


## Insulated Ultra Fast Rectifier Module, 330 A



SOT-227

### FEATURES

- Gen 4 FRED Pt<sup>®</sup> dices technology
- Two fully independent diodes
- Fully insulated package
- Ultrafast, soft reverse recovery, with high operation junction temperature ( $T_J$  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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

PRIMARY CHARACTERISTICS	
$V_R$	600 V
$I_{F(AV)}$ per module at $T_C = 107$ °C	330 A
$t_{rr}$	98 ns
Type	Modules - Diode FRED Pt <sup>®</sup>
Package	SOT-227
Circuit configuration	Two separate diodes, parallel pin-out

### DESCRIPTION / APPLICATIONS

The VS-UFL330FA60 insulated modules integrate two state of the art ultrafast recovery rectifiers in the compact, industry standard SOT-227 package.

Gen 4 FRED technology, state of the art, ultra low  $V_F$ , soft switching optimized for IGBT F/W diode.

The minimized conduction loss, optimized storage charge, and low recovery current minimized the switching losses and reduce the over dissipation in the switching element and snubbers.

ABSOLUTE MAXIMUM RATINGS ( $T_J = 25$ °C unless otherwise specified)				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		600	V
Continuous forward current per diode	$I_F$	$T_C = 90$ °C	243	A
Single pulse forward current per diode	$I_{FSM}$	$T_C = 25$ °C, 10 ms sine or 6 ms rectangular pulse	1130	
Maximum power dissipation per module	$P_D$	$T_C = 90$ °C	773	W
RMS isolation voltage	$V_{ISOL}$	Any terminal to case, $t = 1$ minute	2500	V
Operating junction and storage temperatures	$T_J, T_{Stg}$		-55 to +175	°C



ELECTRICAL SPECIFICATIONS PER DIODE ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	$V_{BR}$	$I_R = 500\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	$V_{FM}$	$I_F = 200\text{ A}$	-	1.43	1.65	
		$I_F = 200\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	1.29	-	
		$I_F = 200\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	1.22	-	
Reverse leakage current	$I_{RM}$	$V_R = 600\text{ V}$	-	0.3	150	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}, V_R = 600\text{ V}$	-	222	-	mA
		$T_J = 175\text{ }^\circ\text{C}, V_R = 600\text{ V}$	-	4.2	-	
Junction capacitance	$C_T$	$V_R = 600\text{ V}, f = 1\text{ MHz}$	-	160	-	pF

DYNAMIC RECOVERY CHARACTERISTICS ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	-	98	-	ns	
		$T_J = 125\text{ }^\circ\text{C}$	-	163	-		
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 50\text{ A}$ $di_F/dt = 500\text{ A}/\mu\text{s}$ $V_R = 200\text{ V}$	-	17	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	34	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$		-	825	-	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	2788	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction to case, single leg conducting	$R_{thJC}$		-	-	0.22	$^\circ\text{C}/\text{W}$
Junction to case, both leg conducting			-	-	0.11	
Case to heatsink	$R_{thCS}$	Flat, greased surface	-	0.1	-	
Weight			-	30	-	g
Mounting torque		Torque to terminal	-	-	1.1 (9.7)	Nm (lbf.in)
		Torque to heatsink	-	-	1.8 (15.9)	Nm (lbf.in)
Case style			SOT-227			

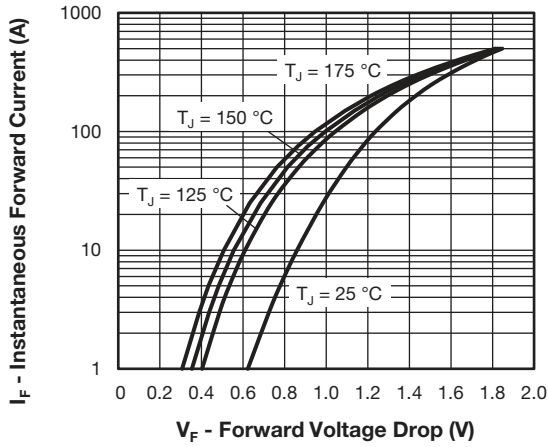


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

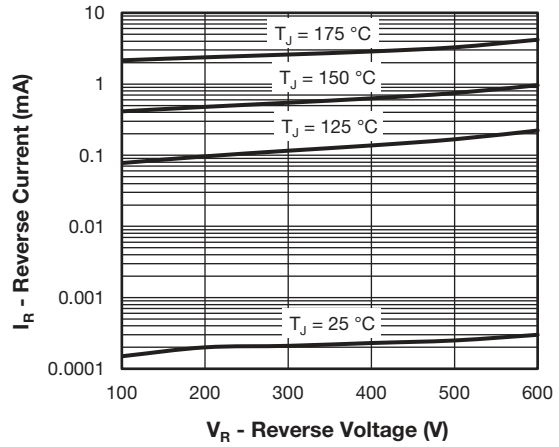


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

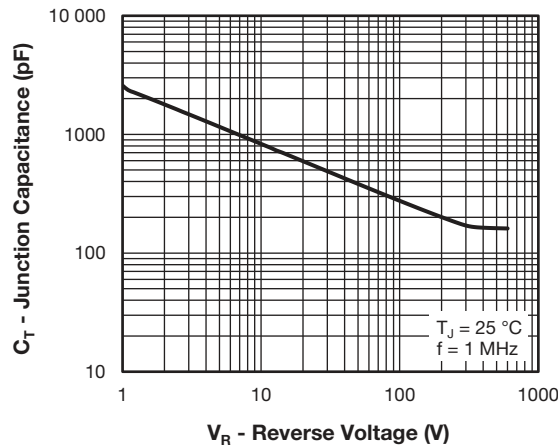


Fig. 3 - Typical Junction Capacitance vs Reverse Voltage (Per Diode)

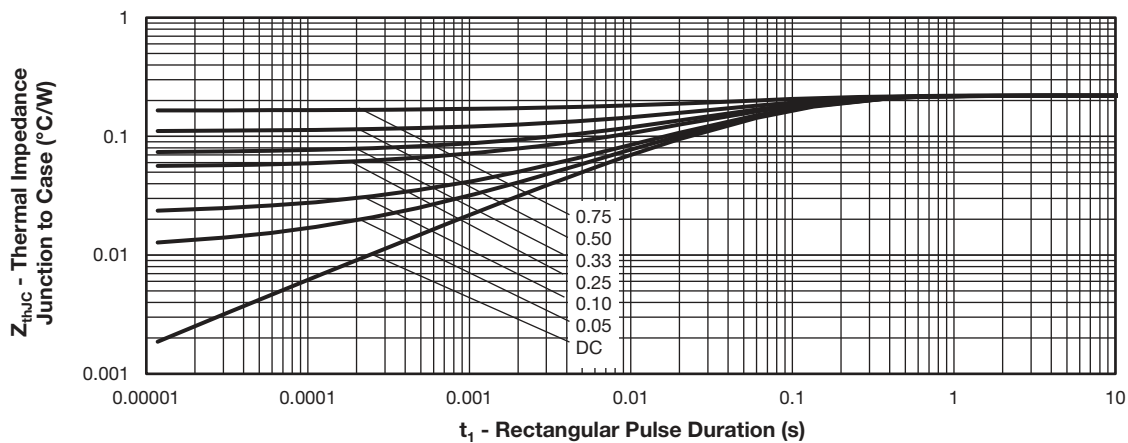


Fig. 4 - Maximum Thermal Impedance Junction-to-Case Characteristics (Per Diode)

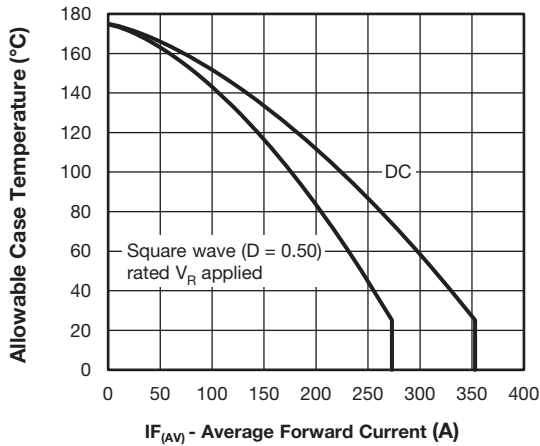


Fig. 5 - Maximum Current Rating Capability (Per Diode)

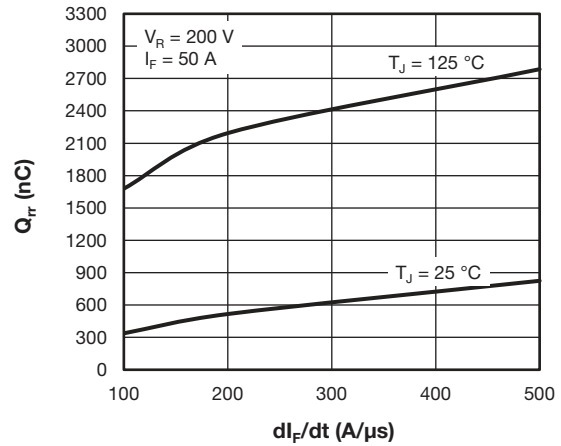


Fig. 7 - Typical Reverse Recovery Charge vs.  $dI_F/dt$  (Per Diode)

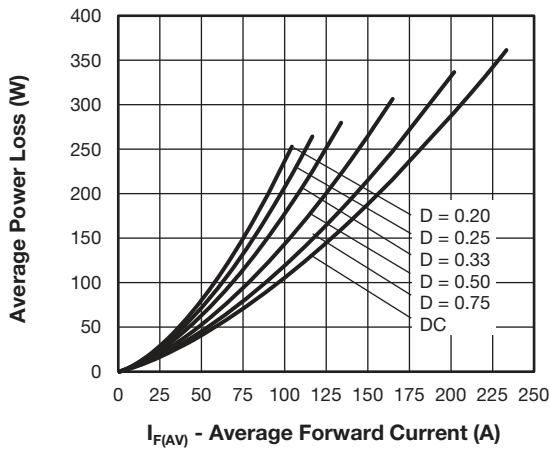


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

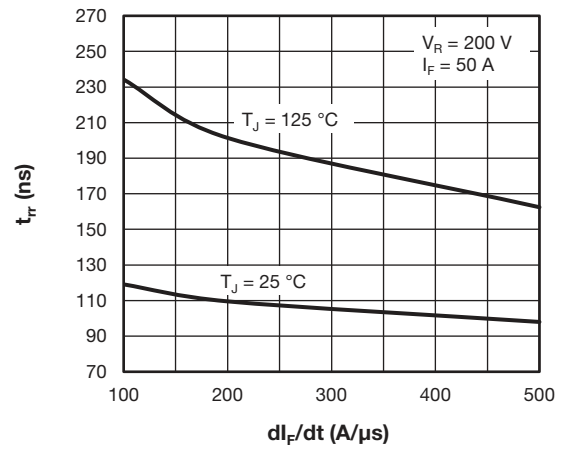


Fig. 8 - Typical Reverse Recovery Time vs.  $dI_F/dt$  (Per Diode)

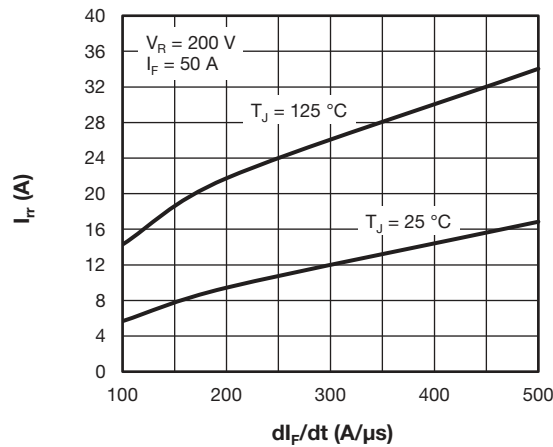
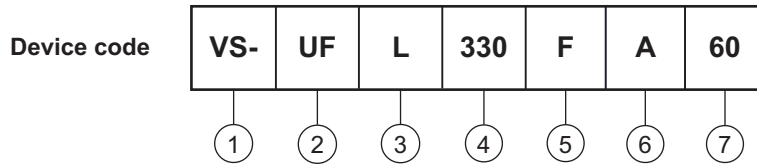


Fig. 9 - Typical Reverse Recovery Current vs.  $dI_F/dt$  (Per Diode)



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Ultrafast rectifier
- 3** - Ultrafast Pt diffused, low  $V_F$
- 4** - Current rating (300 = 300 A)
- 5** - Circuit configuration (2 separate diodes, parallel pin-out)
- 6** - Package indicator (SOT-227 standard insulated base)
- 7** - Voltage rating (60 = 600 V)

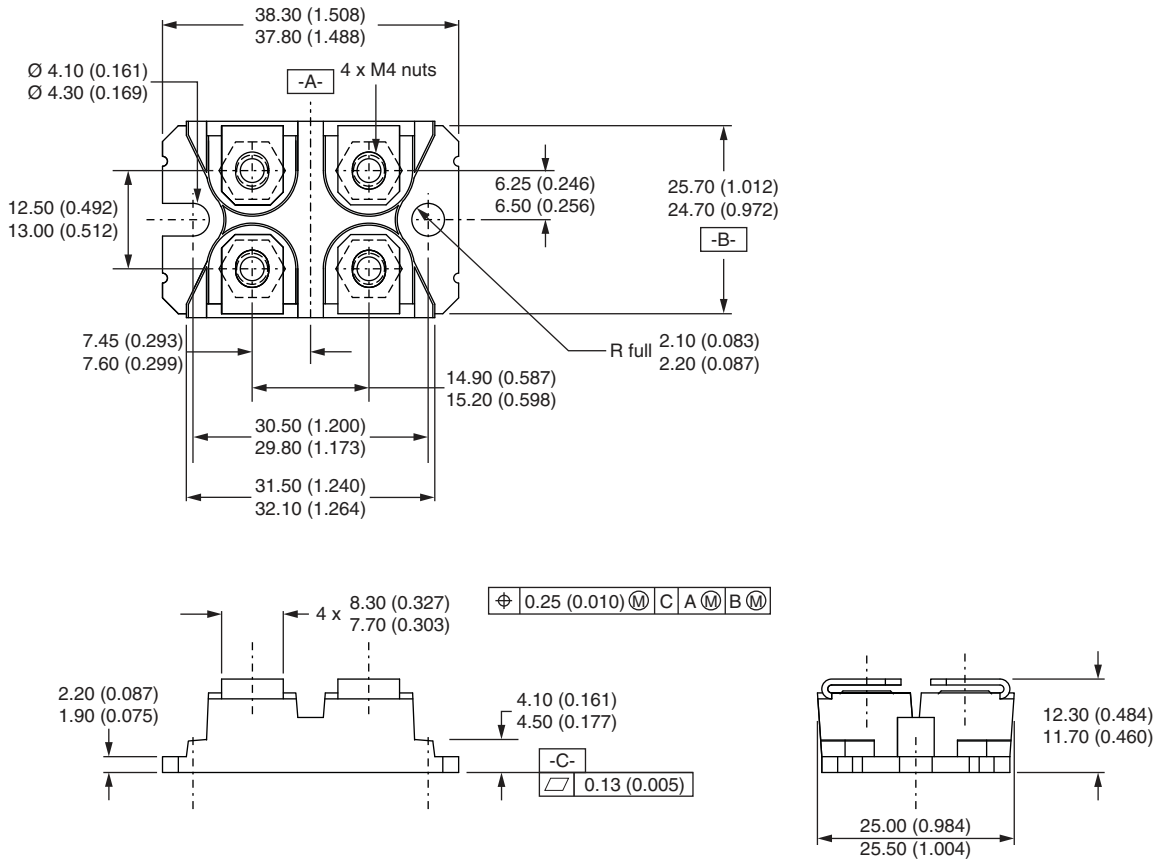
Quantity per tube is 10 pcs, M4 screw and washer included

CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	 

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95423">www.vishay.com/doc?95423</a>
Packaging information	<a href="http://www.vishay.com/doc?95425">www.vishay.com/doc?95425</a>



**DIMENSIONS** in millimeters (inches)



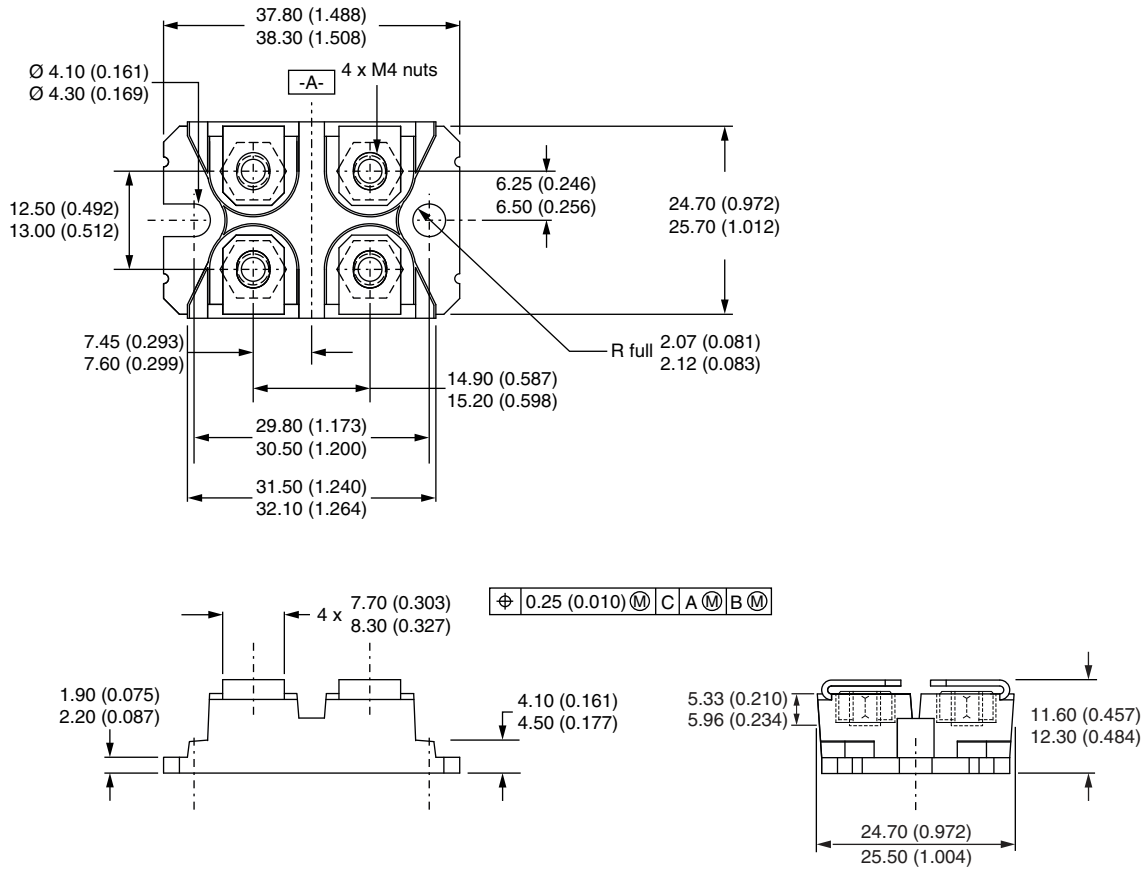
**Note**

- Controlling dimension: millimeter



# SOT-227 Generation 2

**DIMENSIONS** in millimeters (inches)



**Note**

- Controlling dimension: millimeter



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