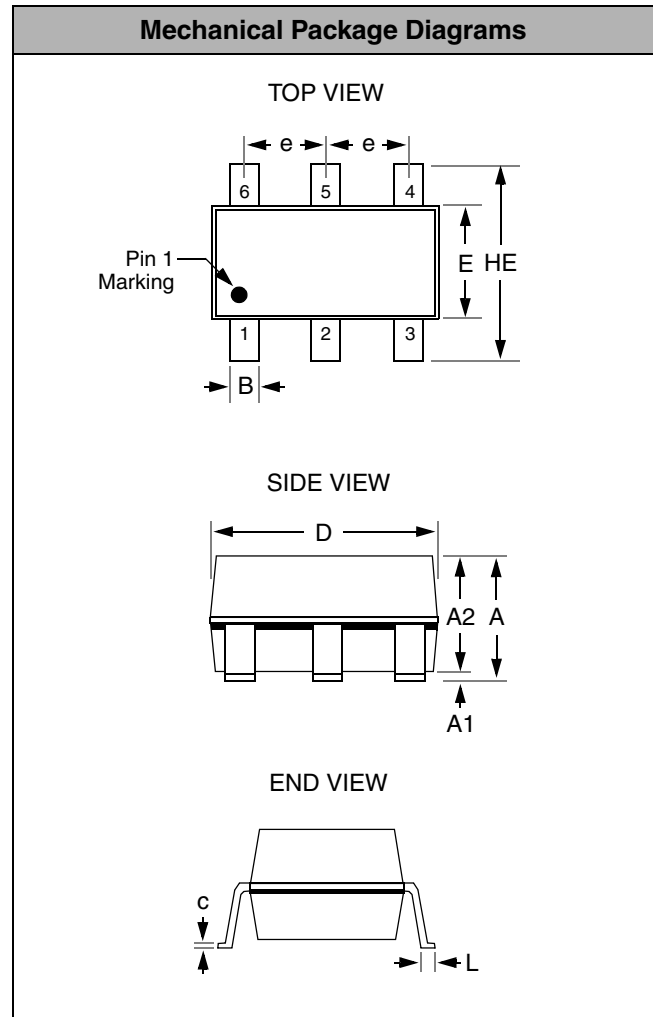
Mechanical Details (continued)

SC70-6 Mechanical Specifications:

The PACDN045YB6R and PACDN045YB6R-R are supplied in a 6-pin SC70 package. Dimensions are presented below.

Note: The PACDN045YB6R-R has a different tape and reel package. See “[SC70-6 Tape and Reel Specifications \(PACDN045YB6R-R\)](#)” on page 19.

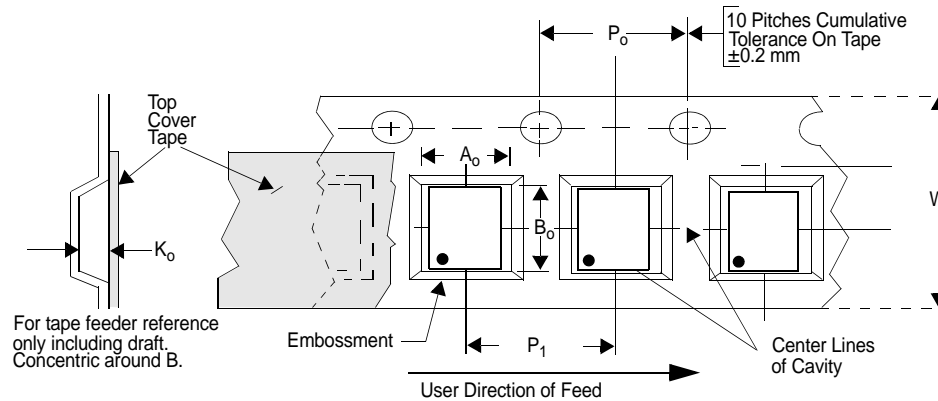
PACKAGE DIMENSIONS		
Package	SC70-6 (JEDEC name is MO-203 Issue A)	
Pins	6	
Dimensions	Millimeters	
	Min	Max
A	0.80	1.10
A1	0.00	0.10
A2	0.70	1.00
B	0.15	0.30
c	0.08	0.25
D	1.85	2.25
E	1.15	1.35
e	0.65 BSC	
HE	2.00	2.40
L	0.26	0.46
# / tape and reel	3000 pieces	
Controlling dimension: millimeters		



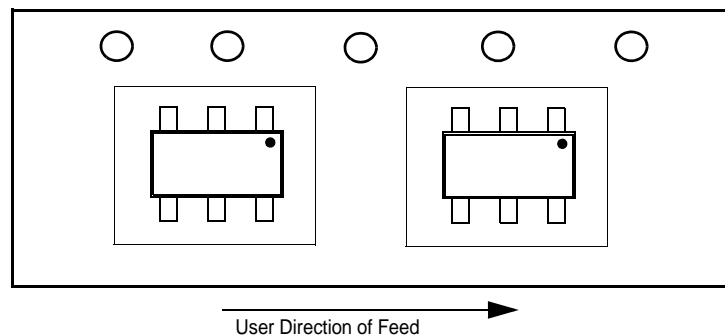
Package Dimensions for SC70-6.

SC70-6 Tape and Reel Specifications (PACDN045YB6R)

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN045YB6R	2.05 X 1.25 X 0.95	2.40 X 2.25 X 1.20	8mm	178mm (7")	3000	4mm	4mm


SC70-6 Tape and Reel Specifications (PACDN045YB6R-R)

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN045YB6R-R	2.05 X 1.25 X 0.95	2.40 X 2.25 X 1.20	8mm	178mm (7")	3000	4mm	4mm

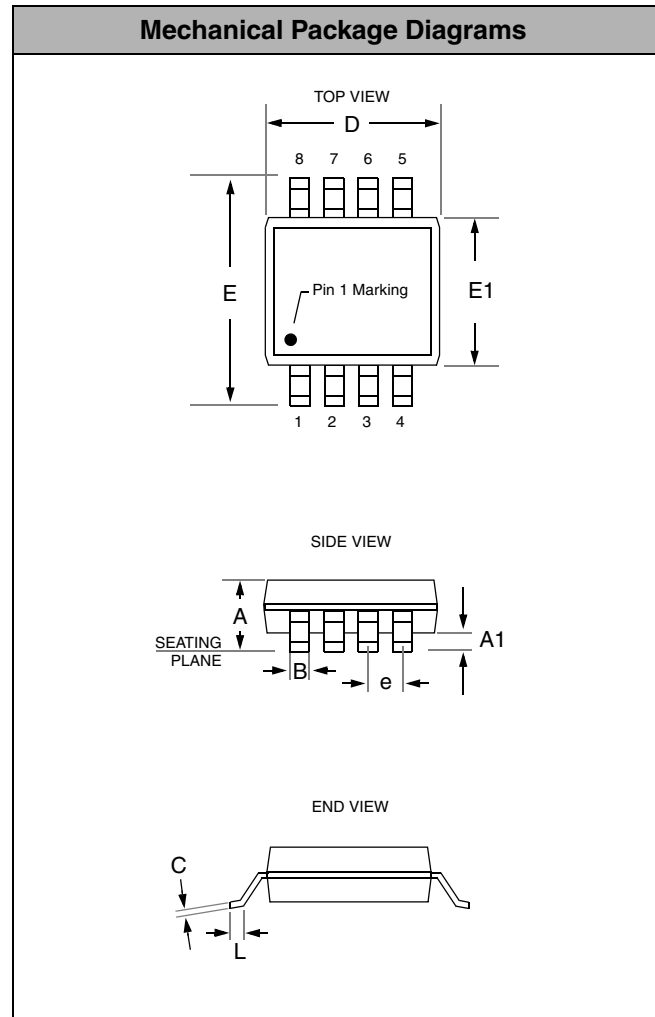


Mechanical Details (continued)

TSSOP-8 Mechanical Specifications:

The PACDN044TR is supplied in a 8-pin TSSOP package. Dimensions are presented below.

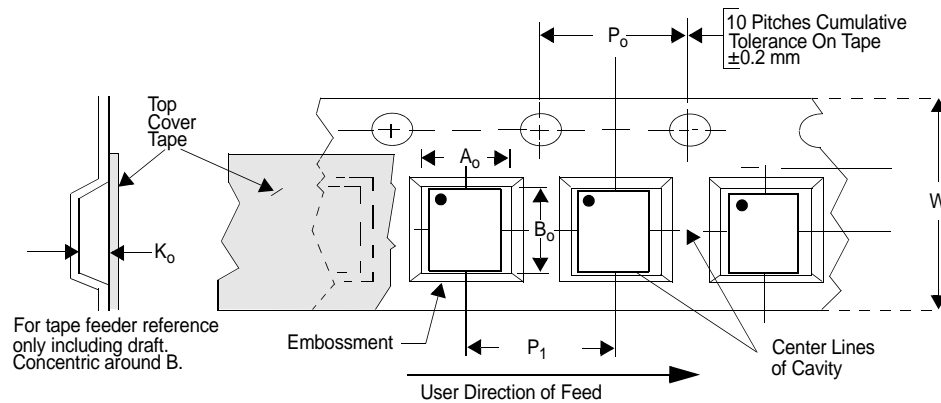
PACKAGE DIMENSIONS				
Package	TSSOP			
Pins	8			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	—	1.10	—	0.0433
A1	0.05	0.15	0.002	0.006
B	0.19	0.30	0.0075	0.0118
C	0.09	0.20	0.0035	0.0079
D	2.90	3.10	0.114	0.122
E	6.25	6.50	0.246	0.256
E1	4.30	4.50	0.169	0.177
e	0.65 BSC		0.0256 BSC	
L	0.50	0.70	0.020	0.028
# per tape and reel	2500 pcs			
Controlling dimension: millimeters				



Package Dimensions for TSSOP-8

TSSOP-8 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN044TR	3.00 X 6.38 X 1.10	3.40 X 6.80 X 1.60	12mm	330mm (13")	2500	4mm	8mm

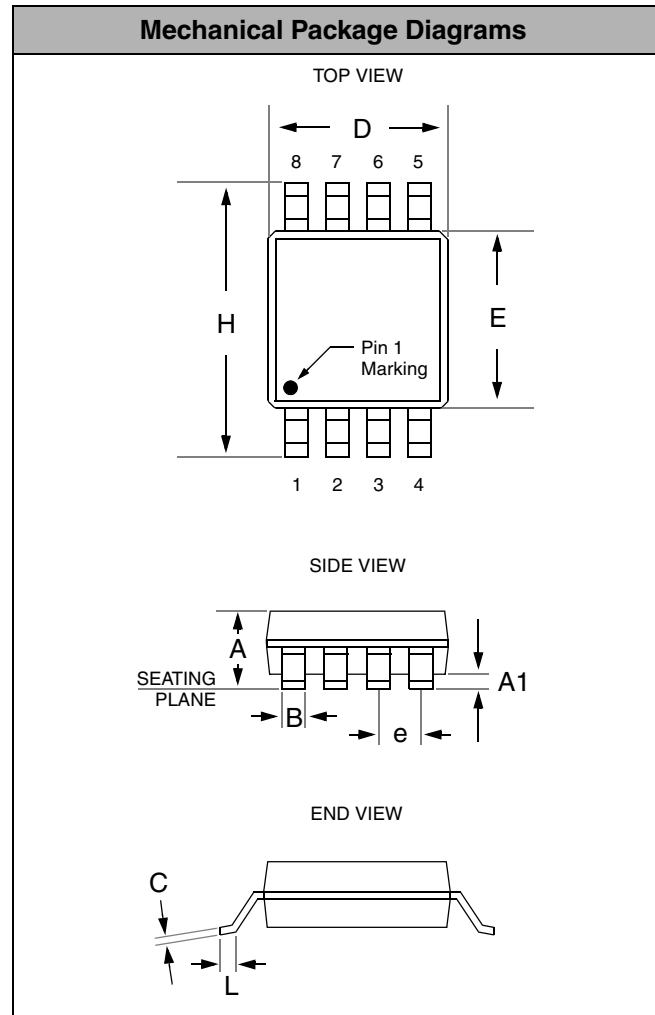


Mechanical Details (continued)

MSOP-8 Mechanical Specifications:

The PACDN046MR is supplied in a 8-pin MSOP package. Dimensions are presented below.

PACKAGE DIMENSIONS				
Package	MSOP			
Pins	8			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	0.87	1.17	0.034	0.046
A1	0.05	0.25	0.002	0.010
B	0.28	0.38	0.011	0.015
C	0.13	0.23	0.005	0.009
D	2.90	3.10	0.114	0.122
E	2.90	3.10	0.114	0.122
e	0.65 BSC		0.025 BSC	
H	4.90 BSC		0.193 BSC	
L	0.40	0.70	0.016	0.028
# per tape and reel	4000 pieces			
Controlling dimension: inches				



Package Dimensions for MSOP-8

MSOP-8 Tape and Reel Specifications

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
PACDN046MR	3.00 X 3.00 X 0.85	3.30 X 5.30 X 1.30	12mm	330mm (13")	4000	4mm	8mm

