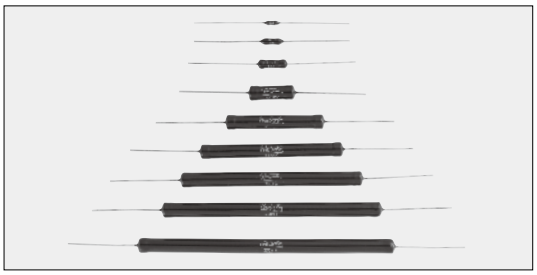
GS High Voltage High Resistance Thick Film Resistors



Coating color : Brown
Marking : Alphanumeric

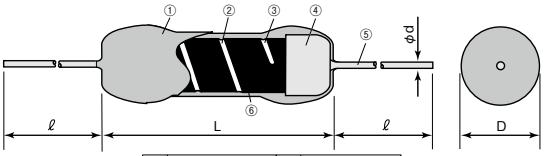
■Features

- Miniature construction endurable to high voltage and high power.
- Resistors excellent in anti-surge characteristics.
- Wide resistance range of 500kΩ～10GΩ and small T.C.R.
- Products meet EU-RoHS requirements. EU-RoHS regulation is not intended for Pb-glass contained in resistor element and Pb contained in Brass cap.

■Applications

- Copying machines.
- LBPs.
- Charging and discharging resistors for power supply circuits.
- High voltage dividing resistors.

■Construction



①	Insulation coating	④	Electrode cap
②	Trimming line	⑤	Lead wire
③	Ceramic core	⑥	Resistive film

■Dimensions

Type	Dimensions (mm)				Weight (g) (1000pcs)
	L	D	d (Nominal)	ℓ	
GS 1/4	6.3±1.0	2.3±0.5	0.65	38±3	320
GS 1/2	9.5±1.0	3.5±0.6	0.8		590
GS 1	15.0±1.5	4.5±1.0			1,230
GS 2	24.0±1.5	7.9±1.0	1.0		4,190
GS 3	52.0±2.0				7,750
GS 5	76.0±2.0				10,790
GS 7	97.0±3.0				13,350
GS 10	117.0±3.0				16,180
GS 12	137.0±3.0				18,440

■Type Designation

Example

GS	1/2	L	C	106	J
Product Code	Power Rating	T.C.R. (×10⁻⁶/K)	Terminal Surface Material	Nominal Resistance	Resistance Tolerance
	1/4 : 0.25W 1/2 : 0.5W 1 : 1W 2 : 2W 3 : 3W 5 : 5W 7 : 7W 10 : 10W 12 : 12W	D : ±100 L : ±200	C : SnCu	D,F : 4 digits G,J,K : 3 digits	D : ±0.5% F : ±1% G : ±2% J : ±5% K : ±10%

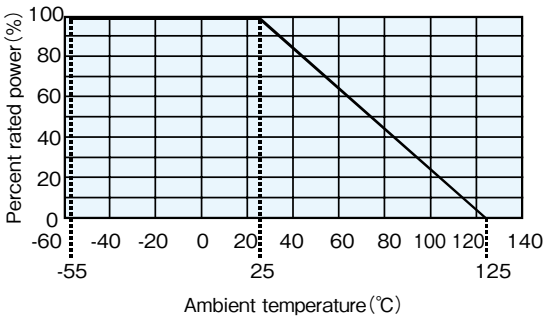
Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.
Custom forming for all of items and custom taping for GS1/4 · GS1/2 are available on request.

■Ratings

Type	Power Rating	T.C.R. (×10⁻⁶/K)	Resistance Range (Ω) D : ±0.5% E24·25×10ⁿ·50×10ⁿ	F : ±1% E24·25×10ⁿ·50×10ⁿ	G : ±2% E24·25×10ⁿ·50×10ⁿ	J : ±5% E24·25×10ⁿ·50×10ⁿ	K : ±10% E24·25×10ⁿ·50×10ⁿ	Max. Working Voltage	Max. Overload Voltage	Impulse Withstand Voltage
GS 1/4DC	0.25W	D : ±100	500k～20M	500k～100M	500k～100M	500k～100M	500k～100M	0.5kV	1kV	1.25kV
GS 1/4LC		L : ±200								
GS 1/2DC	0.5W	D : ±100	500k～50M		500k～200M	500k～200M	500k～200M	1kV	2kV	2.5kV
GS 1/2LC		L : ±200			500k～500M	500k～500M	500k～500M			
GS 1DC	1W	D : ±100			500k～500M	500k～500M	500k～500M	3kV	4.5kV	6kV
GS 1LC		L : ±200			500k～1G	500k～5G	500k～5G			
GS 2DC	2W	D : ±100			500k～500M	500k～500M	500k～500M	5kV	7.5kV	10kV
GS 2LC		L : ±200			500k～1G	500k～5G	500k～5G			
GS 3DC	3W	D : ±100			500k～500M	500k～500M	500k～500M	15kV	20kV	30kV
GS 3LC		L : ±200			500k～1G	500k～10G	500k～10G			
GS 5DC	5W	D : ±100			500k～500M	500k～500M	500k～500M	20kV	30kV	40kV
GS 5LC		L : ±200			500k～1G	500k～10G	500k～10G			
GS 7DC	7W	D : ±100	1M～50M	1M～100M	1M～500M	1M～500M	1M～500M	30kV	40kV	50kV
GS 7LC		L : ±200	500k～50M	500k～100M	500k～1G	500k～10G	500k～10G			
GS 10DC	10W	D : ±100	1M～50M	1M～100M	1M～500M	1M～500M	1M～500M	35kV	50kV	60kV
GS 10LC		L : ±200	500k～50M	500k～100M	500k～1G	500k～10G	500k～10G			
GS 12DC	12W	D : ±100	1M～50M	1M～100M	1M～500M	1M～500M	1M～500M	40kV	60kV	70kV
GS 12LC		L : ±200	500k～50M	500k～100M	500k～1G	500k～10G	500k～10G			

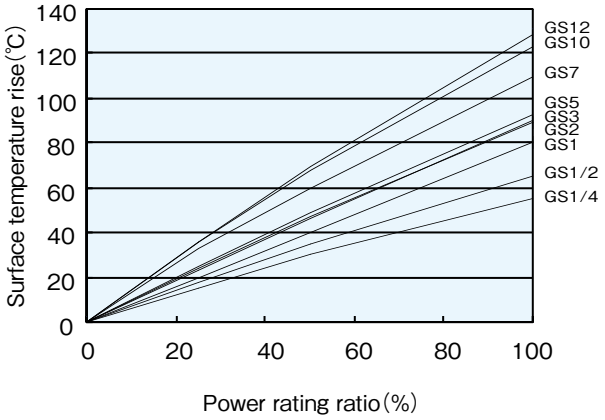
Rated Ambient Temperature : +25℃
Operating Temperature Range : −55℃～+125℃
Rated voltage = $\sqrt{\text{Power Rating} \times \text{Resistance value}}$ or Max. working voltage, whichever is lower.

■Derating Curve



For resistors operated at an ambient temperature of 25℃ or higher, the power shall be derated in accordance with the above derating curve.

■Surface Temperature Rise



■Performance

Test Items	Performance Requirements ΔR±%	Test Methods
Resistance	Within specified tolerance	25℃
T.C.R.	Within specified T.C.R.	+25℃/+125℃
Overload (Short time)	2 : T.C.R. 200×10⁻⁶/K 0.5 : T.C.R. 100×10⁻⁶/K	Rated voltage×2.5 (GS1/4, GS1/2), Rated voltage×2 (GS1～GS12) or Max. overload voltage, whichever is lower, for 5s
Resistance to soldering heat	2 : T.C.R. 200×10⁻⁶/K 0.5 : T.C.R. 100×10⁻⁶/K	350℃±10℃, 3s±0.5s or 260℃±5℃, 10s±1s
Rapid change of temperature	2 : T.C.R. 200×10⁻⁶/K 0.5 : T.C.R. 100×10⁻⁶/K	−55℃ (30min.) /+125℃ (30min.), 5 cycles
Moisture resistance	5 : T.C.R. 200×10⁻⁶/K 2 : T.C.R. 100×10⁻⁶/K	40℃, 90%～95%RH, 1000h
Endurance at 25℃	3 : T.C.R. 200×10⁻⁶/K 2 : T.C.R. 100×10⁻⁶/K	25℃, 1000h 1.5h ON/0.5h OFF cycle
Voltage coefficient	±50×10⁻⁶/ V : T.C.R. 200×10⁻⁶/K ±10×10⁻⁶/ V : T.C.R. 100×10⁻⁶/K	GS1/4, 1/2 only Rated voltage or max. working voltage, whichever is lower and 1/10 of its voltage.
Voltage characteristics	5 : T.C.R. 200×10⁻⁶/K 3 : T.C.R. 100×10⁻⁶/K	GS1～12 Rated voltage or max. working voltage, whichever is lower and 1/10 of its voltage.
Resistance to solvent	No evidence of damage to protective coating and marking.	Soaking in IPA for 1min and brushing 10 times -3 cycles- liquid temp. 25℃±5℃
Impulse withstand voltage	No abnormality in appearance and flash-over.	An impulse voltage shall be applied 5 times at an interval of 1min.

■Precautions for Use

- Impulse withstanding voltage is specified for waveform of 1/40μs or 1.2/50μs as a standard. Please inquire of us in advance when using other than the standard waveform, since the specified value may change, depending on time constant or length of wave tail.
- Use the components under less dusty places, as continual applying of high voltage makes dust adhere to the surface of the resistors and causes surface leakage and corona. Also periodic cleaning of the surface of resistors is needed.
- Use them at 50% or under of the rated power for stable use for a long time.
- Do not touch the resistors with high resistance value by hand to prevent surface-leakage current.
- Set the products away from near electric conductors 1cm or over per 3kVd.c. to avoid occurrence of corona and short-circuit by discharge, if there are electric conductors near to.
- Ceramic is used for the core of these resistors. Pay attention to the handling as the characteristics may be deteriorated by damage and inner crack when they are fallen or shocked.
- In case of using in oil, inquire of us in advance.
- Take care that the resistors may become instable in resistance value by absorption of humidity when they are stored or used in high humidity environment.