FRED Pt® Gen 4 Doubler Ultrafast Diode, 400 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

Pb-free

RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
V_R	600 V
$I_{F(AV)}$ at T_C	375 A at 50 °C
t_{rr} at 25 °C	159 ns
Type	Modules - diode, FRED Pt®
Package	INT-A-PAK
Circuit configuration	Diode doubler circuit

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	MAX.	UNITS
Cathode to anode voltage	V_R		600	V
Continuous forward current	I_F	T_C = 25 °C	540	A
		T_C = 80 °C	400	
Single pulse forward current	I_{FSM}	t_p = 10 ms, 50 Hz, sine half wave, initial T_J = 175 °C	4140	
Maximum power dissipation	P_D	T_C = 25 °C	1153	W
		T_C = 90 °C	653	
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 s	3500	V

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	I_R = 500 µA	600	-	-	V
Forward voltage drop	V_{FM}	I_F = 200 A	-	1.28	-	
		I_F = 400 A	-	1.51	1.67	
		I_F = 200 A, T_J = 150 °C	-	1.04	-	
		I_F = 400 A, T_J = 150 °C	-	1.35	-	
Reverse leakage current	I_{RM}	V_R = 600 V	-	12	-	µA
		T_J = 150 °C, V_R = 600 V	-	2.2	-	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 = 200 A/µs V_R = 400 V	-	159	-	ns
		T_J = 125 °C		-	320	-	
Peak recovery current	I_{rr}	T_J = 25 °C		-	14	-	A
		T_J = 125 °C		-	32	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	0.9	-	µC
		T_J = 125 °C		-	4.3	-	

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation	0.147	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		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
Mounting torque ± 10 % — busbar				
Approximate weight			200	g
			7.1	oz.
Case style			INT-A-PAK	

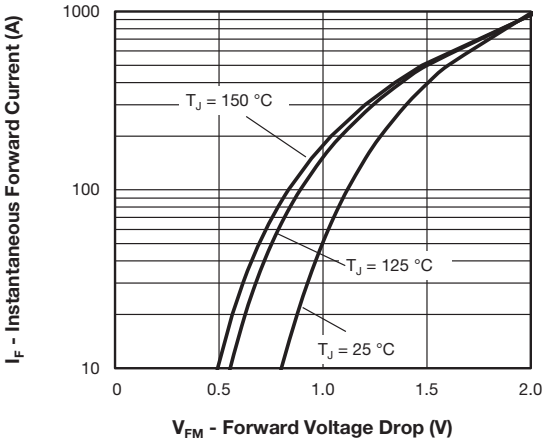


Fig. 1 - Typical Forward Voltage Drop Characteristics

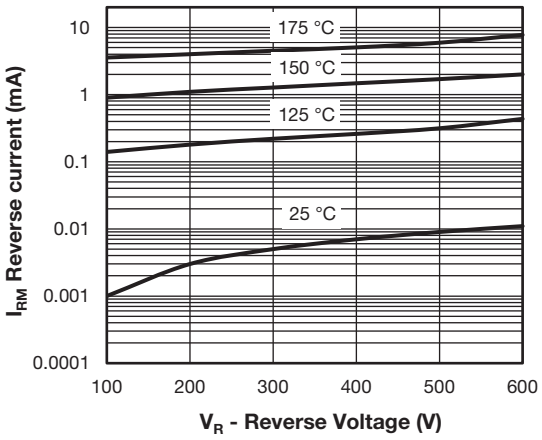


Fig. 2 - Typical Value of Reverse Current vs. Reverse Voltage

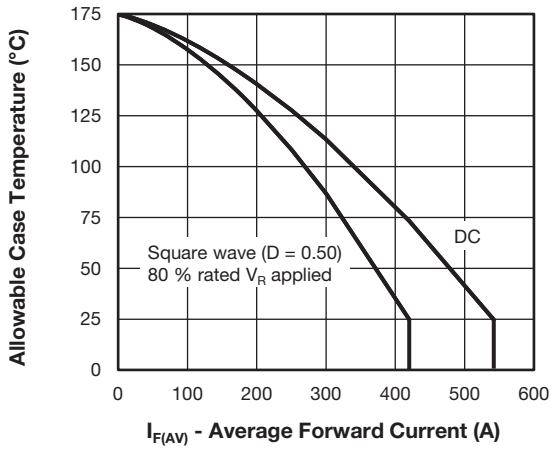


Fig. 3 - Maximum Allowable Case Temperature vs. Average Forward Current

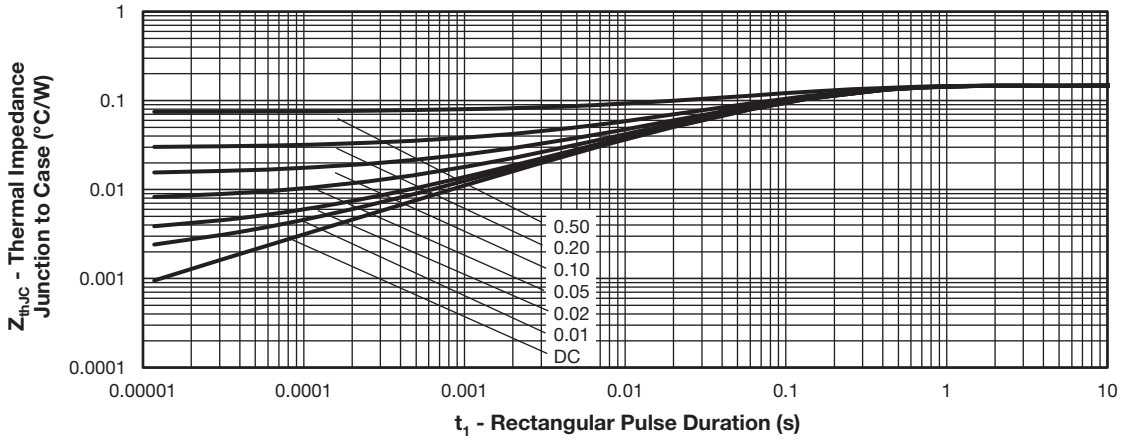


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

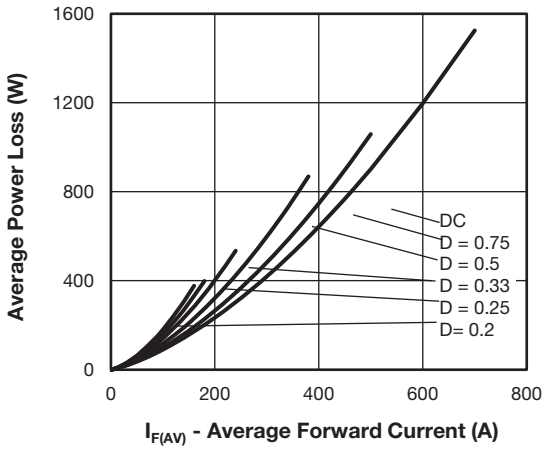


Fig. 5 - Forward Power Loss Characteristics

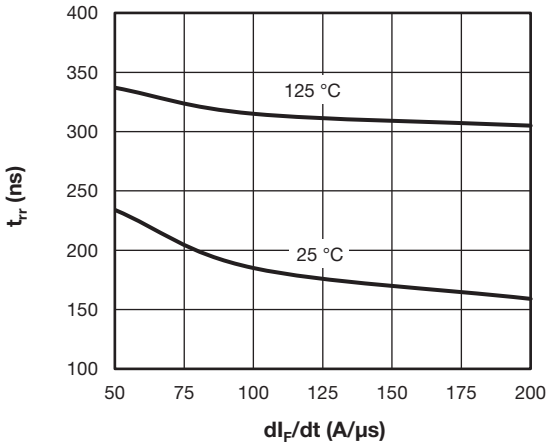


Fig. 6 - Typical Reverse Recovery Time vs. dI_F/dt
I_{FM} = 150 A, V_R = 400 V

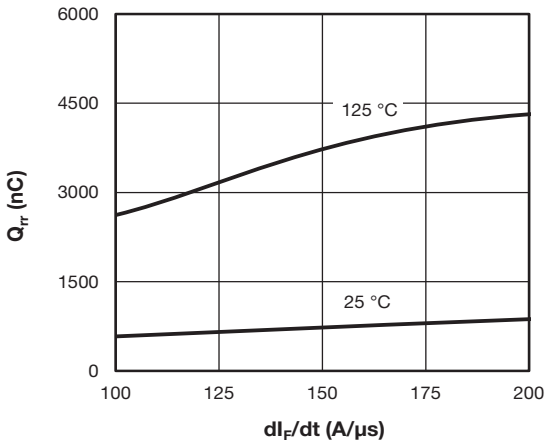


Fig. 7 - Typical Reverse Recovery Charge vs. dI_F/dt
I_{FM} = 150 A, V_R = 400 V

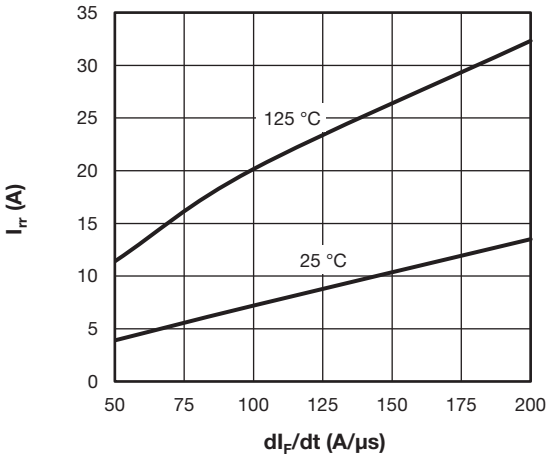


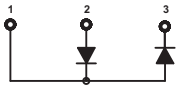
Fig. 8 - Typical Reverse Recovery Current vs. dI_F/dt
I_{FM} = 150 A, V_R = 400 V

ORDERING INFORMATION TABLE

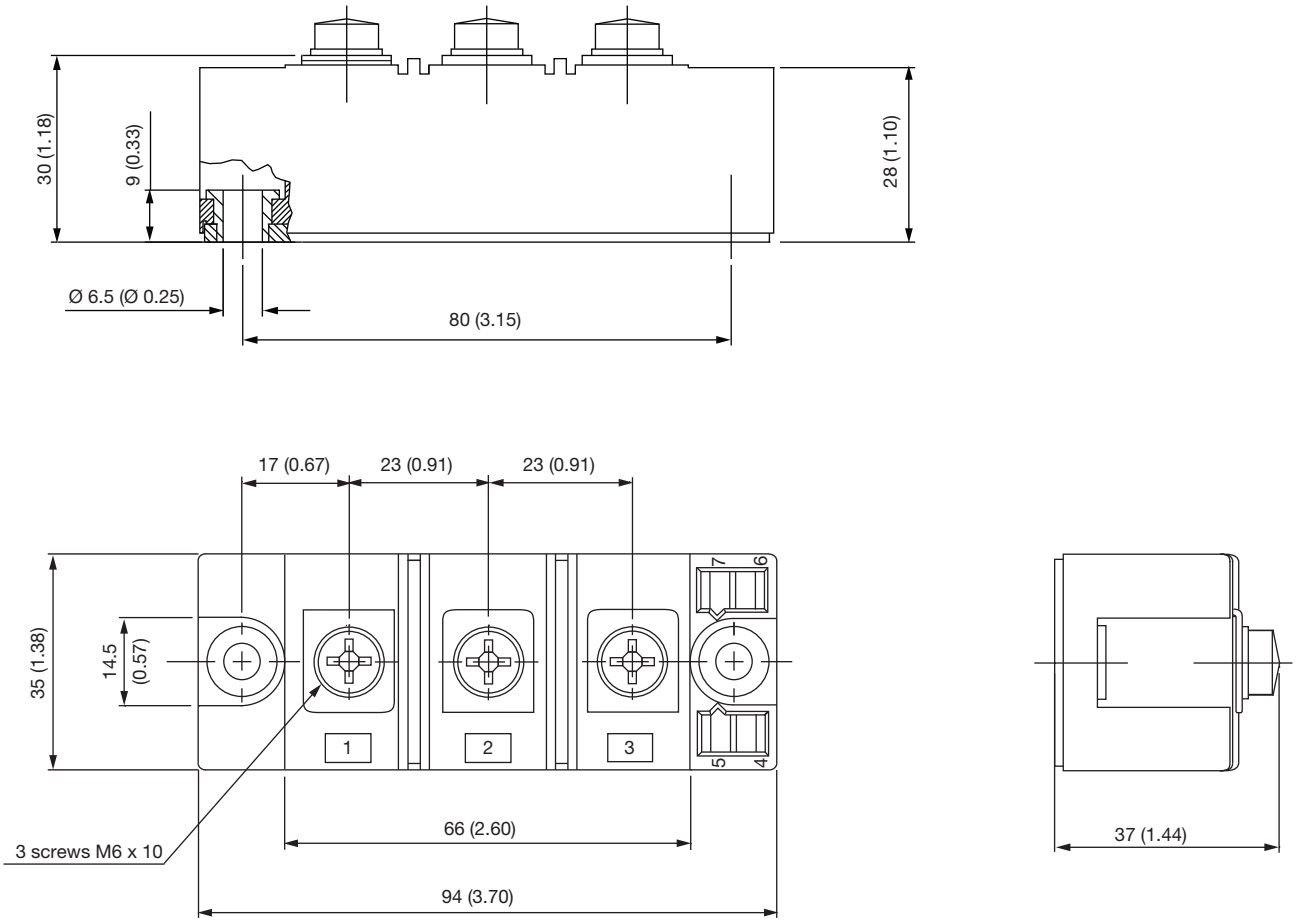
Device code

VS-VS	KD	F	400	06	PbF
1	2	3	4	5	6

1	-	Vishay Semiconductors product
2	-	Circuit configuration: KD = doubler circuit
3	-	F = FRED Pt® ultrafast diode
4	-	Current rating (400 = 400 A)
5	-	Voltage rating (06 = 600 V)
6	-	PbF = lead (Pb)-free

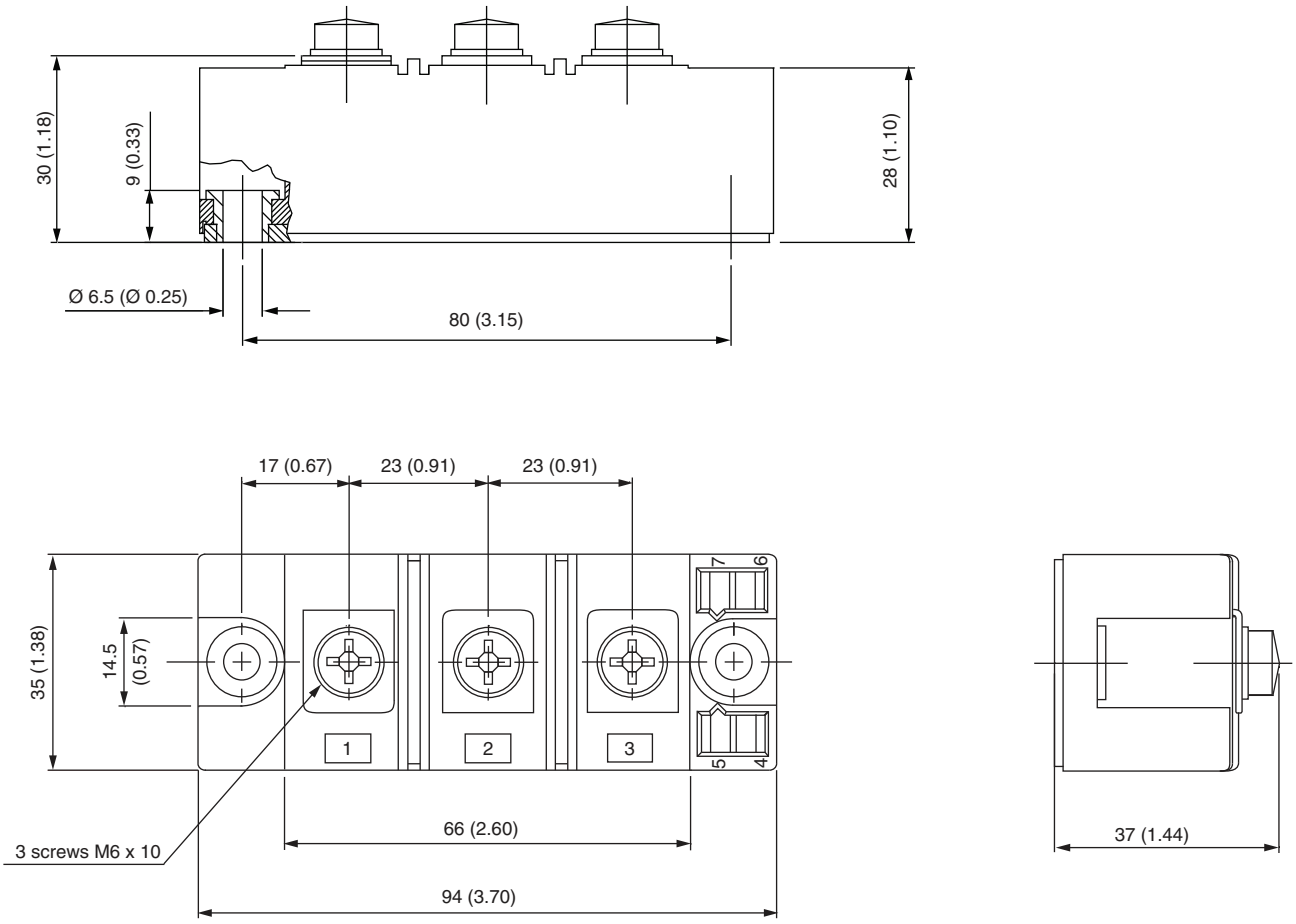
CIRCUIT CONFIGURATION		
CIRCUIT	**CIRCUIT CONFIGURATION CODE**	**CIRCUIT DRAWING**
Diode doubler circuit	KD	KD reversed polarity 

DIMENSIONS in millimeters (inches)



INT-A-PAK DBC

DIMENSIONS in millimeters (inches)



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