

## DAMPER + MODULATION DIODE FOR VIDEO

**Table 1: Main Product Characteristics**

	DAMPER	MODUL.
$I_{F(AV)}$	6 A	3 A
$V_{RRM}$	1500 V	600 V
$t_{rr} (\text{max})$	135 ns	50 ns
$V_F (\text{max})$	1.65V	1.4 V

### FEATURES AND BENEFITS

- Full kit in one package
- High breakdown voltage capability
- Very fast recovery diode
- Specified turn on switching characteristics
- Low static and peak forward voltage drop for low dissipation
- Insulated version:  
Insulated voltage = 2000 V<sub>RMS</sub>  
Capacitance = 7 pF
- Planar technology allowing high quality and best electrical characteristics
- Outstanding performance of well proven DTV as damper and new faster Turbo 2 600V technology as modulation

### DESCRIPTION

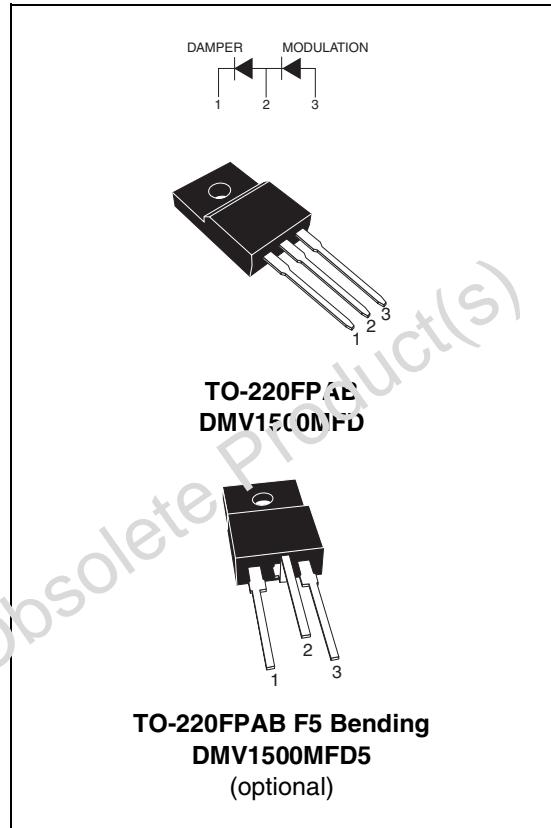
High voltage semiconductor especially designed for horizontal deflection stage in standard and high resolution video display with E/W correction.

The insulated TO-220FPAB package includes both the DAMPER diode and the MODULATION diode, thanks to a dedicated design.

Assembled on automated line, it offers very low dispersion values on insulating and thermal performances.

**Table 2: Order Codes**

Part Number	Marking
DMV1500MFD	DMV1500M
DMV1500MFD5	DMV1500M



## DMV1500M

**Table 3: Absolute Maximum Ratings**

Symbol	Parameter	Value		Unit
		Damper	Modul.	
$V_{RRM}$	Repetitive peak reverse voltage	1500	600	V
$I_{FSM}$	Surge non repetitive forward current $t_p = 10\text{ms}$ sinusoidal	75	35	A
$T_{stg}$	Storage temperature range	-40 to +150		$^{\circ}\text{C}$
$T_j$	Maximum operating junction temperature	150		$^{\circ}\text{C}$

**Table 4: Thermal Resistance**

Symbol	Parameter	Value		Unit
$R_{th(j-c)}$	Junction to case thermal resistance	3.7		$^{\circ}\text{C/W}$

**Table 5: Static Electrical Characteristics**

Symbol	Parameter	Test conditions		Value				Unit
				$T_j = 25^{\circ}\text{C}$		$T_j = 125^{\circ}\text{C}$		
		Typ.	Max.	Typ.	Max.	Typ.	Max.	
$I_R$ *	Reverse leakage current	Damper	$V_R = 1500 \text{ V}$		100	100	1000	$\mu\text{A}$
		Modulation	$V_R = 600 \text{ V}$		20	3	50	
$V_F$ **	Forward voltage drop	Damper	$I_F = 6 \text{ A}$	1.4	2.2	1.2	1.65	V
		Modulation	$I_F = 3 \text{ A}$		1.8	1.1	1.4	

Pulse test:

\*  $t_p = 5 \text{ ms}$ ,  $\delta < 2\%$

\*\*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the maximum conduction losses of the DAMPER and MODULATION diodes use the following equations :

$$\text{DAMPER: } P = 1.37 \times I_F(\text{AV}) + 0.047 \times I_F^2(\text{RMS})$$

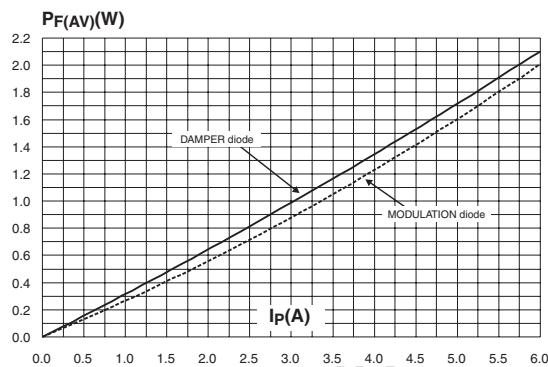
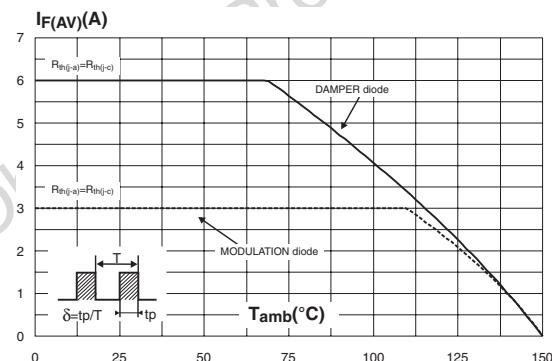
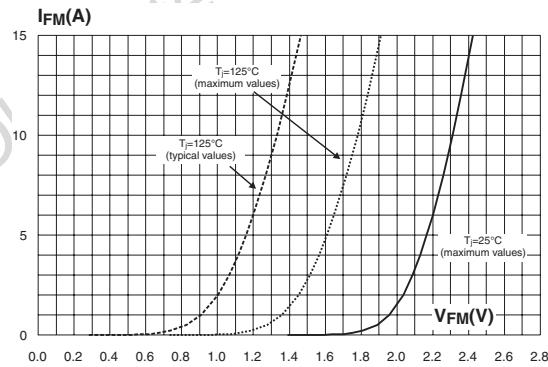
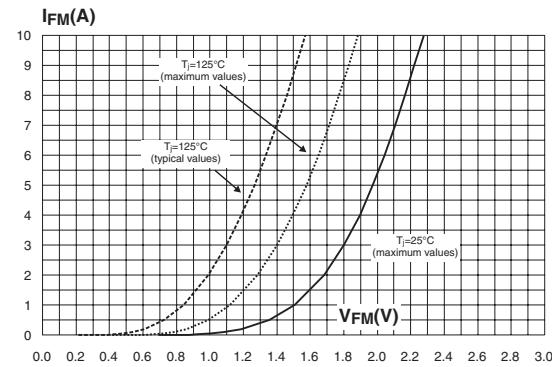
$$\text{MODULATION: } P = 1.12 \times I_F(\text{AV}) + 0.092 \times I_F^2(\text{RMS})$$

**Table 6: Recovery Characteristics**

Symbol	Parameter	Test conditions		Value				Unit
				Damper		Modul.		
		Typ.	Max.	Typ.	Max.	Typ.	Max.	
$t_{rr}$	Reverse recovery time	$I_F = 100\text{mA}$	$T_j = 25^{\circ}\text{C}$	750		110	350	ns
		$I_R = 100\text{mA}$						
		$I_{RR} = 10\text{mA}$						
		$I_F = 1\text{A}$						
		$dI_F/dt = -50 \text{ A}/\mu\text{s}$						
		$V_R = 30\text{V}$						
				110	135	35	50	

**Table 7: Turn-On Switching Characteristics**

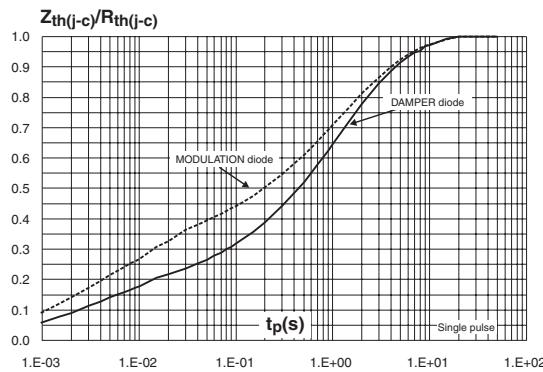
Symbol	Parameter	Test conditions			Value	Unit
			Typ.	Max.		
$t_{fr}$	Forward recovery time	Damper	$I_F = 6 \text{ A}$ $dI_F/dt = 80 \text{ A}/\mu\text{s}$ $V_{FR} = 3 \text{ V}$	$T_j = 100^\circ\text{C}$	570	ns
		Modul.	$I_F = 3 \text{ A}$ $dI_F/dt = 80 \text{ A}/\mu\text{s}$ $V_{FR} = 2 \text{ V}$	$T_j = 100^\circ\text{C}$	240	
$V_{FP}$	Peak forward voltage	Damper	$I_F = 6 \text{ A}$ $dI_F/dt = 80 \text{ A}/\mu\text{s}$	$T_j = 100^\circ\text{C}$	21	28
		Modul.	$I_F = 3 \text{ A}$ $dI_F/dt = 80 \text{ A}/\mu\text{s}$	$T_j = 100^\circ\text{C}$	8	V

**Figure 1: Power dissipation versus peak forward current (triangular waveform,  $\delta=0.45$ )****Figure 2: Average forward current versus ambient temperature****Figure 3: Forward voltage drop versus forward current (damper diode)****Figure 4: Forward voltage drop versus forward current (modulation diode)**

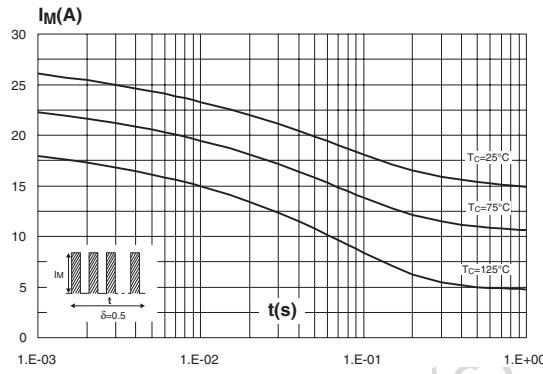
## DMV1500M

---

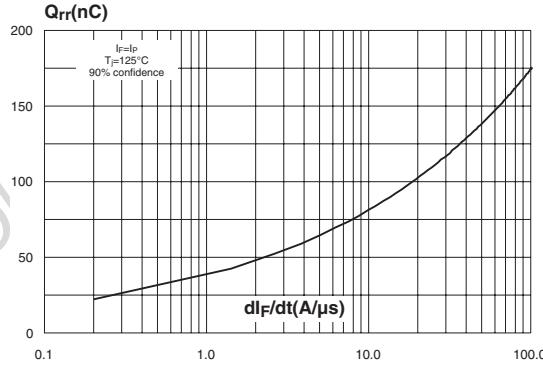
**Figure 5: Relative variation of thermal impedance junction to case versus pulse duration**



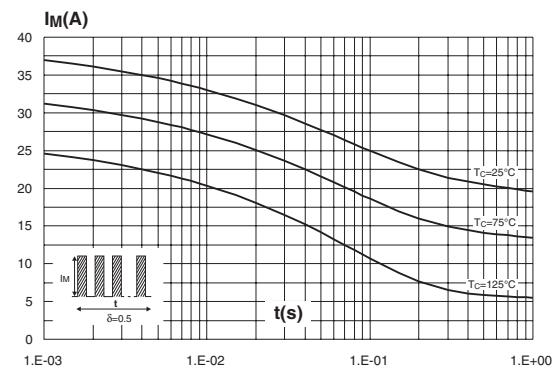
**Figure 7: Non repetitive peak forward current versus overload duration (modulation diode)**



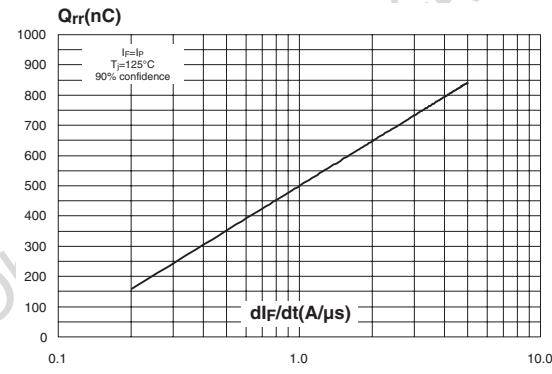
**Figure 9: Reverse recovery charges versus  $dI_F/dt$  (modulation diode)**



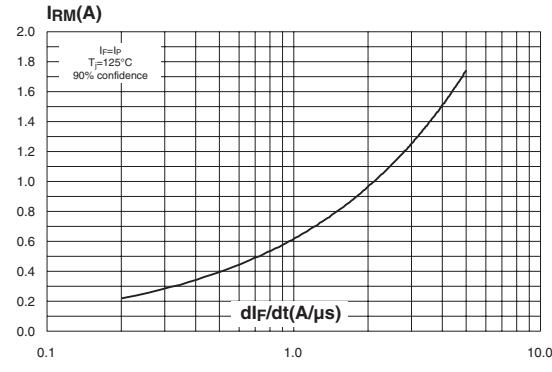
**Figure 6: Non repetitive peak forward current versus overload duration (damper diode)**



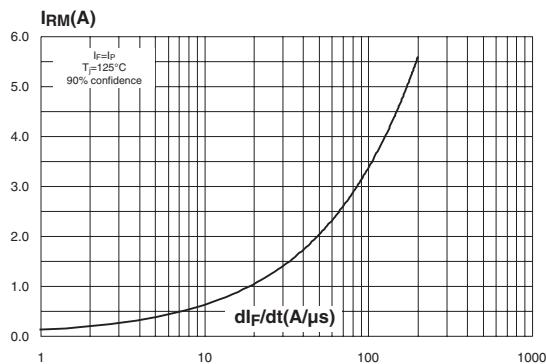
**Figure 8: Reverse recovery charges versus  $dI_F/dt$  (damper diode)**



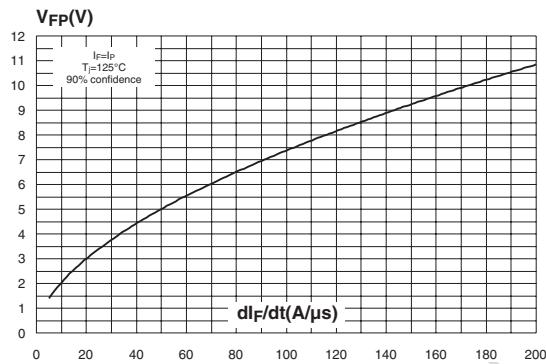
**Figure 10: Peak reverse recovery current versus  $dI_F/dt$  (damper diode)**



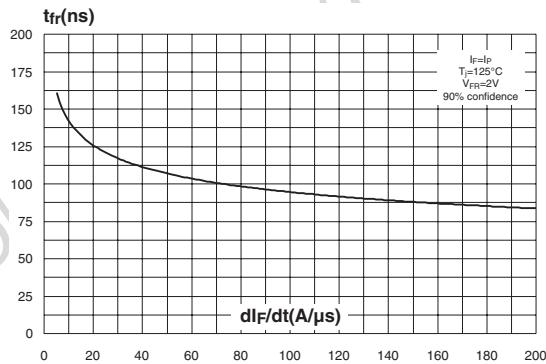
**Figure 11: Peak reverse recovery current versus  $dI_F/dt$  (modulation diode)**



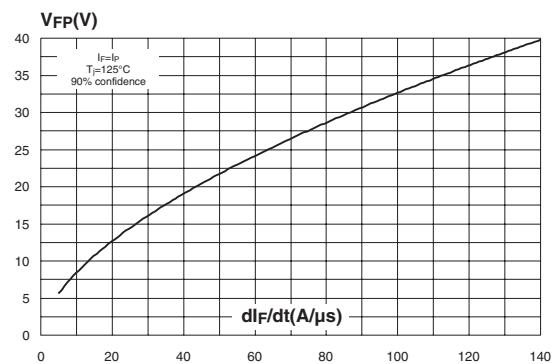
**Figure 13: Transient peak forward voltage versus  $dI_F/dt$  (modulation diode)**



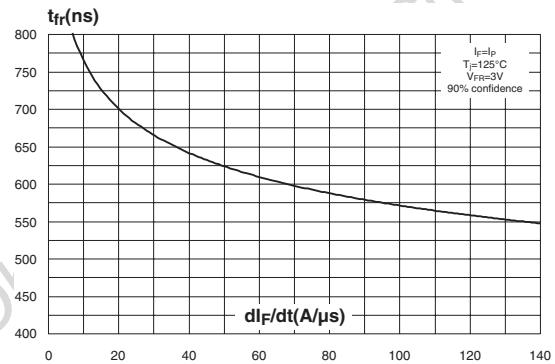
**Figure 15: Forward recovery time versus  $dI_F/dt$  (modulation diode)**



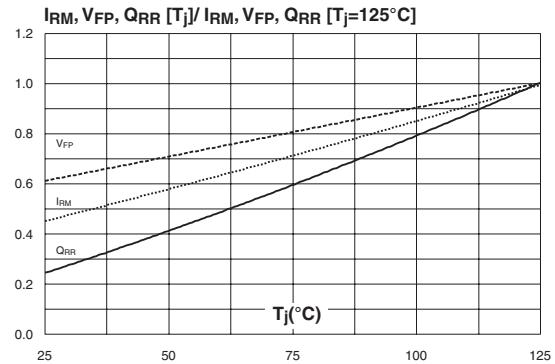
**Figure 12: Transient peak forward voltage versus  $dI_F/dt$  (damper diode)**



**Figure 14: Forward recovery time versus  $dI_F/dt$  (damper diode)**

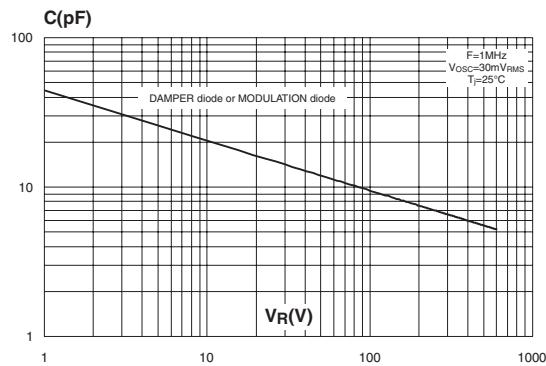


**Figure 16: Relative variation of dynamic parameters versus junction temperature**



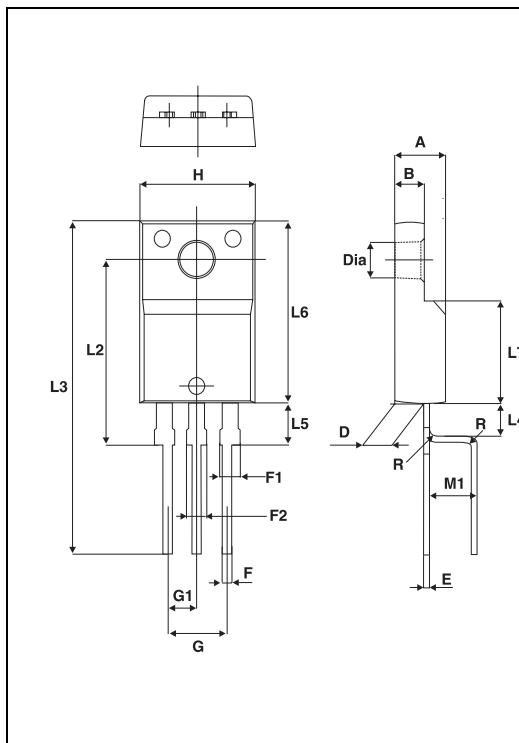
## DMV1500M

**Figure 17: Junction capacitance versus reverse voltage applied (typical values)**



**Figure 18: TO-220FPAB Package Mechanical Data**

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.9	0.173	0.192
B	2.5	2.9	0.098	0.114
D	2.45	2.75	0.096	0.108
E	0.4	0.7	0.016	0.027
F	0.6	1	0.024	0.039
F1	1.15	1.7	0.045	0.067
F2	1.15	1.7	0.045	0.067
G	4.95	5.2	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.7	0.393	0.421
L2	16 Typ.		0.630 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.7	0.385	0.421
L6	15.8	16.4	0.622	0.646
L7	9	9.9	0.354	0.390
Dia.	2.9	3.5	0.114	0.138

**Figure 19: TO-220FPAB F5 Bending (option) Package Mechanical Data**


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.9	0.173	0.192
B	2.5	2.9	0.098	0.114
D	2.45	2.75	0.096	0.108
E	0.4	0.7	0.016	0.027
F	0.6	1	0.024	0.039
F1	1.15	1.7	0.045	0.067
F2	1.15	1.7	0.045	0.067
G	4.95	5.2	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.7	0.393	0.421
L2	16 Typ.		0.630 Typ.	
L3	24.16	26.9	0.951	1.059
L4	1.65	2.41	0.065	0.095
L6	15.8	16.4	0.622	0.646
L7	9	9.9	0.354	0.390
M1	2.92	3.3	0.115	0.130
R	1.4 Typ.		0.055 Typ.	
Dia.	2.9	3.5	0.114	0.138

**Table 8: Ordering Information**

Part Number	Marking	Package	Weight	Base qty	Delivery mode
DMV1500MFD	DMV1500M	TO-220FPAB	2.4 g	50	Tube
DMV1500MFD5	DMV1500M	TO-220FPAB F5	2.4 g	45	Tube

**Table 9: Revision History**

Date	Revision	Description of Changes
07-Sep-2004	1	First issue

Obsolete Product(s) - Obsolete Product(s)

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.  
All other names are the property of their respective owners

© 2004 STMicroelectronics - All rights reserved

**STMicroelectronics group of companies**

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -  
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)