

## DAMPER + MODULATION DIODE FOR VIDEO

**Table 1: Main Product Characteristics**

|                | DAMPER | MODUL. |
|----------------|--------|--------|
| $I_{F(AV)}$    | 4 A    | 3 A    |
| $V_{RRM}$      | 1500 V | 600 V  |
| $t_{rr} (max)$ | 170 ns | 50 ns  |
| $V_F (max)$    | 1.5V   | 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  |
|-------------|----------|
| DMV1500LFD  | DMV1500L |
| DMV1500LFD5 | DMV1500L |

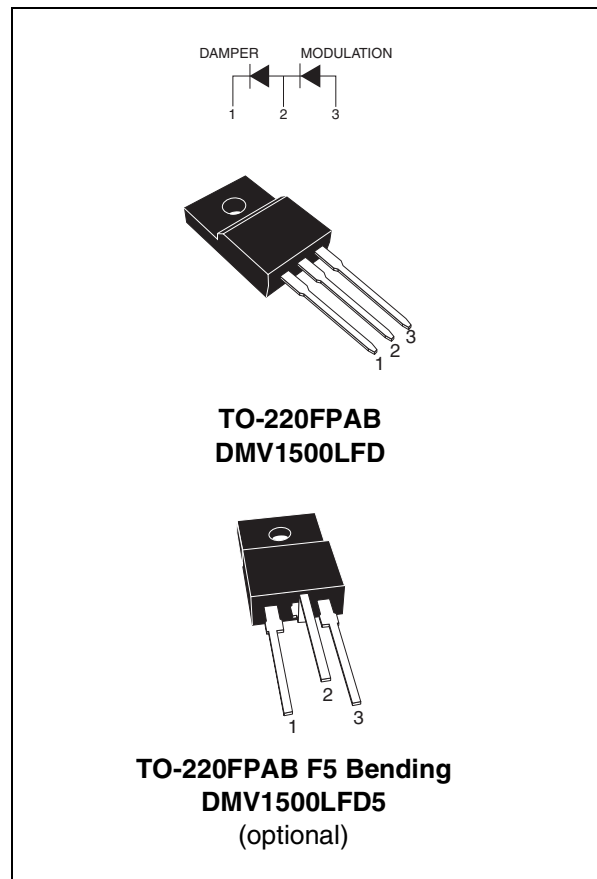


Table 3: Absolute Maximum Ratings

| Symbol    | Parameter                              | Value       |        | Unit |
|-----------|--|-------------|--------|------|
|           |  | Damper      | Modul. |      |
| $V_{RRM}$ | Repetitive peak reverse voltage        | 1500        | 600    | V    |
| $I_{FSM}$ | Surge non repetitive forward current   | 50          | 35     | A    |
| $T_{stg}$ | Storage temperature range              | -40 to +150 |        | °C   |
| $T_j$     | Maximum operating junction temperature | 150         |        | °C   |

Table 4: Thermal Resistance

| Symbol        | Parameter                           | Value | Unit |
|---------------|-------------------------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case thermal resistance | 4.0   | °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. |      |               |
| $I_R^*$    | Reverse leakage current | Damper          | $V_R = 1500\text{ V}$    |      | 100                       | 100  | 1000 | $\mu\text{A}$ |
|            |                         | Modul.          | $V_R = 600\text{ V}$     |      | 20                        | 3    | 50   |               |
| $V_F^{**}$ | Forward voltage drop    | Damper          | $I_F = 4\text{ A}$       | 1.2  | 1.7                       | 1.1  | 1.5  | V             |
|            |                         | Modul.          | $I_F = 3\text{ A}$       |      | 1.8                       | 1.1  | 1.4  |               |

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

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

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

**DAMPER:**  $P = 1.2 \times I_{F(AV)} + 0.075 \times I_F^2(\text{RMS})$

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

Table 6: Recovery Characteristics

| Symbol   | Parameter             | Test conditions   | Value                    |      |        |      | Unit |    |
|----------|-----------------------|---|--------------------------|------|--------|------|------|----|
|          |                       |   | Damper                   |      | Modul. |      |      |    |
|          |                       |   | Typ.                     | Max. | Typ.   | Max. |      |    |
| $t_{rr}$ | Reverse recovery time | $I_F = 100\text{ mA}$<br>$I_R = 100\text{ mA}$<br>$I_{RR} = 10\text{ mA}$         | $T_j = 25^\circ\text{C}$ | 850  |        | 110  | 350  | ns |
|          |                       | $I_F = 1\text{ A}$<br>$dI_F/dt = -50\text{ A}/\mu\text{s}$<br>$V_R = 30\text{ V}$ | $T_j = 25^\circ\text{C}$ | 130  | 170    | 35   | 50   |    |

Table 7: Turn-On Switching Characteristics

| Symbol   | Parameter             | Test conditions |  |                           | Value |      | Unit |
|----------|-----------------------|-----------------|--|---------------------------|-------|------|------|
|          |                       |                 |  |                           | Typ.  | Max. |      |
| $t_{fr}$ | Forward recovery time | Damper          | $I_F = 4\text{ A}$<br>$di_F/dt = 80\text{ A}/\mu\text{s}$<br>$V_{FR} = 3\text{ V}$   | $T_j = 100^\circ\text{C}$ |       | 450  | ns   |
|          |                       |                 | $I_F = 6.5\text{ A}$<br>$di_F/dt = 50\text{ A}/\mu\text{s}$<br>$V_{FR} = 3\text{ V}$ | $T_j = 25^\circ\text{C}$  |       | 450  |      |
|          |                       | Modul.          | $I_F = 3\text{ A}$<br>$di_F/dt = 80\text{ A}/\mu\text{s}$<br>$V_{FR} = 2\text{ V}$   | $T_j = 100^\circ\text{C}$ |       | 240  |      |
| $V_{FP}$ | Peak forward voltage  | Damper          | $I_F = 4\text{ A}$<br>$di_F/dt = 80\text{ A}/\mu\text{s}$                            | $T_j = 100^\circ\text{C}$ | 28    | 36   | V    |
|          |                       |                 | $I_F = 6.5\text{ A}$<br>$di_F/dt = 50\text{ A}/\mu\text{s}$                          | $T_j = 25^\circ\text{C}$  | 13    | 17   |      |
|          |                       | Modul.          | $I_F = 3\text{ A}$<br>$di_F/dt = 80\text{ A}/\mu\text{s}$                            | $T_j = 100^\circ\text{C}$ |       | 8    |      |

Figure 1: Power dissipation versus peak forward current (triangular waveform,  $\delta=0.45$ )

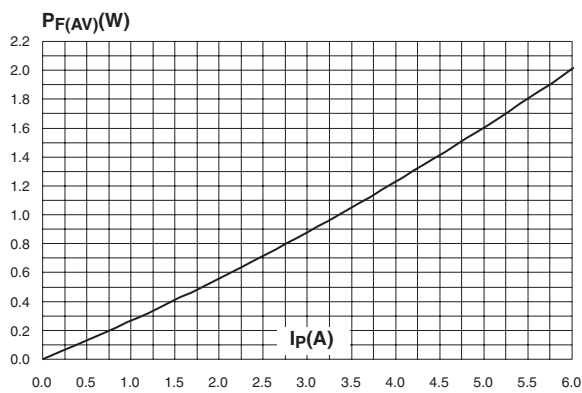
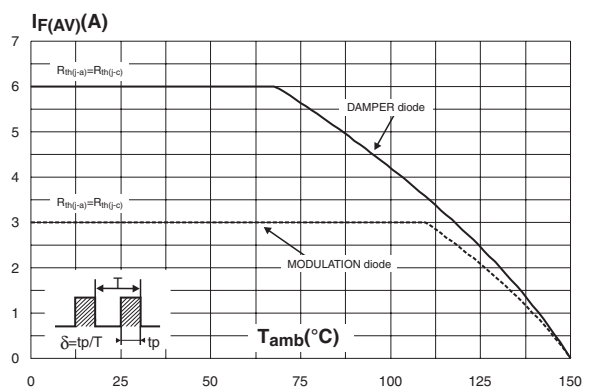
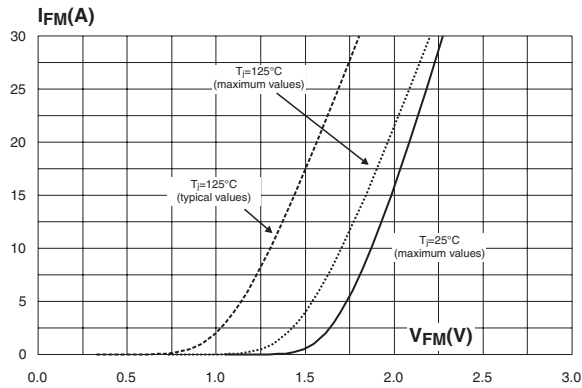


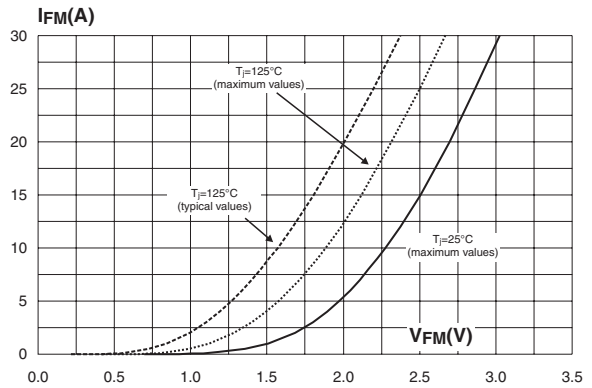
Figure 2: Average forward current versus ambient temperature



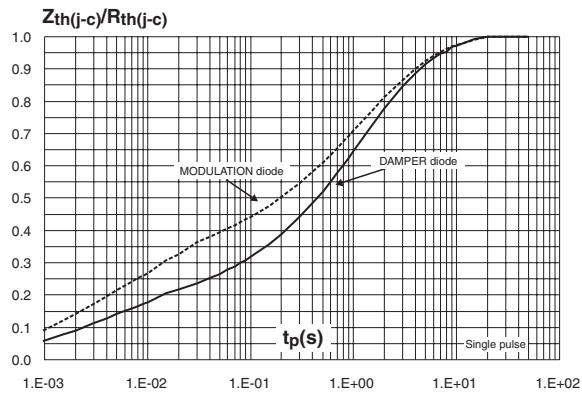
**Figure 3: Forward voltage drop versus forward current (damper diode)**



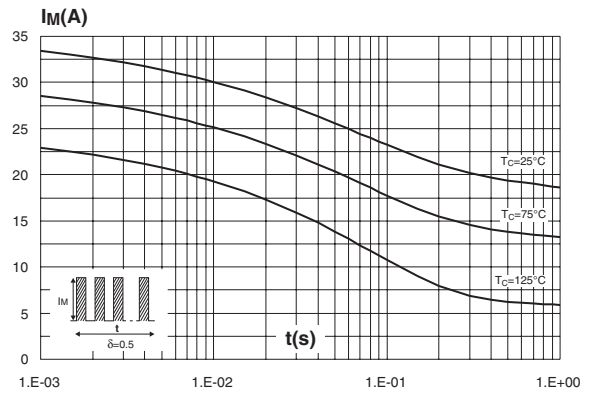
**Figure 4: Forward voltage drop versus forward current (modulation diode)**



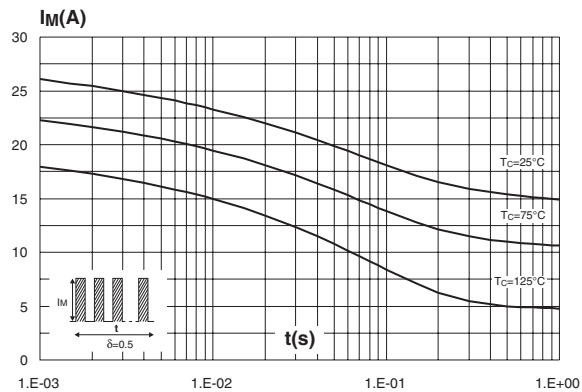
**Figure 5: Relative variation of thermal impedance junction to case versus pulse duration**



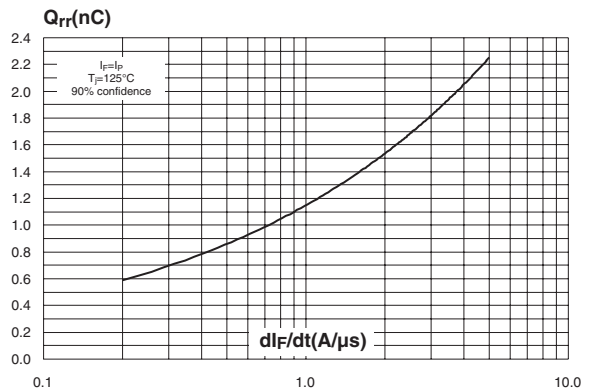
**Figure 6: Non repetitive peak forward current versus overload duration (damper diode)**



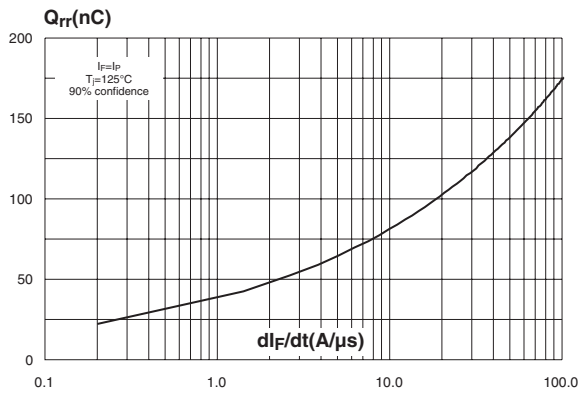
**Figure 7: Non repetitive peak forward current versus overload duration (modulation diode)**



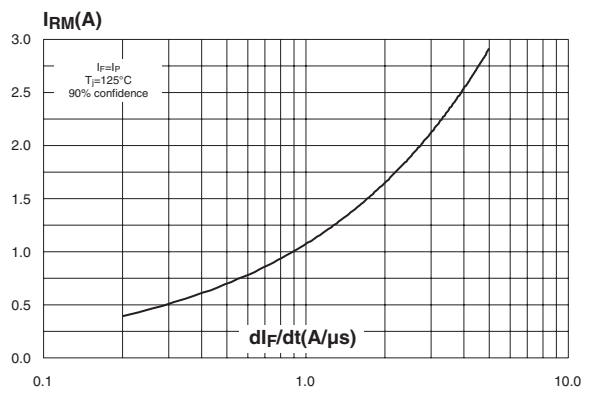
**Figure 8: Reverse recovery charges versus di/dt (damper diode)**



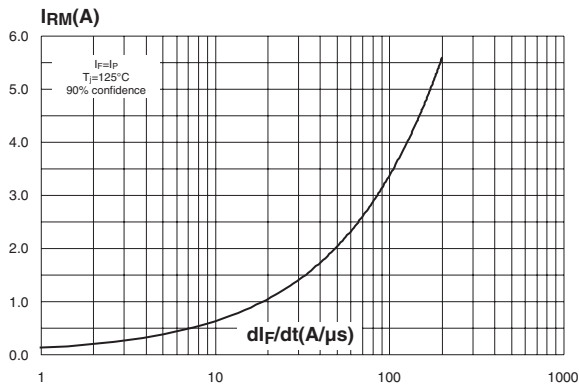
**Figure 9: Reverse recovery charges versus  $di_F/dt$  (modulation diode)**



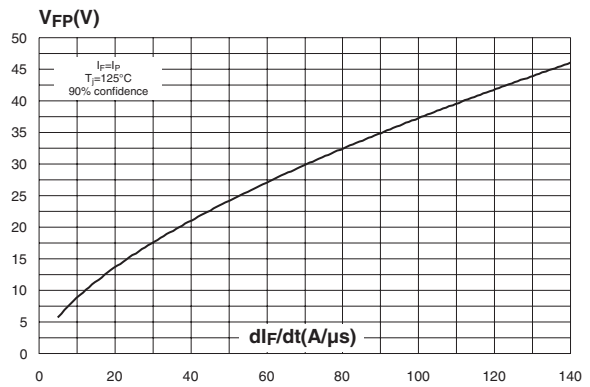
**Figure 10: Peak reverse recovery current versus  $di_F/dt$  (damper diode)**



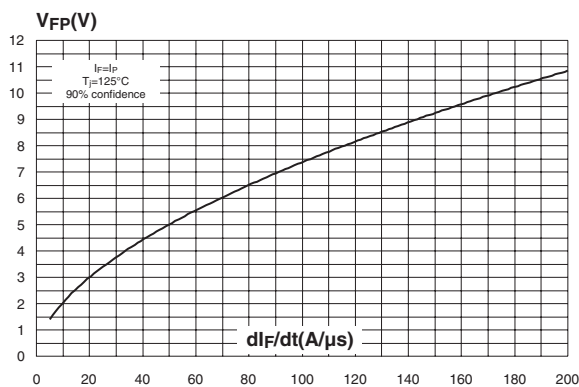
**Figure 11: Peak reverse recovery current versus  $di_F/dt$  (modulation diode)**



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



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



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

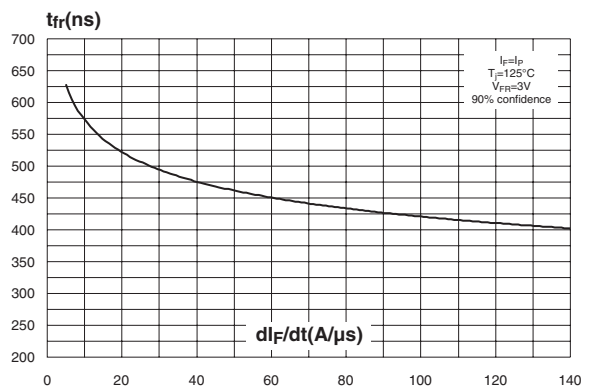


Figure 15: Forward recovery time versus  $di_F/dt$  (modulation diode)

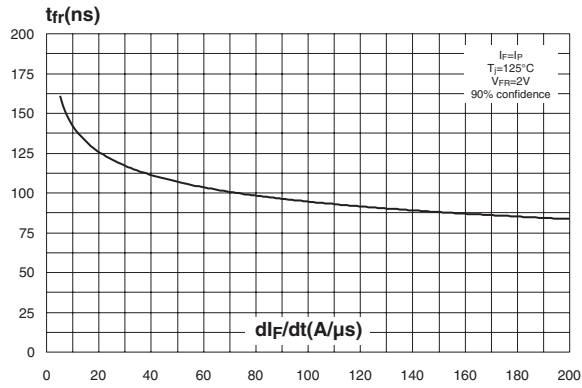


Figure 16: Relative variation of dynamic parameters versus junction temperature

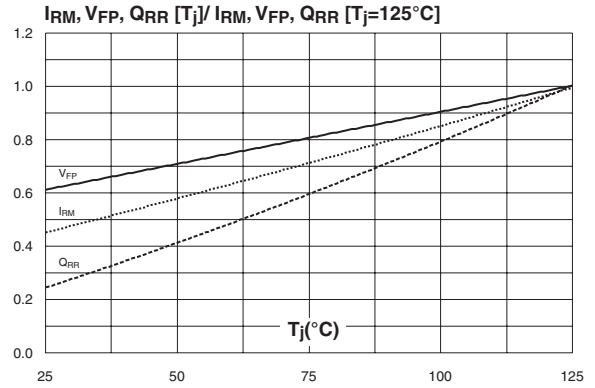


Figure 17: Junction capacitance versus reverse voltage applied (typical values)

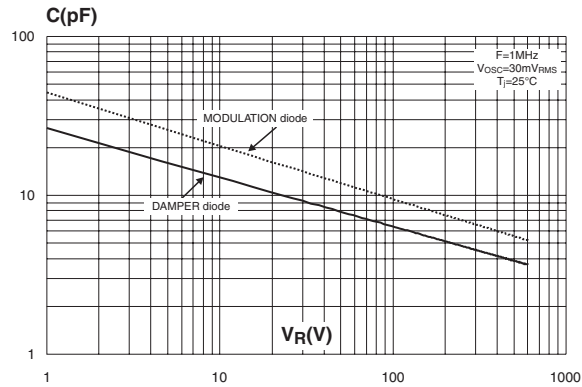


Figure 18: TO-220FPAB Package Mechanical Data

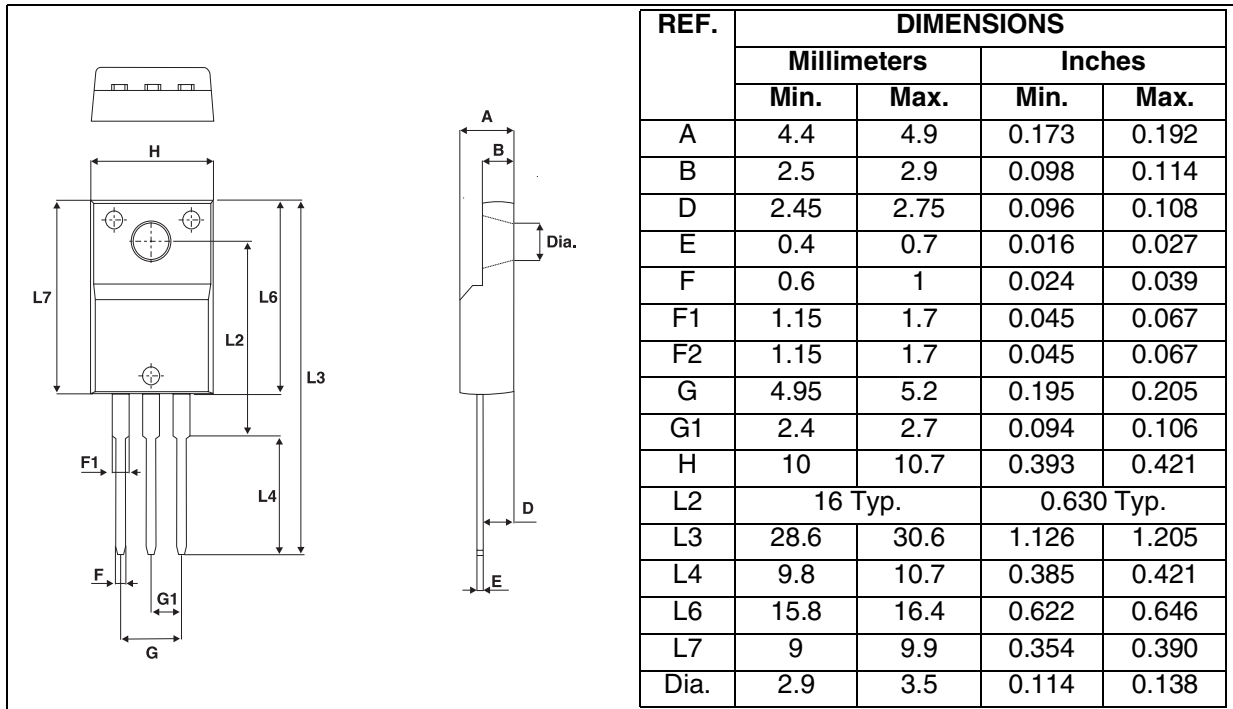


Figure 19: TO-220FPAB F5 Bending (option) Package Mechanical Data

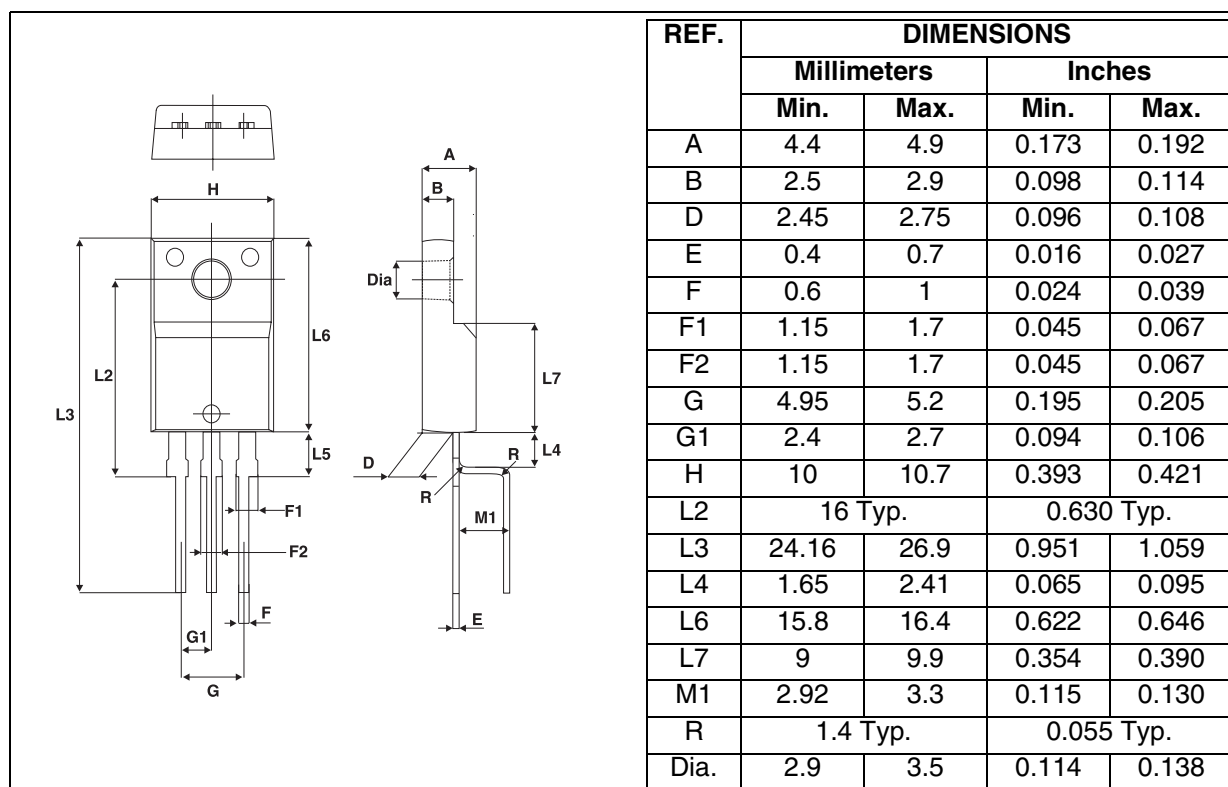


Table 8: Ordering Information

| Part Number | Marking  | Package       | Weight | Base qty | Delivery mode |
|-------------|----------|---------------|--------|----------|---------------|
| DMV1500LFD  | DMV1500L | TO-220FPAB    | 2.4 g  | 50       | Tube          |
| DMV1500LFD5 | DMV1500L | TO-220FPAB F5 | 2.4 g  | 45       | Tube          |

Table 9: Revision History

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



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