


## 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

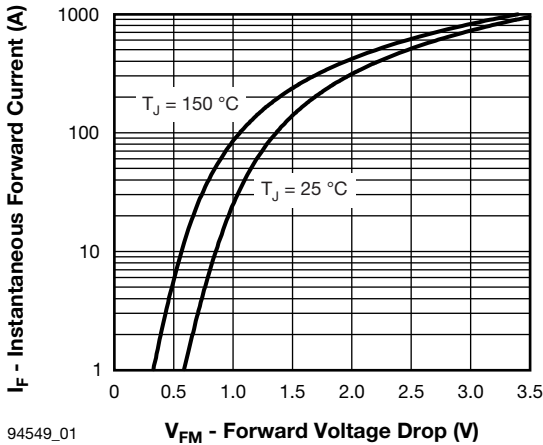
ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V <sub>R</sub>		600	V
Continuous forward current per leg	I <sub>F</sub>	T <sub>C</sub> = 25 °C	435	A
		T <sub>C</sub> = 100 °C	230	
Single pulse forward current	I <sub>FSM</sub>	Limited by junction temperature	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



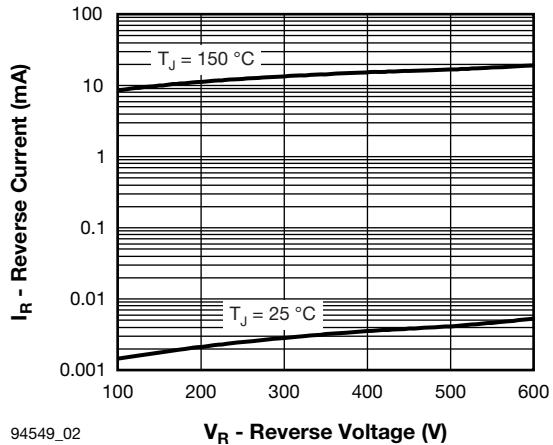
DYNAMIC RECOVERY CHARACTERISTICS ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 50\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $V_R = 400\text{ V (per leg)}$	-	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	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

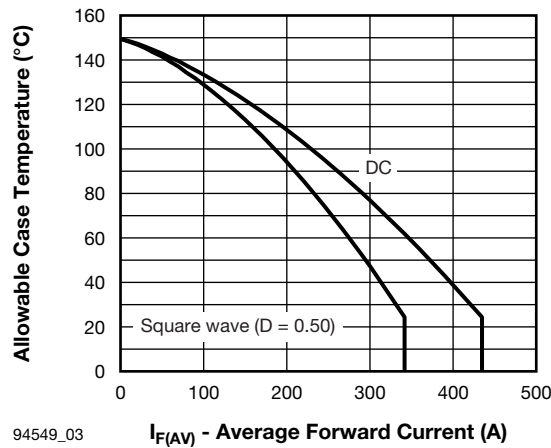


Fig. 3 - Maximum Allowable Case Temperature vs. Average Forward Current

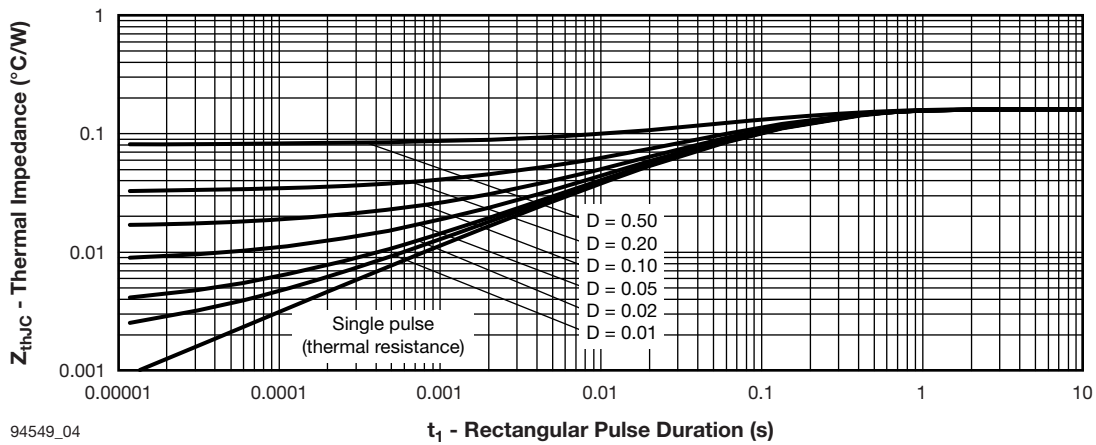


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

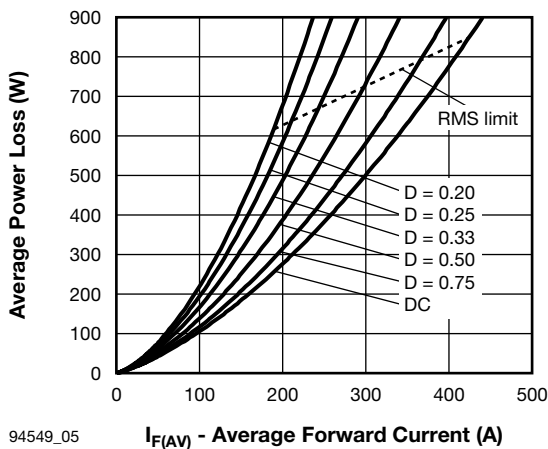


Fig. 5 - Forward Power Loss Characteristics

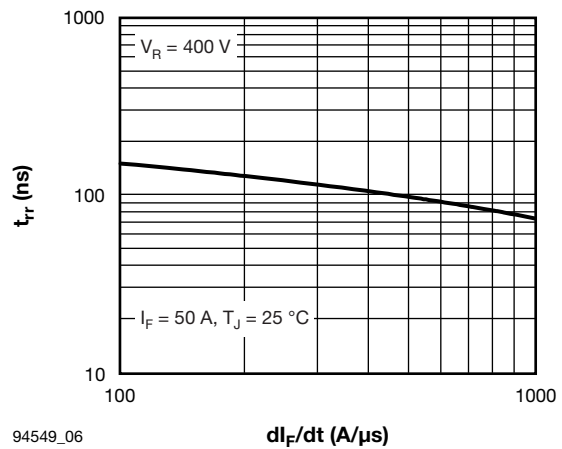
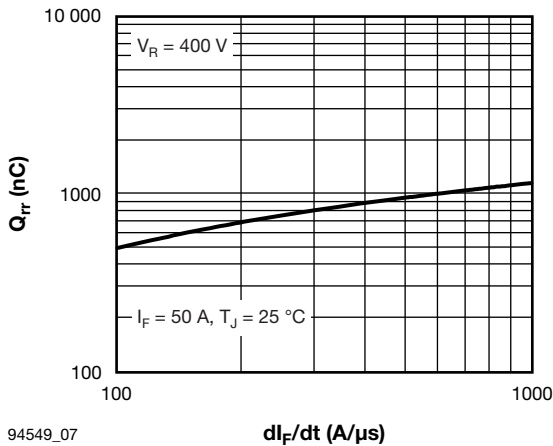
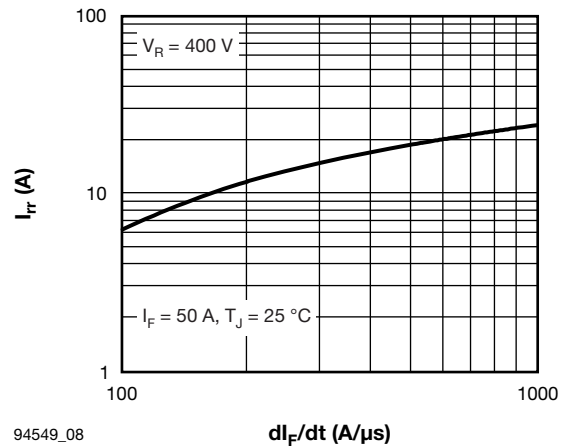


Fig. 6 - Typical Reverse Recovery Time vs.  $di_F/dt$  (Per Leg)



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>
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## INT-A-PAK DBC

**DIMENSIONS** in millimeters (inches)





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