SPICE MODEL: PDU420

PDU420

4A ULTRA-FAST RECOVERY RECTIFIER
PowerDI™5

NEW PRODUCT

Features

- Glass Passivated Die Construction
- Ultra-Fast Recovery Time for High Efficiency
- High Maximum Junction Temperature
- For Use in Low Voltage, High Frequency Inverters, Free Wheeling, and Polarity Protection Applications
- High Forward Surge Current Capability
- **Lead Free Finish, RoHS Compliant (Note 1)**
- **"Green" Molding Compound (No Br, Sb)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: PowerDI™5
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Polarity: See Diagram on Page 4
- Marking: See Page 3
- Weight: 0.096 grams (approx.)

TOP VIEW

BOTTOM VIEW

Maximum Ratings @ T_A = 25°C unless otherwise specified

Single phase, half wave, 60Hz, resistive or inductive load.
For capacitive load, derate current by 20%.

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	200	V
RMS Reverse Voltage	$V_{R(RMS)}$	141	V
Average Rectified Output Current (See also figure 4)	I_O	4	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single half sine-wave Superimposed on Rated Load	I_{FSM}	125	A

Thermal Characteristics

Characteristic		Symbol	Typ	Max	Unit
Thermal Resistance Junction to Soldering Point		$R_{\theta JS}$	—	3.0	°C/W
Thermal Resistance Junction to Ambient Air (Note 2)	T_A = 25°C	$R_{\theta JA}$	85	—	°C/W
Thermal Resistance Junction to Ambient Air (Note 3)	T_A = 25°C	$R_{\theta JA}$	60	—	°C/W
Thermal Resistance Junction to Ambient Air (Note 4)	T_A = 25°C	$R_{\theta JA}$	40	—	°C/W
Operating Temperature Range		T_j	-65 to +175		°C
Storage Temperature Range		T_{STG}	-65 to +175		°C

Notes:
1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.
2. FR-4 PCB, 2 oz. Copper, minimum recommended pad layout per http://www.diodes.com/datasheets/ap02001.pdf.
3. Polymide PCB, 2 oz. Copper, minimum recommended pad layout per http://www.diodes.com/datasheets/ap02001.pdf.
4. Polymide PCB, 2 oz. Copper. Cathode pad dimensions 9.4mm x 7.2mm. Anode pad dimensions 2.7mm x 1.6mm.

NEW PRODUCT

Electrical Characteristics @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit	Test Condition
Minimum Reverse Breakdown Voltage (Note 5)	$V_{(BR)R}$	200	V	I_R = 5μA
Maximum Forward Voltage	V_{FM}	0.875 0.71 0.89 0.85 0.72 1.25	V	I_F = 3A, T_S = 25°C I_F = 3A, T_S = 150°C I_F = 4A, T_S = 25°C I_F = 4A, T_S = 100°C I_F = 4A, T_S = 150°C I_F = 12A, T_S = 25°C
Maximum Reverse Leakage Current (Note 5)	I_{RM}	5 150	μA	T_S = 25°C, V_R = 200V T_S = 150°C, V_R = 200V
Maximum Reverse Recovery Time	t_{rr}	25	ns	I_F = 0.5A, I_R = 1.0A I_{RR} = 0.25A (See figure 7)

Notes: 5. Short duration test pulse used to minimize self-heating effect.

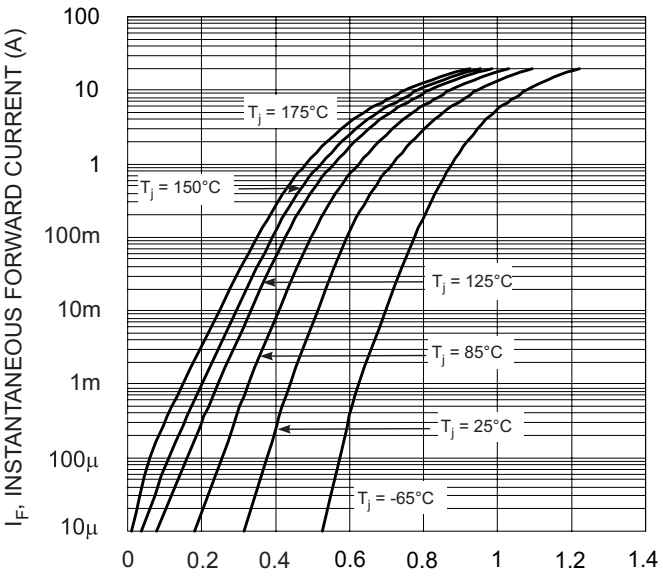


Fig. 1 Typical Forward Characteristics

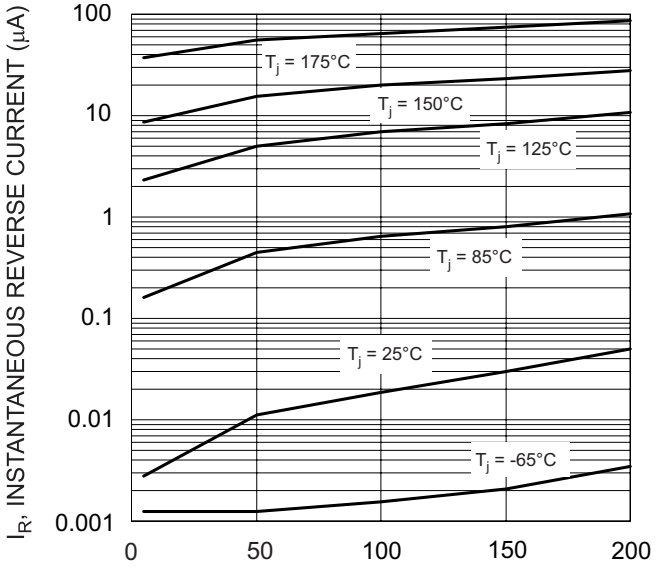


Fig. 2 Typical Reverse Characteristics

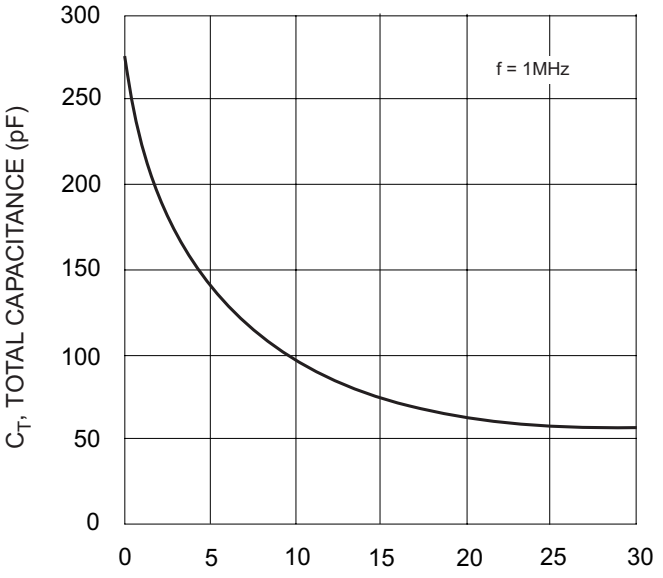


Fig. 3 Typical Total Capacitance

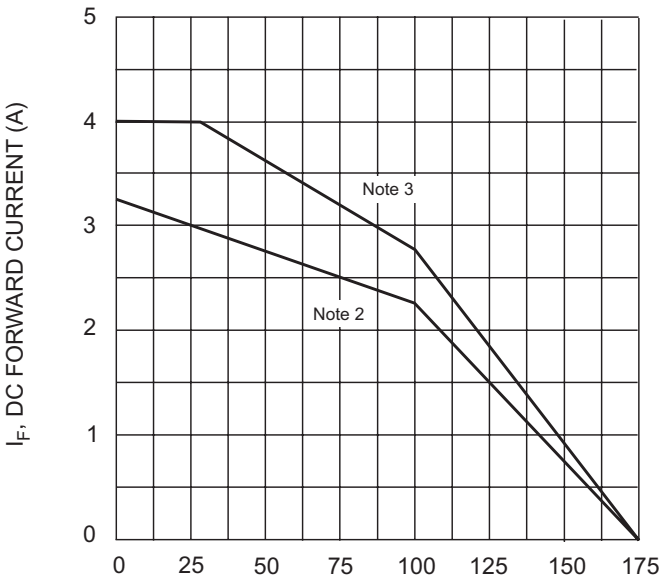


Fig. 4 DC Forward Current Derating

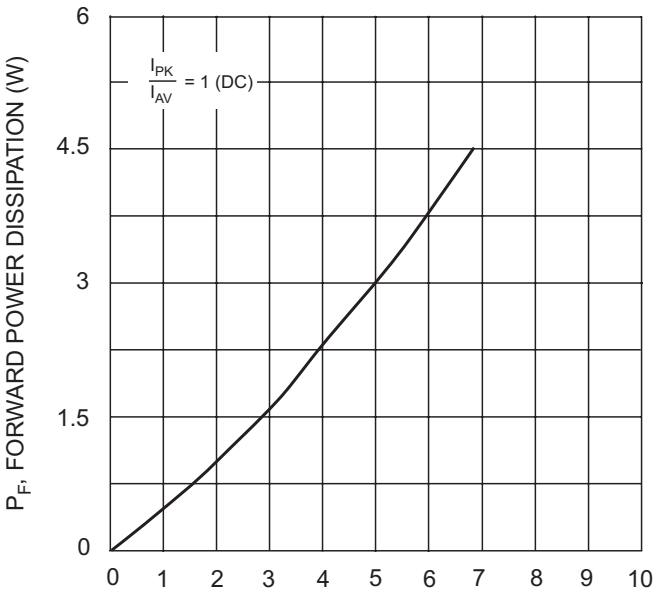


Fig. 5 Forward Power Dissipation

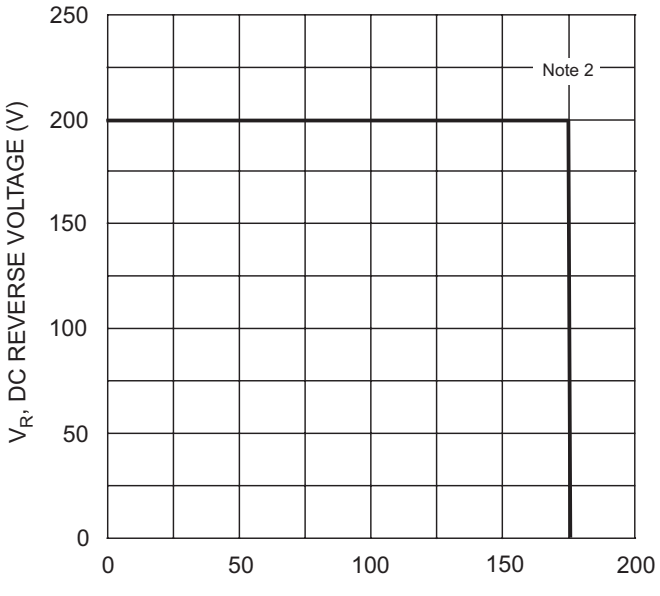
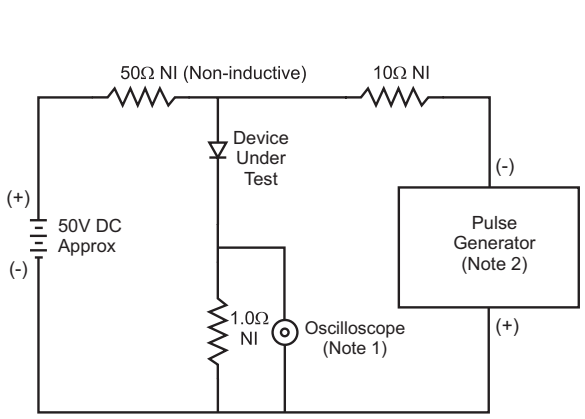


Fig. 6 Operating Temperature Derating



Notes:
1. Rise Time = 7.0ns max. Input Impedance = 1.0MΩ, 22pF.
2. Rise Time = 10ns max. Input Impedance = 50Ω.

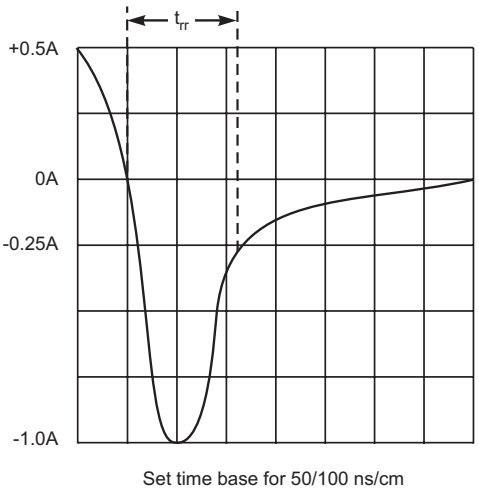


Fig. 7 Reverse Recovery Time Characteristic and Test Circuit

Ordering Information (Note 6)

Device	Packaging	Shipping
PDU420-13	PowerDI™5	5000/Tape & Reel

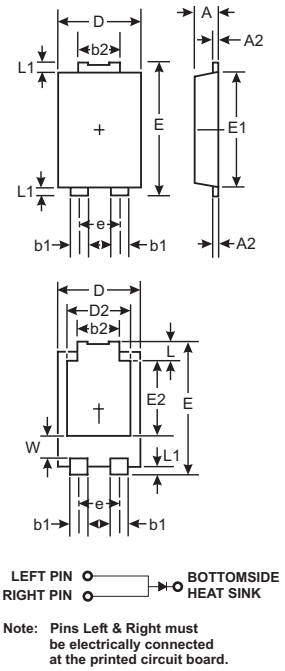
Notes: 6. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information

U420 = Product type marking code
= Manufacturers' code marking
YYWW = Date code marking
YY = Last digit of year ex: 06 for 2006
WW = Week code 01 to 52
K = Factory Designator

NEW PRODUCT

Package Outline Dimensions



Note: Pins Left & Right must be electrically connected at the printed circuit board.

PowerDI™5		
Dim	**Min**	**Max**
A	1.05	1.15
A2	0.33	0.43
b1	0.80	0.99
b2	1.70	1.88
D	3.90	4.05
D2	3.05 NOM	
E	6.40	6.60
e	1.84 NOM	
E1	5.30	5.45
E2	3.55 NOM	
L	0.75	0.95
L1	0.50	0.65
W	1.20	1.50
All Dimensions in mm		