



WORLD PRODUCTS INC.
ELECTRONIC COMPONENT SOLUTIONS
Automotive • Industrial • Telecom • Wireless

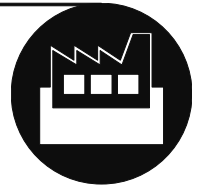
GAS DISCHARGE TUBES

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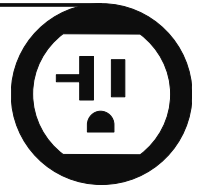
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POWER SUPPLY



SURGE PROTECTION



GAS DISCHARGE TUBES

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General Characteristics

Features

- UL Recognition.
- CUL Recognition (specific types).
- Compliance to MIL STD 202G, method 208H and 106.
- Can be used to meet the requirements of GR-1361 and ITU K.12.

Temperature Rating

Storage -40°C to +150°C
Operate -30°C to +85°C

100% Inspection

- DC Breakdown, insulation resistance, physical dimensions, lead/weld strength and appearance.
- All other gas tube characteristics are checked using the appropriate sampling procedures.
- ISO 9001 Certified.
- Gas Tubes have no radioactive content.

RoHS Compliance

WPGT Series Gas Discharge Tubes purchased from World Products Inc. comply to a maximum concentration value of 0.1% by weight in homogeneous materials for lead (Pb), mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) and of 0.01% weight in homogeneous materials for cadmium and are in compliance with Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive). Fail safe types with date code of 10/05 or after comply to RoHS standards stated above.

Solderability

Complies with MIL STD 202G, Method 208H.

Part Marking

2 Electrode Series

Explanation of Example:

- World Products Inc. Logo
- 4 Digit EIA Date Code
- /C = Low Capacitance (Only applicable for 2R & 2N, 70V - 145V)
- /S Denotes WPGT-2R600S or WPGT-2R800S
- 2RM = 2 Electrode Mini (not pictured)
- 2R = 2 Electrode Standard
- 2N = 2 Electrode High Current
- WPGT = 2 Electrode High Voltage
- 2T = 2 Electrode Switching (not pictured)
- 145 = DC Breakdown Voltage
- 3000 = DC Breakdown Voltage
- UL recognition

2 Electrode Surface Mount Series

Explanation of Example:

- 145 = DC Breakdown Voltage
- 4 Digit EIA Date Code
- 2SM = UL recognition

Examples:
 145 0624 2SS
 WPGT2S-145 0624 2S

3 Electrode Series

Explanation of Example:

- World Products Inc. Logo
- 4 Digit EIA Date Code
- 3R = Standard Series
- 3RM = Mini Series
- 145 = DC Breakdown Voltage
- UL recognition

3 Electrode Surface Mount (3SM) Series

Explanation of Example:

- World Products Inc. Logo
- 4 Digit EIA Date Code
- 350 = DC Breakdown Voltage
- UL recognition

General Characteristics (continued)

Terms and Definitions

DC Breakdown Voltage	The voltage measured at a rise time of 100v/s.	
Maximum Impulse Breakdown Voltage	The maximum breakdown voltage at rise times of 100v/us and 1000v/us.	
Maximum Impulse Discharge Current	The maximum current applying a waveform of 8/20us that can be applied across the terminals of the gas tube without causing the gas tube to change more than ±25% from its initial measured DC breakdown voltage. Dwell time between pulses is 3 minutes.	
Alternating Discharge Current	Rated RMS value of AC current at 50Hz, 1 sec. 10 times. Intervals: 3min. DC breakdown voltage may not change more than ±25% from its initial measured DC breakdown voltage. IR > 10 ⁸ ohms (-20%, +30% for 70 – 90V).	
Impulse Life	The minimum number of impulses of a specified waveform and peak current which a gas tube will conduct without causing the gas tube to change more than ±25% from its initial measured DC breakdown voltage. Dwell time between pulses is 1-2 minutes.	
DC Holdover Voltage	The maximum DC voltage across the two terminals of the gas tube under which it may be expected to return to the high impedance state after the gas tube breakdown.	
Insulation Resistance	The resistance of the gas tube shall be measured each terminal to each other terminal.	
	DC Breakdown Voltage	Measuring Voltage
	70-150V	50V
	151-400V	100V
	470-1000V	250V
	1001-2000V	500V
	2001-6000V	1000V
Capacitance	The capacitance of a gas tube shall be measured each terminal to each other terminal. Test frequency: 1MHz. In measurements involving 3-electrode gas tubes, the terminal not being tested shall be connected to a ground plane.	

2 Electrode Series

Part Numbering System

Example part number:

WPGT - 2R 800 B 8 L C TA
 (1) (2) (3) (4) (5) (6) (7) (8)

(1) World Products Gas Discharge Tubes

(2) Series Code

2RM = 2 Electrode Mini Series
2R = 2 Electrode Standard Series and High Voltage Series
2N = 2 Electrode High Current Series
2T = 2 Electrode Switching Type

(3) DC Breakdown Voltage

70 = 70V	600S = 600V - 2R Standard Series Only
75 = 75V	800S = 800V - 2R Standard Series Only
90 = 90V	600 = 600V - 2RM High Voltage 2T Series Only
120 = 120V	800 = 800V - 2RM High Voltage 2T Series Only
130 = 130V	1000 = 1000V
145 = 145V	1200 = 1200V
150 = 150V - 2 RM Series Only	1400 = 1400V
180 = 180V	1600 = 1600V
230 = 230V	2000 = 2000V
250 = 250V	2500 = 2500V
300 = 300V	2700 = 2700V
350 = 350V	3000 = 3000V
400 = 400V	3500 = 3500V
470 = 470V	3600 = 3600V
	4000 = 4000V
	4500 = 4500V
	5000 = 5000V
	6000 = 6000V

(4) Diameter ("D" Dimension)

A = 5.5mm - 2RM Series Only
B = 8mm

(5) Length ("T" Dimension)

6 = 6mm
8 = 8mm - High Voltage Series Only
10 = 10mm - High Voltage Series Only (WPGT-2R5000 and WPGT-2R6000)

(6) Lead Type

B = No Leads
L = Axial lead (0.8mm lead diameter)
L1 = Axial lead (1.0mm lead diameter)
A1 = Radial lead (0.8mm lead diameter)
B1 = Radial lead (1.0mm lead diameter)
C1 = Radial lead Clip-in style (1.0mm lead diameter)
D1 = Radial Lead Clip-in style (0.8mm lead diameter)

(7) Low Capacitance

(Only applicable for 2R & 2N, 70V – 145V)
N11 = Regular Capacitance of 1.5pf
C = Low capacitance of 0.8pf

(8) Taping Specifications

TA = Taped (Ammo Box)
TR = Tape & Reel

GAS DISCHARGE TUBES

2 Electrode Mini Series (2RM) Specifications

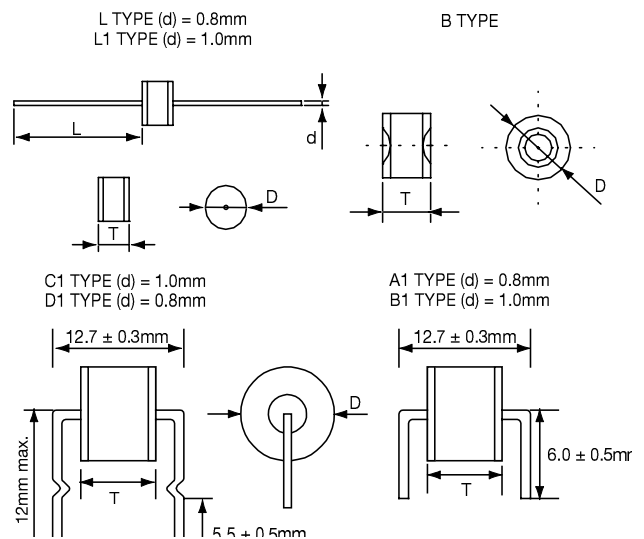
Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (kA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (100A)	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
	100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles	times	<150ms	*	1MHz
WPGT-2RM70	70 \pm 20%	700	800	10	5	5	20	300	52	1	1
WPGT-2RM75	75 \pm 20%	700	800	10	5	5	20	300	52	1	1
WPGT-2RM90	90 \pm 20%	600	700	10	5	5	20	300	52	1	1
WPGT-2RM120	120 \pm 15%	600	700	10	5	5	20	300	52	1	1
WPGT-2RM130	130 \pm 15%	600	700	10	5	5	20	300	52	1	1
WPGT-2RM145	145 \pm 15%	600	700	10	5	5	20	300	52	1	1
WPGT-2RM150	150 \pm 15%	600	700	10	5	5	20	300	52	1	1
WPGT-2RM180	180 \pm 15%	600	700	10	5	5	20	300	80	1	1
WPGT-2RM230	230 \pm 15%	600	700	10	5	5	20	300	80	1	1
WPGT-2RM250	250 \pm 15%	600	700	10	5	5	20	300	80	1	1
WPGT-2RM300	300 \pm 15%	700	900	10	5	5	20	300	150	1	1
WPGT-2RM350	350 \pm 15%	700	900	10	5	5	20	300	150	1	1
WPGT-2RM400	400 \pm 15%	800	1000	10	5	5	20	300	150	1	1
WPGT-2RM470	470 \pm 15%	1000	1200	10	5	5	20	300	150	1	1
WPGT-2RM600	600 \pm 20%	1300	1500	5	2.5	2.5	5	300	150	1	1
WPGT-2RM800	800 \pm 20%	1500	1700	5	2.5	2.5	5	300	150	1	1
WPGT-2RM1000	1000 \pm 20%	1600	1800	3	1.5	2	4	300	150	1	1
WPGT-2RM1200	1200 \pm 20%	1800	2000							1	1
WPGT-2RM1400	1400 \pm 20%	2200	2400							1	1
WPGT-2RM1600	1600 \pm 20%	2400	2600							1	1
WPGT-2RM2000	2000 \pm 20%	2800	3000							1	1
WPGT-2RM2500	2500 \pm 20%	3300	3500							1	1
WPGT-2RM3000	3000 \pm 20%	3800	4000							1	1
WPGT-2RM3500	3500 \pm 20%	4300	4500							1	1
WPGT-2RM3600	3600 \pm 20%	4400	4600							1	1

UL497B Recognized, File #E135015 (through WPGT-2RM800), voltage types higher than 800V are pending UL recognition.

Dimensions

Unit: mm

Item	Dimensions
D	5.5 + 0.3
T	6.0 + 0.3
d	0.8 or 1.0 \pm 0.05
L	24 Min.



*DC Breakdown Voltage	DC Measuring Voltage
70-90V	50V
120-400V	100V
470-800V	250V
1000-2000V	500V
2500-4000V	1000V

2 Electrode Standard Series (2R)

Specifications

Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (100A)	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
	100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles	times	<150ms	*	1MHz
WPGT-2R70	70 \pm 20%	500	600	15	10	10	65	500	52	10	1.5**
WPGT-2R75	75 \pm 20%	500	600	15	10	10	65	500	52	10	1.5**
WPGT-2R90	90 \pm 20%	500	600	15	10	10	65	500	52	10	1.5**
WPGT-2R120	120 \pm 15%	500	700	15	10	10	65	500	52	10	1.5**
WPGT-2R130	130 \pm 15%	500	700	15	10	10	65	500	52	10	1.5**
WPGT-2R145	145 \pm 15%	500	700	15	10	10	65	500	52	10	1.5**
WPGT-2R180	180 \pm 15%	500	700	15	10	10	65	500	80	10	1.5
WPGT-2R230	230 \pm 15%	500	700	15	10	10	65	500	80	10	1.5
WPGT-2R250	250 \pm 15%	500	700	15	10	10	65	500	80	10	1.5
WPGT-2R300	300 \pm 15%	700	900	15	10	10	65	500	150	10	1.5
WPGT-2R350	350 \pm 15%	700	900	15	10	10	65	500	150	10	1.5
WPGT-2R400	400 \pm 15%	800	1000	15	10	10	65	500	150	10	1.5
WPGT-2R470	470 \pm 15%	1000	1200	15	10	10	65	500	150	10	1.5
WPGT-2R600S	600 \pm 20%	1100	1400	10	5	10	65	300	150	10	1.5
WPGT-2R800S	800 \pm 20%	1300	1700	10	5	10	65	300	150	10	1.5

UL497B Recognized, File #E135015

*DC Breakdown Voltage	DC Measuring Voltage
70-90V	50V
120-400V	100V
470-800V	250V

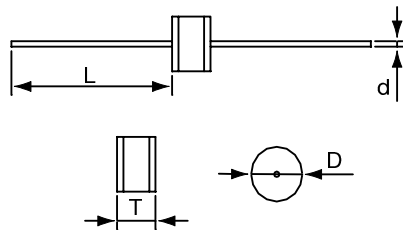
**May be offered with 0.8pf capacitance rating. See part numbering system for special coding.

Dimensions

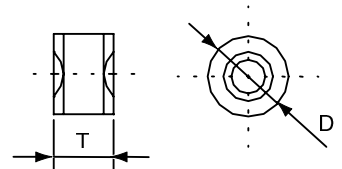
Unit: mm

Item	Dimensions
D	8.0 \pm 0.3
T	6.0 \pm 0.3
d	0.8 or 1.0 \pm 0.05
L	24 Min.

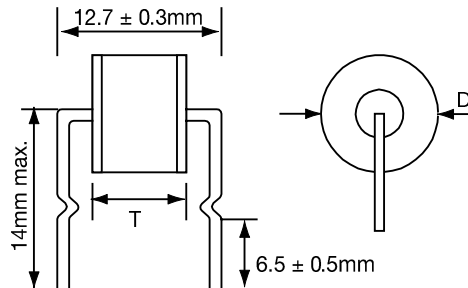
L TYPE (d) = 0.8mm
L1 TYPE (d) = 1.0mm



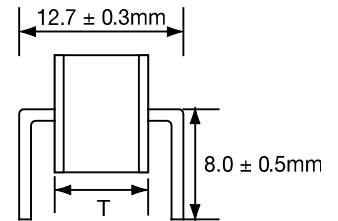
B TYPE



C1 TYPE (d) = 1.0mm
D1 TYPE (d) = 0.8mm



A1 TYPE (d) = 0.8mm
B1 TYPE (d) = 1.0mm



2 Electrode High Voltage Series (2R)

Specifications

Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (100A)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
	100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles	times	*	1MHz
WPGT-2R600	600 \pm 15%	1000	1100	10	5	10	65	500	10	1.5
WPGT-2R800	800 \pm 15%	1100	1200	10	5	10	65	500	10	1.5
WPGT-2R1000	1000 \pm 20%	1300	1400	10	5	10	65	300	10	1.0
WPGT-2R1400	1400 \pm 20%	2100	2200	5	2.5	2.5	5	100	10	1.0
WPGT-2R1600	1600 \pm 20%	2300	2400	5	2.5	2.5	5	100	10	1.0
WPGT-2R2000	2000 \pm 20%	2700	2800	5	2.5	2.5	5	100	10	1.0
WPGT-2R2500	2500 \pm 20%	3500	3600	5	2.5	2.5	5	100	10	1.0
WPGT-2R2700	2340-2970	3600	\leq 3800	5	3***	2.5	5	300**	10	1.0
WPGT-2R3000	3000 \pm 20%	4100	4200	5	2.5	2.5	5	300**	10	1.0
WPGT-2R3500	3500 \pm 20%	4900	5000	5	3	2.5	5	100	10	1.0
WPGT-2R4000	4000 \pm 20%	5300	5500	5	3	2.5	5	100	10	1.0
WPGT-2R4500	4500 \pm 20%	5800	6000	5	3	2.5	5	100	10	1.0
WPGT-2R5000	5000 \pm 20%	6000	6400	5	3	2.5	5	100	10	1.0
WPGT-2R6000	6000 \pm 20%	7000	7800	5	3	2.5	5	100	10	1.0

UL 1449 and C-UL 3rd Edition Recognized, File #E196885. WPGT-2R2700 is additionally C-UL & UL 1414 Recognized, File #E71602, Complies to VDE Gap requirements and MIL-STD-202, Method 106 (Moisture resistance.)

*DC Breakdown Voltage DC Measuring Voltage
 600-1000V 250V
 1400-2000V 500V
 2500-6000V 1000V

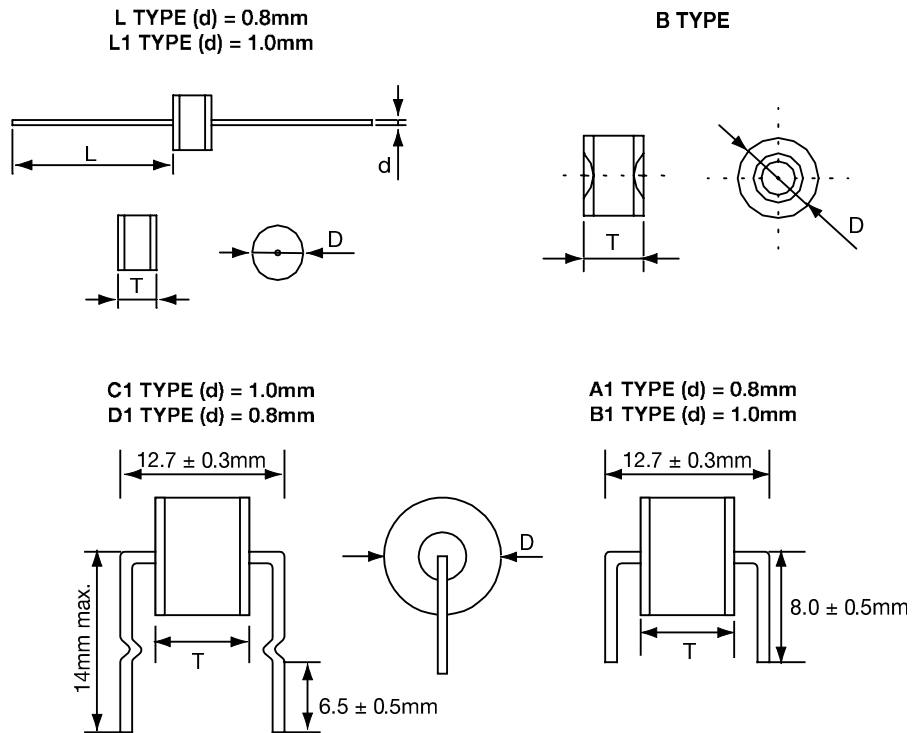
**Measured with an 8/20 μ s waveform, 100A.
 ***For WPGT-2R2700 rating is 3KA (10 times each polarity).
 DC Breakdown voltage is measured at 5kV/s.

Dimensions

Unit: mm

Item	Dimensions
D	8.0 \pm 0.3
T*	8.0 +0.6, -0.1
d	0.8 or 1.0 \pm 0.05
L	24 Min.

*T Dimension for WPGT-2R5000 and WPGT-2R6000 is 10 +0.6, -0.1.



2 Electrode High Current Series (2N)

Specifications

Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (100A)	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
	100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles	times	<150ms	*	1MHz
WPGT-2N70	70 \pm 20%	500	600	20	15	20	65	500	52	10	1.5**
WPGT-2N75	75 \pm 20%	500	600	20	15	20	65	500	52	10	1.5**
WPGT-2N90	90 \pm 20%	500	600	20	15	20	65	500	52	10	1.5**
WPGT-2N120	120 \pm 15%	500	700	20	15	20	65	500	52	10	1.5**
WPGT-2N130	130 \pm 15%	500	700	20	15	20	65	500	52	10	1.5**
WPGT-2N145	145 \pm 15%	500	700	20	15	20	65	500	52	10	1.5**
WPGT-2N180	180 \pm 15%	500	700	20	15	20	65	500	80	10	1.5
WPGT-2N230	230 \pm 15%	500	700	20	15	20	65	500	80	10	1.5
WPGT-2N250	250 \pm 15%	500	700	20	15	20	65	500	80	10	1.5
WPGT-2N300	300 \pm 15%	700	900	20	15	20	65	500	150	10	1.5
WPGT-2N350	350 \pm 15%	700	900	20	15	20	65	500	150	10	1.5
WPGT-2N400	400 \pm 15%	800	1000	20	15	20	65	500	150	10	1.5
WPGT-2N470	470 \pm 15%	1000	1200	20	15	20	65	500	150	10	1.5

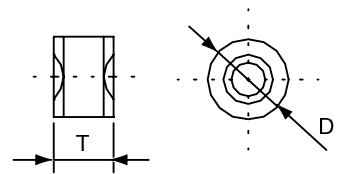
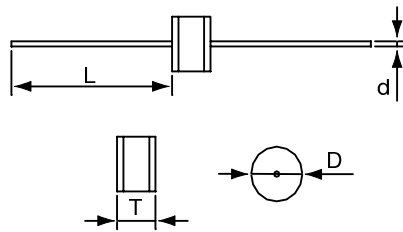
UL497B Recognized, File #E135015

*DC Breakdown Voltage	DC Measuring Voltage
70-90V	50V
120-400V	100V
470V	250V

**May be offered with 0.8pf capacitance rating. See part numbering system for special coding.

L TYPE (d) = 0.8mm
L1 TYPE (d) = 1.0mm

B TYPE



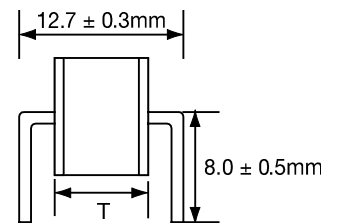
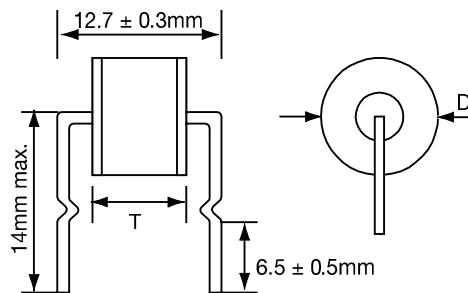
Dimensions

Unit: mm

Item	Dimensions
D	8.0 \pm 0.3
T	6.0 \pm 0.3
d	0.8 or 1.0 \pm 0.05
L	24 Min.

C1 TYPE (d) = 1.0mm
D1 TYPE (d) = 0.8mm

A1 TYPE (d) = 0.8mm
B1 TYPE (d) = 1.0mm



2 Electrode Switching Series (2T)

Specifications

Base Part Number	DC Breakdown Voltage (V)	Maximum Ignition Frequency (HZ)	Switching Operations (times)	Minimum Insulation Resistance (GΩ)*	Operating Temperature °C	Maximum Capacitance 0.1Vrms 1MHZ (pf)
	100V/s					
WPGT-2T350	350 ± 10%	400	1 x 10 ⁵	1	-45 ~ + 125	1
WPGT-2T400	400 ± 10%	400	1 x 10 ⁵	1	-45 ~ + 125	1
WPGT-2T470	470 ± 10%	400	1 x 10 ⁵	1	-45 ~ + 125	1
WPGT-2T600	600 ± 10%	400	1 x 10 ⁵	1	-45 ~ + 125	1
WPGT-2T800	800 ± 10%	400	1 x 10 ⁵	1	-45 ~ + 125	1
WPGT-2T1000	1000 ± 10%	400	1 x 10 ⁵	1	-45 ~ + 125	1

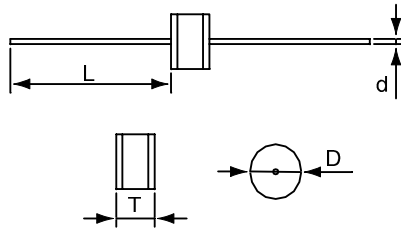
UL497B Recognized, File #E135015 (With the exception of WPGT-2T800 and WPGT-2T1000.)

*DC Breakdown Voltage DC Measuring Voltage
 350-400V 100V
 470-1000V 250V

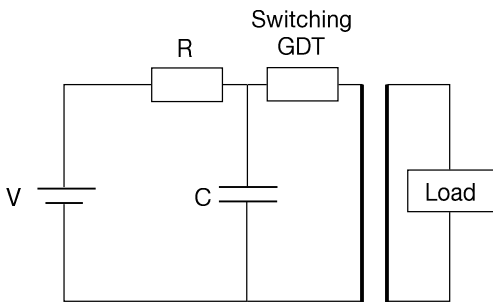
Dimensions

Unit: mm

Item	Dimensions
D	8.0 ± 0.3
T	6.0 ± 0.3
d	0.8 ± 0.05
L	25 Max.



Basic Application Circuit



3 Electrode Series

Part Numbering System

Example part number:

WPGT - **3R** **200** **C**
 (1) (2) (3) (4)

(1) World Products Gas Discharge Tubes

(2) **Series Code**

3RM = 3 Electrode Mini Series
3R = 3 Electrode Standard Series

(3) **DC Breakdown Voltage**

75 = 75V - 3R Series Only

90 = 90V

145 = 145V

200 = 200V

230 = 230V

250 = 250V

260 = 260V - 3R Series Only

300 = 300V - 3R Series Only

350 = 350V

400 = 400V

420 = 420V - 3RM Series Only

470 = 470V

550 = 550V - 3R Series Only

600 = 600V

(4) **Lead Type**

B = No Leads

CF = (1.0mm lead diameter) with Fail Safe - 3R Series Only

CF1 = (0.8mm lead diameter) with Fail Safe

C = Radial lead (1.0mm lead diameter) - 3R Series Only

C2 = Radial lead (0.8mm lead diameter) - 3R Series Only

C3 = Radial lead with 3.8 ± 0.3mm lead pitch (0.8mm lead diameter) 3RM series only

G = Axial lead (1.0mm lead diameter) - 3R Series Only

G1 = Axial lead (0.8mm lead diameter) - 3R Series Only

H = Radial lead with 4.4mm ± 0.3mm lead pitch (0.8mm lead diameter) 3RM series only

3 Electrode Mini Series (3RM)

Specifications

Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)			Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (200A) times	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
		100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles				
WPGT-3RM90	90 \pm 20%	750	850	10	5	5	30	300	52	10	2	
WPGT-3RM145	145 \pm 20%	750	850	10	5	5	30	300	52	10	2	
WPGT-3RM200	200 \pm 20%	600	700	15	10	10	60	300	135	10	2	
WPGT-3RM230	230 \pm 20%	600	700	15	10	10	60	300	135	10	2	
WPGT-3RM250	250 \pm 20%	600	700	15	10	10	60	300	135	10	2	
WPGT-3RM350	350 \pm 20%	650	750	15	10	10	60	300	150	10	2	
WPGT-3RM400	400 \pm 20%	700	800	15	10	10	60	300	150	10	2	
WPGT-3RM420	420 \pm 20%	700	800	15	10	10	60	300	150	10	2	
WPGT-3RM470	470 \pm 20%	800	900	15	10	10	60	300	150	10	2	
WPGT-3RM600	600 \pm 20%	900	1000	10	5	5	30	300	150	10	2	

UL497B Recognized, File #E135015

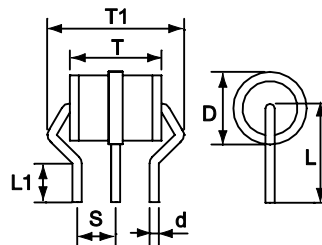
*DC Breakdown Voltage	DC Measuring Voltage
90-145V	50V
200-400V	100V
420-600V	250V

Dimensions

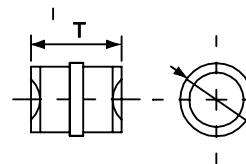
Unit: mm

Item	Dimensions (mm)
D	6.0 +0.2, -0.5
T	8.5 \pm 0.4
T1	11.5 +0.8, -0.5
L	7.0 \pm 0.5
S	3.8 \pm 0.3 or 4.4 \pm 0.3
d	0.8 \pm 0.05
L1	2.5 \pm 0.3

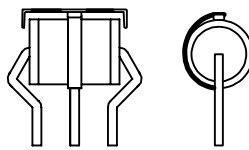
C3 TYPE (S) = 3.8 \pm 0.3mm
H TYPE (S) = 4.4 \pm 0.3mm



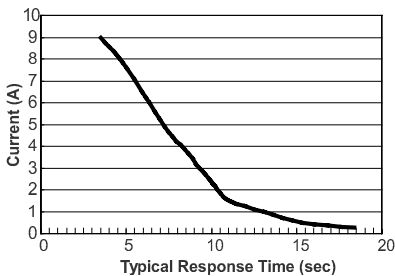
B TYPE



CF1 TYPE



Failsafe Current - Time Curve



3 Electrode Standard Series (3R)

Specifications

Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (400A)	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
	100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles	times	<150ms	*	1MHz
WPGT-3R75	75 \pm 20%	600	700	20	10	10	130	300	52	10	2
WPGT-3R90	90 \pm 20%	600	700	20	10	10	130	300	52	10	2
WPGT-3R145	145 \pm 20%	500	700	20	10	10	130	300	52	10	2
WPGT-3R200	200 \pm 20%	500	700	20	10	10	130	300	80	10	2
WPGT-3R230	230 \pm 20%	600	700	20	10	10	130	300	80	10	2
WPGT-3R250	250 \pm 20%	600	700	20	10	10	130	300	80	10	2
WPGT-3R260	260 \pm 20%	600	700	20	10	10	130	300	80	10	2
WPGT-3R300	300 \pm 20%	700	900	20	10	10	130	300	150	10	2
WPGT-3R350	350 \pm 20%	700	900	20	10	10	130	300	150	10	2
WPGT-3R400	400 \pm 20%	800	1000	20	10	10	130	300	150	10	2
WPGT-3R470	470 \pm 20%	800	1000	20	10	10	130	300	150	10	2
WPGT-3R550	550 \pm 20%	1100	1400	20	10	10	130	300	150	10	2
WPGT-3R600	600 \pm 20%	1200	1500	20	10	10	130	300	150	10	2

UL497B Recognized, File #E135015

*DC Breakdown Voltage DC Measuring Voltage
 70-90V 50V
 145-400V 100V
 470-600V 250V

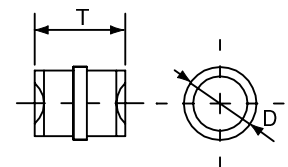
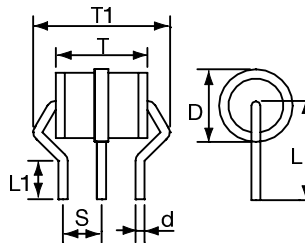
Dimensions

Unit: mm

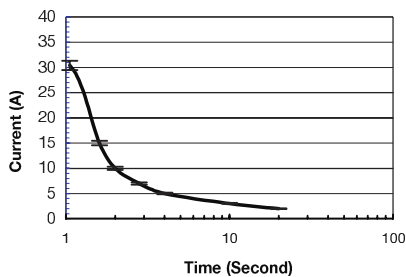
Item	Dimensions (mm)	Item	Dimensions (mm)
D	8.0 \pm 0.2	L1	2.5 \pm 0.3
T	10.0 \pm 0.3	R1	8.1 \pm 0.3
T1	13.4 \pm 0.4	R2	9.8 \pm 0.4
L	11.0 \pm 0.5	S	4.4 \pm 0.3

C TYPE (d) = 1.0mm
 C2 TYPE (d) = 0.8mm

B TYPE

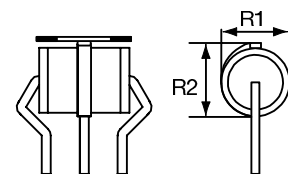
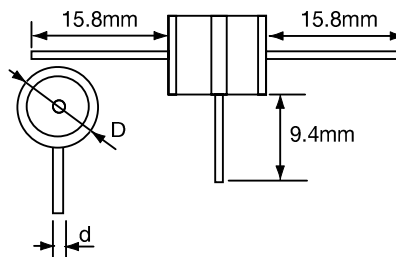


Failsafe Current - Time Curve



G TYPE (d) = 1.0mm
 G1 TYPE (d) = 0.8mm

CF TYPE** (d) = 1.0mm
 CF1 TYPE (d) = 0.8mm



2 & 3 Electrode Surface Mount Series

Part Numbering System

Example part number:

WPGT - **2S** **230** **TR**
 (1) (2) (3) (4)

(1) World Products Gas Discharge Tubes

(2) Series Code

2SM = 2 Electrode Surface Mount Mini Series

2S = 2 Electrode Surface Mount Series

2SS = 2 Electrode Surface Mount Mini Square Series

3SM = 3 Electrode Surface Mount Mini Series

(3) DC Breakdown Voltage

75 = 75V

90 = 90V

120 = 120V - 3SM Series Only

145 = 145V

150 = 150V - 3SM Series Only

200 = 200V

230 = 230V

250 = 250V

300 = 300V

350 = 350V

400 = 400V

420 = 420V

470 = 470V

600 = 600V

1200 = 1200V - 2S Series Only

1800 = 1800V - 2S Series Only

2000 = 2000V - 2S Series Only

2500 = 2500V - 2S Series Only

2700 = 2700V - 2S Series Only

3000 = 3000V - 2S Series Only

(4) Taping Specifications

TR = Tape & Reel

2 Electrode Surface Mount Mini Series (2SM)

Specifications

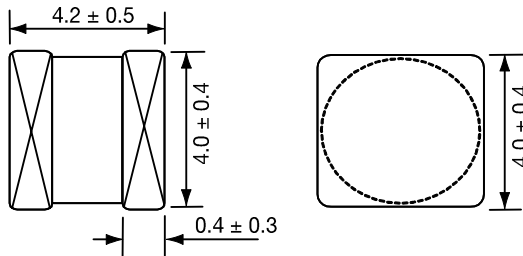
Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (100A) times	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
		100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec				
WPGT-2SM75	75 \pm 20%	700	800	5	3	3	6	300	52	1	0.5
WPGT-2SM90	90 \pm 20%	700	800	5	3	3	6	300	52	1	0.5
WPGT-2SM145	145 \pm 20%	700	800	5	3	3	6	300	52	1	0.5
WPGT-2SM230	230 \pm 20%	600	700	5	3	3	6	300	135	1	0.5
WPGT-2SM250	250 \pm 20%	600	700	5	3	3	6	300	135	1	0.5
WPGT-2SM300	300 \pm 20%	600	700	5	3	3	6	300	135	1	0.5
WPGT-2SM350	350 \pm 20%	650	800	5	3	3	6	300	135	1	0.5
WPGT-2SM400	400 \pm 20%	700	800	5	3	3	6	300	135	1	0.5
WPGT-2SM470	470 \pm 20%	700	800	5	3	3	6	300	135	1	0.5
WPGT-2SM600	600 \pm 20%	900	1000	5	3	3	6	300	135	1	0.5

UL497B Recognized, File #E135015

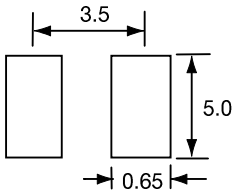
*DC Breakdown Voltage DC Measuring Voltage
 75-400V 100V
 470-600V 250V

Dimensions

Unit: mm



Recommended Pad Size



2 Electrode Surface Mount Mini Square Series (2SS)

Specifications

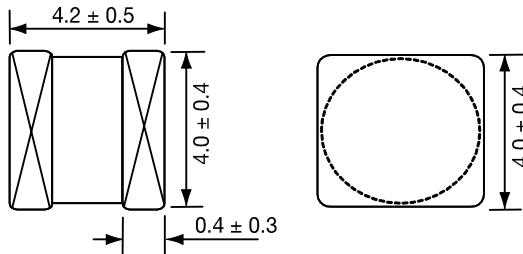
Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (100A) times	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
		100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec				
WPGT-2SS75	75 \pm 20%	700	800	5	3	3	6	300	52	1	0.5
WPGT-2SS90	90 \pm 20%	700	800	5	3	3	6	300	52	1	0.5
WPGT-2SS145	145 \pm 20%	700	800	5	3	3	6	300	52	1	0.5
WPGT-2SS230	230 \pm 20%	600	700	5	3	3	6	300	135	1	0.5
WPGT-2SS250	250 \pm 20%	600	700	5	3	3	6	300	135	1	0.5
WPGT-2SS300	300 \pm 20%	600	700	5	3	3	6	300	135	1	0.5
WPGT-2SS350	350 \pm 20%	650	800	5	3	3	6	300	135	1	0.5
WPGT-2SS400	400 \pm 20%	700	800	5	3	3	6	300	135	1	0.5
WPGT-2SS470	470 \pm 20%	700	800	5	3	3	6	300	135	1	0.5
WPGT-2SS600	600 \pm 20%	900	1000	5	3	3	6	300	135	1	0.5

UL 497B Recognition, File #E135015

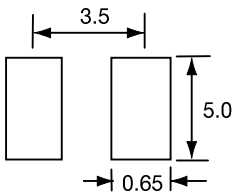
*DC Breakdown Voltage	DC Measuring Voltage
75-400V	100V
470-600V	250V

Dimensions

Unit: mm



Recommended Pad Size



Note: This product has a square ceramic body.

2 Electrode Surface Mount Standard Series (2S)

Specifications

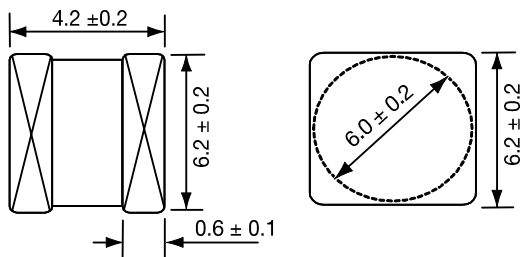
Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)		Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (100A)	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
	100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles	times	<150ms	*	1MHz
WPGT-2S75	75 \pm 20%	600	700	8	5	5	15	1000	52	1	1
WPGT-2S90	90 \pm 20%	600	700	8	5	5	15	1000	52	1	1
WPGT-2S145	145 \pm 20%	500	700	8	5	5	15	1000	52	1	1
WPGT-2S230	230 \pm 20%	450	550	8	5	5	15	1000	135	1	1
WPGT-2S250	250 \pm 20%	450	550	8	5	5	15	1000	135	1	1
WPGT-2S300	300 \pm 20%	500	600	8	5	5	15	1000	135	1	1
WPGT-2S350	350 \pm 20%	500	600	8	5	5	15	1000	135	1	1
WPGT-2S400	400 \pm 20%	600	700	8	5	5	15	1000	135	1	1
WPGT-2S470	470 \pm 20%	700	800	8	5	5	15	1000	135	1	1
WPGT-2S600	600 \pm 20%	800	900	8	5	5	15	1000	135	1	1
WPGT-2S1200	1200 \pm 20%	1700	1800	8	5	5	10	300	150	1	1
WPGT-2S1800	1800 \pm 20%	2500	2600	5	3	3	10	300	150	1	1
WPGT-2S2000	2000 \pm 20%	2700	2800	5	3	3	10	300	150	1	1
WPGT-2S2500	2500 \pm 20%	3100	3200	5	3	3	10	300	150	1	1
WPGT-2S2700	2700 \pm 20%	3300	3400	5	3	3	10	300	150	1	1
WPGT-2S3000	3000 \pm 20%	3600	3700	5	3	3	10	300	150	1	1

UL497B Recognized, File #E135015 (WPGT-2S75 through WPGT-2S600)
 UL1449 and C-UL 3rd Edition Recognized, File #E196885 (WPGT-2S1200 through WPGT-2S3000)

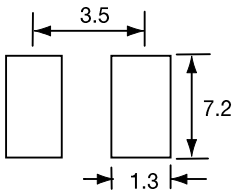
*DC Breakdown Voltage	DC Measuring Voltage
70-90V	50V
145-400V	100V
470-600V	250V
1200-2000V	550V

Dimensions

Unit: mm



Recommended Pad Size



3 Electrode Surface Mount Mini Series (3SM)

Specifications

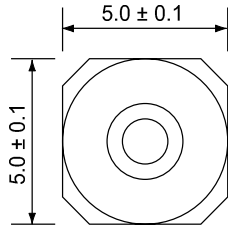
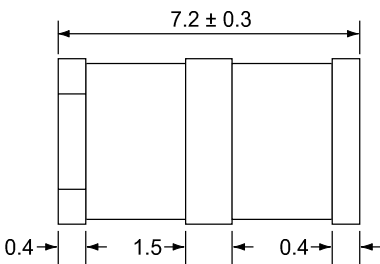
Base Part Number	DC Breakdown Voltage (V)	Maximum Impulse Breakdown Voltage (V)			Maximum Impulse Discharge Current (8/20 μ s) (KA)		Alternating Discharge Current (A)		Impulse Life (10/1000 μ s) (200A) times	DC Holdover Voltage (V)	Minimum Insulation Resistance (G Ω)	Maximum Capacitance (pf)
		100V/s	100V/ μ s	1000V/ μ s	1 time	10 times (5 times each polarity)	50Hz, 1 sec	Single 9 cycles				
WPGT-3SM75	75 \pm 20%	600	700		10	5	5	30	300	52	1	2
WPGT-3SM90	90 \pm 20%	500	600		10	5	5	30	300	52	1	2
WPGT-3SM120	120 \pm 20%	500	600		10	5	5	30	300	52	1	2
WPGT-3SM150	150 \pm 20%	500	600		10	5	5	30	300	52	1	2
WPGT-3SM200	200 \pm 20%	600	700		15	10	10	60	300	135	1	2
WPGT-3SM230	230 \pm 20%	600	700		15	10	10	60	300	135	1	2
WPGT-3SM250	250 \pm 20%	600	700		15	10	10	60	300	135	1	2
WPGT-3SM350	350 \pm 20%	650	750		15	10	10	60	300	150	1	2
WPGT-3SM400	400 \pm 20%	700	800		15	10	10	60	300	150	1	2
WPGT-3SM420	420 \pm 20%	700	800		15	10	10	60	300	150	1	2
WPGT-3SM470	470 \pm 20%	800	900		15	10	10	60	300	150	1	2
WPGT-3SM600	600 \pm 20%	900	1000		10	5	5	30	300	150	1	2

UL 497B Recognized, File #E135015.

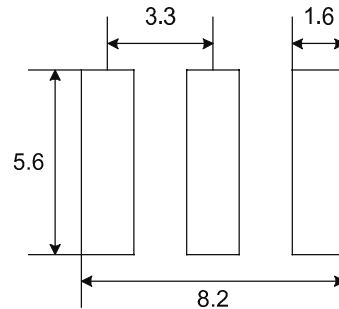
*DC Breakdown Voltage	DC Measuring Voltage
70 - 90	50V
120 - 400V	100V
420 - 600V	250V

Dimensions

Unit: mm



Recommended Pad Size



Note: Max coplanarity is 0.2mm. If tighter requirements are needed please contact World Products Inc.

Packaging

Standard Bulk Packaging

Axial or Radial Lead

100 pieces per plastic tray
 500 pieces per inner box
 10 inner boxes per carton
 5000 pieces per full carton

Surface Mount

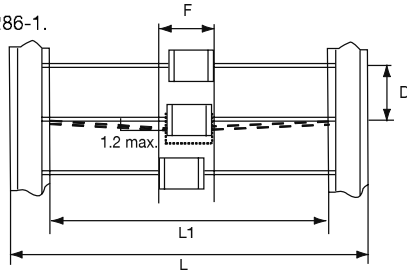
1000 pieces per plastic airproof bag
 2 plastic bags per inner box
 10 inner boxes per carton
 20000 pieces per full carton

2RM, 2R, 2N, 2T Axial Lead Taping

Unit: mm

Complies to EIA-296-E and EN60286-1.

Item	Dimensions
L1	52.4 ± 1.5
L	63.5 ± 1.5
D	10 ± 0.5
F	Length + 1.4 Max.

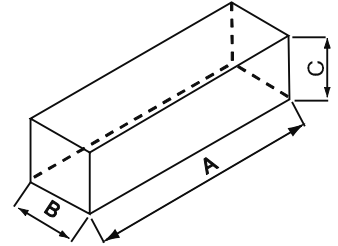


2RM, 2R, 2N, 2T Axial Lead Ammo Box

Unit: mm

Quantity: 500 pieces

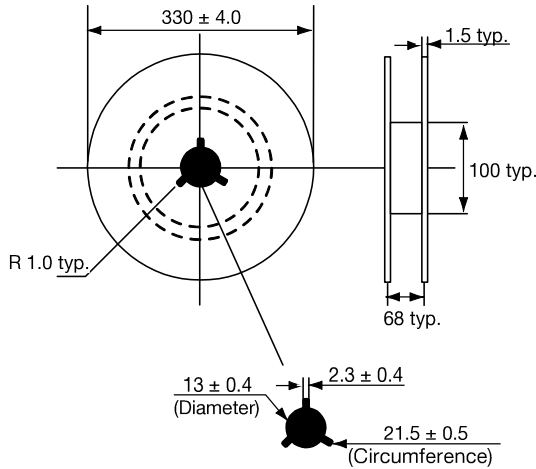
Item	Dimensions
A	255 Max.
B	75 ± 5.0
C	68 ± 5.0



2RM, 2R, 2N, 2T Axial Lead Reel

Unit: mm

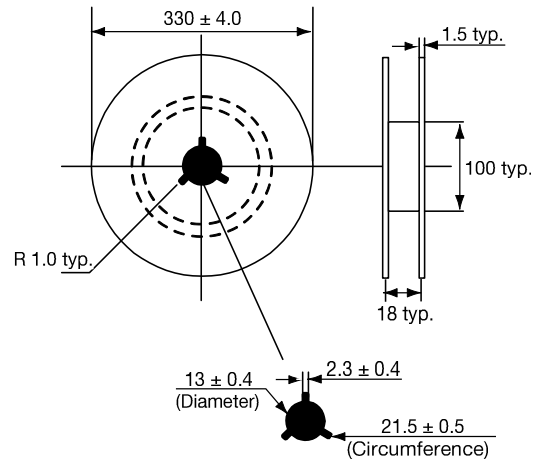
Quantity: 500 pieces



2S, 2SM, 2SS, 3SM SMD Reel

Unit: mm

Quantity: See SMD Taping

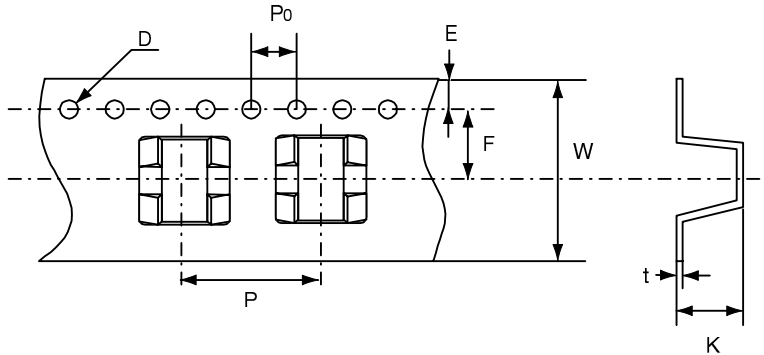


Packaging (continued)

2S SMD Taping

Unit: mm
 Quantity: 800 pieces per reel (13") - [Beginning March 2007]
 3 reels per inner box
 5 inner boxes per carton
 12,000 pieces per full carton - [Beginning March 2007]

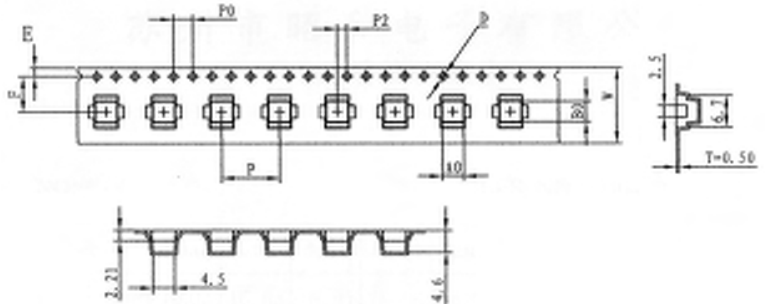
Item	Dimensions	Item	Dimensions
P	12.0 ± 0.1	E	1.75 ± 0.1
P ₀	4.0 ± 0.1	D	1.55 ± 0.1
W	16.0 ± 0.3	K	6.4 ± 0.1
F	7.5 ± 0.1	t	0.4 ± 0.05



2SM and 2SS SMD Taping

Unit: mm
 Quantity: 900 pieces per reel (13")
 3 reels per inner box
 5 inner boxes per carton
 13,500 pieces per full carton

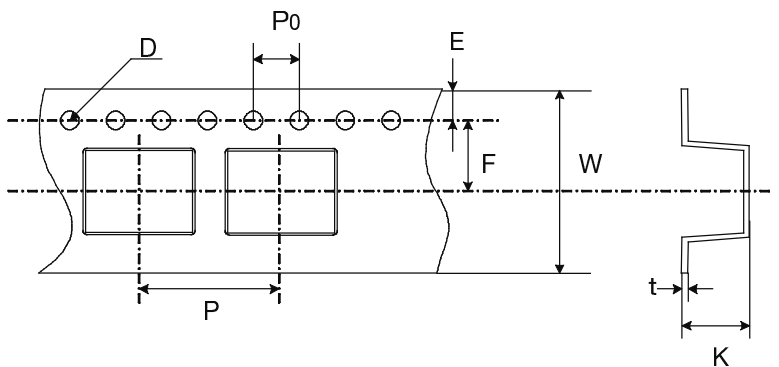
Item	Dimensions	Item	Dimensions
P	12.0 ± 0.1	E	1.75 ± 0.1
P ₀	4.0 ± 0.1	D	1.5 ± 0.1
W	16.0 ± 0.3	t	0.5 typ
F	7.5 ± 0.1	A ₀	4.5 ± 0.1
B ₀	4.3 ± 0.1	K ₀	4.6 ± 0.1
		K ₁	0 ± 0.1
		D ₁	0 ± 0.1
		P ₂	2 ± 0.1



3SM SMD Taping

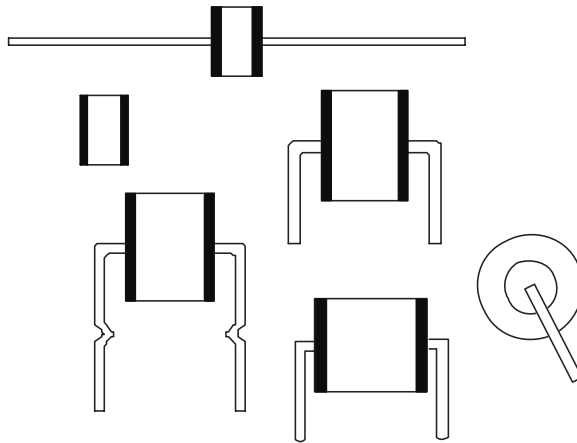
Unit: mm
 Quantity: 900 pieces per reel (13")
 3 reels per inner box
 5 inner boxes per carton
 13,500 pieces per full carton

Item	Dimensions	Item	Dimensions
P	12.0 ± 0.1	E	1.75 ± 0.1
P ₀	4.0 ± 0.1	D	1.55 ± 0.05
W	16.0 ± 0.3	K	5.5 ± 0.1
F	7.5 ± 0.1	t	0.4 ± 0.05



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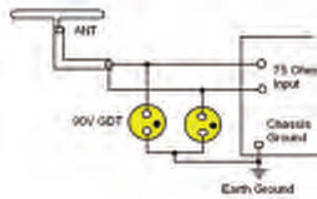
GAS DISCHARGE TUBES



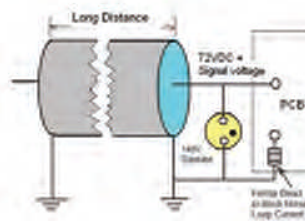
www.DataSheet4U.com

Gas Discharge Tube are designed to limit voltage surges on balanced or unbalanced communications circuits and on DC to 420 Hz power circuits. Although telephone circuits are a major application for gas tube surge arrestors, this guide will also provide useful information for other surge applications such as AC circuits.

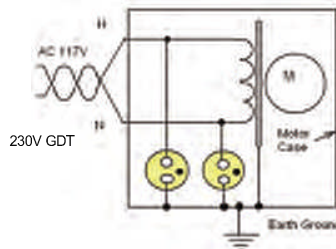
Gas Tube in Antenna Protection



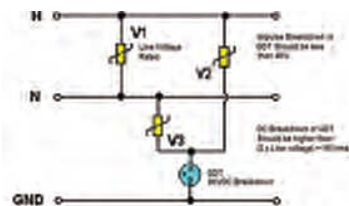
GDT In Cable Protection



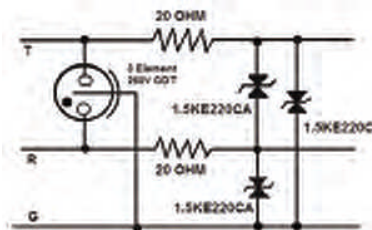
Motor (two wire System) Protection from Lightning



Gas Tube Application In AC Line Isolation



GDT & TVSD Telephone Line Protection



All application notes/circuits are shown as examples only. It is the responsibility of the purchaser to insure that the application meets purchaser's specifications. No representation or warranty, whether express or implied, is given and no liability is assumed by WPI with respect to the use of such examples.

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