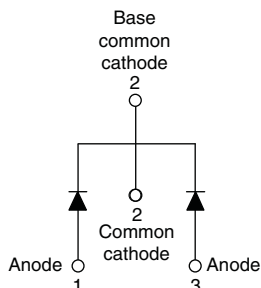


Ultrafast Rectifier, 10 A FRED Pt®


TO-220AB


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)



RoHS
COMPLIANT
HALOGEN
FREE
Available

DESCRIPTION/APPLICATIONS

VS-MUR.. series are the state of the art ultrafast recovery rectifiers 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-220AB
$I_{F(AV)}$	2 x 5 A
V_R	200 V
V_F at I_F	See Electrical table
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	5	A
		total device	10	
Non-repetitive peak surge current per leg	I_{FSM}	Rated V_R , $T_C = 149$ °C	50	
Peak repetitive forward current per leg	I_{FM}	Rated V_R , square wave, 20 kHz $T_C = 149$ °C	10	
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	$I_F = 5$ A, $T_J = 125$ °C	-	0.87	0.99	
		$I_F = 10$ A, $T_J = 125$ °C	-	1.02	1.20	
		$I_F = 10$ A	-	1.12	1.25	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	10	μ A
		$T_J = 150$ °C, $V_R = V_R$ rated	-	-	250	
Junction capacitance	C_T	$V_R = 200$ V	-	8	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

**DYNAMIC RECOVERY CHARACTERISTICS** ($T_J = 25\text{ }^{\circ}\text{C}$ 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
		$I_F = 0.5\text{ A}$, $I_R = 1.0\text{ A}$, $I_{REC} = 0.25\text{ A}$	-	-	25	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	24	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	35	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	3.3	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	5.0	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	33	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	76	-	

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		- 65	-	175	$^{\circ}\text{C}$
Thermal resistance, junction to case per leg	R_{thJC}		-	-	5	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction to ambient per leg	R_{thJA}		-	-	50	
Thermal resistance, case to heatsink	R_{thCS}	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-220AB	MUR1020CT			

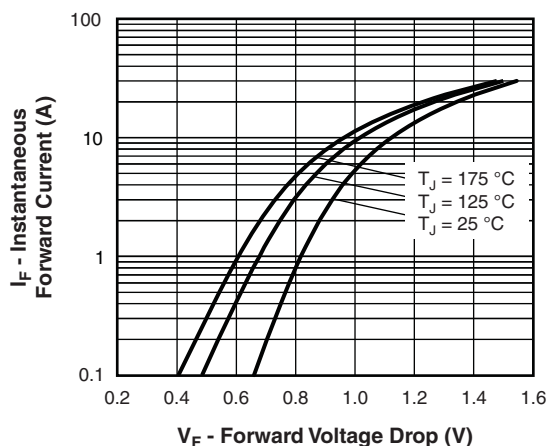


Fig. 1 - Typical Forward Voltage Drop Characteristics

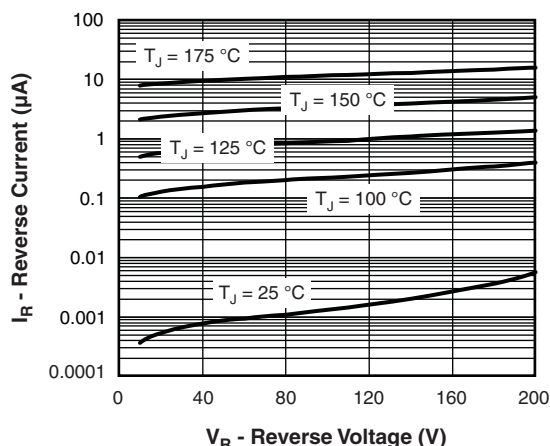


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

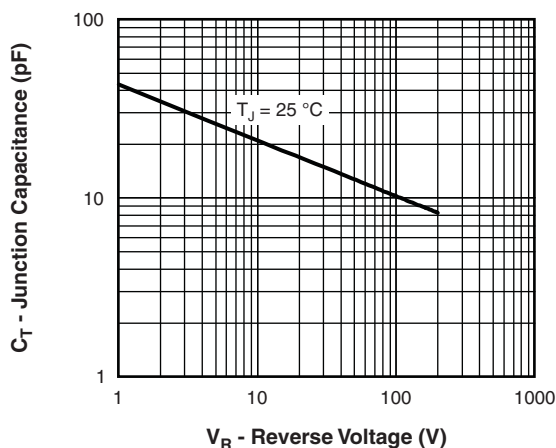


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

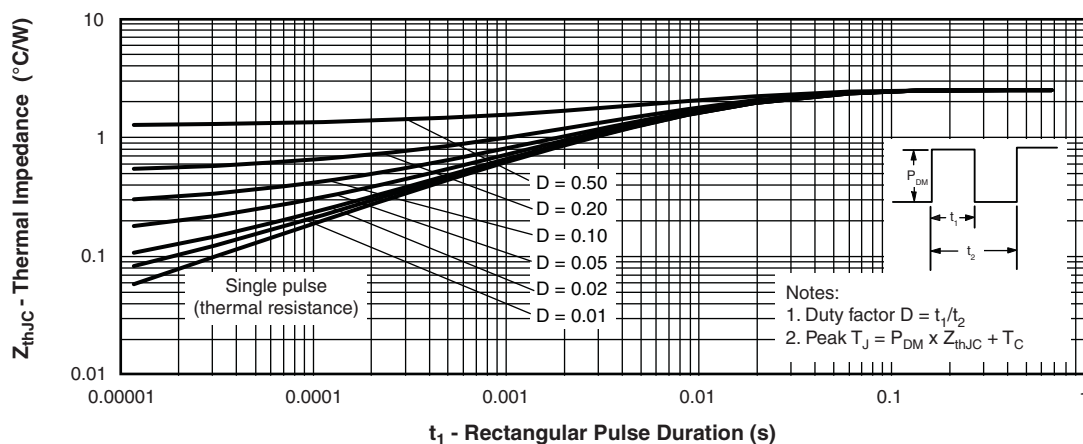


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

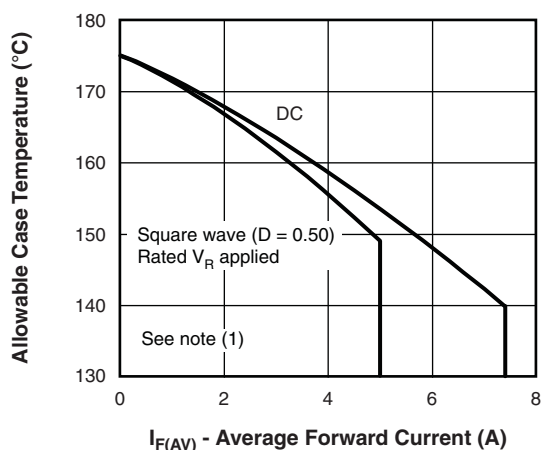


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

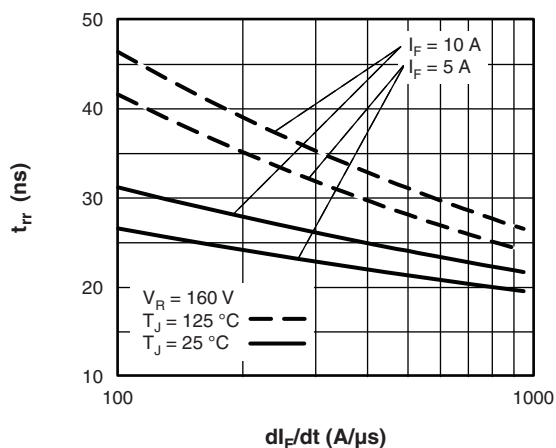


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

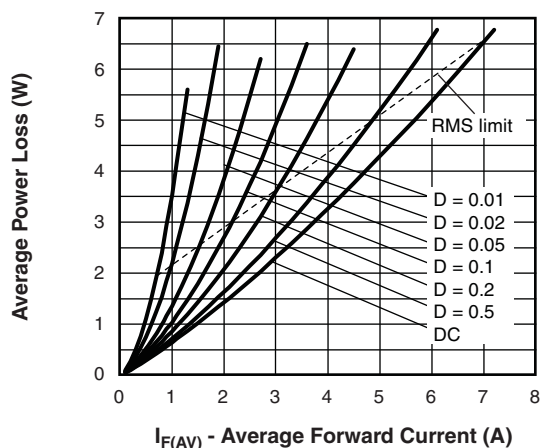


Fig. 6 - Forward Power Loss Characteristics

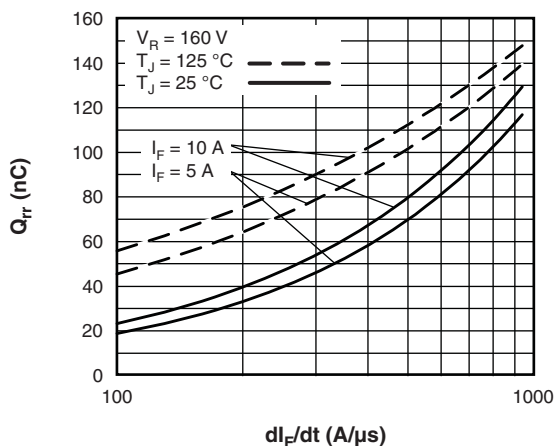


Fig. 8 - Typical Stored Charge vs. dI_F/dt

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 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

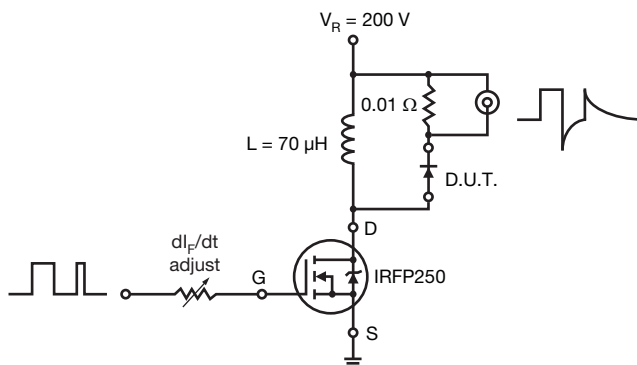


Fig. 9 - Reverse Recovery Parameter Test Circuit

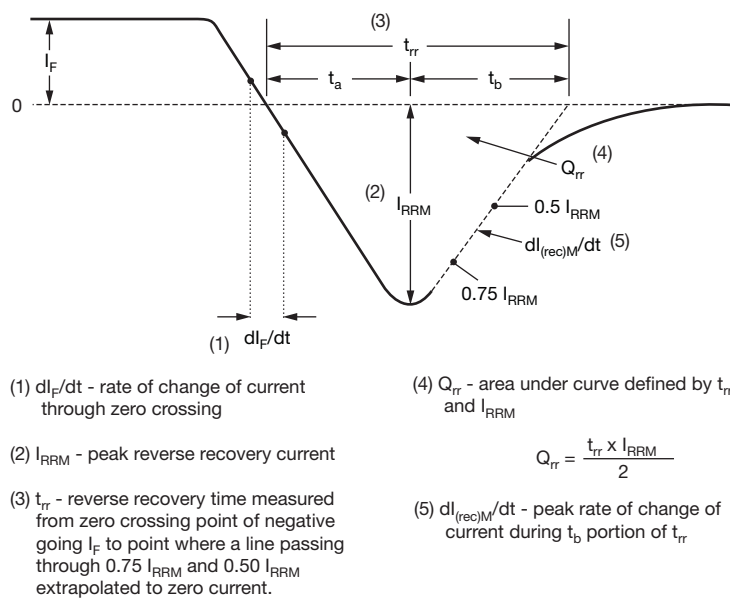


Fig. 10 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	VS-	MUR	10	20	CT	PbF
	①	②	③	④	⑤	⑥

- | | |
|----------|---|
| 1 | - Vishay Semiconductors product |
| 2 | - Ultrafast MUR series |
| 3 | - Current rating (10 = 10 A) |
| 4 | - Voltage rating (20 = 200 V) |
| 5 | - CT = Center tap (dual) TO-220/D ² PAK/TO-262 |
| 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-MUR1020CTPbF	50	1000	Antistatic plastic tube
VS-MUR1020CT-N3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95222
Part marking information	TO-220ABPbF	www.vishay.com/doc?95225
	TO-220AB-N3	www.vishay.com/doc?95028



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