



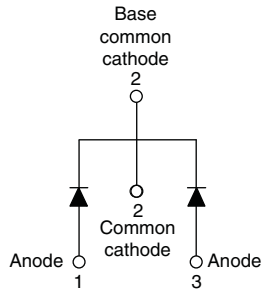
# VS-MUR1620CTPbF, VS-MUR1620CT-N3

KERSEMI

## Ultrafast Rectifier, 2 x 8 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)



### DESCRIPTION/APPLICATIONS

VS-MUR1620CTPbF 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-220AB
$I_{F(AV)}$	2 x 8 A
$V_R$	200 V
$V_F$ at $I_F$	0.975 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	8.0	A
		total device	16	
Non-repetitive peak surge current per leg	$I_{FSM}$	Rated $V_R$ , $T_C = 150$ °C	100	
Peak repetitive forward current per leg	$I_{FM}$	Rated $V_R$ , square wave, 20 kHz, $T_C = 150$ °C	16	
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	$V_{BR}, V_R$	$I_R = 100$ $\mu$ A	200	-	-	V
		$I_F = 8$ A	-	-	0.975	
Forward voltage	$V_F$	$I_F = 8$ A, $T_J = 150$ °C	-	-	0.895	
		$V_R = V_R$ rated	-	-	5	
Reverse leakage current	$I_R$	$T_J = 150$ °C, $V_R = V_R$ rated	-	-	250	$\mu$ A
			-	-	-	
Junction capacitance	$C_T$	$V_R = 200$ V	-	25	-	pF
Series inductance	$L_S$	Measured lead to lead 5 mm from package body	-	8.0	-	nH



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DYNAMIC RECOVERY CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 1.0 A, di <sub>F</sub> /dt = 50 A/μs, V <sub>R</sub> = 30 V	-	-	35	ns
		I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>REC</sub> = 0.25 A	-	-	25	
		T <sub>J</sub> = 25 °C	-	20	-	
		T <sub>J</sub> = 125 °C	-	34	-	
Peak recovery current	I <sub>RRM</sub>	T <sub>J</sub> = 25 °C	-	1.7	-	A
		T <sub>J</sub> = 125 °C	-	4.2	-	
Reverse recovery charge	Q <sub>rr</sub>	T <sub>J</sub> = 25 °C	-	23	-	nC
		T <sub>J</sub> = 125 °C	-	75	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		- 65	-	175	°C
Thermal resistance, junction to case per leg	R <sub>thJC</sub>		-	-	3.0	°C/W
Thermal resistance, junction to ambient per leg	R <sub>thJA</sub>		-	-	50	
Thermal resistance, case to heatsink	R <sub>thCS</sub>	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	MUR1620CT			



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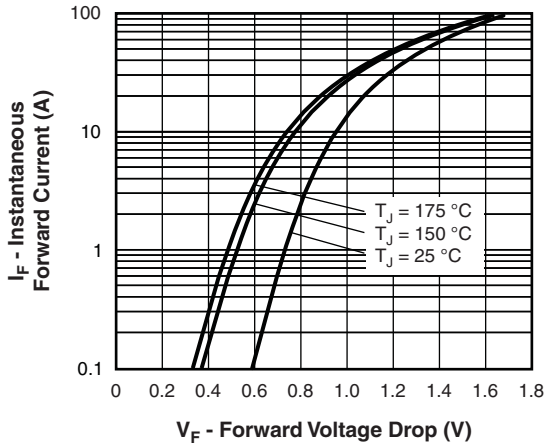


Fig. 1 - Typical Forward Voltage Drop Characteristics

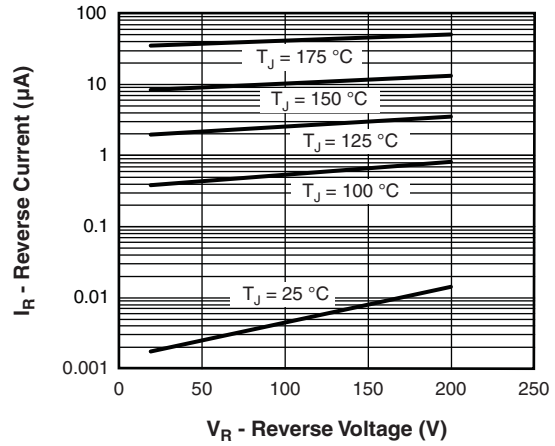


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

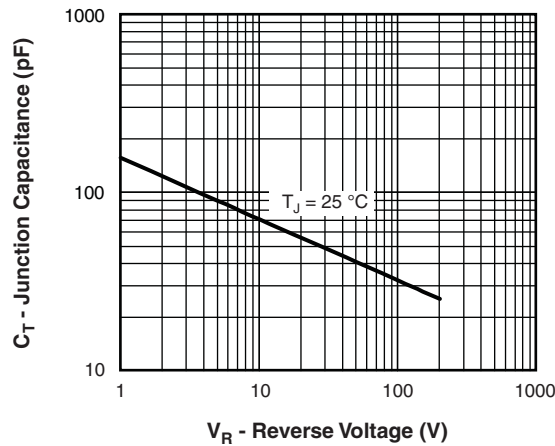


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

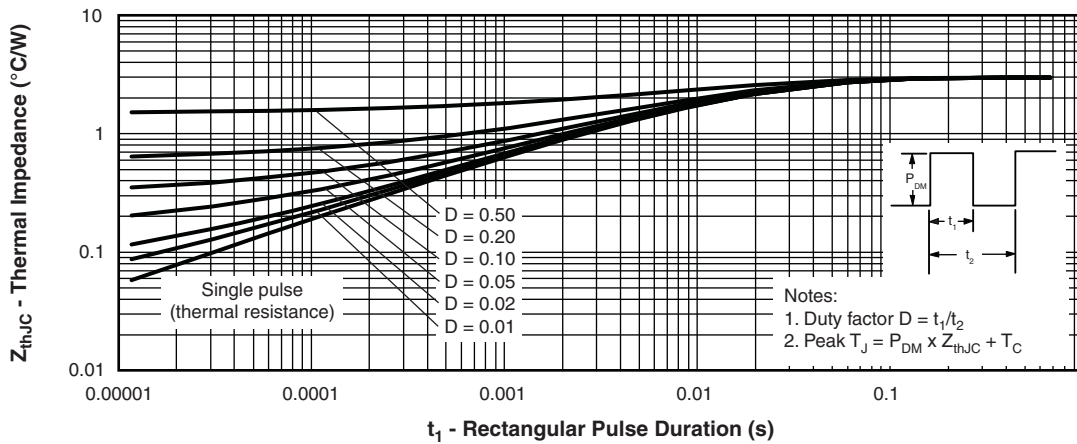


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics



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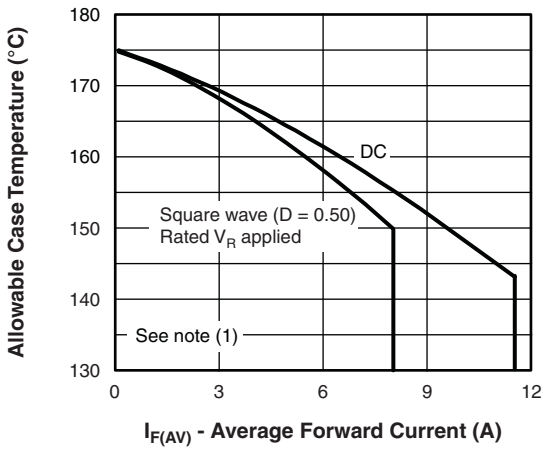


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

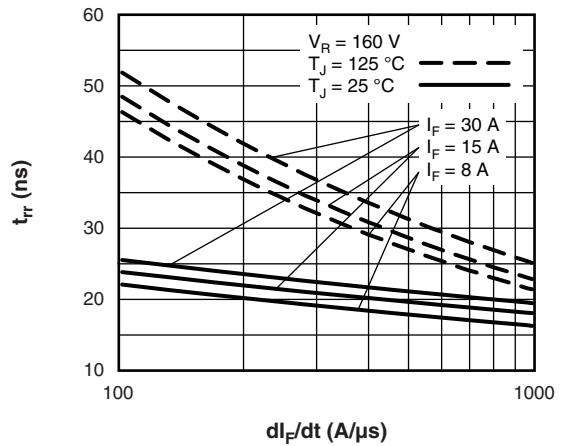


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

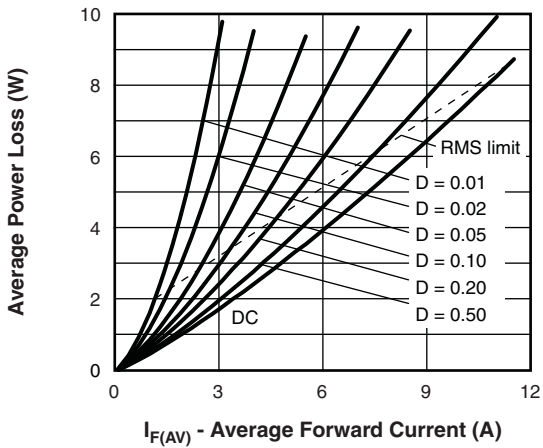


Fig. 6 - Forward Power Loss Characteristics

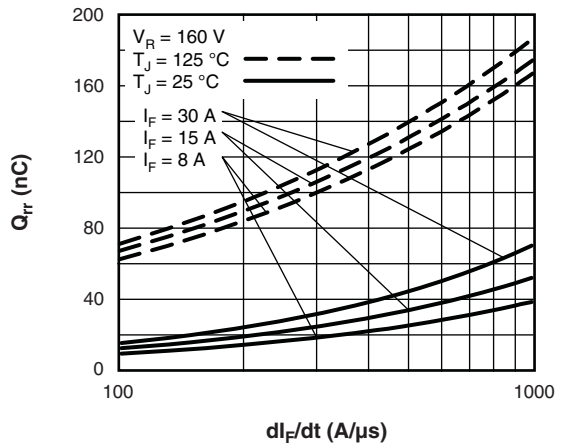


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

**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  $V_R$



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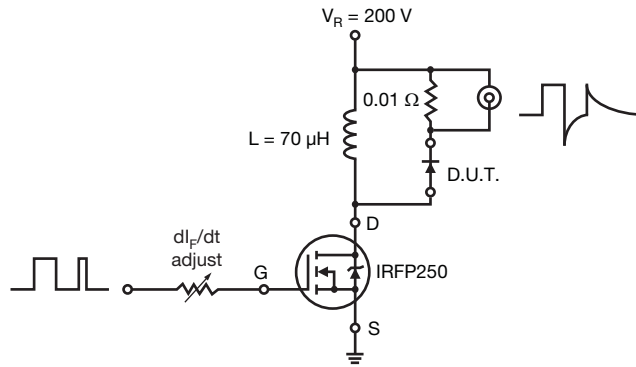
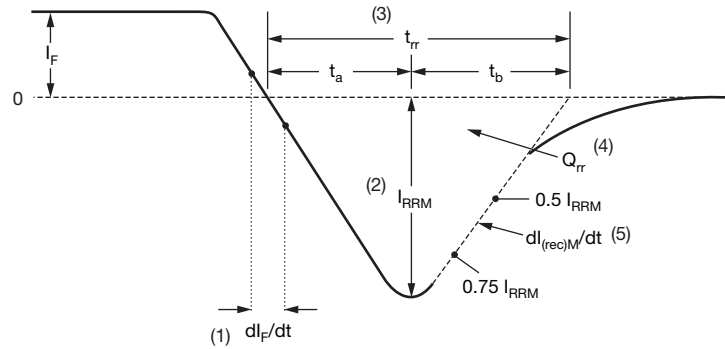


Fig. 9 - Reverse Recovery Parameter Test Circuit



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

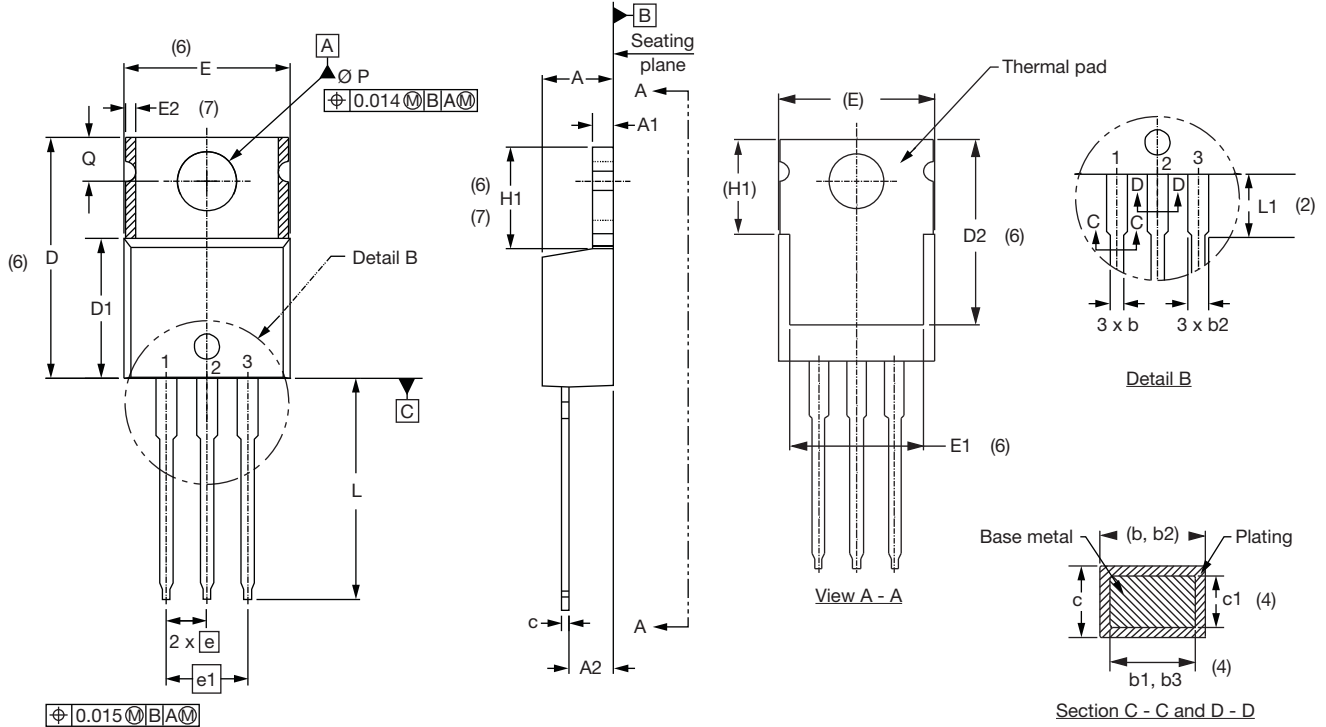


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# Outline Dimensions

## 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
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
E2	-	0.76	-	0.030	7
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6, 7
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
Ø P	3.54	3.73	0.139	0.147	
Q	2.60	3.00	0.102	0.118	
θ	90° to 93°		90° to 93°		