



# DUPONT™ 00X0A

## RESISTOR SERIES

### PRODUCT DESCRIPTION

Designed to give an ideal balance of properties, the DuPont™ 00x0A Series has been specifically developed for Chip Resistor applications. Excellent electrical properties have been achieved while satisfying the market needs of lower overall cost, smaller resistors and process insensitivity when used with high silver terminations. 00X0A Series is fully blendable allowing a wide range of resistance without sacrifice of electrical properties. The series is cadmium free\*.

### PRODUCT BENEFITS

- Exceptional ESD stability
- Excellent power handling stability
- Low Quan-Tech noise
- Well controlled TCRs
- Small TCR length and thickness effects
- Linear blend behavior of electrical properties between adjacent members
- Excellent thermal cycle stability
- Cadmium free\*

\*Cadmium “free” as used herein means that these are not intentionally added to the referenced product. Trace amounts however may be present.

### PROCESSING FEATURES

- Co-fireable with specified termination
- Optimized high resolution printing speeds of up to 30cm/sec.
- Fast firing – 850° C/30 minute profile

### RECOMMENDED PROCESSING CONDITIONS

#### Substrates

Reported properties are based on tests with 96% alumina substrates. Good performance properties have also been observed on DuPont QM44 dielectric. Substrates of other compositions may yield variation in performance properties.

#### Termination

DuPont™ 00x0A resistors were designed for use with high silver-containing terminations. Reported properties were obtained using DuPont™ 5426 Ag/Pd termination. Data with other terminations is available.

### Printing

Unless otherwise noted, properties are based on resistors printed to 20 ±2µm dried thickness. This can be achieved by using 250 -325 mesh screens with emulsions of 10-15µm. Resistors smaller than 0.3x0.3mm will require finer mesh screen to achieve the desired print resolution. Although Resistance and TCR values will change, similar functional properties have been observed with thinner dried film prints (<18µm). To optimize laser trainability, dried thickness >22µm should be avoided.

### Thinner

DuPont™ 00x0A Series has been optimized for screen printing and thinning is not normally required or recommended. DuPont™ 8250 thinner may be added sparingly to compensate for evaporative losses.

### Drying

Parts should be allowed to level at room temperature for 5-10 minutes and then dried for 10-15 minutes at 150°C.

### Firing

Properties are based on a 30 minute firing cycle (100°C -100°C) with 10 minutes at a peak temperature of 850°C. DuPont™ 00x0A was designed to allow cofiring of selected termination materials with the resistors. See sample furnace profile.

### Blending

DuPont™ 00x0A Series is blendable between each adjacent member.

### Storage and Shelf Life

Containers should be stored, tightly sealed, in a clean, stable environment at a temperature of 0-5°C for 00L2C and at room temperature (<25° C) for other 00x0A Series. Shelf life of material in unopened containers is six months from date of shipment. Some settling of solids may occur and compositions should be thoroughly mixed prior to use.

### Safety and Handling

For Safety and Handling information pertaining to this product, read the Material Safety Data Sheet (MSDS).

# DUPONT™ 00X0A RESISTOR SERIES

## TYPICAL PERFORMANCE PROPERTIES

	Resistivity <sup>1</sup> (Ω/sq)	Hot TCR <sup>2</sup> (ppm/C)	Cold TCT <sup>2</sup> (ppm/C)	Noise <sup>3</sup> (dB)	EDS <sup>4</sup> 5KV (avg ?R)	Viscosity <sup>5</sup> (Pa.S)	Solids (%)
00L2C	0.05-0.09	-20 to 50	-100 to 100			100-200	For info
00L1	0.14-0.20	±100	±100	< -35	< ±0.1%	80-180	For info
0001	0.85-1.15	±100	±100	< -35	< ±0.1%	80-180	For info
0004A	2.8-4.0	0 to 100	±100	< -35	< ±0.3%	100-150	58-62
0010A	8.5-11.5	20 to 60	-60 to -10	< -35	< ±0.3%	100-180	58-62
0020A	85-115	10 to 50	-60 to -10	< -29	< ±0.3%	110-180	56-59.5
0030	0.8k-1.2k	-25 to 25	-60 to 0	< -17	< ±3%	110-180	56-61
0040A	8.5k-11.5k	10 to 50	-60 to 0	< -11	< ±3%	110-180	55.9-59
0050A	85k-115k	10 to 50	-60 to 0	< -6	< ±0.2%	110-180	56-59.5
0060A	0.85M - 1.15M	20 to 40	-60 to 0	< -6	< ±0.1%	110-180	58-62
0071	8M-12M	-10 to 50	-70 to 0	< 10	< ±0.1%	110-180	56-60

<sup>1</sup>Unless otherwise noted, resistors were printed on DuPont™ 5426 terminations at 18-22µm dried thickness, then co-fired in 30 minute cycles with 850°C peak for 10 minutes (13-15µm dry thickness for 0071). Resistor geometry is 0.8x0.8mm (Used 500 square serpentine pattern for 00L2C, 00L1, 0001).

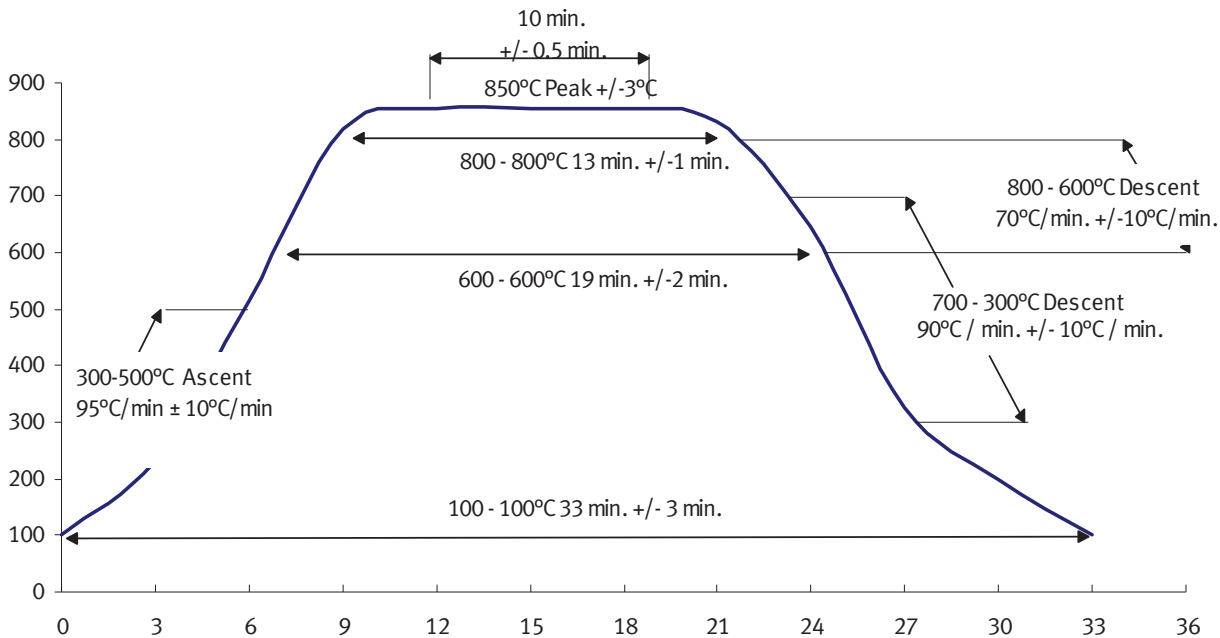
<sup>2</sup>Temperature coefficient of resistance from 25°C to 125°C for Hot TCR and 25°C to -55°C for Cold TCR.

<sup>3</sup>Using Quan-Tech Model 315C meter, untrimmed 0.8mm x 0.8mm resistors.

<sup>4</sup>Electrostatic discharge using 100pF/1500Ω R/C network. Untrimmed resistors, 0.8mm x 0.8mm @5kV.

<sup>5</sup>Brookfield HAT Viscometer 10 rpm, UC&SP (SC4-14/6R), 25°C±0.2°C

### Typical 30 Minute Furnace Profile





## DUPONT™ 00X0A RESISTOR SERIES

**FOR MORE INFORMATION ON DUPONT™ 00X0A OR OTHER DUPONT ADVANCED MATERIALS, PLEASE CONTACT YOUR LOCAL REPRESENTATIVE:**

### Americas

DuPont Photovoltaics & Advanced  
Materials  
Chestnut Run Plaza, B708  
974 Centre Rd, Wilmington, DE 19805  
U.S.A  
Tel. +1919 248 5188

### Europe, Middle East & Africa

Bristol & Bath Science Park  
Dirac Crescent, Emersons Green  
Bristol, BS16 7FR  
U.K.  
Tel. +44 117 9709667

### Asia

DuPont Electronic Materials K.K.  
KSP R&D B213, 2-1  
Sakado 3-chome, Takatsu-ku,  
Kawasaki-shi, Kanagawa, 213-0012  
Japan  
Tel +81 44 820 7575

DuPont Taiwan Ltd  
45, Hsing-Pont Road  
Taoyuan, 330  
Taiwan  
Tel. + 886 3 377 3616

DuPont China Holding Co. Ltd  
B11, 399 Keyuan Road  
Zhangjiang Hi-Tech Park  
Pudong New District,  
Shanghai 201203  
China  
Tel. +86 21 3862 2888

DuPont Korea Inc.  
3-5th Floor, Asia tower #726,  
Yeoksam-dong, Gangnam-gu  
Seoul 135-719,  
Korea  
Tel. +82 2 2222 5275

E. I. DuPont India Private Limited  
7th Floor, Tower C, DLF Cyber Greens,  
Sector-25A, DLF City, Phase-III  
Gurgaon 122 002 Haryana, India  
Tel. +91 124 4091818

DuPont Company (Singapore) Pte Ltd  
21 Biopolis Road  
#06-21 Nucleos South Tower  
Singapore 138567  
Tel. +65 6586 3022

**[advancedmaterials.dupont.com](http://advancedmaterials.dupont.com)**

Copyright © 2018 DuPont. All rights reserved. The DuPont Oval Logo, DuPont™, and all DuPont products denoted with ® or ™ are registered trademarks or trademarks of E. I. du Pont de Nemours and Company or its affiliates.

This information corresponds to our current knowledge on the subject. It is offered solely to provide possible suggestions for your own experimentations. It is not intended, however, to substitute for any testing you may need to conduct to determine for yourself the suitability of our products for your particular purposes. This information may be subject to revision as new knowledge and experience becomes available. Since we cannot anticipate all variations in end-use conditions, DuPont makes no warranties, and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent right.

K-29424 (10/18)