

## Features

- Trench LV MOSFET Technology
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device<sup>(Note1)</sup>
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

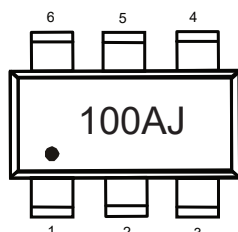
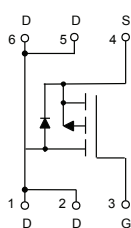
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 84°C/W Junction to Ambient<sup>(Note2)</sup>

| Parameter                                  | Symbol                    | Rating | Unit  |
|--------------------------------------------|---------------------------|--------|-------|
| Drain-Source Voltage                       | $V_{DS}$                  | -60    | V     |
| Gate-Source Voltage                        | $V_{GS}$                  | ±20    | V     |
| Continuous Drain Current                   | $T_A=25^{\circ}\text{C}$  | $I_D$  | -2.81 |
|                                            | $T_A=100^{\circ}\text{C}$ |        | -1.77 |
| Pulsed Drain Current <sup>(Note3)</sup>    | $I_{DM}$                  | -11.2  | A     |
| Total Power Dissipation <sup>(Note4)</sup> | $P_D$                     | 1.48   | W     |

Note:

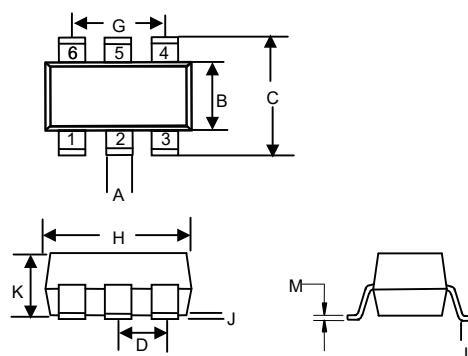
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The Value of  $R_{\theta JA}$  is Measured with the Device Mounted on 1in2 FR-4 Board with 1oz. Copper, in a Still Air Environment with  $T_A=25^{\circ}\text{C}$ .
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



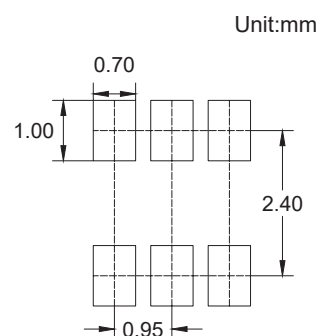
## P-Channel MOSFET

### 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 |      |

### 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  | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$                            | -60  |      |           | V          |
| Gate-Source Leakage Current     | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 20V$                           |      |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current | $I_{DSS}$     | $V_{DS}=-60V, V_{GS}=0V$                              |      |      | -1        | $\mu A$    |
| Gate-Threshold Voltage          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=-250\mu A$                        | -1.2 | -1.7 | -2.2      | V          |
| Drain-Source On-Resistance      | $R_{DS(on)}$  | $V_{GS}=-10V, I_D=-2A$                                |      | 75   | 100       | m $\Omega$ |
|                                 |               | $V_{GS}=-4.5V, I_D=-1A$                               |      | 93   | 120       |            |
| Gate Resistance                 | $R_g$         | f=1 MHz, Open Drain                                   |      | 5.8  |           | $\Omega$   |
| Diode Characteristics           |               |                                                       |      |      |           |            |
| Continuous Body Diode Current   | $I_S$         |                                                       |      |      | -2.81     | A          |
| Diode Forward Voltage           | $V_{SD}$      | $V_{GS}=0V, I_S=-2A$                                  |      |      | -1.2      | V          |
| Reverse Recovery Time           | $t_{rr}$      | $I_F=-2A, di_F/dt=100A/\mu s$                         |      | 17   |           | ns         |
| Reverse Recovery Charge         | $Q_{rr}$      |                                                       |      | 16   |           | nC         |
| Dynamic Characteristics         |               |                                                       |      |      |           |            |
| Input Capacitance               | $C_{iss}$     | $V_{DS}=-30V, V_{GS}=0V, f=1MHz$                      |      | 931  |           | pF         |
| Output Capacitance              | $C_{oss}$     |                                                       |      | 44   |           |            |
| Reverse Transfer Capacitance    | $C_{rss}$     |                                                       |      | 36   |           |            |
| Total Gate Charge               | $Q_g$         | $V_{DS}=-30V, V_{GS}=-10V, I_D=-2A$                   |      | 18   |           | nC         |
| Gate-Source Charge              | $Q_{gs}$      |                                                       |      | 2.4  |           |            |
| Gate-Drain Charge               | $Q_{gd}$      |                                                       |      | 2.1  |           |            |
| Turn-On Delay Time              | $t_{d(on)}$   | $V_{DS}=-30V, V_{GS}=-10V$<br>$R_G=3\Omega, I_D=-2A,$ |      | 6.7  |           | ns         |
| Turn-On Rise Time               | $t_r$         |                                                       |      | 3    |           |            |
| Turn-Off Delay Time             | $t_{d(off)}$  |                                                       |      | 28   |           |            |
| Turn-Off Fall Time              | $t_f$         |                                                       |      | 5.6  |           |            |

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

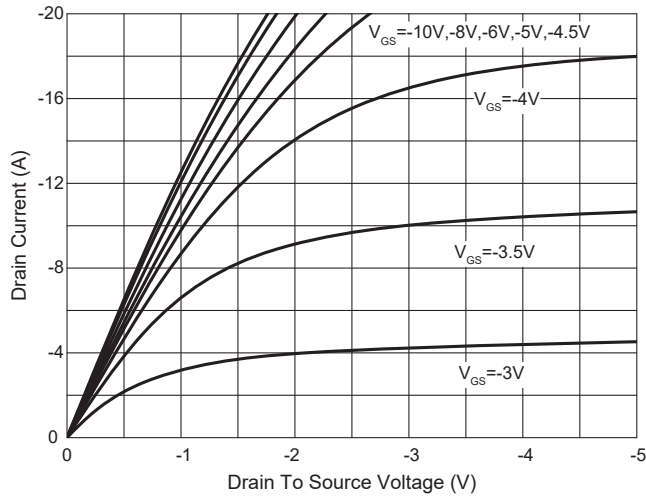


Fig. 2 - Transfer Characteristics

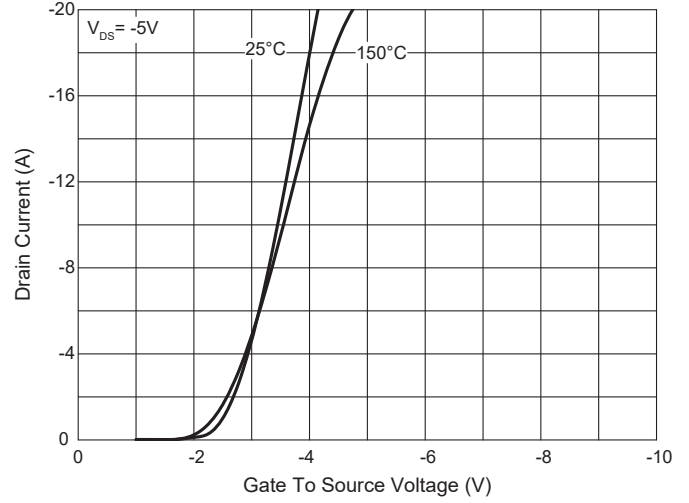


Fig.3- $R_{DS(ON)}$ - $V_{GS}$

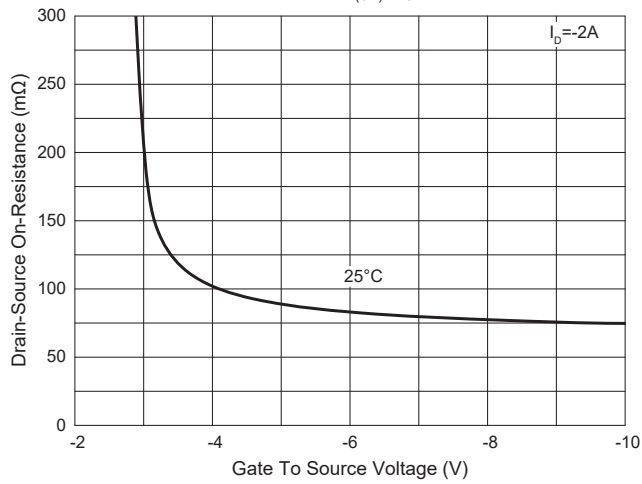


Fig.4- $R_{DS(ON)}$ - $I_D$

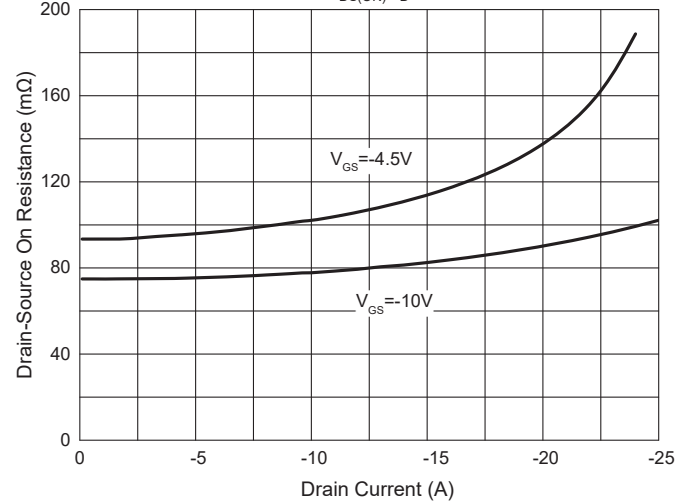


Fig. 5 - Capacitance Characteristics

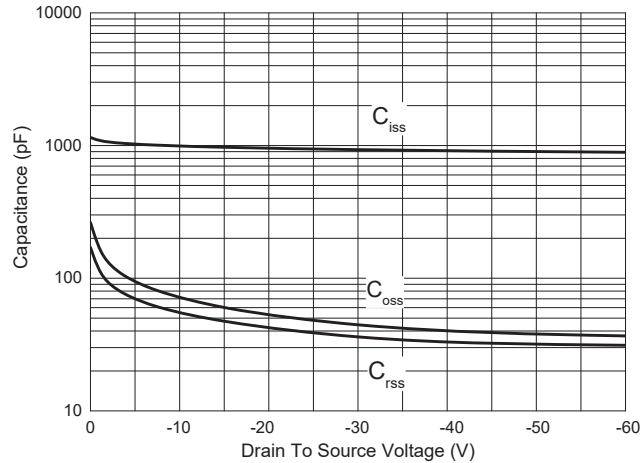
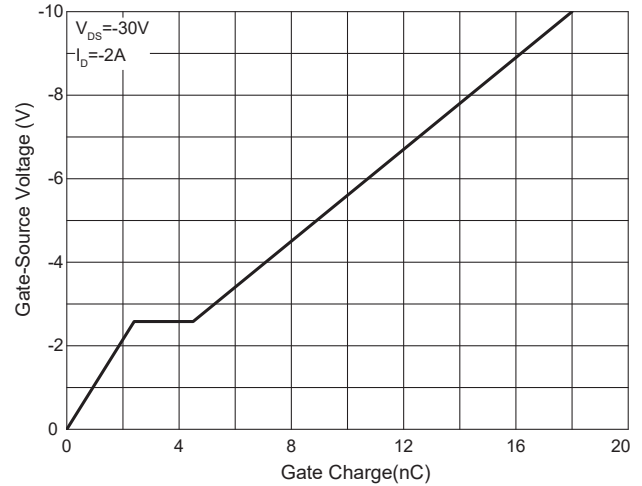


Fig. 6 - Gate Charge



## Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

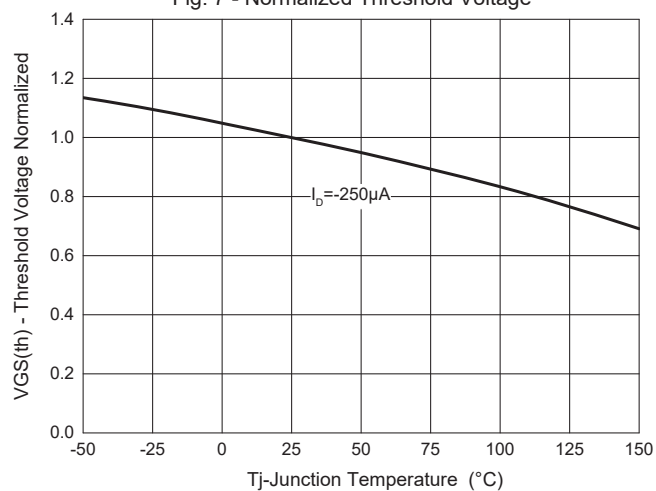


Fig. 8 - Normalized On Resistance Characteristics

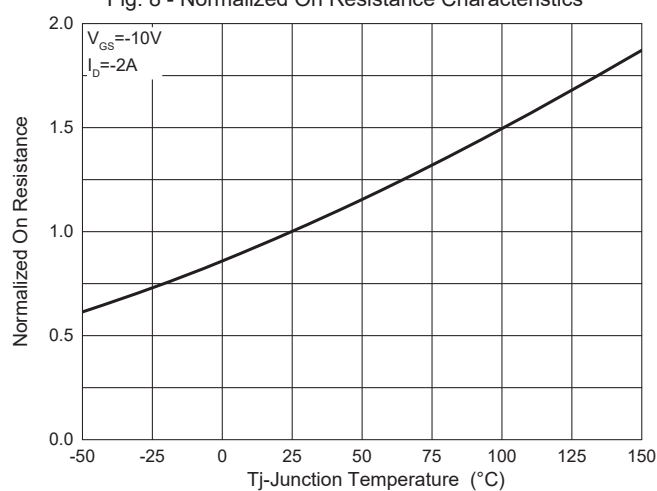


Fig.9- $I_S$ - $V_{SD}$

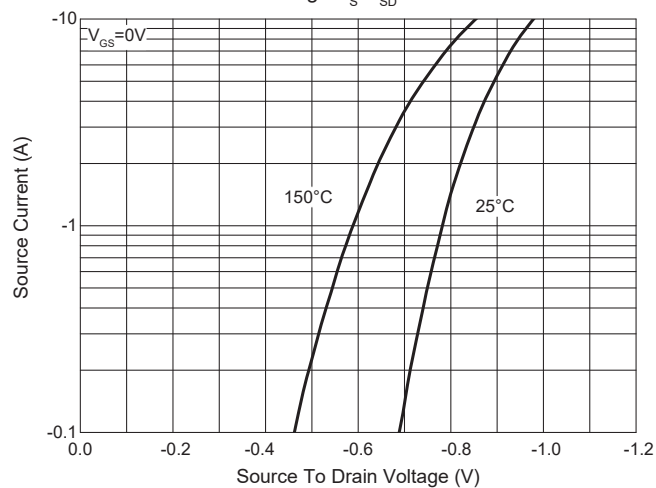


Fig. 10 - Drain Current

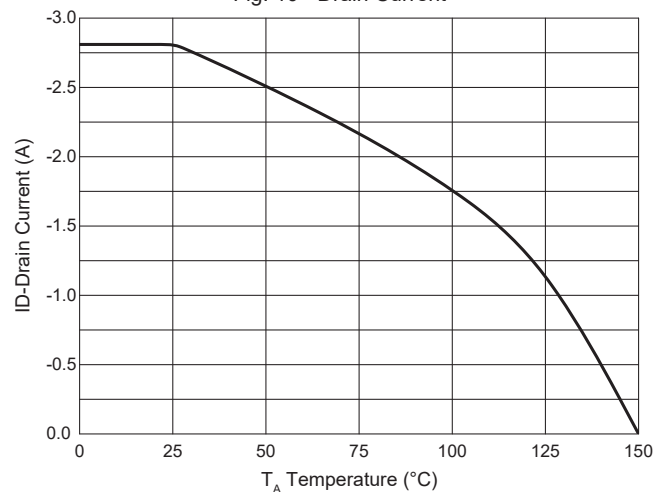
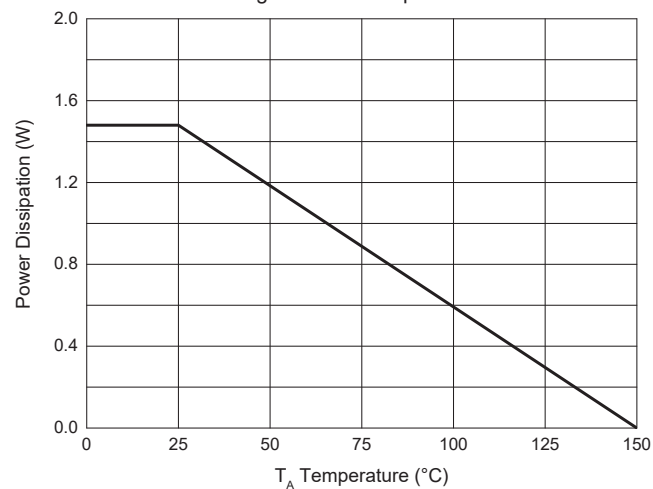


Fig. 11 - PD Dissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

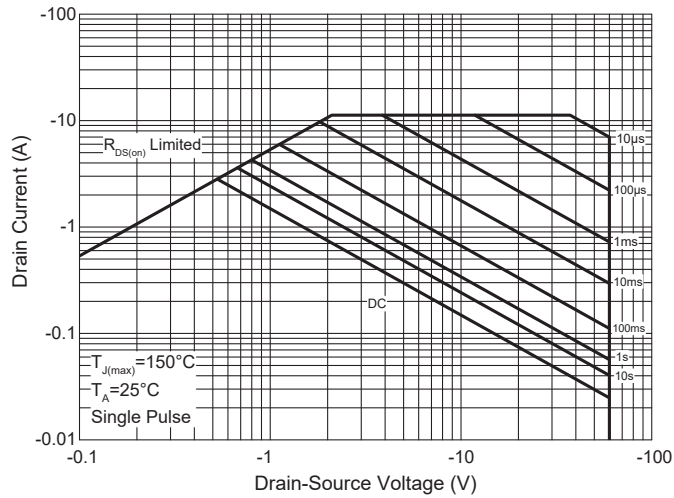
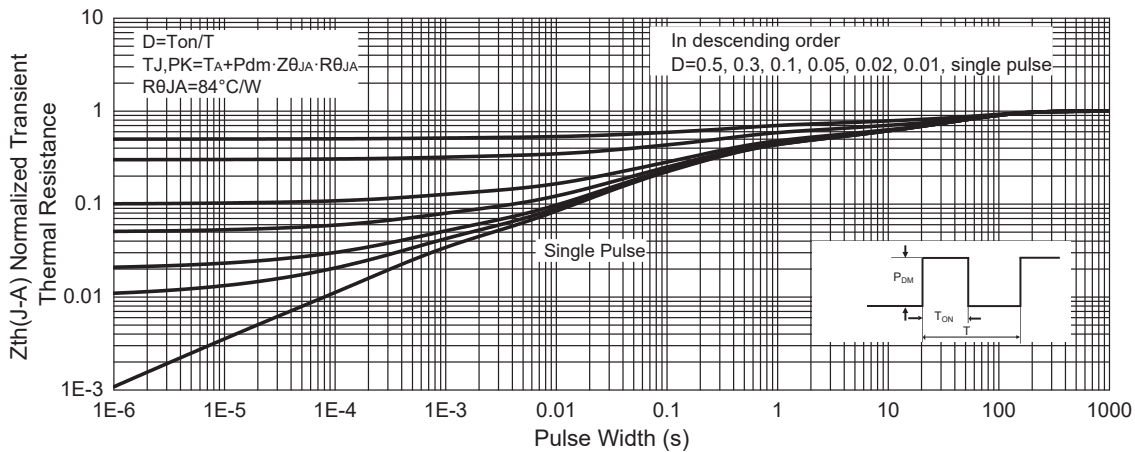


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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