

CARBON FILM RESISTORS(CF) SPECIFICATION	SPECIFICATION NO.	LGE—CF--01
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1. GENERAL INSTRUCTION:

1-1 SCOPE

This specification applies to the Carbon Film Resistor MADE BY LGE ELECTRONICS IND.CORP.

1-2 CLASSIFICATION

Type number is described as follows:  
CF      1/2W      T      100K OHM      J(±5%)  
CLASS    POWER RATING      SHAPE      NOMINAL      TOLERANCE  
RESISTANCE  
VALUE

2. NOMINAL RESISTANCE:

The nominal resistance shall be the resistance marked on the resistor body and identified, as a rule, in units ,Ω,KΩ,MΩ.

3. NOMINAL RESISTANCE TOLERANCE.

The nominal resistance tolerance is represented in one capital letter selected from G(±2%), J(±5%),K(±10%)

4 RSTING:

MOF (CARBON FILM FLXED RESISTORS)

STYLE	MAX WORKING	MAX OVERLOAD	RESISTANCE VALUE RANGE
CF1/6W.1/8W.1/16W	200V	400V	1Ω—10MΩ
CF1/4 WS	250V	500V	1Ω—100MΩ
CF1/4 W	250V	500V	1Ω—10MΩ
CF1/2 WS	350V	700V	1Ω—10MΩ
CF1/2W	350V	700V	1Ω—10MΩ
CF1WS	500V	1000V	1Ω—10MΩ
CF1W	500V	1000V	1Ω—10MΩ
CF2WS	500V	1000V	1Ω—10MΩ
CF2W	500V	1000V	1Ω—10MΩ
CF3WS	500V	1000V	1Ω—10MΩ
CF3W	500V	1000V	1Ω—10MΩ

**LIEAN-GIMN ENTERPRISE CO.,LTD.**

CARBON FILM RESISTORS(CF) SPECIFICATION	SPECIFICATION NO.	LGE—CF--02
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**4-1.POWER RATING**

power rating is defined as maximum power rating continuously applied under ambient temperature at 70°C .when the ambient temperature exceeds 70°C ,use chart 1.

**RATED  
POWER  
RATIO %**

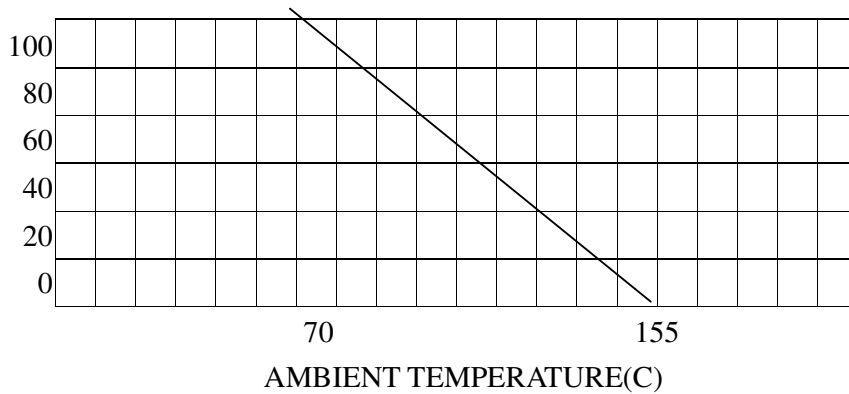


CHART 1

**4-2 RATED VOLTAGE**

Rated voltage is defined as the DC or AC(effective Value at commercial frequency example 50 C/S,60 C/S) Voltage when rated power is applied and can be calculated By the following EQUATIONE = $\sqrt{P \times R}$   
 E=RATED VOLTAGE VOLTAGE  
 P=RATED POWER (WATTS)  
 R=NOMINAL RESISTANCE VALUE(OHM)

When the calculated rated voltage exceeds the Maximum usable voltage flue shown in CHART 1,the Maximum usable voltage is defined as the voltage According to the power-decreasing curve shown in CHART1.

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CARBON FILM RESISTORS(CF) SPECIFICATION		SPECIFICATION NO.	LGE—CF—03
ITEM (STANDARD)	PERFORMANCE AND/OR QUALITY ACCEPTANCE	TEST METHOD	
Current noise	$R_X < 100\text{Kohm}$ 0.2 $100\text{ Kohm} \leq R_X \leq 1\text{Mohm}$ 0.4 $\mu\text{ v/V}$ $1\text{Mohm} < R_X$ 0.6 $\mu\text{ v/V}$	Use resistor noise tester model 315B Quean-tech laboratories INC.U.S.A.	
Resistance value Vs Temperature Characteristics	For $R_X < 100\text{Kohm} + 350 \sim 500\text{ppm}/^\circ\text{C}$ $100\text{Kohm} \leq R_X \leq 1\text{Mohm}$ 0~ -700PPM / $^\circ\text{C}$ 1 Mohm < $R_X$ 0~ -1500PPM / $^\circ\text{C}$	Measure resistance( $R_o$ ohm)at room temperature( $T_o$ $^\circ\text{C}$ ) Measure again the same at 100 $^\circ\text{C}$ higher than room temperature $\text{PPM} = \frac{R - R_o}{R_o} \times \frac{10^6}{(T_o + 100) - T_o}$	
Short time overload	The resistance variation shall be with in $\pm(0.75\% + 0.05\text{ohm})$ and there shall be no mechanical breakage	Apply DC voltage 2.5times the rated voltage for 5 seconds The leave at room temperature for 30 minutes then measure MAX overload voltage 0.50W – 700V(DC)	
Insulation resistance	10,000M ohm or more	Lay the resistor on 90 $^\circ$ angle metal V block apply 100VDC between resistor lead and V block for one Minute And measure	
voltage endurance	The resistance variation shall be with in $\pm(0.5\% + 0.05\text{ohm})$ and there shall be no mechanical breakage	lay the resistor on the 90 $^\circ$ angle metal V block and apply rated AC voltage for one Minute .Test voltage 0.25W – 500V(AC) 0.50W – 700V(AC)	
Intermittent overload	Resistance variation variation shall be With in $\pm(0.75\% + 0.05\text{ohm})$	Apply AC voltage 4 times the rated voltage for 1 second and rest for 25seconds and Repeat this cycle for 10.000 $\pm$ 200 times leave resistor 30 minutes at room temperature after test and measure. Maximum voltage for intermittent overload .0.50W – 700V(AC)	

CARBON FILM RESISTORS(CF) SPECIFICATION		SPECIFICATION NO.		LGE—CF—04		
ITEM (STANDARD)	PERFORMANCE AND/OR QUALITY ACCEPTANCE	TEST METHOD				
Terminal strength	Resistance variation shall be with in $\pm(0.5\%+0.05\text{ohm})$ also there shall be on mechanical breakage	Pull test: apply 1kg force to the lead in the direction of lead axis for $30\pm 5$ seconds. Bend test: apply 500g at $90^\circ$ angle against the direction of lead axis then bend the lead $90^\circ$ angle and bend back the lead to make it straight then lead $90^\circ$ to the opposite direction)				
Vibration (Low Frequency)	Resistance variation shall be With in $\pm(1\%+0.05\text{ohm})$ and there shall be no mechanical breakage	Apply 1.5mm amplitude vibration to there directions perpendicular to each other 2 hours each total 6 hours. vibrating frequency is 10HZ—55HZ—10HZ cycle in in one minute and repeat cycle				
Heat resistively against soldering	Resistance variation shall be With in $\pm(0.75\%+0.05\text{ohm})$ also there shall be no mechanical breakage	Dip the lead into a solder bath having a temperature of $350^\circ\text{C}\pm 10^\circ\text{C}$ up to $4\pm 0.8$ mm from the body of the resistor and hold it for $3\pm 0.5$ seconds leave the resistor at room temperature 3 hours after test ,then measure				
Solder ability	More than 95% of the surface of the lead Shall be covered by new solder after the Leads are dipped in the solder	Dip the lead into a solder bath having a temperature of $230^\circ\text{C}\pm 5^\circ\text{C}$ up to $4\pm 0.8$ mm from the body of the resistor and hold it for $5\pm 0.5$ seconds then inspect				
Temperature cycle	Resistance variation shall be With in $\pm(0.75\%+0.05\text{ohm})$ also there shall be no mechanical breakage	Sequence	1	2	3	4
		Temperature-	$55^\circ\text{C}$	$25^\circ\text{C}$	$155^\circ\text{C}$	$25^\circ\text{C}$
		Time	30 Min.	10—15 Min.	30 Min.	10-15 Min.
		One cycle consist 1-2-3-4 described above test for continuous 5 cycles and leave at room temperature for 1 hour after test, then measure				
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CARBON FILM RESISTORS(CF) SPECIFICATION		SPECIFICATION NO.	LGE—CF--05
ITEM (STANDARD)	PERFORMANCE AND/OR QUALITY ACCEPTANCE	TEST METHOD	
Humidity load test	Resistance variation be With in $\pm(3\%+0.05\text{ohm})$ also there shall be no mechanical breakage	In temperature chamber having temperature $40^{\circ}\text{C}\pm 2^{\circ}\text{C}$ ,relative humidity 90-95%, apply rated voltage 1.5hour and shut voltage 0.5 hour repeat this cycle for 1000 hours,leave in room temperature for 1hour after test,then measure	
Load test	The variation of the resistance shall be With in $\pm(3\%+0.05\text{ohm})$ also there shall be no mechanical breakage	In the constant temperature chamber having temperature $70^{\circ}\text{C}\pm 2^{\circ}\text{C}$ , apply rated DC voltage for 1.5hour and shut voltage for 0.5 hour and repeat this cycle for 1000 hours,Leave in room temperature 1hour after test.Then measure	
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5. Marking



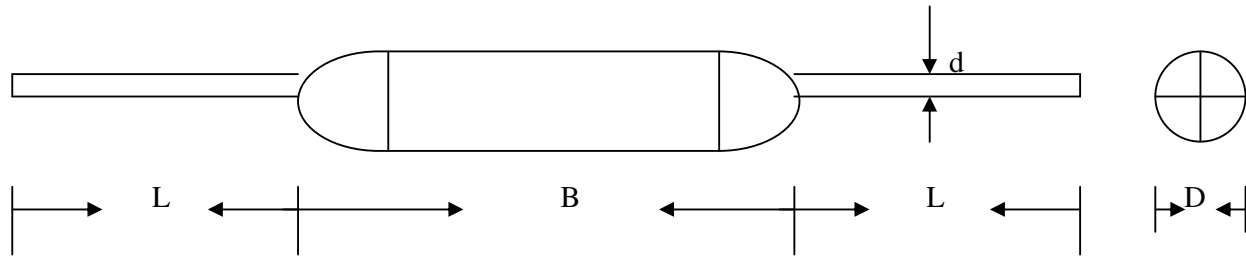
Tolerance  
Number of zeros or decimal multiplier  
2 nd significant figure  
1 st significant figure

Color refer

Color	1 st Band	2 nd Band	3 rt Band	4 th Band
Black	0	0	$10^0$	
Brown	1	1	$10^1$	
Red	2	2	$10^2$	$\pm 2\%$
Orange	3	3	$10^3$	
Yellow	4	4	$10^4$	
Green	5	5	$10^5$	
Blue	6	6	$10^6$	
Violet	7	7	$10^7$	
Grey	8	8	$10^8$	
White	9	9	$10^9$	
Gold			$10^{-1}$	$\pm 5\%$
Silver			$10^{-2}$	$\pm 10\%$

6.Dimension

6-1 Outline Dimensions

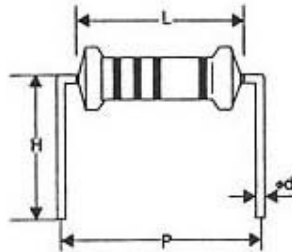


6-2 TABLE

WATTS	B	D	L	$d \pm 0.02m$
1/6W / 1/8W 1/16W	$3.2 \pm 0.2$	$1.8 \pm 0.2$	$28 \pm 2.0$	0.43
1/4WS	$3.2 \pm 0.2$	$1.8 \pm 0.2$	$28 \pm 2.0$	0.43
1/4W	$6.0 \pm 0.2$	$2.3 \pm 0.2$	$27 \pm 2.0$	0.50
1/2WS	$6.0 \pm 0.2$	$2.3 \pm 0.2$	$27 \pm 2.0$	0.50
1/2W	$9.0 \pm 0.5$	$3.2 \pm 0.2$	$26 \pm 2.0$	0.60
1WS	$9.0 \pm 0.5$	$3.2 \pm 0.2$	$26 \pm 2.0$	0.60
1W	$11.0 \pm 0.5$	$4.5 \pm 0.5$	$35 \pm 2.0$	0.70
2WS	$11.0 \pm 0.5$	$4.5 \pm 0.5$	$35 \pm 2.0$	0.70
2W	$15.0 \pm 0.5$	$5.0 \pm 0.5$	$32 \pm 2.0$	0.80
3WS	$15.0 \pm 0.5$	$5.0 \pm 0.5$	$32 \pm 2.0$	0.80
3W	$17.0 \pm 0.5$	$6.0 \pm 0.5$	$32 \pm 2.0$	0.80

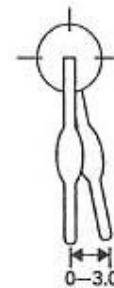
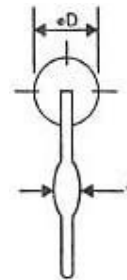
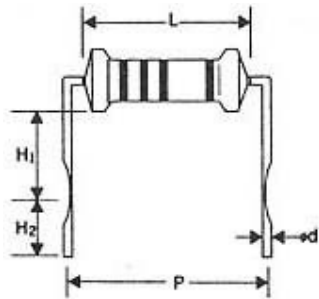
7. FORMED DIMENSIONS

7-1 M-TYPE



WATTS	DIMENSIONS(mm)				
	L	P±1.0	D	d±0.02	H±1.0
1/6W/1/8W/1/16W /1/4WS	3.2±0.2	6	1.8±0.2	0.43	8.0
1/4W/1/2WS	6.0±0.2	10	2.3±0.2	0.50	10
1/2W/1WS	9.0±0.5	12.5	3.2±0.2	0.60	10
1W/2WS	11.0±0.5	15	4.5±0.5	0.70	12.5
2W/3WS	15.0±0.5	20	5.0±0.5	0.80	15.0
3W	17.0±0.5	22	6.0±0.5	0.80	14.5

7-2 MB-TYPE



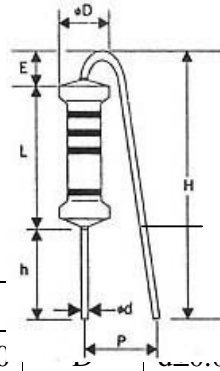
WATTS	DIMENSIONS(mm)						
	L	P±1.0	D	d±0.02	H1±1.0	H2±1.0	t±0.5
1/2W/1WS	9.0±0.5	12.5	3.2±0.2	0.60	6.0	5.0	1.2
1W/2WS	11.0±0.5	15	4.5±0.5	0.70	6.0	5.0	1.25
2W/3WS	15.0±0.5	20	5.0±0.5	0.80	7.0	5.0	1.25
3W	17.0±0.5	22	6.0±0.5	0.80	13.0	5.0	1.25

CARBON FILM RESISTORS(CF)  
SPECIFICATION

SPECIFICATION NO.

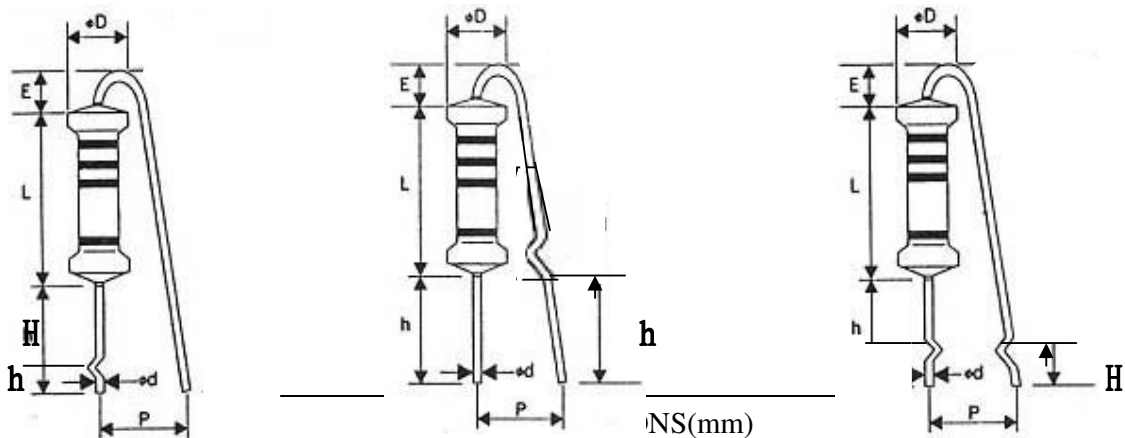
LGE—CF—09

7-3 F-TYPE



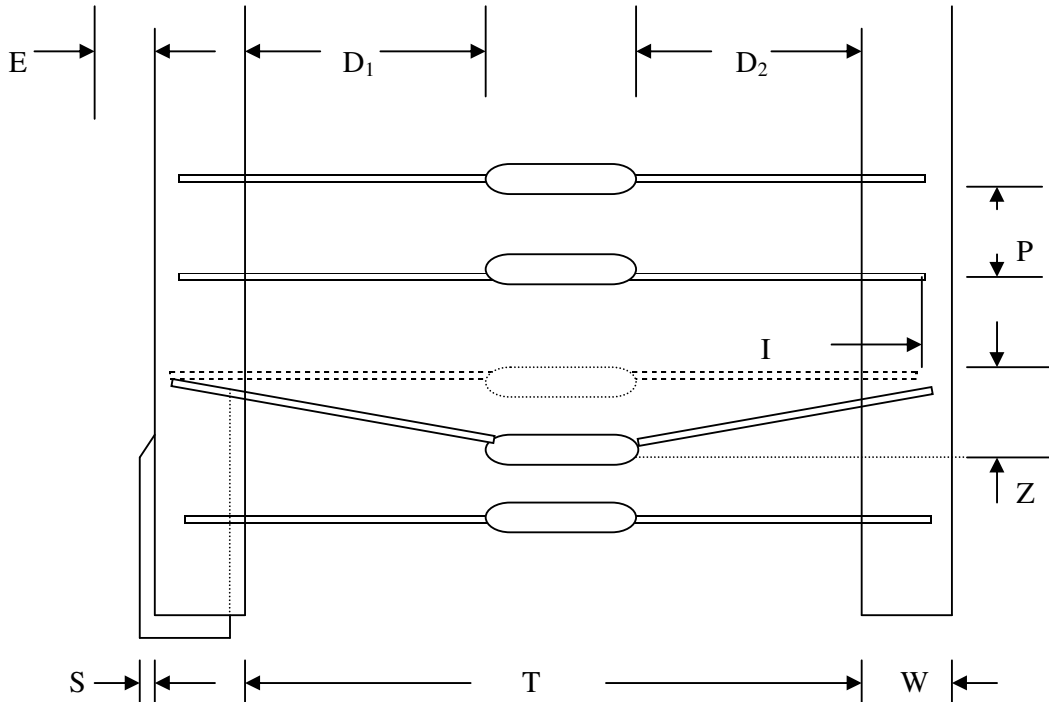
WATTS	S (mm)						
	L	P±1.0	D	d±0.02	h+1/-0	H±1.0	E <sub>max</sub>
1/4W/1/2WS	6.0±0.2	6	2.3±0.2	0.50	5.0	14	3
1/2W/1WS	9.0±0.5	6	3.2±0.2	0.60	5.0	18	3.5
1W/2WS	11.0±0.5	6	4.5±0.5	0.70	5.0	20	3.5
2W/3WS	15.0±0.5	6	5.0±0.5	0.80	5.0	24	3.5
3W	17.0±0.5	6	6.0±0.5	0.80	5.0	26	3.5

7-4 FK1-TYPE,FK2-TYPE AND FKK-TYPE



WATTS	NS(mm)						
	L	P±1.0	D	d±0.02	h+1/-0	H±1.0	E <sub>max</sub>
1/2W/1WS	9.0±0.5	6	3.2±0.2	0.60	5	5	3.5
1W/2WS	11.0±0.5	9	4.5±0.5	0.70	5	5	3.5
2W/3WS	15.0±0.5	10	5.0±0.5	0.80	5	5	3.5
3W	17.0±0.5	10	6.0±0.5	0.80	5	5	3.5

8. Taping Dimensions



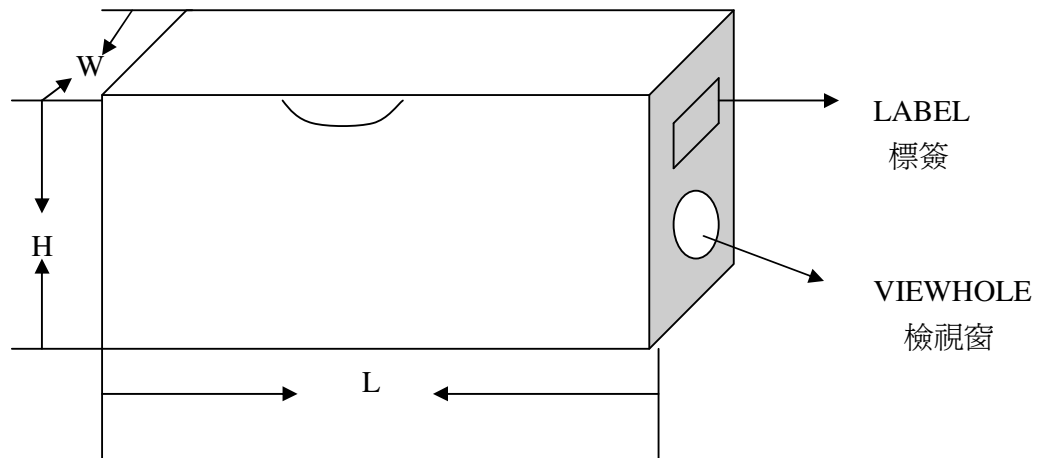
WATTS	Type	T	p±0.5	W±0.5	D1-D2 MAX	E MAX	Z MAX	S MAX	I MAX
1/6W/1/8W	T- 26	26-1.5 26-0	5	6	0.8	0	1.2	0.8	3.2
	T- 52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1/4W 1/2WS	T- 26	26+1.5 26-0	5	6	0.8	0	1.2	0.8	3.2
	T- 52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1/2W/1WS	T- 52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1W/2WS	T- 73	73±1.5	5	6	0.8	0	1.4	0.8	3.2
2W/3WS	T- 73	73±1.5	10	6	0.8	0	1.4	0.8	3.2
3W	T- 73	73±1.5	10	6	0.8	0	1.4	0.8	3.2

9 PACKING

9—1. TAPING TYPE

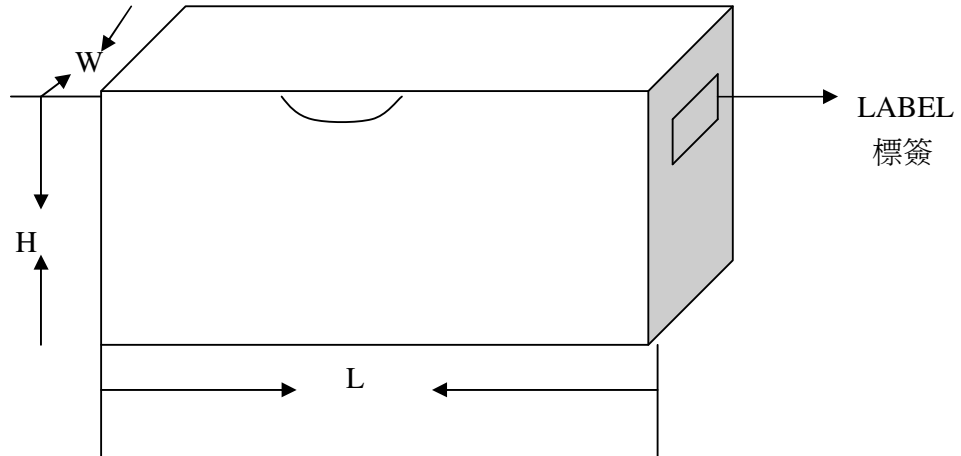
LABEL SPECIFICATION

- 1 TYPE
- 2 2 WATTS TOLERANCE
- 3 3 RESISTANT QUANTITY LIEAN-GIMN ENTERPRISE CO, LTD
- 4 P/N
- 5 LOT NO.



TYPE	WATTS	L (in)	W (in)	H (in)	QTY(pcs)
T—26	1/6W 1/8W	10.25	2	2.75	5000
	1/16W 1/4WS				
	1/4W/ 1/2WS				
T—52	1/6W / 1/8W	10.25	2.875	2.5	5000
	1/16W 1/4WS				
	1/4W/ 1/2WS				
	1/2W/ 1WS			1.875	1000
	1W/ 2WS				
	2WS/ 3WS				
	3W	10.5	3.625	2.875	500

9-2 BULK



WATTS		TYPE	L(in)	W(in)	H(in)	POLY BOG	BOX(pcs)
1/6W	1/16W	P	9.75	5.5	2.64	1000	20000
1/8W	1/4WS	MOLDING					
1/4W	1/2WS	P	9.75	5.5	2.64	500	10000
		MOLDING					
1/2W	1WS	P	9.75	5.5	2.64	500	5000
		MOLDING					
1W	2WS	P	9.75	5.5	2.64	200	2000
		MOLDING					
2W	3WS	P	9.75	5.5	2.64	200	1000
		MOLDING					
3W		P	9.75	5.5	2.64	100	1000
		MOLDING					