

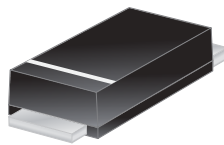
## Features

- Packaged in the Low Profile D-FLAT to Optimize Board Space
- Glass Passivated Die Construction
- Excellent Clamping Capability
- IEC 61000-4-2 (ESD): Air  $\pm 30$ kV, Contact  $\pm 30$ kV
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

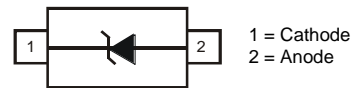
## Mechanical Data

- 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)

D-FLAT



Top View



Device Schematic

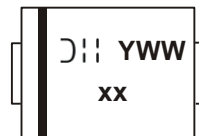
## Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
P4SMAJX.XADF-13	Standard	D-FLAT	10,000/Tape & Reel
P4SMAJXXADF-13	Standard	D-FLAT	10,000/Tape & Reel

\*XX = Device Voltage, for example: P4SMAJ17ADF-13.

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <https://www.diodes.com/quality/lead-free/> 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)
- DII = Manufacturers' Code Marking
- YWW = Date Code Marking
- Y = Last Digit of Year (ex: 9 for 2019)
- 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 (Non Repetitive Current Pulse Derated Above T <sub>A</sub> = +25°C) (Note 5)	P <sub>PK</sub>	400	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Superimposed on Rated Load (Notes 5 & 6)	I <sub>FSM</sub>	40	A
Steady State Power Dissipation @ T <sub>L</sub> = +75°C	PM <sub>(AV)</sub>	1.0	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>	37	°C/W
Typical Thermal Resistance, Junction to Terminal (Note 8)	R <sub>θJT</sub>	39	°C/W
Typical Thermal Resistance, Junction to Ambient (Note 7)	R <sub>θJA</sub>	114	°C/W
Typical Thermal Resistance, Junction to Ambient (Note 8)	R <sub>θJA</sub>	88	°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"\*1", 2oz, single-sided, PC boards with 0.06"\*0.09" copper pad.  
8. Device mounted on FR-4 substrate, 0.4"\*0.5", 2oz, single-sided, PC boards with 0.2"\*0.25" copper pad.

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

Part Number	Reverse Standoff Voltage	Breakdown Voltage		Test Current	Max. Reverse Leakage @	Max. Clamping Voltage @ I <sub>PP</sub>	Max. Peak Pulse Current	Marking Code
	V <sub>RWM</sub> (V)	V <sub>BR</sub> @ I <sub>T</sub> (Note 9)	Min (V)		Max (V)	I <sub>R</sub> (μA)	V <sub>C</sub> (V)	
P4SMAJ5.0ADF	5.0	6.40	7.25	10	400	9.2	43.5	HE
P4SMAJ6.0ADF	6.0	6.67	7.37	10	400	10.3	38.8	HG
P4SMAJ6.5ADF	6.5	7.22	7.98	10	250	11.2	35.7	HK
P4SMAJ7.0ADF	7.0	7.78	8.60	10	100	12.0	33.3	HM
P4SMAJ7.5ADF	7.5	8.33	9.21	1.0	50	12.9	31.0	HP
P4SMAJ8.0ADF	8.0	8.89	9.83	1.0	25	13.6	29.4	HR
P4SMAJ8.5ADF	8.5	9.44	10.82	1.0	10	14.4	27.7	HT
P4SMAJ9.0ADF	9.0	10.0	11.5	1.0	5.0	15.4	26.0	HV
P4SMAJ10ADF	10	11.1	12.3	1.0	1.0	17.0	23.5	HX
P4SMAJ11ADF	11	12.2	13.5	1.0	1.0	18.2	22.0	HZ
P4SMAJ12ADF	12	13.3	14.7	1.0	1.0	19.9	20.1	IE
P4SMAJ13ADF	13	14.4	15.9	1.0	1.0	21.5	18.6	IG
P4SMAJ14ADF	14	15.6	17.2	1.0	1.0	23.2	17.2	IK
P4SMAJ15ADF	15	16.7	18.5	1.0	1.0	24.4	16.4	IM
P4SMAJ16ADF	16	17.8	19.7	1.0	1.0	26.0	15.3	IP
P4SMAJ17ADF	17	18.9	20.9	1.0	1.0	27.6	14.5	IR
P4SMAJ18ADF	18	20.0	22.1	1.0	1.0	29.2	13.7	IT
P4SMAJ20ADF	20	22.2	24.5	1.0	1.0	32.4	12.3	IV
P4SMAJ22ADF	22	24.4	26.9	1.0	1.0	35.5	11.2	IX
P4SMAJ24ADF	24	26.7	29.5	1.0	1.0	38.9	10.3	IZ
P4SMAJ26ADF	26	28.9	31.9	1.0	1.0	42.1	9.5	JE
P4SMAJ28ADF	28	31.1	34.4	1.0	1.0	45.4	8.8	JG
P4SMAJ30ADF	30	33.3	36.8	1.0	1.0	48.4	8.3	JK
P4SMAJ33ADF	33	36.7	40.6	1.0	1.0	53.3	7.5	JM
P4SMAJ36ADF	36	40.0	44.2	1.0	1.0	58.1	6.9	JP

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

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

Part Number	Reverse Standoff Voltage	Breakdown Voltage		Test Current	Max. Reverse Leakage @	Max. Clamping Voltage @ I <sub>PP</sub>	Max. Peak Pulse Current	Marking Code
	V <sub>RWM</sub> (V)	V <sub>BR</sub> @ I <sub>T</sub> (Note 9)	Min (V)		Max (V)	I <sub>R</sub> (μA)	V <sub>C</sub> (V)	
P4SMAJ40ADF	40	44.4	49.1	1.0	1.0	64.5	6.2	JR
P4SMAJ43ADF	43	47.8	52.8	1.0	1.0	69.4	5.7	JT
P4SMAJ45ADF	45	50.0	55.3	1.0	1.0	72.7	5.5	JV
P4SMAJ48ADF	48	53.3	58.9	1.0	1.0	77.4	5.2	JX
P4SMAJ51ADF	51	56.7	62.7	1.0	1.0	82.4	4.9	JZ
P4SMAJ54ADF	54	60.0	66.3	1.0	1.0	87.1	4.6	RE
P4SMAJ58ADF	58	64.4	71.2	1.0	1.0	93.6	4.3	RG
P4SMAJ60ADF	60	66.7	73.7	1.0	1.0	96.8	4.1	RK
P4SMAJ64ADF	64	71.1	78.6	1.0	1.0	103	3.9	RM
P4SMAJ70ADF	70	77.8	86.0	1.0	1.0	113	3.5	RP
P4SMAJ75ADF	75	83.3	92.1	1.0	1.0	121	3.3	RR
P4SMAJ78ADF	78	86.7	95.8	1.0	1.0	126	3.2	RT
P4SMAJ85ADF	85	94.4	104	1.0	1.0	137	2.9	RV

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

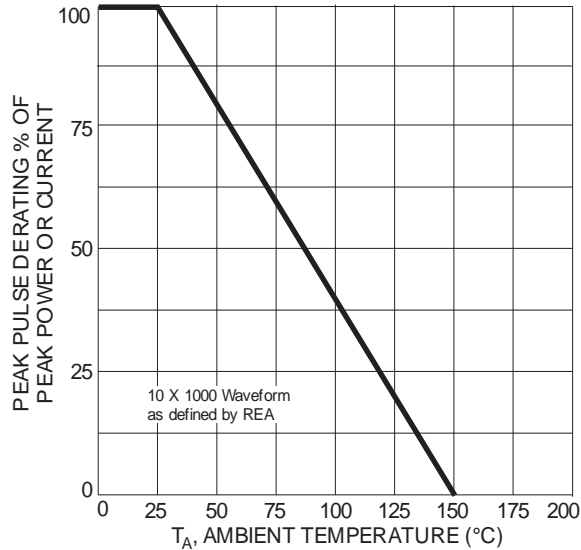


Figure 1 Power Dissipation vs. Ambient Temperature

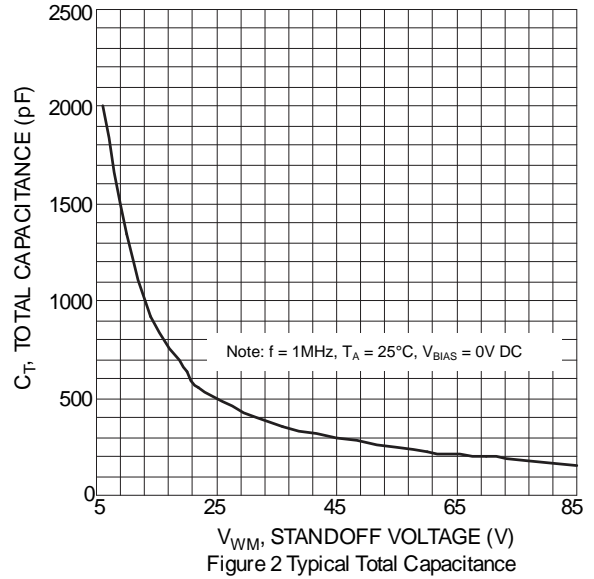


Figure 2 Typical Total Capacitance

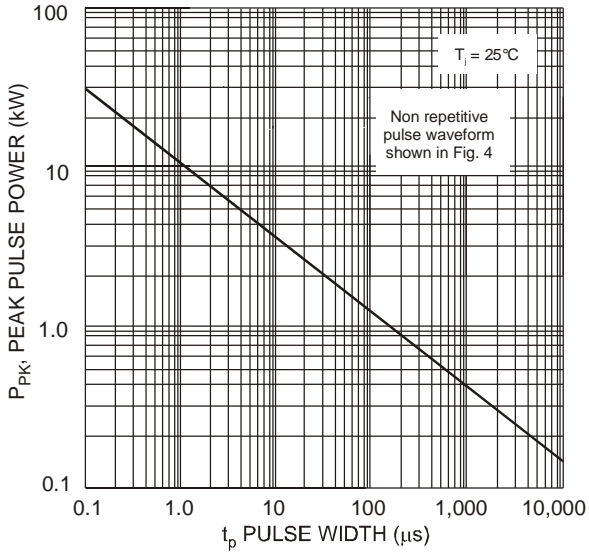


Fig. 3 Pulse Rating Curve

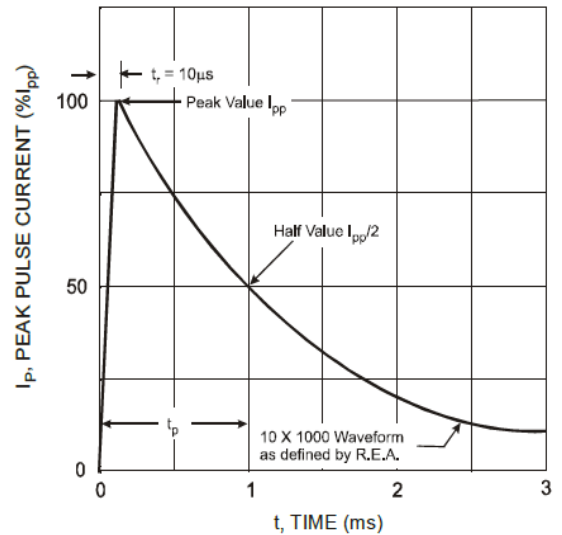


Fig. 4 Pulse Waveform

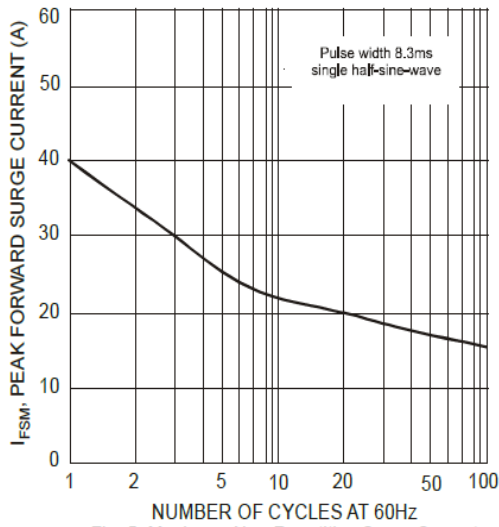


Fig. 5 Maximum Non-Repetitive Surge Current

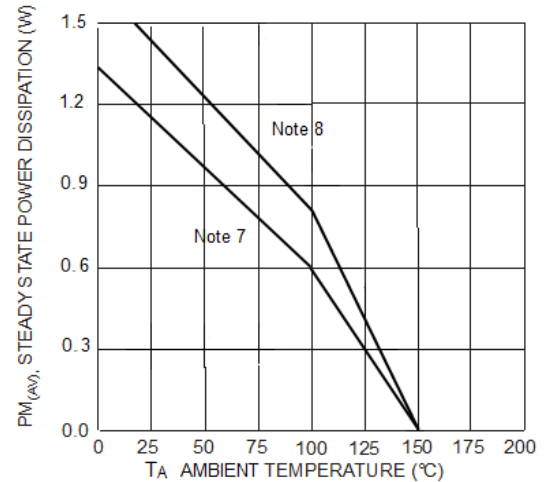
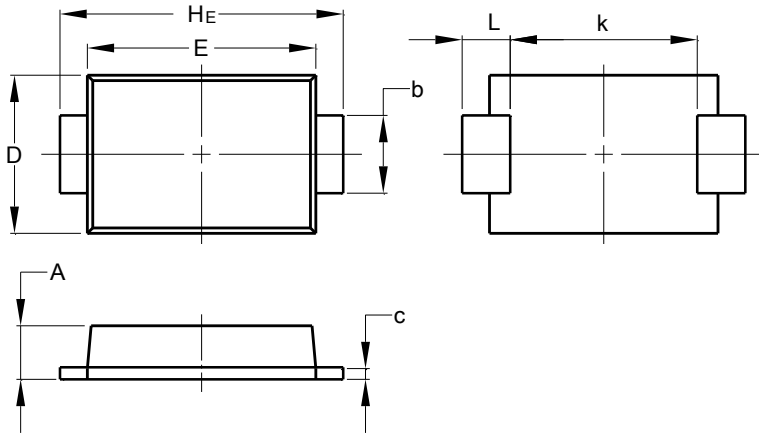


Fig. 6 Steady State Power Derating Curve

**Package Outline Dimensions**

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

**D-FLAT**

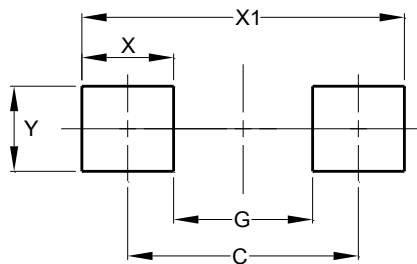


D-FLAT		
Dim	Min	Max
A	0.90	1.10
b	1.25	1.65
c	0.10	0.40
D	2.25	2.95
E	3.95	4.60
k	2.80	-
HE	5.00	5.60
L	0.50	1.30
All Dimensions in mm		

**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

**IMPORTANT NOTICE**

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

**LIFE SUPPORT**

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2019, Diodes Incorporated

**[www.diodes.com](http://www.diodes.com)**