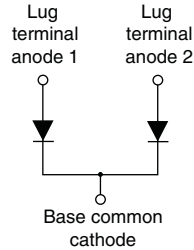


FRED Pt[®], Ultrafast Soft Recovery Diode Module, 400 A



TO-244


FEATURES

- Ultrafast recovery
- UL approved file E222165
- Designed for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


**RoHS
COMPLIANT**
BENEFITS

- Reduced RFI and EMI
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

DESCRIPTION / APPLICATIONS

FRED Pt[®] diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for HF welding, power converters and other applications where switching losses are significant portion of the total losses.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	400 A
V_R	600 V
Q_{rr}	830 nC
t_{rr}	90 ns
Type	Modules - diode, FRED Pt [®]
Package	TO-244
Circuit configuration	Two diodes common cathode

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	V_R		600	V
Continuous forward current per diode	$I_{F(AV)}$	$T_C = 25\text{ }^\circ\text{C}$	330	A
		$T_C = 85\text{ }^\circ\text{C}$	230	
		$T_C = 97\text{ }^\circ\text{C}$	200	
Single pulse forward current per diode	I_{FSM}	$T_C = 25\text{ }^\circ\text{C}$	2520	
Maximum power dissipation	P_D	$T_C = 25\text{ }^\circ\text{C}$	660	W
		$T_C = 97\text{ }^\circ\text{C}$	280	
Operating junction and storage temperatures	T_J, T_{Stg}		-40 to +150	$^\circ\text{C}$

ELECTRICAL SPECIFICATIONS PER LEG ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage	V_{BR}	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	V_{FM}	$I_F = 200\text{ A}$	-	1.45	2.0	
		$I_F = 400\text{ A}$	-	1.67	2.3	
		$I_F = 200\text{ A}, T_J = 150\text{ }^\circ\text{C}$	-	1.13	1.4	
		$I_F = 400\text{ A}, T_J = 150\text{ }^\circ\text{C}$	-	1.39	1.8	
Reverse leakage current	I_{RM}	$T_J = 150\text{ }^\circ\text{C}, V_R = V_R\text{ rated}$	-	0.3	1.38	mA
Series inductance	L_S	From top of terminal hole to mounting plane	-	5	-	nH



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}	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 200\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 200\text{ V}$	-	90	-	ns
		$T_J = 150\text{ }^\circ\text{C}$		-	240	-	
Peak recovery current	I_{RRM}	$I_F = 200\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 200\text{ V}$		-	8.3	-	A
		$I_F = 200\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 200\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$		-	24	-	
Reverse recovery charge	Q_{rr}	$I_F = 200\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 200\text{ V}$		-	830	-	nC
		$I_F = 200\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 200\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$		-	4730	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	per leg	R_{thJC}	-	-	0.19	$^\circ\text{C}/\text{W}$
	per module		-	-	0.095	
Thermal resistance, case to heatsink		R_{thCS}	-	0.10	-	
Weight			-	68	-	g
			-	2.4	-	oz.
Mounting torque			30 (3.4)	-	40 (4.6)	lbf · in (N · m)
Mounting torque center hole			12 (1.4)	-	18 (2.1)	
Terminal torque			30 (3.4)	-	40 (4.6)	
Vertical pull			-	-	80	lbf · in
2" lever pull			-	-	35	
Case style			TO-244			

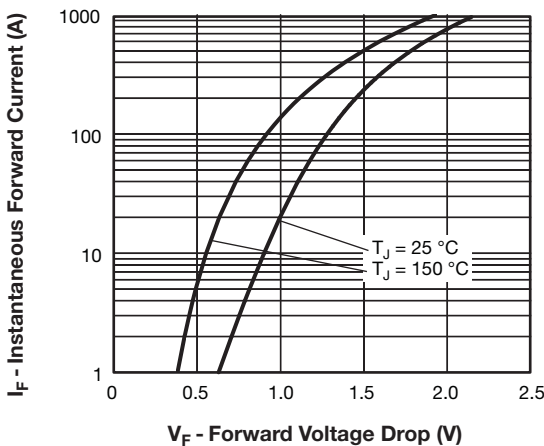


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Leg)

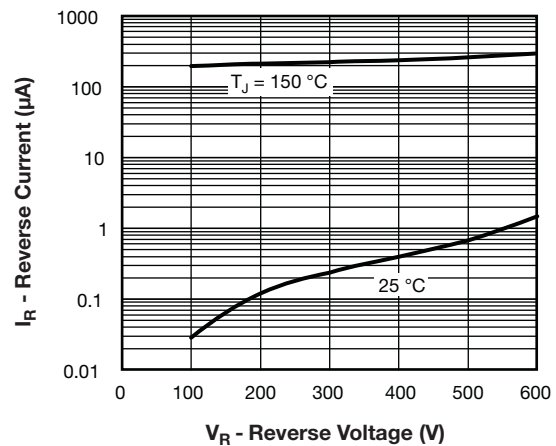


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Leg)

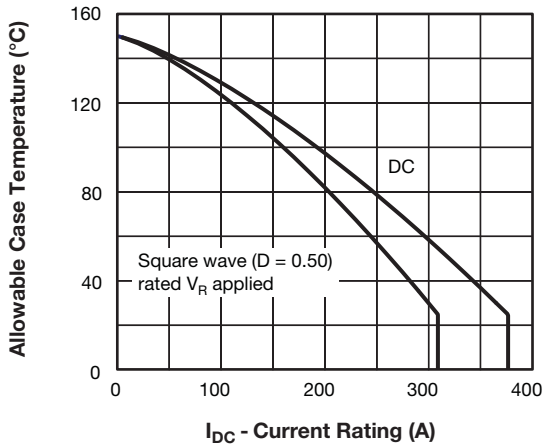


Fig. 3 - Maximum Current Rating Capability (Per Leg)

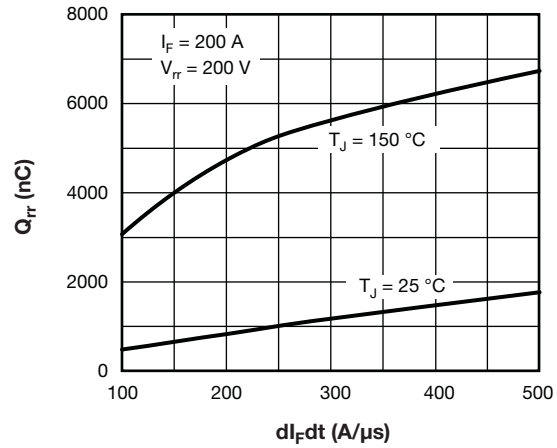


Fig. 6 - Typical Reverse Recovery Charge vs. di_F/dt (Per Leg)

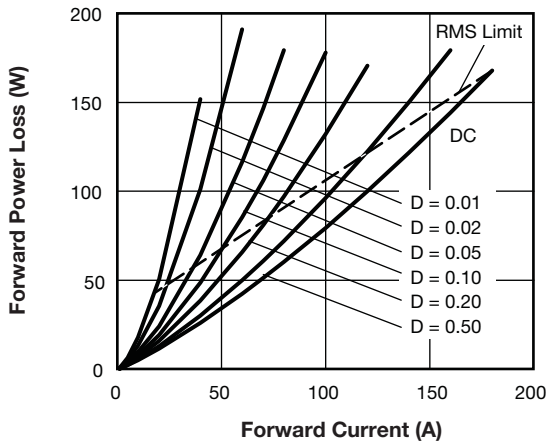


Fig. 4 - Forward Power Loss Characteristics

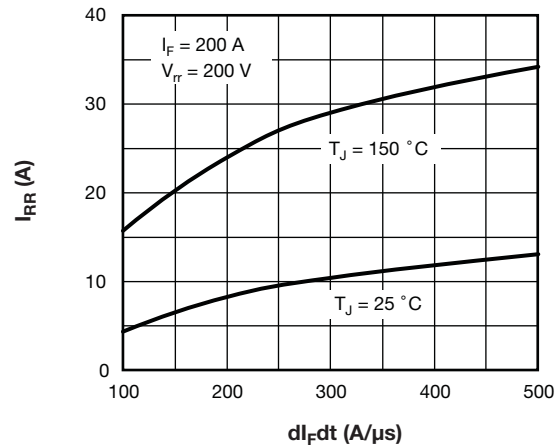


Fig. 7 - Typical Reverse Recovery Current vs. di_F/dt (Per Leg)

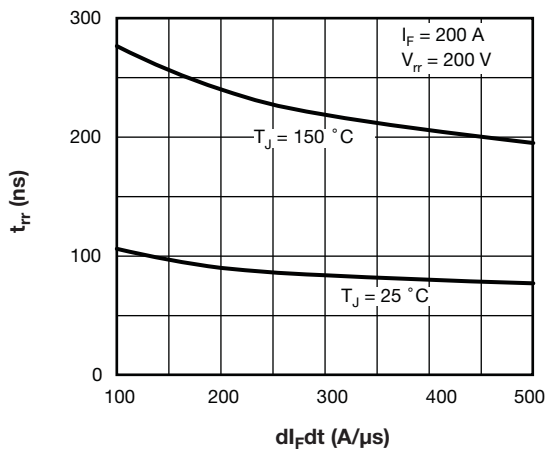


Fig. 5 - Typical Reverse Recovery Time vs. di_F/dt (Per Leg)

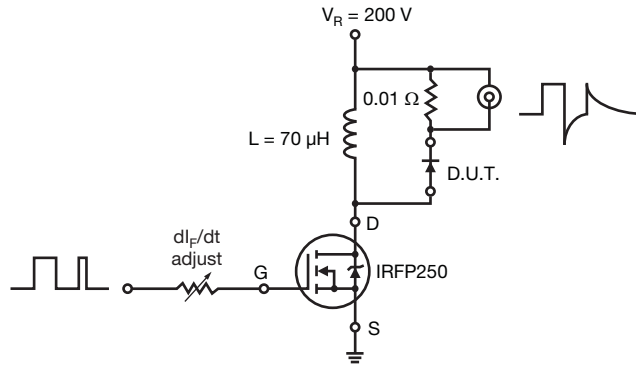


Fig. 8 - Reverse Recovery Parameter Test Circuit

ORDERING INFORMATION TABLE

Device code	VS-VS	UD	400	C	W	60
	①	②	③	④	⑤	⑥

- 1** - Vishay Semiconductors product
- 2** - UD = FRED Pt[®]
- 3** - Current rating (400 = 400 A)
- 4** - Circuit configuration:
C = two diodes common cathode
- 5** - W = TO-244 wire bondable not insulated
- 6** - Voltage rating (60 = 600 V)

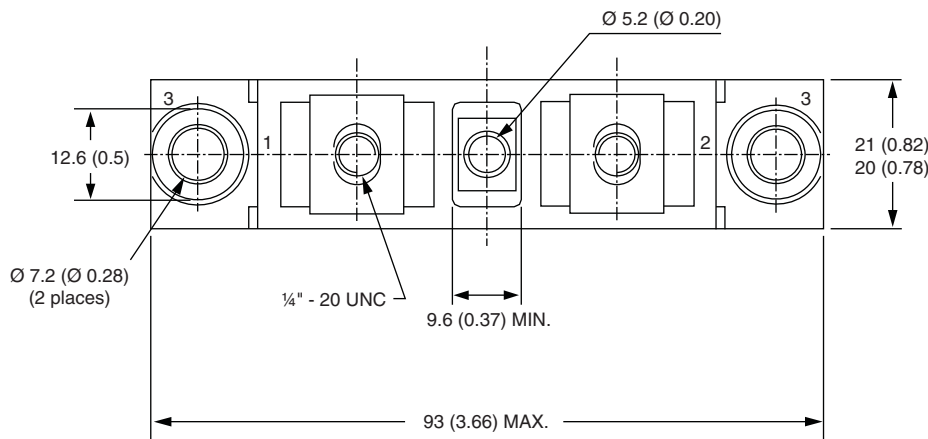
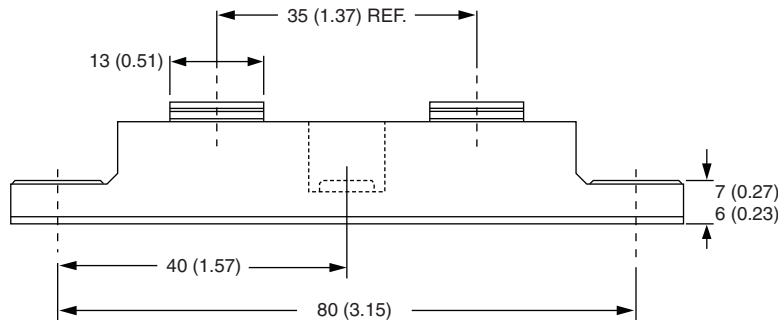
CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two diodes common cathode	C	

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95021



TO-244

DIMENSIONS in millimeters (inches)





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