

## Features

- Advanced Trench MOSFET Process Technology
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

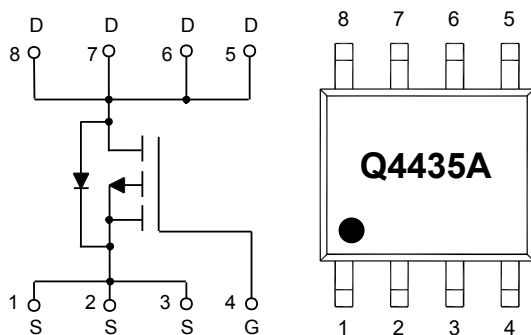
- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 89°C/W Junction to Ambient
- Thermal Resistance: 27.8°C/W Junction to Case

| Parameter                              | Symbol                 | Rating   | Unit |
|--|------------------------|----------|------|
| Drain -Source Voltage                  | $V_{DS}$               | -30      | V    |
| Gate -Source Voltage                   | $V_{GS}$               | $\pm 20$ | V    |
| Drain Current-Continuous               | $T_A=25^\circ\text{C}$ | -10      | A    |
|  | $T_A=85^\circ\text{C}$ | -7       | A    |
| Drain Current-Pulsed                   | $I_{DM}$               | -36      | A    |
| Power Dissipation                      | $P_D$ (Note5)          | 4.5      | W    |
| Single Pulsed Avalanche Energy (Note1) | $E_{AS}$               | 20       | mJ   |

### Note:

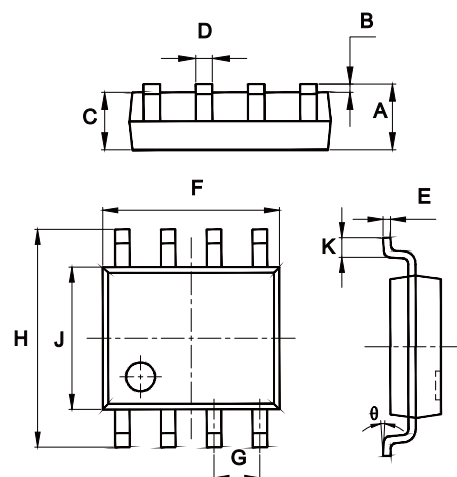
1. The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
2. The maximum current rating is package limited.
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ ,  $L=0.5\text{mH}$ , starting  $T_J=25^\circ\text{C}$ .
5.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.

## Internal Structure and Marking Code



# P-Channel Power MOSFET

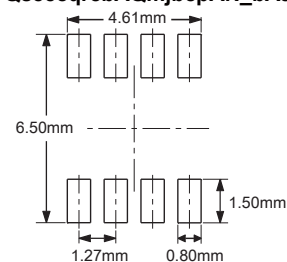
## SOP-8



### DIMENSIONS

| DIM      | INCHES |       | MM    |      | NOTE |
|----------|--------|-------|-------|------|------|
|          | MIN    | MAX   | MIN   | MAX  |      |
| A        | 0.053  | 0.069 | 1.35  | 1.75 |      |
| B        | 0.004  | 0.010 | 0.10  | 0.25 |      |
| C        | 0.053  | 0.061 | 1.35  | 1.55 |      |
| D        | 0.013  | 0.020 | 0.33  | 0.51 |      |
| E        | 0.007  | 0.010 | 0.17  | 0.25 |      |
| F        | 0.185  | 0.200 | 4.70  | 5.10 |      |
| G        | 0.050  |       | 1.270 |      | TYP. |
| H        | 0.228  | 0.244 | 5.80  | 6.20 |      |
| J        | 0.150  | 0.157 | 3.80  | 4.00 |      |
| K        | 0.016  | 0.050 | 0.40  | 1.27 |      |
| $\theta$ | 0°     | 8°    | 0°    | 8°   |      |

### QseecqrcbAQmjbcpAN\_bAJ\_wmsr



**ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise specified)**

| Parameter  | Symbol               | Test conditions  | Min  | Typ  | Max  | Unit |
|--|----------------------|--|------|------|------|------|
| <b>Static Characteristics</b>                      |                      |  |      |      |      |      |
| Drain-Source Breakdown Voltage                     | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA  | -30  |      |      | V    |
| Gate-Threshold Voltage <sup>(Note1)</sup>          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA  | -1.0 | -1.7 | -3.0 | V    |
| Gate-Body Leakage Current                          | I <sub>GSS</sub>     | V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0V  |      |      | ±100 | nA   |
| Zero Gate Voltage Drain Current                    | I <sub>DSS</sub>     | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V   |      |      | -1.0 | μA   |
| Drain-Source On-Resistance <sup>(Note1)</sup>      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-5.0A   |      | 14   | 24   | mΩ   |
|  |                      | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5.0A  |      | 23   | 35   |      |
| Forward Transconductance <sup>(Note1)</sup>        | g <sub>FS</sub>      | V <sub>DS</sub> =-10V, I <sub>D</sub> =-9.1A   | 20   |      |      | S    |
| <b>Dynamic Characteristics<sup>(Note2)</sup></b>   |                      |  |      |      |      |      |
| Input Capacitance                                  | C <sub>iss</sub>     | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz   |      | 1350 |      | pF   |
| Output Capacitance                                 | C <sub>oss</sub>     |  |      | 215  |      |      |
| Reverse Transfer Capacitance                       | C <sub>rss</sub>     |  |      | 185  |      |      |
| <b>Switching Characteristics<sup>(Note2)</sup></b> |                      |  |      |      |      |      |
| Turn-On Delay Time                                 | t <sub>d(on)</sub>   | V <sub>DD</sub> =-15V, I <sub>D</sub> =-1.0A, V <sub>GS</sub> =-10V<br>, R <sub>GEN</sub> =1Ω, R <sub>L</sub> =15Ω |      |      | 15   | ns   |
| Turn-On Rise Time                                  | t <sub>r</sub>       |  |      |      | 15   |      |
| Turn-Off Delay Time                                | t <sub>d(off)</sub>  |  |      |      | 70   |      |
| Turn-Off Fall Time                                 | t <sub>f</sub>       |  |      |      | 25   |      |
| Gate Resistance                                    | R <sub>g</sub>       | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz   |      | 5.8  |      | Ω    |
| Total Gate Charge                                  | Q <sub>g</sub>       | V <sub>DS</sub> =-15V, I <sub>D</sub> =-9.1A, V <sub>GS</sub> =-10V  |      |      | 50   | nC   |
|  |                      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-9.1A, V <sub>GS</sub> =-4.5V   |      |      | 25   |      |
| Gate-Source Charge                                 | Q <sub>gs</sub>      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-9.1A, V <sub>GS</sub> =-4.5V   |      | 4.0  |      |      |
| Gate-Drain Charge                                  | Q <sub>gd</sub>      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-9.1A, V <sub>GS</sub> =-4.5V   |      | 7.5  |      |      |
| <b>Drain-Source Diode Characteristics</b>          |                      |  |      |      |      |      |
| Diode Forward Voltage <sup>(Note1)</sup>           | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =-2A   |      |      | -1.2 | V    |
| Continuous Drain-Source Diode Forward Current      | I <sub>S</sub>       |  |      |      | -10  | A    |
| Pulsed Drain-Source Diode Forward Current          | I <sub>SM</sub>      |  |      |      | -36  | A    |

Note:

- 1.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
- 2.Guaranteed by design, not subject to production testing.

# Curve Characteristics

Fig. 1 - Output Characteristics

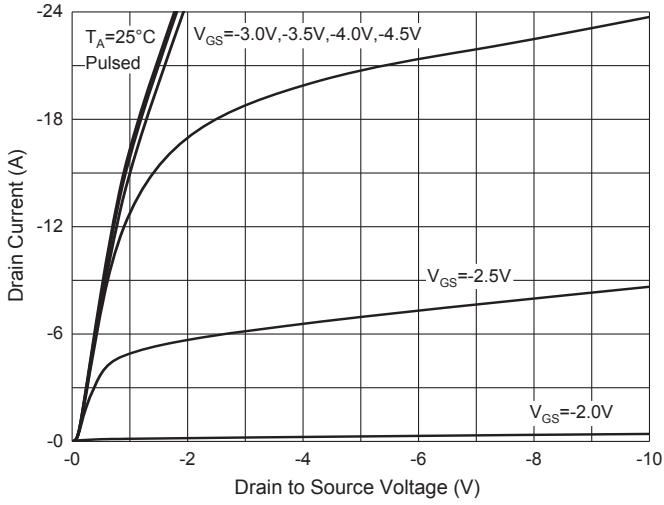


Fig. 2 - Transfer Characteristics

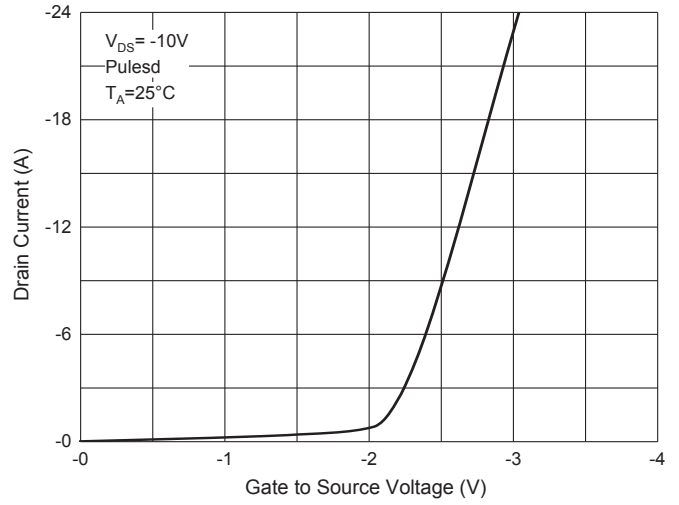


Fig. 3 -  $R_{DS(ON)} - I_D$

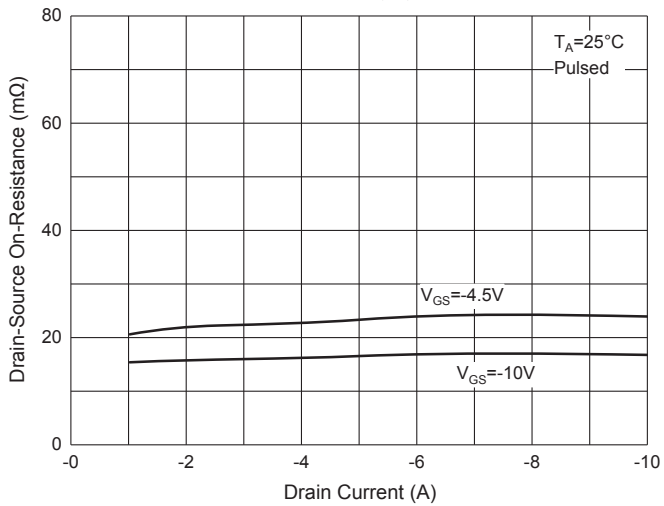


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

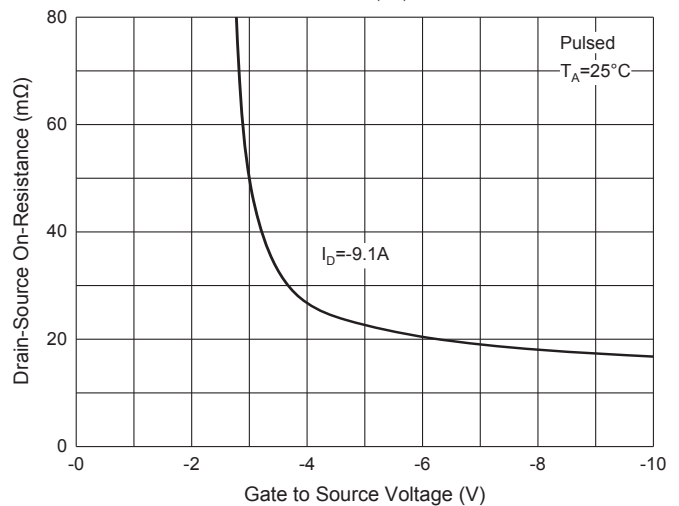


Fig. 5 - Threshold Voltage

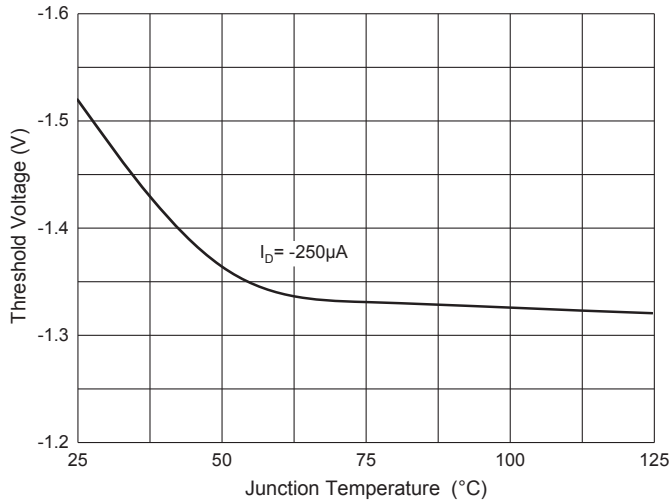


Fig. 6 -  $I_S - V_{SD}$

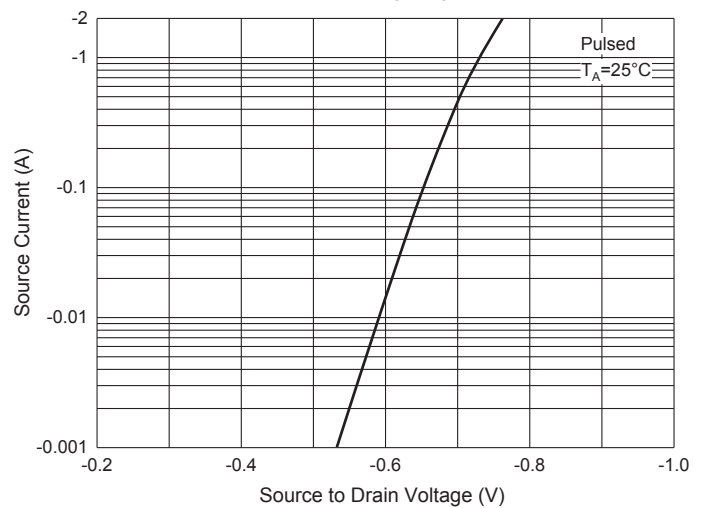
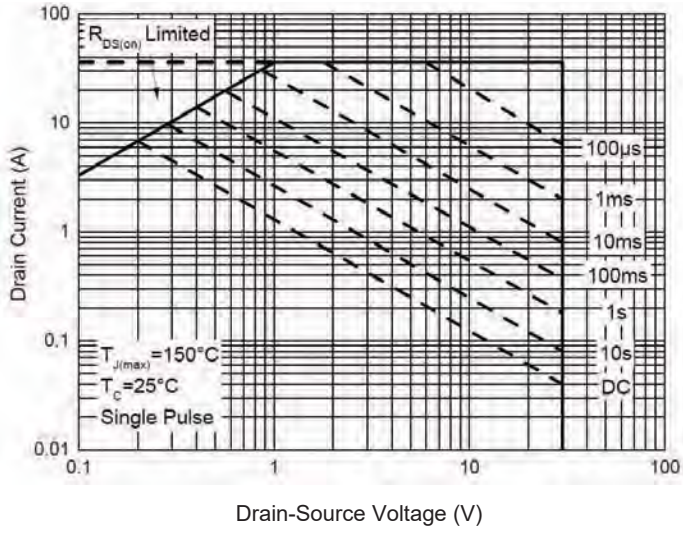


Fig.7-Safe Operation Area



## Ordering Information

| Device         | Packing              |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:4Kpcs/Reel |

Note : Adding "-HF" Suffix For Halogen Free, eg. Part Number-TP-HF

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