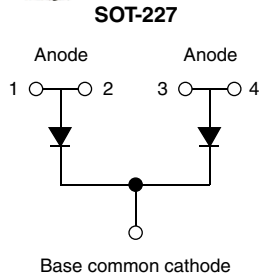


## Not Insulated SOT-227 Power Module Ultrafast Rectifier, 250 A



### FEATURES

- Not insulated package
- Ultrafast reverse recovery
- Ultrasoft reverse recovery current shape
- Optimized for power conversion: welding and industrial SMPS applications
- Plug-in compatible with other SOT-227 packages
- Easy to assemble
- Direct mounting to heatsink
- 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)



### DESCRIPTION

The VS-UFL250CB60 not insulated modules integrate two state of the art ultrafast recovery rectifiers in the compact, industry standard SOT-227 package. The planar structure of the diodes, and the platinum doping life time control, provide a 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.

PRODUCT SUMMARY	
$V_R$	600 V
$I_{F(AV)}$ at $T_C = 119\text{ }^\circ\text{C}$ per module <sup>(1)</sup>	250 A
$t_{rr}$	44 ns
Type	Modules - Diode FRED Pt®

#### Note

<sup>(1)</sup> All 4 anode terminals connected

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		600	V
Continuous forward current per diode	$I_F$ <sup>(1)</sup>	$T_C = 135\text{ }^\circ\text{C}$	130	A
Single pulse forward current per diode	$I_{FSM}$ <sup>(2)</sup>	$T_C = 25\text{ }^\circ\text{C}$	1500	
Maximum power dissipation per module	$P_D$	$T_C = 135\text{ }^\circ\text{C}$	421	W
Operating junction and storage temperatures	$T_J, T_{Stg}$		- 55 to 175	$^\circ\text{C}$

#### Notes

- <sup>(1)</sup> Both anode terminals connected;  
Maximum  $I_{RMS}$  current per leg 200 A to do not exceed the maximum temperature of terminals
- <sup>(2)</sup> 10 ms sine or 6 ms rectangular pulse



<b>ELECTRICAL SPECIFICATIONS PER DIODE</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	$V_{BR}$	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Forward voltage, per leg	$V_{FM}$	$I_F = 100\text{ A}$	-	1.28	1.44	
		$I_F = 100\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	1.13	1.24	
		$I_F = 100\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	1.03	-	
		$I_F = 200\text{ A}$	-	1.48	1.66	
		$I_F = 200\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	1.37	1.55	
		$I_F = 200\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	1.28	-	
Reverse leakage current, per leg	$I_{RM}$	$V_R = V_R\text{ rated}$	-	0.1	50	$\mu\text{A}$
		$V_R = V_R\text{ rated}, T_J = 125\text{ }^\circ\text{C}$	-	100	-	mA
		$V_R = V_R\text{ rated}, T_J = 175\text{ }^\circ\text{C}$	-	0.25	2	
Junction capacitance, per leg	$C_T$	$V_R = 600\text{ V}$	-	72	-	pF

<b>DYNAMIC RECOVERY CHARACTERISTICS PER DIODE</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time, per leg	$t_{rr}$	$I_F = 1.0\text{ A}, di_F/dt = 400\text{ A}/\mu\text{s}, V_R = 30\text{ V}$	-	44	-	ns
		$T_J = 25\text{ }^\circ\text{C}$	-	104	-	
		$T_J = 125\text{ }^\circ\text{C}$	-	210	-	
Peak recovery current, per leg	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	-	10	-	A
		$T_J = 125\text{ }^\circ\text{C}$	-	22	-	
		$T_J = 25\text{ }^\circ\text{C}$	-	520	-	
Reverse recovery charge, per leg	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	-	2200	-	nC
		$T_J = 125\text{ }^\circ\text{C}$	-	-	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction to case, single leg conducting	$R_{thJC}$		-	-	0.19	$^\circ\text{C}/\text{W}$
Junction to case, both leg conducting			-	-	0.095	
Case to heatsink, per module	$R_{thCS}$	Flat, greased surface	-	0.07	-	
Weight			-	30	-	g
Mounting torque, on terminal and heatsink			-	-	1.3	Nm
Case style			SOT-227 not insulated			

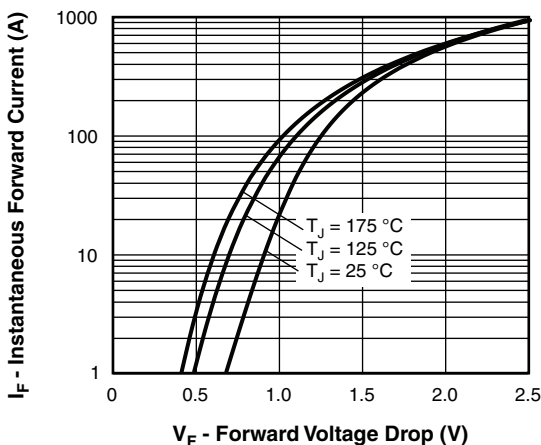


Fig. 1 - Typical Forward Voltage Drop Characteristics, Per Leg

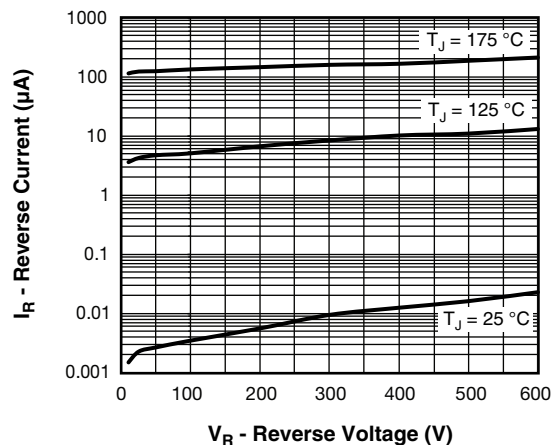


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage, Per Leg

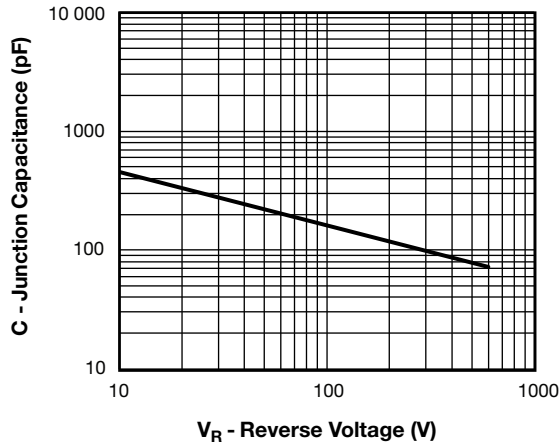


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, Per Leg

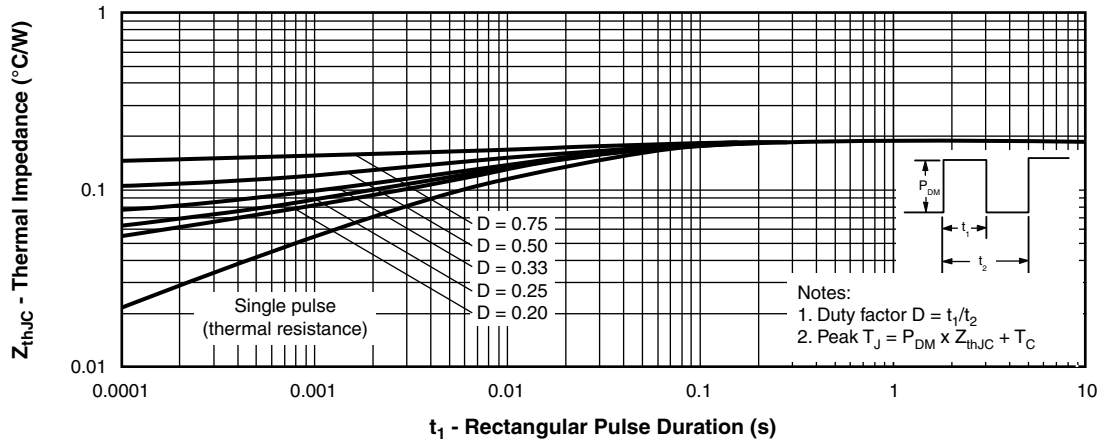


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics, Per Leg

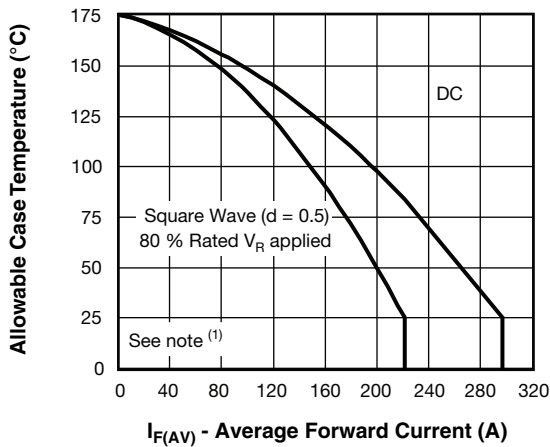


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current, Per Leg

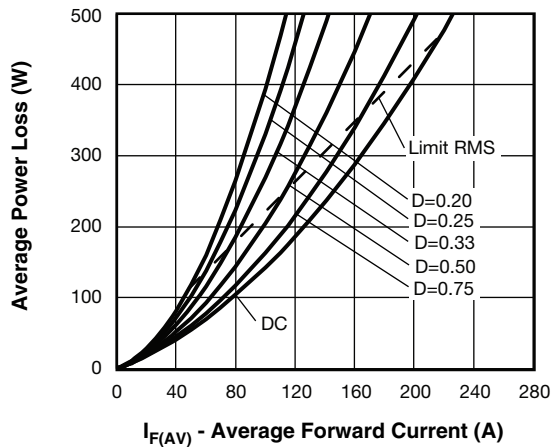


Fig. 6 - Forward Power Losses Characteristics, Per Leg

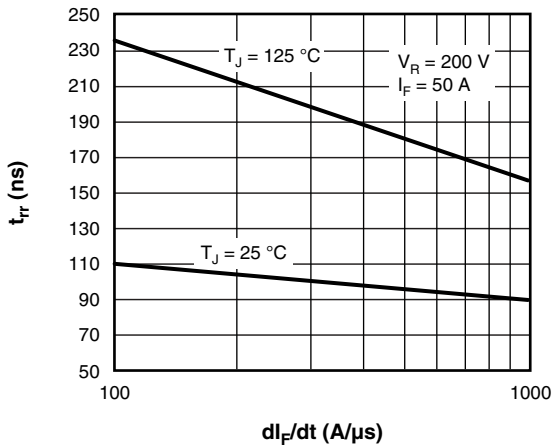


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$ , Per Leg

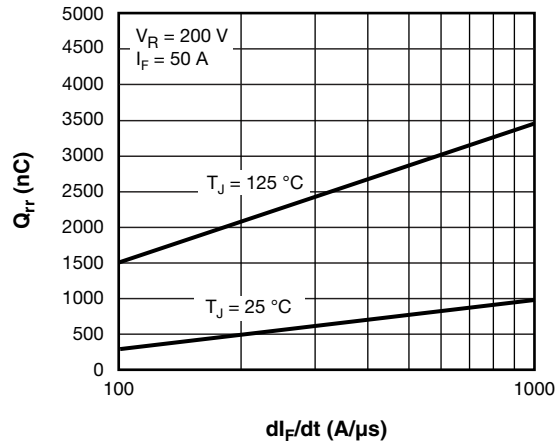


Fig. 8 - Typical Reverse Recovery Charge vs.  $dI_F/dt$ , Per Leg

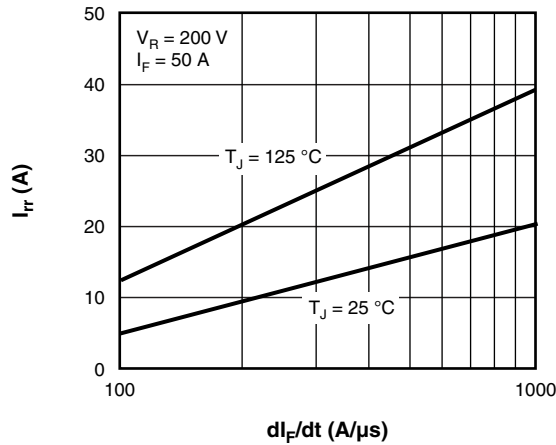


Fig. 9 - Typical Reverse Recovery Current vs.  $dI_F/dt$ , Per Leg

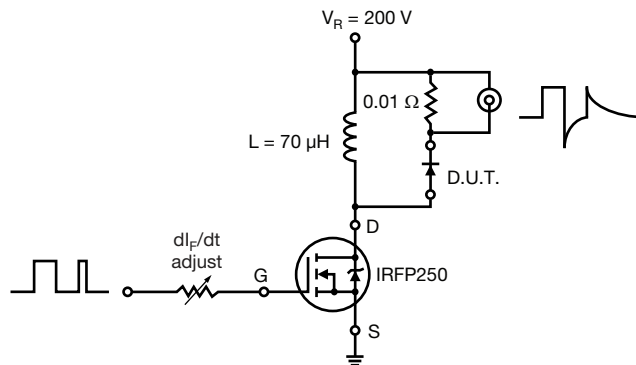
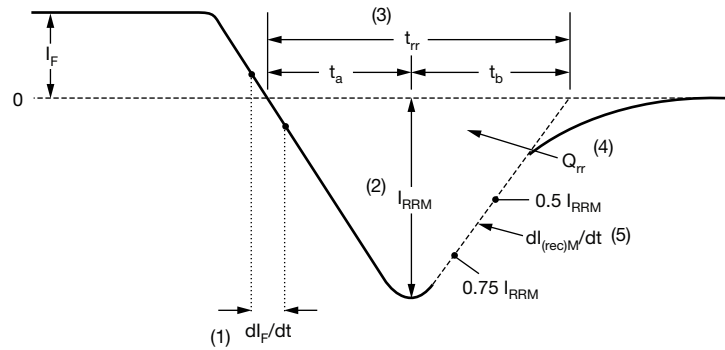


Fig. 10 - Reverse Recovery Parameter Test Circuit



- (1)  $di_F/dt$  - rate of change of current through zero crossing
- (2)  $I_{RRM}$  - peak reverse recovery current
- (3)  $t_{rr}$  - reverse recovery time measured from zero crossing point of negative going  $I_F$  to point where a line passing through  $0.75 I_{RRM}$  and  $0.50 I_{RRM}$  extrapolated to zero current.
- (4)  $Q_{rr}$  - area under curve defined by  $t_{rr}$  and  $I_{RRM}$
- (5)  $di_{(rec)M}/dt$  - peak rate of change of current during  $t_b$  portion of  $t_{rr}$

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

Fig. 11 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>UF</b>	<b>L</b>	<b>250</b>	<b>C</b>	<b>B</b>	<b>60</b>
	①	②	③	④	⑤	⑥	⑦

- 1** - Vishay Semiconductors product
- 2** - Ultrafast rectifier
- 3** - Ultrafast Pt diffused, low  $V_F$
- 4** - Current rating (250 = 250 A)
- 5** - Circuit configuration (2 common cathode diodes)
- 6** - Package indicator (SOT-227 standard not insulated)
- 7** - Voltage rating (60 = 600 V)

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

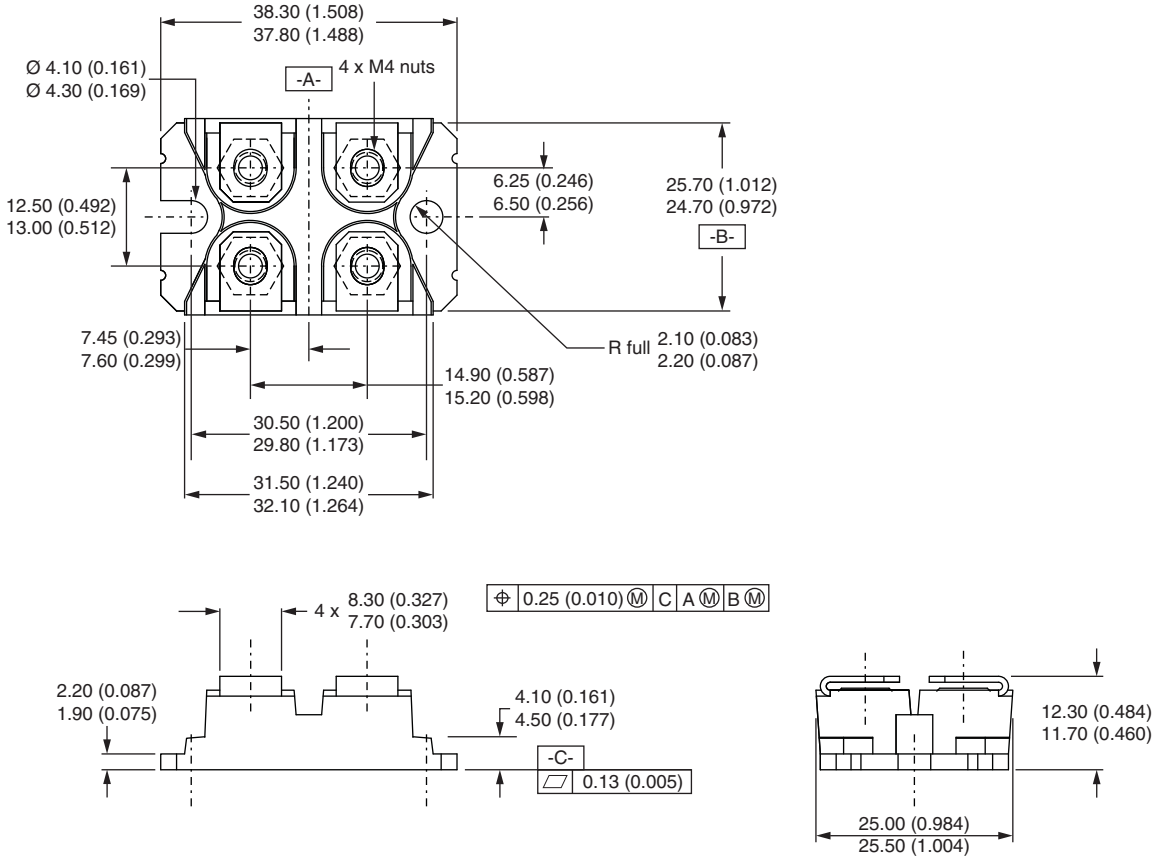
CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Common cathodes diodes, not in insulated base	C	

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



### SOT-227 Generation II

**DIMENSIONS** in millimeters (inches)



**Note**

- Controlling dimension: millimeter



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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
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ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

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