

## Features

- Trench LV MOSFET Technology
- High Density Cell Design For Ultra Low  $R_{DS(on)}$
- Moisture Sensitivity Level 3
- Halogen Free."Green"Device(Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

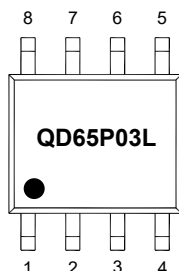
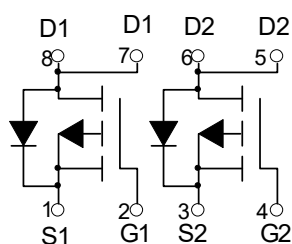
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 100°C/W Junction to Ambient (Note 2)

| Thermal Resistance: 100 °C/W Junction to Ambient |                       |                 |        |      |
|--------------------------------------------------|-----------------------|-----------------|--------|------|
| Parameter                                        |                       | Symbol          | Rating | Unit |
| Drain-Source Voltage                             |                       | V <sub>DS</sub> | -30    | V    |
| Gate-Source Voltage                              |                       | V <sub>GS</sub> | ±20    | V    |
| Continuous Drain Current                         | T <sub>A</sub> =25°C  | I <sub>D</sub>  | -4     | A    |
|                                                  | T <sub>A</sub> =100°C |                 | -2.5   |      |
| Pulsed Drain Current <sup>(Note 3)</sup>         |                       | I <sub>DM</sub> | -16    | A    |
| Total Power Dissipation <sup>(Note 4)</sup>      |                       | P <sub>D</sub>  | 1.25   | W    |

Note:

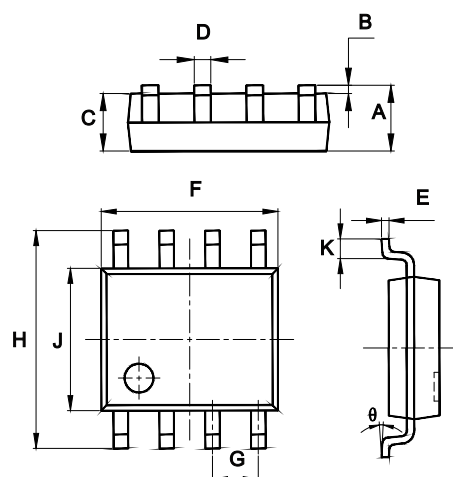
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-ambient thermal resistance.

## Internal Structure and Marking Code



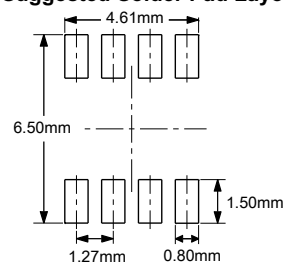
## Dual P-Channel Power MOSFET

### SOP-8



| 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°   |      |

### Suggested Solder Pad Layout



# Electrical Characteristics @ 25°C (Unless Otherwise Specified)

| Parameter                       | Symbol               | Test Conditions                                                             | Min | Typ  | Max  | Unit |
|---------------------------------|----------------------|-----------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics          |                      |                                                                             |     |      |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                                 | -30 |      |      | V    |
| Gate-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                  |     |      | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                  |     |      | 1    | μA   |
| Gate-Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                   | -1  | -1.5 | -2.4 | V    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-4A                                  |     | 50   | 65   | mΩ   |
|                                 |                      | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.2A                               |     | 80   | 110  |      |
| Gate Resistance                 | R <sub>g</sub>       | f=1 MHz, Open drain                                                         |     | 17   |      | Ω    |
| Diode Characteristics           |                      |                                                                             |     |      |      |      |
| Continuous Body Diode Current   | I <sub>S</sub>       |                                                                             |     |      | -4   | A    |
| Diode Forward Voltage           | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =-4A                                    |     |      | -1.2 | V    |
| Reverse Recovery Time           | t <sub>rr</sub>      | I <sub>F</sub> =-3A, dI <sub>F</sub> /dt=100A/μs                            |     | 12   |      | ns   |
| Reverse Recovery Charge         | Q <sub>rr</sub>      |                                                                             |     | 4    |      | nC   |
| Dynamic Characteristics         |                      |                                                                             |     |      |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =-15V,V <sub>GS</sub> =0V,f=1MHz                            |     | 260  |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                             |     | 50   |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                             |     | 40   |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =-15V,V <sub>GS</sub> =-10V,I <sub>D</sub> =-3A             |     | 7    |      | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                             |     | 2    |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                             |     | 1    |      |      |
| Turn-On Delay Time              | t <sub>d(on)</sub>   | V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V,<br>RG=3Ω,I <sub>DS</sub> =-3A |     | 5    |      | ns   |
| Turn-On Rise Time               | t <sub>r</sub>       |                                                                             |     | 23   |      |      |
| Turn-Off Delay Time             | t <sub>d(off)</sub>  |                                                                             |     | 21   |      |      |
| Turn-Off Fall Time              | t <sub>f</sub>       |                                                                             |     | 30   |      |      |

## Curve Characteristics

Fig.1 - Typical Output Characteristics

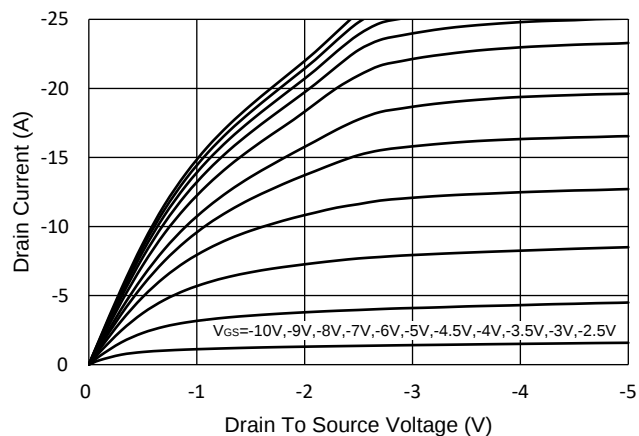


Fig.2 - Transfer Characteristics

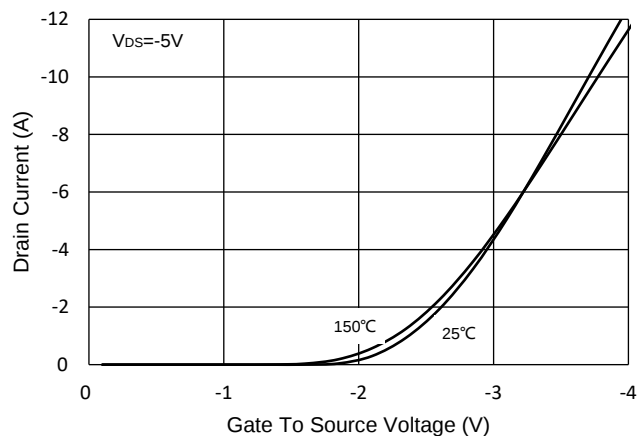


Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$

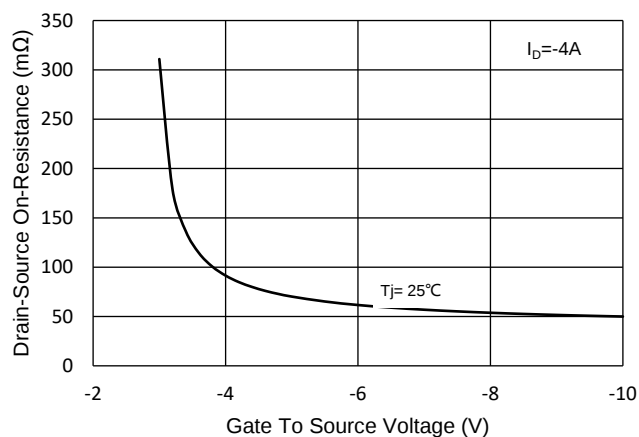


Fig.4 -  $R_{DS(ON)}$  -  $I_D$

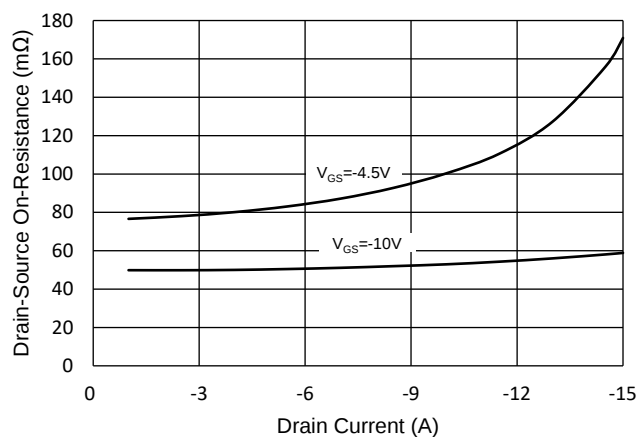


Fig.5 - Capacitance Characteristics

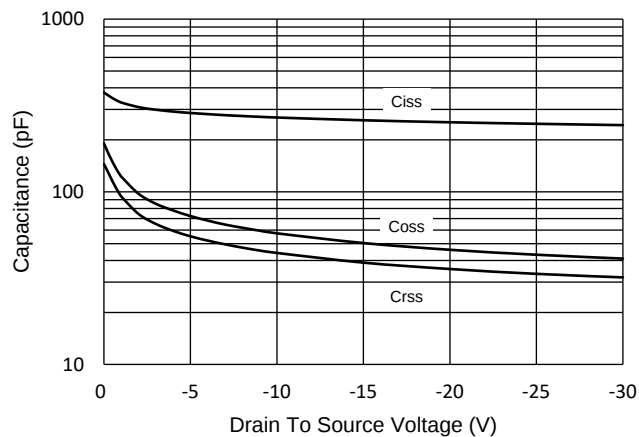
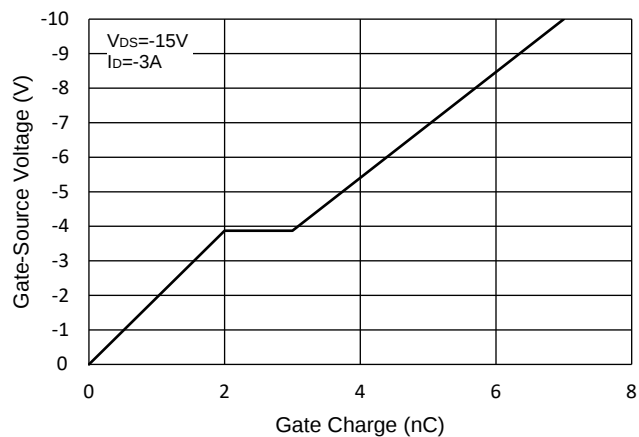


Fig.6 - Gate Charge



## Curve Characteristics

Fig.7 - Normalized Threshold Voltage

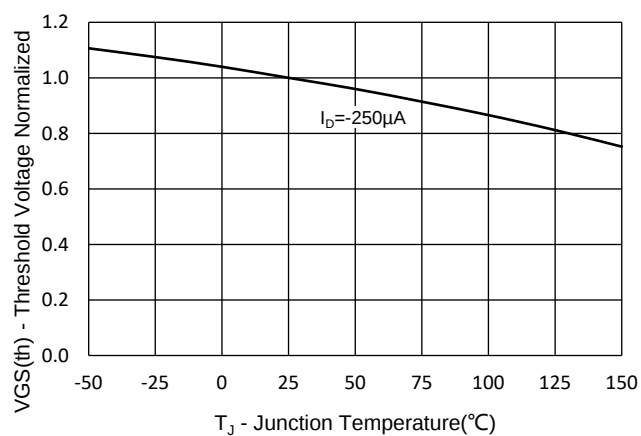


Fig.8 - Normalized On Resistance Characteristics

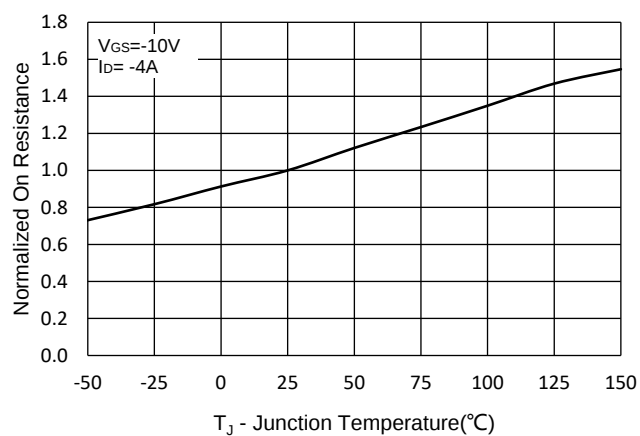


Fig.9 -  $I_S - V_{SD}$

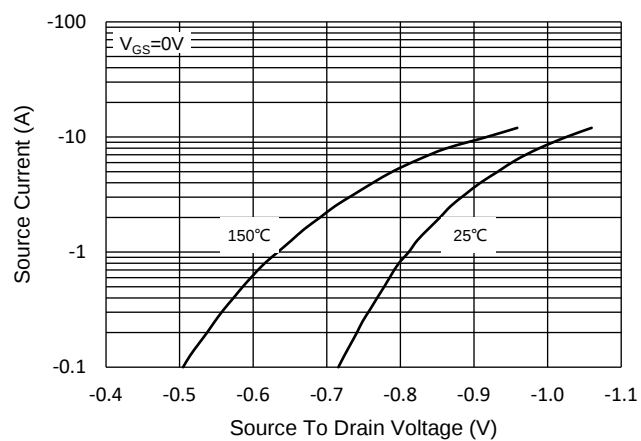


Fig.10 - Drain Current

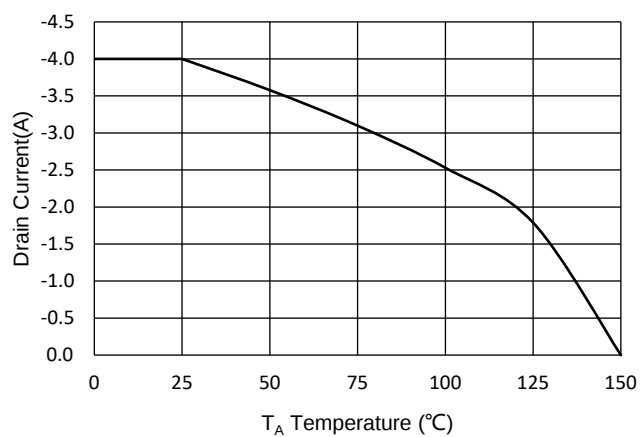
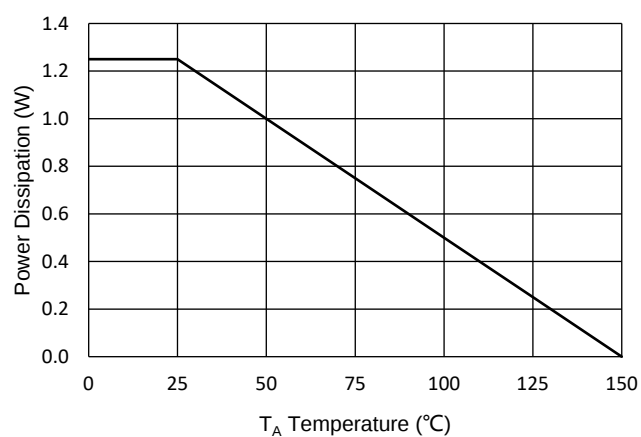


Fig.11 - PD Dissipation



## Curve Characteristics

Fig.12 - Safe Operation Area

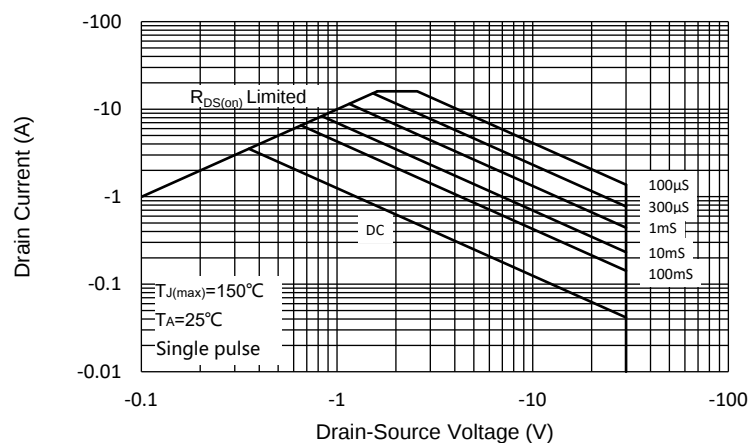
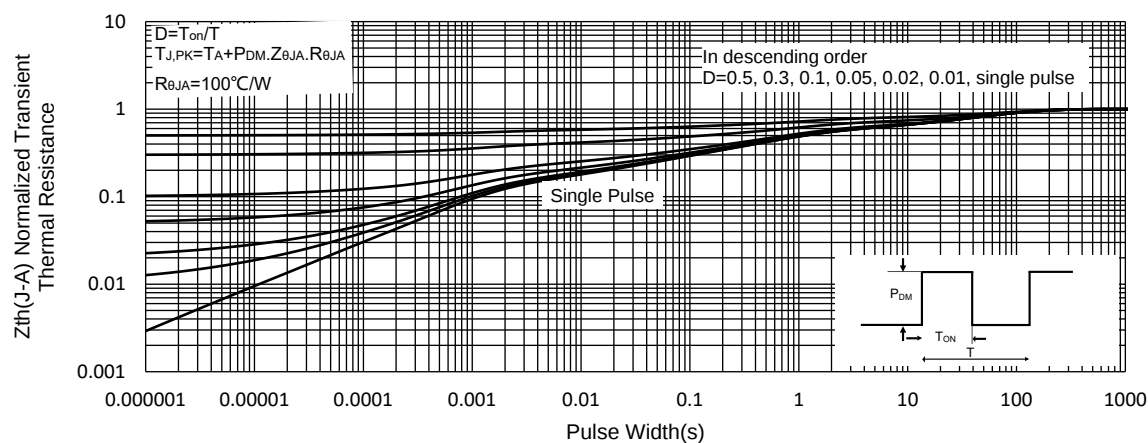


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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