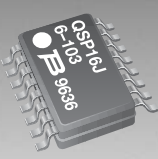


\*RoHS COMPLIANT



**BOURNS®**

**Features**

- Lead free
- RoHS compliant\*
- Resistor ladder in 1:2 ratio
- Stable thin-film-on-silicon technology
- Ultra-miniature packages to JEDEC standards



Models 2QSP-XX6 and 2NBS-XX6 are obsolete and not recommended for new designs.

**Applications**

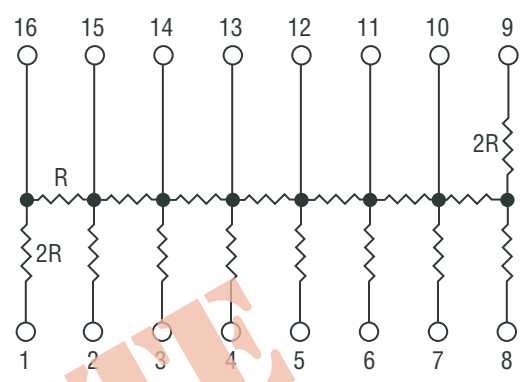
- Digital to analog converters
- Successive approximation ADCs
- Ideal for space-constrained applications

**Thin Film on Silicon 2QSP / 2NBS-XX6 R2R Ladder**

**General Information**

The R2R Ladder Network is used in Digital to Analog and Analog to Digital conversion. Binary weighted currents, flowing in the individual ladder segments, depend on the integrity of the R:2R relationship for an accurate conversion result. Fabricated with Tantalum Nitride on Silicon, these resistors feature excellent stability, TCR and tracking performance. R2R Ladder Networks are available in a range of miniature packages conforming to JEDEC standards.

**Package Schematic**



**Electrical & Environmental Characteristics**

Electrical Characteristics	Symbol	Minimum	Nominal	Maximum	Unit
Resistance Range	R	10		50 K	Ω
Tolerance:					
Absolute		±1 %		±5 %	Ω
Ratio		±0.5 %			Ω
TCR:					
Absolute			100		ppm/°C
Tracking			25		ppm/°C
Operating Voltage				50	V
<b>Environmental Characteristics</b>					
ESD		2 K			V
Operating Temperature	T <sub>J</sub>	-55		+125	°C
Storage Temperature	T <sub>stg</sub>	-65		+150	°C
Power Rating per Resistor @ 70 °C				0.1	Watt
Power Rating per Package @ 70 °C:					
QSOP: 16 Pin				0.75	Watt
20, 24 Pin				1.00	Watt
28 Pin				1.12	Watt
NBSOIC: 8 Pin				0.60	Watt
14, 16 Pin				1.00	Watt

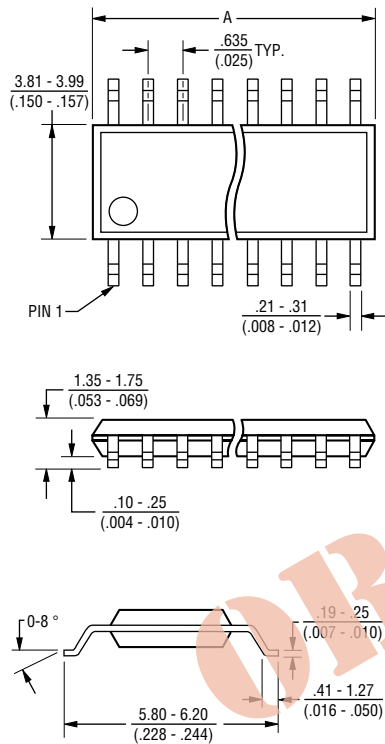
\*RoHS Directive 2002/95/EC Jan 27, 2003 including Annex  
 Specifications are subject to change without notice.  
 Customers should verify actual device performance in their specific applications.

# Thin Film on Silicon 2QSP / 2NBS -XX6 R2R Ladder



## Mechanical Characteristics

### QSOP Package Dimensions

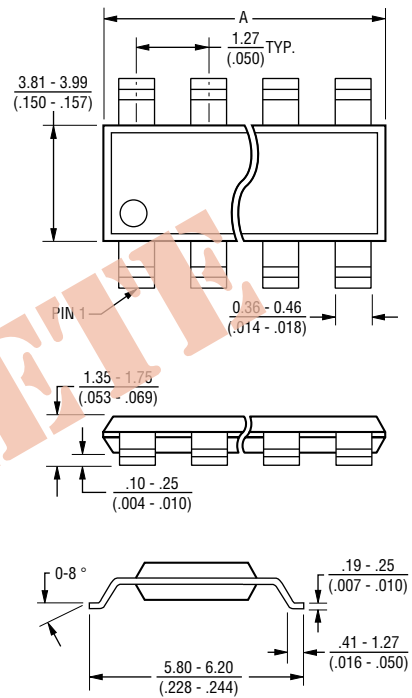


Model	A
2QSP16	4.80 - 4.98 (.189 - .196)
2QSP20	8.56 - 8.74 (.337 - .344)
2QSP24	8.56 - 8.74 (.337 - .344)
2QSP28	9.80 - 9.98 (.386 - .393)

Governing dimensions are in mm. Dimensions in parentheses are in inches and are approximate.

JEDEC Reference Number MO-137.

### Narrow-Body SOIC Package Dimensions



Model	A
2NBS08	4.80 - 4.98 (.189 - .196)
2NBS14	8.56 - 8.74 (.337 - .344)
2NBS16	9.80 - 9.98 (.386 - .393)

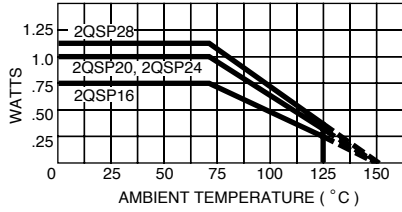
Governing dimensions are in mm. Dimensions in parentheses are in inches and are approximate.

JEDEC Reference Number MS-012.

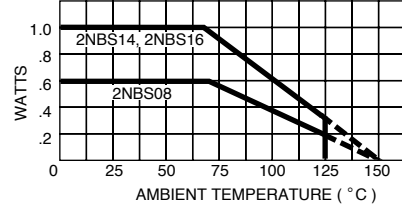
# Thin Film on Silicon 2QSP / 2NBS -XX6 R2R Ladder



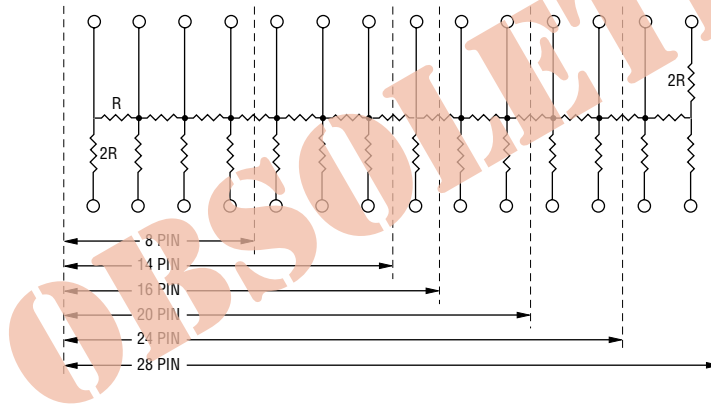
QSOP Package Power Temperature Derating Curve



Narrow-Body SOIC Package Power Temperature Derating Curve

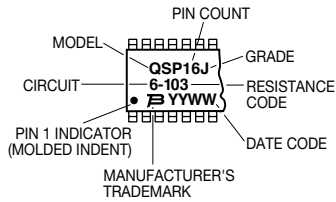


## Schematic



## Typical Part Marking

Represents total content. Layout may vary.



## Standard Resistance Values

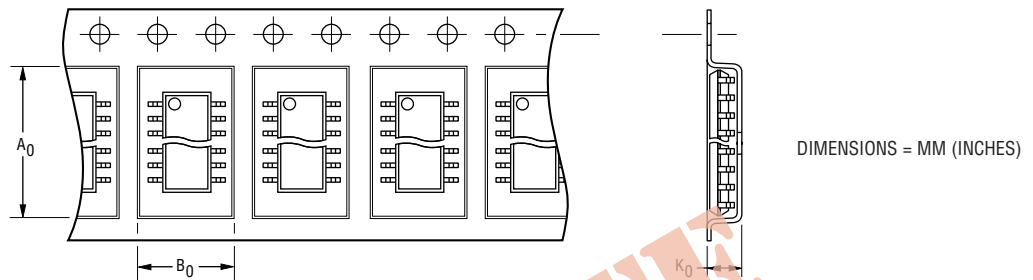
R1 Value (ohms)	R2 Value (ohms)	Resistance Code
10 K	20 K	103
25 K	50 K	253

# Thin Film on Silicon 2QSP / 2NBS -XX6 R2R Ladder



## Dispensing

For large quantities, the product will be dispensed in Tape and Reel (see diagram below).



DIMENSIONS = MM (INCHES)

Package	A <sub>0</sub>	B <sub>0</sub>	K <sub>0</sub>	Width	Pitch	No. of Pieces per 13 reel	No. of Pieces per tube
<b>QSOP</b>							
16 Pin	6.4 (0.252)	5.2 (0.205)	2.1 (0.083)	12 (0.472)	8 (0.315)	3,500	98
20, 24 Pin	6.5 (0.256)	9.0 (0.354)	2.1 (0.083)	16 (0.630)	8 (0.315)	3,500	56
28 Pin	6.5 (0.256)	10.3 (0.406)	2.1 (0.083)	16 (0.630)	8 (0.315)	3,500	49
<b>NBSOIC</b>							
8 Pin	6.4 (0.252)	9.0 (0.354)	2.1 (0.083)	12 (0.472)	8 (0.315)	3,500	98
14 Pin	6.5 (0.256)	9.0 (0.354)	2.1 (0.083)	16 (0.630)	8 (0.315)	3,500	56
16 Pin	6.5 (0.256)	9.0 (0.354)	2.1 (0.083)	16 (0.630)	8 (0.315)	3,500	49

## How To Order

**2 QSP 20 - T J 6 - 103 LF**

Product Class \_\_\_\_\_  
Thin-Film-on-Silicon

Standard Package Style \_\_\_\_\_  
QSP = QSOP  
NBS = Narrow-Body SOIC

Pin Count \_\_\_\_\_  
QSP = 16, 20, 24, 28  
NBS = 8, 14, 16

Dispensing \_\_\_\_\_  
R = Reel  
T = Tube

Standard Grade \_\_\_\_\_  
Tolerance  
J = ±5 %  
G = ±2 %  
F = ±1 %

Circuit \_\_\_\_\_  
6 = R/2R Ladder

Resistance Value Code \_\_\_\_\_  
1st three digits specify R1 resistance code.

Terminations \_\_\_\_\_  
• LF = 100 % Sn (lead free)



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