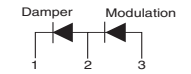
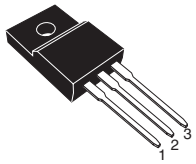
DMV1500SD

Damper + modulation diode for CRT TV

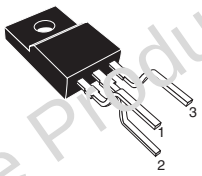
Features

- 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_{RMS}
  - Capacitance = 7 pF
- Planar technology allowing high quality and best electrical characteristics
- Outstanding performance of well proven DTV as damper and new faster Turbo 2 600 V technology as modulation





TO-220FPAB
DMV1500SDFD



TO-220FPAB FD6 bending
DMV1500SDFD6 (optional)

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 performanes.

Table 1. Device summary

Symbol	Damper	Modulation
$I_{F(AV)}$	6 A	6 A
I_{Fpeak} (max)	12 A	12 A
V_{RRM}	1500 V	600 V
t_{rr} (typ)	150 ns	60 ns
V_F (typ)	1.1 V	1.0 V
V_{FP} (typ)	26 V	5 V

1 Characteristics

Table 2. Absolute maximum ratings

Symbol	Parameter		Value		Unit
			Damper	Modulation	
V_{RRM}	Repetitive peak reverse voltage		1500	600	V
I_{Fpeak}	Peak working forward current	F = 56 kHz	12	12	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	50	50	A
T_{stg}	Storage temperature range		-40 to +150		°C
T_j	Maximum operating junction temperature		150		°C

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	4.0	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Value				Unit
				T_j = 25 °C		T_j = 125 °C		
				Typ.	Max.	Typ.	Max.	
I_R (1)	Reverse leakage current	**Damper**	V_R = 1500 V		100	100	1000	µA
		Modulation Modulation	V_R = 600 V		3	3	30	
V_F (2)	Forward voltage drop	**Damper**	I_F = 6 A	1.2	1.75	1.1	1.5	V
		Modulation	I_F = 6 A	1.15	1.4	1	1.25	

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the maximum conduction losses of the **damper** and **modulation** diodes use the following equations :

Damper: $P = 1.2 \times I_{F(AV)} + 0.050 \times I_F{}^2{}_{(RMS)}$

Modulation: $P = 0.89 \times I_{F(AV)} + 0.055 \times I_F{}^2{}_{(RMS)}$

Table 5. Recovery characteristics

Symbol	Parameter	Test conditions		Value				Unit
				Damper		Modulation		
				Typ.	Max.	Typ.	Max.	
t_{rr}	Reverse recovery time	I_F = 100 mA I_R =100 mA I_{RR} = 10 mA	T_j = 25 °C	1000	2000	250	400	ns
		I_F = 1 A dI_F/dt = -50 A/µs V_R = 30 V	T_j = 25 °C	150	250	60	85	

Table 6. Turn-on switching characteristics

Symbol	Parameter	Test conditions			Value		Unit
					Typ.	Max.	
t_{fr}	Forward recovery time	**Damper**	I_F = 6 A dI_F/dt = 80 A/µs V_{FR} = 3 V	T_j = 100 °C	350	500	ns
		Modulation	I_F = 6 A dI_F/dt = 80 A/µs V_{FR} = 2 V	T_j = 100 °C	85	125	
V_{FP}	Peak forward voltage	**Damper**	I_F = 6 A dI_F/dt = 80 A/µs	T_j = 100 °C	26	36	V
		Modulation	I_F = 6 A dI_F/dt = 80 A/µs	T_j = 100 °C	5	7.5	

Figure 1. Power dissipation vs. peak forward current (triangular waveform, δ = 0.45) (damper diode)

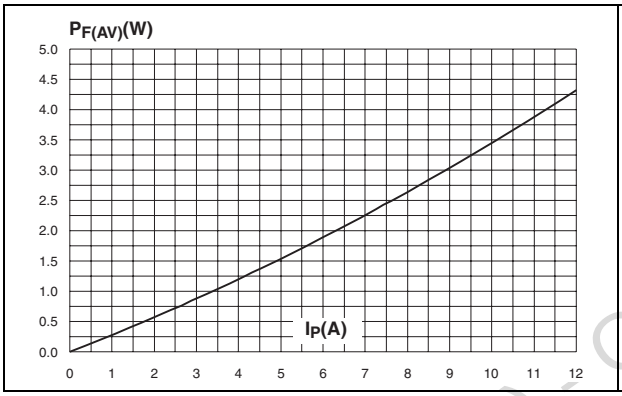


Figure 2. Power dissipation vs. peak forward current (triangular waveform, δ = 0.45) (modulation diode)

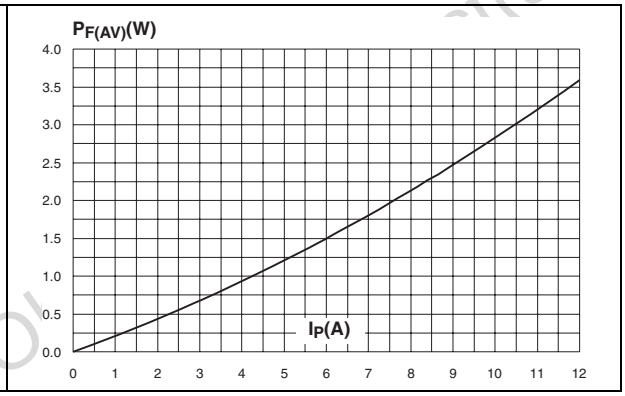


Figure 3. Average forward current vs. ambient temperature

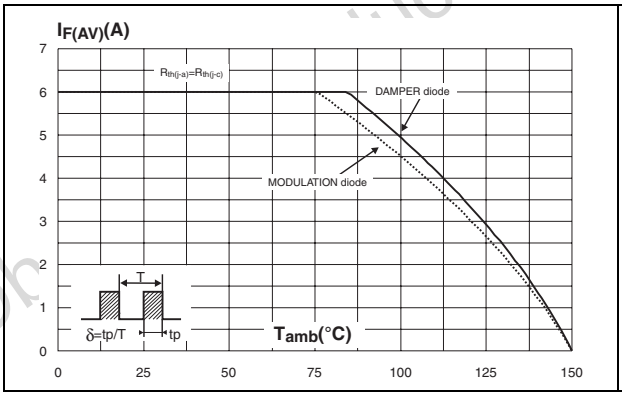


Figure 4. Forward voltage drop vs. forward current (damper diode)

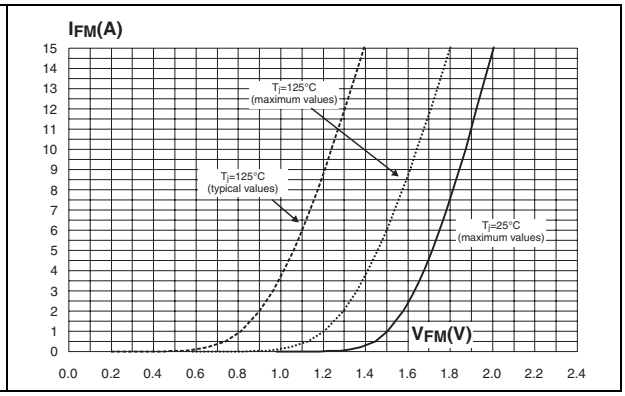


Figure 5. Forward voltage drop vs. forward current (modulation diode)

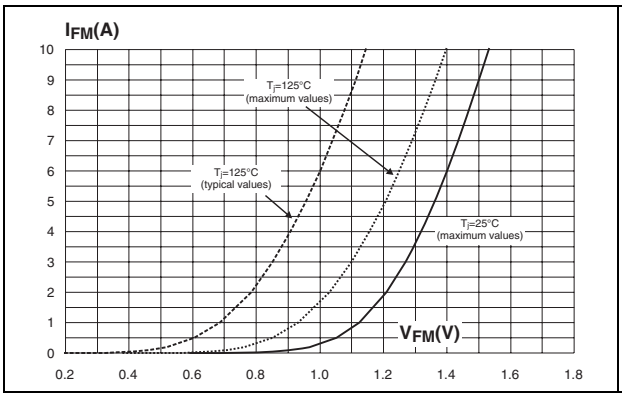


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

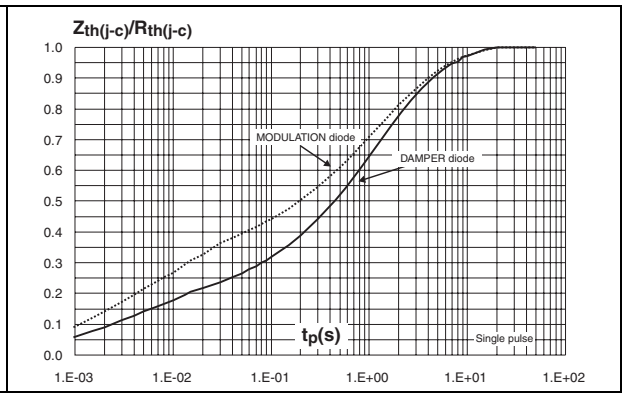


Figure 7. Reverse recovery charges vs. dI_F/dt (damper diode)

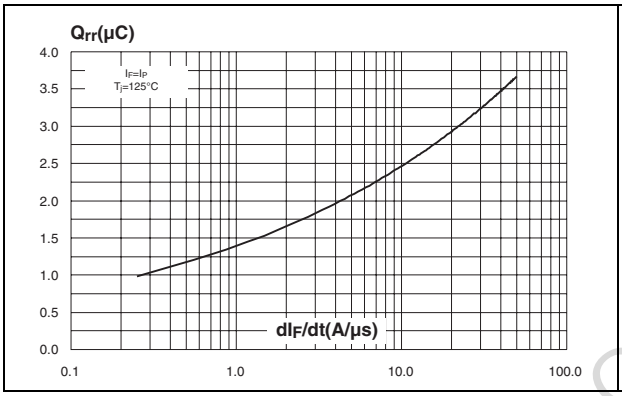


Figure 8. Reverse recovery charges vs. dI_F/dt (modulation diode)

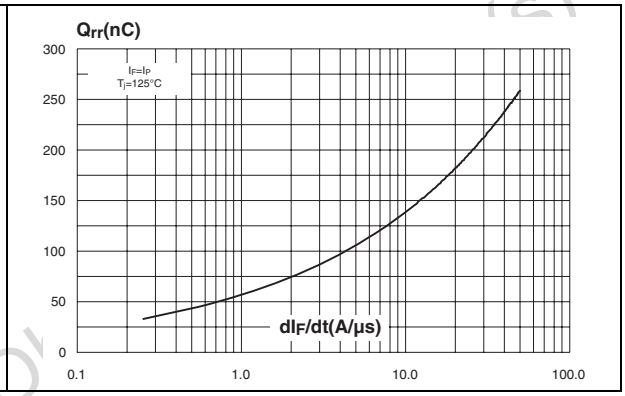


Figure 9. Peak reverse recovery current vs. dI_F/dt (damper diode)

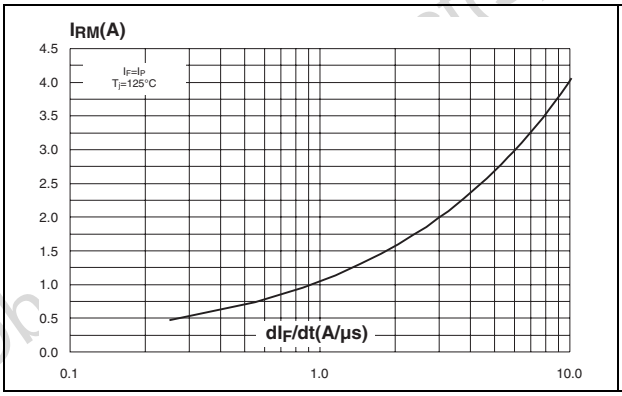


Figure 10. Peak reverse recovery current vs. dI_F/dt (modulation diode)

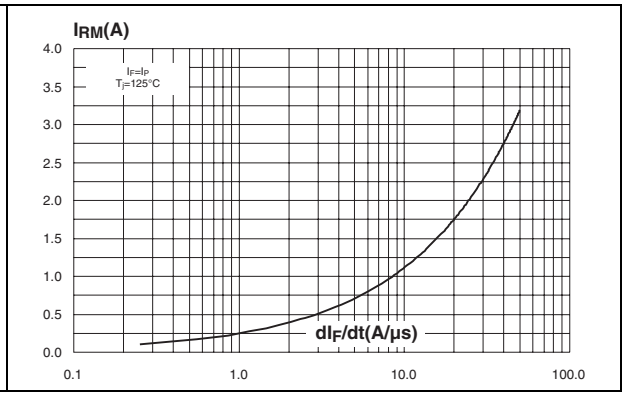


Figure 11. Transient peak forward voltage vs. dI_F/dt (damper diode, typical values)

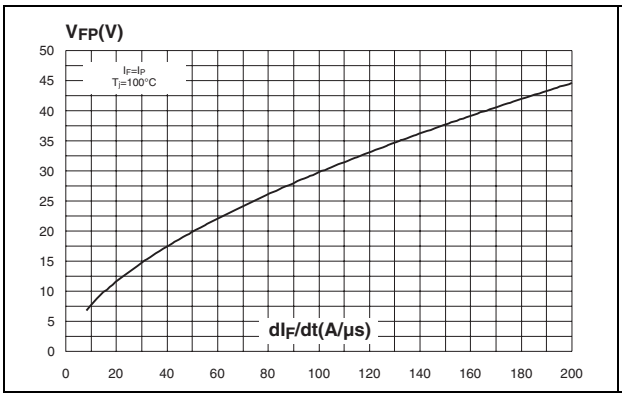


Figure 12. Transient peak forward voltage vs. dI_F/dt (modulation diode, typical values)

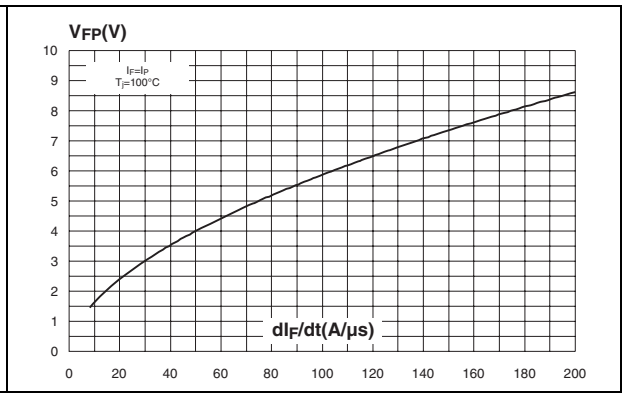


Figure 13. Forward recovery time vs. dI_F/dt (damper diode, typical values)

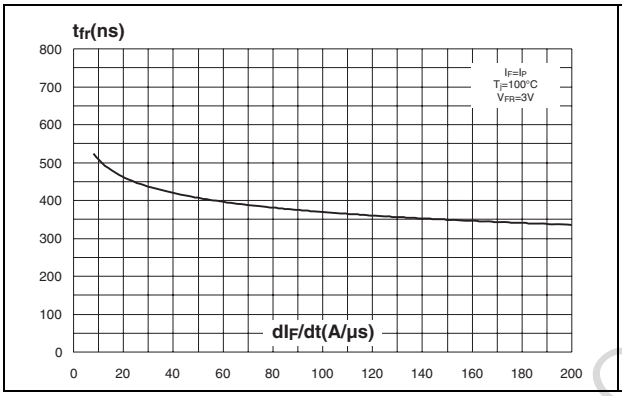


Figure 14. Forward recovery time vs. dI_F/dt (modulation diode, typical values)

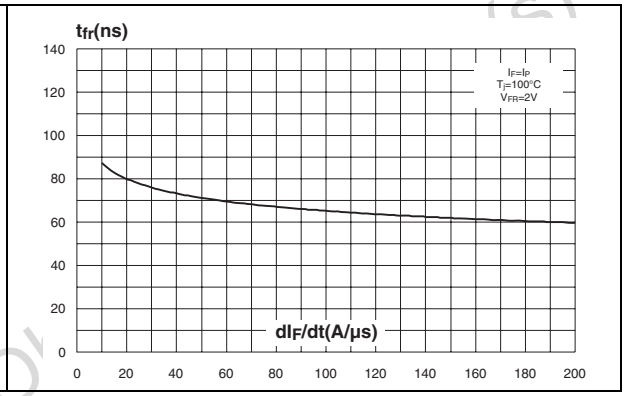


Figure 15. Relative variation of dynamic parameters vs. junction temperature

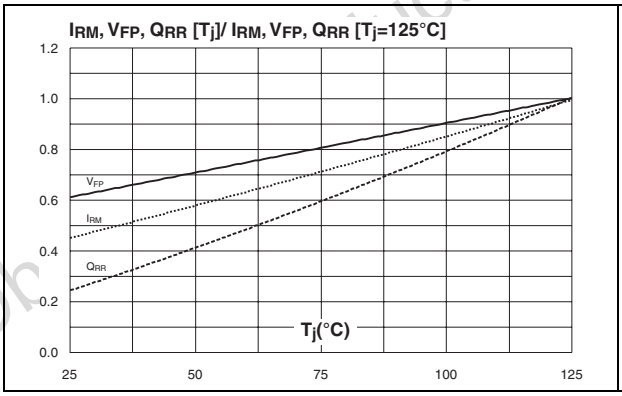
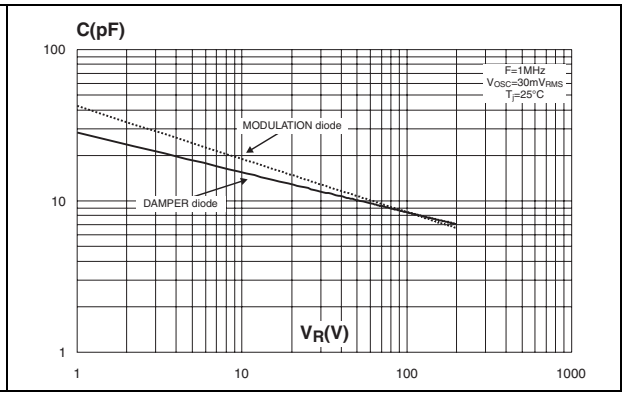


Figure 16. Junction capacitance vs. reverse voltage applied (typical values)

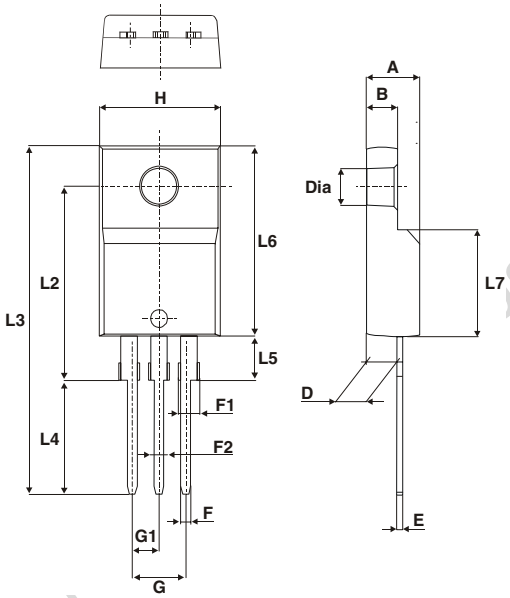


2 Package information

- Epoxy meets UL94,V0
- Recommended torque: 0.4 to 0.6 N·m

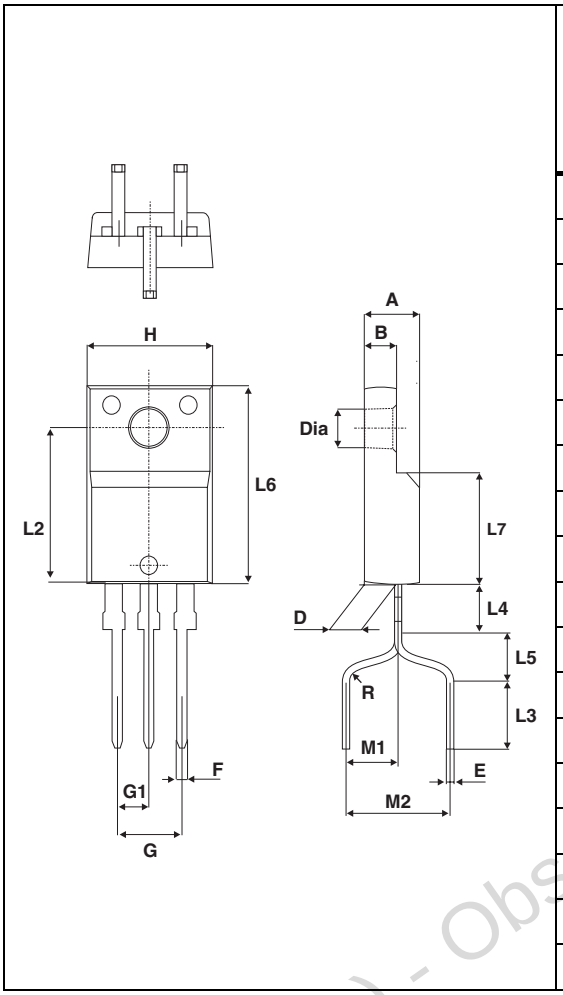
In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at *www.st.com*

Table 7. TO-220FPAB dimensions



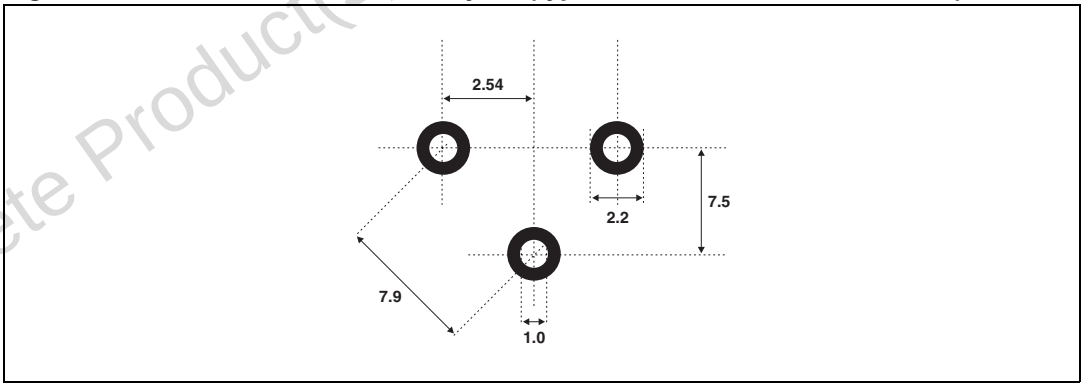
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.50	0.045	0.059
F2	1.15	1.50	0.045	0.059
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

Table 8. TO-220FPAB F6 dimensions



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	0.028
F	0.6	1	0.024	0.039
G	4.8	5.3	0.195	0.205
G1	2.2	2.95	0.094	0.106
H	10	10.7	0.394	0.421
L2	12.7	12.8	0.500	0.504
L3	4.8 Typ.		0.189 Typ.	
L4	3.4	4.8	0.150	0.165
L5	2.9 Typ.		0.114 Typ.	
L6	15.8	16.4	0.622	0.646
L7	9	9.9	0.354	0.390
M1	3.75 Typ.		0.148 Typ.	
M2	7	8	0.276	0.315
R	1 Typ.		0.039 Typ.	
Dia.	2.9	3.5	0.114	0.138

Figure 17. TO-220FPAB FD6 PCB layout (typical dimensions in millimeters)



3 Ordering information

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
DMV1500SDFD	DMV1500SD	TO-220FPAB	2.4 g	50	Tube
DMV1500SDFD6	DMV1500SD	TO-220FPAB FD6	2.4 g	45	Tube

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
25-Oct-2004	1	First issue
10-Dec-2004	2	TO-220FPAB FD6 package mechanical data changes: 1. Ref. G: from 4.95 - 5.2 mm to 4.8 - 5.3 mm 2. Ref. G1: from 2.4 - 2.7 mm to 2.2 - 2.95 mm 3. Ref. L4: from 3.8 - 4.2 mm to 3.4 - 4.8 mm 4. Ref L5 addition: 2.9 mm typ.
16-Mar-2005	3	I_{Fpeak} parameter included
02-Dec-2008	4	Reformatted to current standards. Updated ECOPACK statement. Updated dimension illustration for TO-220FPAB FD6 in *Table 8*.

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