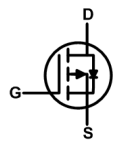
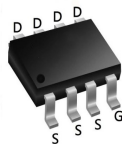


### Description

The 9435A is the high cell density trenched P-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The 9435A meet the RoHS and Green Product requirement with full function reliability approved.

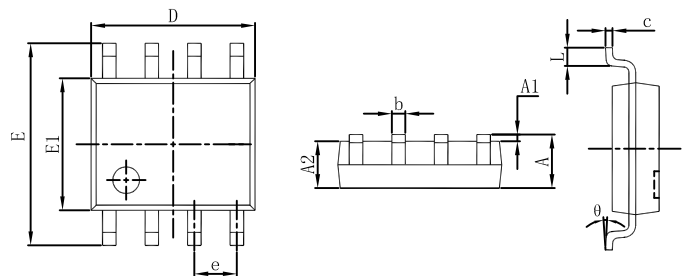
Green Device Available  
Super Low Gate Charge  
Excellent  $CdV/dt$  effect decline  
Advanced high cell density Trench technology



### Product Summary

| BVDSS | RDS(on) | ID    |
|-------|---------|-------|
| -30V  | 36mΩ    | -5.3A |

### SOP-8



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.007                | 0.010 |
| D      | 4.800                     | 5.000 | 0.189                | 0.197 |
| e      | 1.270 (BSC)               |       | 0.050 (BSC)          |       |
| E      | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1     | 3.800                     | 4.000 | 0.150                | 0.157 |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

### Absolute Maximum Ratings

| Symbol                | Parameter                                   | Rating     | Units |
|-----------------------|---------------------------------------------|------------|-------|
| $V_{DS}$              | Drain-Source Voltage                        | -30        | V     |
| $V_{GS}$              | Gate-Source Voltage                         | ±20        | V     |
| $I_D@T_A=25^{\circ}C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -5.3       | A     |
| $I_D@T_A=70^{\circ}C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -4.7       | A     |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>           | -20        | A     |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup>  | ---        | mJ    |
| $I_{AS}$              | Avalanche Current                           | ---        | A     |
| $P_D@T_A=25^{\circ}C$ | Total Power Dissipation <sup>4</sup>        | 1.5        | 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 |
|-----------------|--------------------------------------------------|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient <sup>1</sup> | ---  | 55   | °C/W |

# 9435A

## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                                     | Symbol               | 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    |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>     | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V                                                     | -    | -    | -1   | μA   |
| Gate-Source Leakage                           | I <sub>GSS</sub>     | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V                                                     | -    | -    | ±100 | nA   |
| Gate-Source Threshold voltage                 | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                      | -1   | -1.5 | -2.5 | V    |
| Drain-Source on-State Resistance <sup>3</sup> | R <sub>DS(on)</sub>  | V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.1A                                                   | -    | 36   | 51   | mΩ   |
|                                               |                      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A                                                    | -    | 48   | 79   |      |
| Dynamic Characteristics <sup>4</sup>          |                      |                                                                                                  |      |      |      |      |
| Input Capacitance                             | C <sub>iss</sub>     | V <sub>GS</sub> = 0V , V <sub>DS</sub> = -15V,<br>f = 1.0MHz                                     | -    | 530  | -    | pF   |
| Output Capacitance                            | C <sub>oss</sub>     |                                                                                                  | -    | 70   | -    |      |
| Reverse Transfer Capacitance                  | C <sub>rss</sub>     |                                                                                                  | -    | 56   | -    |      |
| Switching Characteristics <sup>4</sup>        |                      |                                                                                                  |      |      |      |      |
| Total Gate Charge                             | Q <sub>g</sub>       | V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V,<br>I <sub>D</sub> = -4.1A                        | -    | 6.8  | -    | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>      |                                                                                                  | -    | 1.0  | -    |      |
| Gate-Drain Charge                             | Q <sub>gd</sub>      |                                                                                                  | -    | 1.4  | -    |      |
| Turn-on Delay Time                            | t <sub>d(on)</sub>   | V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V ,<br>R <sub>L</sub> = 15Ω,R <sub>GEN</sub> = 2.5Ω | -    | 14   | -    | ns   |
| Rise Time                                     | t <sub>r</sub>       |                                                                                                  | -    | 61   | -    |      |
| Turn-off Delay time                           | t <sub>d(off)</sub>  |                                                                                                  | -    | 19   | -    |      |
| Fall Time                                     | t <sub>f</sub>       |                                                                                                  | -    | 10   | -    |      |
| Source-Drain Body Diode Characteristics       |                      |                                                                                                  |      |      |      |      |
| Diode Forward Voltage <sup>3</sup>            | V <sub>SD</sub>      | I <sub>S</sub> = -4.1A, V <sub>GS</sub> = 0V                                                     | -    | -    | -1.2 | V    |
| Continuous Source Current                     | I <sub>S</sub>       |                                                                                                  | -    | -    | -5.3 | A    |

### Notes:

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C.
2. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycles≤2%.
4. This value is guaranteed by design hence it is not included in the production test.

## RATING AND CHARACTERISTIC CURVES (9435A)

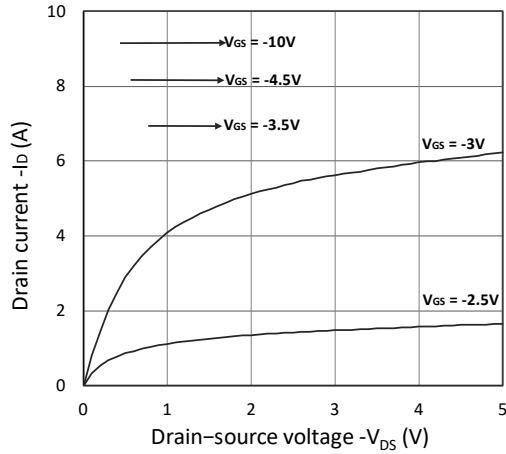


Figure 1. Output Characteristics

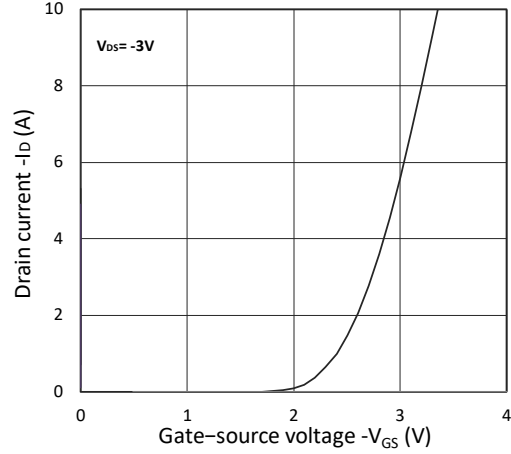


Figure 2. Transfer Characteristics

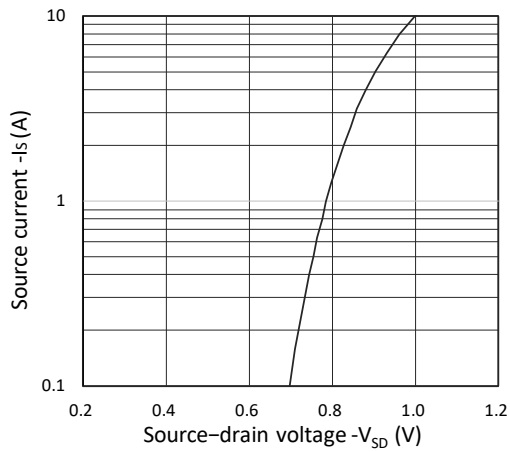


Figure 3. Forward Characteristics of Reverse

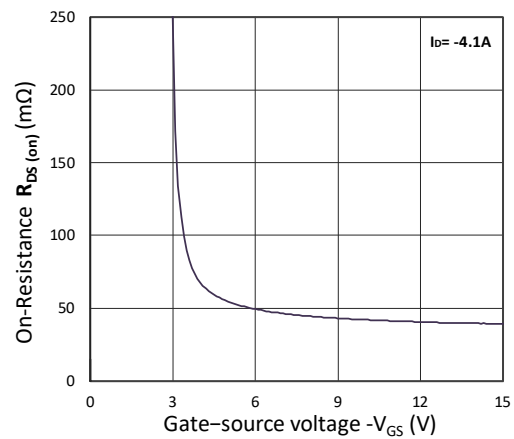


Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$

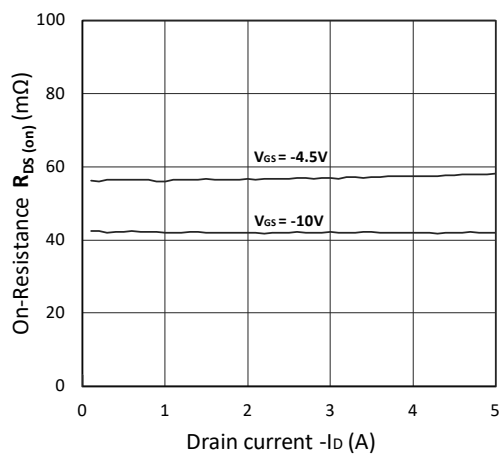


Figure 5.  $R_{DS(ON)}$  vs.  $I_D$

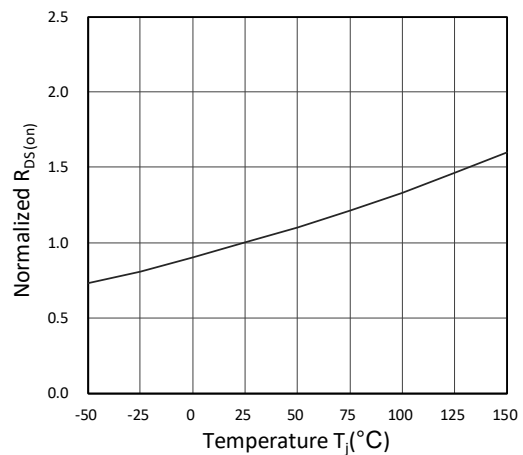


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

## RATING AND CHARACTERISTIC CURVES (9435A)

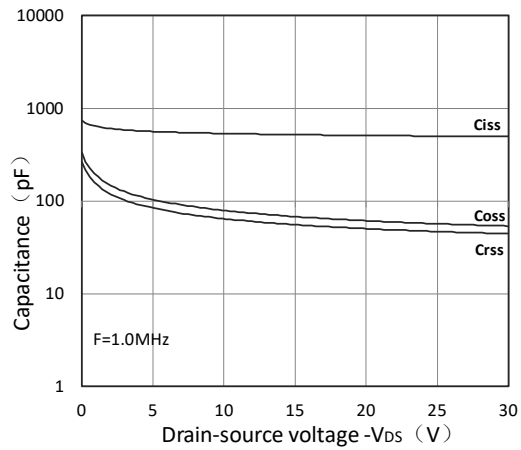


Figure 7. Capacitance Characteristics

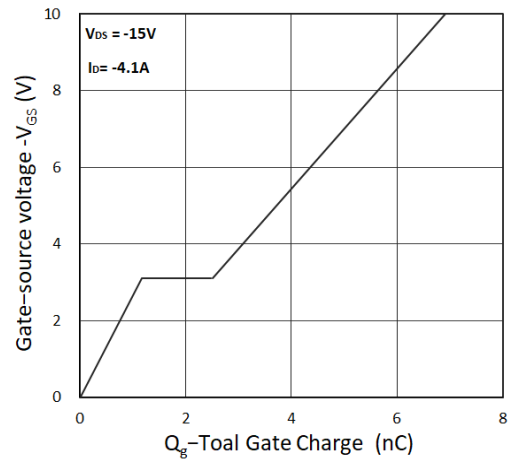


Figure 8. Gate Charge Characteristics