

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
		$I_F = 0.5 \text{ A}$ , $I_R = 1.0 \text{ A}$ , $I_{REC} = 0.25 \text{ A}$		-	-	25	
		$T_J = 25^\circ\text{C}$	$I_F = 5 \text{ A}$ $dI_F/dt = 200 \text{ A}/\mu\text{s}$ $V_R = 160 \text{ V}$	-	24	-	
		$T_J = 125^\circ\text{C}$		-	35	-	
Peak recovery current	$I_{RRM}$	$T_J = 25^\circ\text{C}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	-	3.3	-	A
		$T_J = 125^\circ\text{C}$		-	5.0	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25^\circ\text{C}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	-	33	-	nC
		$T_J = 125^\circ\text{C}$		-	76	-	

THERMAL - MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	$T_J$ , $T_{Stg}$			-65	-	175	°C
Thermal resistance, junction to case per leg	$R_{thJC}$			-	-	5	°C/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			

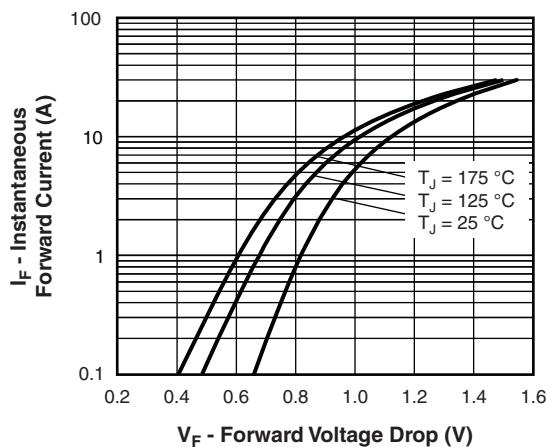


Fig. 1 - Typical Forward Voltage Drop Characteristics

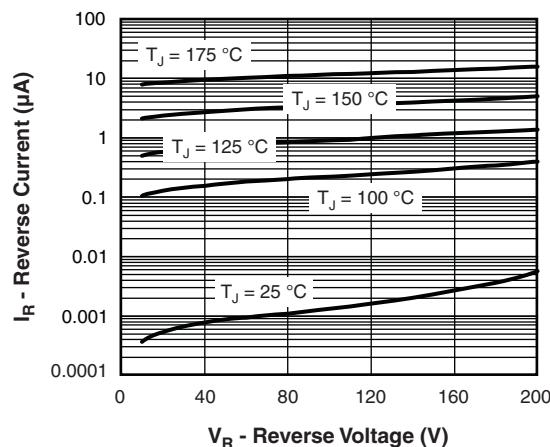


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

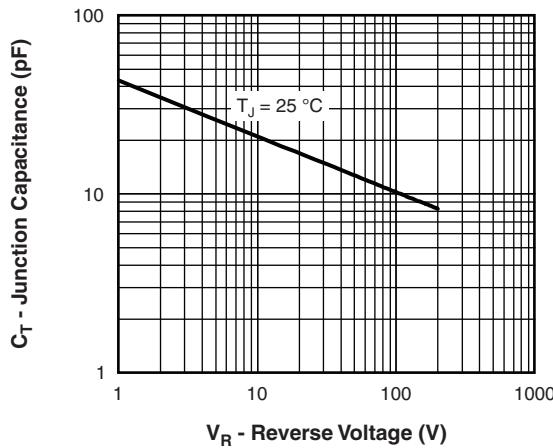


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

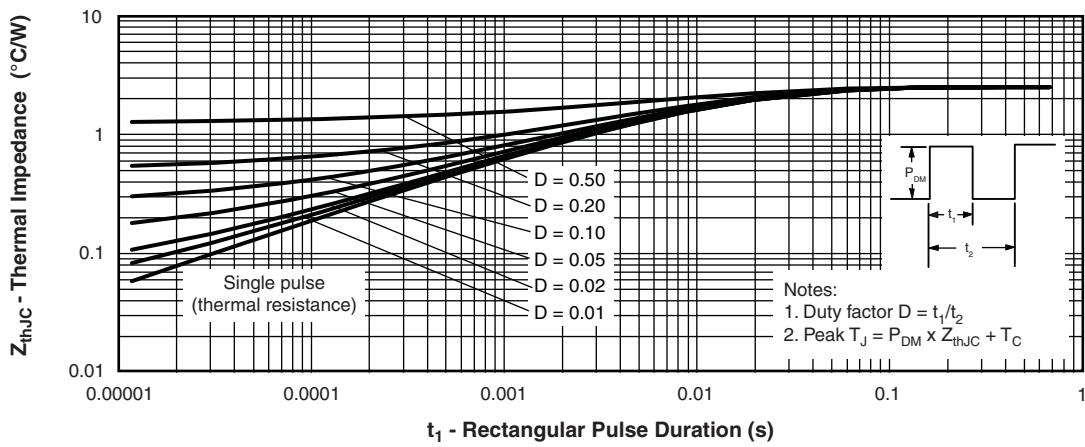


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

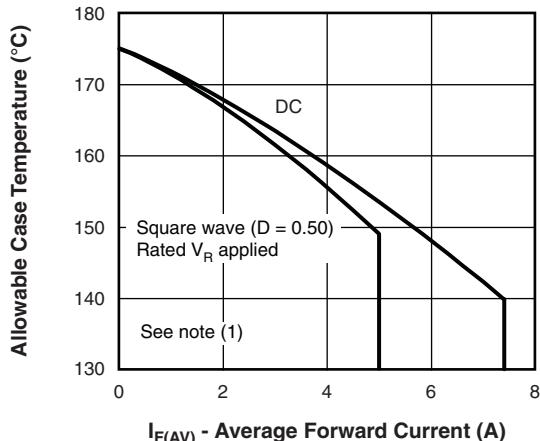


Fig. 5 - Maximum Allowable Case Temperature vs.  
Average Forward Current

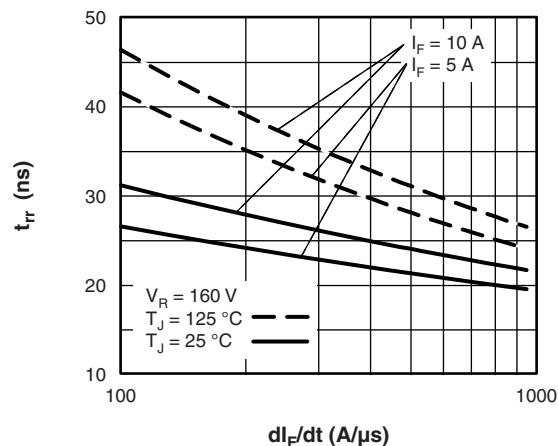


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$

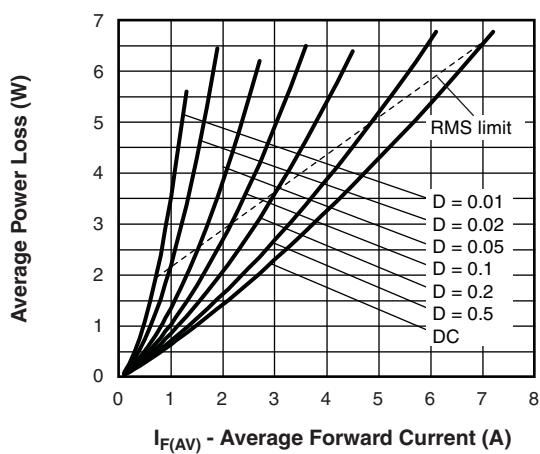


Fig. 6 - Forward Power Loss Characteristics

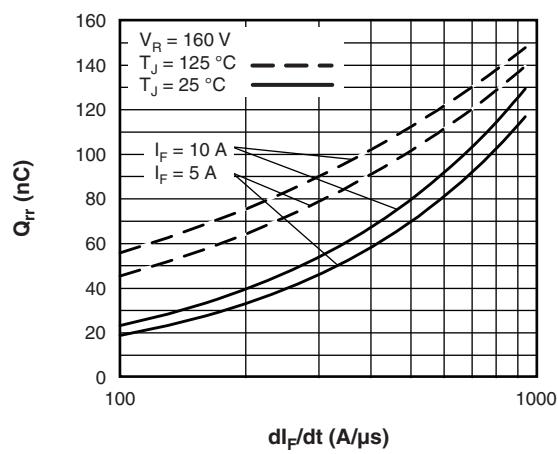


Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$

#### Note

<sup>(1)</sup> 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  $V_R$

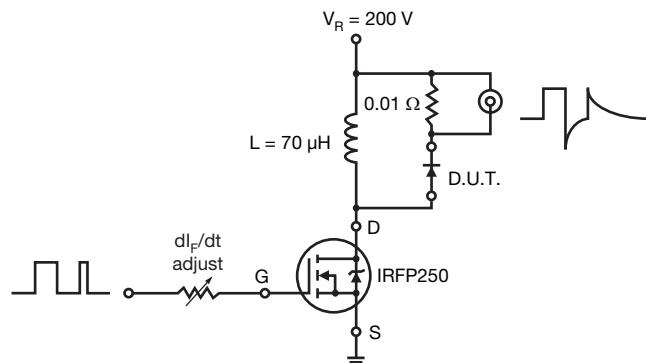
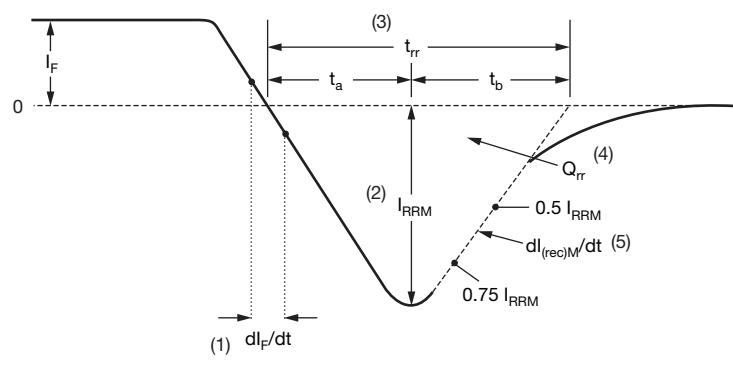


Fig. 9 - Reverse Recovery Parameter Test Circuit



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

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

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

(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.

(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	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<sup>2</sup>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)

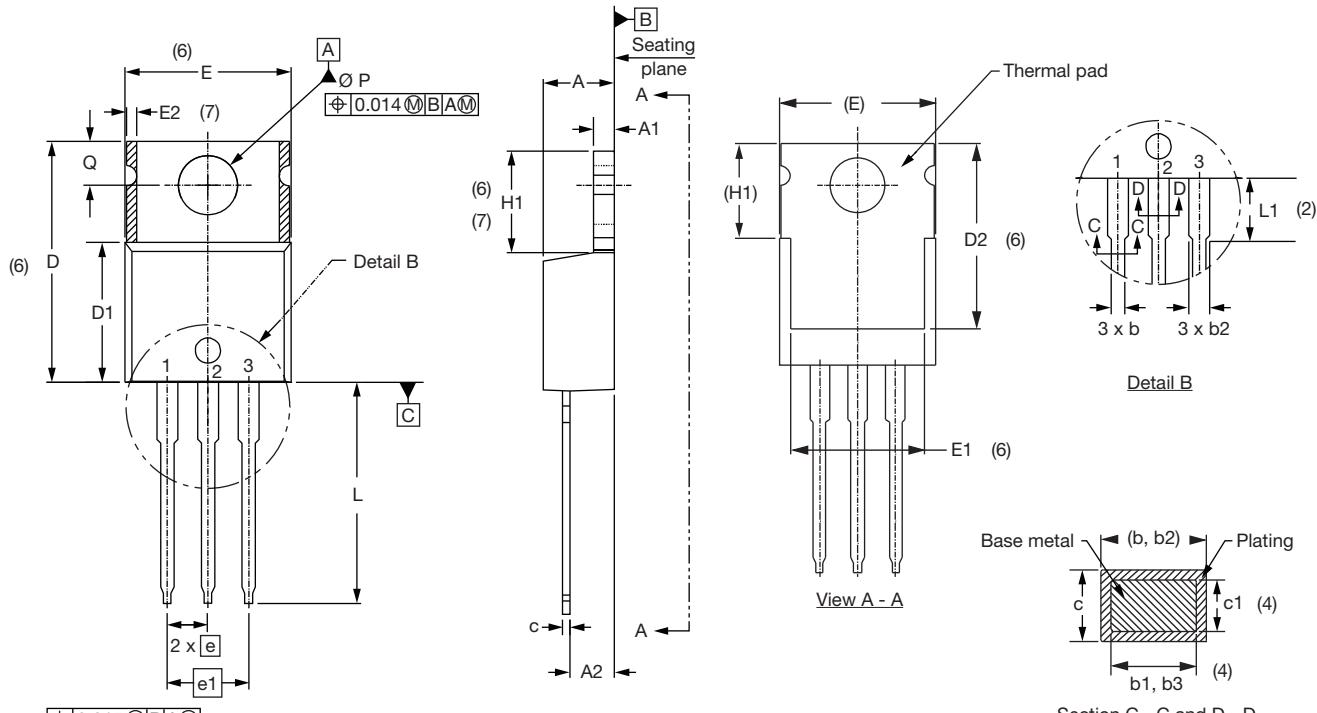
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MUR1020CTPbF	50	1000	Antistatic plastic tube
VS-MUR1020CT-N3	50	1000	Antistatic plastic tube

**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>	
Part marking information	TO-220ABPbF	<a href="http://www.vishay.com/doc?95225">www.vishay.com/doc?95225</a>
	TO-220AB-N3	<a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a>

### TO-220AB

#### DIMENSIONS in millimeters and inches

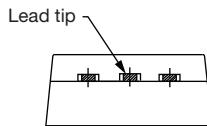


#### Lead assignments

##### Diodes

1. - Anode/open
2. - Cathode
3. - Anode

Conforms to JEDEC outline TO-220AB



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.56	2.92	0.101	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.25	0.585	0.600	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	12.88	0.460	0.507	6

#### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 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) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1

(7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed

(8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline

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