

## Features

- AEC-Q101 Qualified
- Trench MOSFET Technology
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

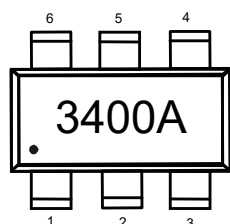
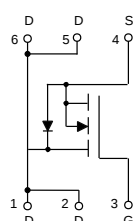
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Maximum Thermal Resistance: 70°C/W Junction to Ambient (Note2)

| Parameter                       | Symbol   | Rating   | Unit |
|---------------------------------|----------|----------|------|
| Drain-Source Voltage            | $V_{DS}$ | 30       | V    |
| Gate-Source Voltage             | $V_{GS}$ | $\pm 12$ | V    |
| Continuous Drain Current        | $I_D$    | 5.8      | A    |
|                                 |          | 3.7      |      |
| Pulsed Drain Current (Note3)    | $I_{DM}$ | 23       | A    |
| Total Power Dissipation (Note4) | $P_D$    | 1.8      | W    |

Note:

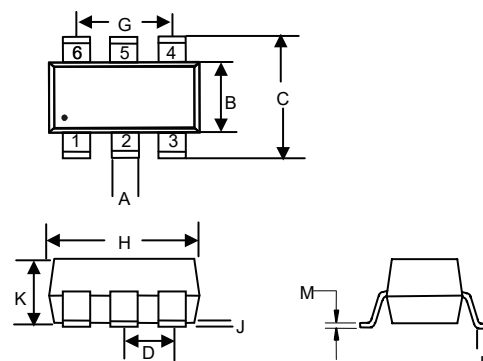
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ . The Power dissipation  $P_{DSM}$  is based on  $R_{\theta JA} \leq 10\text{s}$  and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
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



## N-CHANNEL MOSFET

### SOT23-6L



| DIM | INCHES |       | MM   |      | NOTE |
|-----|--------|-------|------|------|------|
|     | MIN    | MAX   | MIN  | MAX  |      |
| A   | 0.012  | 0.020 | 0.30 | 0.50 |      |
| B   | 0.051  | 0.070 | 1.30 | 1.80 |      |
| C   | 0.087  | 0.126 | 2.20 | 3.20 |      |
| D   | 0.037  |       | 0.95 |      | TYP. |
| G   | 0.074  |       | 1.90 |      | TYP. |
| H   | 0.106  | 0.122 | 2.70 | 3.10 |      |
| J   | 0.002  | 0.006 | 0.05 | 0.15 |      |
| K   | 0.030  | 0.051 | 0.75 | 1.30 |      |
| L   | 0.012  | 0.024 | 0.30 | 0.60 |      |
| M   | 0.003  | 0.008 | 0.08 | 0.22 |      |

**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-Body Leakage Current          | I <sub>GSS</sub>     | V <sub>GS</sub> =±12V, 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    | μA   |
| Gate-Threshold Voltage             | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 0.5 | 0.9  | 1.5  | V    |
| Drain-Source On-Resistance         | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =5.6A                                             |     | 20   | 26   | mΩ   |
|                                    |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                                              |     | 21.5 | 33   |      |
| Forward Transconductance           | g <sub>fs</sub>      | V <sub>DS</sub> =5V, I <sub>D</sub> =5A                                                |     | 20   |      | S    |
| Gate Resistance                    | R <sub>g</sub>       | F=1 MHz, Open drain                                                                    |     | 12   |      | Ω    |
| Drain-Source Diode Characteristics |                      |                                                                                        |     |      |      |      |
| Diode Forward Current              | I <sub>S</sub>       |                                                                                        |     |      | 5.8  | A    |
| Diode Forward Voltage              | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>s</sub> =5.6A                                              |     |      | 1.2  | V    |
| Reverse Recovery Time              | t <sub>rr</sub>      | I <sub>F</sub> =5.6A,di/dt=100A/us                                                     |     | 10   |      | nS   |
| Reverse Recovery Charge            | Q <sub>rr</sub>      |                                                                                        |     | 3.7  |      | nC   |
| Dynamic Characteristics            |                      |                                                                                        |     |      |      |      |
| Input Capacitance                  | C <sub>iss</sub>     | V <sub>DS</sub> =15V,V <sub>GS</sub> =0V, f=1MHz                                       |     | 580  |      | pF   |
| Output Capacitance                 | C <sub>oss</sub>     |                                                                                        |     | 60   |      |      |
| Reverse Transfer Capacitance       | C <sub>rss</sub>     |                                                                                        |     | 50   |      |      |
| Total Gate Charge                  | Q <sub>g</sub>       | V <sub>DS</sub> =15V,V <sub>GS</sub> =10V,I <sub>D</sub> =5.6A                         |     | 16.3 |      | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>      |                                                                                        |     | 2.2  |      |      |
| Gate-Drain Charge                  | Q <sub>gd</sub>      |                                                                                        |     | 2.1  |      |      |
| Turn-on Delay Time                 | t <sub>d(on)</sub>   | V <sub>DD</sub> =15V,V <sub>GS</sub> =10V<br>, I <sub>D</sub> =5.6A,R <sub>G</sub> =3Ω |     | 5.5  |      | ns   |
| Turn-on Rise Time                  | t <sub>r</sub>       |                                                                                        |     | 28.3 |      |      |
| Turn-off Delay Time                | t <sub>d(off)</sub>  |                                                                                        |     | 24.8 |      |      |
| Turn-off Fall Time                 | t <sub>f</sub>       |                                                                                        |     | 13.7 |      |      |

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

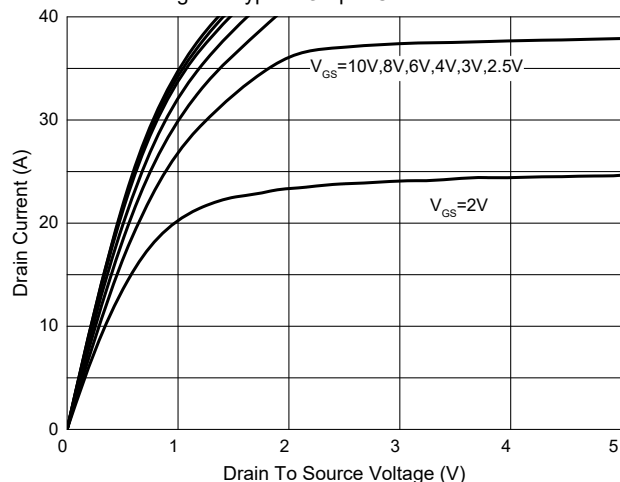


Fig. 2 - Transfer Characteristics

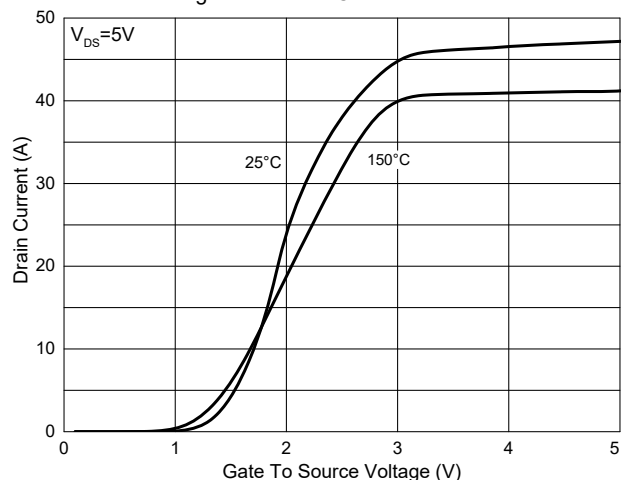


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

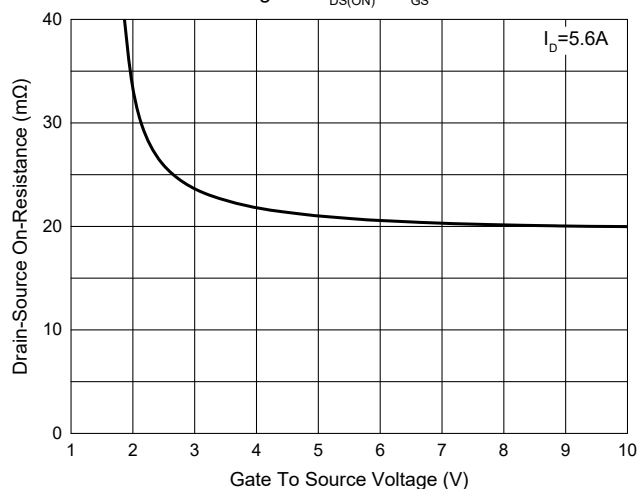


Fig. 4 -  $R_{DS(ON)} - I_D$

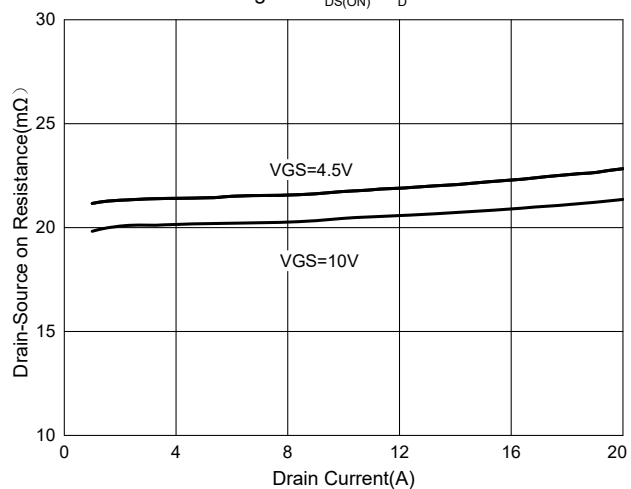


Fig. 5 - Capacitance Characteristics

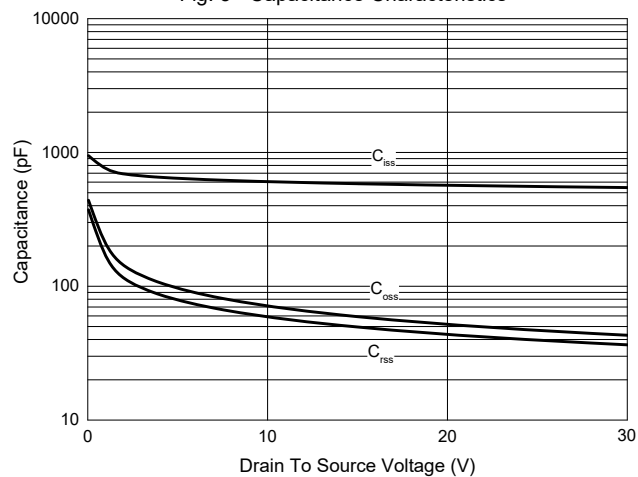
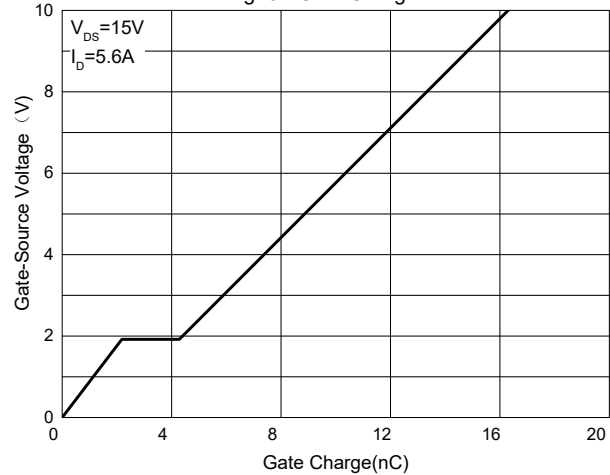


Fig. 6 - Gate Charge



## Curve Characteristics

Fig. 7 - Nomalized Threshold Voltage

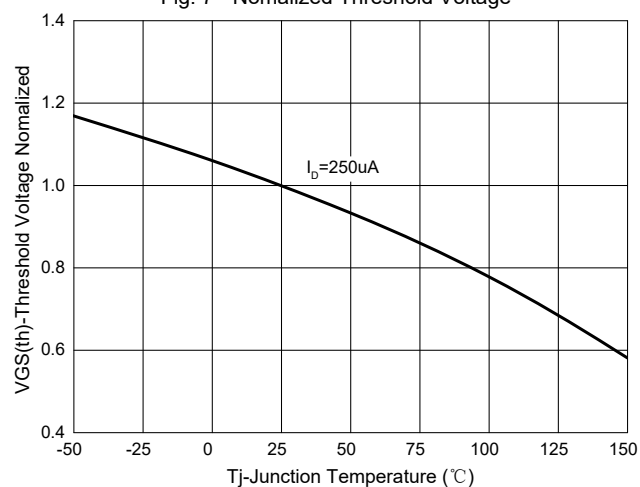


Fig.8-Normalized On Resistance Characteristics

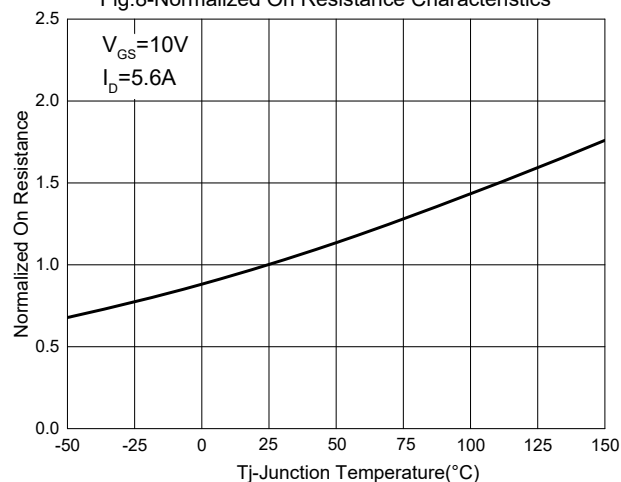


Fig.9 -  $I_S - V_{SD}$

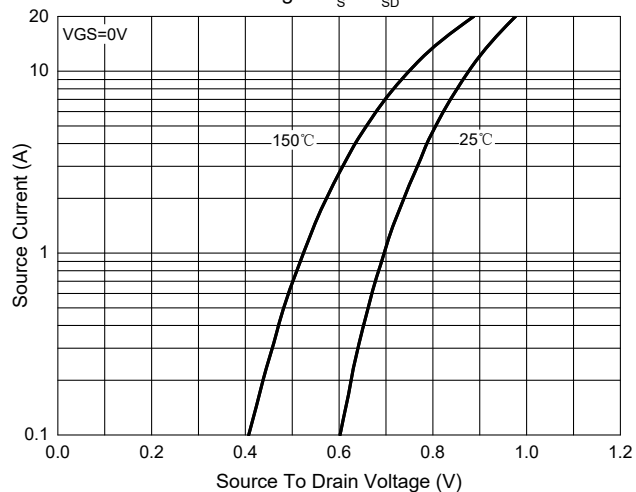


Fig. 10 - Drain Current

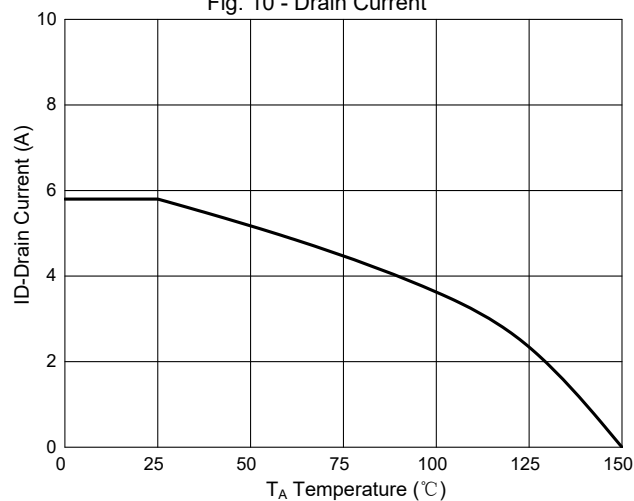
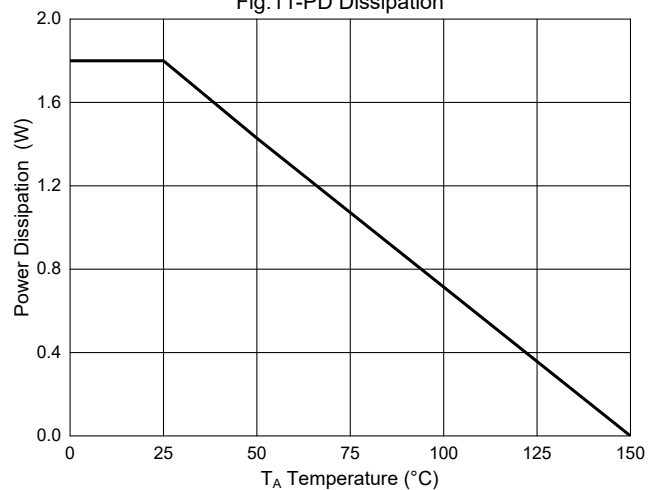


Fig.11-PD Dissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

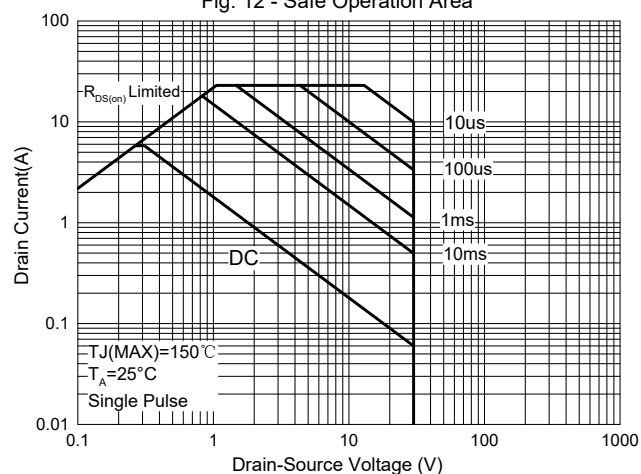
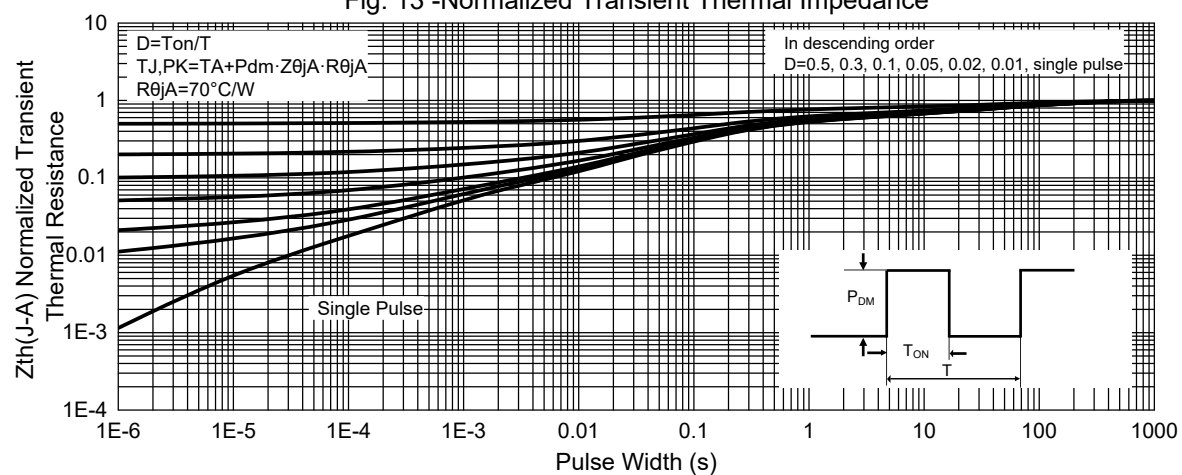


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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