

## Features

- High Dense Cell Design for Extremely Low  $R_{DS(ON)}$
- Exceptional On-Resistance and Maximum DC Current Capability
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

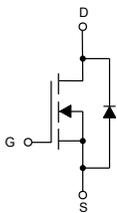
## Maximum Ratings

- Operating Junction Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Storage Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Thermal Resistance:  $96^{\circ}\text{C/W}$  Junction to Ambient<sup>(Note 3)</sup>

| Parameter                                | Symbol   | Rating   | Unit |
|--|----------|----------|------|
| Drain -Source Voltage                    | $V_{DS}$ | 30       | V    |
| Gate -Source Voltage                     | $V_{GS}$ | $\pm 12$ | V    |
| Drain Current-Continuous                 | $I_D$    | 5.8      | A    |
| Drain Current-Pulsed <sup>(Note 2)</sup> | $I_{DM}$ | 30       | A    |
| Power Dissipation                        | $P_D$    | 1.3      | W    |

Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

## Internal Structure

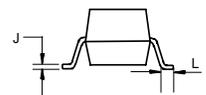
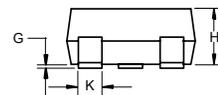
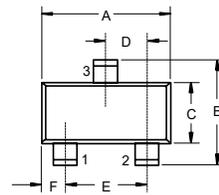


1. GATE
2. SOURCE
3. DRAIN

Marking: R0<sub>A</sub>

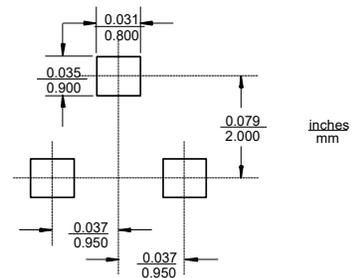
# N-Channel MOSFET

## SOT-23



| DIM | DIMENSIONS |       |      |      | NOTE |
|-----|------------|-------|------|------|------|
|     | INCHES     |       | MM   |      |      |
|     | MIN        | MAX   | MIN  | MAX  |      |
| A   | 0.110      | 0.120 | 2.80 | 3.04 |      |
| B   | 0.083      | 0.104 | 2.10 | 2.64 |      |
| C   | 0.047      | 0.055 | 1.20 | 1.40 |      |
| D   | 0.034      | 0.041 | 0.85 | 1.05 |      |
| E   | 0.067      | 0.083 | 1.70 | 2.10 |      |
| F   | 0.018      | 0.024 | 0.45 | 0.60 |      |
| G   | 0.0004     | 0.006 | 0.01 | 0.15 |      |
| H   | 0.035      | 0.043 | 0.90 | 1.10 |      |
| J   | 0.003      | 0.007 | 0.08 | 0.18 |      |
| K   | 0.012      | 0.020 | 0.30 | 0.51 |      |
| L   | 0.007      | 0.020 | 0.20 | 0.50 |      |

### Suggested Solder Pad Layout



**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

| Parameter   | Symbol        | Test conditions  | Min | Typ | Max       | Unit       |
|---|---------------|--|-----|-----|-----------|------------|
| <b>Static Characteristics</b>                                 |               |  |     |     |           |            |
| Drain-Source Breakdown Voltage                                | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                                | 30  |     |           | V          |
| Gate-Threshold Voltage <sup>(Note 4)</sup>                    | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                            | 0.7 |     | 1.2       | V          |
| Gate-Body Leakage Current                                     | $I_{GSS}$     | $V_{GS}=\pm 12V, V_{DS}=0V$                              |     |     | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current                               | $I_{DSS}$     | $V_{DS}=24V, V_{GS}=0V$                                  |     |     | 1         | $\mu A$    |
| Drain-Source On-Resistance <sup>(Note 4)</sup>                | $R_{DS(on)}$  | $V_{GS}=10V, I_D=5.8A$                                   |     | 21  | 27        | m $\Omega$ |
|   |               | $V_{GS}=4.5V, I_D=5.0A$                                  |     | 25  | 33        |            |
|   |               | $V_{GS}=2.5V, I_D=4.0A$                                  |     | 33  | 51        |            |
| Forward Transconductance                                      | $g_{FS}$      | $V_{DS}=5V, I_D=5.0A$                                    | 8.0 |     |           | S          |
| <b>Dynamic Characteristics<sup>(Note 5)</sup></b>             |               |  |     |     |           |            |
| Input Capacitance   | $C_{iss}$     | $V_{DS}=15V, V_{GS}=0V, f=1MHz$                          |     |     | 1155      | pF         |
| Output Capacitance  | $C_{oss}$     |  |     | 108 |           |            |
| Reverse Transfer Capacitance                                  | $C_{rss}$     |  |     | 84  |           |            |
| Gate Resistance   | $R_g$         | $V_{DS}=0V, V_{GS}=0V, f=1MHz$                           |     |     | 3.6       | $\Omega$   |
| <b>Switching Characteristics<sup>(Note 5)</sup></b>           |               |  |     |     |           |            |
| Turn-On Delay Time  | $t_{d(on)}$   | $V_{GS}=10V, R_L=2.7\Omega, V_{DS}=15V, R_{GEN}=3\Omega$ |     |     | 5         | ns         |
| Turn-On Rise Time   | $t_r$         |  |     |     | 7         |            |
| Turn-Off Delay Time   | $t_{d(off)}$  |  |     |     | 40        |            |
| Turn-Off Fall Time  | $t_f$         |  |     |     | 6         |            |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |               |  |     |     |           |            |
| Diode Forward voltage <sup>(Note 4)</sup>                     | $V_{SD}$      | $V_{GS}=0V, I_S=1A$                                      |     |     | 1.0       | V          |

## Notes:

2. Repetitive Rating : Pulse width limited by maximum junction temperature.
3. Surface Mounted on FR4 Board,  $t < 5$  sec.
4. Pulse Test: Pulse Width $\leq 300\mu A$ , Duty Cycle $\leq 2\%$ .
5. Guaranteed by Design, Not Subject to Production Testing.

Curve Characteristics

Fig. 1 - Output Characteristics

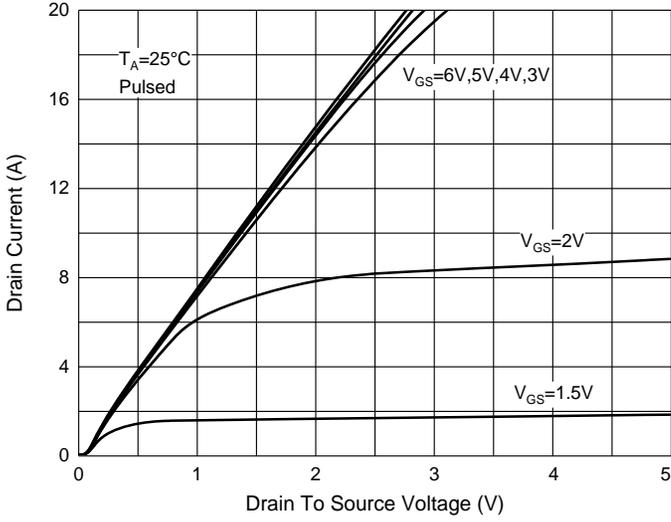


Fig. 2 - Transfer Characteristics

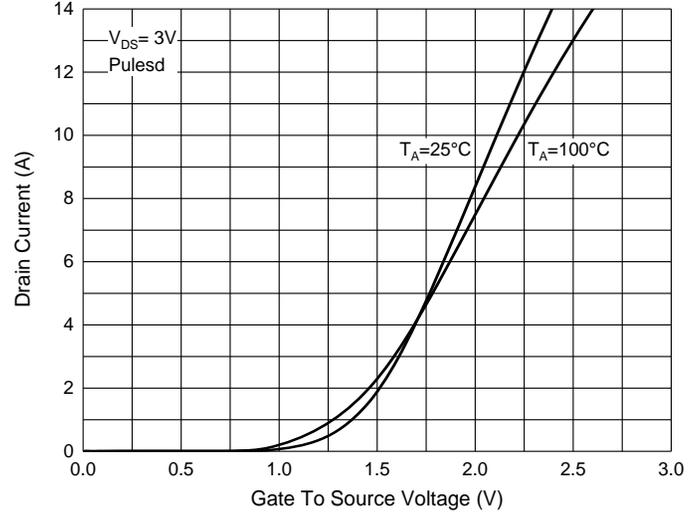


Fig. 3 -  $R_{DS(ON)} - I_D$

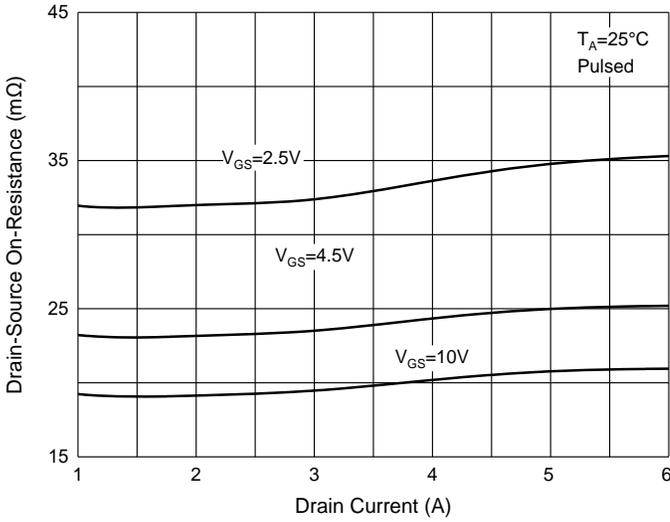


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

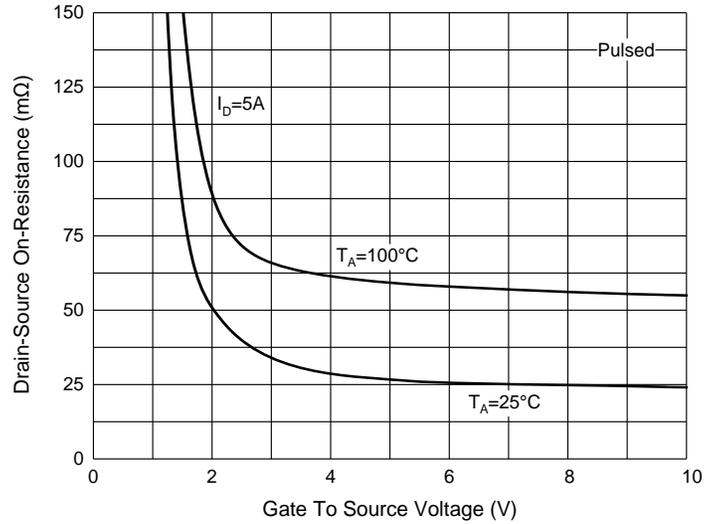


Fig. 5 -  $I_S - V_{SD}$

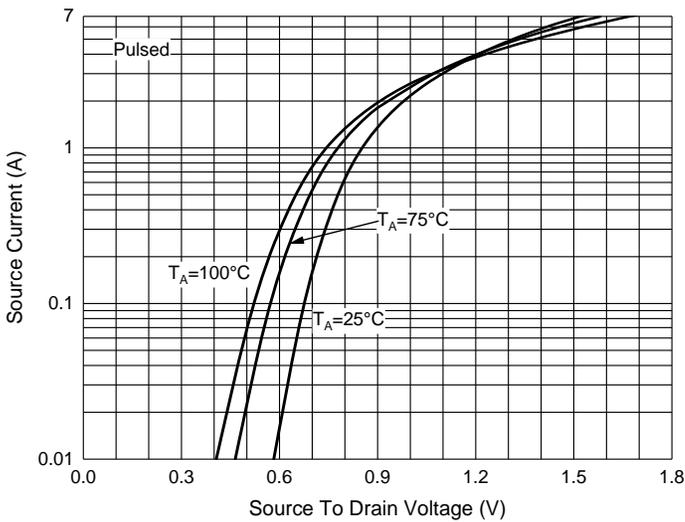
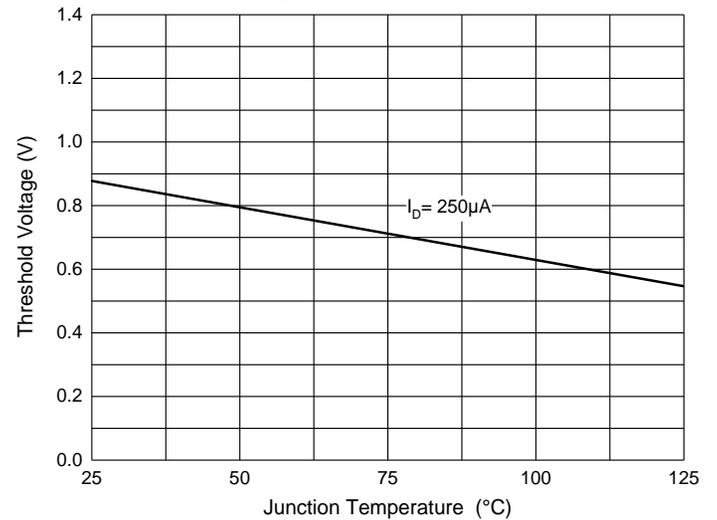


Fig. 6 - Threshold Voltage



## Ordering Information

| Device         | Packing              |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:3Kpcs/Reel |

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