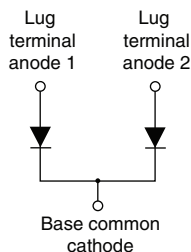



FRED Pt® **Ultrafast Soft Recovery Diode Module, 480 A**


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

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

$I_{F(AV)}$	480 A
V_R	200 V
Q_{rr} (typical)	249 nC
t_{rr}	87 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		200	V
Continuous forward current	$I_{F(AV)}$	$T_C = 127^\circ\text{C}$	240	A
Single pulse forward current	I_{FSM}	$T_C = 25^\circ\text{C}$	2300	
Storage temperature range	T_{Stg}		-40 to +150	$^\circ\text{C}$
Operating junction temperature range	T_J		-40 to +175	$^\circ\text{C}$

ELECTRICAL SPECIFICATIONS PER LEG ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage	V_{BR}	$I_R = 100\ \mu\text{A}$	200	-	-	V
Forward voltage	V_{FM}	$I_F = 200\ \text{A}$	-	0.94	1.0	
		$I_F = 400\ \text{A}$	-	1.06	1.14	
		$I_F = 200\ \text{A}, T_J = 175^\circ\text{C}$	-	0.73	0.80	
		$I_F = 400\ \text{A}, T_J = 175^\circ\text{C}$	-	0.88	0.99	
Reverse leakage current	I_{RRM}	$T_J = 175^\circ\text{C}, V_R = V_R$ rated	-	0.67	1.5	mA
Series inductance	L_S	From top of terminal hole to mounting plane	-	5	-	nH

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 50\ \text{A}, dI_F/dt = 200\ \text{A}/\mu\text{s}, V_R = 200\ \text{V}, T_J = 25^\circ\text{C}$	-	87	130	ns
		$I_F = 50\ \text{A}, dI_F/dt = 200\ \text{A}/\mu\text{s}, V_R = 100\ \text{V}, T_J = 125^\circ\text{C}$	-	95	155	
Peak recovery current	I_{RR}	$I_F = 50\ \text{A}, dI_F/dt = 200\ \text{A}/\mu\text{s}, V_R = 200\ \text{V}, T_J = 25^\circ\text{C}$	-	6	11.5	A
		$I_F = 50\ \text{A}, dI_F/dt = 200\ \text{A}/\mu\text{s}, V_R = 100\ \text{V}, T_J = 125^\circ\text{C}$	-	10.62	16.5	
Reverse recovery charge	Q_{rr}	$I_F = 50\ \text{A}, dI_F/dt = 200\ \text{A}/\mu\text{s}, V_R = 200\ \text{V}, T_J = 25^\circ\text{C}$	-	249	420	nC
		$I_F = 50\ \text{A}, dI_F/dt = 200\ \text{A}/\mu\text{s}, V_R = 100\ \text{V}, T_J = 125^\circ\text{C}$	-	493	980	



THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T _J , T _{Stg}		-	-	-40 to +175	°C
Thermal resistance, junction-to-case per leg	R _{thJC}	DC operation	-	-	0.19	°C/W
Thermal resistance, junction-to-case per module			-	-	0.095	
Thermal resistance, case-to-heatsink (flag greased surface)	R _{thCS}	Flag, greased, surface	-	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			

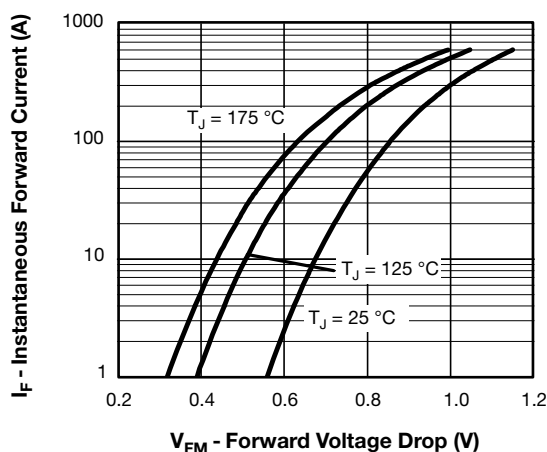


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Leg)



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

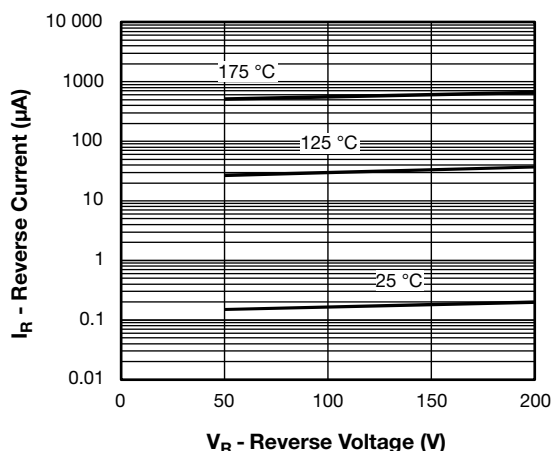
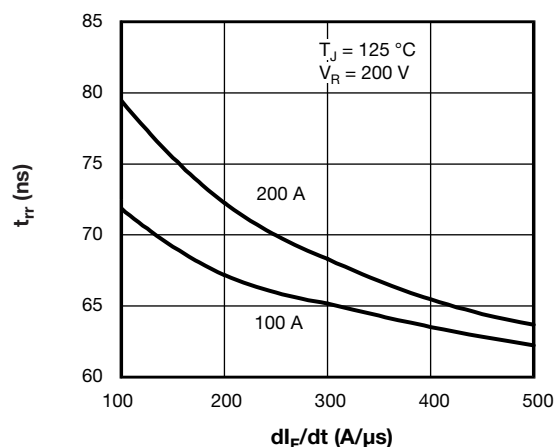


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Leg)

Fig. 4 - Typical Recovery Time vs. dI_F/dt (Per Leg)

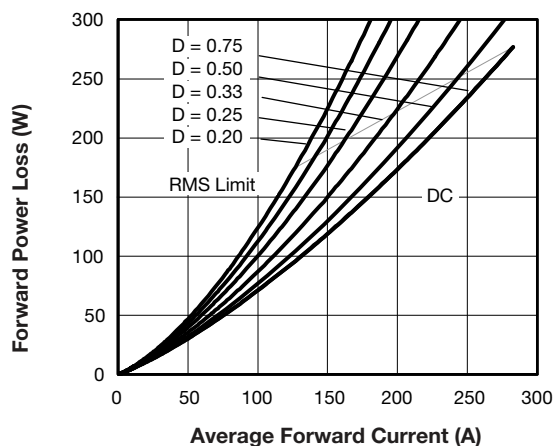
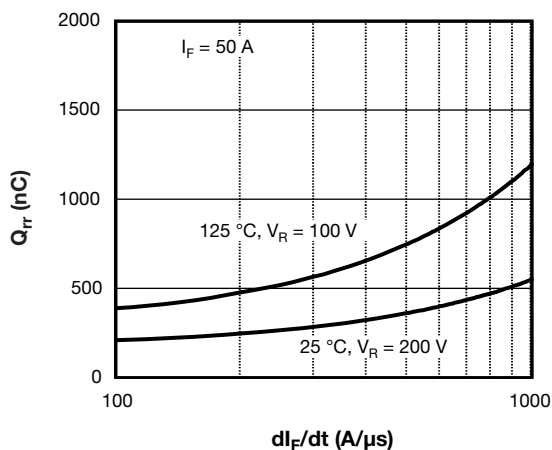
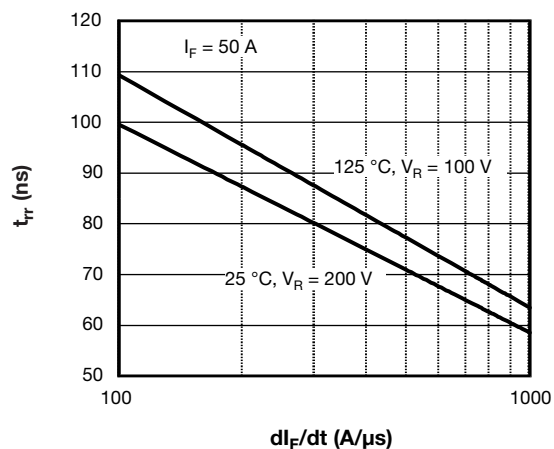
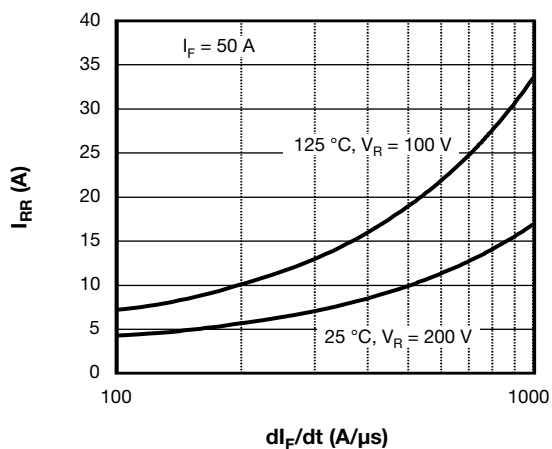
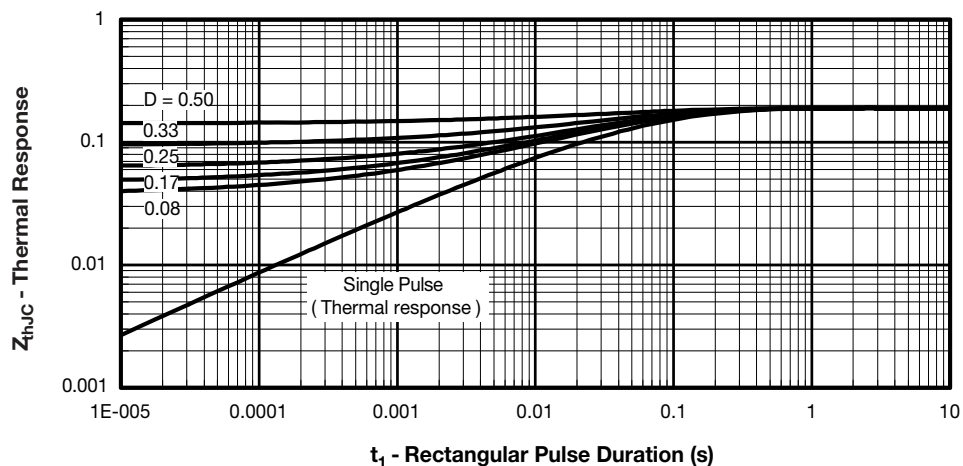


Fig. 5 - Forward Power Loss Characteristics (Per Leg)


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

Fig. 6 - Typical Reverse Recovery Time vs. dI_F/dt (Per Leg)

Fig. 8 - Typical Reverse Recovery Current vs. dI_F/dt (Per Leg)

Fig. 9 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

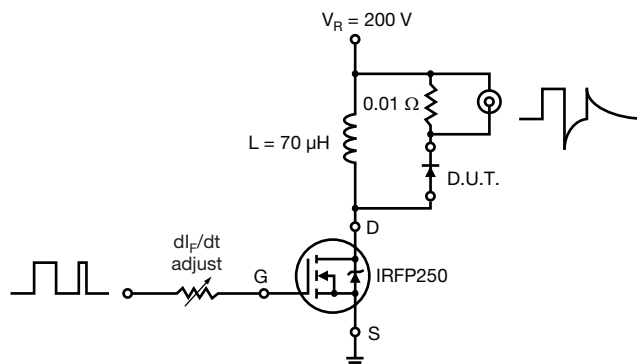


Fig. 10 - Reverse Recovery Parameter Test Circuit
(All recovery characteristics have been determined using test circuit shown)

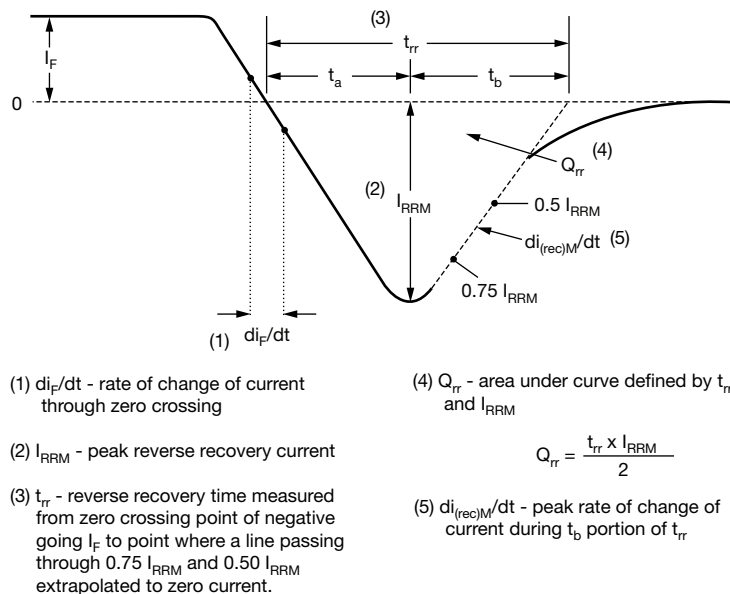
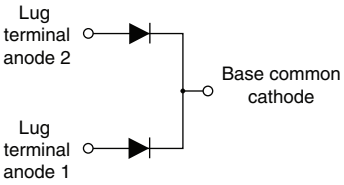


Fig. 11 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code	VS-VS	UD	400	C	W	20
	1	2	3	4	5	6
1	- VS-VS = Vishay Semiconductors product					
2	- Ultrafast diode					
3	- Current rating (400 = 400 A)					
4	- Circuit configuration: C = not isolated					
5	- Type of device: W = TO-244 wire bondable not isolated					
6	- Voltage rating (20 = 200 V)					

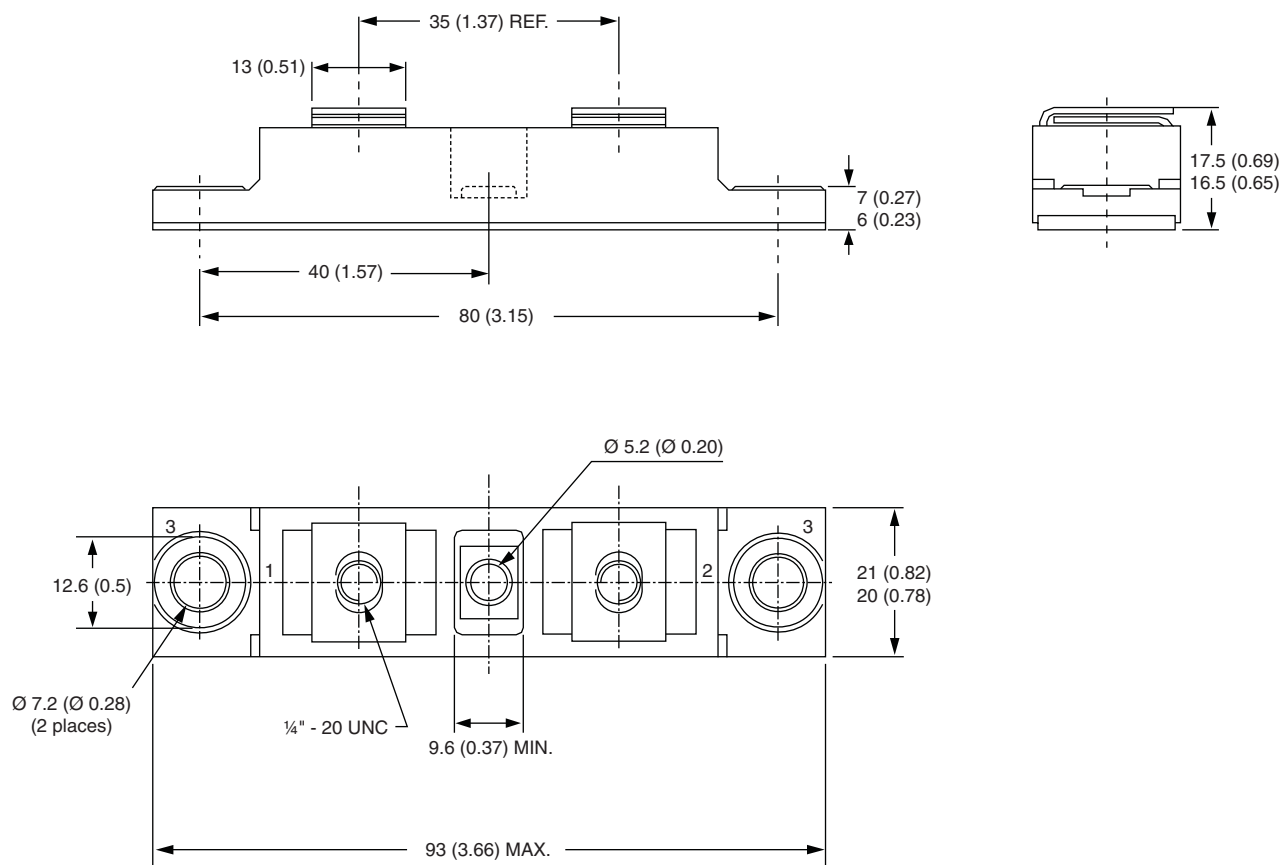
CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two diodes common cathode	C	

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



TO-244

DIMENSIONS in millimeters (inches)





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