# P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

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NEW PRODUCT

## Features

- Low $R_{DS(ON)}$:
  - 80 mΩ @$V_{GS}$ = -4.5V
  - 110 mΩ @$V_{GS}$ = -2.7V
  - 130 mΩ @$V_{GS}$ = -2.5V
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **"Green" Device (Note 4)**

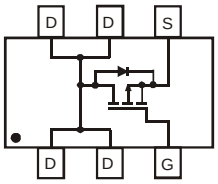
## Mechanical Data

- Case: SOT-26
- Case Material – Molded Plastic. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 2
- Ordering Information: See page 2
- Weight: 0.008 grams (approximate)

SOT-26



TOP VIEW




TOP VIEW
Internal Schematic

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | -20 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±12 | V |
| Drain Current (Note 1) Continuous | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | -3.4<br>-2.7 | A |
| Pulsed Drain Current (Note 2) | | $I_{DM}$ | -12 | A |
| Body-Diode Continuous Current (Note 1) | | $I_S$ | 2.0 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Total Power Dissipation (Note 1) | $P_D$ | 1.25 | W |
| Thermal Resistance, Junction to Ambient (Note 1); Steady-State | $R_{\theta JA}$ | 100 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

Notes:
1. Device mounted on 1"x1", FR-4 PC board with 2 oz. Copper and test pulse width t ≤10s.
2. Repetitive Rating, pulse width limited by junction temperature.
3. No purposefully added lead.
4. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.


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## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -20 | — | — | V | $I_D$ = -250μA, $V_{GS}$ = 0V |
| Zero Gate Voltage Drain Current $T_J$ = 25°C | $I_{DSS}$ | — | — | -1 | μA | $V_{DS}$ = -20V, $V_{GS}$ = 0V |
| Gate-Body Leakage Current | $I_{GSS}$ | — | — | ±100 | nA | $V_{DS}$ = 0V, $V_{GS}$ = ±12V |
| Gate Threshold Voltage | $V_{GS(th)}$ | -0.6 | — | -1.25 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA |
| On State Drain Current (Note 5) | $I_{D(ON)}$ | -15 | — | — | A | $V_{GS}$ = -4.5V, $V_{DS}$ = -5V |
| Static Drain-Source On-Resistance (Note 5) | $R_{DS(ON)}$ | — | 51<br>82<br>94 | 80<br>110<br>130 | mΩ | $V_{GS}$ = -4.5V, $I_D$ = -4.5A<br>$V_{GS}$ = -2.7V, $I_D$ = -3.8A<br>$V_{GS}$ = -2.5V, $I_D$ = -3.7A |
| Forward Transconductance (Note 5) | $g_{FS}$ | — | 6.3 | — | S | $V_{DS}$ = -10V, $I_D$ = -4.5A |
| Diode Forward Voltage (Note 5) | $V_{SD}$ | — | 0.79 | -1.26 | V | $I_S$ = -1.7A, $V_{GS}$ = 0V |
| Maximum Body-Diode Continuous Current (Note 1) | $I_S$ | — | — | 1.7 | A | — |
| **DYNAMIC PARAMETERS (Note 6)** | | | | | | |
| Total Gate Charge | $Q_g$ | — | 7.3 | — | nC | $V_{GS}$ = -4.5V, $V_{DS}$ = -10V, $I_D$ = 4.5A |
| Gate-Source Charge | $Q_{gs}$ | — | 2.0 | — | nC | $V_{GS}$ = -4.5V, $V_{DS}$ = -10V, $I_D$ = 4.5A |
| Gate-Drain Charge | $Q_{gd}$ | — | 1.9 | — | nC | $V_{GS}$ = -4.5V, $V_{DS}$ = -10V, $I_D$ = 4.5A |
| Turn-On Delay Time | $t_{D(on)}$ | — | 12 | — | ns | $V_{DS}$ = -10V, $V_{GS}$ = -4.5V, $R_L$ = 10Ω, $R_G$ = 6Ω |
| Turn-On Rise Time | $t_r$ | — | 20 | — | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 38 | — | ns | |
| Turn-Off Fall Time | $t_f$ | — | 41 | — | ns | |
| Input Capacitance | $C_{iss}$ | — | 443 | — | pF | $V_{DS}$ = -16V, $V_{GS}$ = 0V f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 125 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 98 | — | pF | |

Notes: 5. Test pulse width t = 300μs.
6. Guaranteed by design. Not subject to production testing.

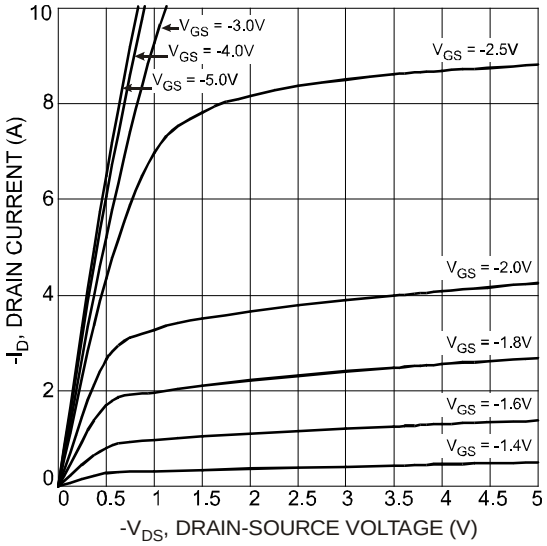



Fig. 1 Typical Output Characteristics

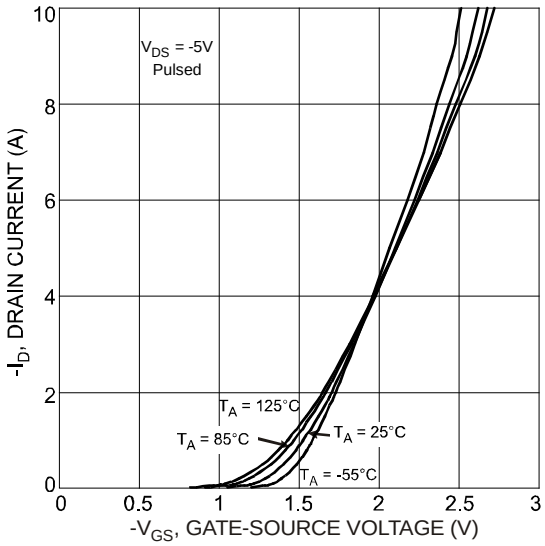



Fig. 2 Typical Transfer Characteristics


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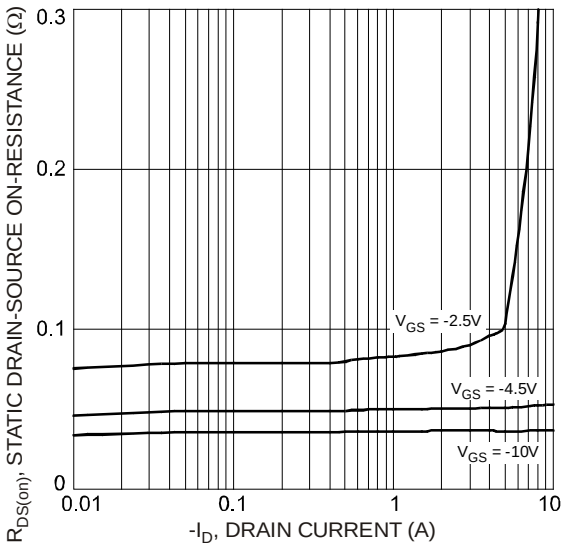



Fig. 3 On-Resistance vs. Drain Current and Gate Voltage

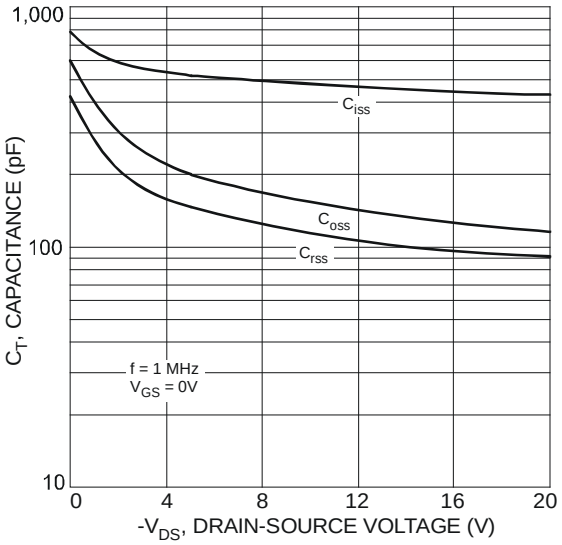



Fig. 4 Typical Total Capacitance

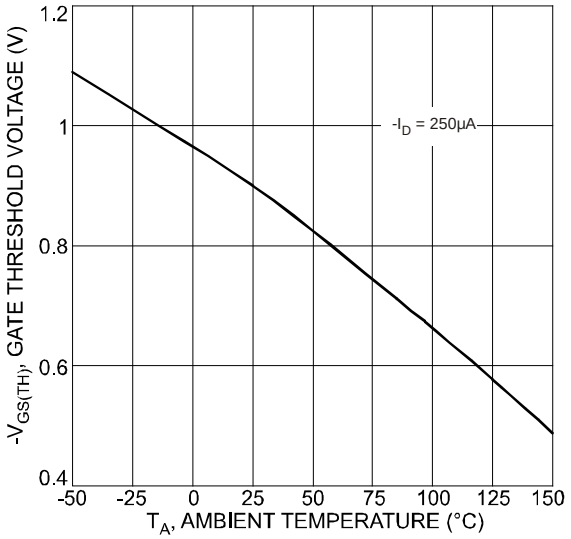



Fig. 5 Gate Threshold Voltage vs. Ambient Temperature

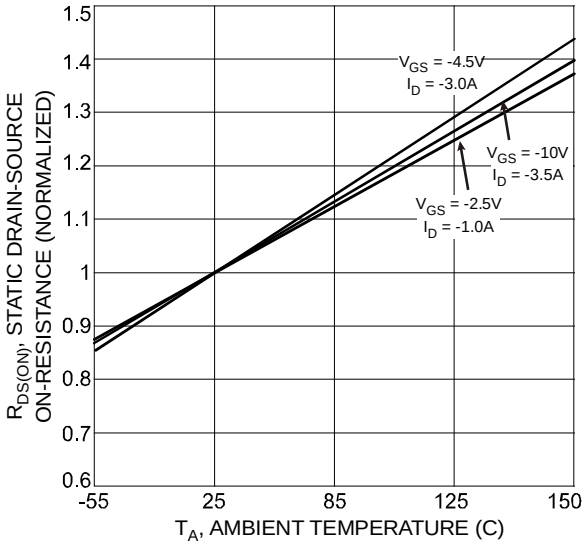



Fig. 6 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

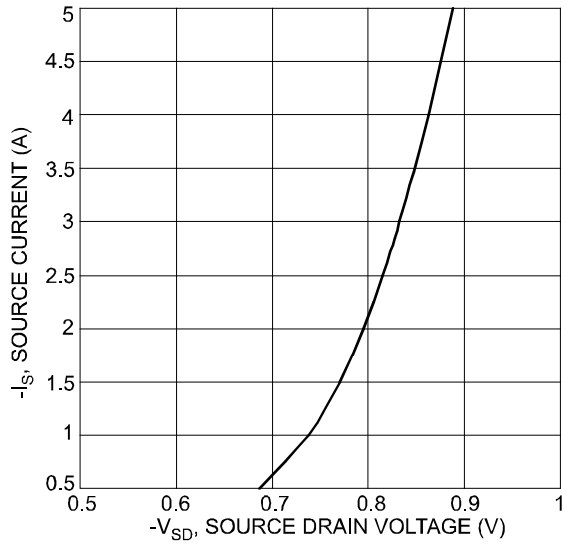



Fig. 7 Reverse Drain Current vs. Source-Drain Voltage


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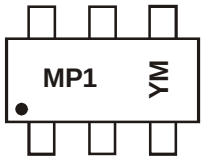
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## Ordering Information (Note 7)

| Part Number | Case | Packaging |
|---|---|---|
| DMP2130LDM-7 | SOT-26 | 3000/Tape & Reel |

Notes: 7. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information



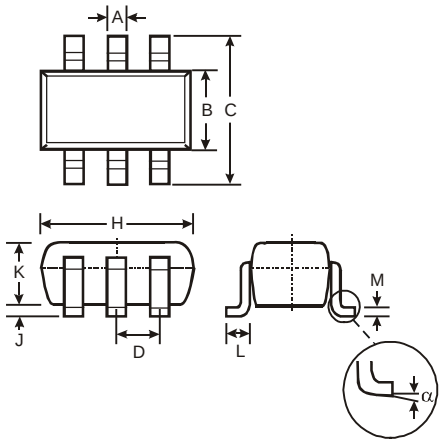

MP1 = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: U = 2007
M = Month ex: 9 = September

Date Code Key

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|
| Code | U | V | W | X | Y | Z |

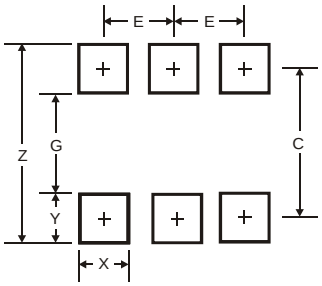
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

## Package Outline Dimensions




| SOT-26 | | | |
|---|---|---|---|
| Dim | Min | Max | Typ |
| A | 0.35 | 0.50 | 0.38 |
| B | 1.50 | 1.70 | 1.60 |
| C | 2.70 | 3.00 | 2.80 |
| D | — | — | 0.95 |
| H | 2.90 | 3.10 | 3.00 |
| J | 0.013 | 0.10 | 0.05 |
| K | 1.00 | 1.30 | 1.10 |
| L | 0.35 | 0.55 | 0.40 |
| M | 0.10 | 0.20 | 0.15 |
| α | 0° | 8° | — |
| All Dimensions in mm | | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| Z | 3.20 |
| G | 1.60 |
| X | 0.55 |
| Y | 0.80 |
| C | 2.40 |
| E | 0.95 |

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