FEAT URES
- BROAD BAND INTERNALLY MATCHED FET
- HIGH POWER
  \( P_{1dB} = 41.5 \text{dBm at } 7.7\text{GHz to } 8.5\text{GHz} \)
- HIGH GAIN
  \( G_{1dB} = 8.5\text{dB at } 7.7\text{GHz to } 8.5\text{GHz} \)
- LOW INTERMODULATION DISTORTION
  \( \text{IM}_3 = -47\text{dBc at } P_{out} = 30.5\text{dBm} \)
- HERMETICALLY SEALED PACKAGE

RF PERFORMANCE SPECIFICATIONS (\( Ta = 25^\circ C \))

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SYMBOL</th>
<th>CONDITIONS</th>
<th>UNIT</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
</tr>
</thead>
</table>
| Output Power at 1dB Gain Compression Point | \( P_{1dB} \) | \( V_{DS} = 10\text{V} \)
| Power Gain at 1dB Gain Compression Point | \( G_{1dB} \) | \( V_{DS} = 10\text{V} \)
| Drain Current | \( I_{DS1} \) | \( f = 7.7\text{ to } 8.5\text{GHz} \)
| Gain Flatness | \( \Delta G \) | \( V_{DS} = 10\text{V} \)
| Power Added Efficiency | \( \eta_{add} \) | Two Tone Test
| 3rd Order Intermodulation Distortion | \( \text{IM}_3 \) | \( P_{out} = 30.5\text{dBm}, \Delta f = 5\text{MHz} \)
| Drain Current | \( I_{DS2} \) | \( V_{DS} = 10\text{V} \)
| Channel Temperature Rise | \( \Delta T_{ch} \) | \( (V_{DS} \times I_{DS} + P_{out} - P_{1dB}) \times R_{th(c-c)} \) |

Recommended Gate Resistance (\( R_g \)): 68 \( \Omega \)

ELECTRICAL CHARACTERISTICS (\( Ta = 25^\circ C \))

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SYMBOL</th>
<th>CONDITIONS</th>
<th>UNIT</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
</tr>
</thead>
</table>
| Transconductance | \( g_m \) | \( V_{DS} = 3\text{V} \)
| Pinch-off Voltage | \( V_{GSOff} \) | \( V_{DS} = 3\text{V} \)
| Saturated Drain Current | \( I_{DSS} \) | \( V_{DS} = 3\text{V} \)
| Gate-Source Breakdown Voltage | \( V_{GSO} \) | \( I_{GSO} = -140\mu\text{A} \)
| Thermal Resistance | \( R_{th(c-c)} \) | Channel to Case |

\*The information contained herein is presented as guidance for product use. No responsibility is assumed by TOSHIBA INFRASTRUCTURE SYSTEMS & SOLUTIONS CORPORATION (hereinafter, referred to as “TISS”) for any infringement of patents or any other intellectual property rights of third parties that may result from the use of product. No license to any intellectual property right is granted by this document. The information contained herein is subject to change without prior notice. It is advisable to contact TISS before proceeding with design of equipment incorporating this product.

TIM7785-12UL

MICROWAVE POWER GaAs FET

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ABSOLUTE MAXIMUM RATINGS (Ta= 25°C)

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SYMBOL</th>
<th>UNIT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-Source Voltage</td>
<td>VDS</td>
<td>V</td>
<td>15</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>VGS</td>
<td>V</td>
<td>-5</td>
</tr>
<tr>
<td>Drain Current</td>
<td>IDS</td>
<td>A</td>
<td>10.0</td>
</tr>
<tr>
<td>Total Power Dissipation (Tc= 25°C)</td>
<td>PT</td>
<td>W</td>
<td>62.5</td>
</tr>
<tr>
<td>Channel Temperature</td>
<td>Tch</td>
<td>°C</td>
<td>175</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>Tstg</td>
<td>°C</td>
<td>-65 to +175</td>
</tr>
</tbody>
</table>

PACKAGE OUTLINE (2-16G1B)

HANDLING PRECAUTIONS FOR PACKAGE MODEL

Soldering iron should be grounded and the operating time should not exceed 10 seconds at 260°C or 3 seconds at 350°C.
RF PERFORMANCE

Output Power vs. Frequency

Output Power vs. Input Power

V_{DS} = 10V
I_{DS} = 3.2A
Pin = 33.0dBm

f = 8.1GHz
V_{DS} = 10V
I_{DS} = 3.2A
Power Dissipation vs. Case Temperature

IM3 vs. Output Power Characteristics

- \( V_{DS} = 10V \)
- \( I_{DS} \approx 3.2A \)
- \( f = 8.1\text{GHz} \)
- \( \Delta f = 5\text{MHz} \)