



## Features:

- Low profile package
- Ideal for automated placement
- Glass passivated junction
- Built-in strain relief
- Excellent clamping capability
- Fast response time : Typically less than 1.0ps from 0 volt to BV min
- Typical IR less than 1 $\mu$ A above 10V
- 400 watts peak pulse power capability with a 10 / 1,000  $\mu$ s waveform (300W above 78V)
- Moisture sensitivity level: level 1, per J-STD-020
- Halogen-free according to IEC 61249-2-21 definition

## Mechanical Data

Case : DO-214AC (SMA)  
Molding compound  
Base P/N with suffix "G" on packing code - Green compound (halogen-free)  
Base P/N with prefix "H" on packing code - AEC-Q101 qualified  
Terminals : Pure tin plated lead free  
Polarity : Indicated by cathode band  
Weight : 0.06 g (approximately)

## Max. Ratings and Electrical Characteristics

(T<sub>A</sub> = 25°C unless otherwise noted)

| Type Number                                                                         | Symbol                            | Value       | Units |
|-------------------------------------------------------------------------------------|-----------------------------------|-------------|-------|
| Peak Power Dissipation at T <sub>A</sub> = 25°C, T <sub>P</sub> = 1ms (Note 1)      | P <sub>PK</sub>                   | 400         | Watts |
| Steady Power Dissipation                                                            | P <sub>D</sub>                    | 1           |       |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load | I <sub>FSM</sub>                  | 40          | Amps  |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only                | V <sub>F</sub>                    | 3.5         | Volts |
| Operating and Storage Temperature Range                                             | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

**Notes :** Note 1: Non-repetitive Current Pulse Per Fig. 3 and Derated above T<sub>A</sub> = 25°C Per Fig. 2

Devices for bipolar applications:

1. For bidirectional use C or CA suffix for types SMAJ5.0 through types SMAJ188.
2. Electrical characteristics apply in both directions.

## Ordering Information:

| Part No.             | Aec-Q101 Qualified | Packing Code | Green Compound Code | Package    | Packing                  |
|----------------------|--------------------|--------------|---------------------|------------|--------------------------|
| SMAJxxxx<br>(Note 1) | Prefix "H"         | R3           | Suffix "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 |
|                      | N/A                | E3           |                     | Clip SMA   | 1,800 / 7" Plastic reel  |
|                      |                    | E2           |                     | Clip SMA   | 7,500 / 13" Plastic reel |
|                      |                    |              |                     |            |                          |

Note 1: "xxxx" defines voltage from 5.0V (SMAJ5.0) to 188V (SMAJ188)

## Example:

| Preferred P/N | Part No. | AEC-Q101 Qualified | Packing Code | Green Compound Code | Description        |
|---------------|----------|--------------------|--------------|---------------------|--------------------|
| SMAJ26A R3    | SMAJ26A  |                    | R3           |                     |                    |
| SMAJ26A R3G   | SMAJ26A  |                    | R3           | G                   | Green compound     |
| SMAJ26AHR3    | SMAJ26A  | H                  | R3           |                     | AEC-Q101 qualified |

## Ratings and Characteristics Curves (T<sub>A</sub> = 25 unless otherwise noted)

FIG. 1 PEAK PULSE POWER RATING CURVE

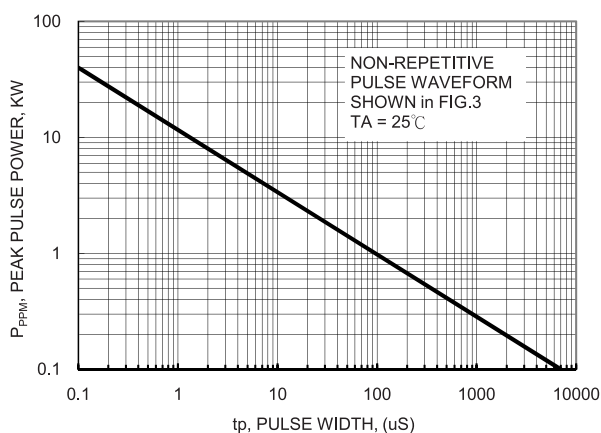


FIG.2 PULSE DERATING CURVE

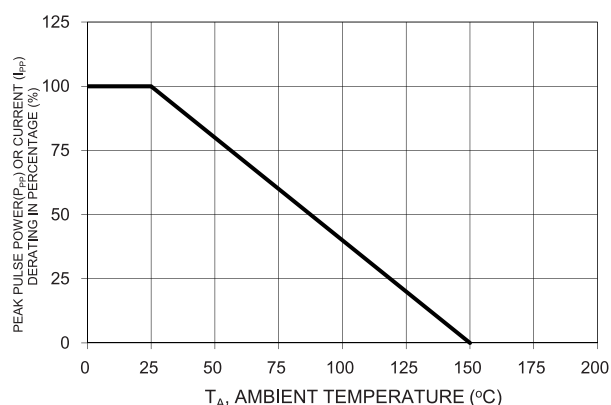


FIG. 3 CLAMPING POWER PULSE WAVEFORM

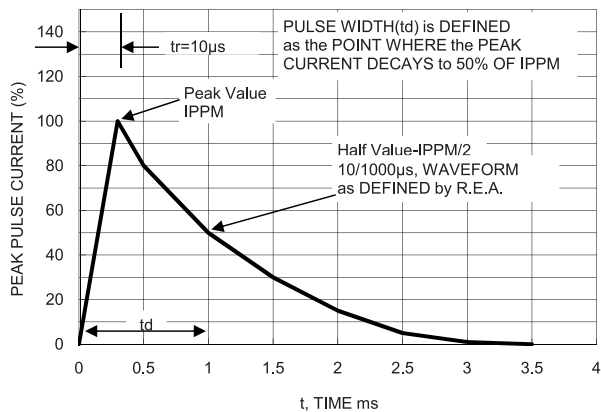


FIG. 4 MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

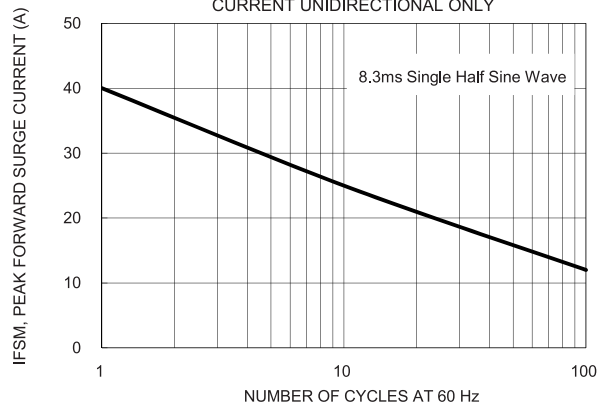
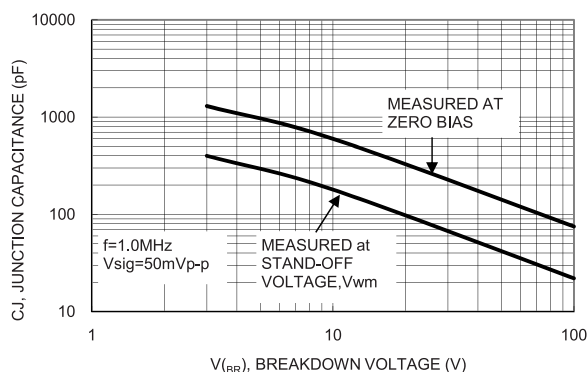


FIG. 5 TYPICAL JUNCTION CAPACITANCE



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

| Device   | Device Marking Code (Note 9) | Working Peak Reverse Voltage $V_{WM}$ (Volts) | Breakdown Voltage $V_{(BR)}$ (Volts) at $I_T$ |         | Test Current at $I_T$ (mA) | Maximum Clamping Voltage at $I_{PPM} V_C$ (Volts) (Note 5) | Maximum Peak Pulse Surge Current $I_{PPM}$ (Note 5) (Amps) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) |
|----------|------------------------------|-----------------------------------------------|-----------------------------------------------|---------|----------------------------|------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|
|          |                              |                                               | Minimum                                       | Maximum |                            |                                                            |                                                            |                                                             |
| SMAJ5.0A | AE                           | 5                                             | 6.4                                           | 7       | 10                         | 9.2                                                        | 43.5                                                       | 800                                                         |
| SMAJ6.0A | AG                           | 6                                             | 6.67                                          | 7.37    | 10                         | 10.3                                                       | 38.8                                                       | 800                                                         |
| SMAJ6.5A | AK                           | 6.5                                           | 7.22                                          | 7.98    | 10                         | 11.2                                                       | 35.7                                                       | 500                                                         |
| SMAJ7.0A | AM                           | 7                                             | 7.78                                          | 8.6     | 10                         | 12.0                                                       | 33.3                                                       | 200                                                         |
| SMAJ7.5A | AP                           | 7.5                                           | 8.33                                          | 9.21    | 1                          | 12.9                                                       | 31.0                                                       | 100                                                         |
| SMAJ8.0A | AR                           | 8                                             | 8.89                                          | 9.83    | 1                          | 13.6                                                       | 29.4                                                       | 50                                                          |
| SMAJ8.5A | AT                           | 8.5                                           | 9.44                                          | 10.4    | 1                          | 14.4                                                       | 27.8                                                       | 10                                                          |

# SMAJ Series



| Device   | Device Marking Code (Note 9) | Working Peak Reverse Voltage $V_{WM}$ (Volts) | Breakdown Voltage $V_{(BR)}$ (Volts) at $I_T$ |         | Test Current at $I_T$ (mA) | Maximum Clamping Voltage at $I_{PPM} V_C$ (Volts) (Note 5) | Maximum Peak Pulse Surge Current $I_{PPM}$ (Note 5) (Amps) | Maximum Reverse Leakage at $V_{WM}$ ID ( $\mu A$ ) |
|----------|------------------------------|-----------------------------------------------|-----------------------------------------------|---------|----------------------------|------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------|
|          |                              |                                               | Minimum                                       | Maximum |                            |                                                            |                                                            |                                                    |
| SMAJ9.0A | AV                           | 9                                             | 10                                            | 11.1    | 1                          | 15.4                                                       | 26.0                                                       | 5                                                  |
| SMAJ10A  | AX                           | 10                                            | 11.1                                          | 12.3    | 1                          | 17.0                                                       | 23.5                                                       | 5                                                  |
| SMAJ11A  | AZ                           | 11                                            | 12.2                                          | 13.5    | 1                          | 18.2                                                       | 22.0                                                       | 1                                                  |
| SMAJ12A  | BE                           | 12                                            | 13.3                                          | 14.7    | 1                          | 19.9                                                       | 20.1                                                       | 1                                                  |
| SMAJ13A  | BG                           | 13                                            | 14.4                                          | 15.9    | 1                          | 21.5                                                       | 18.6                                                       | 1                                                  |
| SMAJ14A  | BK                           | 14                                            | 15.6                                          | 17.2    | 1                          | 23.2                                                       | 17.2                                                       | 1                                                  |
| SMAJ15A  | BM                           | 15                                            | 16.7                                          | 18.5    | 1                          | 24.4                                                       | 16.4                                                       | 1                                                  |
| SMAJ16A  | BP                           | 16                                            | 17.8                                          | 19.7    | 1                          | 26.0                                                       | 15.4                                                       | 1                                                  |
| SMAJ17A  | BR                           | 17                                            | 18.9                                          | 20.9    | 1                          | 27.6                                                       | 14.5                                                       | 1                                                  |
| SMAJ18A  | BT                           | 18                                            | 20                                            | 22.1    | 1                          | 29.2                                                       | 13.7                                                       | 1                                                  |
| SMAJ20A  | BV                           | 20                                            | 22.2                                          | 24.5    | 1                          | 32.4                                                       | 12.3                                                       | 1                                                  |
| SMAJ22A  | BX                           | 22                                            | 24.4                                          | 26.9    | 1                          | 35.5                                                       | 11.3                                                       | 1                                                  |
| SMAJ24A  | BZ                           | 24                                            | 26.7                                          | 29.5    | 1                          | 38.9                                                       | 10.3                                                       | 1                                                  |
| SMAJ26A  | CE                           | 26                                            | 28.9                                          | 31.9    | 1                          | 42.1                                                       | 9.5                                                        | 1                                                  |
| SMAJ28A  | CG                           | 28                                            | 31.1                                          | 34.4    | 1                          | 45.4                                                       | 8.8                                                        | 1                                                  |
| SMAJ30A  | CK                           | 30                                            | 33.3                                          | 36.8    | 1                          | 48.4                                                       | 8.3                                                        | 1                                                  |
| SMAJ33A  | CM                           | 33                                            | 36.7                                          | 40.6    | 1                          | 53.3                                                       | 7.5                                                        | 1                                                  |
| SMAJ36A  | CP                           | 36                                            | 40                                            | 44.2    | 1                          | 58.1                                                       | 6.9                                                        | 1                                                  |
| SMAJ40A  | CR                           | 40                                            | 44.4                                          | 49.1    | 1                          | 64.5                                                       | 6.2                                                        | 1                                                  |
| SMAJ43A  | CT                           | 43                                            | 47.8                                          | 52.8    | 1                          | 69.4                                                       | 5.8                                                        | 1                                                  |
| SMAJ45A  | CV                           | 45                                            | 50                                            | 55.3    | 1                          | 72.7                                                       | 5.5                                                        | 1                                                  |
| SMAJ48A  | CX                           | 48                                            | 53.3                                          | 58.9    | 1                          | 77.4                                                       | 5.2                                                        | 1                                                  |
| SMAJ51A  | CZ                           | 51                                            | 56.7                                          | 62.7    | 1                          | 82.4                                                       | 4.9                                                        | 1                                                  |
| SMAJ54A  | RE                           | 54                                            | 60                                            | 66.3    | 1                          | 87.1                                                       | 4.6                                                        | 1                                                  |
| SMAJ58A  | RG                           | 58                                            | 64.4                                          | 71.2    | 1                          | 93.6                                                       | 4.3                                                        | 1                                                  |
| SMAJ60A  | RK                           | 60                                            | 66.7                                          | 73.7    | 1                          | 96.8                                                       | 4.1                                                        | 1                                                  |
| SMAJ64A  | RM                           | 64                                            | 71.1                                          | 78.6    | 1                          | 103                                                        | 3.9                                                        | 1                                                  |
| SMAJ70A  | RP                           | 70                                            | 77.8                                          | 86      | 1                          | 113                                                        | 3.5                                                        | 1                                                  |
| SMAJ75A  | RR                           | 75                                            | 83.3                                          | 92.1    | 1                          | 121                                                        | 3.3                                                        | 1                                                  |
| SMAJ78A  | RT                           | 78                                            | 86.7                                          | 95.8    | 1                          | 126                                                        | 3.2                                                        | 1                                                  |
| SMAJ85A  | RV                           | 85                                            | 94.4                                          | 104     | 1                          | 137                                                        | 2.2                                                        | 1                                                  |
| SMAJ90A  | RX                           | 90                                            | 100                                           | 111     | 1                          | 146                                                        | 2.1                                                        | 1                                                  |
| SMAJ100A | RZ                           | 100                                           | 111                                           | 123     | 1                          | 162                                                        | 1.9                                                        | 1                                                  |

# SMAJ Series



| Device    | Device Marking Code (Note 9) | Working Peak Reverse Voltage $V_{WM}$ (Volts) | Breakdown Voltage $V_{(BR)}$ (Volts) at $I_T$ |         | Test Current at $I_T$ (mA) | Maximum Clamping Voltage at $I_{PPM} V_C$ (Volts) (Note 5) | Maximum Peak Pulse Surge Current $I_{PPM}$ (Note 5) (Amps) | Maximum Reverse Leakage at $V_{WM}$ ID ( $\mu A$ ) |
|-----------|------------------------------|-----------------------------------------------|-----------------------------------------------|---------|----------------------------|------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------|
|           |                              |                                               | Minimum                                       | Maximum |                            |                                                            |                                                            |                                                    |
| SMAJ110A  | SE                           | 110                                           | 122                                           | 135     | 1                          | 177                                                        | 1.7                                                        | 1                                                  |
| SMAJ120A  | SG                           | 120                                           | 133                                           | 147     | 1                          | 193                                                        | 1.6                                                        | 1                                                  |
| SMAJ130A  | SK                           | 130                                           | 144                                           | 159     | 1                          | 209                                                        | 1.5                                                        | 1                                                  |
| SMAJ150A  | SM                           | 150                                           | 167                                           | 185     | 1                          | 243                                                        | 1.3                                                        | 1                                                  |
| SMAJ160A  | SP                           | 160                                           | 178                                           | 197     | 1                          | 259                                                        | 1.2                                                        | 1                                                  |
| SMAJ170A  | SR                           | 170                                           | 189                                           | 209     | 1                          | 275                                                        | 1.1                                                        | 1                                                  |
| SMAJ188A  | SS                           | 188                                           | 209                                           | 231     | 1                          | 328                                                        | 0.91                                                       | 1                                                  |
| SMAJ5.0CA | AE                           | 5                                             | 6.4                                           | 7       | 10                         | 9.2                                                        | 43.5                                                       | 800                                                |
| SMAJ6.0CA | AG                           | 6                                             | 6.67                                          | 7.37    | 10                         | 10.3                                                       | 38.8                                                       | 800                                                |
| SMAJ6.5CA | AK                           | 6.5                                           | 7.22                                          | 7.98    | 10                         | 11.2                                                       | 35.7                                                       | 500                                                |
| SMAJ7.0CA | AM                           | 7                                             | 7.78                                          | 8.6     | 10                         | 12.0                                                       | 33.3                                                       | 200                                                |
| SMAJ7.5CA | AP                           | 7.5                                           | 8.33                                          | 9.21    | 1                          | 12.9                                                       | 31.0                                                       | 100                                                |
| SMAJ8.0CA | AR                           | 8                                             | 8.89                                          | 9.83    | 1                          | 13.6                                                       | 29.4                                                       | 50                                                 |
| SMAJ8.5CA | AT                           | 8.5                                           | 9.44                                          | 10.4    | 1                          | 14.4                                                       | 27.8                                                       | 10                                                 |
| SMAJ9.0CA | AV                           | 9                                             | 10                                            | 11.1    | 1                          | 15.4                                                       | 26.0                                                       | 5                                                  |
| SMAJ10CA  | AX                           | 10                                            | 11.1                                          | 12.3    | 1                          | 17.0                                                       | 23.5                                                       | 5                                                  |
| SMAJ11CA  | AZ                           | 11                                            | 12.2                                          | 13.5    | 1                          | 18.2                                                       | 22.0                                                       | 1                                                  |
| SMAJ12CA  | BE                           | 12                                            | 13.3                                          | 14.7    | 1                          | 19.9                                                       | 20.1                                                       | 1                                                  |
| SMAJ13CA  | BG                           | 13                                            | 14.4                                          | 15.9    | 1                          | 21.5                                                       | 18.6                                                       | 1                                                  |
| SMAJ14CA  | BK                           | 14                                            | 15.6                                          | 17.2    | 1                          | 23.2                                                       | 17.2                                                       | 1                                                  |
| SMAJ15CA  | BM                           | 15                                            | 16.7                                          | 18.5    | 1                          | 24.4                                                       | 16.4                                                       | 1                                                  |
| SMAJ16CA  | BP                           | 16                                            | 17.8                                          | 19.7    | 1                          | 26.0                                                       | 15.4                                                       | 1                                                  |
| SMAJ17CA  | BR                           | 17                                            | 18.9                                          | 20.9    | 1                          | 27.6                                                       | 14.5                                                       | 1                                                  |
| SMAJ18CA  | BT                           | 18                                            | 20                                            | 22.1    | 1                          | 29.2                                                       | 13.7                                                       | 1                                                  |
| SMAJ20CA  | BV                           | 20                                            | 22.2                                          | 24.5    | 1                          | 32.4                                                       | 12.3                                                       | 1                                                  |
| SMAJ22CA  | BX                           | 22                                            | 24.4                                          | 26.9    | 1                          | 35.5                                                       | 11.3                                                       | 1                                                  |
| SMAJ24CA  | BZ                           | 24                                            | 26.7                                          | 29.5    | 1                          | 38.9                                                       | 10.3                                                       | 1                                                  |
| SMAJ26CA  | CE                           | 26                                            | 28.9                                          | 31.9    | 1                          | 42.1                                                       | 9.5                                                        | 1                                                  |
| SMAJ28CA  | CG                           | 28                                            | 31.1                                          | 34.4    | 1                          | 45.4                                                       | 8.8                                                        | 1                                                  |
| SMAJ30CA  | CK                           | 30                                            | 33.3                                          | 36.8    | 1                          | 48.4                                                       | 8.3                                                        | 1                                                  |
| SMAJ33CA  | CM                           | 33                                            | 36.7                                          | 40.6    | 1                          | 53.3                                                       | 7.5                                                        | 1                                                  |
| SMAJ36CA  | CP                           | 36                                            | 40                                            | 44.2    | 1                          | 58.1                                                       | 6.9                                                        | 1                                                  |
| SMAJ40CA  | CR                           | 40                                            | 44.4                                          | 49.1    | 1                          | 64.5                                                       | 6.2                                                        | 1                                                  |

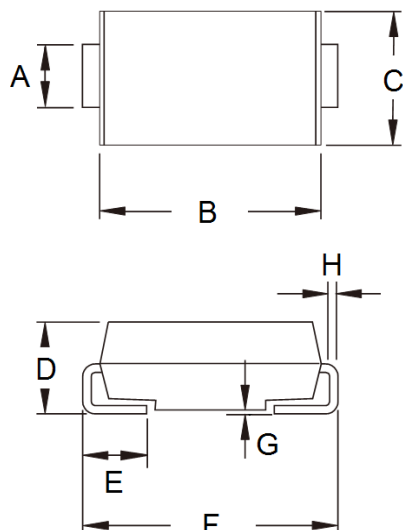
| Device    | Device Marking Code (Note 9) | Working Peak Reverse Voltage $V_{WM}$ (Volts) | Breakdown Voltage $V_{(BR)}$ (Volts) at $I_T$ |         | Test Current at $I_T$ (mA) | Maximum Clamping Voltage at $I_{PPM} V_C$ (Volts) (Note 5) | Maximum Peak Pulse Surge Current $I_{PPM}$ (Note 5) (Amps) | Maximum Reverse Leakage at $V_{WM}$ ID ( $\mu A$ ) |
|-----------|------------------------------|-----------------------------------------------|-----------------------------------------------|---------|----------------------------|------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------|
|           |                              |                                               | Minimum                                       | Maximum |                            |                                                            |                                                            |                                                    |
| SMAJ43CA  | CT                           | 43                                            | 47.8                                          | 52.8    | 1                          | 69.4                                                       | 5.8                                                        | 1                                                  |
| SMAJ45CA  | CV                           | 45                                            | 50                                            | 55.3    | 1                          | 72.7                                                       | 5.5                                                        | 1                                                  |
| SMAJ48CA  | CX                           | 48                                            | 53.3                                          | 58.9    | 1                          | 77.4                                                       | 5.2                                                        | 1                                                  |
| SMAJ51CA  | CZ                           | 51                                            | 56.7                                          | 62.7    | 1                          | 82.4                                                       | 4.9                                                        | 1                                                  |
| SMAJ54CA  | RE                           | 54                                            | 60                                            | 66.3    | 1                          | 87.1                                                       | 4.6                                                        | 1                                                  |
| SMAJ58CA  | RG                           | 58                                            | 64.4                                          | 71.2    | 1                          | 93.6                                                       | 4.3                                                        | 1                                                  |
| SMAJ60CA  | RK                           | 60                                            | 66.7                                          | 73.7    | 1                          | 96.8                                                       | 4.1                                                        | 1                                                  |
| SMAJ64CA  | RM                           | 64                                            | 71.1                                          | 78.6    | 1                          | 103                                                        | 3.9                                                        | 1                                                  |
| SMAJ70CA  | RP                           | 70                                            | 77.8                                          | 86      | 1                          | 113                                                        | 3.5                                                        | 1                                                  |
| SMAJ75CA  | RR                           | 75                                            | 83.3                                          | 92.1    | 1                          | 121                                                        | 3.3                                                        | 1                                                  |
| SMAJ78CA  | RT                           | 78                                            | 86.7                                          | 95.8    | 1                          | 126                                                        | 3.2                                                        | 1                                                  |
| SMAJ85CA  | RV                           | 85                                            | 94.4                                          | 104     | 1                          | 137                                                        | 2.2                                                        | 1                                                  |
| SMAJ90CA  | RX                           | 90                                            | 100                                           | 111     | 1                          | 146                                                        | 2.1                                                        | 1                                                  |
| SMAJ100CA | RZ                           | 100                                           | 111                                           | 123     | 1                          | 162                                                        | 1.9                                                        | 1                                                  |
| SMAJ110CA | SE                           | 110                                           | 122                                           | 135     | 1                          | 177                                                        | 1.7                                                        | 1                                                  |
| SMAJ120CA | SG                           | 120                                           | 133                                           | 147     | 1                          | 193                                                        | 1.6                                                        | 1                                                  |
| SMAJ130CA | SK                           | 130                                           | 144                                           | 159     | 1                          | 209                                                        | 1.5                                                        | 1                                                  |
| SMAJ150CA | SM                           | 150                                           | 167                                           | 185     | 1                          | 243                                                        | 1.3                                                        | 1                                                  |
| SMAJ160CA | SP                           | 160                                           | 178                                           | 197     | 1                          | 259                                                        | 1.2                                                        | 1                                                  |
| SMAJ170CA | SR                           | 170                                           | 189                                           | 209     | 1                          | 275                                                        | 1.1                                                        | 1                                                  |
| SMAJ188CA | SS                           | 188                                           | 209                                           | 231     | 1                          | 328                                                        | 0.91                                                       | 1                                                  |

## Notes:

1. Suffix A = Unidirectional
2. Suffix CA = Bidirectional
3. Non-repetitive current pulse and derated above  $T_A = 25^\circ C$ .
4. Mounted on 5mm<sup>2</sup> copper pads to each terminal.
5. Lead temperature at  $T_L = 75^\circ C$ .
6. Measured on 8.3ms single half sine-wave duty cycle = 4 pulses per minutes max.
7. Peak pulse power waveform is 10/1000 us.
8. For bi-directional devices having  $V_R$  of 10 volts and under, the  $I_R$  limit is double.
9. Cathode band marking on device for Uni-Directional parts , blank for Bi-Directional

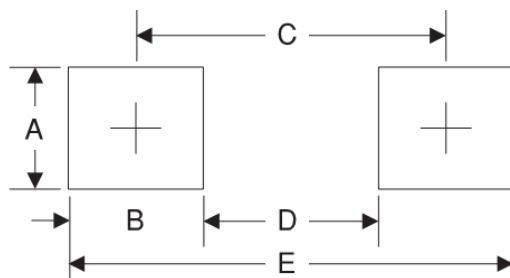
## Dimensions

DO-214AC (SMA)



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min.      | Max. | Min.        | Max.  |
| A    | 1.27      | 1.58 | 0.05        | 0.062 |
| B    | 4.06      | 4.6  | 0.16        | 0.181 |
| C    | 2.29      | 2.83 | 0.09        | 0.111 |
| D    | 1.99      | 2.5  | 0.078       | 0.098 |
| E    | 0.9       | 1.41 | 0.035       | 0.056 |
| F    | 4.95      | 5.33 | 0.195       | 0.21  |
| G    | 0.1       | 0.2  | 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      | 0.06        |
| C      | 3.93      | 0.155       |
| D      | 2.41      | 0.095       |
| E      | 5.45      | 0.215       |

## Marking Diagram:



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

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