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J175 / J176 / MMBFJ175 / MMBFJ176 / MMBFJ177
P-Channel Switch

Description
This device is designed for low-level analog switching sample-and-hold circuits and chopper-stabilized amplifiers. Sourced from process 88.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Marking</th>
<th>Package</th>
<th>Packing Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>J175_D26Z</td>
<td>J175</td>
<td>TO-92 3L</td>
<td>Tape and Reel</td>
</tr>
<tr>
<td>J176_D74Z</td>
<td>J176</td>
<td>TO-92 3L</td>
<td>Ammo</td>
</tr>
<tr>
<td>MMBFJ175</td>
<td>6W</td>
<td>SOT-23 3L</td>
<td>Tape and Reel</td>
</tr>
<tr>
<td>MMBFJ176</td>
<td>6X</td>
<td>SOT-23 3L</td>
<td>Tape and Reel</td>
</tr>
<tr>
<td>MMBFJ177</td>
<td>6Y</td>
<td>SOT-23 3L</td>
<td>Tape and Reel</td>
</tr>
</tbody>
</table>

Figure 1. J175 / J176 Device Package
Figure 2. MMBFJ175 / 176 / 177 Device Package

Note: Source & drain are interchangeable.
Absolute Maximum Ratings\(^{(1),(2)}\)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at \(T_A = 25\)°C unless otherwise noted.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(V_{DG})</td>
<td>Drain-Gate Voltage</td>
<td>-30</td>
<td>V</td>
</tr>
<tr>
<td>(V_{GS})</td>
<td>Gate-Source Voltage</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>(I_{GF})</td>
<td>Forward Gate Current</td>
<td>50</td>
<td>mA</td>
</tr>
<tr>
<td>(T_{J, STG})</td>
<td>Operating and Storage Junction Temperature Range</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Notes:
1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty cycle operations.

Thermal Characteristics
Values are at \(T_A = 25\)°C unless otherwise noted.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Max. (J175 / J176) (3)</th>
<th>Max. (MMBFJ175 / MMBFJ176 / MMBFJ177) (3)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P_D)</td>
<td>Total Device Dissipation</td>
<td>350</td>
<td>225</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>Derate Above 25°C</td>
<td>2.8</td>
<td>1.8</td>
<td>mW/°C</td>
</tr>
<tr>
<td>(R_{J, JC})</td>
<td>Thermal Resistance, Junction to Case</td>
<td>125</td>
<td></td>
<td>°C/W</td>
</tr>
<tr>
<td>(R_{J, JA})</td>
<td>Thermal Resistance, Junction to Ambient</td>
<td>357</td>
<td>556</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

Note:
3. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.
## Electrical Characteristics

Values are at $T_A = 25^\circ$C unless otherwise noted.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{\text{BR}}$</td>
<td>Gate-Source Breakdown Voltage</td>
<td>$I_G = 1.0 \mu A$, $V_{DS} = 0$</td>
<td>30</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>$I_{\text{GSS}}$</td>
<td>Gate Reverse Current</td>
<td>$V_{GS} = 20 V$, $V_{DS} = 0$</td>
<td>1.0</td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>$V_{\text{GS(off)}}$</td>
<td>Gate-Source Cut-Off Voltage</td>
<td>$V_{DS} = -15 V$, $I_D = -10 nA$</td>
<td>3.0</td>
<td>6.0</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>$I_{\text{DSS}}$</td>
<td>Zero-Gate Voltage Drain Current(4)</td>
<td>$V_{DS} = -15 V$, $V_{GS} = 0$</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$J175$ / MMBFJ175</td>
<td>-7.0</td>
<td>-60.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$J176$ / MMBFJ176</td>
<td>-2.0</td>
<td>-25.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MMBFJ177</td>
<td>-1.5</td>
<td>-20.0</td>
</tr>
<tr>
<td>$r_{\text{DS(on)}}$</td>
<td>Drain-Source On Resistance</td>
<td>$V_{DS} \leq 0.1 V$, $V_{GS} = 0$</td>
<td></td>
<td></td>
<td>Ω</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$J175$ / MMBFJ175</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$J176$ / MMBFJ176</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MMBFJ177</td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

4. Pulse test: pulse width $\leq 300 \mu s$, duty cycle $\leq 2.0\%$. 

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Typical Performance Characteristics

Figure 3. Common Drain-Source

Figure 4. Parameter Interactions

Figure 5. Transfer Characteristics

Figure 6. Transfer Characteristics

Figure 7. Normalized Drain Resistance vs. Bias Voltage

Figure 8. Output Conductance vs. Drain Current
Typical Performance Characteristics (Continued)

Figure 9. Transconductance vs. Drain Current

Figure 10. Capacitance vs. Voltage

Figure 11. Noise Voltage vs. Frequency

Figure 12. Channel Resistance vs. Temperature

Figure 13. Power Dissipation vs. Ambient Temperature
Physical Dimensions

Figure 14. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form
Physical Dimensions (Continued)

Figure 15. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE

NOTES: UNLESS OTHERWISE SPECIFIED
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B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
E) DRAWING FILE NAME: MA03DREV10

GAGE PLANE
0.23
0.08
0.20 MIN
(0.55)

SEATING PLANE
0.25

LAND PATTERN RECOMMENDATION

SEE DETAIL A

DRAWING FILE NAME: MA03DREV10

Figure 15. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE
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