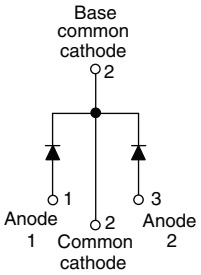
Ultrafast Rectifier, 2 x 35 A FRED Pt®

TO-218



FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- Up to 175 °C operating junction temperature
- Common-cathode diodes
- Low leakage current
- Optimized for power conversion: welding and industrial SMPS applications
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial level
- Halogen-free according to IEC 61249-2-21 definition

RoHS COMPLIANT
HALOGEN FREE

PRODUCT SUMMARY	
Package	TO-218
$I_{F(AV)}$	2 x 35 A
V_R	200 V
V_F at I_F	1.09 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Diode variation	Common cathode

DESCRIPTION

The VS-70CRU02PbF integrates two state of the art Vishay Semiconductors 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/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 °C	35	A
Cathode to anode voltage	V_R		200	V
Single pulse forward current per diode	I_{FSM}	T_C = 25 °C	300	A
Maximum power dissipation per module	P_D	T_C = 100 °C	67	W
Operating junction and storage temperatures	T_J, T_{Stg}		- 55 to 175	°C

ELECTRICAL SPECIFICATIONS PER DIODE (T_J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	I_R = 60 µA	200	-	-	V
Forward voltage	V_F	I_F = 35 A	-	0.95	1.09	V
		I_F = 35 A, T_J = 125 °C	-	0.9	1.0	V
		I_F = 35 A, T_J = 175 °C	-	0.85	0.9	V
Reverse leakage current	I_R	V_R = V_R rated	-	-	60	µA
		T_J = 150 °C, V_R = V_R rated	-	-	2	mA
Junction capacitance	C_T	V_R = 200 V	-	50	-	pF
Series inductance	L_S	Measured from A-lead to K-lead 5 mm from package body	-	10	-	nH

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 = 1 A V_R = 30 V dI_F/dt = 200 A/μs	-	-	28	ns
		T_J = 125 °C		-	34	-	
		T_J = 25 °C	I_F = 35 A V_R = 100 V dI_F/dt = 200 A/μs	-	26	-	
		T_J = 125 °C		-	49	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	3.7	-	A
		T_J = 125 °C		-	8.2	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	48.7	-	μC
		T_J = 125 °C		-	202	-	

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER		**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Thermal resistance, junction to case	per diode	R_{thJC}		-	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			

For technical questions within your region, please contact one of the following:
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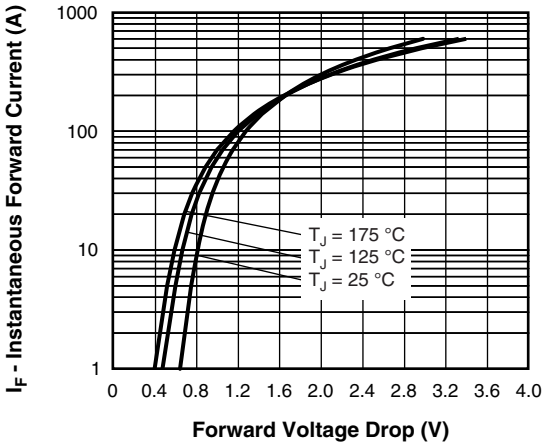


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Diode)

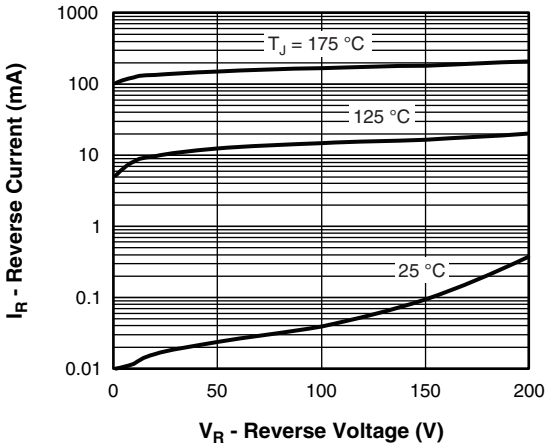


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

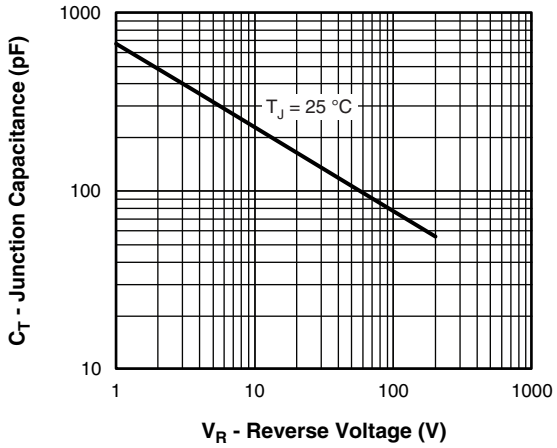


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

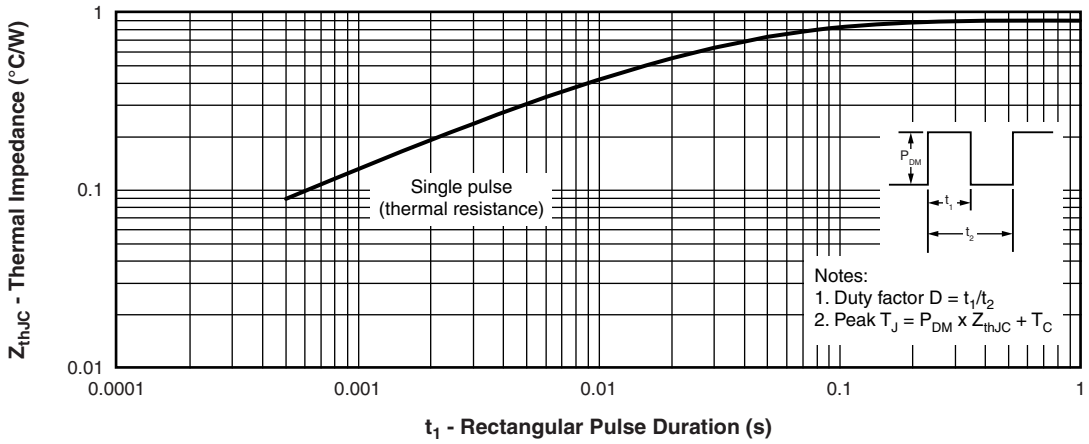


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Diode)

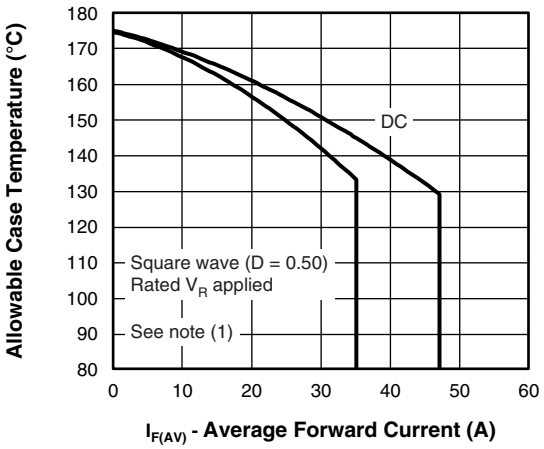


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

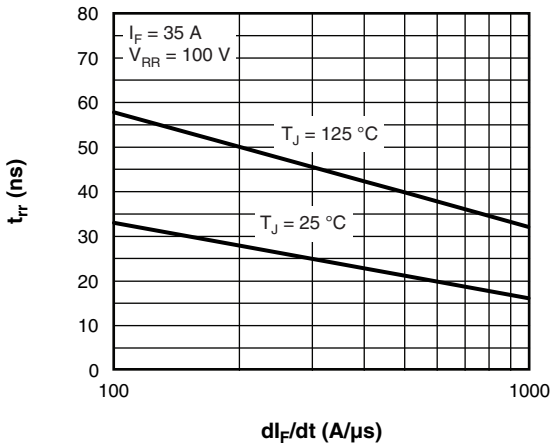


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

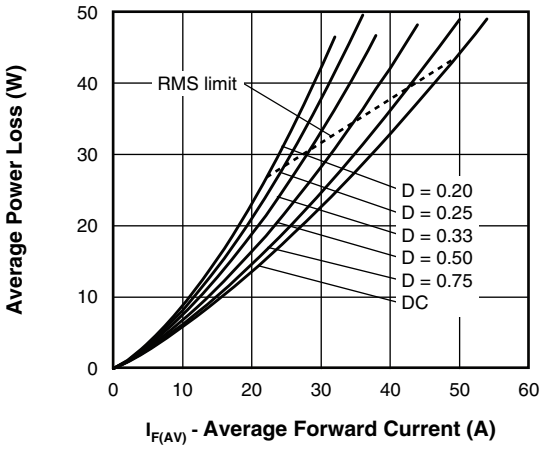


Fig. 6 - Forward Power Loss Characteristics

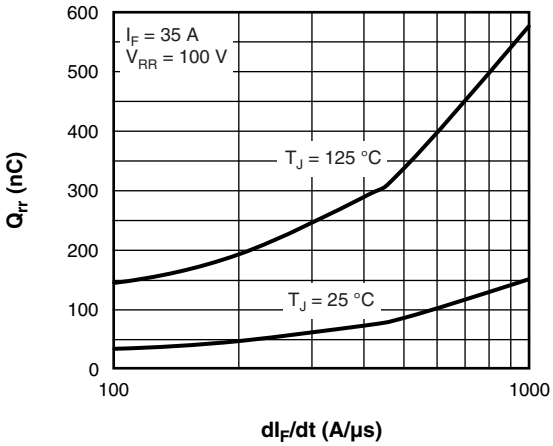


Fig. 8 - Typical Stored Charge vs. dI_F/dt

Note

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

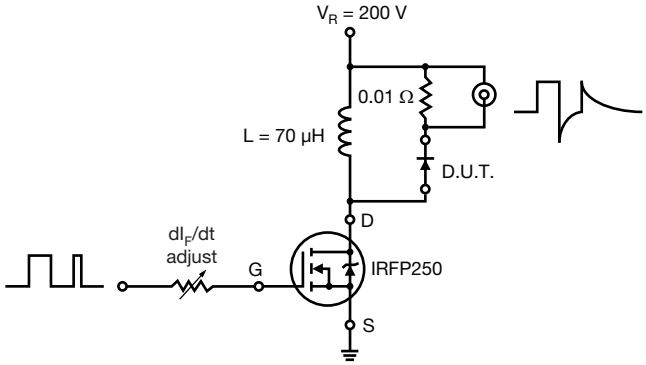
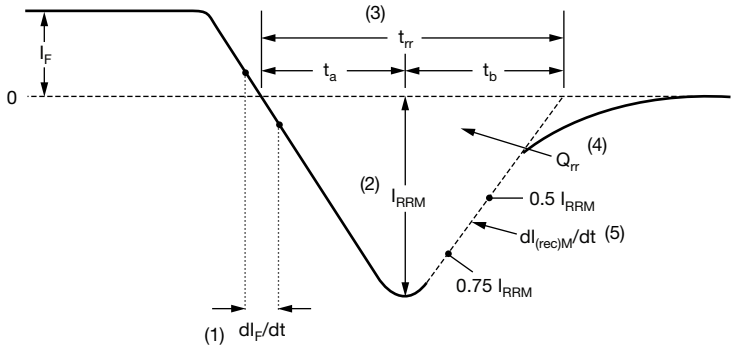


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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}

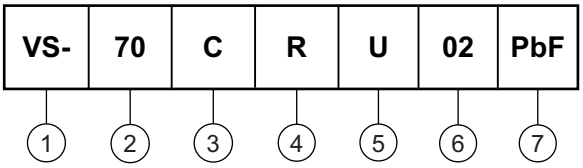
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(5) $dI_{(rec)M}/dt$ - 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



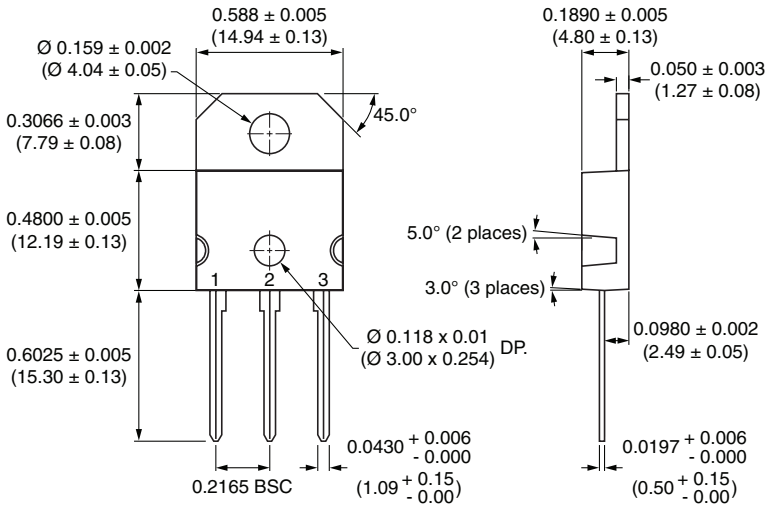
1	-	Vishay Semiconductors product
2	-	Current rating (70 = 70 A)
3	-	Common cathode
4	-	TO-218
5	-	Ultrafast recovery
6	-	Voltage rating (02 = 200 V)
7	-	PbF = Lead (Pb)-free

Tube standard pack quantity: 30 pieces

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

FRED Pt™ TO-218

DIMENSIONS in millimeters (inches)



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