

FRED Pt[®] Ultrafast Soft Recovery Diode Module, 360 A


TO-244
FEATURES

- Very low Q_{rr} and t_{rr}
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level


**RoHS
COMPLIANT**
BENEFITS

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

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 a significant portion of the total losses.

PRODUCT SUMMARY	
$I_{F(AV)}$	360 A
V_R	400 V
Q_{rr} (typical)	1250 nC
t_{rr}	40 ns
Type	Modules - Diode, FRED Pt [®]

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	V_R		400	V
Continuous forward current per diode	$I_{F(AV)}$	$T_C = 25\text{ °C}$	510	A
		$T_C = 85\text{ °C}$	305	
		$T_C = 116\text{ °C}$	180	
Single pulse forward current per diode	I_{FSM}		1200	
Maximum power dissipation	P_D	$T_C = 25\text{ °C}$	570	W
		$T_C = 110\text{ °C}$	180	
Operating junction and storage temperatures	T_J, T_{Stg}		- 40 to 150	°C

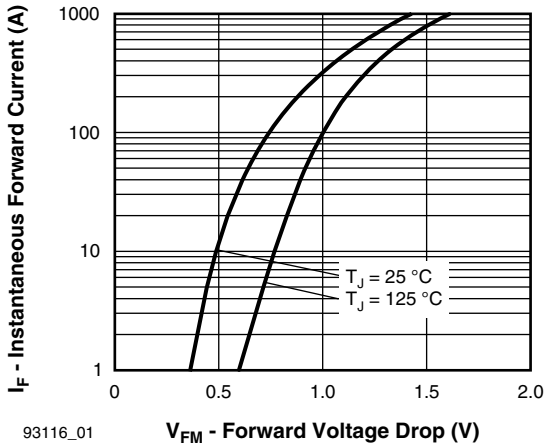
ELECTRICAL SPECIFICATIONS PER LEG ($T_J = 25\text{ °C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage	V_{BR}	$I_R = 100\text{ }\mu\text{A}$	400	-	-	
Forward voltage	V_{FM}	$I_F = 180\text{ A}$	-	1.09	1.27	V
		$I_F = 360\text{ A}$	-	1.23	1.50	
		$I_F = 180\text{ A}, T_J = 175\text{ °C}$	-	0.88	0.96	
		$I_F = 360\text{ A}, T_J = 175\text{ °C}$	-	1.04	1.18	
Reverse leakage current	I_{RM}	$T_J = 150\text{ °C}, V_R = V_R$ rated	-	0.26	1.28	mA
Series inductance	L_S	From top of terminal hole to mounting plane	-	5	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	t _{rr}	I _F = 1.0 A, di _F /dt = 200 A/μs, V _R = 30 V	-	40	69	ns	
		T _J = 25 °C	I _F = 180 A, di _F /dt = 200 A/μs, V _R = 200 V	-	74		-
		T _J = 150 °C		-	171		-
Peak recovery current	I _{RRM}	I _F = 1.0 A, di _F /dt = 200 A/μs, V _R = 30 V	-	5.1	-	A	
		I _F = 180 A, di _F /dt = 200 A/μs, V _R = 200 V	-	6.6	-		
		I _F = 180 A, di _F /dt = 200 A/μs, V _R = 200 V, T _J = 150 °C	-	15.2	-		
Reverse recovery charge	Q _{rr}	I _F = 1.0 A, di _F /dt = 200 A/μs, V _R = 30 V	-	125	-	nC	
		I _F = 180 A, di _F /dt = 200 A/μs, V _R = 200 V	-	243	-		
		I _F = 180 A, di _F /dt = 200 A/μs, V _R = 200 V, T _J = 150 °C	-	1295	-		

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	
Thermal resistance, junction to case	R _{thJC}	-	-	0.19	°C/W	
		-	-	0.095		
Thermal resistance, case to heatsink (flag greased surface)	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 (TO-244AB)				

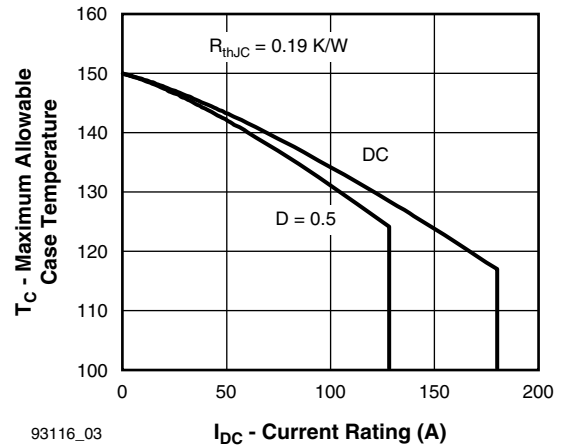
FRED Pt®
Ultrafast Soft Recovery Diode Module, 360 A

Vishay Semiconductors



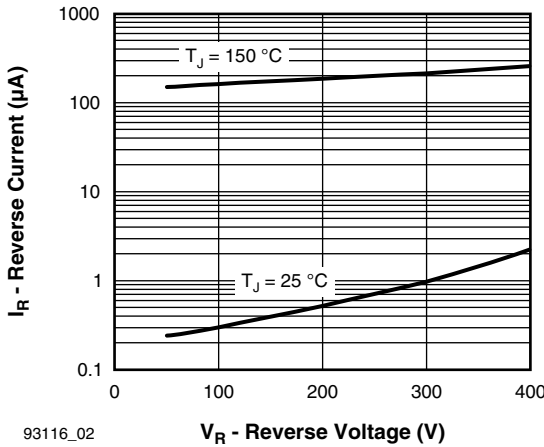
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V_{FM} - Forward Voltage Drop (V)
Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Leg)



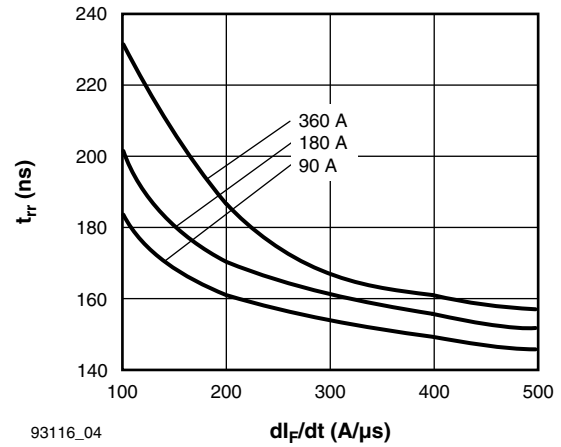
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I_{DC} - Current Rating (A)
Fig. 3 - Maximum Current Rating Capability (Per Leg)



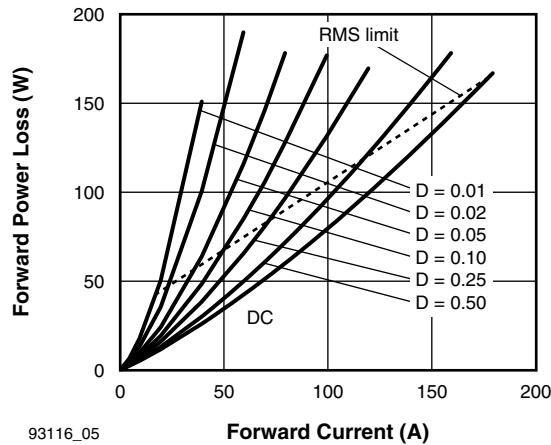
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V_R - Reverse Voltage (V)
Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Leg)



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di_F/dt (A/µs)
Fig. 4 - Typical Reverse Recovery Time vs. di_F/dt
T_J = 125 °C (Per Leg)



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Forward Current (A)
Fig. 5 - Forward Power Loss Characteristics

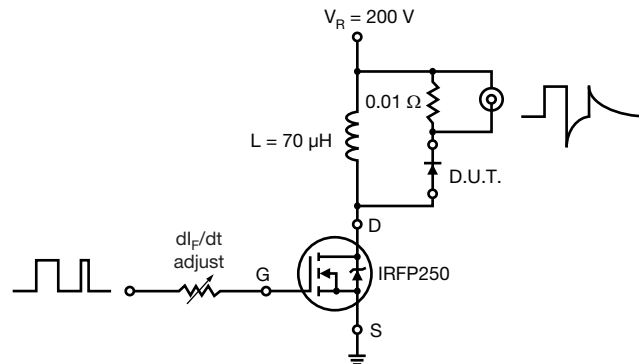
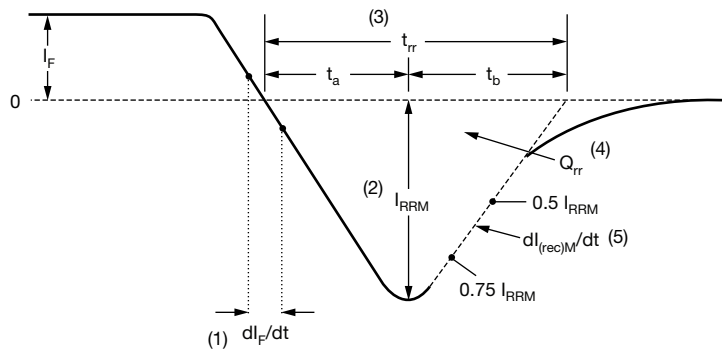


Fig. 6 - Reverse Recovery Parameter Test Circuit



- | | |
|---|---|
| <p>(1) dI_F/dt - rate of change of current through zero crossing</p> <p>(2) I_{RRM} - peak reverse recovery current</p> <p>(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.</p> | <p>(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}</p> $Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$ <p>(5) $dI_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}</p> |
|---|---|

Fig. 7 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code	VS	UD	360	C	W	40
	①	②	③	④	⑤	⑥

- 1** - Vishay Semiconductors product suffix
- 2** - Type of device: UD = FRED Pt®
- 3** - Current rating (360 = 360 A)
- 4** - Circuit configuration:
C = Common cathode
- 5** - Type of device:
W = TO-244 wire bondable not isolated
- 6** - Voltage rating (40 = 400 V)

CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separated diodes, parallel pin out	C	

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



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