



**THE DATASHEET OF  
PGSMAJ22A F3G**



## 400W, 5V - 100V Surface Mount Transient Voltage Suppressor

### FEATURES

- Low profile package
- Ideal for automated placement
- Photo Glass passivated junction
- Excellent clamping capability
- Typical  $I_R$  less than  $1\mu A$  above 10V
- 400 watts peak pulse power capability with a 10 / 1000  $\mu s$  waveform (300W above 78V)
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

| KEY PARAMETERS |                |      |
|----------------|----------------|------|
| PARAMETER      | VALUE          | UNIT |
| $V_{WM}$       | 5 - 100        | V    |
| $V_{BR}$       | 6.8 - 117      | V    |
| $T_{J MAX}$    | 175            | °C   |
| Package        | DO-214AC (SMA) |      |
| Configuration  | Single die     |      |



### APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter



### MECHANICAL DATA

- Case: DO-214AC (SMA)
- Molding compound meets UL 94V-0 flammability rating
- Part no. with suffix "H" means AEC-Q101 qualified
- Packing code with suffix "G" means green compound (halogen-free)
- Moisture sensitivity level: level 1, per J-STD-020
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.06 g (approximately)

DO-214AC (SMA)

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ unless otherwise noted)               |           |             |      |
|---|-----------|-------------|------|
| PARAMETER   | SYMBOL    | VALUE       | UNIT |
| Peak power dissipation at $T_A=25^\circ C$ , $t_d=1ms$ (Note 1)                     | $P_{PPM}$ | 400         | W    |
| Steady state power dissipation  | $P_D$     | 1           | W    |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 40          | A    |
| Maximum instantaneous forward voltage at 25 A for unidirectional only               | $V_F$     | 3.5         | V    |
| Operating junction temperature range  | $T_J$     | -55 to +175 | °C   |
| Storage temperature range   | $T_{STG}$ | -55 to +175 | °C   |

#### Notes:

1. Non-repetitive Current Pulse Per Fig.3 and derated above  $T_A=25^\circ C$  Per Fig.2. Rating is 300 W for  $V_{WM} > 78 V$

#### Devices for Bi-directional Applications

1. For Bi-directional use CA suffix (e.g. PGSMAJ10CA).
2. Electrical Characteristics Apply in Both Directions

| <b>THERMAL PERFORMANCE</b>                       |                 |              |               |
|--|-----------------|--------------|---------------|
| <b>PARAMETER</b>                                 | <b>SYMBOL</b>   | <b>LIMIT</b> | <b>UNIT</b>   |
| Junction-to-lead thermal resistance per diode    | $R_{\theta JL}$ | 29           | $^{\circ}C/W$ |
| Junction-to-ambient thermal resistance per diode | $R_{\theta JA}$ | 120          | $^{\circ}C/W$ |
| Junction-to-case thermal resistance per diode    | $R_{\theta JC}$ | 31           | $^{\circ}C/W$ |

**Thermal Performance Note:** Units mounted on recommended PCB (5.0mm x 5.0mm Cu pad test board)

| <b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^{\circ}C$ unless otherwise noted) |              |   |       |                         |  |   |  |  |
|--|--------------|---|-------|-------------------------|--|---|--|--|
| Part number  | Marking code | Breakdown voltage $V_{BR}@I_T$ (V) (Note 1) |       | Test current $I_T$ (mA) | Working stand-off voltage $V_{WM}$ (V) | Maximum reverse leakage current $I_R@V_{WM}$ ( $\mu A$ ) (Note 1) | Maximum peak impulse current $I_{PPM}$ (A) $t_p = 10/1000 \mu s$ | Maximum clamping voltage $V_C@I_{PPM}$ (V) $t_p = 10/1000 \mu s$ |
|  |              | Min.  | Max.  |                         |  |   |  |  |
| PGSMAJ5.0A   | PAE          | 6.4   | 7.00  | 10                      | 5                                      | 800   | 43.5   | 9.2  |
| PGSMAJ6.0A   | PAG          | 6.67  | 7.37  | 10                      | 6                                      | 800   | 38.8   | 10.3   |
| PGSMAJ6.5A   | PAK          | 7.22  | 7.98  | 10                      | 6.5                                    | 500   | 35.7   | 11.2   |
| PGSMAJ7.0A   | PAM          | 7.78  | 8.60  | 10                      | 7                                      | 200   | 33.3   | 12.0   |
| PGSMAJ7.5A   | PAP          | 8.33  | 9.21  | 1                       | 7.5                                    | 100   | 31.0   | 12.9   |
| PGSMAJ8.0A   | PAR          | 8.89  | 9.83  | 1                       | 8                                      | 50  | 29.4   | 13.6   |
| PGSMAJ8.5A   | PAT          | 9.44  | 10.40 | 1                       | 8.5                                    | 10  | 27.8   | 14.4   |
| PGSMAJ9.0A   | PAV          | 10.0  | 11.10 | 1                       | 9                                      | 5   | 26.0   | 15.4   |
| PGSMAJ10A  | PAX          | 11.1  | 12.30 | 1                       | 10                                     | 5   | 23.5   | 17.0   |
| PGSMAJ11A  | PAZ          | 12.2  | 13.50 | 1                       | 11                                     | 1   | 22.0   | 18.2   |
| PGSMAJ12A  | PBE          | 13.3  | 14.70 | 1                       | 12                                     | 1   | 20.1   | 19.9   |
| PGSMAJ13A  | PBG          | 14.4  | 15.90 | 1                       | 13                                     | 1   | 18.6   | 21.5   |
| PGSMAJ14A  | PBK          | 15.6  | 17.20 | 1                       | 14                                     | 1   | 17.2   | 23.2   |
| PGSMAJ15A  | PBM          | 16.7  | 18.50 | 1                       | 15                                     | 1   | 16.4   | 24.4   |
| PGSMAJ16A  | PBP          | 17.8  | 19.70 | 1                       | 16                                     | 1   | 15.4   | 26.0   |
| PGSMAJ17A  | PBR          | 18.9  | 20.90 | 1                       | 17                                     | 1   | 14.5   | 27.6   |
| PGSMAJ18A  | PBT          | 20.0  | 22.10 | 1                       | 18                                     | 1   | 13.7   | 29.2   |
| PGSMAJ20A  | PBV          | 22.2  | 24.50 | 1                       | 20                                     | 1   | 12.3   | 32.4   |
| PGSMAJ22A  | PBX          | 24.4  | 26.90 | 1                       | 22                                     | 1   | 11.3   | 35.5   |
| PGSMAJ24A  | PBZ          | 26.7  | 29.50 | 1                       | 24                                     | 1   | 10.3   | 38.9   |
| PGSMAJ26A  | PCE          | 28.9  | 31.90 | 1                       | 26                                     | 1   | 9.5  | 42.1   |
| PGSMAJ28A  | PCG          | 31.1  | 34.40 | 1                       | 28                                     | 1   | 8.8  | 45.4   |
| PGSMAJ30A  | PCK          | 33.3  | 36.8  | 1                       | 30                                     | 1   | 8.3  | 48.4   |
| PGSMAJ33A  | PCM          | 36.7  | 40.6  | 1                       | 33                                     | 1   | 7.5  | 53.3   |
| PGSMAJ36A  | PCP          | 40.0  | 44.2  | 1                       | 36                                     | 1   | 6.9  | 58.1   |
| PGSMAJ40A  | PCR          | 44.4  | 49.1  | 1                       | 40                                     | 1   | 6.2  | 64.5   |
| PGSMAJ43A  | PCT          | 47.8  | 52.8  | 1                       | 43                                     | 1   | 5.8  | 69.4   |
| PGSMAJ45A  | PCV          | 50.0  | 55.3  | 1                       | 45                                     | 1   | 5.5  | 72.7   |
| PGSMAJ48A  | PCX          | 53.3  | 58.9  | 1                       | 48                                     | 1   | 5.2  | 77.4   |
| PGSMAJ51A  | PCZ          | 56.7  | 62.7  | 1                       | 51                                     | 1   | 4.9  | 82.4   |
| PGSMAJ54A  | PRE          | 60.0  | 66.3  | 1                       | 54                                     | 1   | 4.6  | 87.1   |
| PGSMAJ58A  | PRG          | 64.4  | 71.2  | 1                       | 58                                     | 1   | 4.3  | 93.6   |
| PGSMAJ60A  | PRK          | 66.7  | 73.7  | 1                       | 60                                     | 1   | 4.1  | 96.8   |
| PGSMAJ64A  | PRM          | 71.1  | 78.6  | 1                       | 64                                     | 1   | 3.9  | 103  |
| PGSMAJ70A  | PRP          | 77.8  | 86    | 1                       | 70                                     | 1   | 3.5  | 113  |
| PGSMAJ75A  | PRR          | 83.3  | 92.1  | 1                       | 75                                     | 1   | 3.3  | 121  |
| PGSMAJ78A  | PRT          | 86.7  | 95.8  | 1                       | 78                                     | 1   | 3.2  | 126  |
| PGSMAJ85A  | PRV          | 94.4  | 104   | 1                       | 85                                     | 1   | 2.2  | 137  |
| PGSMAJ90A  | PRX          | 100   | 111   | 1                       | 90                                     | 1   | 2.1  | 146  |
| PGSMAJ100A   | PRZ          | 111   | 123   | 1                       | 100                                    | 1   | 1.9  | 162  |

**Notes:**

1. Non-repetitive current pulse, per Fig. 3 and derated above  $T_A=25^{\circ}C$  per Fig. 2
2. Mounted on 5 x 5mm copper pads to each terminal
3. Lead temperature at  $T_L=75^{\circ}C$
4. Measure on 8.3ms single half sine-wave duty cycle=4 pulses per minutes maximum
5. Peak pulse power waveform is 10/1000  $\mu s$
6. For Bi-directional devices having  $V_R$  of 10 volts and under, the  $I_R$  limit is double

**ORDERING INFORMATION**

| <b>PART NO.</b>        | <b>PART NO. SUFFIX(*)</b> | <b>PACKING CODE</b> | <b>PACKING CODE SUFFIX</b> | <b>PACKAGE</b> | <b>PACKING</b>           |
|------------------------|---------------------------|---------------------|----------------------------|----------------|--------------------------|
| PGSMAJxxxx<br>(Note 1) | H                         | R3                  | G                          | SMA            | 1,800 / 7" Plastic reel  |
|                        |                           | R2                  |                            | SMA            | 7,500 / 13" Paper reel   |
|                        |                           | M2                  |                            | SMA            | 7,500 / 13" Plastic reel |
|                        |                           | F3                  |                            | Folded SMA     | 1,800 / 7" Plastic reel  |
|                        |                           | F2                  |                            | Folded SMA     | 7,500 / 13" Paper reel   |
|                        |                           | F4                  |                            | Folded SMA     | 7,500 / 13" Plastic reel |
|                        |                           | E3                  |                            | Clip SMA       | 1,800 / 7" Plastic reel  |
|                        |                           | E2                  |                            | Clip SMA       | 7,500 / 13" Plastic reel |

**Note :**

1. "xxxx" defines voltage from 5.0V (PGSMAJ5.0A) to 100V (PGSMAJ100A)

\*: Optional available.

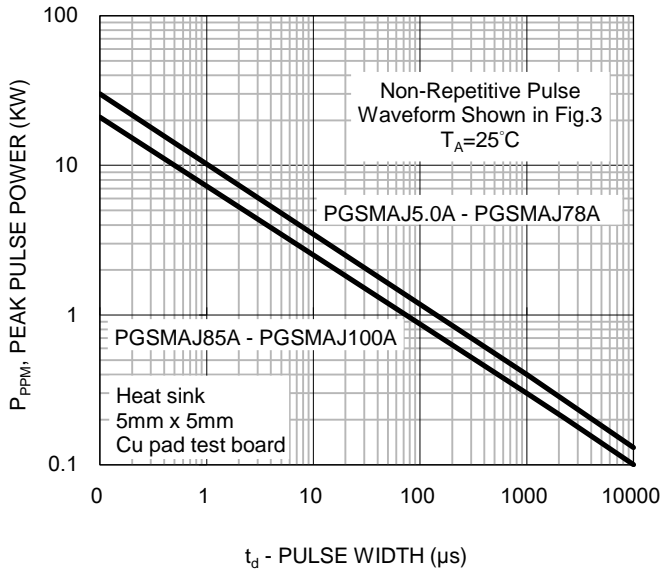
**EXAMPLE**

| <b>EXAMPLE P/N</b> | <b>PART NO.</b> | <b>PART NO. SUFFIX</b> | <b>PACKING CODE</b> | <b>PACKING CODE SUFFIX</b> | <b>DESCRIPTION</b>                   |
|--------------------|-----------------|------------------------|---------------------|----------------------------|--------------------------------------|
| PGSMAJ26AHR3G      | PGSMAJ26A       | H                      | R3                  | G                          | AEC-Q101 qualified<br>Green compound |

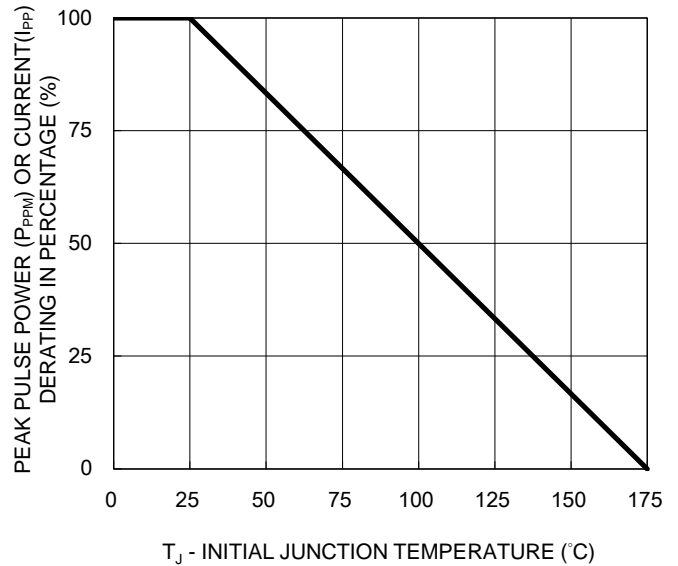
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

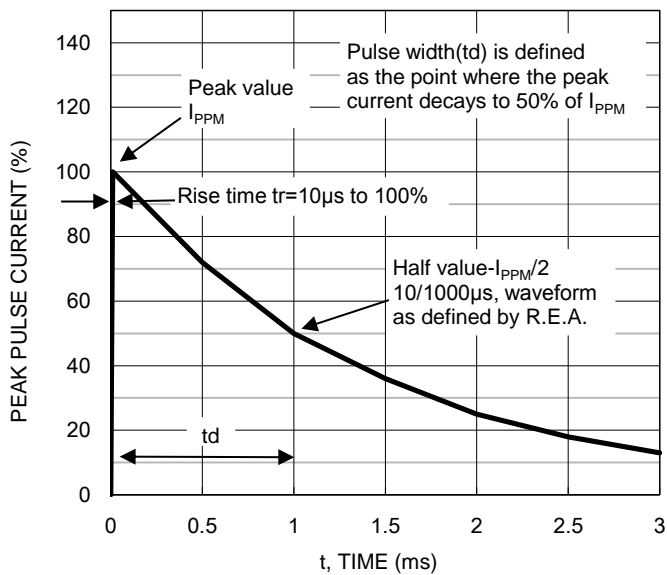
**Fig.1 Peak Pulse Power Rating Curve**



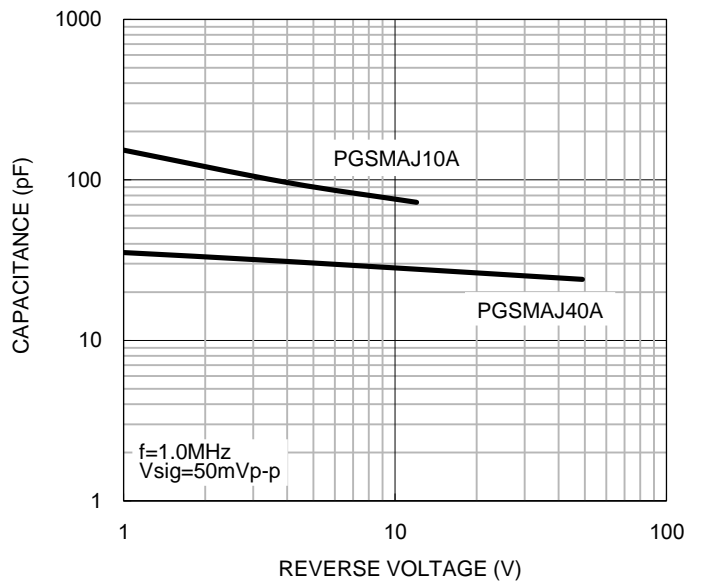
**Fig.2 Pulse Derating Curve**



**Fig.3 Clamping Power Pulse Waveform**

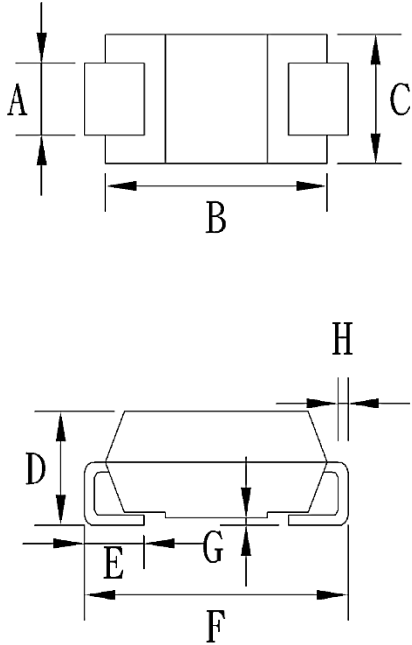


**Fig.4 Typical Junction Capacitance**



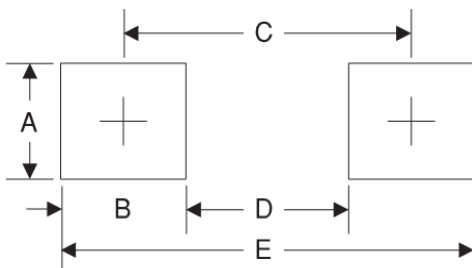
**PACKAGE OUTLINE DIMENSIONS**

DO-214AC (SMA)



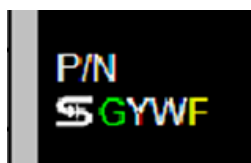
| DIM | Unit (mm) |      | Unit (inch) |       |
|-----|-----------|------|-------------|-------|
|     | Min       | Max  | Min         | Max   |
| A   | 1.27      | 1.58 | 0.050       | 0.062 |
| B   | 4.06      | 4.60 | 0.160       | 0.181 |
| C   | 2.29      | 2.83 | 0.090       | 0.111 |
| D   | 1.99      | 2.50 | 0.078       | 0.098 |
| E   | 0.90      | 1.41 | 0.035       | 0.056 |
| F   | 4.95      | 5.33 | 0.195       | 0.210 |
| G   | 0.10      | 0.20 | 0.004       | 0.008 |
| H   | 0.15      | 0.31 | 0.006       | 0.012 |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 1.68      | 0.066       |
| B      | 1.52      | 0.060       |
| C      | 3.93      | 0.155       |
| D      | 2.41      | 0.095       |
| E      | 5.45      | 0.215       |

**MARKING DIAGRAM**



- P/N = Marking Code
- G = Green Compound
- YW = Date Code
- F = Factory Code

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