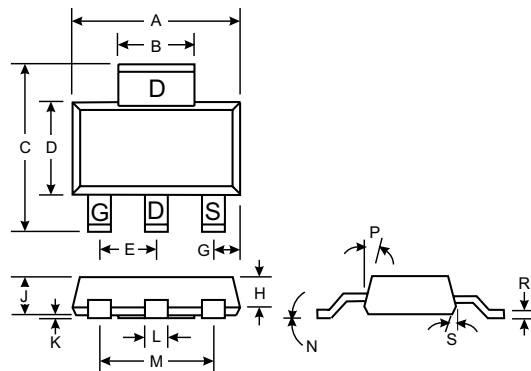


### Features

- High Cell Density DMOS Technology
- Low On-State Resistance
- High Power and Current Capability
- Fast Switching Speed
- High Transient Tolerance



| SOT-223              |       |       |
|----------------------|-------|-------|
| Dim                  | Min   | Max   |
| A                    | 6.30  | 6.71  |
| B                    | 2.90  | 3.10  |
| C                    | 6.71  | 7.29  |
| D                    | 3.30  | 3.71  |
| E                    | 2.22  | 2.35  |
| G                    | 0.92  | 1.00  |
| H                    | 1.10  | 1.30  |
| J                    | 1.55  | 1.80  |
| K                    | 0.025 | 0.102 |
| L                    | 0.66  | 0.79  |
| M                    | 4.55  | 4.70  |
| N                    | —     | 10°   |
| P                    | 10°   | 16°   |
| R                    | 0.254 | 0.356 |
| S                    | 10°   | 16°   |
| All Dimensions in mm |       |       |

### Mechanical Data

- SOT-223 Plastic Case
- Terminal Connections: See Outline Drawing and Internal Circuit Diagram Above

### Maximum Ratings

25°C unless otherwise specified

| Characteristic                          | Symbol         | Value       | Unit |
|-----------------------------------------|----------------|-------------|------|
| Drain-Source Voltage                    | $V_{DS}$       | -30         | V    |
| Gate-Source Voltage                     | $V_{GS}$       | $\pm 20$    | V    |
| Drain Current                           | $I_D$          | $\pm 3.0$   | A    |
| Note 1a Continuous Pulsed               |                | $\pm 20$    |      |
| Maximum Power Dissipation               | $P_d$          | 3.0         | W    |
| Note 1a                                 |                | 1.3         |      |
| Note 1b<br>Note 1c                      |                | 1.1         |      |
| Operating and Storage Temperature Range | $T_J, T_{STG}$ | -65 to +150 | °C   |

### Thermal Characteristics

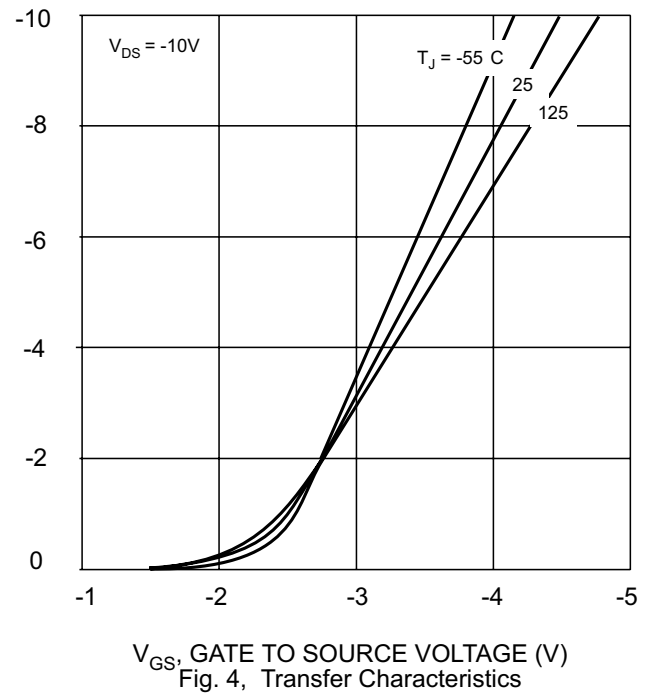
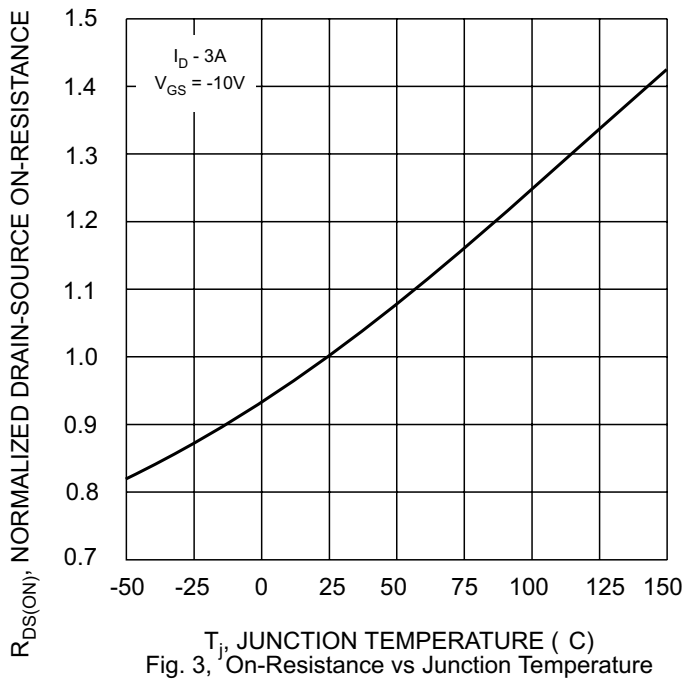
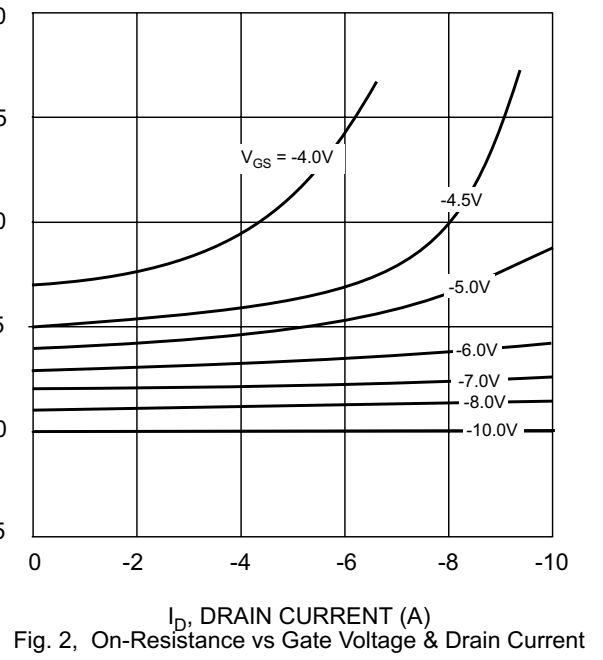
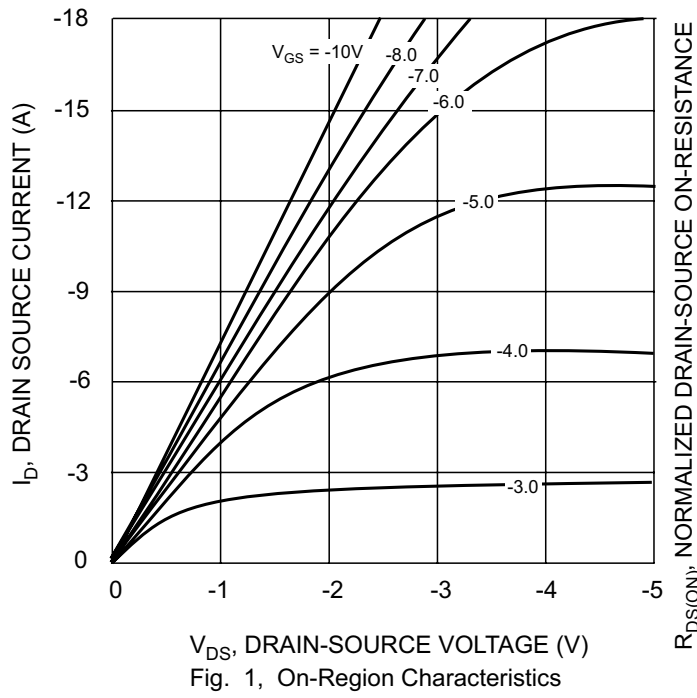
| Characteristic                          | Symbol          | Value | Unit |
|-----------------------------------------|-----------------|-------|------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 42    | °C/W |
| Note 1                                  |                 | 12    |      |
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 12    | °C/W |

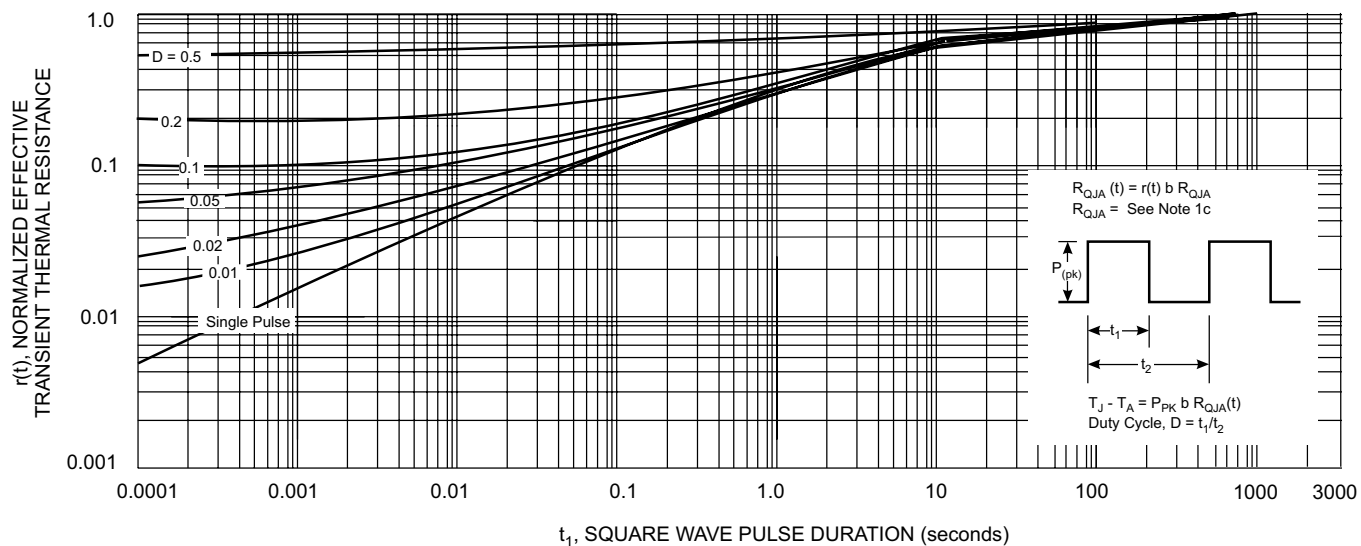
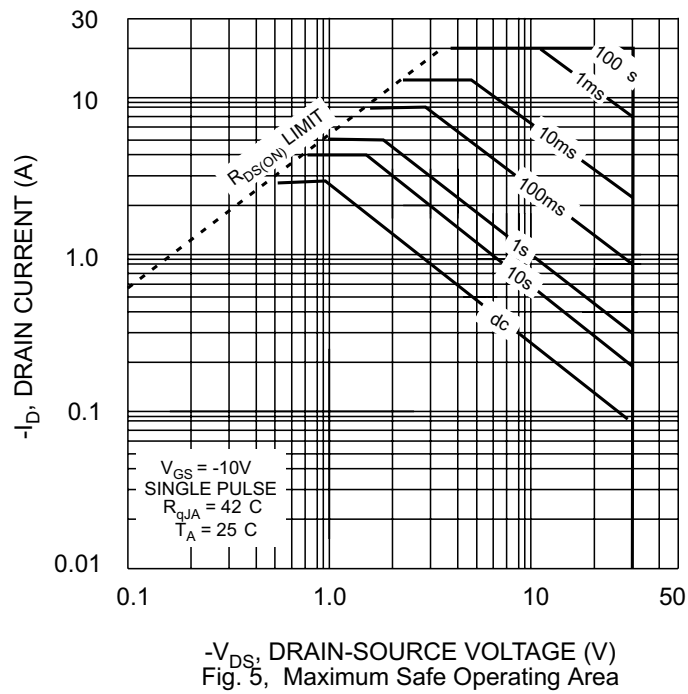
- Notes:
1.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.
    - 1a. With 1 in<sup>2</sup> oz 2 oz. copper mounting pad  $R_{\theta JA} = 42^\circ\text{C/W}$ .
    - 1b. With 0.0066 in<sup>2</sup> oz 2 oz. copper mounting pad  $R_{\theta JA} = 95^\circ\text{C/W}$ .
    - 1c. With 0.0123 in<sup>2</sup> oz 2 oz. copper mounting pad  $R_{\theta JA} = 110^\circ\text{C/W}$ .

## Electrical Characteristics 25°C unless otherwise specified

| Characteristic                                              | Symbol               | Min          | Typ                              | Max                              | Unit | Test Condition                                                                                  |
|-------------------------------------------------------------|----------------------|--------------|----------------------------------|----------------------------------|------|-------------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS                                         |                      |              |                                  |                                  |      |                                                                                                 |
| Drain-Source Breakdown Voltage                              | BV <sub>DSS</sub>    | 30           | —                                | —                                | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                    |
| Zero Gate Voltage Drain Current<br>T <sub>j</sub> = 55°C    | I <sub>DSS</sub>     | —            | —                                | 1.0<br>10                        | μA   | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V                                                     |
| Gate-Body Leakage, Forward                                  | I <sub>GSSF</sub>    | —            | —                                | 100                              | nA   | V <sub>GS</sub> = 20V, V <sub>DS</sub> = 0V                                                     |
| Gate-Body Leakage, Reverse                                  | I <sub>GSSR</sub>    | —            | —                                | -100                             | nA   | V <sub>GS</sub> = 20V, V <sub>DS</sub> = 0V                                                     |
| ON CHARACTERISTICS (Note 2)                                 |                      |              |                                  |                                  |      |                                                                                                 |
| Gate Threshold Voltage<br>T <sub>j</sub> = 125°C            | V <sub>GS(th)</sub>  | -1.0<br>-0.7 | 1.6<br>1.2                       | 3.0<br>2.2                       | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                      |
| Static Drain-Source On-Resistance<br>T <sub>j</sub> = 125°C | R <sub>DS (ON)</sub> | —            | 0.030<br>0.042<br>0.042<br>0.058 | 0.035<br>0.070<br>0.055<br>0.100 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 7.2A<br>V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.0A   |
| On-State Drain Current                                      | I <sub>D(ON)</sub>   | 25<br>15     | —                                | —                                | A    | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 5.0V<br>V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 5.0V |
| Forward Transconductance                                    | g <sub>FS</sub>      | —            | 11                               | —                                | m    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 7.2A                                                    |
| DYNAMIC CHARACTERISTICS                                     |                      |              |                                  |                                  |      |                                                                                                 |
| Input Capacitance                                           | C <sub>ISS</sub>     | —            | 720                              | —                                | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                       |
| Output Capacitance                                          | C <sub>OSS</sub>     | —            | 370                              | —                                | pF   |                                                                                                 |
| Reverse Transfer Capacitance                                | C <sub>RSS</sub>     | —            | 250                              | —                                | pF   |                                                                                                 |
| SWITCHING CHARACTERISTICS (Note 2)                          |                      |              |                                  |                                  |      |                                                                                                 |
| Turn-On Delay Time                                          | t <sub>D(ON)</sub>   | —            | 12                               | 20                               | ns   | V <sub>DD</sub> = 10V, I <sub>D</sub> = 1.0A<br>V <sub>GEN</sub> = 10V, R <sub>GEN</sub> = 6.0Ω |
| Turn-On Rise Time                                           | t <sub>r</sub>       | —            | 13                               | 30                               | ns   |                                                                                                 |
| Turn-Off Delay Time                                         | t <sub>D(OFF)</sub>  | —            | 29                               | 50                               | ns   |                                                                                                 |
| Turn-Off Fall Time                                          | t <sub>f</sub>       | —            | 10                               | 20                               | ns   |                                                                                                 |
| Total Gate Charge                                           | Q <sub>g</sub>       | —            | 19                               | 30                               | nC   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.0A.<br>V <sub>GS</sub> = 10V                          |
| Gate-Source Charge                                          | Q <sub>gs</sub>      | —            | 2.3                              | —                                | nC   |                                                                                                 |
| Gate-Drain Charge                                           | Q <sub>gd</sub>      | —            | 5.5                              | —                                | nC   |                                                                                                 |
| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS      |                      |              |                                  |                                  |      |                                                                                                 |
| Max Continuous Drain-Source Diode Forward Current           | I <sub>S</sub>       | —            | —                                | 2.3                              | A    |                                                                                                 |
| Drain-Source Diode Forward Voltage                          | V <sub>SD</sub>      | —            | 0.9                              | 1.3                              | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 7.2A (Note 2)                                            |

Notes: 2. Pulse Test: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2.0\%$ .





Remark: Thermal characterization performed under conditions described in note 1c. Transient thermal response will change depending on the circuit board design.