

## Fujipoly Data Sheet

# SARCON<sup>®</sup> GAR series

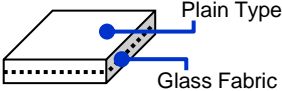
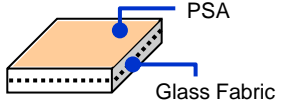
## Higher Performance Rubber Type

### FEATURES

**Thin Film with Higher Thermal Conductivity , Electric Isolation and Non-Flammable.**

- Heat conductive silicone rubber within glass fiber cloth has excellent mechanical and physical characteristics.
- SARCON GAR is available in tape, die-cut Gaskets and more with desired designs.

### CONSTRUCTIONS

Series	Characteristics	Constructions
<b>SARCON<sup>®</sup> GAR</b>	Fine heat conductive particles are mixed with insulative silicone rubber to produce this excellent insulative, high heat conductive silicone material within Glass Fiber Cloth : 3.0W/mK (by Hot Wire)	 Plain Type Glass Fabric
<b>SARCON<sup>®</sup> GAR-AD</b>	SARCON GAR is available with a PSA (Pressure Sensitive Adhesive) mounting option, simply remove the protective liner and press into position to attach.	 PSA Glass Fabric

### THERMAL RESISTANCE

Unit : K-cm<sup>2</sup>/W (K-in<sup>2</sup>/W)

Clamping Torque	20GAR (0.2mmT)	30GAR (0.3mmT)	45GAR (0.45mmT)
0.29Nm / 0.22lbf-ft	1.3 (0.20)	1.8 (0.28)	2.1 (0.33)
0.49Nm / 0.36lbf-ft	1.1 (0.17)	1.7 (0.26)	1.9 (0.30)
0.69Nm / 0.51lbf-ft	1.1 (0.17)	1.7 (0.26)	1.9 (0.30)

#### 1. Test Method by FTM P-3010

Fujipoly test method FTM P-3010 which gives ASTM D5470 equivalent value. Punched-out specimen in TO-3 package is located between a transistor and heat sink, and secured them by using a screwdriver. 20watt power is applied to the transistor. After three minutes, the thermal resistance is calculated based on the following formula.

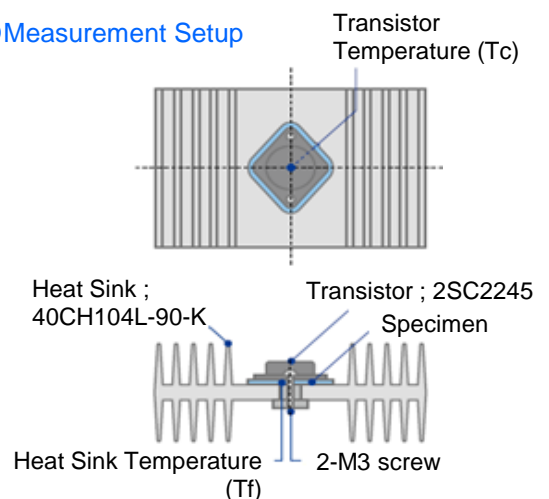
#### 2. Principle

A thermal impedance is given by the equation below.

$$R_t = (T_c - T_f) / P_0$$

$R_t$  : Thermal resistance (K/W)  
 $T_c$  : Transistor temperature (K)  
 $T_f$  : Heat sink temperature (K)  
 $P_0$  : Heat Flow (W)

#### ● Measurement Setup



**TYPICAL PROPERTIES**

Properties	unit	GAR			Test method		
		20GAR	30GAR	45GAR			
Physical Properties	Color	-	White			Visual	
	Thickness	mm	0.2 ±0.05	0.3 +0.1/-0	0.45 ±0.05	ISO 463:2006	
	Specific Gravity	-	2.9			ASTM D792	
	Hardness Highest Value	IRHD	80	87	87	ISO 7619	
	Tensile Strength	MPa	47.5	23.2	21.8	ASTM D1458	
		psi	6888	3364	3161		
Elongation	%	3 or less	3 or less	3 or less	ASTM D412		
Electrical Properties	Volume Resistivity	Ohm-m	2x10 <sup>15</sup>	2x10 <sup>15</sup>	2x10 <sup>15</sup>	ASTM D257	
	Breakdown Voltage	kV(AC)	10	11	12	ASTM D149	
	Dielectric Strength	kV(AC)	9	9	9	ASTM D149	
	Dielectric Constant	-	50Hz	2.4	3.4	4.0	ASTM D150
			1kHz	2.4	3.3	3.9	
			1MHz	2.4	3.3	3.9	
	Dissipation Factor	-	50Hz	0.032	0.026	0.021	ASTM D150
1kHz			0.007	0.007	0.006		
1MHz			0.003	0.004	0.003		
Thermal Properties	Thermal Conductivity	W/m-K	3.0			ASTM D2326 (Hot Wire)	
	Recommended Operating Temp.	°C	-40 to +150			-	
		°F	-40 to +302				
Flame Retardant	UL94	V-0			UL 94		

**DURABILITY****Heat Aging Test : 150°C (300°F)**

Properties	unit	20GAR			30GAR			45GAR		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	80	95	96	87	96	99	87	98	99
Tensile Strength	Mpa	9.7	10.7	10.3	8.3	10.9	10.5	10.0	10.9	11.6
Elongation	%	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	Ohm-m	2.0x10 <sup>15</sup>	1.1x10 <sup>15</sup>	2.8x10 <sup>15</sup>	2.2x10 <sup>15</sup>	1.8x10 <sup>15</sup>	1.1x10 <sup>15</sup>	2.0x10 <sup>15</sup>	1.9x10 <sup>15</sup>	2.3x10 <sup>15</sup>
Breakdown Voltage	kV	10	11	11	11	11	11	12	13	12
Dielectric Strength	kV	9	9	9	10	11	11	9	10	11
Dielectric Constant	50Hz	2.4	2.1	2.1	3.4	3.0	3.0	4.0	3.5	3.5
	1kHz	2.4	2.1	2.1	3.3	3.0	3.0	3.9	3.5	3.5
	1MHz	2.4	2.1	2.1	3.3	3.0	3.0	3.9	3.5	3.5
Dissipation Factor	50Hz	0.032	0.007	0.004	0.026	0.008	0.005	0.021	0.006	0.005
	1kHz	0.007	0.003	0.002	0.007	0.004	0.003	0.006	0.003	0.003
	1MHz	0.003	0.002	0.002	0.004	0.003	0.002	0.003	0.002	0.002

**Humidity Test : 60°C (140°F) / 95%RH**

Properties	unit	20GAR			30GAR			45GAR		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	80	81	81	87	90	92	87	92	95
Tensile Strength	Mpa	9.7	9.0	6.3	8.3	10.0	8.7	10.0	11.0	8.5
Elongation	%	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	Ohm-m	$2.0 \times 10^{15}$	$1.2 \times 10^{15}$	$1.3 \times 10^{15}$	$2.2 \times 10^{15}$	$2.8 \times 10^{15}$	$6.5 \times 10^{15}$	$2.0 \times 10^{15}$	$2.6 \times 10^{15}$	$6.1 \times 10^{15}$
Breakdown Voltage	kV	10	10	11	11	10	9	12	9	11
Dielectric Strength	kV	9	8	9	10	11	9	9	9	10
Dielectric Constant	50Hz	2.4	2.1	2.1	3.4	3.4	3.5	4.0	4.0	4.1
	1kHz	2.4	2.1	2.1	3.3	3.3	3.3	3.9	3.8	3.9
	1MHz	2.4	2.1	2.1	3.3	3.3	3.3	3.9	3.8	3.8
Dissipation Factor	50Hz	0.032	0.007	0.004	0.026	0.033	0.034	0.021	0.031	0.029
	1kHz	0.007	0.003	0.002	0.007	0.009	0.011	0.006	0.009	0.012
	1MHz	0.003	0.002	0.002	0.004	0.005	0.004	0.003	0.006	0.004

**Cold Test : -40°C (-40°F)**

Properties	unit	20GAR			30GAR			45GAR		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	80	81	80	87	90	87	87	90	91
Tensile Strength	Mpa	9.7	9.0	6.3	8.3	10.0	11.1	10.0	11.0	11.9
Elongation	%	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	Ohm-m	$2.0 \times 10^{15}$	$1.2 \times 10^{15}$	$1.3 \times 10^{15}$	$2.2 \times 10^{15}$	$1.0 \times 10^{15}$	$2.8 \times 10^{15}$	$2.0 \times 10^{15}$	$1.2 \times 10^{15}$	$3.0 \times 10^{15}$
Breakdown Voltage	kV	10	10	11	11	11	11	12	11	11
Dielectric Strength	kV	9	8	9	10	11	11	9	9	9
Dielectric Constant	50Hz	2.4	2.5	2.4	3.4	3.4	3.4	4.0	4.0	3.9
	1kHz	2.4	2.4	2.4	3.3	3.3	3.4	3.9	4.0	3.9
	1MHz	2.4	2.4	2.4	3.3	3.3	3.3	3.9	4.0	3.8
Dissipation Factor	50Hz	0.032	0.033	0.028	0.026	0.026	0.023	0.021	0.019	0.018
	1kHz	0.007	0.008	0.006	0.007	0.007	0.006	0.006	0.006	0.005
	1MHz	0.003	0.003	0.003	0.004	0.004	0.004	0.003	0.003	0.003

**Heat Shock Test : -40°C (-40°F)/30min ⇌ 125°C (257°F)/30min**

Properties	unit	20GAR			30GAR			45GAR		
		Before	500hrs	1,000hrs	Before	500hrs	1,000hrs	Before	500hrs	1,000hrs
Hardness	IRHD	80	91	90	87	90	96	87	92	98
Tensile Strength	Mpa	9.7	10.1	10.8	8.3	10.0	11.1	10.0	11.0	11.9
Elongation	%	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	Ohm-m	$2.0 \times 10^{15}$	$9.3 \times 10^{15}$	$3.0 \times 10^{15}$	$2.2 \times 10^{15}$	$2.1 \times 10^{16}$	$5.6 \times 10^{16}$	$2.0 \times 10^{15}$	$3.4 \times 10^{16}$	$1.4 \times 10^{17}$
Breakdown Voltage	kV	10	12	11	11	11	11	12	11	11
Dielectric Strength	kV	9	9	9	10	11	11	9	9	9
Dielectric Constant	50Hz	2.4	2.2	2.3	3.4	3.1	3.1	4.0	3.7	3.7
	1kHz	2.4	2.2	2.2	3.3	3.1	3.1	3.9	3.7	3.7
	1MHz	2.4	2.2	2.2	3.3	3.1	3.1	3.9	3.7	3.6
Dissipation Factor	50Hz	0.032	0.010	0.007	0.026	0.008	0.006	0.021	0.009	0.007
	1kHz	0.007	0.004	0.004	0.007	0.004	0.004	0.006	0.005	0.004
	1MHz	0.003	0.003	0.003	0.004	0.007	0.004	0.003	0.003	0.004

## **HANDLING NOTES**

- It is recommended to compress the material with the equal ratio on the whole surface. Partial excessive stress may also result in excessive silicone oil exudation.

## **WARRANTY STATEMENT**

- Properties of the products may be revised due to some changes for improving performance.
- Properties values in this document are not specification or guaranteed.
- This product is made of silicone, and silicone oil may exude from the product.
- This product is made of silicone, and low molecular siloxane may vaporize depending on operating conditions.
- The product is designed, developed, and manufactured for general industrial use only. Never use for medical, surgical, and/or relating purposes. Never use for the purpose of implantation and/or other purposes by which a part of or whole product remains in human body.
- Before using, a safety must be evaluated and verified by the purchaser.
- Contents described in the document do not guarantee the performances and qualities required for the purchaser's specific purposes. The purchaser is responsible for pre-testing the product under the purchaser's specific conditions and for verifying the expected performances.
- Statements concerning possible or suggested uses made herein may not be relied upon, or be constructed, as a guaranty of no patent infringement.
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