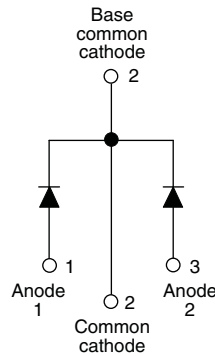


Ultrafast Rectifier, 2 x 15 A FRED Pt®



TO-247AC



FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- 175 °C operating junction temperature
- Low leakage current
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial level


RoHS
COMPLIANT

DESCRIPTION/APPLICATIONS

VS-MUR3020WTPbF is the state of the art ultrafast recovery rectifier specifically designed with optimized performance of forward voltage drop and ultrafast recovery time.

The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in the output rectification stage of SMPS, UPS, DC/DC converters as well as freewheeling diode in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

PRODUCT SUMMARY

Package	TO-247AC
$I_{F(AV)}$	2 x 15 A
V_R	200 V
V_F at I_F	1.05 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Diode variation	Common cathode

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current	$I_{F(AV)}$	per leg total device Rated V_R , $T_C = 150$ °C	15	A
Non-repetitive peak surge current per leg			I_{FSM}	
Peak repetitive forward current per leg	I_{FM}	Rated V_R , square wave, 20 kHz, $T_C = 150$ °C	30	
Operating junction and storage temperatures	T_J , T_{Stg}		- 65 to 175	°C

ELECTRICAL SPECIFICATIONS ($T_J = 25$ °C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR} , V_R	$I_R = 100$ μ A	200	-	-	V
Forward voltage	V_F	$I_F = 15$ A $I_F = 15$ A, $T_J = 150$ °C	-	-	1.05 0.85	
Reverse leakage current	I_R	$V_R = V_R$ rated $T_J = 150$ °C, $V_R = V_R$ rated	-	-	10 500	μ A
Junction capacitance	C_T	$V_R = 200$ V	-	55	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	12	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t _{rr}	I _F = 1.0 A, dI _F /dt = 50 A/μs, V _R = 30 V	-	-	35	ns
		T _J = 25 °C	-	22	-	
		T _J = 125 °C	-	39	-	
Peak recovery current	I _{RRM}	T _J = 25 °C	-	1.6	-	A
		T _J = 125 °C	-	4.1	-	
Reverse recovery charge	Q _{rr}	T _J = 25 °C	-	19	-	nC
		T _J = 125 °C	-	90	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T _J , T _{Stg}		- 65	-	175	°C
Thermal resistance, junction to case per leg	R _{thJC}		-	-	1.5	°C/W
Thermal resistance, junction to ambient per leg	R _{thJA}	Typical socket mount	-	-	40	
Thermal resistance, case to heatsink	R _{thCS}	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	6.0	-	g
			-	0.21	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-247AC	MUR3020WT			

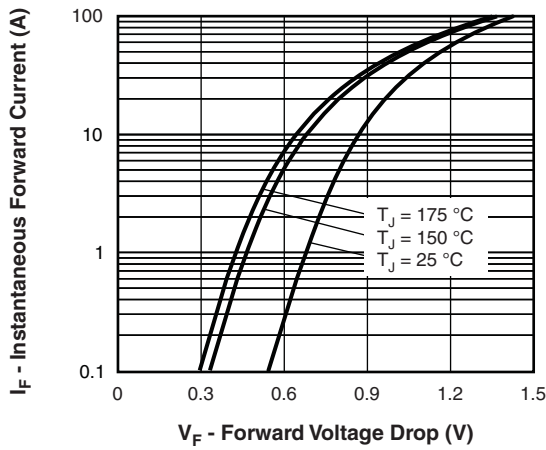


Fig. 1 - Typical Forward Voltage Drop Characteristics

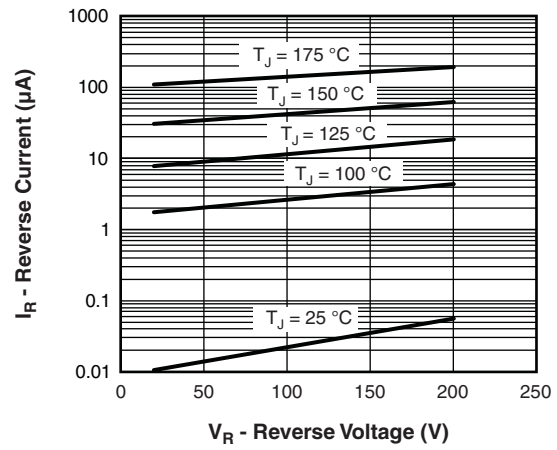


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

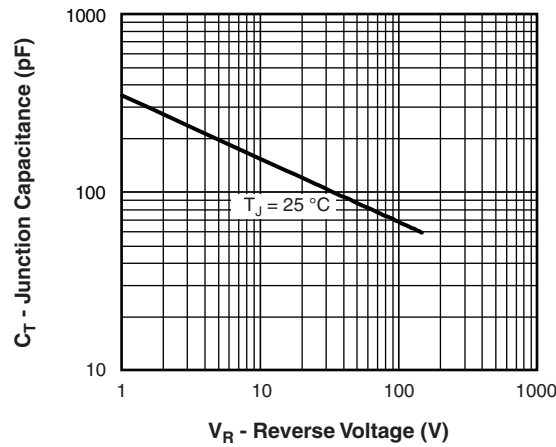


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

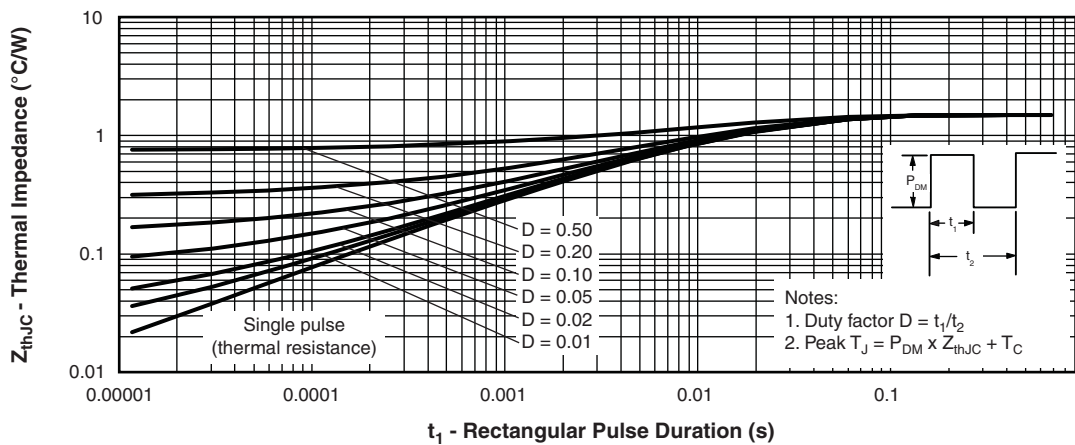


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

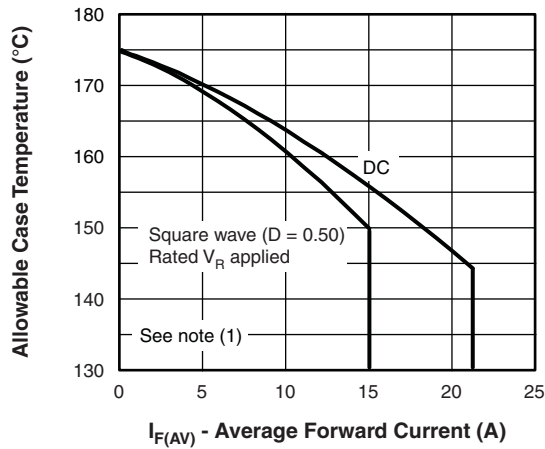


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

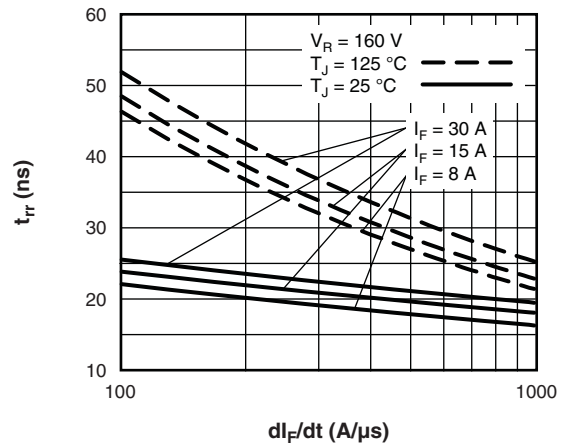


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

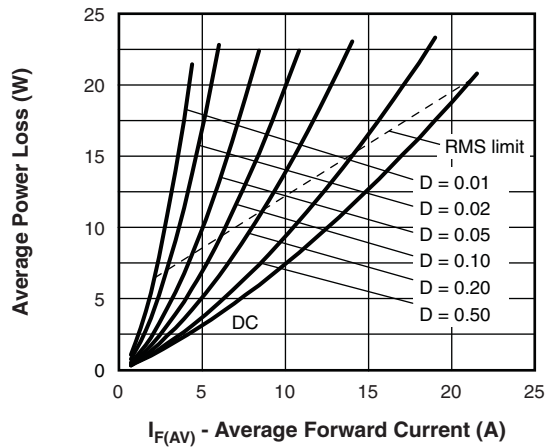


Fig. 6 - Forward Power Loss Characteristics

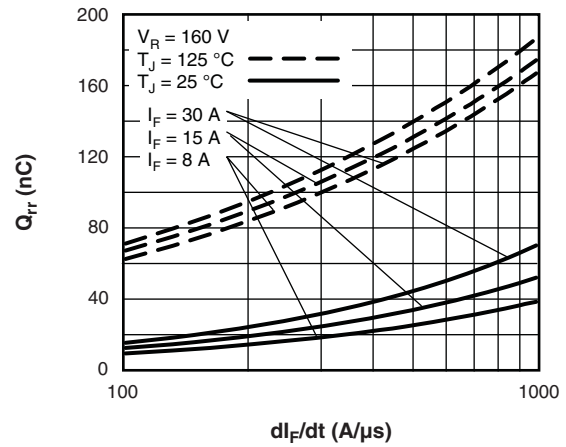


Fig. 8 - Typical Stored Charge vs. di_F/dt

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

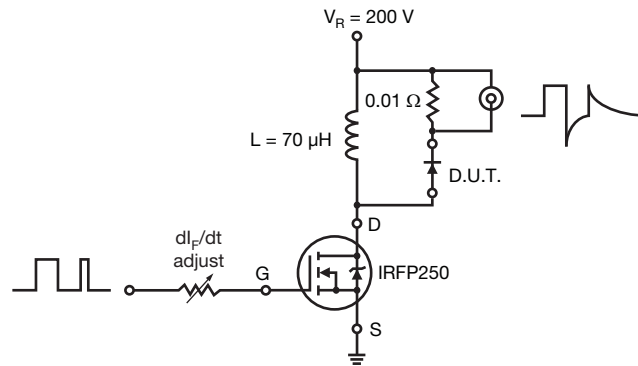
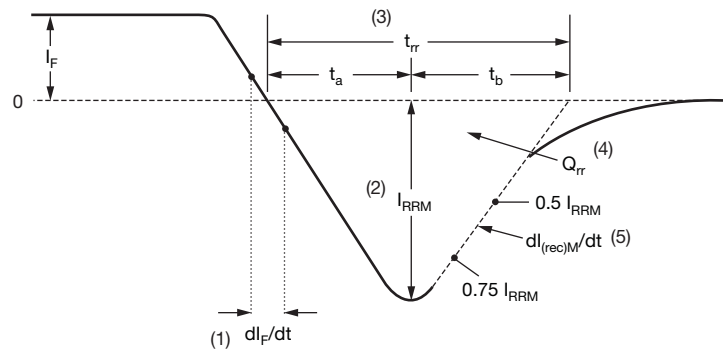


Fig. 9 - Reverse Recovery Parameter Test Circuit



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

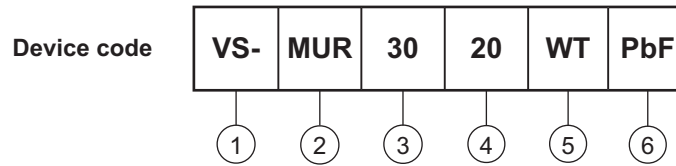
Fig. 10 - Reverse Recovery Waveform and Definitions

VS-MUR3020WTPbF



Vishay Semiconductors Ultrafast Rectifier, 2 x 15 A FRED Pt®

ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Ultrafast MUR series (TO-247AC)
- 3** - Current rating (30 = 30 A)
- 4** - Voltage rating (20 = 200 V)
- 5** - WT = Center tap (dual) TO-247
- 6** - PbF = Lead (Pb)-free

Tube standard pack quantity: 25 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95223
Part marking information	www.vishay.com/doc?95226



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