

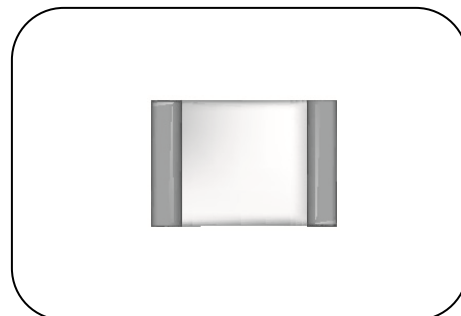
# Gas Discharge Tube: GS22R Series



## SMD L3.2 x W1.6 x H1.6 mm Type

### ■ Features

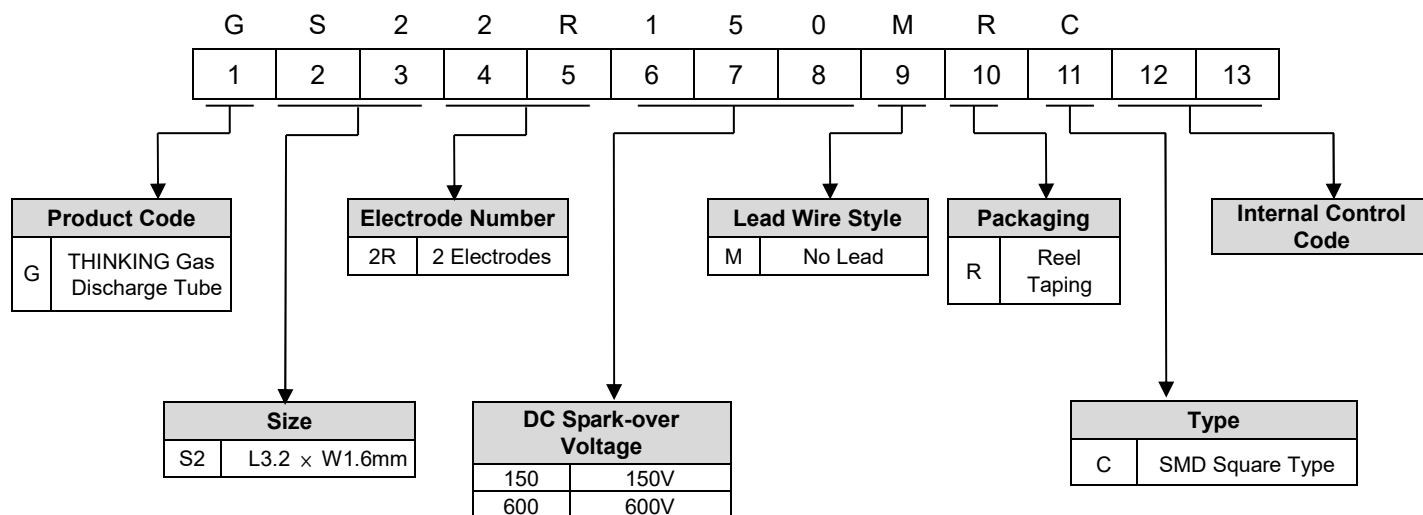
1. RoHS & HF compliant
2. SMD structure
3. DC spark-over voltage: 150~600V
4. Low capacitance
5. Agency recognition: UL
6. Operating temperature: -40°C ~ +105°C  
Storage temperature: -40°C ~ +115°C



### ■ Recommended Applications

1. Cable modem
2. xDSL
3. Set-top box
4. TV sets
5. Ethernet port
6. Consumer electronics

### ■ Part Number Code



# Gas Discharge Tube: GS22R Series



## SMD L3.2 x W1.6 x H1.6 mm Type

### ■ Characteristics

Part No.	DC Spark-over Voltage	Max. Impulse Discharge Current	Impulse Withstanding Voltage Capacity	Normal Alternating Discharge Current	Impulse Life	Minimum Insulation Resistance (MΩ)	Maximum Capacitance 1MHz (pF)	Safety Approvals UL 1449
	100V/S	8/20μs	10/700μs	50Hz, 1 Sec	8/20μs, 50A			
	(V)	(A)	(KV)	(A)	(Times)			
GS22R150MRC	105~195	500A (Positive/ Negative 5 Times)	6KV R=40Ω (Positive/ Negative 5 Times)	0.5A 10 Times	300	Min. 100 (@DC 100V)	0.3	√
GS22R200MRC	140~260							√
GS22R400MRC	280~520							√
GS22R420MRC	294~546							√
GS22R500MRC	350~650							√
GS22R600MRC	420~780							√

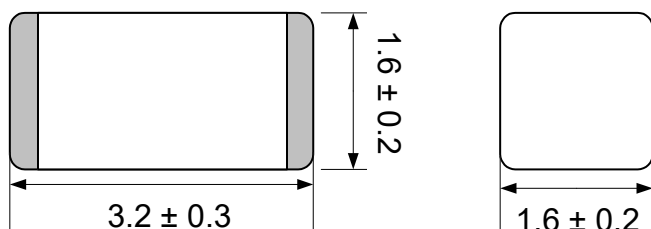
Note1: UL 1449 4th File No: E314979

Note2: Insulation resistance test condition:

DC Spark-over Voltage	DC Measuring Voltage
150-600V	100V

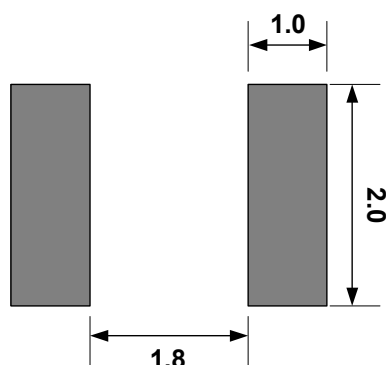
### ■ Dimension

(Unit: mm)



### ■ Recommended Pad Size

(Unit: mm)



# Gas Discharge Tube: GS22R Series

## SMD L3.2 x W1.6 x H1.6 mm Type

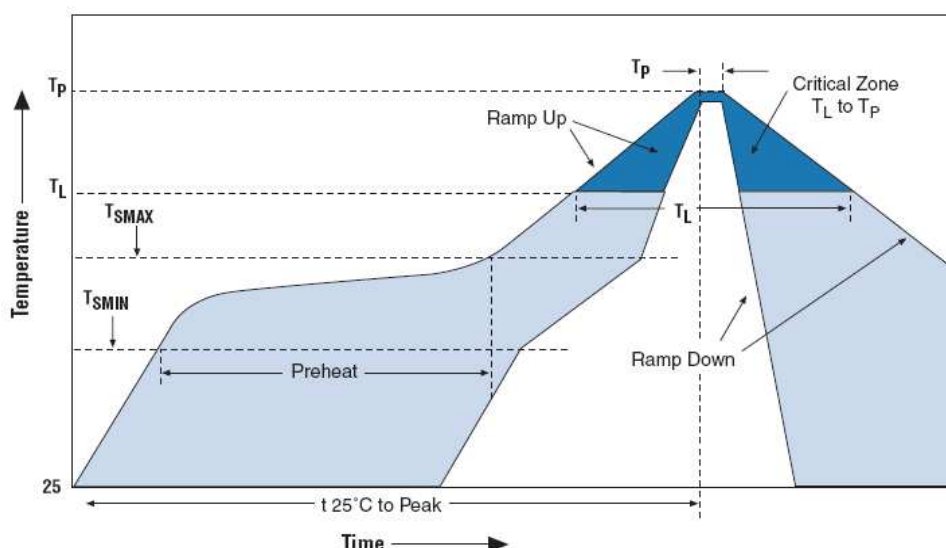


### ■ Soldering Recommendation

#### ● Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec. (max.)
Diameter of Soldering Iron-tip	Φ3mm (max.)
Caution: Please do not touch the component surface with soldering iron directly to avoid its damage.	

#### ● IR-Reflow Soldering Profile



#### Lead-Free Reflow Profile Recommendation (IPC/JEDEC J-STD-020C)

Reflow Parameter	Lead-Free Assembly
Minimum preheat temperature (TsMIN)	150°C
Maximum preheat temperature (TsMAX)	200°C
Preheat Time	60-180 seconds
TsMAX to TL ramp-up rate	3°C/second maximum
Time above temperature TL (tL)	217°C 60-120 seconds
Peak Temperature (TP)	245°C ~260°C(recommended 250°C)
Time 25°C to TP	6 minute maximum
Time within 5° of Peak TP	10-20 seconds
Ramp-down rate	4°C/second maximum

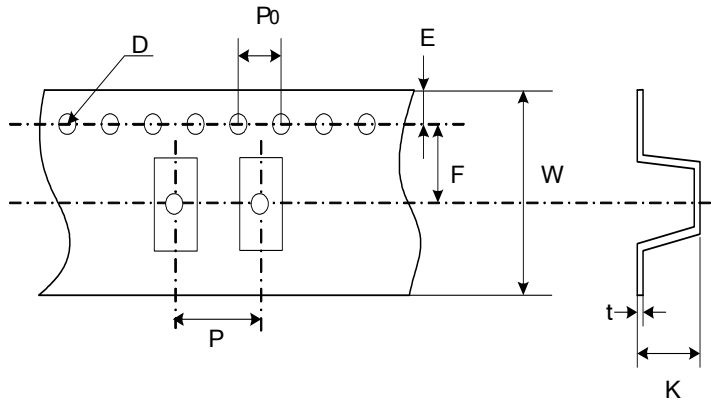
# Gas Discharge Tube: GS22R Series



## SMD L3.2 x W1.6 x H1.6 mm Type

### ■ Packaging

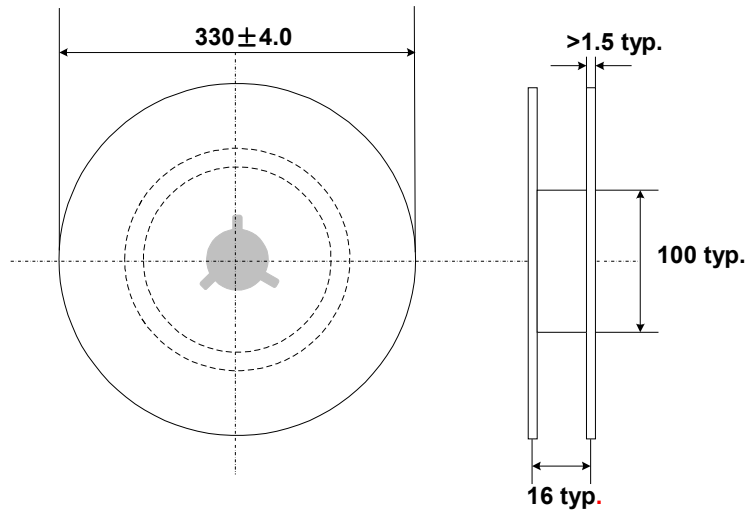
#### ● Taping



Quantity (MPQ): 3,000pcs

(Unit: mm)

Item	P	P0	W	F	E	D	K	t
Spec.	8.0	4.0	12.0	5.45	1.75	Φ1.55	2.0	0.3
Tolerance	±0.1	±0.1	±0.3	±0.1	±0.1	±0.05	±0.1	±0.05



### ■ Warehouse Storage Conditions of Products

#### ● Storage Conditions:

1. Storage Temperature:  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative Humidity:  $\leq 75\% \text{RH}$
3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage: 1 year

# Gas Discharge Tube: GF32R Series



## SMD L4.5 x W3.2 x H2.7 mm Type

### ■ Features

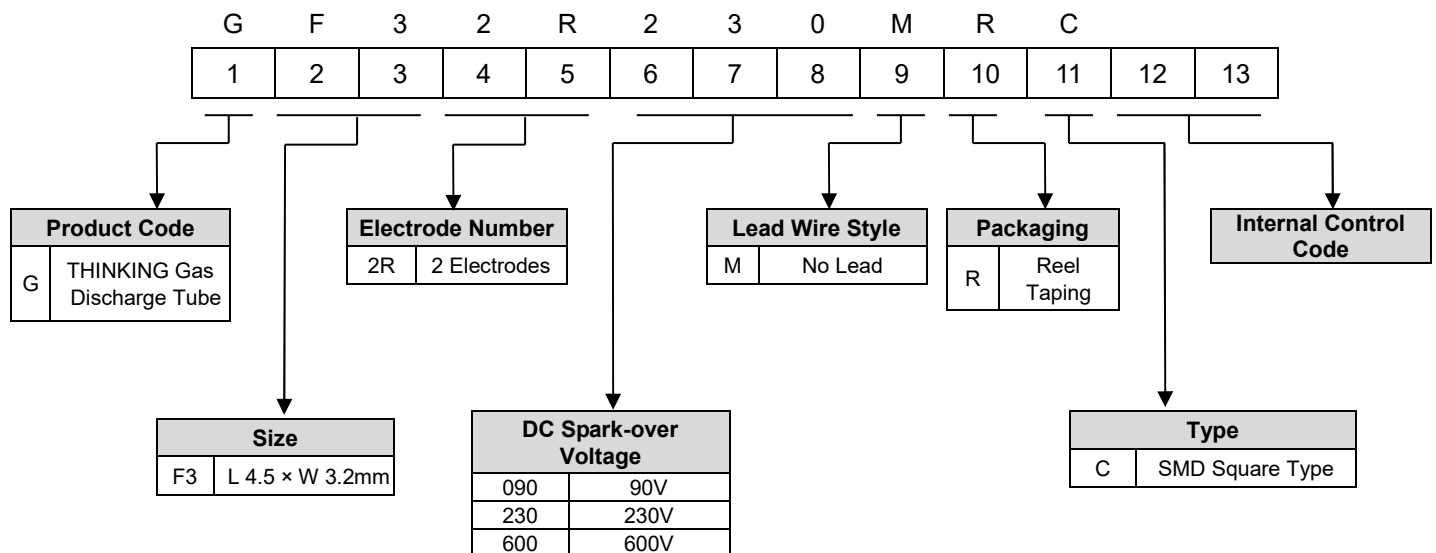
1. RoHS & HF compliant
2. SMD structure
3. DC spark-over voltage: 90~600V
4. Low capacitance
5. Agency recognition: UL
6. Operating temperature: -40°C ~ +105°C  
Storage temperature: -40°C ~ +115°C



### ■ Recommended Applications

1. Cable modem
2. xDSL
3. Set-top box
4. TV sets
5. Ethernet port
6. Consumer electronics

### ■ Part Number Code



# Gas Discharge Tube: GF32R Series



## SMD L4.5 x W3.2 x H2.7 mm Type

### ■ Characteristics

Part No.	DC Spark-over Voltage	Maximum Impulse Breakdown Voltage	Max. Impulse Discharge Current	Impulse Withstanding Voltage Capacity	Impulse Life	Minimum Insulation Resistance	Maximum Capacitance	Safety Approvals		
	100V/S (V)	1000V/ $\mu$ s (V)	8/20 $\mu$ s (KA)	10/700 $\mu$ s (KV)	8/20 $\mu$ s, 100A (Times)		1MHz (pF)	UL 497B		
GF32R090MRC	90 (63~117)	800	3KA (Positive/ Negative 5 Times)	6KV R=40 $\Omega$ (Positive/ Negative 5 Times)	300	100 (DC 100V)	0.5	√		
GF32R120MRC	120 (84~156)	600						√		
GF32R150MRC	150 (105~195)	600						√		
GF32R200MRC	200 (140~260)	600						√		
GF32R230MRC	230 (161~299)	700						√		
GF32R300MRC	300 (210~390)	700						√		
GF32R350MRC	350 (245~455)	750	2KA (Positive/ Negative 5 Times)		6KV R=40 $\Omega$ (Positive/ Negative 5 Times)			300	100 (DC 100V)	√
GF32R400MRC	400 (280~520)	850								√
GF32R420MRC	420 (294~546)	900								√
GF32R470MRC	470 (329~611)	950								√
GF32R500MRC	500 (350~650)	1000								√
GF32R600MRC	600 (420~780)	1050								√
GF32R800MRC	800 (560~1040)	1600	1KA (Positive/ Negative 5 Times)	6KV R=40 $\Omega$ (Positive/ Negative 5 Times)		300	100 (DC 100V)	-		
GF32R10BMRC	1000 (700~1300)	1600						-		
GF32R12BMRC	1200 (840~1560)	1800						-		

Note1: UL 497B File No : E245070

Note2: Insulation resistance test condition:

DC Spark-over Voltage	DC Measuring Voltage
70-90V	50V
120-600V	100V
800-1000V	250V
1000-1200V	500V

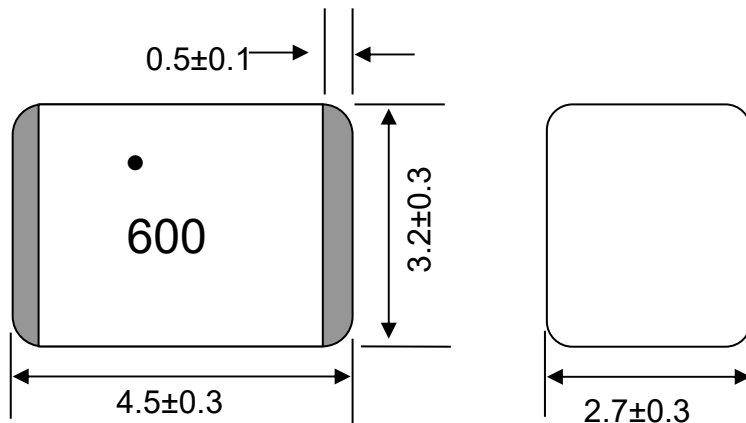
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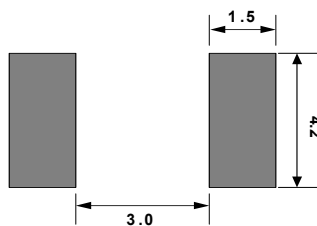
## SMD L4.5 x W3.2 x H2.7 mm Type

### ■ Dimension

(Unit: mm)

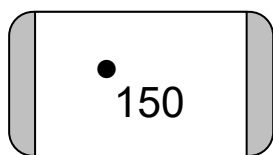


### ■ Recommended Pad Size



### ■ Marking

Example: GF32R150MRC



# Gas Discharge Tube: GF32R Series

## SMD L4.5 x W3.2 x H2.7 mm Type

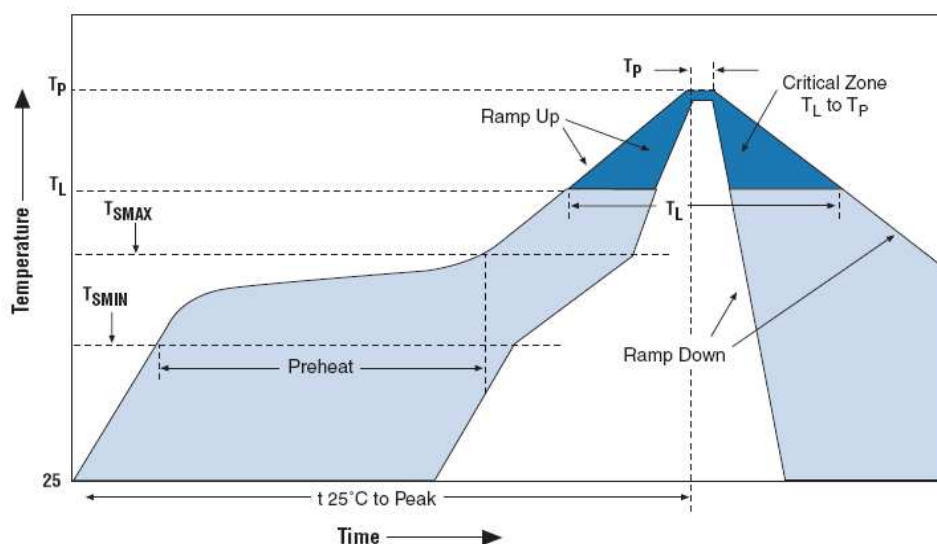


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Time above temperature TL(tL)	217°C 60-120 seconds
Peak Temperature (TP)	245°C ~260°C(recommended 250°C)
Time 25°C to TP	6 minute maximum
Time within 5° of Peak TP	10-20 seconds
Ramp-down rate	4°C/second maximum