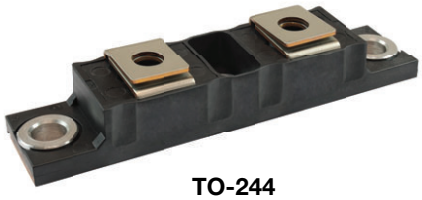
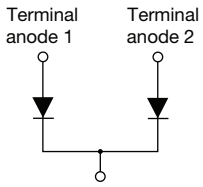
FRED Pt®, Ultrafast Soft Recovery Diode, 500 A



TO-244



FEATURES

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

Pb-free

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	
$I_{F(AV)}$	500 A
V_R	600 V
Q_{rr} (typical)	460 nC
t_{rr}	178 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	$I_{F(DC)}$	T_C = 25 °C	572	A
		T_C = 85 °C	403	
		T_C = 129 °C	250	
Single pulse forward current per diode	I_{FSM}	T_C = 25 °C	3800	
Maximum power dissipation per diode	P_D	T_C = 25 °C	938	W
		T_C = 129 °C	287	
Operating junction and storage temperatures	T_J, T_{Stg}		-40 to +175	°C

ELECTRICAL SPECIFICATIONS PER DIODE (T_J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage	V_{BR}	I_R = 200 µA	600	-	-	V
Forward voltage	V_{FM}	I_F = 250 A	-	1.15	1.355	
		I_F = 500 A	-	1.29	-	
		I_F = 250 A, T_J = 175 °C	-	0.95	-	
		I_F = 500 A, T_J = 175 °C	-	1.14	-	
Reverse leakage current	I_{RM}	T_J = 175 °C, V_R = V_R rated	-	0.82	-	mA

DYNAMIC RECOVERY CHARACTERISTICS PER DIODE (T_J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	T_J = 25 °C	I_F = 50 A, dI_F/dt = 50 A/µs, V_R = 400 V	-	179	-	ns
		T_J = 125 °C		-	360	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	3.65	-	A
		T_J = 125 °C		-	12.8	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	460	-	nC
		T_J = 125 °C		-	3140	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	per diode	R_{thJC}	-	-	0.160	°C/W
	per module		-	-	0.080	
Thermal resistance, case to heatsink	per module	R_{thCS}	-	0.1	-	
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			

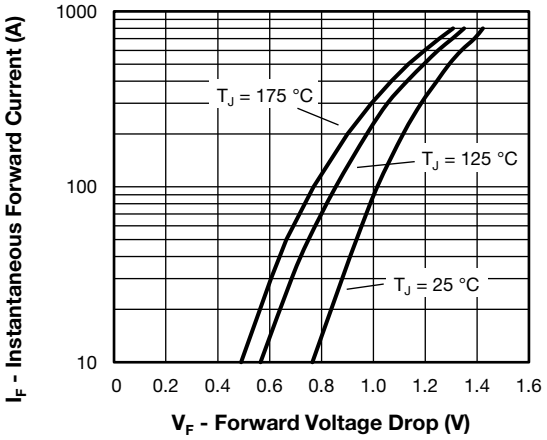


Fig. 1 - Typical Forward Voltage Drop Characteristics vs. Instantaneous Forward Current (Per Diode)

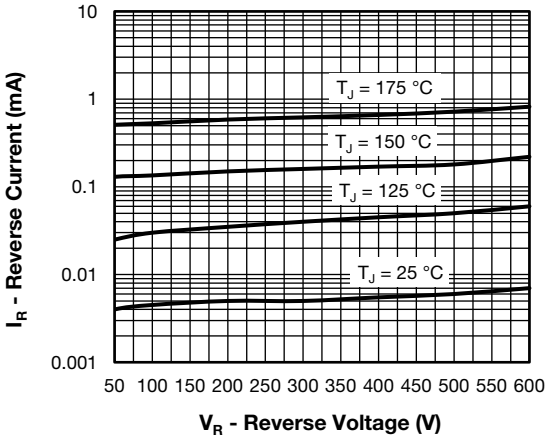


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

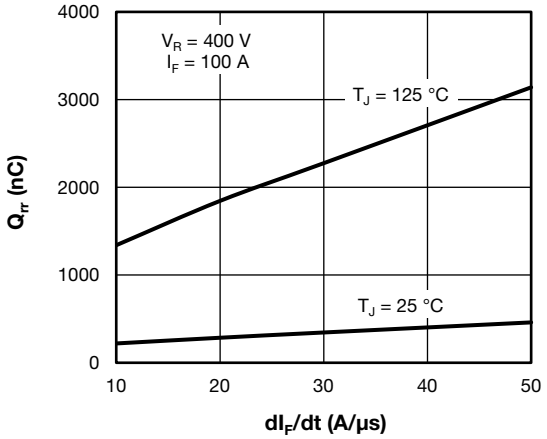


Fig. 3 - Typical Reverse Recovery Charge vs dI_F/dt (Per Diode)

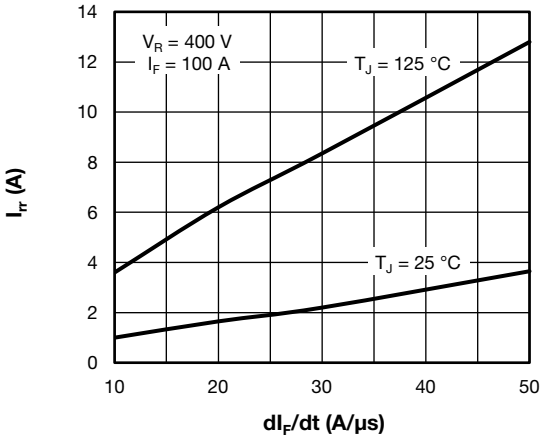


Fig. 5 - Typical Reverse Recovery Current vs. dI_F/dt (Per Diode)

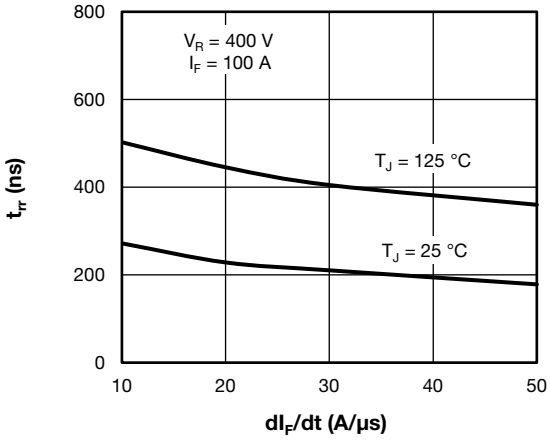


Fig. 4 - Typical Reverse Recovery Time vs dI_F/dt (Per Diode)

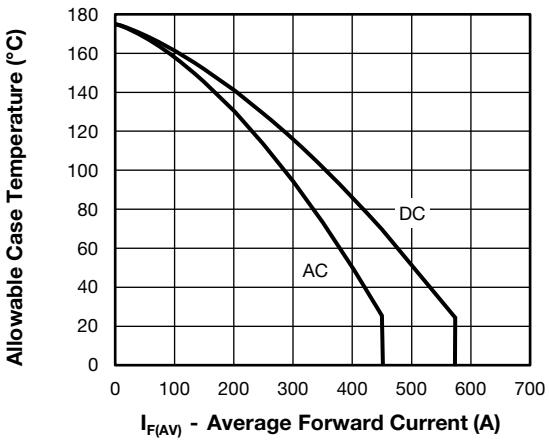


Fig. 6 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

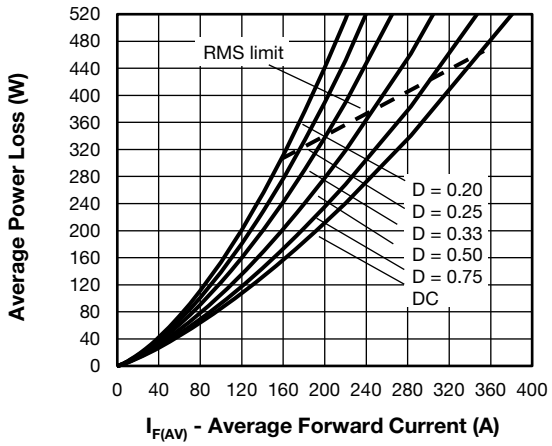


Fig. 7 - Average Power Loss vs. Average Forward Current (Forward Power Loss Characteristics)

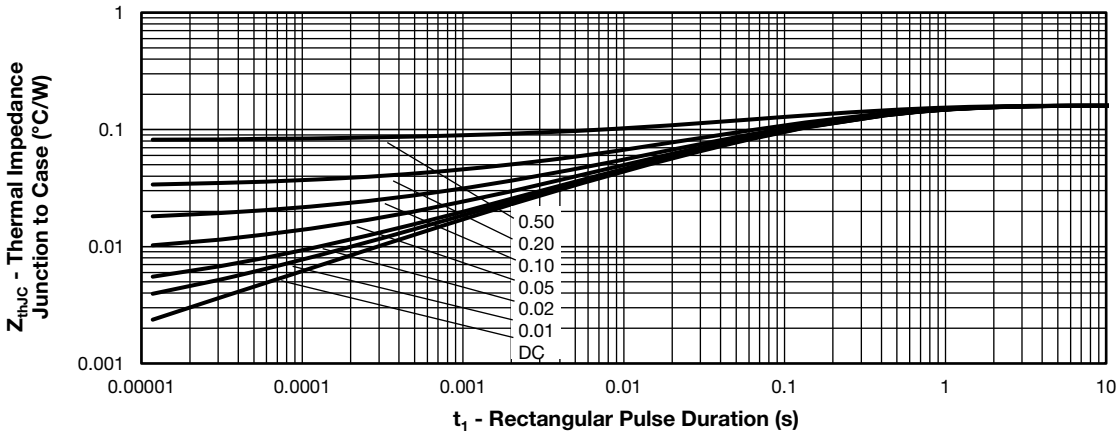


Fig. 8 - Z_{thJC} - Maximum Thermal Impedance Junction to Case vs. t1 Rectangular Pulse Duration

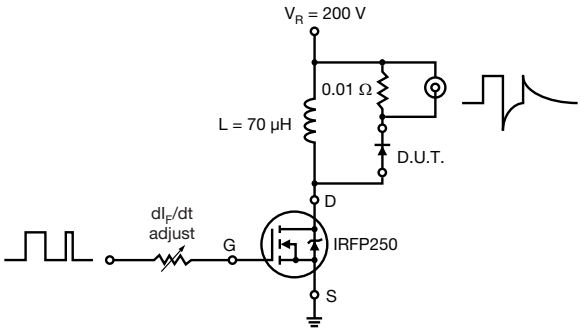
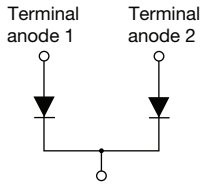


Fig. 9 - Reverse Recovery Parameter Test Circuit

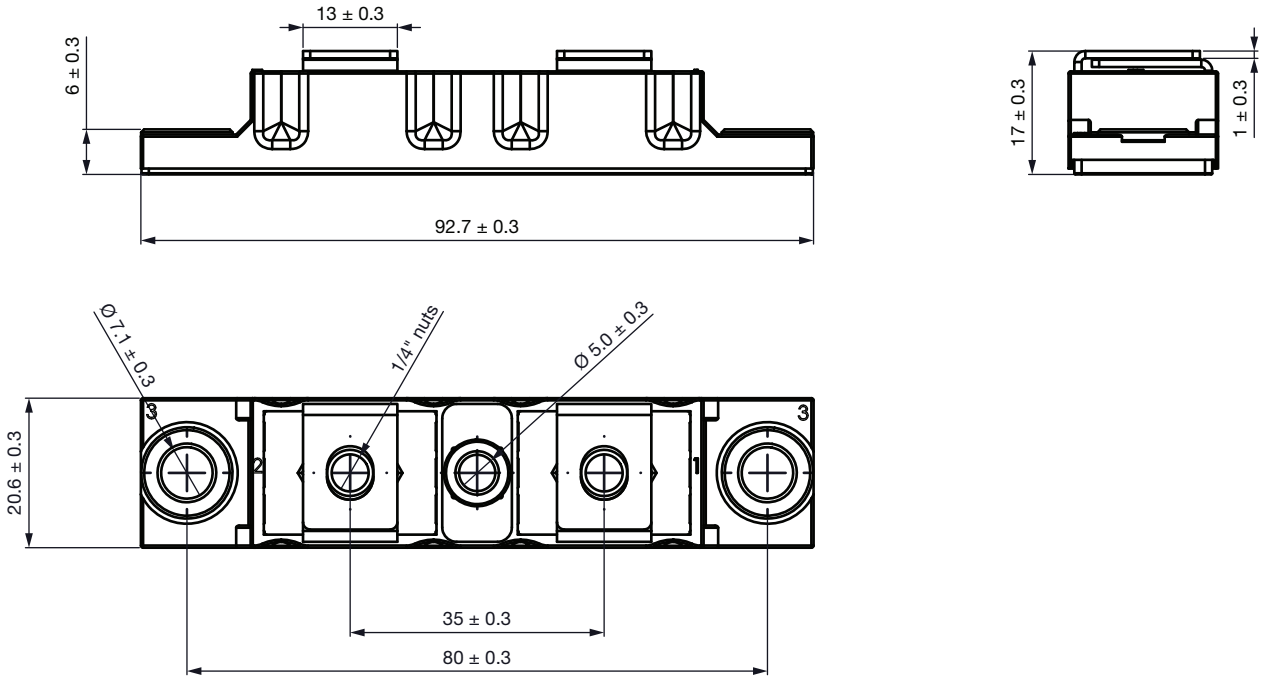
ORDERING INFORMATION TABLE

Device code	VS-VS	UD	505	C	W	60
	1	2	3	4	5	6

- 1 - Vishay Semiconductors product
- 2 - UD = FRED Pt®
- 3 - Current rating (505 = 500 A)
- 4 - Circuit configuration:
  C = two diodes common cathode
- 5 - W = TO-244 wire bondable not isolated
- 6 - Voltage rating (60 = 600 V)

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

DIMENSIONS in millimeters (inches)



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