

# LP2301ALT1G

## S-LP2301ALT1G

20V P-Channel Enhancement-Mode MOSFET

### 1. FEATURES

- $V_{DS} = -20V$
- $R_{DS(ON)}, V_{GS@-2.5V}, I_{DS@-2.0A} = 150m\Omega$
- $R_{DS(ON)}, V_{GS@-4.5V}, I_{DS@-2.8A} = 110m\Omega$
- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.

### 2. APPLICATIONS

- Power management in note book
- Portable equipment
- Battery powered system
- Load switch
- DSC

### 3. DEVICE MARKING AND ORDERING INFORMATION

| Device      | Marking | Shipping        |
|-------------|---------|-----------------|
| LP2301ALT1G | 01A     | 3000/Tape&Reel  |
| LP2301ALT3G | 01A     | 10000/Tape&Reel |

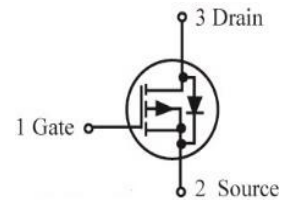
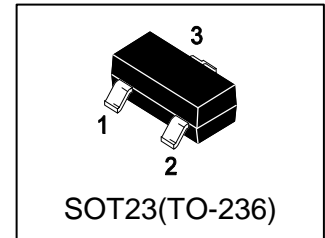
### 4. MAXIMUM RATINGS( $T_a = 25^\circ C$ )

| Parameter                           | Symbol    | Limits  | Unit |
|-------------------------------------|-----------|---------|------|
| Drain–Source Voltage                | $V_{DSS}$ | -20     | V    |
| Gate–to–Source Voltage – Continuous | $V_{GS}$  | $\pm 8$ | V    |
| Drain Current(Note 1)               |           |         | A    |
| – Continuous $T_A = 25^\circ C$     | $I_D$     | -2      |      |
| – Pulsed                            | $I_{DM}$  | -10     |      |

### 5. THERMAL CHARACTERISTICS

| Parameter                                       | Symbol          | Limits          | Unit         |
|---|-----------------|-----------------|--------------|
| Maximum Power Dissipation                       | PD              | 0.7             | W            |
| Thermal Resistance, Junction–to–Ambient(Note 1) | $R_{\theta JA}$ | 175             | $^\circ C/W$ |
| Junction and Storage temperature                | $T_J, T_{stg}$  | $-55 \sim +150$ | $^\circ C$   |

1. The device mounted on 1in<sup>2</sup> FR5 board with 2 oz copper.



## 6. ELECTRICAL CHARACTERISTICS (Ta= 25°C)

### OFF CHARACTERISTICS

| Characteristic  | Symbol | Min. | Typ. | Max. | Unit |
|---|--------|------|------|------|------|
| Drain–Source Breakdown Voltage<br>(VGS = 0, ID = -250μAdc)  | VBRDSS | -20  | -    | -    | Vdc  |
| Zero Gate Voltage Drain Current<br>(VGS = 0, VDS = -20 Vdc) | IDSS   | -    | -    | -1   | μAdc |
| Gate–Body Leakage Current, Forward<br>(VGS = 8 Vdc)         | IGSSF  | -    | -    | 100  | nAdc |
| Gate–Body Leakage Current, Reverse<br>(VGS = - 8 Vdc)       | IGSSR  | -    | -    | -100 | nAdc |

### ON CHARACTERISTICS (Note 2)

|   |         |      |           |            |     |
|---|---------|------|-----------|------------|-----|
| Gate Threshold Voltage<br>(VDS = VGS, ID = -250μAdc)  | VGS(th) | -0.4 | -0.6      | -          | Vdc |
| Static Drain–Source On–State Resistance<br>(VGS = -4.5 Vdc, ID = -2.8 Adc)<br>(VGS = -2.5 Vdc, ID = -2 Adc) | RDS(on) | -    | 90<br>110 | 110<br>150 | mΩ  |

### DYNAMIC CHARACTERISTICS

|   |      |   |     |   |    |
|---|------|---|-----|---|----|
| Input Capacitance<br>(VGS = 0 V, f = 1.0MHz, VDS= -15 V)            | Ciss | - | 480 | - | pF |
| Output Capacitance<br>(VGS = 0 V, f = 1.0MHz, VDS= -15 V)           | Coss | - | 46  | - | pF |
| Reverse Transfer Capacitance<br>(VGS = 0 V, f = 1.0MHz, VDS= -15 V) | Crss | - | 10  | - | pF |

### SWITCHING CHARACTERISTICS

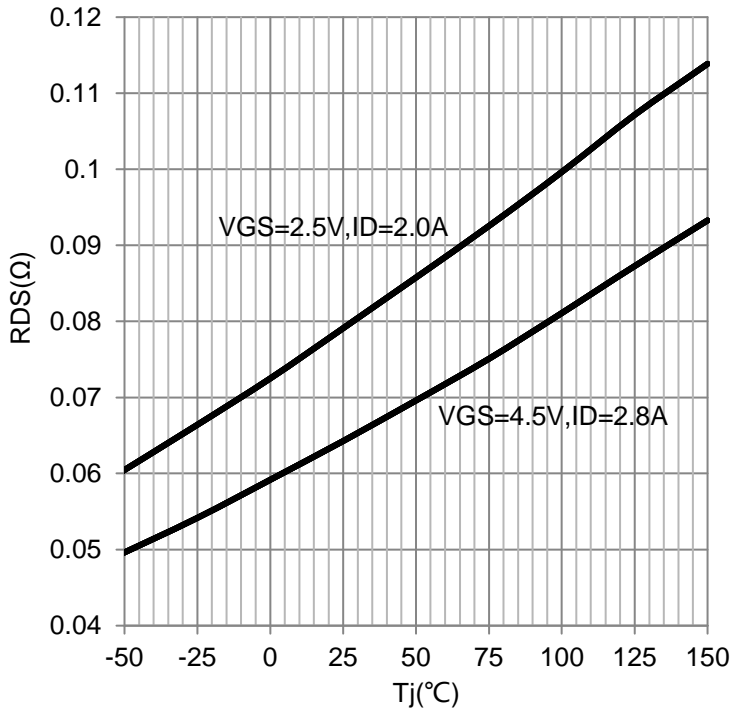
|                     |   |         |   |    |   |    |
|---------------------|---|---------|---|----|---|----|
| Turn-On Delay Time  | (VDS=-6V, RL =6Ω,<br>RGEN=6Ω ,VGS=-4.5V ) | td(on)  | - | 50 | - | ns |
| Rise Time           |   | tr      | - | 30 | - |    |
| Turn-Off Delay Time |   | td(off) | - | 40 | - |    |
| Fall Time           |   | tf      | - | 11 | - |    |

### SOURCE–DRAIN DIODE CHARACTERISTICS

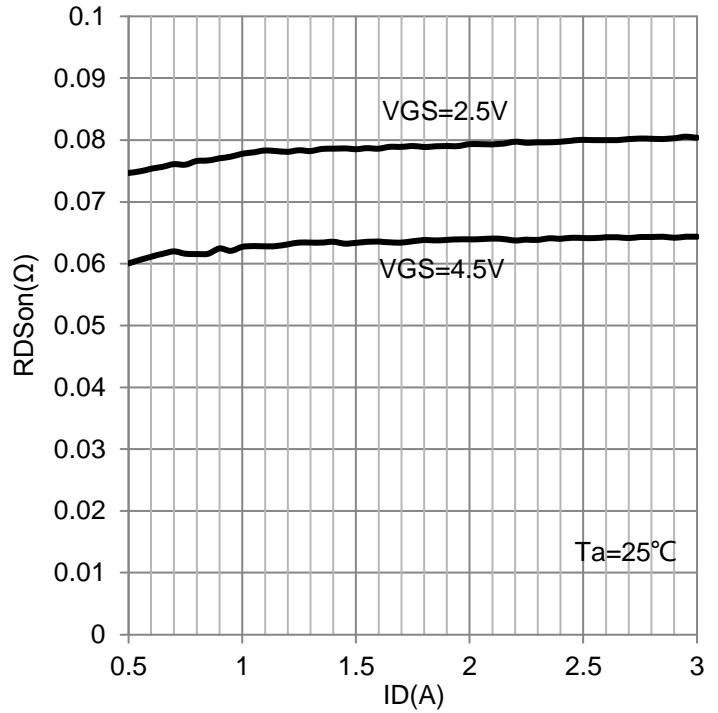
|  |     |   |      |      |   |
|--|-----|---|------|------|---|
| Forward Voltage<br>(VGS = 0 Vdc, ISD = -1 Adc) | VSD | - | -0.7 | -1.4 | V |
|--|-----|---|------|------|---|

2.Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.

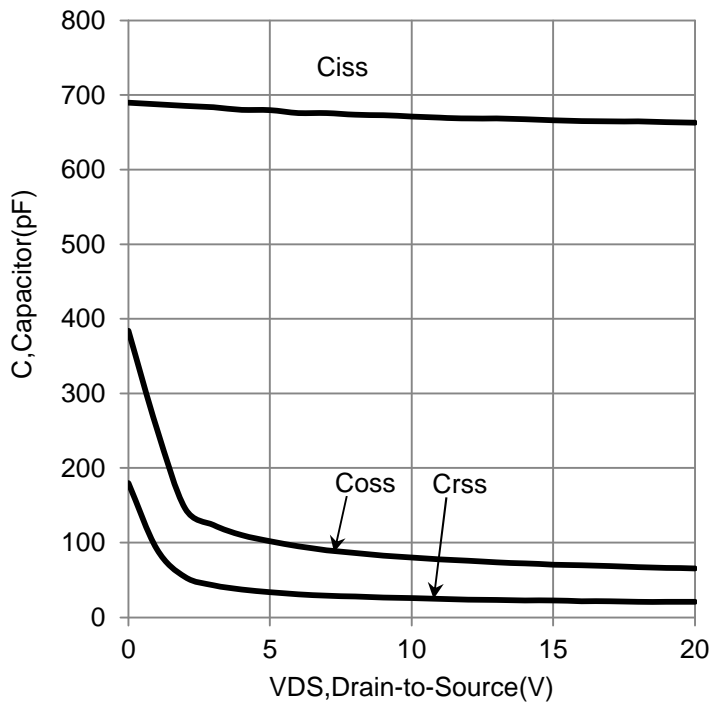
**7. ELECTRICAL CHARACTERISTICS CURVES**



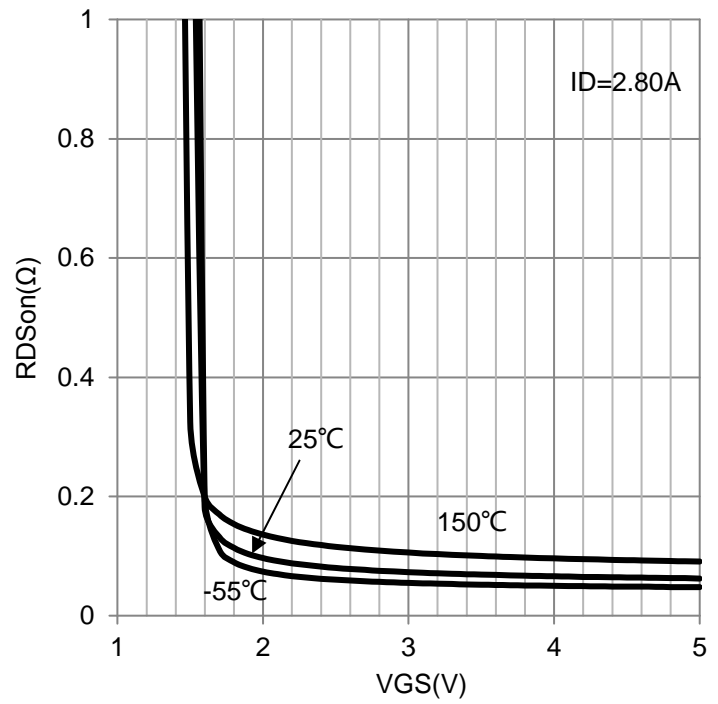
RDS(on) vs. Temperature



RDS(on) vs. ID

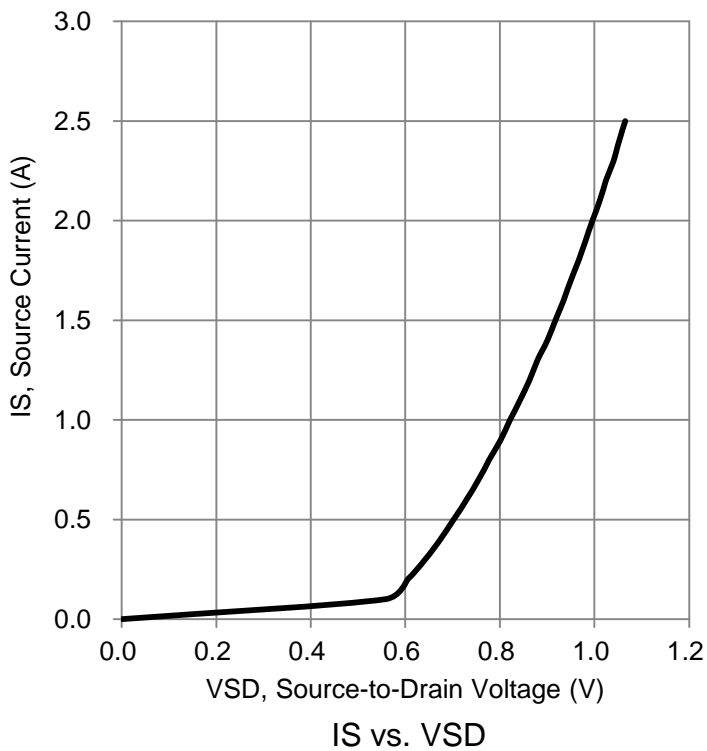
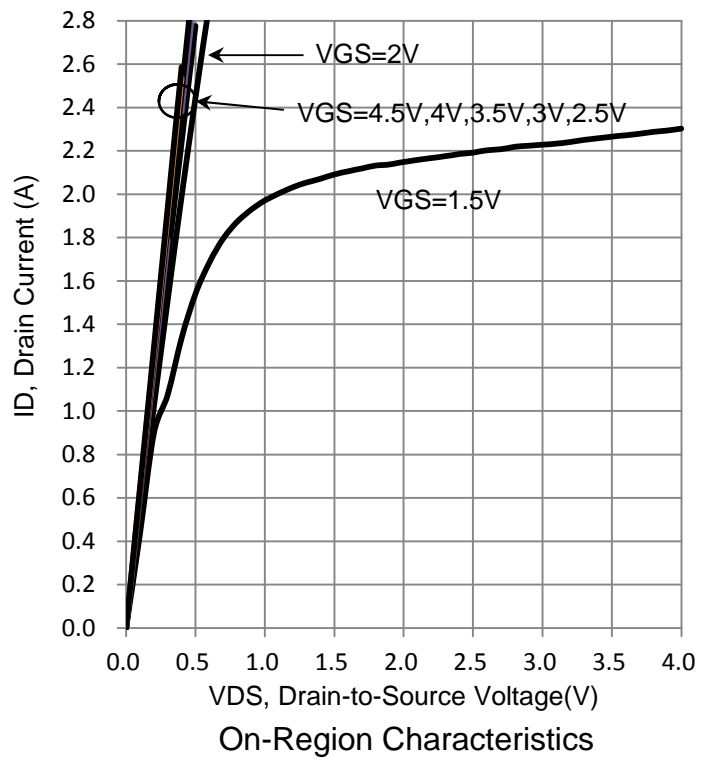
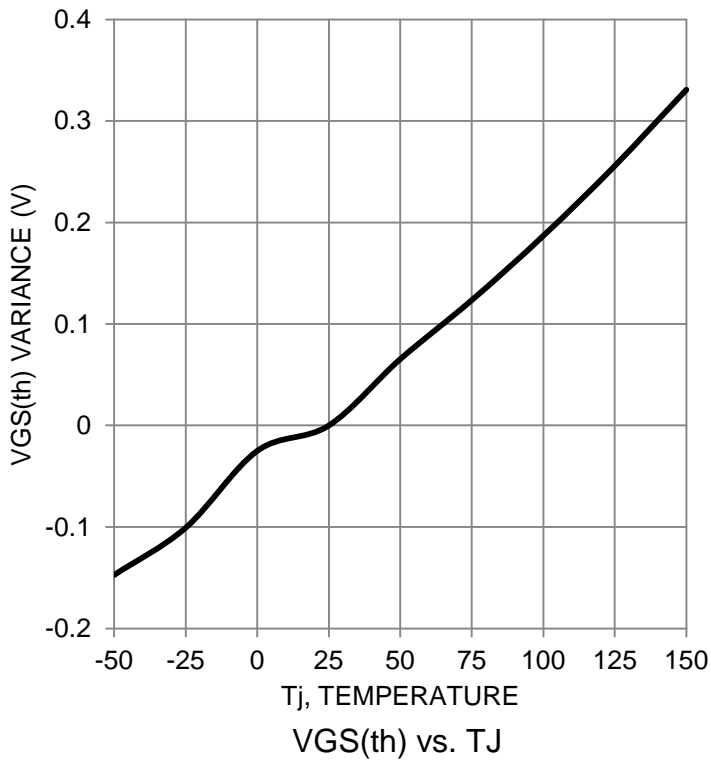


Capacitor vs. VDS



RDS(on) vs. VGS

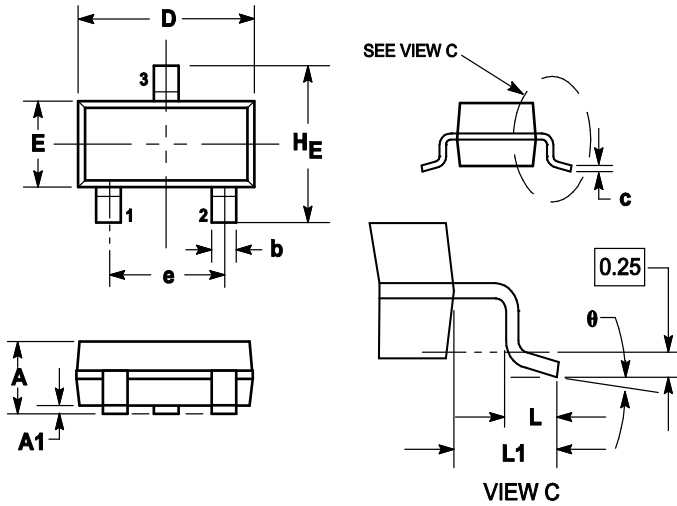
**7. ELECTRICAL CHARACTERISTICS CURVES(Con.)**



### 8.OUTLINE AND DIMENSIONS

Notes:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.



| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A   | 0.89        | 1    | 1.11 | 0.035  | 0.04  | 0.044 |
| A1  | 0.01        | 0.06 | 0.1  | 0.001  | 0.002 | 0.004 |
| b   | 0.37        | 0.44 | 0.5  | 0.015  | 0.018 | 0.02  |
| c   | 0.09        | 0.13 | 0.18 | 0.003  | 0.005 | 0.007 |
| D   | 2.80        | 2.9  | 3.04 | 0.11   | 0.114 | 0.12  |
| E   | 1.20        | 1.3  | 1.4  | 0.047  | 0.051 | 0.055 |
| e   | 1.78        | 1.9  | 2.04 | 0.07   | 0.075 | 0.081 |
| L   | 0.10        | 0.2  | 0.3  | 0.004  | 0.008 | 0.012 |
| L1  | 0.35        | 0.54 | 0.69 | 0.014  | 0.021 | 0.029 |
| HE  | 2.10        | 2.4  | 2.64 | 0.083  | 0.094 | 0.104 |
| θ   | 0°          | ---  | 10°  | 0°     | ---   | 10°   |

### 9.SOLDERING FOOTPRINT

