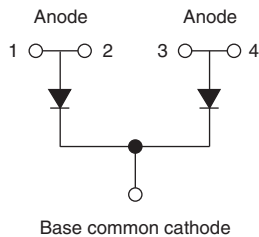


## Not Insulated SOT-227 Power Module U-Series FRED Pt® Gen 4, 600 V


**SOT-227**


Base common cathode

**FEATURES**

- Gen 4 FRED Pt® dices technology
- Ultrasoft reverse recovery characteristics
- Low  $I_{RRM}$  and reverse recovery charge
- Very low forward voltage drop
- Not insulated package
- 175 °C operating junction temperature
- 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**

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.

**PRIMARY CHARACTERISTICS**

$V_R$	600 V
$I_{F(AV)}$ at $T_C = 124\text{ °C}$ per module <sup>(1)</sup>	450 A
$t_{rr}$	97 ns
Type	Modules - Diode FRED Pt®
Package	SOT-227
Circuit configuration	Common cathode

**Note**

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

**ABSOLUTE MAXIMUM RATINGS** ( $T_J = 25\text{ °C}$  unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		600	V
Continuous forward current per diode	$I_F$	$T_C = 133\text{ °C}$	250	A
Single pulse forward current per diode	$I_{FSM}$	$T_C = 25\text{ °C}$ , 10 ms sine or 6 ms rectangular pulse	1170	
Maximum power dissipation per module	$P_D$	$T_C = 135\text{ °C}$	727	W
Operating junction and storage temperatures	$T_J, T_{Stg}$		-55 to +175	°C



<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	$V_{BR}$	$I_R = 500\text{ }\mu\text{A}$	600	-	-	V
Forward voltage, per leg	$V_{FM}$	$I_F = 100\text{ A}$	-	1.18	1.32	
		$I_F = 100\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	1.00	-	
		$I_F = 100\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	0.91	-	
		$I_F = 200\text{ A}$	-	1.34	1.60	
		$I_F = 200\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	1.19	-	
Reverse leakage current, per leg	$I_{RM}$	$V_R = V_R = 600\text{ V},$	-	0.2	150	$\mu\text{A}$
		$V_R = V_R = 600\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	169	-	mA
		$V_R = V_R = 600\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	2.1	-	
Junction capacitance, per leg	$C_T$	$V_R = 600\text{ V}, f = 1\text{ MHz}$	-	173	-	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	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	-	97	-	ns	
		$T_J = 125\text{ }^\circ\text{C}$	-	164	-		
Peak recovery current, per leg	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 50\text{ A}$ $di_F/dt = 500\text{ A}/\mu\text{s}$ $V_R = 200\text{ V}$	-	16	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	33	-	
Reverse recovery charge, per leg	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$		-	794	-	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	2736	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction to case, single leg conducting	$R_{thJC}$		-	-	0.11	$^\circ\text{C}/\text{W}$
Junction to case, both leg conducting			-	-	0.055	
Case to heatsink, per module	$R_{thCS}$	Flat, greased surface	-	0.1	-	
Weight			-	30	-	g
Mounting torque		Torque to terminal	-	-	1.1 (9.7)	Nm (lbf. in)
		Torque to heatsink	-	-	1.3 (11.5)	Nm (lbf. in)
Case style			SOT-227			

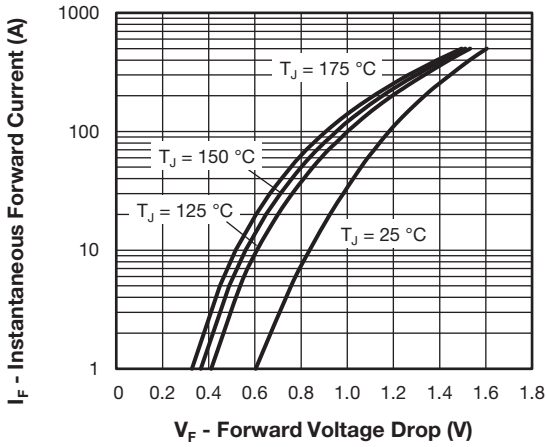


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

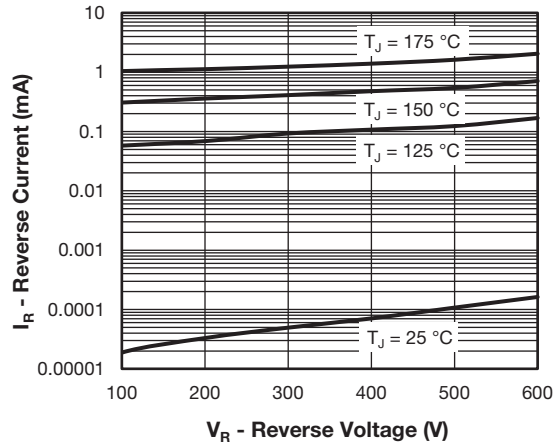


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

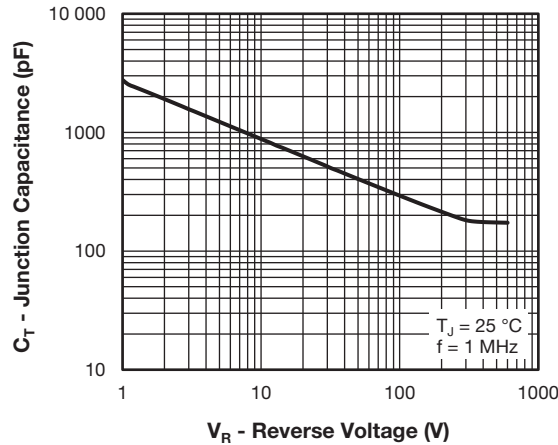


Fig. 3 - Typical Junction Capacitance vs Reverse Voltage (Per Diode)

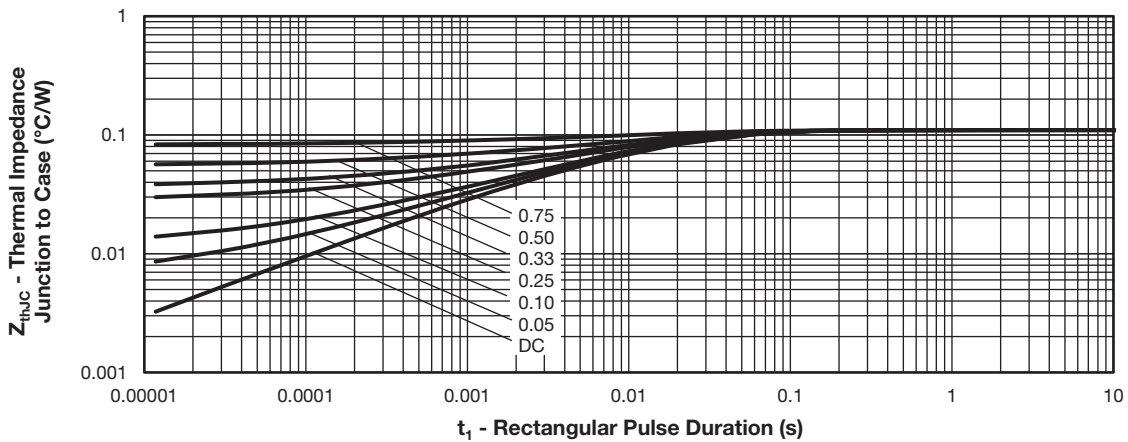


Fig. 4 - Maximum Thermal Impedance Junction-to-Case Characteristics (Per Diode)

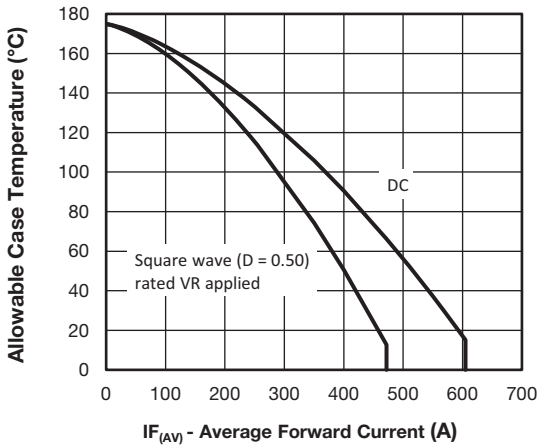


Fig. 5 - Maximum Current Rating Capability (Per Diode)

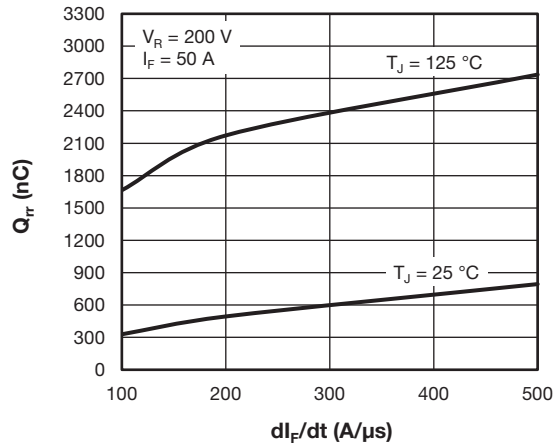


Fig. 7 - Typical Reverse Recovery Charge vs.  $dI_F/dt$  (Per Diode)

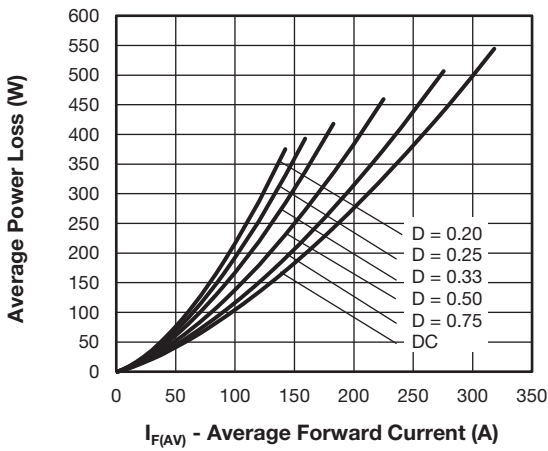


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

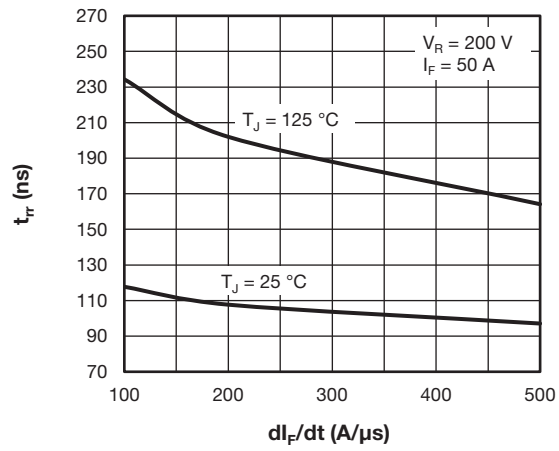


Fig. 8 - Typical Reverse Recovery Time vs.  $dI_F/dt$  (Per Diode)

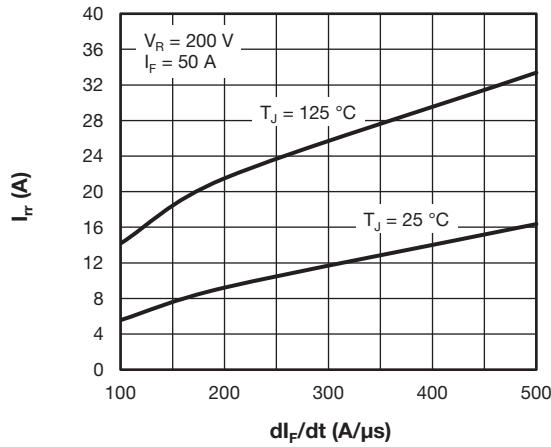


Fig. 9 - Typical Reverse Recovery Current vs.  $dI_F/dt$  (Per Diode)

## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>UF</b>	<b>L</b>	<b>450</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 (450 = 450 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 cathode	C	<p>Lead Assignment</p>

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 2

**DIMENSIONS** in millimeters (inches)



**Note**

- Controlling dimension: millimeter



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