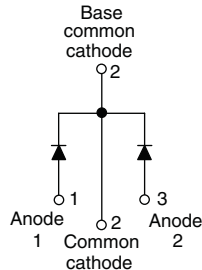


Ultrafast Rectifier, 2 x 35 A FRED Pt™


TO-218


FEATURES

- Two common-cathode diodes
- Ultrafast reverse recovery
- Ultrafast reverse recovery current shape
- Low forward voltage drop
- Low leakage current
- Optimized for power conversion: welding and industrial SMPS applications
- Up to 175 °C operating junction temperature
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level


RoHS*
COMPLIANT

PRODUCT SUMMARY

t_{rr}	28 ns
$I_{F(AV)}$ at $T_C = 145\text{ °C}$	2 x 35 A
V_R	200 V

DESCRIPTION

The 70CRU02 integrates two state of the art Vishay HPP ultrafast recovery rectifiers in the common-cathode configuration. The planar structure of the diodes, and the platinum doping life-time control, provide a ultrasoft recovery current shape, together with the best overall performance, ruggedness and reliability characteristics. These devices are thus intended for high frequency applications in which the switching energy is designed not to be predominant portion of the total energy, such as in the output rectification stage of welding machines, SMPS, dc-to-dc converters. Their extremely optimized stored charge and low recovery current reduce both over-dissipation in the switching elements (and snubbers) and EMI/RFI.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Continuous forward current per diode	$I_{F(AV)}$	$T_C = 145\text{ °C}$	35	A
Cathode to anode voltage	V_R		200	V
Single pulse forward current per diode	I_{FSM}	$T_C = 25\text{ °C}$	300	A
Maximum power dissipation per module	P_D	$T_C = 100\text{ °C}$	67	W
Operating junction and storage temperatures	T_J, T_{Stg}		- 55 to 175	°C

ELECTRICAL SPECIFICATIONS PER DIODE ($T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	$I_R = 60\text{ }\mu\text{A}$	200	-	-	V
Forward voltage	V_F	$I_F = 35\text{ A}$	-	0.95	1.09	
		$I_F = 35\text{ A}, T_J = 125\text{ °C}$	-	0.9	1.0	
		$I_F = 35\text{ A}, T_J = 175\text{ °C}$	-	0.85	0.9	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	60	μA
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	-	2	mA
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	50	-	pF
Series inductance	L_S	Measured from A-lead to K-lead 5 mm from package body	-	10	-	nH

* Pb containing terminations are not RoHS compliant, exemptions may apply



DYNAMIC RECOVERY CHARACTERISTICS PER DIODE ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 1\text{ A}$ $V_R = 30\text{ V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$	-	-	28	ns
		$T_J = 125\text{ }^\circ\text{C}$		-	34	-	
		$T_J = 25\text{ }^\circ\text{C}$	$I_F = 35\text{ A}$ $V_{RR} = 100\text{ V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$	-	26	-	
		$T_J = 125\text{ }^\circ\text{C}$		-	49	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 35\text{ A}$ $V_{RR} = 100\text{ V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$	-	3.7	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	8.2	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 35\text{ A}$ $V_{RR} = 100\text{ V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$	-	48.7	-	μC
		$T_J = 125\text{ }^\circ\text{C}$		-	202	-	

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	R_{thJC}	per diode		-	0.8	0.9	K/W
		both legs		-	-	0.45	
Thermal resistance, case to heatsink	R_{thCS}	Mounting surface, flat, smooth and greased		-	0.2	-	
Weight				-	5.5	-	g
				-	0.2	-	oz.
Mounting torque				1.2 (10)	-	2.4 (20)	N · m (lbf · in)
Marking device		Case style TO-218		70CRU02			

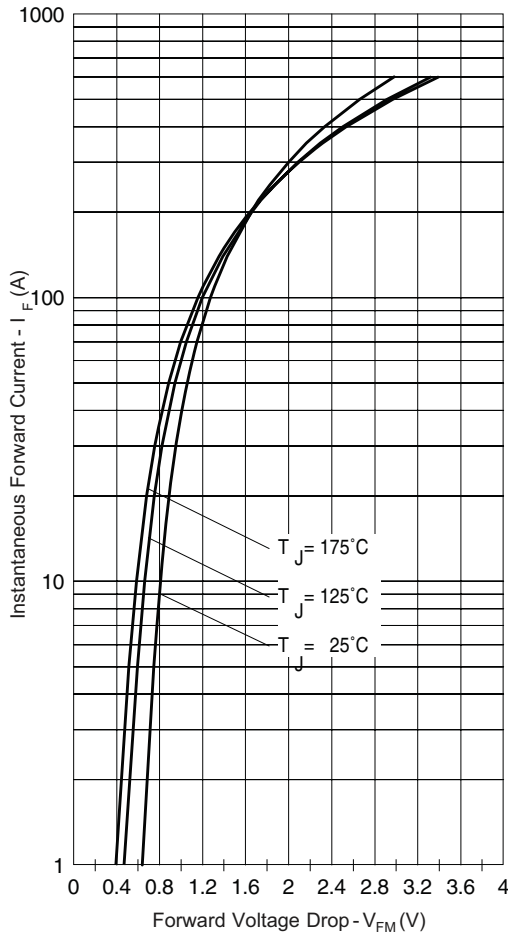


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Diode)

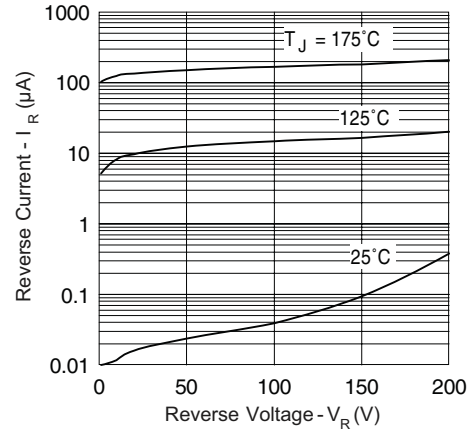


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

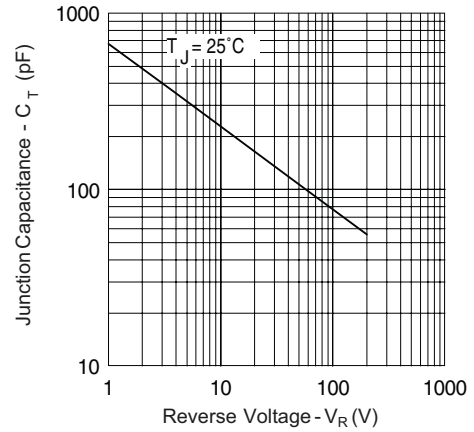


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

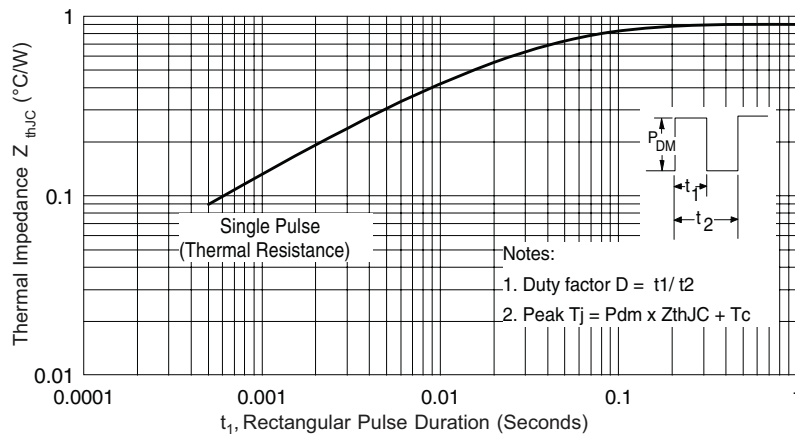


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Diode)

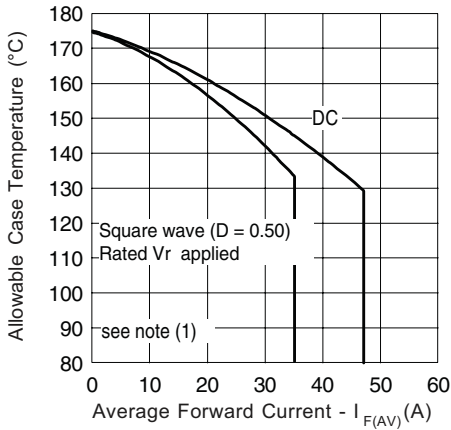


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

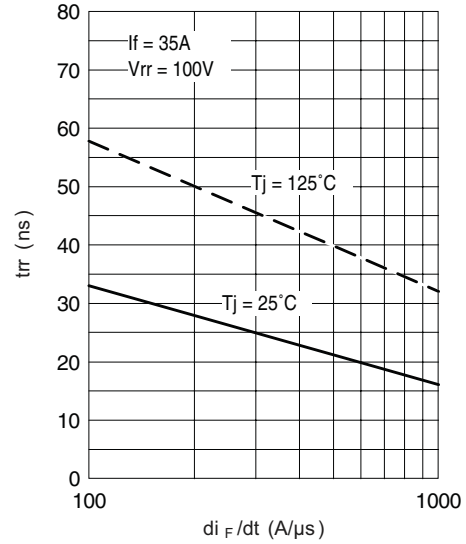


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

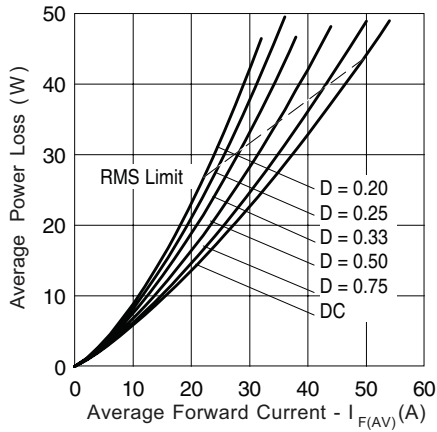


Fig. 6 - Forward Power Loss Characteristics

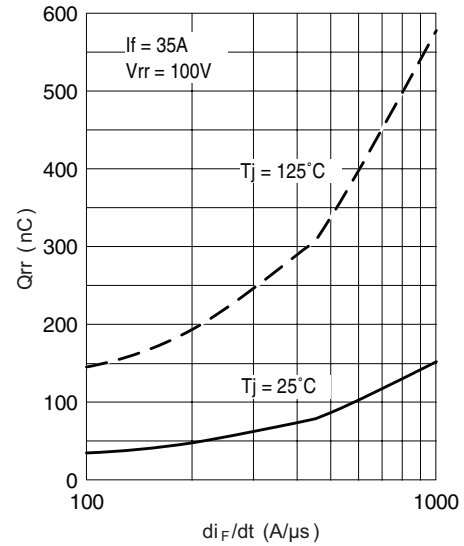


Fig. 8 - Typical Stored Charge vs. di_F/dt

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{d_{REV}}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

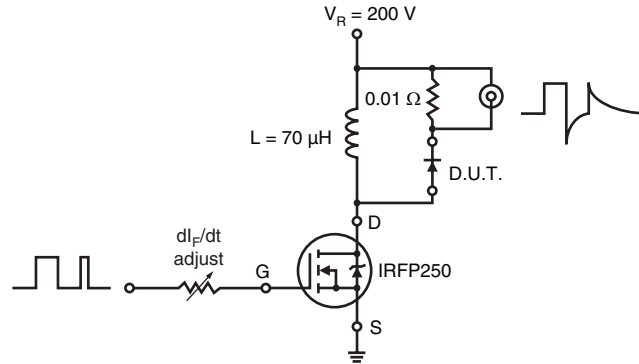
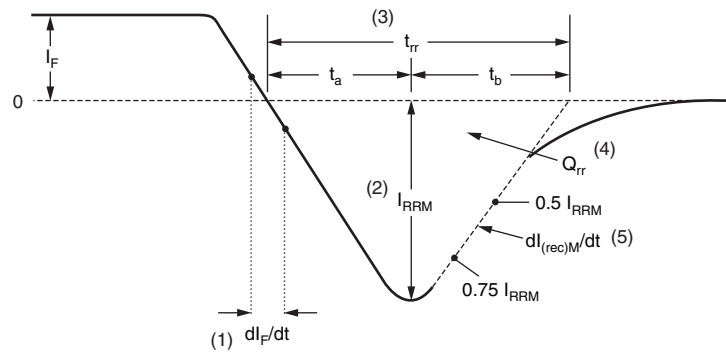


Fig. 9 - Reverse Recovery Parameter Test Circuit



(1) di_F/dt - rate of change of current through zero crossing

(2) I_{RRM} - peak reverse recovery current

(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.

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(5) $dl_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 10 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code	70	C	R	U	02	PbF
	①	②	③	④	⑤	⑥

- 1** - Current rating (70 = 70 A)
- 2** - Common cathode
- 3** - TO-218
- 4** - Ultrafast recovery
- 5** - Voltage rating (02 = 200 V)
- 6** -
 - None = Standard production
 - PbF = Lead (Pb)-free

Tube standard pack quantity: 30 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95214
Part marking information	http://www.vishay.com/doc?95219



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