


## HEXFRED<sup>®</sup> Ultrafast Diodes, 300 A (INT-A-PAK Power Modules)


**INT-A-PAK**
**FEATURES**

- Electrically insulated by DBC ceramic
- 3500 V<sub>RMS</sub> isolating voltage
- Standard JEDEC<sup>®</sup> package
- Simplified mechanical designs, rapid assembly
- High surge capability
- Large creepage distances
- UL approved file E78996 
- Case style INT-A-PAK
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

PRIMARY CHARACTERISTICS	
V <sub>R</sub>	600 V
I <sub>F(AV)</sub> at T <sub>C</sub>	300 A at 48 °C
Package	INT-A-PAK
Circuit configuration	Two diodes doubler circuit

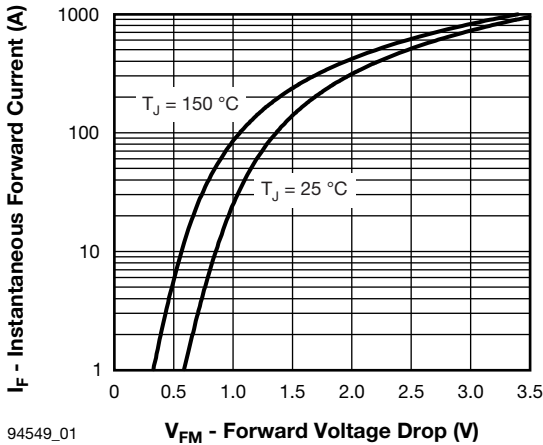
ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V <sub>R</sub>		600	V
Continuous forward current per leg	I <sub>F</sub>	T <sub>C</sub> = 25 °C	435	A
		T <sub>C</sub> = 100 °C	230	
Single pulse forward current	I <sub>FSM</sub>	Limited by junction temperature	TBD	
Maximum power dissipation per leg	P <sub>D</sub>	T <sub>C</sub> = 25 °C	781	W
		T <sub>C</sub> = 100 °C	313	
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-40 to +150	°C
RMS insulation voltage	V <sub>INS</sub>	50 Hz, circuit to base, all terminals shorted, t = 1 s	3500	V

ELECTRICAL SPECIFICATIONS (T <sub>J</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V <sub>BR</sub>	I <sub>R</sub> = 500 μA	600	-	-	V
Forward voltage drop per leg	V <sub>FM</sub>	I <sub>F</sub> = 150 A	-	1.23	1.53	
		I <sub>F</sub> = 300 A	-	1.43	1.96	
		I <sub>F</sub> = 150 A, T <sub>J</sub> = 125 °C	-	1.11	1.29	
		I <sub>F</sub> = 300 A, T <sub>J</sub> = 125 °C	-	1.39	1.73	
Maximum reverse leakage current	I <sub>RM</sub>	T <sub>J</sub> = 150 °C, V <sub>R</sub> = 600 V	-	-	50	mA



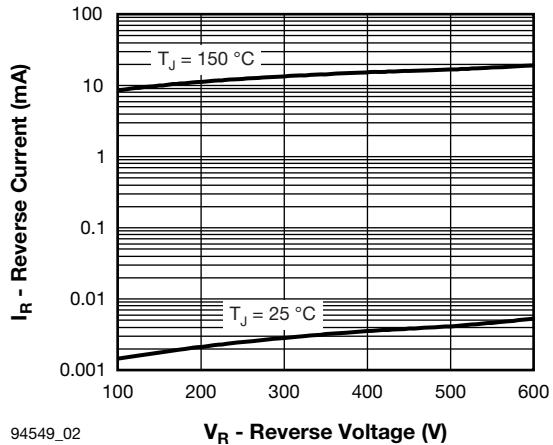
DYNAMIC RECOVERY CHARACTERISTICS ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 50\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $V_R = 400\text{ V (per leg)}$	-	130	165	ns
		$T_J = 125\text{ }^\circ\text{C}$		-	195	260	
Peak recovery current	$I_{rr}$	$T_J = 25\text{ }^\circ\text{C}$		-	11	18	A
		$T_J = 125\text{ }^\circ\text{C}$		-	20	30	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$		-	670	1485	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	1800	3900	
Peak rate of recovery current	$di_{(rec)M}/dt$	$T_J = 125\text{ }^\circ\text{C}$	-	-	400	$\text{A}/\mu\text{s}$	
Softness factor per leg	s	$I_F = 50\text{ A}, T_J = 25\text{ }^\circ\text{C}, di/dt = 400\text{ A}/\mu\text{s}, V_R = 200\text{ V}$	-	0.2	-		
		$I_F = 50\text{ A}, T_J = 125\text{ }^\circ\text{C}, di/dt = 400\text{ A}/\mu\text{s}, V_R = 200\text{ V}$	-	0.22	-		

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating and storage temperature range	$T_J, T_{Stg}$		-40 to +150	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	$R_{thJC}$	DC operation	0.16	K/W
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased	0.05	
Mounting torque $\pm 10\%$	to heatsink busbar	A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow the spread of the compound.	4 to 6	Nm
Approximate weight			200	g
			7.1	oz.
Case style			INT-A-PAK	



94549\_01

Fig. 1 - Maximum Forward Voltage Drop Characteristics



94549\_02

Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

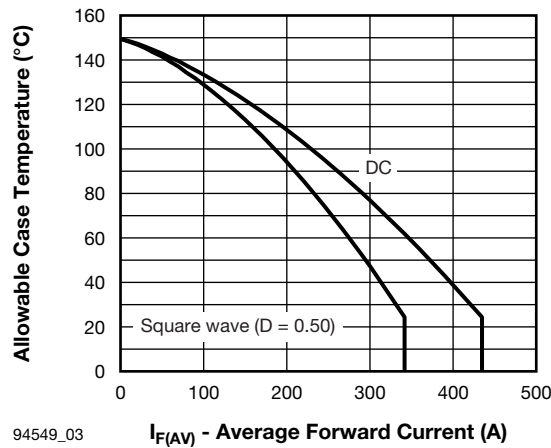


Fig. 3 - Maximum Allowable Case Temperature vs. Average Forward Current

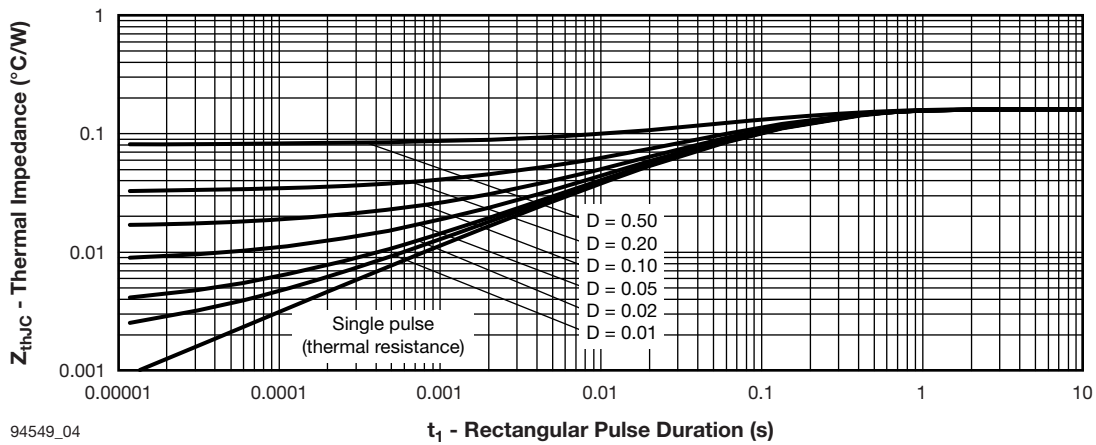


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

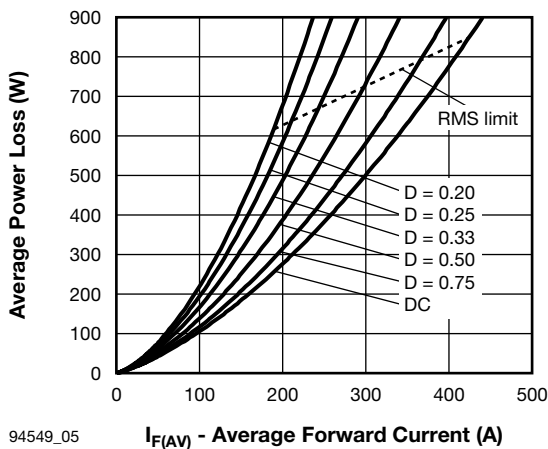


Fig. 5 - Forward Power Loss Characteristics

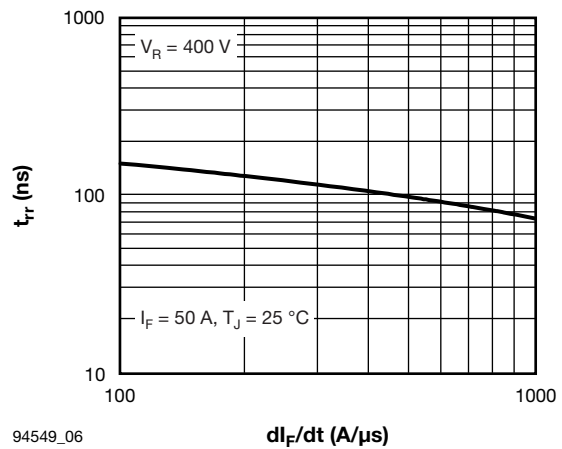
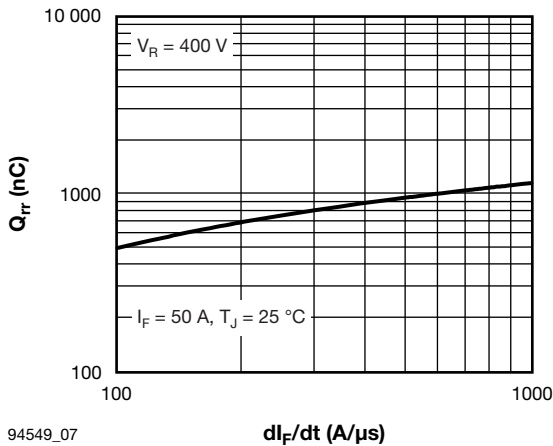
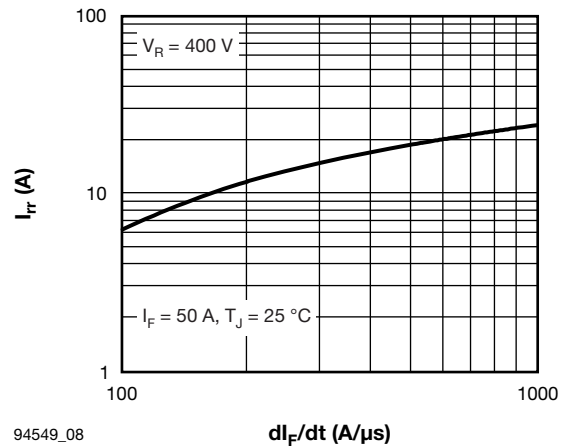


Fig. 6 - Typical Reverse Recovery Time vs.  $di_F/dt$  (Per Leg)



94549\_07

Fig. 7 - Typical Reverse Recovery Charge vs.  $di_F/dt$  (Per Leg)



94549\_08

Fig. 8 - Typical Reverse Recovery Current vs.  $di_F/dt$  (Per Leg)

**ORDERING INFORMATION TABLE**

Device code

<b>VS-VS</b>	<b>KD</b>	<b>U</b>	<b>300</b>	<b>06</b>	<b>PbF</b>
①	②	③	④	⑤	⑥

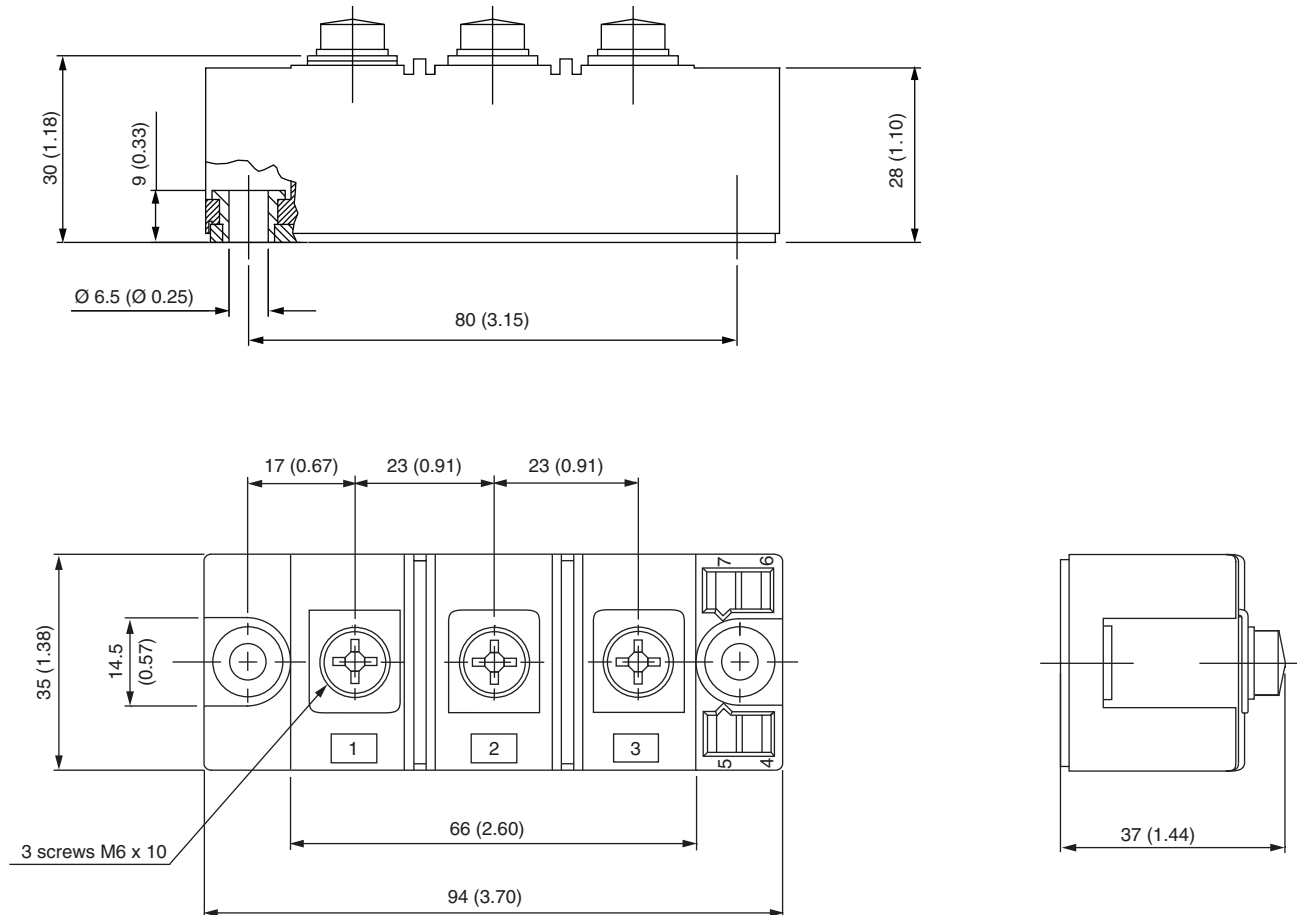
- 1** - Vishay Semiconductors product
- 2** - Circuit configuration:
- 3** - U = Ultrafast diode
- 4** - Current rating (300 = 300 A)
- 5** - Voltage rating (06 = 600 V)
- 6** - PbF = Lead (Pb)-free

CIRCUIT CONFIGURATION	
CIRCUIT	CIRCUIT DRAWING
Two diodes doubler circuit	

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95254">www.vishay.com/doc?95254</a>

## INT-A-PAK DBC

**DIMENSIONS** in millimeters (inches)





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.