μPA2737GR
P-channel MOSFET
–30 V, –11 A, 13 mΩ

Description
The μPA2737GR is P-channel MOS Field Effect Transistor designed for DC/DC converter and power management applications of portable equipment.

Features
- \( V_{\text{DSS}} = -30 \) V (\( T_A = 25^\circ \text{C} \))
- Low on-state resistance
  - \( R_{\text{DS(on)}} = 13 \) mΩ MAX. (\( V_{\text{GS}} = -10 \) V, \( I_D = -11 \) A)
- 4.5 V Gate-drive available
- Small and surface mount package (SOP-8)
- Pb-free and Halogen free

Ordering Information

<table>
<thead>
<tr>
<th>Part No.</th>
<th>LEAD PLATING</th>
<th>PACKING</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>μPA2737GR-E1-AX</td>
<td>Ni / Pd / Au</td>
<td>Tape 2500 p/reel</td>
<td>SOP-8</td>
</tr>
<tr>
<td>μPA2737GR-E2-AX</td>
<td></td>
<td></td>
<td>0.085 g TYP.</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings (\( T_A = 25^\circ \text{C} \))

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain to Source Voltage (( V_{\text{GS}} = 0 ) V)</td>
<td>( V_{\text{DSS}} )</td>
<td>−30</td>
<td>V</td>
</tr>
<tr>
<td>Gate to Source Voltage (( V_{\text{DS}} = 0 ) V)</td>
<td>( V_{\text{GSS}} )</td>
<td>+20</td>
<td>V</td>
</tr>
<tr>
<td>Drain Current (DC)</td>
<td>( I_D(\text{DC}) )</td>
<td>+11</td>
<td>A</td>
</tr>
<tr>
<td>Drain Current (pulse) (^*1)</td>
<td>( I_D(\text{pulse}) )</td>
<td>+110</td>
<td>A</td>
</tr>
<tr>
<td>Total Power Dissipation (^*2)</td>
<td>( P_{T1} )</td>
<td>1.1</td>
<td>W</td>
</tr>
<tr>
<td>Total Power Dissipation (( PW = 10 ) sec) (^*2)</td>
<td>( P_{T2} )</td>
<td>2.5</td>
<td>W</td>
</tr>
<tr>
<td>Channel Temperature</td>
<td>( T_{\text{ch}} )</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>( T_{\text{stag}} )</td>
<td>−55 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Single Avalanche Current (^*3)</td>
<td>( I_{\text{AS}} )</td>
<td>11</td>
<td>A</td>
</tr>
<tr>
<td>Single Avalanche Energy (^*3)</td>
<td>( E_{\text{AS}} )</td>
<td>12.1</td>
<td>mJ</td>
</tr>
</tbody>
</table>

Thermal Resistance

Channel to Ambient Thermal Resistance \(^*2\)

\[ R_{\text{th(ch-A)}} = 114 \text{ °C/W} \]

Notes:
- \(^*1\) \( PW \leq 10 \) μs, Duty Cycle \( \leq 1\% \)
- \(^*2\) Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mmt
- \(^*3\) Starting \( T_{\text{ch}} = 25^\circ \text{C} \), \( V_{\text{DD}} = -15 \) V, \( R_G = 25 \) Ω, \( V_{\text{GS}} = -20 \rightarrow 0 \) V, \( L = 100 \) μH
### Electrical Characteristics (TA = 25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>Unit</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero Gate Voltage Drain Current</td>
<td>$I_{DSS}$</td>
<td>$-1$</td>
<td></td>
<td>$-1$</td>
<td>μA</td>
<td>$V_{DS} = -30$ V, $V_{GS} = 0$ V</td>
</tr>
<tr>
<td>Gate Leakage Current</td>
<td>$I_{GSS}$</td>
<td>±100</td>
<td></td>
<td></td>
<td>nA</td>
<td>$V_{GS} = \pm 20$ V, $V_{DS} = 0$ V</td>
</tr>
<tr>
<td>Gate Cut-off Voltage</td>
<td>$V_{GSOFF}$</td>
<td>$-1.0$</td>
<td></td>
<td>$-2.5$</td>
<td>V</td>
<td>$V_{DS} = -10$ V, $I_D = -1$ mA</td>
</tr>
<tr>
<td>Forward Transfer Admittance $^1$</td>
<td>$</td>
<td>\gamma_s</td>
<td>$</td>
<td>4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain to Source On-state Resistance $^1$</td>
<td>$R_{DSS(ON)1}$</td>
<td>9.7</td>
<td></td>
<td>13</td>
<td>mΩ</td>
<td>$V_{GS} = -10$ V, $I_D = -11$ A</td>
</tr>
<tr>
<td></td>
<td>$R_{DSS(ON)2}$</td>
<td>17</td>
<td></td>
<td>25</td>
<td>mΩ</td>
<td>$V_{GS} = -4.5$ V, $I_D = -11$ A</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>$C_{iss}$</td>
<td>1750</td>
<td></td>
<td></td>
<td>pF</td>
<td>$V_{DS} = -10$ V,</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>$C_{oss}$</td>
<td>850</td>
<td></td>
<td></td>
<td>pF</td>
<td>$V_{GS} = 0$ V,</td>
</tr>
<tr>
<td>Reverse Transfer Capacitance</td>
<td>$C_{rss}$</td>
<td>770</td>
<td></td>
<td></td>
<td>pF</td>
<td>$f = 1$ MHz</td>
</tr>
<tr>
<td>Turn-on Delay Time</td>
<td>$t_{d(on)}$</td>
<td>20</td>
<td></td>
<td></td>
<td>ns</td>
<td>$V_{GS} = -15$ V, $I_D = -5.5$ A,</td>
</tr>
<tr>
<td>Rise Time</td>
<td>$t_r$</td>
<td>32</td>
<td></td>
<td></td>
<td>ns</td>
<td>$R_G = 10$ Ω</td>
</tr>
<tr>
<td>Turn-off Delay Time</td>
<td>$t_{d(off)}$</td>
<td>70</td>
<td></td>
<td></td>
<td>ns</td>
<td>$R_G = 10$ Ω</td>
</tr>
<tr>
<td>Fall Time</td>
<td>$t_f$</td>
<td>55</td>
<td></td>
<td></td>
<td>ns</td>
<td>$R_G = 10$ Ω</td>
</tr>
<tr>
<td>Total Gate Charge</td>
<td>$Q_G$</td>
<td>45</td>
<td></td>
<td></td>
<td>nC</td>
<td>$V_{DD} = -24$ V,</td>
</tr>
<tr>
<td>Gate to Source Charge</td>
<td>$Q_{GS}$</td>
<td>2.5</td>
<td></td>
<td></td>
<td>nC</td>
<td>$V_{GS} = -10$ V,</td>
</tr>
<tr>
<td>Gate to Drain Charge</td>
<td>$Q_{GD}$</td>
<td>23</td>
<td></td>
<td></td>
<td>nC</td>
<td>$I_D = -11$ A</td>
</tr>
<tr>
<td>Body Diode Forward Voltage $^1$</td>
<td>$V_{F(S-D)}$</td>
<td>0.85</td>
<td></td>
<td></td>
<td>V</td>
<td>$I_F = 11$ A, $V_{GS} = 0$ V</td>
</tr>
<tr>
<td>Reverse Recovery Time</td>
<td>$t_{rr}$</td>
<td>49</td>
<td></td>
<td></td>
<td>ns</td>
<td>$I_F = 11$ A, $V_{GS} = 0$ V,</td>
</tr>
<tr>
<td>Reverse Recovery Charge</td>
<td>$Q_{rr}$</td>
<td>48</td>
<td></td>
<td></td>
<td>nC</td>
<td>$I_F = 11$ A, $V_{GS} = 0$ V,</td>
</tr>
</tbody>
</table>

**Note:** $^1$ Pulsed

#### TEST CIRCUIT 1 AVALANCHE CAPABILITY

![Test Circuit 1](image1)

#### TEST CIRCUIT 2 SWITCHING TIME

![Test Circuit 2](image2)

#### TEST CIRCUIT 3 GATE CHARGE

![Test Circuit 3](image3)
TYPICAL CHARACTERISTICS (T_A = 25°C)

DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA

T_A - Ambient Temperature - °C

FORWARD BIAS SAFE OPERATING AREA

V_DS - Drain to Source Voltage – V

TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

R_{th(ch-A)}: Mounted on glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mmt

DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE

V_DS = -10 V

FORWARD TRANSFER CHARACTERISTICS

V_GS = -10 V

0.01

100 μs

1 ms

10 ms

30 ms

0.01

V_GS = -10 V

-0.001

-0.01

-0.1

-1

-10

-100

-0.01

-0.1

-1

-10

-100
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

VDS - Drain to Source Voltage - V

VDD = –24V
–12V
–6V
0 V

VGS - Gate to Source Voltage - V

IF - Diode Forward Current - A

QG - Gate Charge - nC

SOURCE TO DRAIN DIODE FORWARD VOLTAGE

Vf(S-D) - Source to Drain Voltage - V

VGS = –10 V
–4.5 V
0 V
Pulsed
Equivalent Circuit

Remark  Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.
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