



# Metal Film Resistors, Pulse Withstanding Protective



## FEATURES

- Special Vishay Dale design provides lightning withstand characteristics along with resistor functionality
- A thicker tin oxide power film system provides lightning surge absorption capabilities
- Higher turns ratio and glass substrate provide sharper fusing characteristic than the standard flameproof product line
- Protect against a variety of electrical hazards which can change or destroy sensitive electronic equipment including high energy voltage surges caused by power line anomalies (direct power crosses or inductively coupled effects) and other momentary overvoltages
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS\* COMPLIANT

### Note

\* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

STANDARD ELECTRICAL SPECIFICATIONS					
GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{70^{\circ}\text{C}}$ W	RESISTANCE RANGE <sup>(2)</sup> $\Omega$	TOLERANCE $\pm$ %	CUTOFF VALUE <sup>(1)</sup>
FP1/2P	FP1/2P	0.5	10 to 1M	1, 2, 5	2K00
FP001P	FP1P	1	10 to 1M	1, 2, 5	1K00
FP002P	FP2P	2	355 to 125K	1, 2, 5	355R
FP003P	FP3P	3	46.4 to 125K	1, 2, 5	250R
FP069P	FP69P	2	25 to 126K	1, 2, 5	400R

### Notes

- (1) Pulse withstanding capabilities are value dependent. Values above the cutoff value will meet all of the surge test requirements shown on the following pages.
- (2) Contact factory for values outside these published ranges.

MARKING	
	- DALE - Value - Tolerance - Style and case size - Date code (year/week)

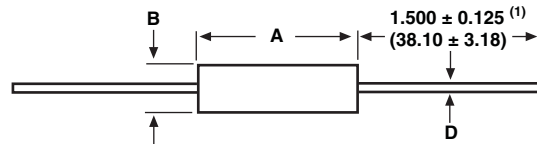
GLOBAL PART NUMBER INFORMATION																
New Global Part Numbering: FP002P1K00F9256B8 (preferred part numbering format)																
F	P	0	0	2	P	1	K	0	0	F	9	2	5	6	B	8
GLOBAL MODEL (See Standard Electrical Specifications table)		RESISTANCE VALUE R = $\Omega$ K = $k\Omega$ M = $M\Omega$ 10R0 = 10 $\Omega$ 1K30 = 1.3 $k\Omega$ 1M00 = 1.0 $M\Omega$			TOLERANCE CODE F = $\pm$ 1 % G = $\pm$ 2 % J = $\pm$ 5 %			SPEC CODES 5555 = FP1/2P 6206 = FP001P 9256 = FP002P 9303 = FP003P 7532 = FP069P			PACKAGING <sup>(3)</sup> EK = Lead (Pb)-free, strip EA = Lead (Pb)-free, T/R  B8 = Tin/lead, strip CH = Tin/lead, T/R (750 pieces) CJ = Tin/lead, T/R (1000 pieces)					
Historical Part Number: FP2P 1K00 1 % B8 (will continue to be accepted)																
FP2P		1K00			1 %			B8								
HISTORICAL MODEL		RESISTANCE VALUE			TOLERANCE CODE			PACKAGING								

### Notes

- (3) Some packaging codes are model specific.
- (4) For additional information on packaging, refer to the Through Hole Resistor Packaging document ([www.vishay.com/doc?31544](http://www.vishay.com/doc?31544)).



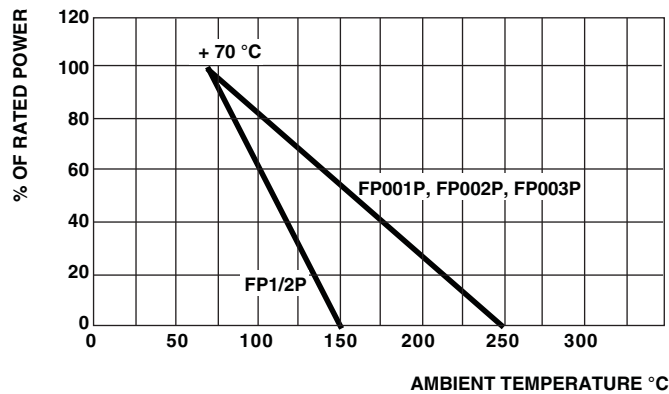
**DIMENSIONS** in inches (millimeters)



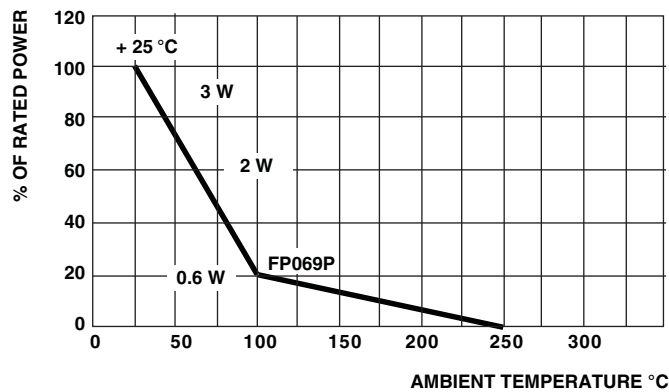
GLOBAL MODEL	A	B	D
FP1/2P	0.360 ± 0.020 (9.14 ± 0.51)	0.138 + 0.012 - 0.023 (3.51 + 0.31 - 0.58)	0.032 ± 0.002 (0.81 ± 0.05)
FP001P	0.560 ± 0.031 (14.22 ± 0.79)	0.190 + 0.005 - 0.030 (4.83 + 0.13 - 0.76)	0.032 ± 0.002 (0.81 ± 0.05)
FP002P	0.687 ± 0.031 (17.45 ± 0.79)	0.300 ± 0.020 (7.62 ± 0.51)	0.032 ± 0.002 (0.81 ± 0.05)
FP003P	0.900 ± 0.055 (22.86 ± 1.40)	0.300 ± 0.020 (7.62 ± 0.51)	0.032 ± 0.002 (0.81 ± 0.05)
FP069P	0.516 ± 0.021 (13.11 ± 0.53)	0.225 ± 0.012 (5.72 ± 0.31)	0.032 ± 0.002 (0.81 ± 0.05)

**Note**

<sup>(1)</sup> Lead length for product in strip pack. For product supplied in Tape and Reel, the actual lead length would be based on the body size, tape spacing and lead trim.



**DERATING**



**DERATING**

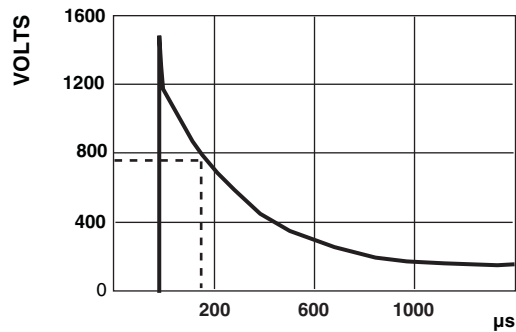


**LIGHTNING PULSE WAVE FORMS**

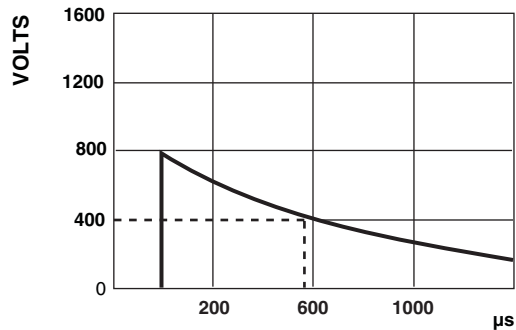
Lightning pulse wave forms are defined by three numbers:

- Maximum time to reach peak voltage level (typically 10  $\mu$ s)
- Minimum time for voltage to decrease to half value
- The peak voltage level

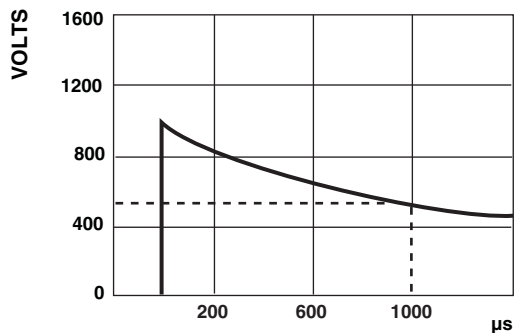
Three examples are shown below.



10 by 160  $\mu$ s up to 1500 V FCC - Longitudinal Surge



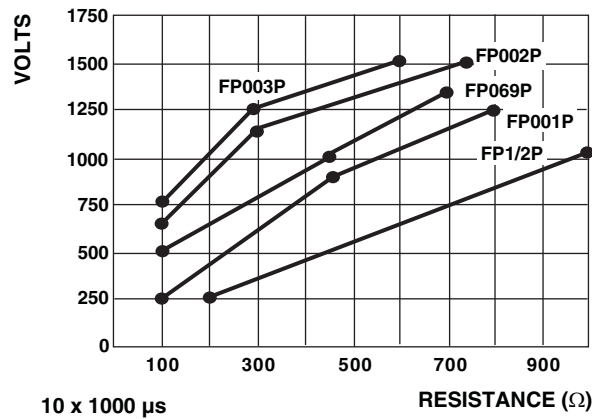
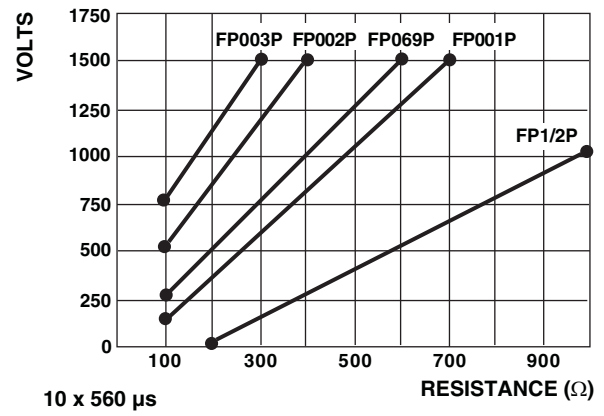
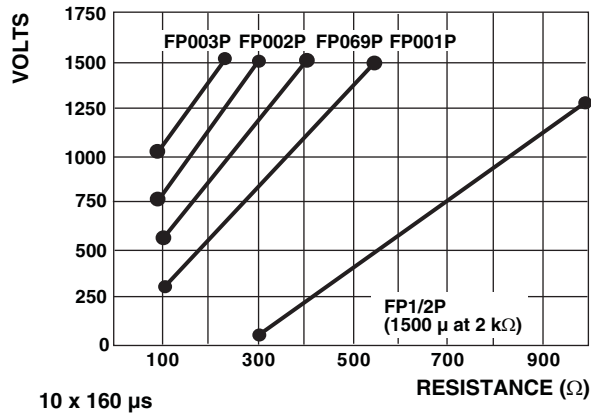
10 by 560  $\mu$ s up to 800 V FCC - Metallic Surge



10 by 1000  $\mu$ s up to 1000 V REA - Current Surge



These graphs show the relationship value and pulse withstanding voltage for FP1/2P thru FP003P using a 1.0 % resistance shift after 10 pulses as the figure of merit. The stable operating region of each package is on the right side of the appropriate line.



PACKAGING			
GLOBAL MODEL	PACKAGING TYPE	PACKAGING CODE	
		LEAD (Pb)-BEARING	LEAD (Pb)-FREE
FP1/2P, FP001P, FP069P	Strip	B8	EK
	Tape/reel	CJ	EA
FP002P, FP003P	Strip	B8	EK
	Tape/reel	CH	EA



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.