



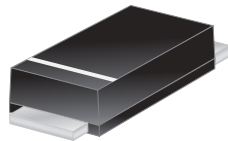
**THE DATASHEET OF  
P6SMAJ20ADF-13**



NEW PRODUCT

### Features

- Packaged in the Low Profile D-FLAT Package to Optimize Board Space
- Glass Passivated Die Construction
- Excellent Clamping Capability
- Fast Response Time
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**



Top View

### Mechanical Data

- Case: D-FLAT
- Case Material: Molded Plastic.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208 (E3)
- Polarity Indicator: Cathode Band
- Weight: 0.035 grams (Approximate)



1 = Cathode  
2 = Anode

Device Schematic

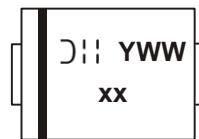
### Ordering Information (Note 4)

| Part Number    | Compliance | Case   | Packaging          |
|----------------|------------|--------|--------------------|
| P6SMAJXXADF-13 | Commercial | D-FLAT | 10,000/Tape & Reel |

\*XX = Device Voltage, for example: P6SMAJ17ADF-13.

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

### Marking Information



xx = Product Type Marking Code  
(See Electrical Characteristics Table)  
J||| = Manufacturers' Code Marking  
YWW = Date Code Marking  
Y = Last Digit of Year (ex: 7 for 2017)  
WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic   | Symbol             | Value | Unit |
|--|--------------------|-------|------|
| Peak Pulse Power Dissipation<br>(Non Repetitive Current Pulse Derated Above T <sub>A</sub> = +25°C) (Note 5) | P <sub>PK</sub>    | 600   | W    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave<br>Superimposed on Rated Load (Notes 5 & 6)          | I <sub>FSM</sub>   | 60    | A    |
| Steady State Power Dissipation @ T <sub>L</sub> = +75°C  | PM <sub>(AV)</sub> | 1.5   | W    |
| Instantaneous Forward Voltage @ I <sub>PP</sub> = 35A (Notes 5 & 6)  | V <sub>F</sub>     | 3.5   | V    |

Notes: 5. Valid provided that terminals are kept at ambient temperature.  
6. Measured with 8.3ms single half sine-wave. Duty cycle = 4 pulses per minute maximum.

**Thermal Characteristics**

| Characteristic  | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Typical Thermal Resistance, Junction to Terminal (Note 7) | R <sub>θJT</sub>                  | 64          | °C/W |
| Typical Thermal Resistance, Junction to Terminal (Note 8) | R <sub>θJT</sub>                  | 57          | °C/W |
| Typical Thermal Resistance, Junction to Ambient (Note 7)  | R <sub>θJA</sub>                  | 115         | °C/W |
| Typical Thermal Resistance, Junction to Ambient (Note 8)  | R <sub>θJA</sub>                  | 92          | °C/W |
| Operating and Storage Temperature Range                   | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

Notes: 7. Device mounted on FR-4 substrate, 1" x 1", 2oz, single-sided, PC boards with 0.06" x 0.09" copper pad.  
8. Device mounted on FR-4 substrate, 0.4" x 0.5", 2oz, single-sided, PC boards with 0.2" x 0.25" copper pad.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Part Number  | Reverse Standoff Voltage | Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> (Note 9) |         | Test Current I <sub>T</sub> (mA) | Max. Reverse Leakage @ V <sub>RWM</sub> | Max. Clamping Voltage @ I <sub>PP</sub> (Note 10) | Max. Peak Pulse Current I <sub>PP</sub> (Note 10) | Marking Code |
|--------------|--------------------------|---|---------|----------------------------------|---|---|---|--------------|
|              | V <sub>RWM</sub> (V)     | Min (V)   | Max (V) |                                  | I <sub>R</sub> (µA)                     | V <sub>C</sub> (V)                                | (A)   |              |
| P6SMAJ5.0ADF | 5.0                      | 6.40  | 7.23    | 10                               | 800                                     | 9.2   | 65.2  | KE           |
| P6SMAJ6.0ADF | 6.0                      | 6.67  | 7.67    | 10                               | 800                                     | 10.3  | 58.3  | KG           |
| P6SMAJ6.5ADF | 6.5                      | 7.22  | 8.30    | 10                               | 500                                     | 11.2  | 53.6  | KK           |
| P6SMAJ7.0ADF | 7.0                      | 7.78  | 8.95    | 10                               | 200                                     | 12.0  | 50.0  | KM           |
| P6SMAJ7.5ADF | 7.5                      | 8.33  | 9.58    | 1.0                              | 100                                     | 12.9  | 46.5  | KP           |
| P6SMAJ8.0ADF | 8.0                      | 8.89  | 10.23   | 1.0                              | 50                                      | 13.6  | 44.1  | KR           |
| P6SMAJ8.5ADF | 8.5                      | 9.44  | 10.82   | 1.0                              | 10                                      | 14.4  | 41.7  | KT           |
| P6SMAJ9.0ADF | 9.0                      | 10.00   | 11.50   | 1.0                              | 5.0                                     | 15.4  | 39.0  | KV           |
| P6SMAJ10ADF  | 10                       | 11.10   | 12.80   | 1.0                              | 5.0                                     | 17.0  | 35.3  | KX           |
| P6SMAJ11ADF  | 11                       | 12.20   | 14.40   | 1.0                              | 1.0                                     | 18.2  | 33.0  | KZ           |
| P6SMAJ12ADF  | 12                       | 13.30   | 15.30   | 1.0                              | 1.0                                     | 19.9  | 30.2  | LE           |
| P6SMAJ13ADF  | 13                       | 14.40   | 16.50   | 1.0                              | 1.0                                     | 21.5  | 27.9  | LG           |
| P6SMAJ14ADF  | 14                       | 15.60   | 17.90   | 1.0                              | 1.0                                     | 23.2  | 25.8  | LK           |
| P6SMAJ15ADF  | 15                       | 16.70   | 19.20   | 1.0                              | 1.0                                     | 24.4  | 24.0  | LM           |
| P6SMAJ16ADF  | 16                       | 17.80   | 20.50   | 1.0                              | 1.0                                     | 26.0  | 23.1  | LP           |
| P6SMAJ17ADF  | 17                       | 18.90   | 21.70   | 1.0                              | 1.0                                     | 27.6  | 21.7  | LR           |
| P6SMAJ18ADF  | 18                       | 20.00   | 23.30   | 1.0                              | 1.0                                     | 29.2  | 20.5  | LT           |
| P6SMAJ20ADF  | 20                       | 22.20   | 25.50   | 1.0                              | 1.0                                     | 32.4  | 18.5  | LV           |
| P6SMAJ22ADF  | 22                       | 24.40   | 28.00   | 1.0                              | 1.0                                     | 35.5  | 16.9  | LX           |
| P6SMAJ24ADF  | 24                       | 26.70   | 30.70   | 1.0                              | 1.0                                     | 38.9  | 15.4  | LZ           |
| P6SMAJ26ADF  | 26                       | 28.90   | 33.20   | 1.0                              | 1.0                                     | 42.1  | 14.2  | ME           |
| P6SMAJ28ADF  | 28                       | 31.10   | 35.80   | 1.0                              | 1.0                                     | 45.4  | 13.2  | MG           |
| P6SMAJ30ADF  | 30                       | 33.30   | 38.30   | 1.0                              | 1.0                                     | 48.4  | 12.4  | MK           |
| P6SMAJ33ADF  | 33                       | 36.70   | 42.20   | 1.0                              | 1.0                                     | 53.3  | 11.3  | MM           |
| P6SMAJ36ADF  | 36                       | 40.00   | 46.00   | 1.0                              | 1.0                                     | 58.1  | 10.3  | MP           |

Notes: 9. V<sub>BR</sub> measured with I<sub>T</sub> current pulse = 10 ~ 15ms.  
10. Per 10 x 1000µs waveform. See Figure 4.

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.) (Cont.)

| Part Number | Reverse Standoff Voltage | Breakdown Voltage         |         | Test Current | Max. Reverse Leakage @ | Max. Clamping Voltage @ $I_{PP}$ | Max. Peak Pulse Current | Marking Code |
|-------------|--------------------------|---------------------------|---------|--------------|------------------------|----------------------------------|-------------------------|--------------|
|             | $V_{RWM}$ (V)            | $V_{BR}$ @ $I_T$ (Note 9) | Min (V) |              | Max (V)                | $I_R$ ( $\mu\text{A}$ )          | $V_C$ (V)               |              |
| P6SMAJ40ADF | 40.0                     | 44.40                     | 51.10   | 1.0          | 1.0                    | 64.5                             | 9.3                     | MR           |
| P6SMAJ43ADF | 43.0                     | 47.80                     | 54.90   | 1.0          | 1.0                    | 69.4                             | 8.6                     | MT           |
| P6SMAJ45ADF | 45.0                     | 50.00                     | 57.50   | 1.0          | 1.0                    | 72.7                             | 8.3                     | MV           |
| P6SMAJ48ADF | 48.0                     | 53.30                     | 61.30   | 1.0          | 1.0                    | 77.4                             | 7.7                     | MX           |
| P6SMAJ51ADF | 51.0                     | 56.70                     | 65.20   | 1.0          | 1.0                    | 82.4                             | 7.3                     | MZ           |
| P6SMAJ54ADF | 54.0                     | 60.00                     | 69.00   | 1.0          | 1.0                    | 87.1                             | 6.9                     | NE           |
| P6SMAJ58ADF | 58.0                     | 64.40                     | 74.60   | 1.0          | 1.0                    | 93.6                             | 6.4                     | NG           |
| P6SMAJ60ADF | 60.0                     | 66.70                     | 76.70   | 1.0          | 1.0                    | 96.8                             | 6.2                     | NK           |
| P6SMAJ64ADF | 64.0                     | 71.10                     | 81.80   | 1.0          | 1.0                    | 103.0                            | 5.8                     | NM           |
| P6SMAJ70ADF | 70.0                     | 77.80                     | 89.50   | 1.0          | 1.0                    | 113.0                            | 5.3                     | NP           |
| P6SMAJ75ADF | 75.0                     | 83.30                     | 95.80   | 1.0          | 1.0                    | 121.0                            | 4.9                     | NR           |
| P6SMAJ78ADF | 78.0                     | 86.70                     | 99.70   | 1.0          | 1.0                    | 126.0                            | 4.7                     | NT           |
| P6SMAJ85ADF | 85.0                     | 94.40                     | 108.20  | 1.0          | 1.0                    | 137.0                            | 4.4                     | NV           |

Notes: 9.  $V_{BR}$  measured with  $I_T$  current pulse = 10 ~ 15ms.  
 10. Per 10 x 1000 $\mu\text{s}$  waveform. See Figure 4.

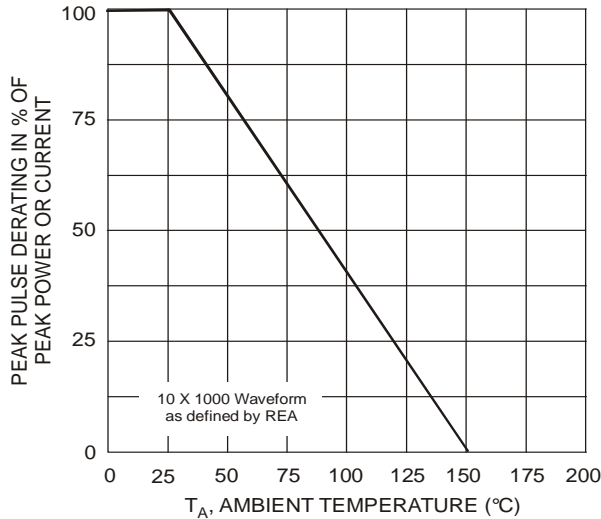


Fig. 1 Pulse Derating Curve

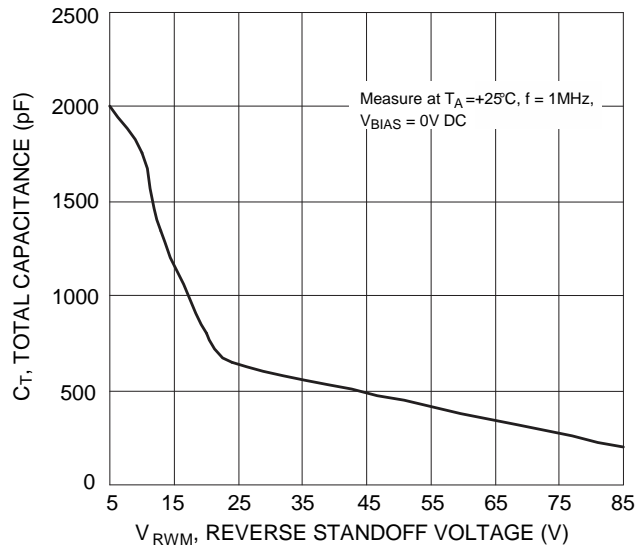
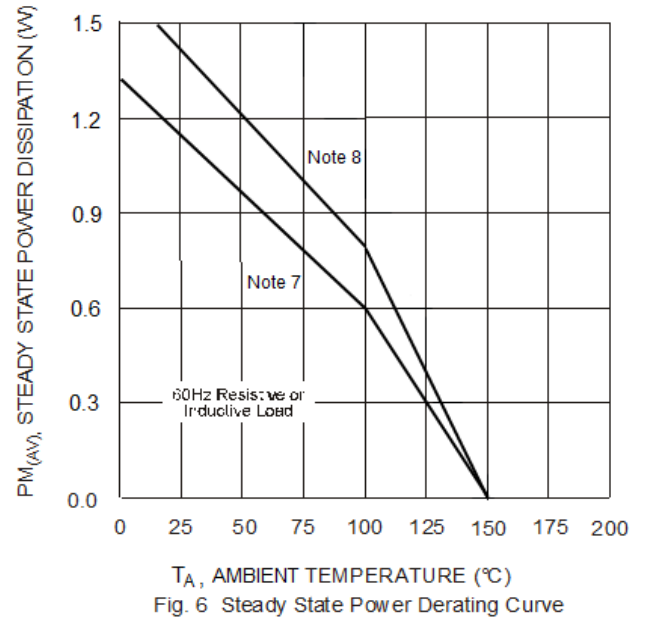
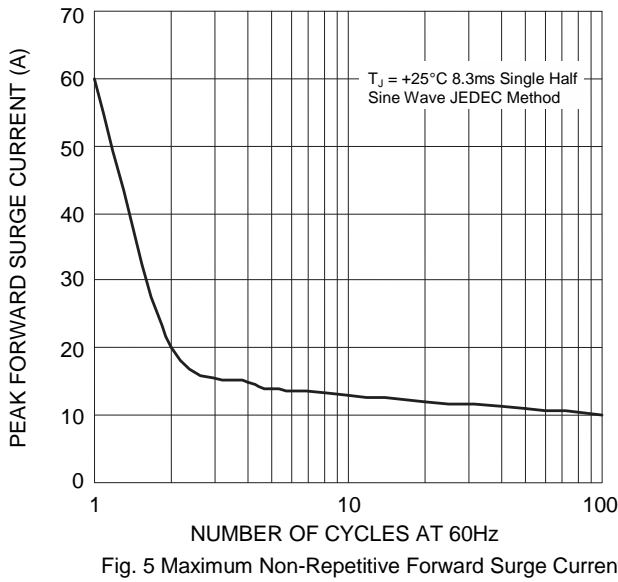
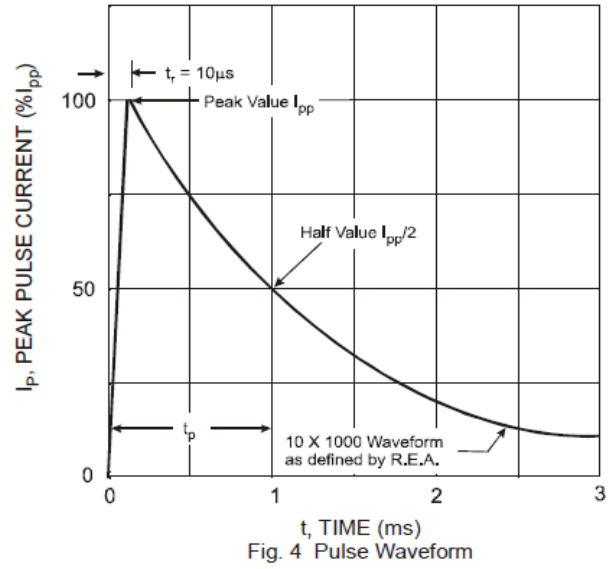
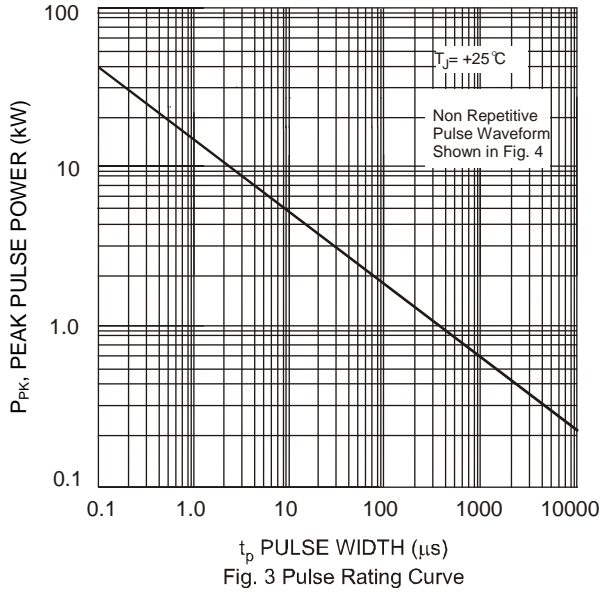


Fig. 2 Typical Total Capacitance vs. Reverse Standoff Voltage

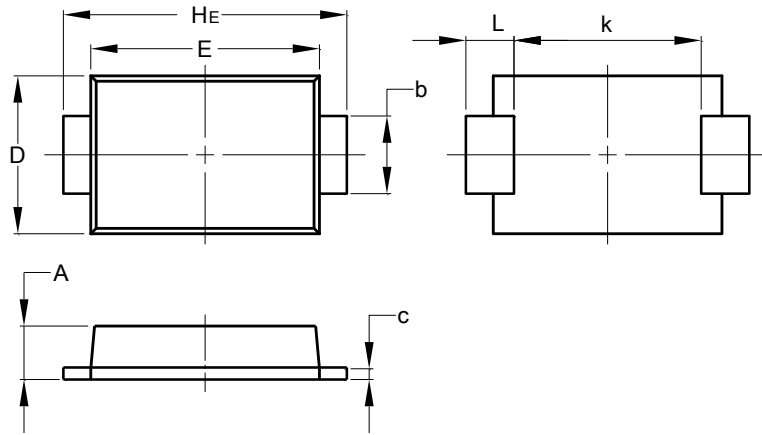


- Notes:
- 7. Device mounted on FR-4 substrate, 1" x 1", 2oz, single-sided, PC boards with 0.06" x 0.09" copper pad.
  - 8. Device mounted on FR-4 substrate, 0.4" x 0.5", 2oz, single-sided, PC boards with 0.2" x 0.25" copper pad.

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

D-FLAT

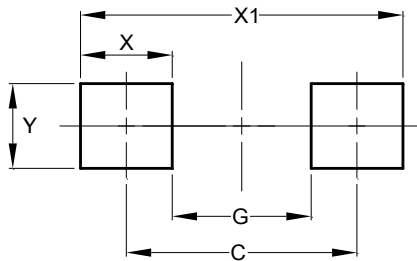


| D-FLAT               |      |      |
|----------------------|------|------|
| Dim                  | Min  | Max  |
| A                    | 0.90 | 1.10 |
| b                    | 1.25 | 1.65 |
| c                    | 0.10 | 0.40 |
| D                    | 2.25 | 2.95 |
| E                    | 3.95 | 4.60 |
| k                    | 2.80 | -    |
| HE                   | 5.00 | 5.60 |
| L                    | 0.50 | 1.30 |
| All Dimensions in mm |      |      |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

D-FLAT



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 4.65          |
| G          | 2.80          |
| X          | 1.85          |
| X1         | 6.50          |
| Y          | 1.70          |

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