

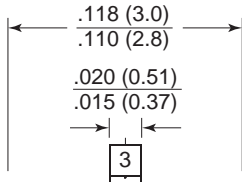


**P-Channel Enhancement-Mode MOSFET**

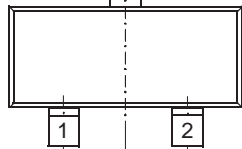
$V_{DS} -30V$   $R_{DS(ON)} 0.12\Omega$   $I_D -2.5A$

**TO-236AB (SOT-23)**

*New Product*  
**TRENCH GENFET**

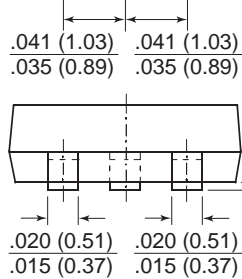


**Top View**

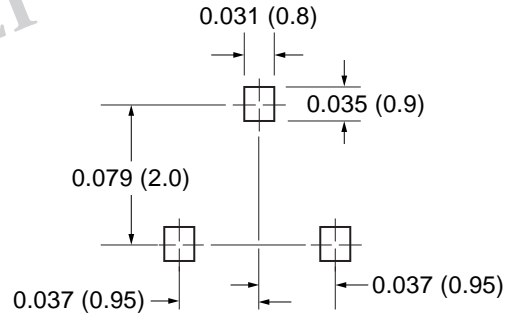
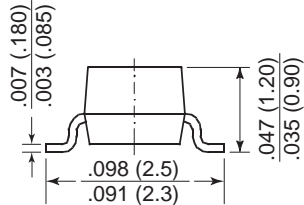


**Pin Configuration**

- 1. Gate
- 2. Source
- 3. Drain



*Dimensions in inches and (millimeters)*



**Mounting Pad Layout**

**Mechanical Data**

**Case:** SOT-23 Plastic Package  
**Weight:** approx. 0.008g  
**Marking Code:** 3A

**Features**

- Advanced Trench Process Technology
- High density cell design for ultra-low on-resistance
- Popular SOT-23 package with copper lead frame for superior thermal and electrical capabilities
- Compact and low profile

**Maximum Ratings and Thermal Characteristics** ( $T_A = 25^\circ C$  unless otherwise noted)

| Parameter  | Symbol          | Limit        | Unit         |
|--|-----------------|--------------|--------------|
| Drain-Source Voltage   | $V_{DS}$        | -30          | V            |
| Gate-Source-Voltage  | $V_{GS}$        | $\pm 20$     | V            |
| Continuous Drain Current <sup>(2)</sup><br>$T_J = 150^\circ C$ | $I_D$           | -2.5<br>-2.0 | A            |
| Pulsed Drain Current <sup>(1)</sup>                            | $I_{DM}$        | -10          | A            |
| Maximum Power Dissipation <sup>(2)</sup>                       | $P_D$           | 1.25<br>0.8  | W            |
| Operating Junction and Storage Temperature Range               | $T_J, T_{stg}$  | -55 to +150  | $^\circ C$   |
| Maximum Junction-to-Ambient Thermal Resistance <sup>(2)</sup>  | $R_{\theta JA}$ | 100          | $^\circ C/W$ |

**Note:**

- (1) Pulse width limited by maximum junction temperature.
- (2) Surface mounted on FR4 board,  $t \leq 5$  sec.

**P-Channel Enhancement-Mode MOSFET**

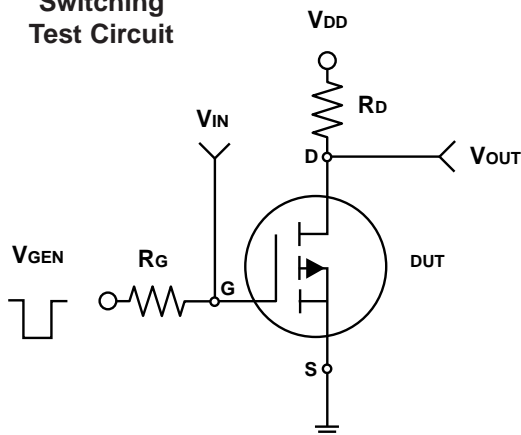
**Electrical Characteristics** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

| Parameter                                       | Symbol       | Test Condition  | Min  | Typ  | Max       | Unit      |
|---|--------------|---|------|------|-----------|-----------|
| <b>Static</b>                                   |              |   |      |      |           |           |
| Drain-Source Breakdown Voltage                  | $BV_{DSS}$   | $V_{GS} = 0V, I_D = -250\mu A$  | -30  | -    | -         | V         |
| Gate Threshold Voltage                          | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250\mu A$  | -1.0 | -    | -         | V         |
| Gate-Body Leakage                               | $I_{GSS}$    | $V_{DS} = 0V, V_{GS} = \pm 20V$   | -    | -    | $\pm 100$ | nA        |
| Zero Gate Voltage Drain Current                 | $I_{DSS}$    | $V_{DS} = -30V, V_{GS} = 0V$  | -    | -    | -1.0      | $\mu A$   |
|   |              | $V_{DS} = -30V, V_{GS} = 0V, T_J = 55^\circ\text{C}$                              | -    | -    | -10       |           |
| On-State Drain Current <sup>(1)</sup>           | $I_{D(on)}$  | $V_{DS} \geq -5V, V_{GS} = -10V$  | -6   | -    | -         | A         |
| Drain-Source On-State Resistance <sup>(1)</sup> | $R_{DS(on)}$ | $V_{GS} = -10V, I_D = -2.5A$  | -    | 100  | 120       | $m\Omega$ |
|   |              | $V_{GS} = -4.5V, I_D = -2.0A$   | -    | 150  | 180       |           |
| Forward Transconductance <sup>(1)</sup>         | $g_{fs}$     | $V_{DS} = -10V, I_D = -2.5A$  | -    | 4.8  | -         | S         |
| <b>Dynamic</b>                                  |              |   |      |      |           |           |
| Total Gate Charge                               | $Q_g$        | $V_{DS} = -15V, V_{GS} = -10V$<br>$I_D = -2.5A$                                   | -    | 7.8  | 12        | nC        |
| Gate-Source Charge                              | $Q_{gs}$     |   | -    | 1.0  | -         |           |
| Gate-Drain Charge                               | $Q_{gd}$     |   | -    | 1.3  | -         |           |
| Turn-On Delay Time                              | $t_{d(on)}$  | $V_{DD} = -15V, R_L = 15\Omega$<br>$I_D = -1A, V_{GEN} = -10V$<br>$R_G = 6\Omega$ | -    | 4    | 20        | ns        |
| Rise Time                                       | $t_r$        |   | -    | 3    | 20        |           |
| Turn-Off Delay Time                             | $t_{d(off)}$ |   | -    | 68   | 90        |           |
| Fall Time                                       | $t_f$        |   | -    | 30   | 50        |           |
| Input Capacitance                               | $C_{iss}$    | $V_{DS} = -15V, V_{GS} = 0V$<br>$f = 1.0\text{MHz}$                               | -    | 370  | -         | pF        |
| Output Capacitance                              | $C_{oss}$    |   | -    | 60   | -         |           |
| Reverse Transfer Capacitance                    | $C_{rss}$    |   | -    | 35   | -         |           |
| <b>Source-Drain Diode</b>                       |              |   |      |      |           |           |
| Maximum Diode Forward Current                   | $I_S$        | -   | -    | -    | -1.25     | A         |
| Diode Forward Voltage                           | $V_{SD}$     | $I_S = -1.25A, V_{GS} = 0V$   | -    | -1.0 | -1.2      | V         |

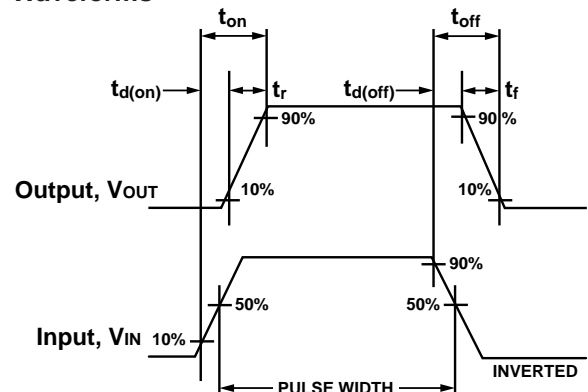
**Note:**

(1) Pulse test; pulse width  $\leq 300 \mu s$ , duty cycle  $\leq 2\%$

**Switching Test Circuit**



**Switching Waveforms**



P-Channel Enhancement-Mode MOSFET

Ratings and Characteristic Curves (T<sub>A</sub> = 25°C unless otherwise noted)

Fig. 1 – Output Characteristics

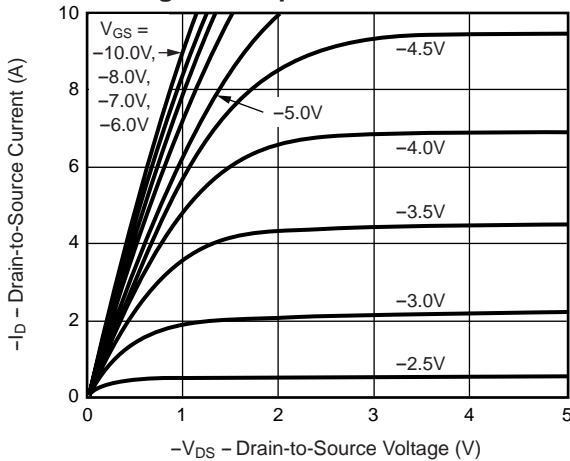


Fig. 2 – Transfer Characteristics

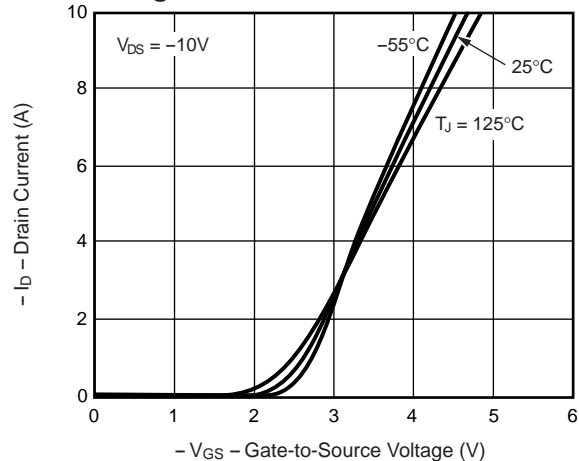


Fig. 3 – Threshold Voltage vs. Temperature

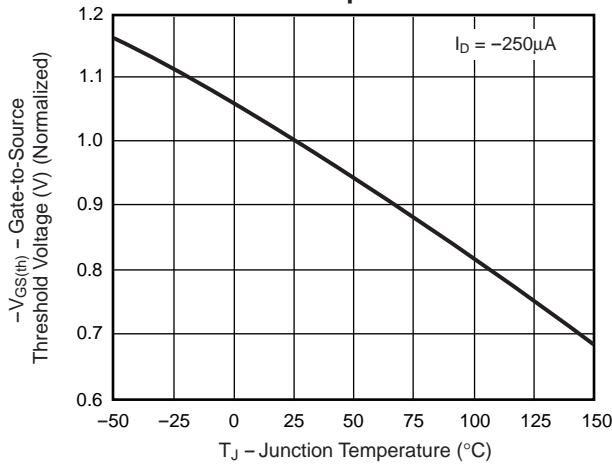


Fig. 4 – On-Resistance vs. Drain Current

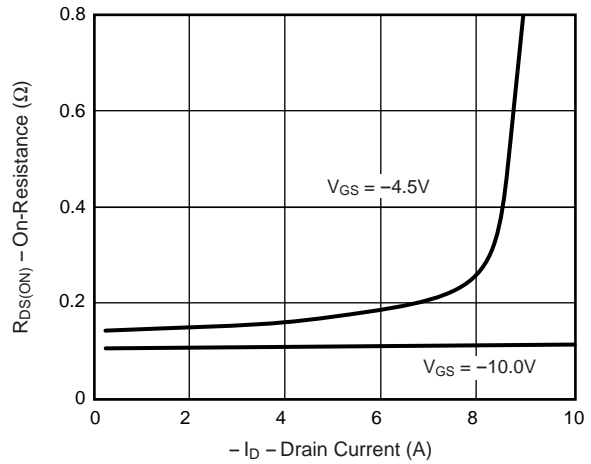


Fig. 5 – On-Resistance vs. Junction Temperature

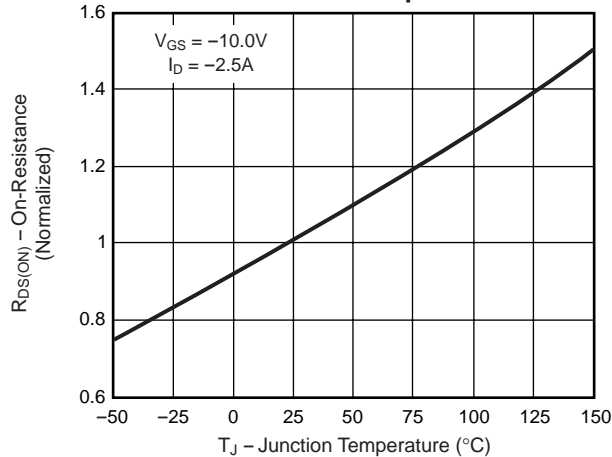
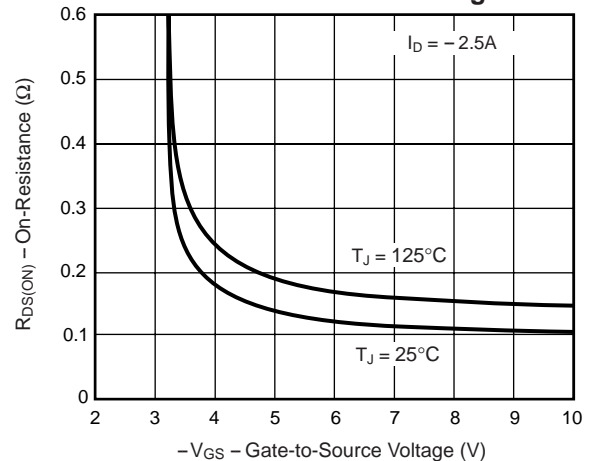


Fig. 6 – On-Resistance vs. Gate-to-Source Voltage



P-Channel Enhancement-Mode MOSFET

Ratings and Characteristic Curves (T<sub>A</sub> = 25°C unless otherwise noted)

Fig. 7 – Gate Charge

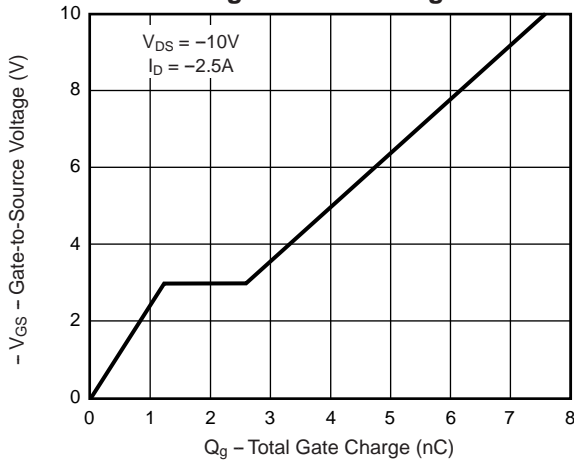


Fig. 8 – Capacitance

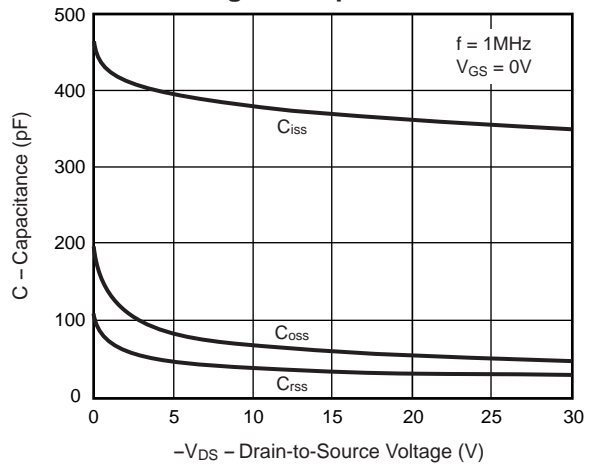


Fig. 9 – Source-Drain Diode Forward Voltage

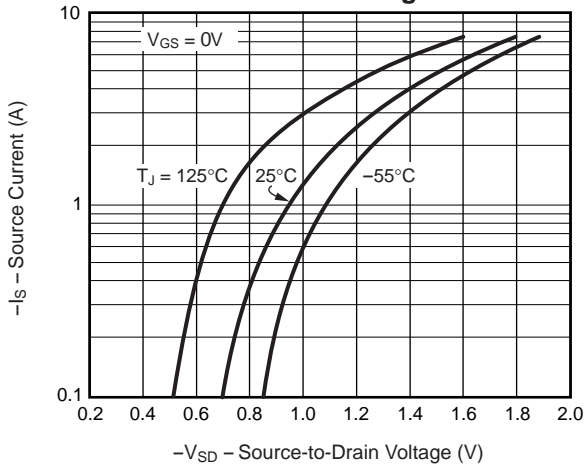


Fig. 10 – Thermal Transient Impedance Junction-to-Ambient

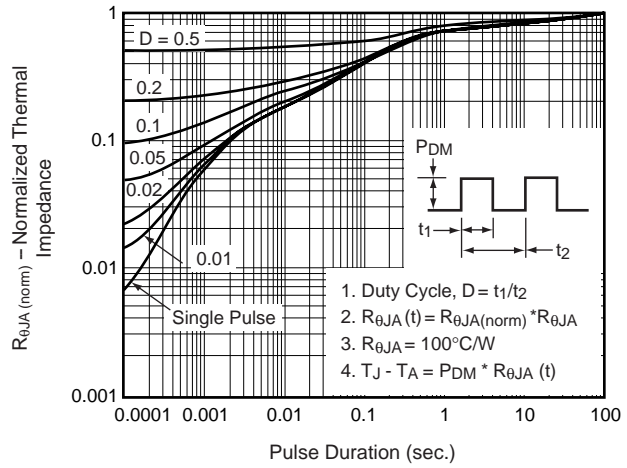


Fig. 11 – Power vs. Pulse Duration

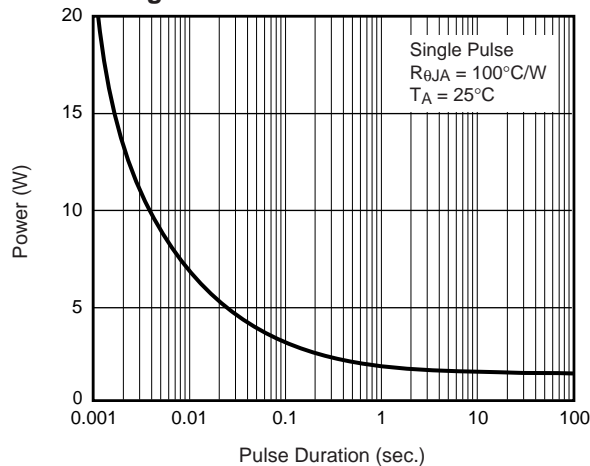


Fig. 12 – Maximum Safe Operating Area

