

- ★ Super Low Gate Charge
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary

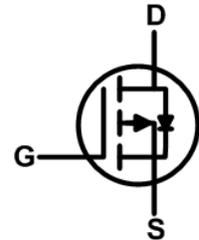
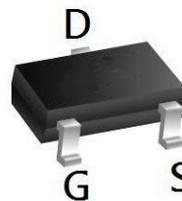


| BVDSS | R _{DS(on)} | I _D |
|-------|---------------------|----------------|
| -18V | 17mΩ | -9A |

Description

The XR2313L is the high cell density trenched P-ch MOSFETs, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications. The XR2313L meet the RoHS and Green Product requirement with full function reliability approved.

SOT23-3L Pin Configurations



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|--------------------------------------|--|------------|-------|
| V _{DS} | Drain-Source Voltage | -18 | V |
| V _{GS} | Gate-Source Voltage | ±12 | V |
| I _D @T _A =25°C | Continuous Drain Current, V _{GS} @ -4.5V ¹ | -9 | A |
| I _D @T _A =70°C | Continuous Drain Current, V _{GS} @ -4.5V ¹ | -5 | A |
| I _{DM} | Pulsed Drain Current ² | -32 | A |
| P _D @T _A =25°C | Total Power Dissipation ³ | 1.31 | W |
| P _D @T _A =70°C | Total Power Dissipation ³ | 0.84 | W |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C |
| T _J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ | --- | 125 | °C/W |
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ (t ≤ 10s) | --- | --- | °C/W |

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | -15 | -18 | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-15V, V_{GS}=0V,$ | - | - | -1 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS}=\pm 12V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.4 | -0.6 | -1.0 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance <small>note2</small> | $V_{GS}=-4.5V, I_D=-5.1A$ | - | 17 | 24 | m Ω |
| | | $V_{GS}=-2.5V, I_D=-3.75A$ | - | 24 | 32 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=-10V, V_{GS}=0V,$ $f=1.0MHz$ | - | 830 | - | pF |
| C_{oss} | Output Capacitance | | - | 132 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 85 | - | pF |
| Q_g | Total Gate Charge | $V_{DS}=-10V, I_D=-2.5A,$ $V_{GS}=-4.5V$ | - | 8.8 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 1.4 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 1.9 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}=-10V, I_D=-4.3A,$ $R_G=1\Omega, V_{GEN}=-4.5V$ | - | 10 | - | ns |
| t_r | Turn-on Rise Time | | - | 32 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 50 | - | ns |
| t_f | Turn-off Fall Time | | - | 51 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -9 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -32 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S=-5.1A$ | - | - | -1.2 | V |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

 2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

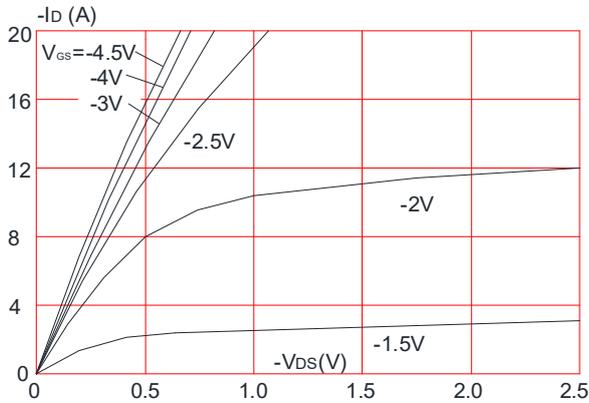


Figure 2: Typical Transfer Characteristics

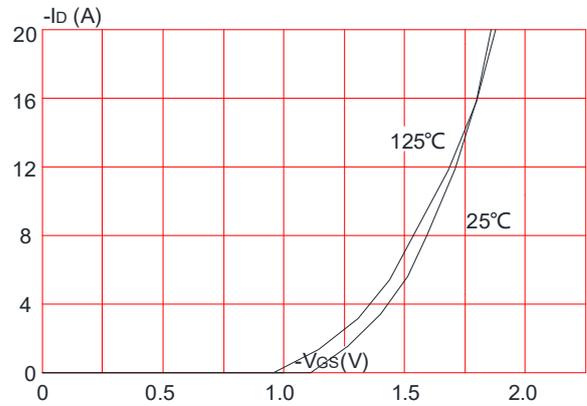


Figure 3: On-resistance vs. Drain Current

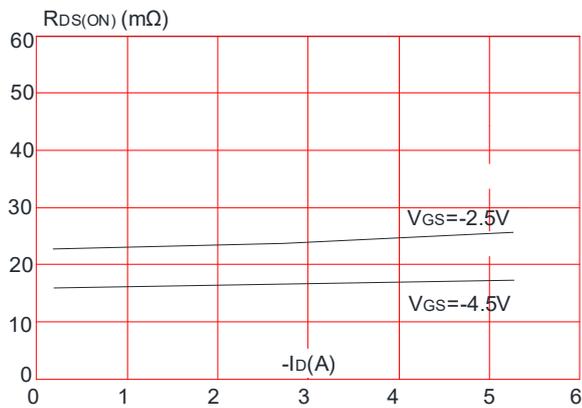


Figure 4: Body Diode Characteristics

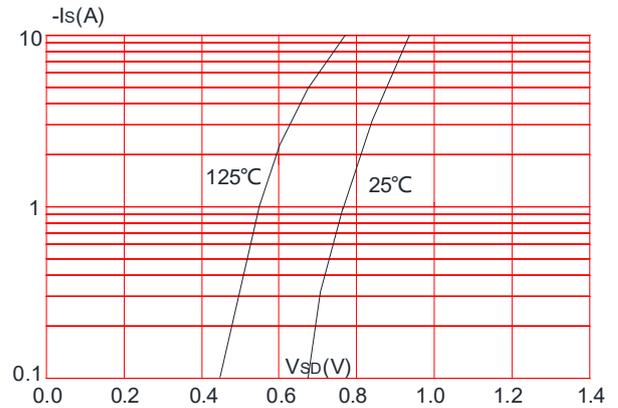


Figure 5: Gate Charge Characteristics

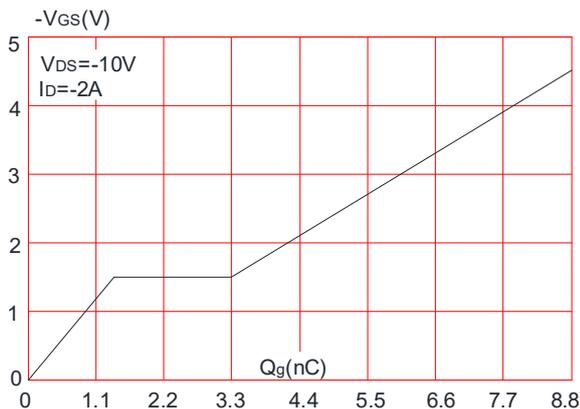
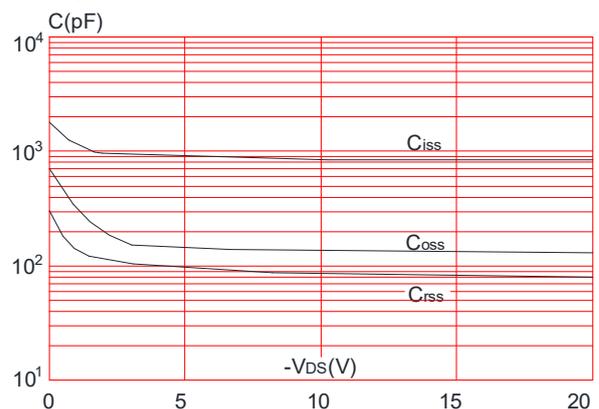


Figure 6: Capacitance Characteristics



P-Ch 18V Fast Switching MOSFETs

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

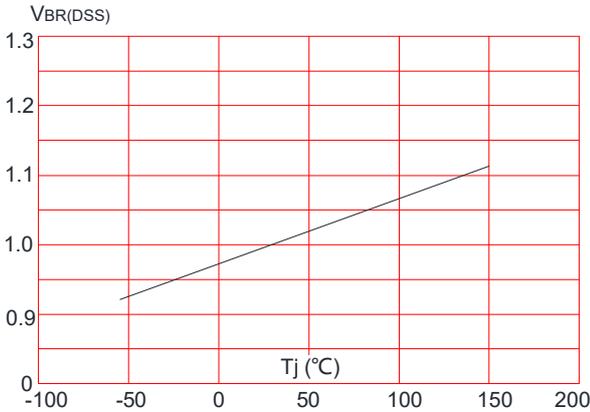


Figure 8: Normalized on Resistance vs. Junction Temperature

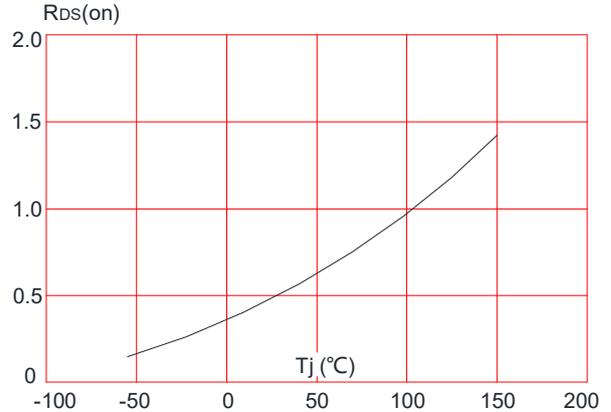


Figure 9: Maximum Safe Operating Area

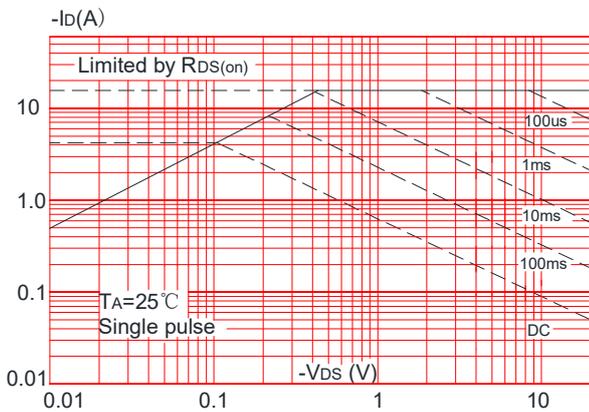


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

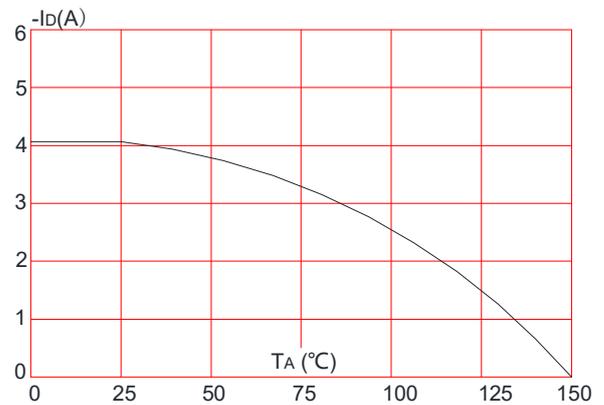
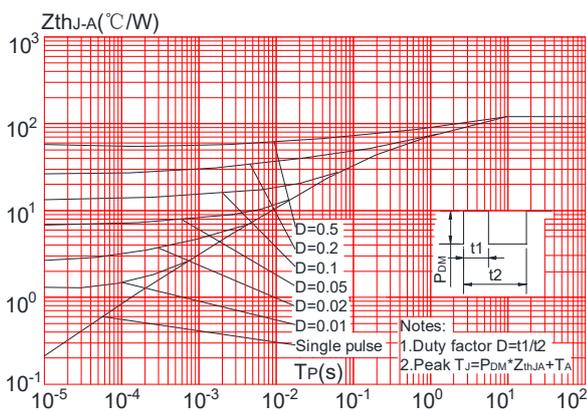
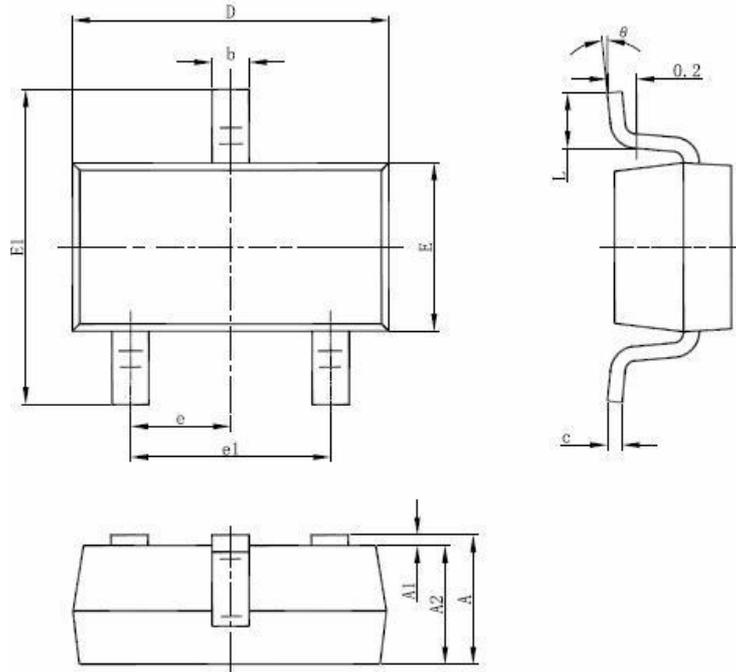


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



SOT-23-3L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |