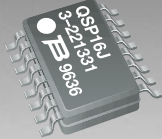


\*RoHS COMPLIANT



**BOURNS®**

## Features

- RoHS compliant\*
- Multiple SCSI termination resistors
- Stable thin-film-on-silicon technology
- Ultra-miniature packages to JEDEC standards

## Applications

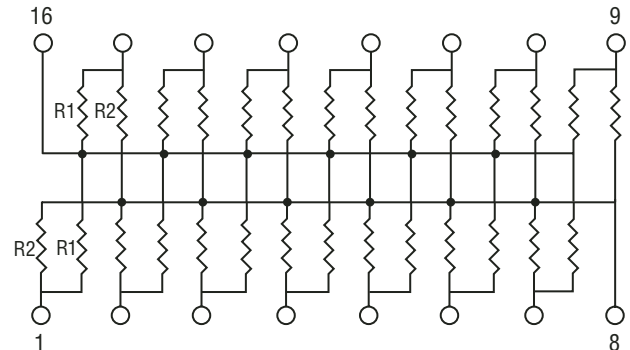
- Single-ended SCSI termination
- SCSI host adaptor cards
- All SCSI bus devices

# Thin Film on Silicon 2QSP / 2NBS-XX3 Dual Terminator

### General Information

Dual Terminator networks are used to correctly terminate single-ended SCSI bus lines. The standard R1, R2 combination ensures that the high frequency component of a signal transition will see an impedance at the termination equal to the characteristic impedance of the line. Fabricated with Tantalum Nitride on Silicon, these resistors feature excellent stability, TCR and tracking performance. The JEDEC standard miniature packages offer the most space-efficient Dual Terminator resistor array available.

### Package Schematic



### Electrical & Environmental Characteristics

Electrical Characteristics	Symbol	Minimum	Nominal	Maximum	Unit
Resistance Range	R	220		750	$\Omega$
Tolerance:					
Absolute		$\pm 1\%$		$\pm 5\%$	$\Omega$
Ratio		$\pm 0.5\%$		$\pm 2\%$	$\Omega$
TCR:					
Absolute			100		ppm/ $^{\circ}\text{C}$
Tracking			25		ppm/ $^{\circ}\text{C}$
Operating Voltage				50	V
<b>Environmental Characteristics</b>					
ESD		2 K			V
Operating Temperature	$T_J$	-55		+125	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-65		+150	$^{\circ}\text{C}$
Power Rating per Resistor @ 70 $^{\circ}\text{C}$				0.1	Watt
Power Rating per Package @ 70 $^{\circ}\text{C}$ :					
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

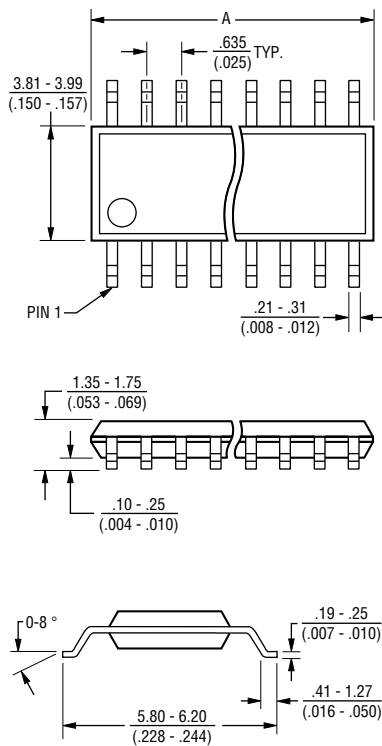
Specifications are subject to change without notice.  
Customers should verify actual device performance in their specific applications.

# Thin Film on Silicon 2QSP / 2NBS -XX3 Dual Terminator



## Mechanical Characteristics

### QSOP Package Dimensions

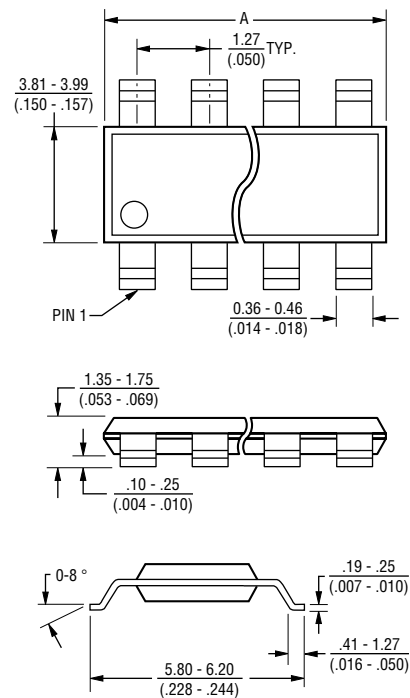


Model	A
2QSP16	4.80 - 4.98 (.189 - .196)
2QSP20	8.56 - 8.74 (.337 - .344)
2QSP24	8.56 - 8.74 (.337 - .344)
2QSP28	9.80 - 9.98 (.386 - .393)

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)

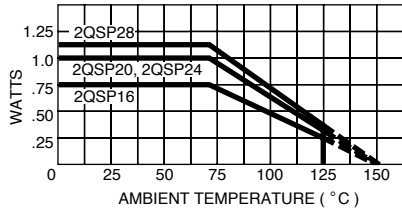
Governing dimensions are in mm. Dimensions in parentheses are in inches and are approximate.

JEDEC Reference Number MS-012.

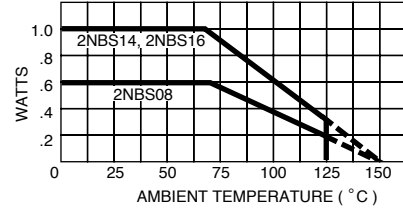
# Thin Film on Silicon 2QSP / 2NBS -XX3 Dual Terminator



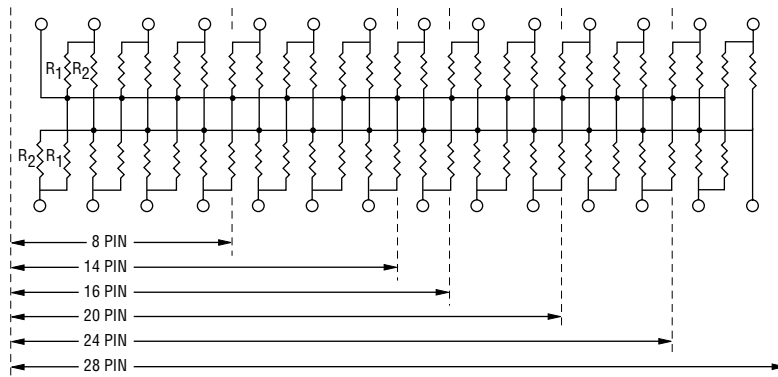
QSOP Package Power Temperature Derating Curve



Narrow-Body SOIC Package Power Temperature Derating Curve

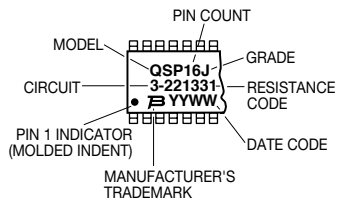


## Schematic



## Typical Part Marking

Represents total content. Layout may vary.



## Standard Resistance Values

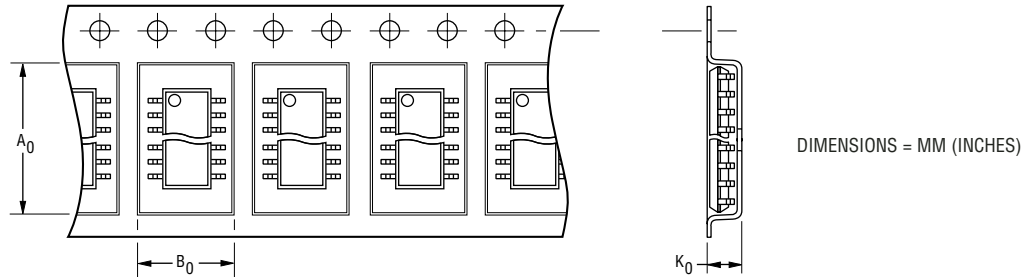
Resistor Designator	Resistance (ohms)	Resistance Code
R1	220	221
R2	330	331
R1	330	331
R2	680	681
R1	750	751
R2	750	751

# Thin Film on Silicon 2QSP / 2NBS -XX3 Dual Terminator



## Dispensing

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



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 3 221331 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 \_\_\_\_\_  
3 = Dual Terminator

Resistance Value Code \_\_\_\_\_  
1st three digits specify R1 resistance code.  
Last three digits specify R2 resistance code.

Terminations \_\_\_\_\_  
• LF = 100 % Sn (RoHS Compliant)



*Reliable Electronic Solutions*

**Asia-Pacific:**  
Tel: +886-2 2562-4117 • Fax: +886-2 2562-4116

**Europe:**  
Tel: +41-41 768 5555 • Fax: +41-41 768 5510

**The Americas:**  
Tel: +1-951 781-5500 • Fax: +1-951 781-5700

[www.bourns.com](http://www.bourns.com)