

Description

The 3415 A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.

General Features

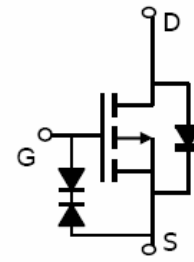
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| V_{DSS} | $R_{DS(ON)}$ @-4.5V(Typ) | $R_{DS(ON)}$ @-2.5V(Typ) | I_D |
|-----------|-----------------------------|-----------------------------|-------|
| -20V | 35.8mΩ | 46.4mΩ | -5.6A |

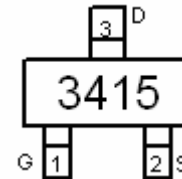
- High Power and current handing capability
- RoHS Compliant
- Surface mount package

Application

- PWM application
- Load switch



Schematic diagram



Marking and pin Assignment

PS:Part number:3415A Mark:3415



SOT-23

Ordering Information

| Part Number | Marking | Case | Packaging |
|-------------|---------|--------|--------------|
| 3415A | 3415 | SOT-23 | 3000pcs/Reel |

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------|
| Drain-Source Voltage | V_{DS} | -20 | V |
| Gate-Source Voltage | V_{GS} | ±10 | V |
| Drain Current-Continuous | I_D | -5.6 | A |
| Drain Current-Pulsed (Note 1) | I_{DM} | -16 | A |
| Maximum Power Dissipation | P_D | 1.4 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | °C |

Thermal Characteristic

| | | | |
|--|-----------------|------|------|
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 89.3 | °C/W |
|--|-----------------|------|------|

Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--------------------------------|------------|----------------------------|-----|-----|-----|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -20 | | - | V |

| | | | | | | |
|---|--------------|---|-------|-------|----------|-----------|
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-20V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 10V, V_{DS}=0V$ | - | - | ± 10 | μA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.45 | -0.68 | -1.1 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=-4.5V, I_D=-1A$ | - | 35.8 | 40 | $m\Omega$ |
| | | $V_{GS}=-2.5V, I_D=-0.5A$ | - | 46.4 | 60 | $m\Omega$ |
| Forward Transconductance | g_{FS} | $V_{DS}=-5V, I_D=-4A$ | 8 | - | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-10V, V_{GS}=0V,$ $F=1.0MHz$ | - | 950 | - | PF |
| Output Capacitance | C_{oss} | | - | 165 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 120 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-10V, R_L=2.5\Omega$ $V_{GS}=-4.5V, R_{GEN}=3\Omega$ | - | 12 | - | nS |
| Turn-on Rise Time | t_r | | - | 10 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 19 | - | nS |
| Turn-Off Fall Time | t_f | | - | 25 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-10V, I_D=-4A,$ $V_{GS}=-4.5V$ | - | 12 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.4 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 3.6 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=-2A$ | - | - | -1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | -2.2 | A |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

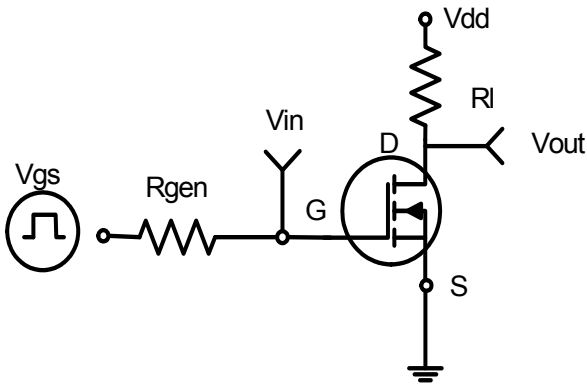


Figure 1: Switching Test Circuit

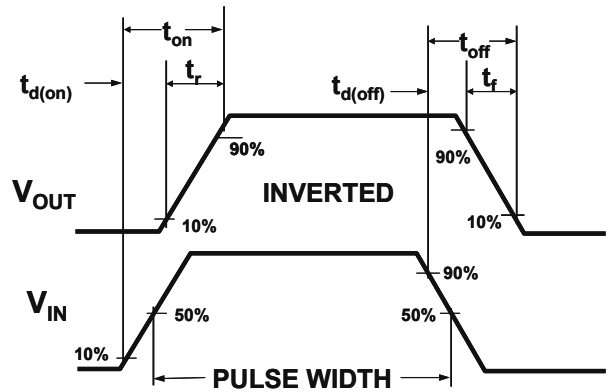


Figure 2: Switching Waveforms

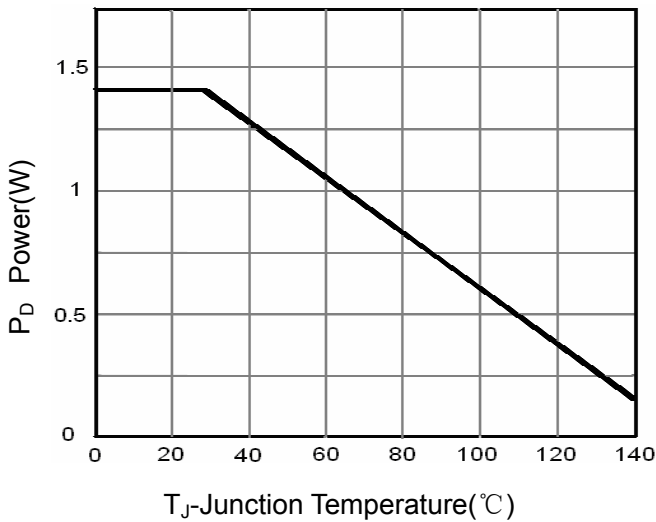


Figure 3 Power Dissipation

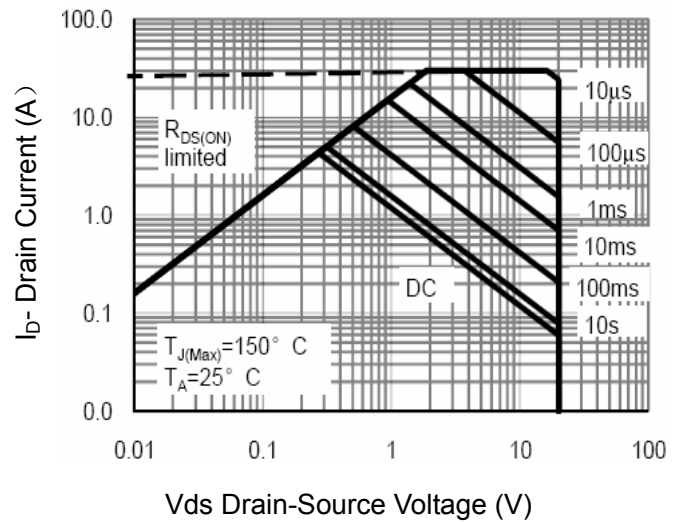


Figure 4 Safe Operation Area

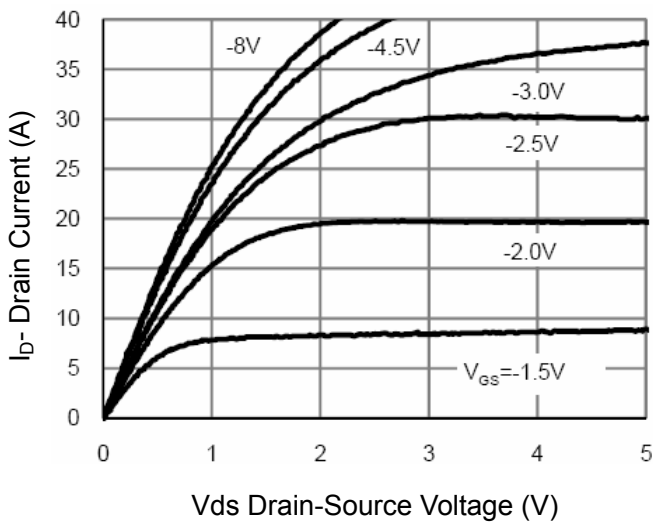


Figure 5 Output CHARACTERISTICS

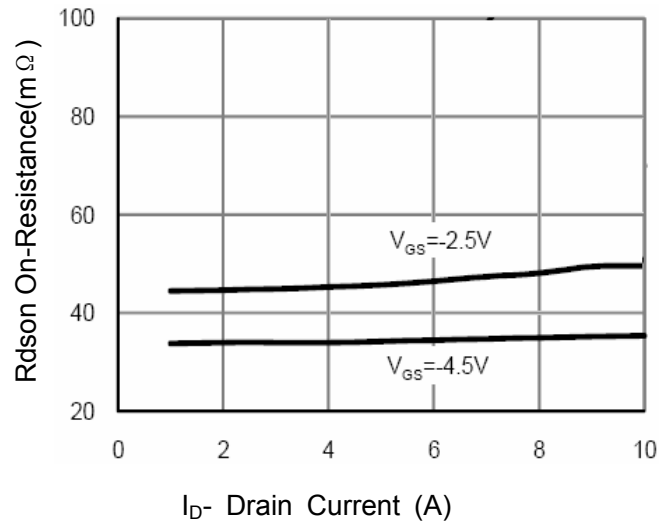


Figure 6 Drain-Source On-Resistance

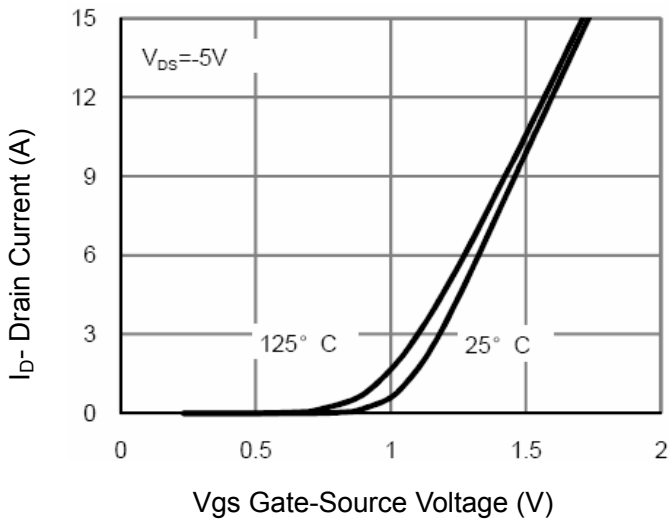


Figure 7 Transfer Characteristics

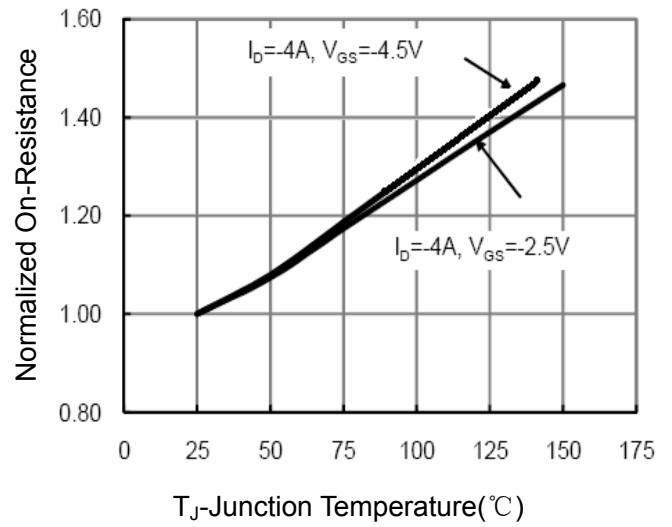


Figure 8 Drain-Source On-Resistance

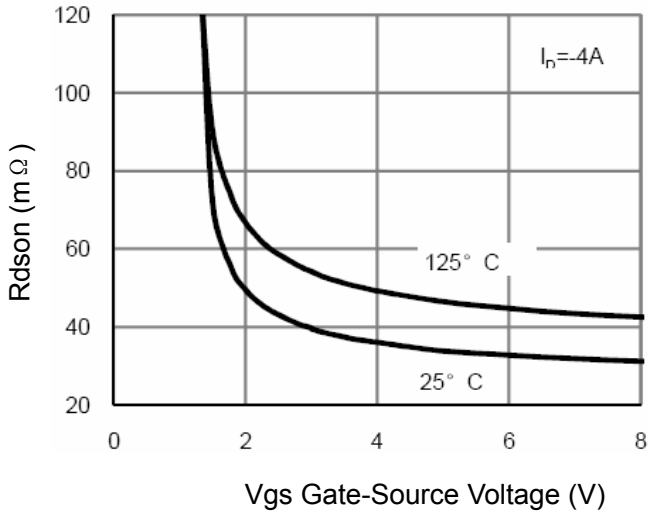


Figure 9 Rdson vs Vgs

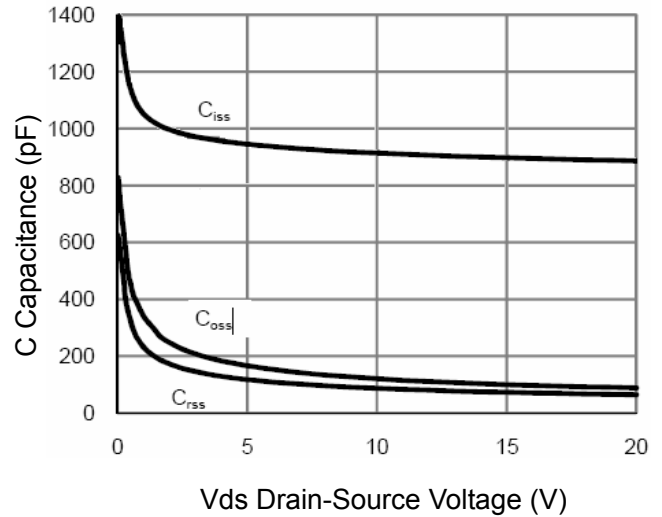


Figure 10 Capacitance vs Vds

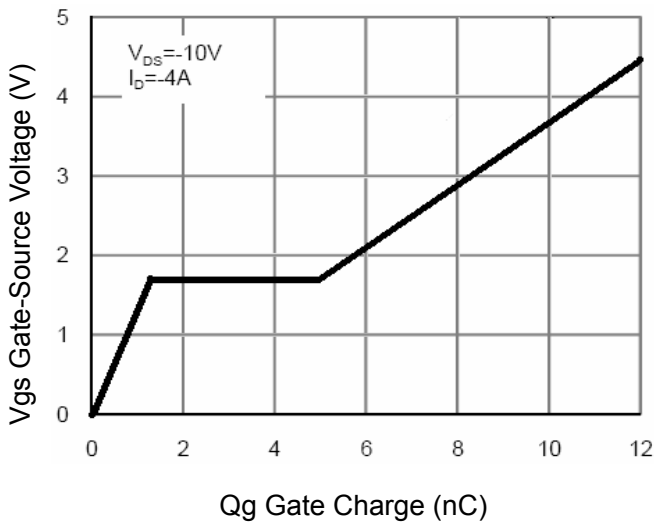


Figure 11 Gate Charge

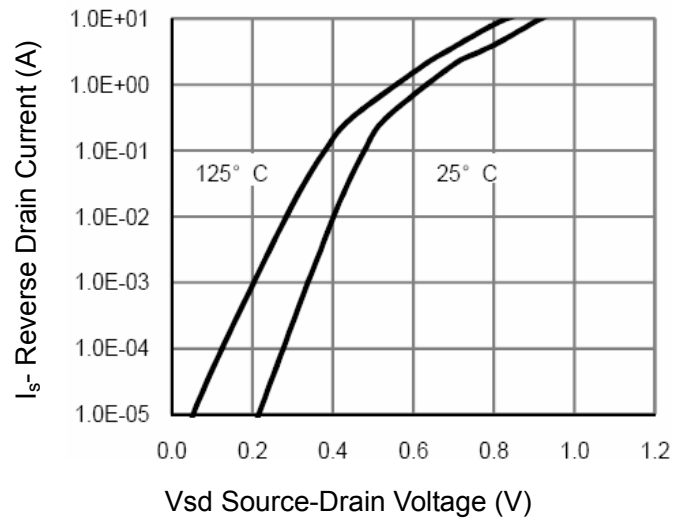


Figure 12 Source- Drain Diode Forward

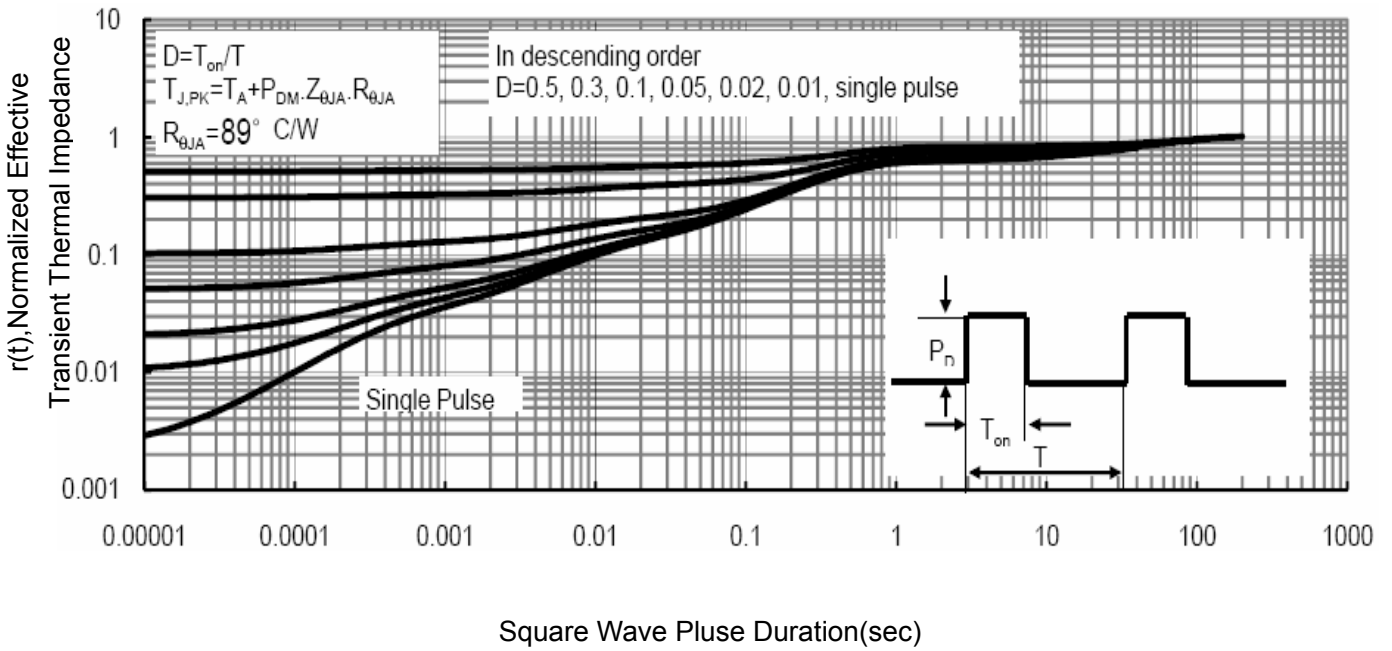
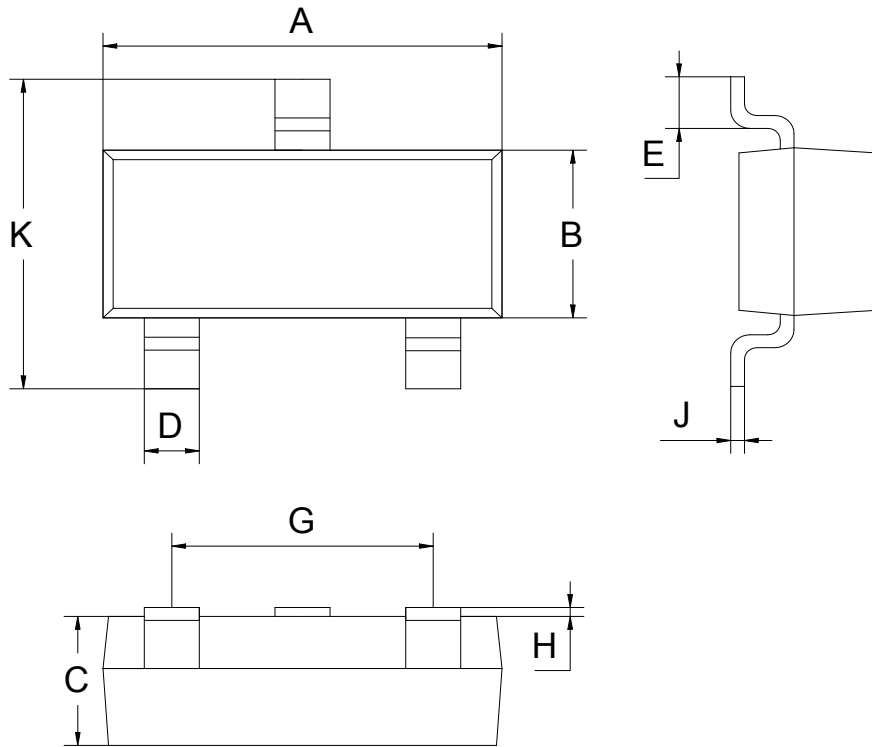


Figure 13 Normalized Maximum Transient Thermal Impedance

SOT-23 Package information



| SOT-23 | | | |
|----------------------|---------|------|------|
| Dim | MIN | NOM | MAX |
| A | 2.80 | 2.90 | 3.00 |
| B | 1.20 | 1.30 | 1.40 |
| C | 0.90 | 1.00 | 1.10 |
| D | 0.39 | 0.40 | 0.45 |
| E | 0.20MIN | | |
| G | 1.90REF | | |
| H | 0.00 | - | 0.10 |
| J | 0.05 | 0.10 | 0.15 |
| K | 2.30 | 2.40 | 2.50 |
| All Dimensions in mm | | | |

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