



Isolated Resistor Termination Network

Features

- Stable thin film resistor network
- High speed termination network
- 4,7,8,10 and 12 terminating lines/package
- Saves board space & reduces assembly cost
- Tolerance of +0.1% available
- TCR of 25ppm/°C available
- Offered in SOIC and QSOP packages

Applications¹

- Series termination
- Parallel termination
- Voltage division
- Digital pulse squaring
- Coding and decoding
- Telemetry

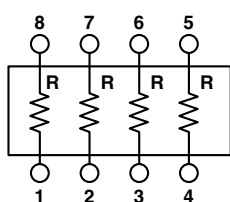
1. Refer to AP-201 Termination Application Note for further information on applications of this device.

Product Description

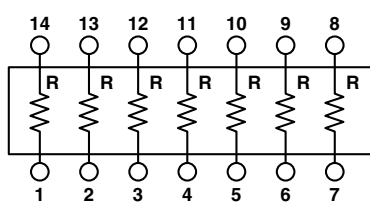
California Micro Devices' PRN100/110 Isolated Resistor Networks offer high integration and performance in a miniature QSOP or SOIC package, which saves critical board area and provides manufacturing cost and reliability efficiencies.

Why thin film resistor networks? A terminating resistor is used to reduce or eliminate unwanted reflections on a transmission line or in some cases provide DC pull-up/pull-down. It can perform this function only when its resistance value is closely matched to the characteristic impedance of the transmission line. The resistors used for terminating transmission lines must be noiseless, stable, and functional at high frequencies. Conventional thick film resistors are not stable enough for this purpose over temperature and time, and may have functional limitations when used in high frequency applications. Thin film-based resistor networks are the preferred choice for transmission line termination.

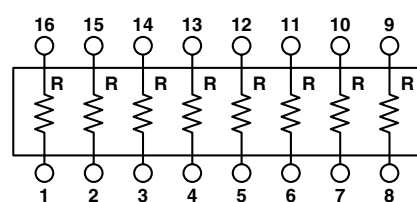
Electrical Schematic Configurations



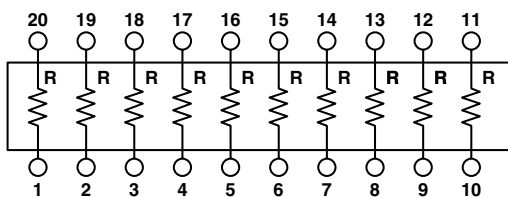
8-pin (SOIC)



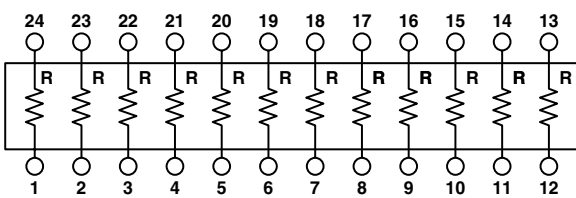
14-pin (SOIC)



16-pin (SOIC, QSOP)



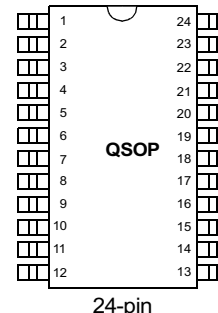
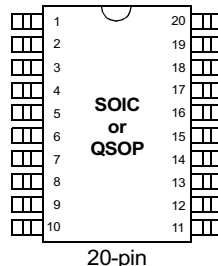
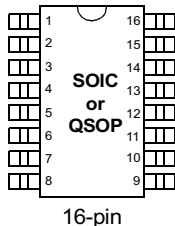
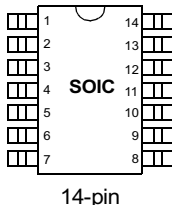
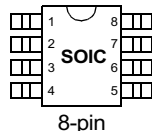
20-pin (SOIC, QSOP)



24-pin (QSOP)



PACKAGE / PINOUT DIAGRAMS



Note: SOIC and QSOP packages are different in size, pitch, and proportion. These drawings are not to scale.

Ordering Information

PRN100/110 part ordering options are presented in the Part Ordering Information table below. For standard and non-standard resistor values and part numbers by parameter values, see the Part Values table and Part Number Key, respectively.

STANDARD AND NON-STANDARD PART ORDERING INFORMATION

Package			Parameters				Ordering Part Number ²	Part Marking
Style	Pins	Package Width	Resistance Code ¹	Tolerance	TCR	Ratio Tolerance		
Standard Parts:								
SOIC	16	Narrow	xxxx (standard values)	±1%	±50ppm/°C	±0.5%	PRN10016NxxxxFAP	PRN10016NxxxxFAP
QSOP	24	--	xxxx (standard values)	±1%	±50ppm/°C	±0.5%	PRN11024xxxxFAP	PRN11024xxxxFAP
Non-Standard Parts:								
SOIC	8 14 16 20	Narrow or Wide	xxxx (within non-std value ranges)	±0.1% ±0.2% ±0.5% ±1% ±2% ±5%	±25ppm/°C ±50ppm/°C ±100ppm/°C ±250ppm/°C	±0.05% ±0.1% ±0.2% ±0.5% ±1%	See Part Number Key in Figure 1 .	See Part Number Key in Figure 1 .
QSOP	16 20 24	--	xxxx (within non-std value ranges)	±0.1% ±0.2% ±0.5% ±1% ±2% ±5%	±25ppm/°C ±50ppm/°C ±100ppm/°C ±250ppm/°C	±0.05% ±0.1% ±0.2% ±0.5% ±1%	See Part Number Key in Figure 1 .	See Part Number Key in Figure 1 .

Note 1: xxxx resistance code format follows guideline defined in [Figure 1](#) for standard or non-standard parts.

Note 2: Parts are shipped in Tape & Reel form unless otherwise specified.

Ordering Information (continued)

PRN100/110 standard and non-standard resistor values are presented in the Part Values table below.

PART VALUES				
STANDARD VALUES		NON-STANDARD VALUES		
R (Ω) Isolated		Part Number	Package	Resistance Range (Ω)
10		PRN100	SOIC	8
22				14
33				16
39				20
100				20
330		PRN110	QSOP	16
470				20
1K				20
2K				24
4.7K				24
10K				24

A guide for constructing part numbers from desired device parameters is presented in the Part Number Key below.

PART NUMBER KEY				
PRN100 PRN110 08 N xxxx F A P				
Part Series 100 = SOIC 110 = QSOP	No. of Pins 08 = 8-pin package 14 = 14-pin package 16 = 16-pin package 20 = 20-pin package 24 = 20-pin package	Package Style - N = Narrow Body SOIC - W = Wide Body SOIC - No width designation letter for QSOP packages	Resistance Code - First 3 digits are significant value - Fourth digit represents number of digits to follow (e.g., code for 4.7kΩ is 4701) - For values less than 3 digits, R designates decimal point (e.g., code for 10Ω is 10R0)	Ratio Tolerance - No letter = no ratio tolerance specified - N = $\pm 1\%$ - P = $\pm 0.5\%$ - Q = $\pm 0.2\%$ - R = $\pm 0.1\%$ - S = $\pm 0.05\%$
				Temperature Coefficient of Resistance (TCR) - No Letter = $\pm 250\text{ppm}/^\circ\text{C}$ - H = $\pm 100\text{ppm}/^\circ\text{C}$ - A = $\pm 50\text{ppm}/^\circ\text{C}$ - B = $\pm 25\text{ppm}/^\circ\text{C}$
				Absolute Tolerance - J = $\pm 5\%$ - G = $\pm 2\%$ - F = $\pm 1\%$ - D = $\pm 0.5\%$ - C = $\pm 0.2\%$ - B = $\pm 0.1\%$

Figure 1. Part Number Key



Specifications

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNITS
Operating Temperature Range	-55 to +125	°C
Storage Temperature Range	-65 to +150	°C
Max DC Power to each Resistor: for $R < 1k\Omega$ for $R \geq 1k\Omega$	100 25	mW

STANDARD OPERATING CONDITIONS

PARAMETER	RATING	UNITS
Ambient Operating Temperature Range	-55 to +125	°C

STANDARD ELECTRICAL OPERATING CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
TOL _R	Absolute Resistor Tolerance				±5	%
TCR	Temperature Coefficient of Resistance				±250	ppm/°C
TTCR	Tracking Temperature Coefficient of Resistance				±5	ppm/°C
R _{INS}	Minimum Insulation Resistance		10,000			MΩ

NON-STANDARD ELECTRICAL OPERATING CHARACTERISTICS

SYMBOL	PARAMETER	AVAILABLE VALUES	UNITS
TOL _R	Absolute Resistor Tolerance	±2, ±1, ±0.5, ±0.2, ±0.1	%
TOL _{R/R}	Ratio Resistor Tolerance	±1, ±0.5, ±0.2, ±0.1, ±0.05	%
TCR	Temperature Coefficient of Resistance	±100, ±50, ±25	ppm/°C



Performance Information

Power dissipation figures for the various package options at 70°C are presented below.

POWER DISSIPATION		
PACKAGE	PIN COUNT	POWER RATING ¹ (W)
SOIC	8 Pins	0.4
	14 Pins	0.8
	16 Pins (Narrow)	0.8
	16 Pins (Wide)	1.0
	20 Pins	1.2
QSOP	16 Pins	0.75
	20 Pins	1.0
	24 Pins	1.0

Note 1: Power ratings are specified at 70°C.



Mechanical Details

PRN100/110 devices are packaged in either SOIC packages (8, 14, 16-narrow, 16-wide, or 20 pins) or QSOP packages (16, 20, or 24 pins).

SOIC-8 Mechanical Specifications

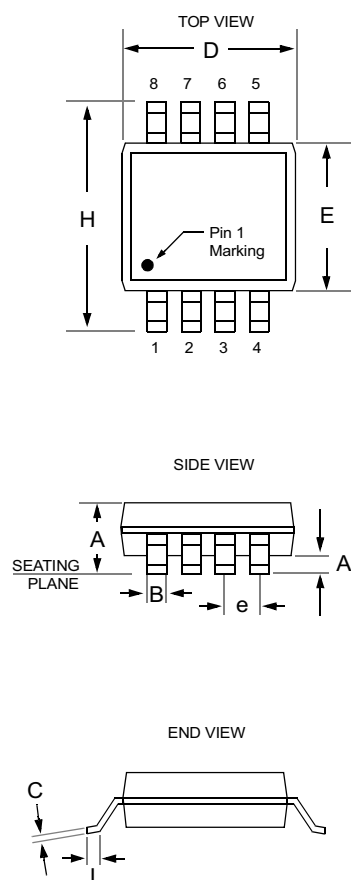
Dimensions for PRN100/110 devices packaged in 8-pin SOIC packages are presented below.

For complete information on the SOIC-8 package, see the California Micro Devices SOIC Package Information document.

PACKAGE DIMENSIONS				
Package	SOIC			
Pins	8			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.25	0.004	0.010
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.19	0.150	0.165
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
# per tube	100 pieces*			
# per tape and reel	2500 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.

Mechanical Package Diagrams



Package Dimensions for SOIC-8



Mechanical Details (continued)

SOIC-14 Mechanical Specifications

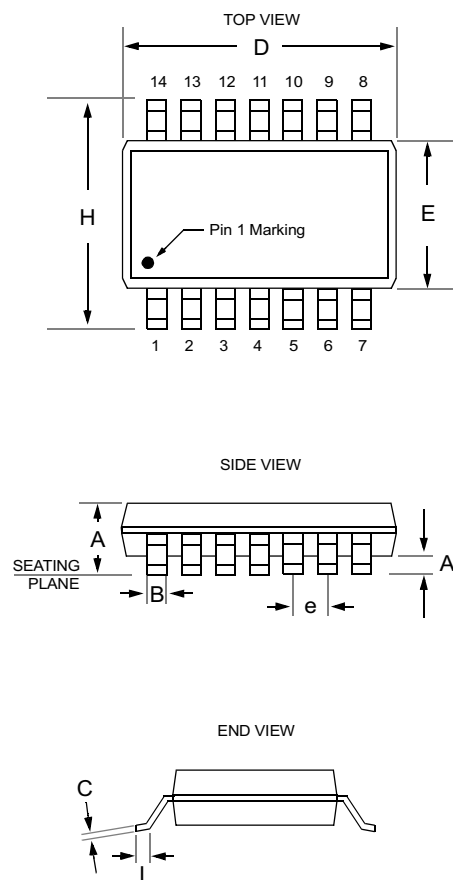
Dimensions for PRN100/110 devices packaged in 14-pin SOIC packages are presented below.

For complete information on the SOIC-14 package, see the California Micro Devices SOIC Package Information document.

PACKAGE DIMENSIONS				
Package	SOIC			
Pins	14			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.25	0.004	0.010
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	8.55	8.75	0.337	0.344
E	3.80	4.19	0.150	0.165
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
# per tube	55 pieces*			
# per tape and reel	2500 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.

Mechanical Package Diagrams



Package Dimensions for SOIC-14

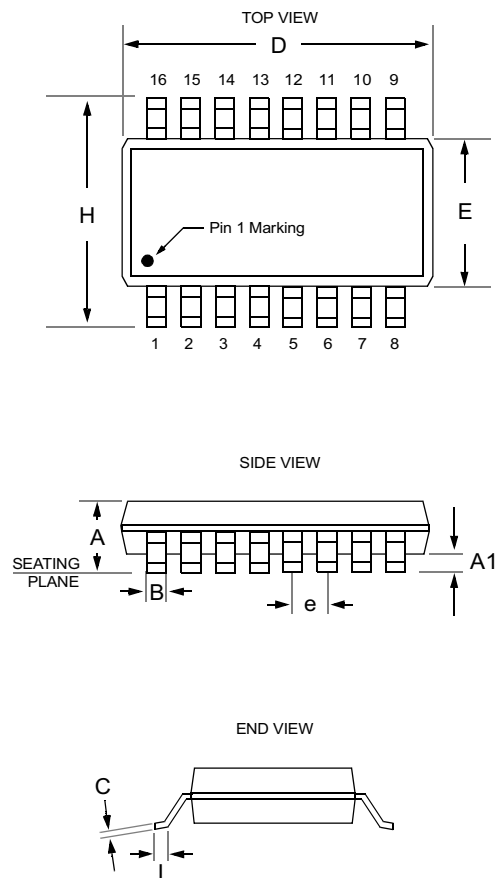
**Mechanical Details (continued)****SOIC-16 (Narrow) Mechanical Specifications**

Dimensions for PRN100/110 devices packaged in 16-pin SOIC (Narrow) packages are presented below.

For complete information on the SOIC-16 (Narrow) package, see the California Micro Devices SOIC Package Information document.

PACKAGE DIMENSIONS				
Package	SOIC Narrow			
Pins	16			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	9.80	10.29	0.385	0.405
E	3.80	4.19	0.150	0.165
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
# per tube	50 pieces*			
# per tape and reel	2500 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.

Mechanical Package Diagrams

Package Dimensions for SOIC-16 (Narrow)

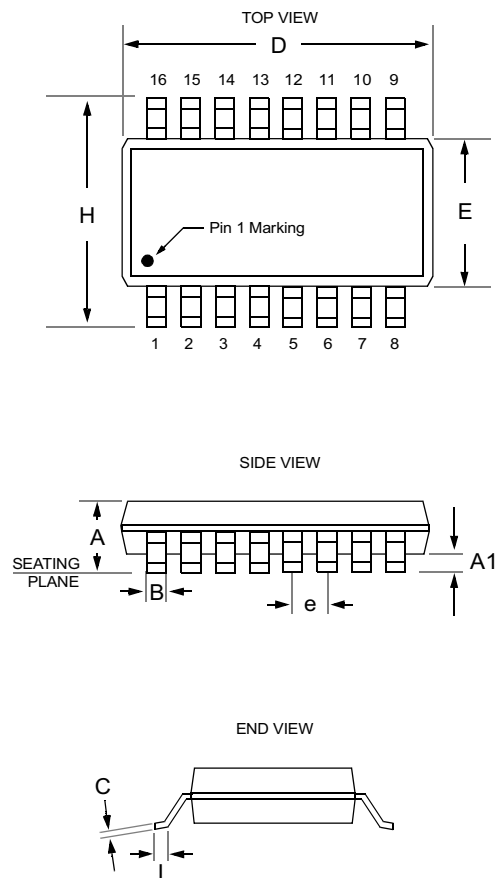
**Mechanical Details (continued)****SOIC-16 (Wide) Mechanical Specifications**

Dimensions for PRN100/110 devices packaged in 16-pin SOIC (Wide) packages are presented below.

For complete information on the SOIC-16 (Wide) package, see the California Micro Devices SOIC Package Information document.

PACKAGE DIMENSIONS				
Package	SOIC Wide			
Pins	16			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	2.35	2.65	0.093	0.104
A1	0.10	0.30	0.004	0.012
B	0.33	0.51	0.013	0.020
C	0.23	0.32	0.009	0.013
D	10.11	10.50	0.398	0.413
E	7.40	7.87	0.291	0.310
e	1.27 BSC		0.050 BSC	
H	10.00	10.65	0.394	0.419
L	0.40	1.27	0.015	0.050
# per tube	48 pieces*			
# per tape and reel	1000 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.

Mechanical Package Diagrams

Package Dimensions for SOIC-16 (Wide)



Mechanical Details (continued)

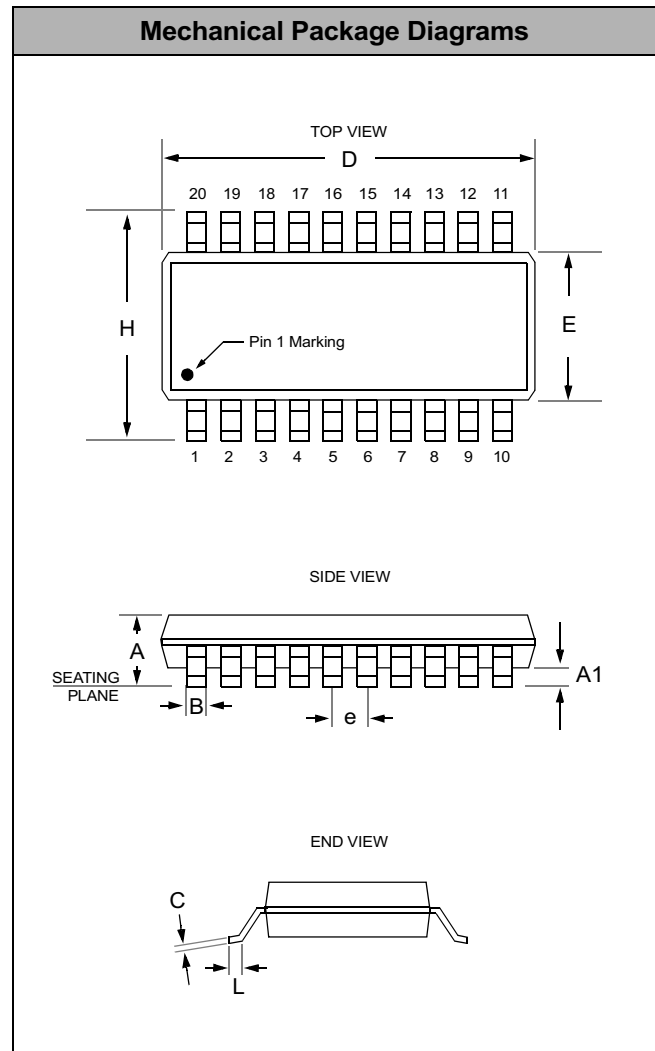
SOIC-20 Mechanical Specifications

Dimensions for PRN100/110 devices packaged in 20-pin SOIC packages are presented below.

For complete information on the SOIC-20 package, see the California Micro Devices SOIC Package Information document.

PACKAGE DIMENSIONS				
Package	SOIC			
Pins	20			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	2.35	2.85	0.093	0.104
A1	0.10	0.30	0.004	0.012
B	0.33	0.51	0.013	0.020
C	0.23	0.32	0.009	0.013
D	12.60	13.21	0.496	0.520
E	7.40	7.87	0.291	0.310
e	1.27 BSC		0.050 BSC	
H	10.00	10.65	0.394	0.419
L	0.40	1.27	0.015	0.050
# per tube	38 pieces*			
# per tape and reel	1000 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.



Package Dimensions for SOIC-20



Mechanical Details (continued)

QSOP-16 Mechanical Specifications

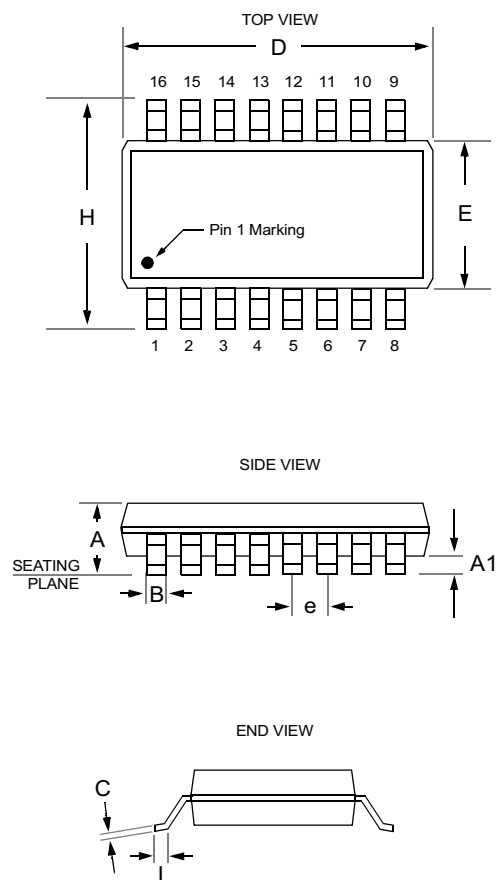
Dimensions for PRN100/110 devices packaged in 16-pin QSOP packages are presented below.

For complete information on the QSOP-16 package, see the California Micro Devices QSOP Package Information document.

PACKAGE DIMENSIONS				
Package	QSOP (JEDEC name is SSOP)			
Pins	16			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
B	0.20	0.30	0.008	0.012
C	0.18	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	3.81	3.98	0.150	0.157
e	0.64 BSC		0.025 BSC	
H	5.79	6.19	0.228	0.244
L	0.40	1.27	0.016	0.050
# per tube	100 pieces*			
# per tape and reel	2500 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.

Mechanical Package Diagrams



Package Dimensions for QSOP-16



Mechanical Details (continued)

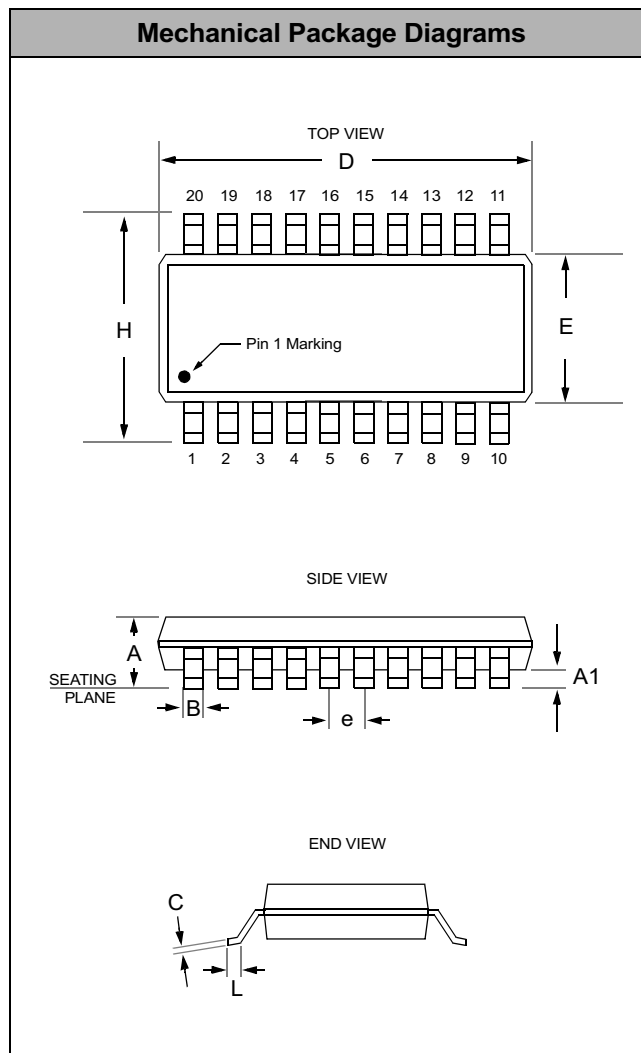
QSOP-20 Mechanical Specifications

Dimensions for PRN100/110 devices packaged in 20-pin QSOP packages are presented below.

For complete information on the QSOP-20 package, see the California Micro Devices QSOP Package Information document.

PACKAGE DIMENSIONS				
Package	QSOP (JEDEC name is SSOP)			
Pins	20			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
B	0.20	0.30	0.008	0.012
C	0.18	0.25	0.007	0.010
D	8.56	8.73	0.337	0.344
E	3.81	3.98	0.150	0.157
e	0.64 BSC		0.025 BSC	
H	5.79	6.19	0.228	0.244
L	0.40	1.27	0.016	0.050
# per tube	57 pieces*			
# per tape and reel	2500 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.



Package Dimensions for QSOP-20



Mechanical Details (continued)

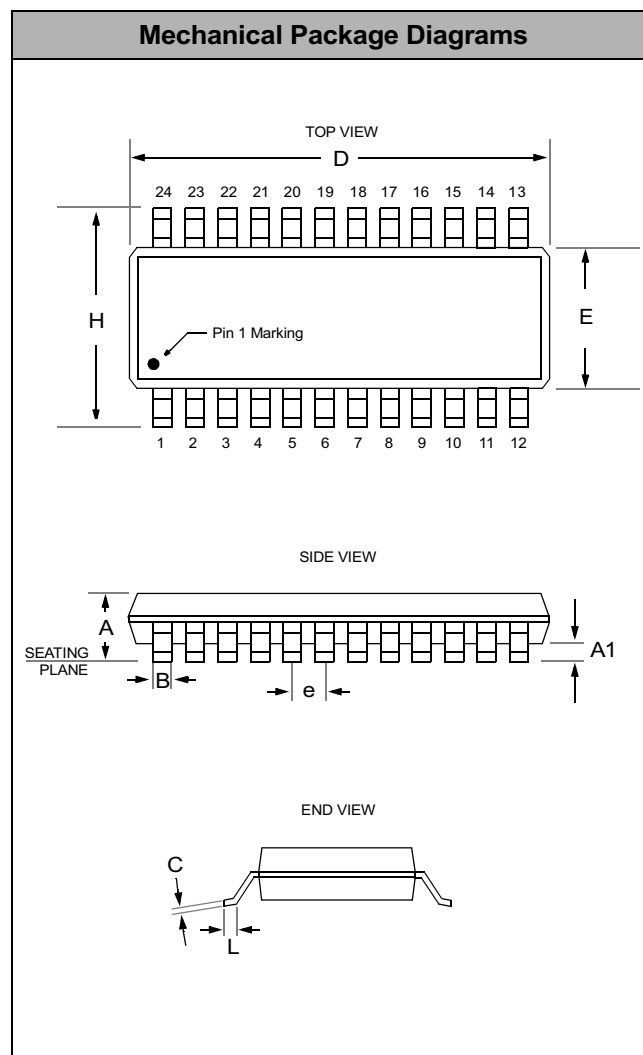
QSOP-24 Mechanical Specifications

Dimensions for PRN100/110 devices packaged in 24-pin QSOP packages are presented below.

For complete information on the QSOP-24 package, see the California Micro Devices QSOP Package Information document.

PACKAGE DIMENSIONS				
Package	QSOP (JEDEC name is SSOP)			
Pins	24			
Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
B	0.20	0.30	0.008	0.012
C	0.18	0.25	0.007	0.010
D	8.56	8.73	0.337	0.344
E	3.81	3.98	0.150	0.157
e	0.64 BSC		0.025 BSC	
H	5.79	6.19	0.228	0.244
L	0.40	1.27	0.016	0.050
# per tube	55 pieces*			
# per tape and reel	2500 pieces			
Controlling dimension: inches				

* This is an approximate amount which may vary.



Package Dimensions for QSOP-24