

FUJIPOLY[®]

SARCON[®] GSR Series.

Highest Heat Conductivity Glass cloth rein forcement.

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FUJIPOLY DATA SHEET NUMBER FPDS 96-07 / Version 5

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FUJIPOLY[®] DATA SHEET FPDS 96-07 (Version 5)

1] Product Name :

1] -1) Sarcon[®] GSR (UL File Number E58126)

-2) Sarcon[®] GSR-AD (Silicone Pressure Sensitive Adhesive option)

2] Features for Sarcon[®] GSR / Sarcon[®] GSR-AD

1) High Heat Conductivity.

SARCON[®] GSR is Fujipoly's originally developed High Heat Conductive Silicone Rubber. Fine, high heat conductive ceramic particles are mixed with insulative silicone rubber to produce this excellent insulative, high heat conductive silicone material.

SARCON[®] GSR is a composite of Heat Conductive Silicone Rubber and Fiberglass. SARCON[®] GSR has excellent mechanical and physical characteristics.

2) Usable Over a Wide Temperature Range. (−60°C ~ 182°C / −76°F ~ +360°F)

Due to its superior resistance to heat and cold, SARCON[®] is ideal for use across a wide temperature range. Sarcon[®] maintains its outstanding electrical and electrical insulating properties which are characteristic of silicone. There is no significant variation in its physical properties.

SARCON[®] is distinguished by a wide range of other outstanding properties, such as excellent resistance to environmental conditions, arc, corona discharge, ozone and chemicals.

3) Simplified Processing and Reduced Operating Costs.

Unlike mica, SARCON[®] requires no grease. This significantly simplifies operation, and dispenses with the various costs required for applying the grease. Sarcon[®] is not messy, easy to apply and free from the problems of contamination due to grease application.

4) Cushion Effect.

Due to SARCON's elastic properties, it has an excellent cushion effect. Attached to devices like transistors. SARCON[®] provides superb protection against damage due to deformation as well as shock and vibration.

5) Complies with UL Standards. (UL 94. UL 746)

A. Complies with UL 746 (Electrical Insulant Standard) 150°C

B. Complies with UL 94 (Flame Retardancy Standard) V-0

6) Adhesive option.

Sarcon[®] GSR is available with a PSA (Pressure Sensitive Adhesive) mounting option. Temperature range performance is −46°C to +150°C. Simply remove the protective liner and press into position to attach.

3] Typical Product Properties of SARCON® GSR / SARCON® GSR-AD

Table - 1

Item	Unit	SARCON 20GSR	SARCON 30GSR	SARCON 45GSR	SARCON 85GSR
Color	—	White			
Thickness	mm	0.20 ±0.05	0.30 +0.10 / -0	0.45 ±0.05	0.85 ±0.05
Hardness	ASTM D2240(A)	85			
Tensile Strength	KN/m	14	15	18	15
Elongation	%	3 or less			
Volume Resistivity	MΩ·m	10 ⁷	10 ⁷	10 ⁷	10 ⁷
Breakdown Voltage	KV/AC	6	10	15	20
Withstand Voltage	KV/minute	3	5	7	10
Dielectric Constant	50Hz	2.6	3.0	3.2	3.7
	10 ³ Hz	2.6	3.0	3.2	3.7
	10 ⁶ Hz	2.6	3.0	3.2	3.7
Dielectric Dissipation Factor	50Hz	0.0026	0.0021	0.0016	0.0013
	10 ³ Hz	0.0007	0.0005	0.0001	0.0004
	10 ⁶ Hz	0.0004	0.0003	0.0002	0.0009
Thermal Impedance	FTM P-3010	0.30 °C/W	0.34 °C/W	0.39 °C/W	0.51 °C/W
Thermal Impedance AD Type	FTM P-3010	0.64 °C/W	0.66 °C/W	0.71 °C/W	0.83 °C/W
Flame Retardant	UL-94	V-0	V-0	V-0	V-0

Note.) 1. Test method is based on on JIS K-6249..

2. Breakdown Voltage : AC 60Hz

Withstand Voltage : AC 60Hz

3. Thermal Impedance : Fujipoly Test Method FTM P-3010 which gives ASTM D5470 Equivalent value.

4. Flame Retardant : UL-94

5. Tensile Strength / Elongation : Test methods according to JIS 2367,
double silicone rubber / Glass clothtest method.

4] Heat Aging Test

Test Condition : 150°C (300°F) x 1000hrs (42days)

SARCON® 20GSR

Table - 2

Properties	Unit	Before test	After 100hrs	After 500hrs	After 1,000hrs
Hardness	ASTM D2240(A)	90	90	90	88
Tensile Strength (ASTM D1458)	KN/m	14	16	14	6
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	MΩ·m	2.9 x 10 ⁷	7.5 x 10 ⁸	8.4 x 10 ⁸	2.6 x 10 ⁷
Breakdown Voltage	KV/AC	6	6	6	6
Dielectric Constant	50Hz	2.00	1.89	1.84	1.92
	10 ³ Hz	2.00	1.89	1.84	1.92
	10 ⁶ Hz	2.01	1.90	1.85	1.93
Dielectric Dissipation Factor	50Hz	0.0023	0.0009	0.0004	0.0015
	10 ³ Hz	0.0010	0.0003	0.0001	0.0005
	10 ⁶ Hz	0.0014	0.0007	0.0004	0.0006

SARCON® 30GSR

Table - 3

Properties	Unit	Before test	After 100hrs	After 500hrs	After 1,000hrs
Hardness	ASTM D2240(A)	90	90	91	90
Tensile Strength (ASTM D1458)	KN/m	15	15	14	7
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	MΩ·m	2.5 x 10 ⁷	2.2 x 10 ⁸	3.3 x 10 ⁸	1.1 x 10 ⁸
Breakdown Voltage	KV/AC	10	14	14	14
Dielectric Constant	50Hz	3.03	2.97	2.91	2.91
	10 ³ Hz	3.02	2.97	2.91	2.91
	10 ⁶ Hz	3.04	2.99	2.93	2.93
Dielectric Dissipation Factor	50Hz	0.0024	0.0009	0.0007	0.0011
	10 ³ Hz	0.0010	0.0003	0.0001	0.0005
	10 ⁶ Hz	0.0009	0.0007	0.0007	0.0005

SARCON® 45GSR

Table - 4

Properties	Unit	Before test	After 100hrs	After 500hrs	After 1,000hrs
Hardness	ASTM D2240(A)	90	90	92	90
Tensile Strength (ASTM D1458)	KN/m	18	14	16	14
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	MΩ·m	3.3 x 10 ⁷	2.3 x 10 ⁸	3.9 x 10 ⁸	1.5 x 10 ⁷
Breakdown Voltage	KV/AC	15	18	16	17
Dielectric Constant	50Hz	3.20	3.13	3.09	3.09
	10 ³ Hz	3.19	3.13	3.09	3.09
	10 ⁶ Hz	3.20	3.15	3.11	3.11
Dielectric Dissipation Factor	50Hz	0.0028	0.0007	0.0005	0.0011
	10 ³ Hz	0.0009	0.0002	0.0000	0.0003
	10 ⁶ Hz	0.0006	0.0001	0.001104	0.0002

SARCON® 85GSR

Table - 5

Properties	Unit	Before test	After 100hrs	After 500hrs	After 1,000hrs
Hardness	ASTM D2240(A)	88	89	92	90
Tensile Strength (ASTM D1458)	KN/m	15	18	18	17
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less	3 or less
Volume Resistivity	MΩ·m	2.1 x 10 ⁷	3.5 x 10 ⁸	2.3 x 10 ⁸	1.2 x 10 ⁸
Breakdown Voltage	KV/AC	20	21	20	22
Dielectric Constant	50Hz	3.71	3.63	3.59	3.63
	10 ³ Hz	3.71	3.63	3.60	3.63
	10 ⁶ Hz	3.72	3.66	3.62	3.65
Dielectric Dissipation Factor	50Hz	0.0019	0.0001	0.0006	0.0007
	10 ³ Hz	0.0004	0.0005	0.0006	0.0001
	10 ⁶ Hz	0.0001	0.0004	0.0005	0.0004

5] Humidity Test.

Test Condition : 60°C (140°F) x 500hrs (20days) x 95%RH

SARCON® 20GSR

Table - 6

Properties	Unit	Before test	After 250hrs	After 500hrs
Hardness	ASTM D2240(A)	90	86	85
Tensile Strength (ASTM D1458)	KN/m	14	12	16
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less
Volume Resistivity	MΩ.m	2.9 x 10 ⁷	4.7 x 10 ⁸	8.4 x 10 ⁸
Breakdown Voltage	KV/AC	6	6	5
Dielectric Constant	50Hz	2.00	1.93	2.09
	10 ³ Hz	2.00	1.89	1.84
	10 ⁶ Hz	2.01	1.90	1.85
Dielectric Dissipation Factor	50Hz	0.0023	0.0030	0.0004
	10 ³ Hz	0.0010	0.0011	0.0001
	10 ⁶ Hz	0.0014	0.0011	0.0004

SARCON® 30GSR

Table - 7

Properties	Unit	Before test	After 250hrs	After 500hrs
Hardness	ASTM D2240(A)	90	88	85
Tensile Strength (ASTM D1458)	KN/m	15	18	16
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less
Volume Resistivity	MΩ.m	2.5 x 10 ⁷	6.5 x 10 ⁶	8.4 x 10 ⁷
Breakdown Voltage	KV/AC	10	11	7
Dielectric Constant	50Hz	3.03	3.02	3.02
	10 ³ Hz	3.02	3.01	3.00
	10 ⁶ Hz	3.04	3.02	3.00
Dielectric Dissipation Factor	50Hz	0.0024	0.0052	0.0062
	10 ³ Hz	0.0010	0.0015	0.0025
	10 ⁶ Hz	0.0009	0.0009	0.0014

SARCON® 45GSR

Table - 8

Properties	Unit	Before test	After 250hrs	After 500hrs
Hardness	ASTM D2240(A)	90	90	91
Tensile Strength (ASTM D1458)	KN/m	18	18	18
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less
Volume Resistivity	MΩ.m	3.3 x 10 ⁷	9.1 x 10 ⁶	0.9 x 10 ⁷
Breakdown Voltage	KV/AC	15	17	18
Dielectric Constant	50Hz	3.20	3.21	3.15
	10 ³ Hz	3.19	3.19	3.13
	10 ⁶ Hz	3.20	3.19	3.12
Dielectric Dissipation Factor	50Hz	0.0028	0.0052	0.0059
	10 ³ Hz	0.0009	0.0018	0.0024
	10 ⁶ Hz	0.0006	0.0009	0.0011

SARCON® 85GSR**Table - 9**

Properties	Unit	Before test	After 250hrs	After 500hrs
Hardness	ASTM D2240(A)	88	87	89
Tensile Strength (ASTM D1458)	KN/m	15	18	17
Elongation (ASTM D1458)	%	3 or less	3 or less	3 or less
Volume Resistivity	MΩ·m	2.1 x 10 ⁷	9.2 x 10 ⁶	3.6 x 10 ⁶
Breakdown Voltage	KV/AC	20	22	20
Dielectric Constant	50Hz	3.71	3.72	3.68
	10 ³ Hz	3.71	3.70	3.66
	10 ⁶ Hz	3.72	3.71	3.66
Dielectric Dissipation Factor	50Hz	0.0019	0.0042	0.0047
	10 ³ Hz	0.0004	0.0013	0.0018
	10 ⁶ Hz	0.0001	0.0004	0.0007

6] Clamping Torque VS Thermal Impedance (°C/W).

Table - 10

Clamping Torque		3kg-cm	5kg-cm	7kg-cm
Product Name	Thickness (mm)			
20GSR	0.20	0.31	0.30	0.30
30GSR	0.35	0.37	0.34	0.33
45GSR	0.45	0.40	0.39	0.37
85GSR	0.85	0.52	0.51	0.50

Note.) Test method : Fujipoly test method FTM P-3010 which gives ASTM D5470 Equivalent gives.

7] Chemical Resistance. (Chemical Name : HCFC AK-225 (Substitutive Freon9)

Table - 11

Product Name	Insulative Resistivity (MΩ·m)		Breakdown Voltage (KV)		Thermal Impedance (°C/W)	
	before soak	after 24hrs	before soak	after 24hrs	before soak	after 24hrs
20GSR	2.9 x 10 ⁷	3.9 x 10 ⁷	6	5	0.30	0.28
30GSR	2.5 x 10 ⁷	1.8 x 10 ⁷	10	9	0.34	0.32
45GSR	3.3 x 10 ⁷	5.6 x 10 ⁷	15	13	0.39	0.38
85GSR	2.1 x 10 ⁷	1.1 x 10 ⁷	20	19	0.51	0.54

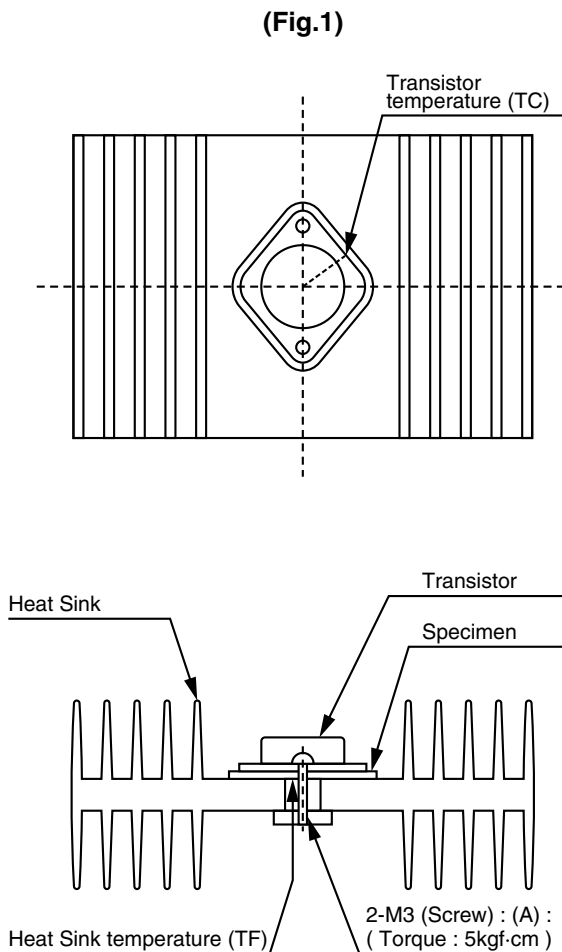
8] Standard Products.

- 20GSR 300 x 300
- 30GSR 300 x 300
- 45GSR 300 x 300
- 85GSR 300 x 300

9] Test Method for Thermal Resistance (Impedance) .

Test method : Fujipoly test method FTM P-3010 which gives ASTM D5470 equivalent value.

- 1) Punched-out specimen in TO-3 package is located between a transistor and heat sink (Fig.1). and secured with screws the position (A), using a screwdriver.
- 2) DC 10V, 2A (20W) current is applied to the transistor.
- 3) After three minutes, the thermal resistance is calculated based on the following formula (B).



Test Apparatus

Transistor : 2SC2245

Heat Sink : 40CH104L-90-K
(manufactured by Ryosan Co., Ltd)

Heat Sensor : 2SC1-OHK300 x 532W x J002Y
(manufactured by Chino Co., Ltd)

Condition : 25°C 60%RH

Formula for Thermal Impedance calculation.

$$(B) : R_t = (T_c - T_f) / P_C$$

R_t : Thermal resistance (°C·inch² / W)

T_c : Transistor temperature °C

T_f : Heat sink temperature °C

P_C : Power applied to transistor

10] Other Technical Information and Design Guide.

Fuji Poly website <http://www.fujipoly.com>

: January 31th 2002 version 5
: October 31th 1999 version 4
: June 1st 1999 version 3
version 2

ISSUED : September 20th 1996 version 1

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