

FRED Pt[®] Gen 4 Single Ultrafast Diode, 500 A (INT-A-PAK Power Modules)


INT-A-PAK
FEATURES

- Gen 4 FRED Pt[®] dices technology
- Ultrasoft reverse recovery characteristics
- Low I_{RRM} and reverse recovery charge
- Very low forward voltage drop
- 175 °C operating junction temperature
- UL approved file E78996 for application with maximum case temperature up to 140 °C
- Large creepage distances
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


**RoHS
COMPLIANT**

PRODUCT SUMMARY	
V_R	600 V
$I_{F(AV)}$ at T_C	500 A at 55 °C
t_{rr} at 25 °C	104 ns
Type	Modules - diode, high voltage
Package	INT-A-PAK
Circuit	Single diode

DESCRIPTION

Gen 4 FRED Pt 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.

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V_R		600	V
Continuous forward current	I_F	$T_C = 25\text{ °C}$	772	A
		$T_C = 90\text{ °C}$	519	
Single pulse forward current	I_{FSM}	$t_p = 10\text{ ms}$, 50 Hz, sine half wave, initial $T_J = 175\text{ °C}$	4500	
Maximum power dissipation	P_D	$T_C = 25\text{ °C}$	1363	W
		$T_C = 90\text{ °C}$	772	
Operating junction temperature range	T_J		-40 to +175	°C
Storage temperature range	T_{Stg}		-40 to +150	
RMS insulation voltage	V_{INS}	50 Hz, circuit to base, all terminals shorted, $t = 1\text{ s}$	3500	V

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ 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 drop	V_{FM}	$I_F = 250\text{ A}$	-	1.25	-	
		$I_F = 500\text{ A}$	-	1.45	1.66	
		$I_F = 250\text{ A}$, $T_J = 150\text{ °C}$	-	1.23	-	
		$I_F = 500\text{ A}$, $T_J = 150\text{ °C}$	-	1.0	-	
Reverse leakage current	I_{RM}	$V_R = 600\text{ V}$	-	2.0	200	μA
		$T_J = 150\text{ °C}$, $V_R = 600\text{ V}$	-	1.8	-	mA



DYNAMIC RECOVERY CHARACTERISTICS (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 = 150 A di/dt = 1000 A/μs V _R = 300 V	-	104	-	ns
		T _J = 125 °C		-	193	-	
Peak recovery current	I _{rr}	T _J = 25 °C		-	59	-	A
		T _J = 125 °C		-	122	-	
Reverse recovery charge	Q _{rr}	T _J = 25 °C		-	3.5	-	μC
		T _J = 125 °C		-	13.8	-	

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation	0.11	K/W
Typical thermal resistance, case to heat sink	R _{thCS}	Mounting surface, flat, smooth and greased	0.035	
Mounting torque ± 10 % to heat sink busbar		A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow the spread of the compound.	4 to 6	Nm
Approximate weight			200	g
			7.1	oz.
Case style			INT-A-PAK	

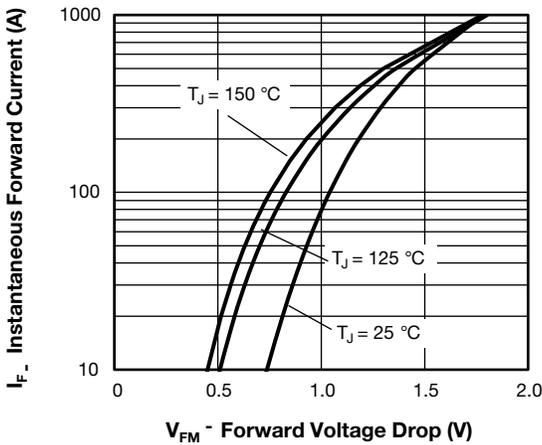


Fig. 1 - Typical Forward Voltage Drop Characteristics

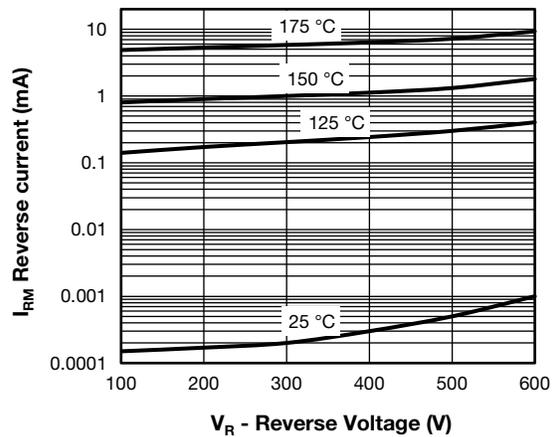


Fig. 2 - Typical Value of Reverse Current vs. Reverse Voltage

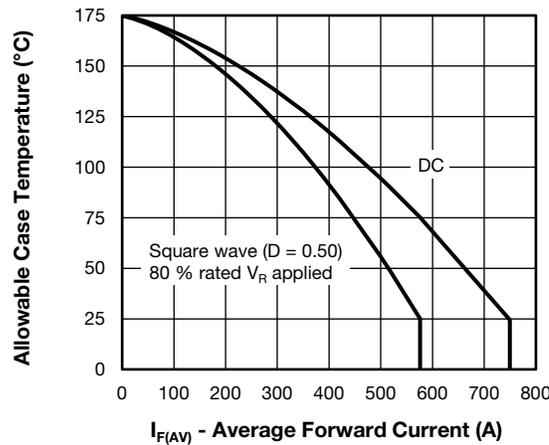


Fig. 3 - Maximum Allowable Case Temperature vs. Average Forward Current

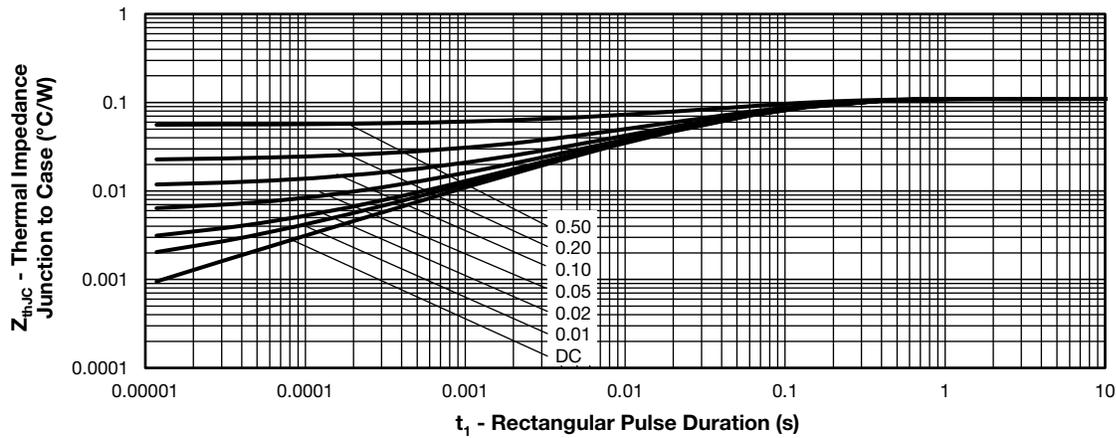


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

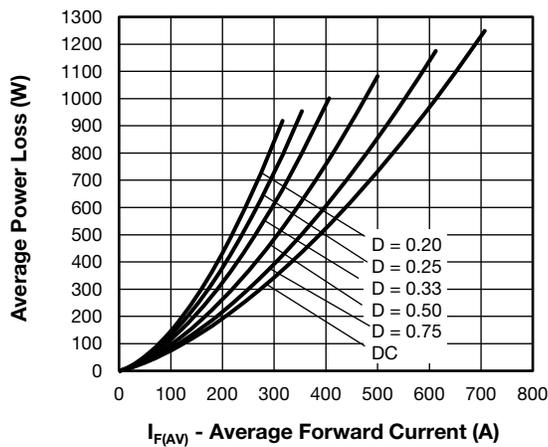


Fig. 5 - Forward Power Loss Characteristics

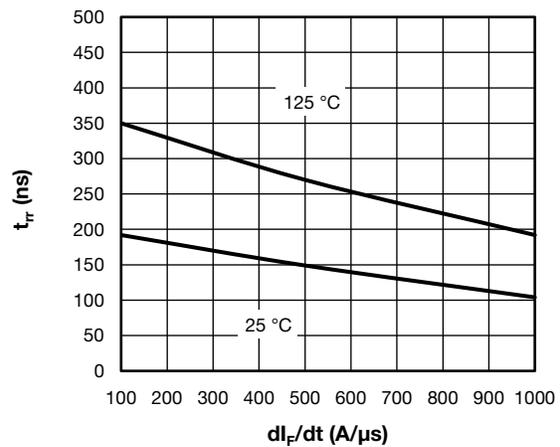


Fig. 6 - Typical Reverse Recovery Time vs. di_F/dt
 $I_{FM} = 150 \text{ A}$, $V_R = 300 \text{ V}$

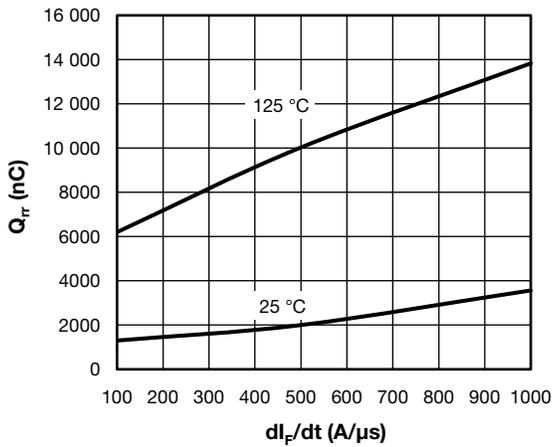


Fig. 7 - Typical Reverse Recovery Charge vs. di_F/dt
 $I_{FM} = 150 \text{ A}$, $V_R = 300 \text{ V}$

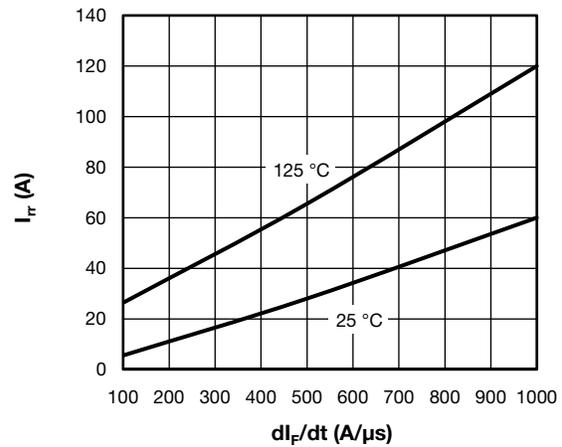


Fig. 8 - Typical Reverse Recovery Current vs. di_F/dt
 $I_{FM} = 150 \text{ A}$, $V_R = 300 \text{ V}$

ORDERING INFORMATION TABLE

Device code	VS-VS	KE	F	500	06	PbF
	①	②	③	④	⑤	⑥

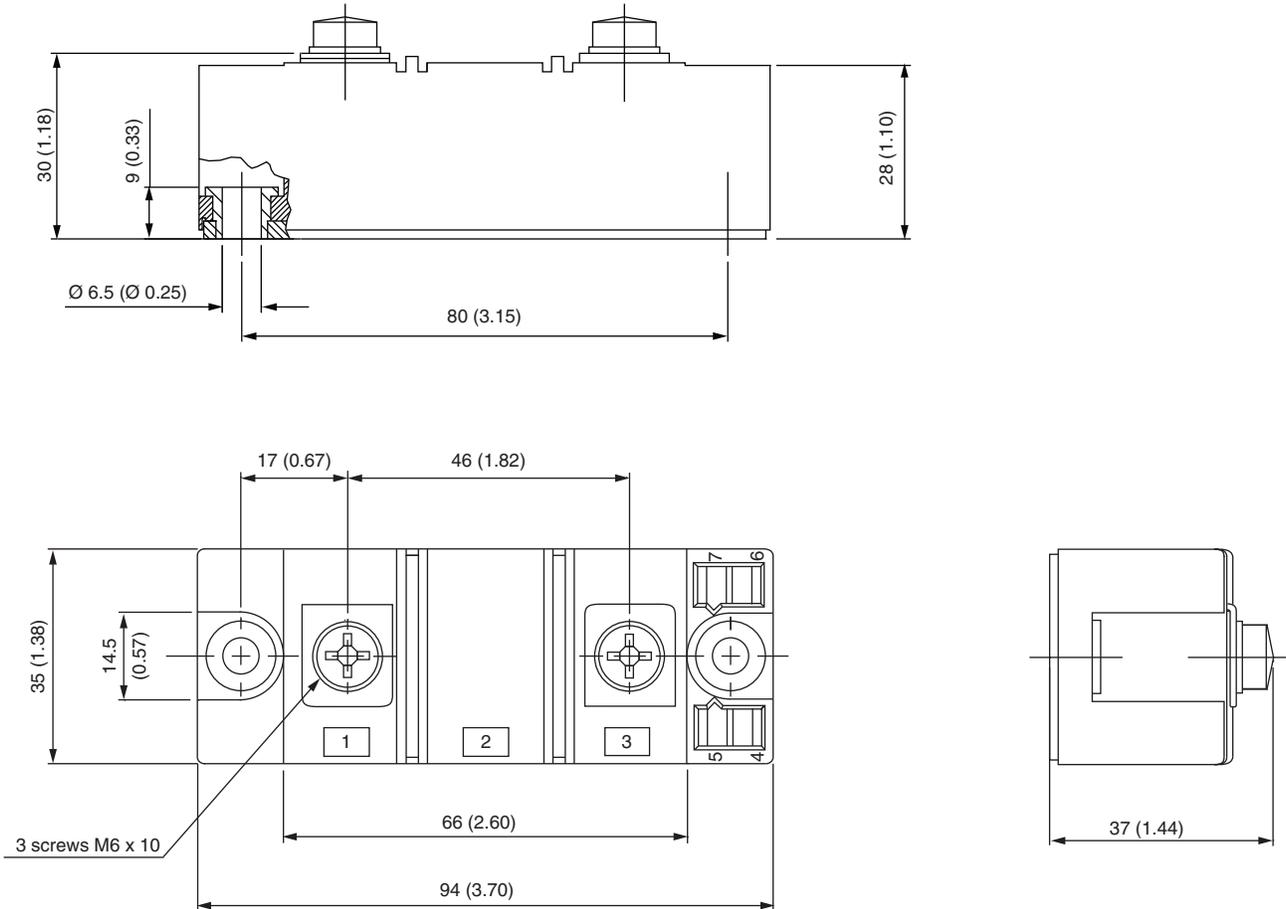
- 1** - Vishay Semiconductors product
- 2** - Circuit configuration: KE = single diode
- 3** - F = FRED Pt[®] ultrafast diode
- 4** - Current rating (500 = 500 A)
- 5** - Voltage rating (06 = 600 V)
- 6** - PbF = lead (Pb)-free

CIRCUIT CONFIGURATION





DIMENSIONS in millimeters (inches)





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