### **Vishay Semiconductors**

## Insulated Hyperfast Rectifier Module, 280 A



www.vishay.com

PRIMARY CHARACTERISTICS								
V <sub>R</sub>	300 V							
$I_{F(AV)}$ per module at $T_C = 81 \text{ °C}$	280 A							
t <sub>rr</sub>	58 ns							
Туре	Modules - diode FRED Pt®							
Package	SOT-227							
Circuit configuration	Two separate diodes, parallel pin-out							

### **FEATURES**

- Two fully independent diodes
- · Fully insulated package
- Hyperfast, soft with reverse recovery, high operation junction temperature  $(T_{.1} max. = 175 °C)$
- Low forward voltage drop
- · Optimized for power conversion: welding and industrial SMPS applications
- · Easy to use and parallel
- Industry standard outline
- UL approved file E78996
- · Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

### **DESCRIPTION / APPLICATIONS**

The VS-UFH280FA30 insulated modules integrate two state of the art ultrafast recovery rectifiers in the compact, industry standard SOT-227 package. The diodes structure, and its life time control, provide an ultrasoft recovery current shape, together with the best overall performance, ruggedness and reliability characteristics.

These devices are thus intended for high frequency applications in which the switching energy is designed not to be predominant portion of the total energy, such as in the output rectification stage of welding machines, SMPS, DC/DC converters. Their extremely optimized stored charge and low recovery current reduce both over dissipation in the switching elements (and snubbers) and EMI/RFI.

ABSOLUTE MAXIMUM RATINGS							
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS			
Cathode to anode voltage	V <sub>R</sub>		300	V			
Continuous forward current per diode	I <sub>F</sub>	T <sub>C</sub> = 95 °C	160	٨			
Single pulse forward current per diode	I <sub>FSM</sub>	T <sub>C</sub> = 25 °C	1539	A			
Maximum power dissipation per module	PD	T <sub>C</sub> = 95 °C	410	W			
RMS isolation voltage	VISOL	Any terminal to case, t = 1 min	2500	V			
Operating junction and storage temperatures	TJ, T <sub>Stg</sub>		-55 to +175	°C			

<b>ELECTRICAL SPECIFICATIONS PER DIODE</b> ( $T_J = 25 \text{ °C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Cathode to anode breakdown voltage	V <sub>BR</sub>	I <sub>R</sub> = 200 μA	300	-	-		
Forward voltage	V <sub>FM</sub>	I <sub>F</sub> = 100 A	-	1.07	1.27	V	
Forward voltage		I <sub>F</sub> = 100 A, T <sub>J</sub> = 175 °C	-	0.82	-		
Deverse leekerse overrent	I <sub>RM</sub>	$V_{R} = V_{R}$ rated	-	0.5	100	μA	
Reverse leakage current		$T_J = 175 \text{ °C}, V_R = V_R \text{ rated}$	-	0.74	-	mA	
Junction capacitance	CT	V <sub>R</sub> = 300 V	-	216	-	pF	

Revision: 18-Sep-2018

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Document Number: 96136

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RoHS

COMPLIANT

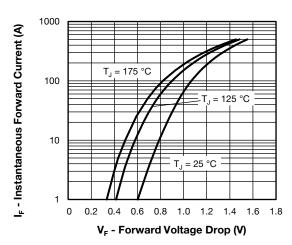


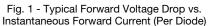
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<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25$ °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CO	MIN.	TYP.	MAX.	UNITS	
Poverse recovery time	+	$T_J = 25 \ ^\circ C$		-	58	-	200
Reverse recovery time	t <sub>rr</sub>	T <sub>J</sub> = 125 °C	I <sub>F</sub> = 50 A dI <sub>F</sub> /dt = 200 A/μs V <sub>R</sub> = 200 V	-	85	-	ns
Deal and a second	I <sub>RRM</sub>	T <sub>J</sub> = 25 °C		-	4.5	-	A
Peak recovery current		T <sub>J</sub> = 125 °C		-	10	-	
Reverse recovery charge	Q <sub>rr</sub>	T <sub>J</sub> = 25 °C		-	130	-	nC
		T <sub>J</sub> = 125 °C		-	429	-	

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Junction-to-case, single leg conducting	Р		-	-	0.39		
Junction-to-case, both leg conducting	R <sub>thJC</sub>		-	-	0.195	°C/W	
Case-to-heatsink	R <sub>thCS</sub>	Flat, greased surface	-	0.1	-		
Weight			-	30	-	g	
Mounting torque		Torque to terminal	-	-	1.1 (9.7)	Nm (lbf.in)	
Mounting torque		Torque to heatsink	-	-	1.8 (15.9)	Nm (lbf.in)	
Case style			SOT-227				





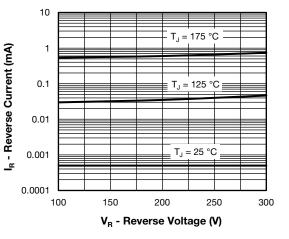
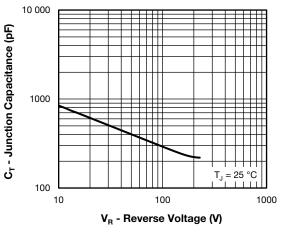


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)





 Revision: 18-Sep-2018
 Document Number: 96136

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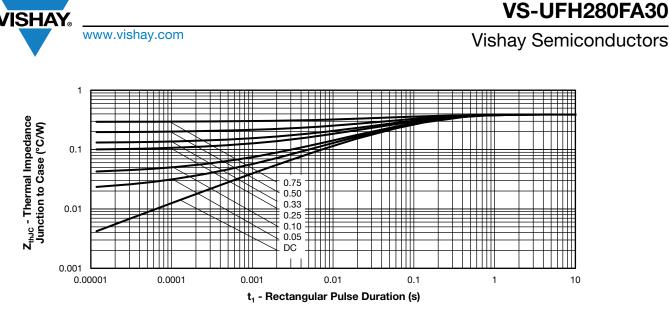


Fig. 4 - Maximum Thermal Impedance Z<sub>thJC</sub> Characteristics (Per Diode)

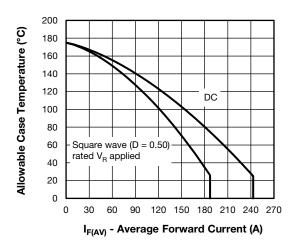


Fig. 5 - Maximum Current Rating Capability (Per Diode)

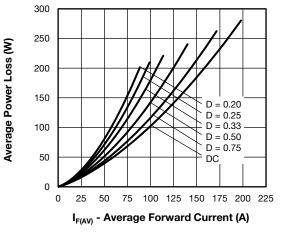
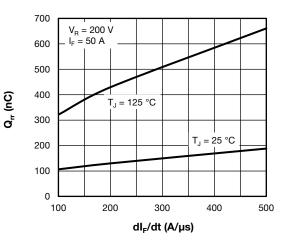


Fig. 6 - Forward Power Loss Characteristics (Per Diode)



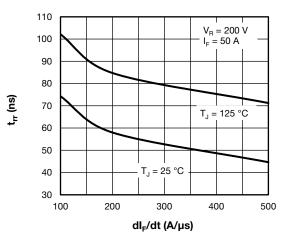


Fig. 7 - Typical Reverse Recovery Charge vs. dl<sub>F</sub>/dt (Per Diode)

Fig. 8 - Typical Reverse Recovery Time vs. dl<sub>F</sub>/dt (Per Diode)

## VS-UFH280FA30

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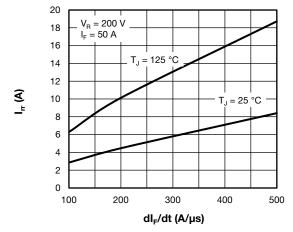


Fig. 9 - Typical Reverse Recovery Current vs. dl<sub>F</sub>/dt (Per Diode)

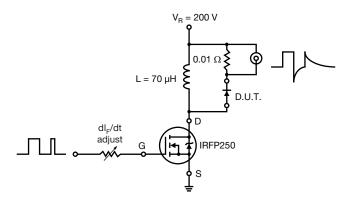
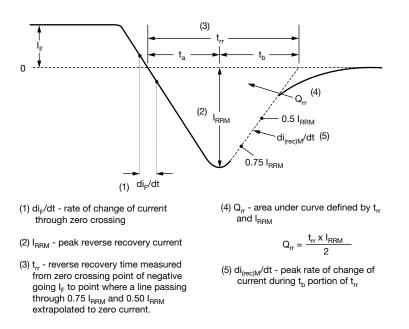
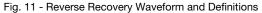


Fig. 10 - Reverse Recovery Parameter Test Circuit









### **ORDERING INFORMATION TABLE**

Device code	vs-	UF	н	280	F	Α	30
		2	3	4	5	6	7
	1 -	Visł	nay Sen	niconduc	ctors pro	oduct	
	2 -	Ultr	a fast re	ctifier			
	3 -	Нур	er fast l	FRED P	t <sup>®</sup> diffus	ed	
	4 -	Cur	rent rati	ng (280	= 280 A	A)	
	5 -	Circ	uit conf	iguratior	n (two s	eparate	diodes
	6 -	Pac	kage in	dicator (	SOT-22	27 stand	lard ins
	7 -	Volt	age rati	ng (30 =	= 300 V)	)	

CIRCUIT CONFI	GURATION	
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	Lead Assignment

LINKS TO RELATED DOCUMENTS					
Dimensions	www.vishay.com/doc?95423				
Packaging information	www.vishay.com/doc?95425				

**Vishay Semiconductors** 



SOT-227 Generation 2

### **DIMENSIONS** in millimeters (inches)



#### Note

• Controlling dimension: millimeter



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Revision: 01-Jan-2024