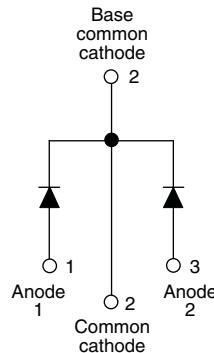


Ultrafast Rectifier, 2 x 15 A FRED Pt®



TO-247AC



RoHS
COMPLIANT
HALOGEN
FREE
Available

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 according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)

DESCRIPTION/APPLICATIONS

VS-MUR3020WT... 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 per leg	$I_{F(AV)}$		15	A	
		Rated V_R , $T_C = 150$ °C	30		
Non-repetitive peak surge current per leg	I_{FSM}		200		
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	$I_R = 100$ µA	200	-	-	V
Forward voltage	V_F	$I_F = 15$ A	-	-	1.05	
		$I_F = 15$ A, $T_J = 150$ °C	-	-	0.85	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	10	µA
		$T_J = 150$ °C, $V_R = V_R$ rated	-	-	500	
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 ($T_J = 25^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 1.0 \text{ A}$, $dI_F/dt = 50 \text{ A}/\mu\text{s}$, $V_R = 30 \text{ V}$		-	-	35	ns
		$T_J = 25^\circ\text{C}$	$I_F = 15 \text{ A}$ $dI_F/dt = 200 \text{ A}/\mu\text{s}$ $V_R = 160 \text{ V}$	-	22	-	
		$T_J = 125^\circ\text{C}$		-	39	-	
Peak recovery current	I_{RRM}	$T_J = 25^\circ\text{C}$		-	1.6	-	A
		$T_J = 125^\circ\text{C}$		-	4.1	-	
Reverse recovery charge	Q_{rr}	$T_J = 25^\circ\text{C}$		-	19	-	nC
		$T_J = 125^\circ\text{C}$		-	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			

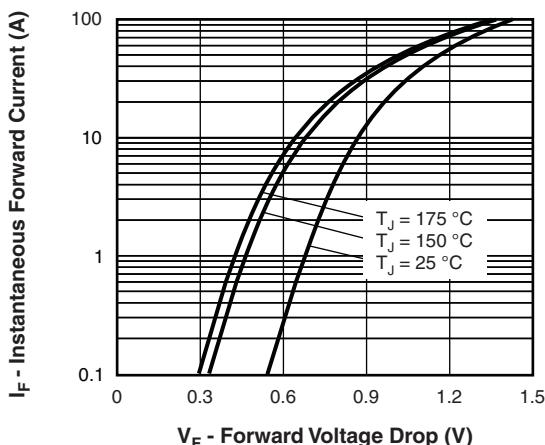


Fig. 1 - Typical Forward Voltage Drop Characteristics

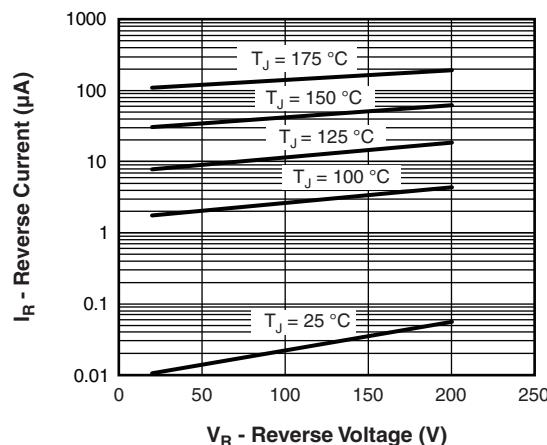


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

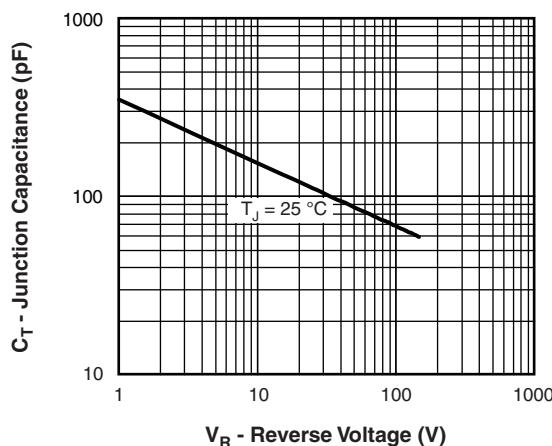


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

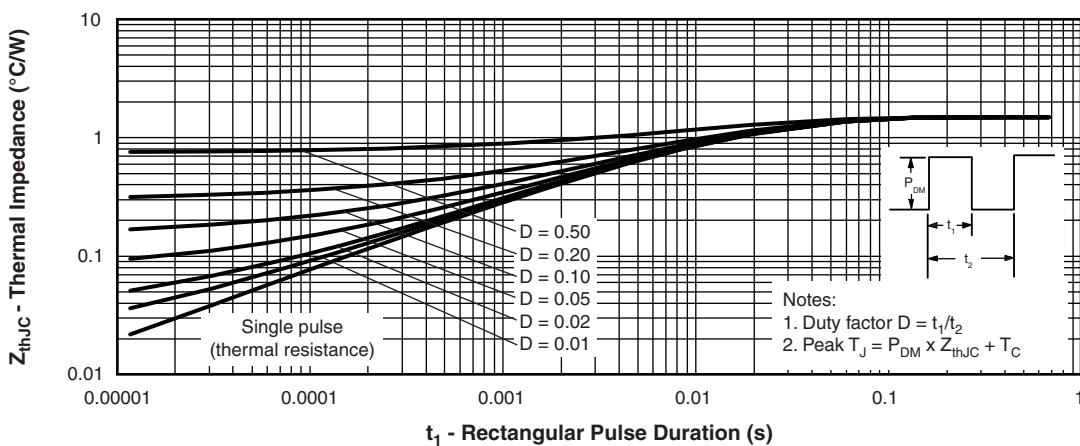
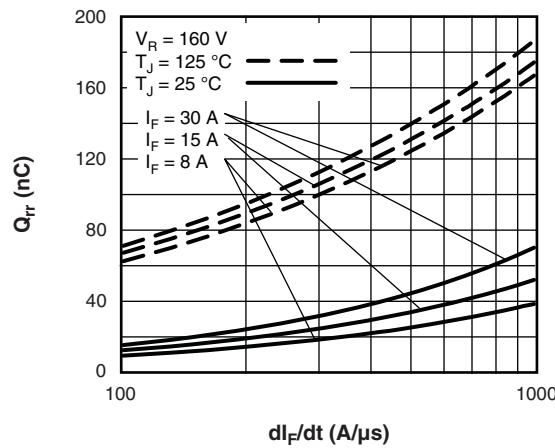
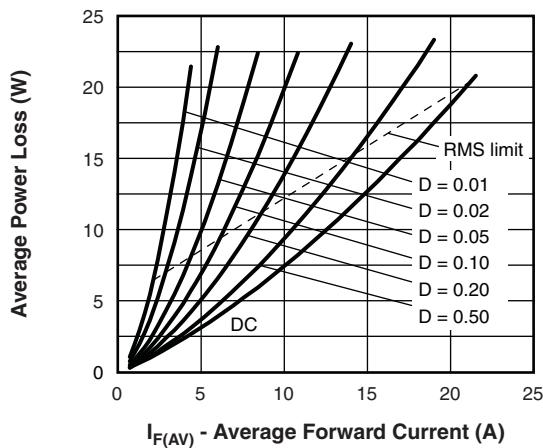
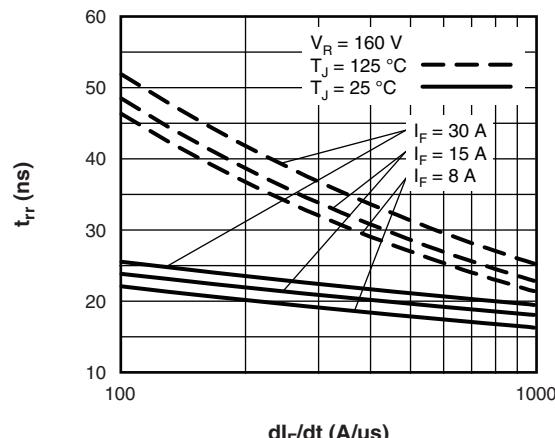
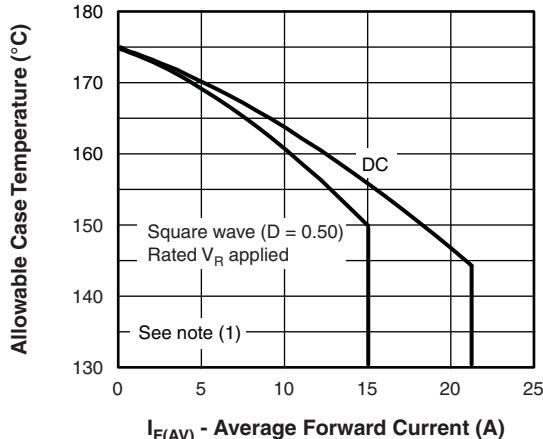


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics



Note

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

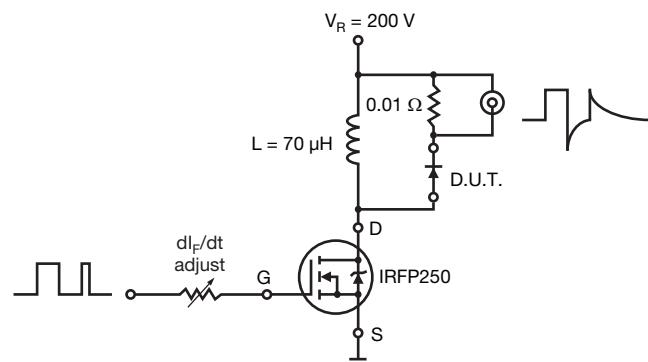
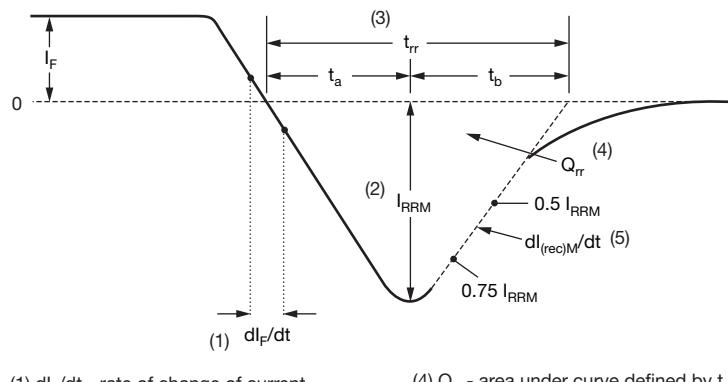


Fig. 9 - Reverse Recovery Parameter Test Circuit



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

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

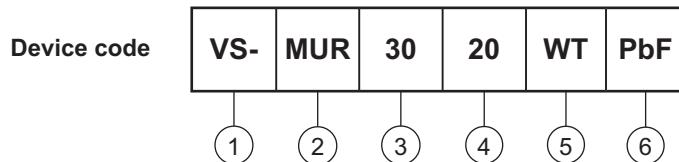
(2) I_{RRM} - peak reverse recovery current

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

(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.

(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


- 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** - Environmental digit:

PbF = Lead (Pb)-free and RoHS compliant

-N3 = Halogen-free, RoHS compliant and totally lead (Pb)-free

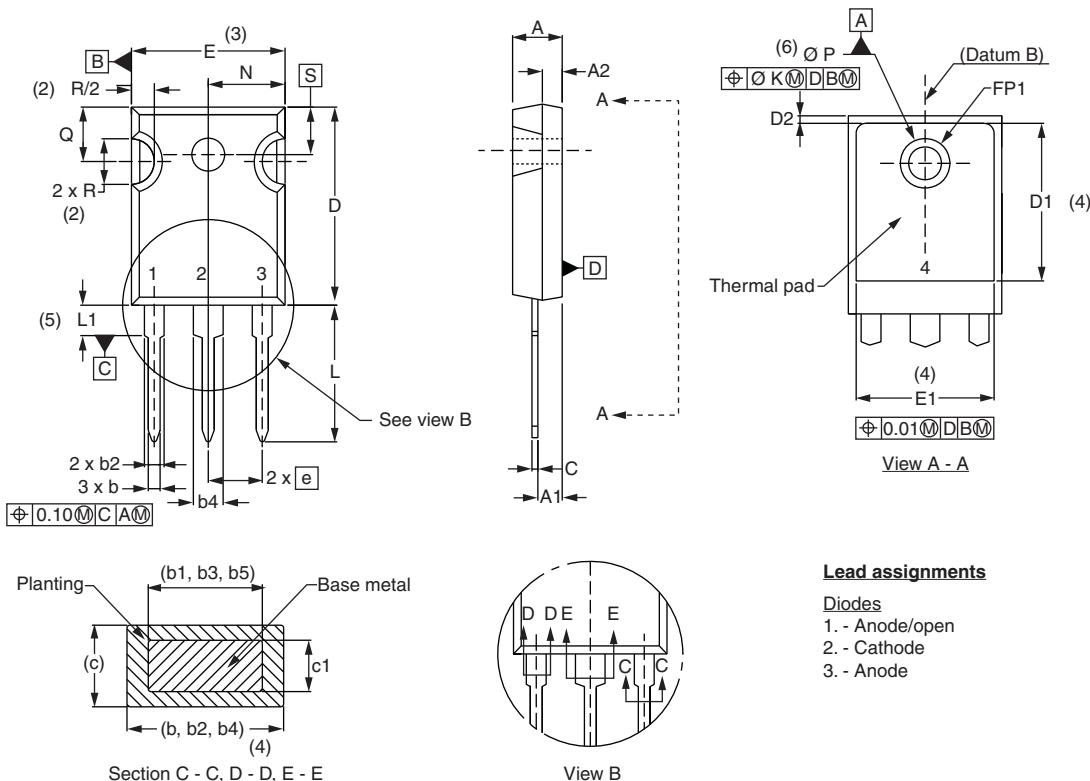
ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MUR3020WTPbF	25	500	Antistatic plastic tube
VS-MUR3020WT-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95223
Part marking information	www.vishay.com/doc?95226
TO-247AC-N3	www.vishay.com/doc?95007

DIMENSIONS in millimeters and inches



Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC outline TO-247 with exception of dimension c

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