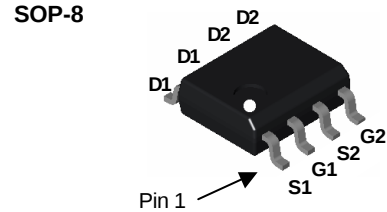
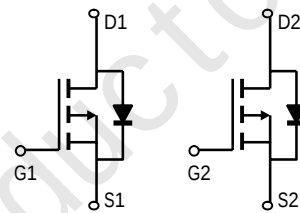


| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| -30V          | 0.059Ω@-10V     | -5.3A |
|               | 0.089Ω@-4.5V    |       |



Equivalent Circuit



MARKING



Y :year code W :week code

### General FEATURE

- TrenchFET Power MOSFET
- Lead free product is acquired
- Surface mount package

### APPLICATION

- Load Switch for Portable Devices
- DC/DC Converter

### Maximum ratings ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                                                  | Symbol          | Value     | Unit                        |
|------------------------------------------------------------|-----------------|-----------|-----------------------------|
| Drain-Source Voltage                                       | $V_{DS}$        | -30       | V                           |
| Gate-Source Voltage                                        | $V_{GS}$        | ±20       |                             |
| Continuous Drain Current                                   | $I_D$           | -5.3      | A                           |
| Pulsed Drain Current                                       | $I_{DM}$        | -20       |                             |
| Maximum Power Dissipation                                  | $P_D$           | 2.0       | W                           |
| Thermal Resistance from Junction to Ambient( $t \leq 5s$ ) | $R_{\theta JA}$ | 125       | $^{\circ}\text{C}/\text{W}$ |
| Junction Temperature                                       | $T_J$           | 150       | $^{\circ}\text{C}$          |
| Storage Temperature                                        | $T_{stg}$       | -55 ~+150 |                             |

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

| Symbol                                                 | Parameter                                             | Test Conditions                                                                                 | Min | Typ  | Max  | Units |
|--------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----|------|------|-------|
| Off Characteristics                                    |                                                       |                                                                                                 |     |      |      |       |
| BV <sub>DSS</sub>                                      | Drain–Source Breakdown Voltage                        | V <sub>GS</sub> = 0 V, I <sub>b</sub> = −250 μA                                                 | −30 |      |      | V     |
| I <sub>DSS</sub>                                       | Zero Gate Voltage Drain Current                       | V <sub>DS</sub> = −24 V, V <sub>GS</sub> = 0 V                                                  |     |      | −1   | μA    |
| I <sub>GSSF</sub>                                      | Gate–Body Leakage, Forward                            | V <sub>GS</sub> = −20 V, V <sub>DS</sub> = 0 V                                                  |     |      | −100 | nA    |
| I <sub>GSSR</sub>                                      | Gate–Body Leakage, Reverse                            | V <sub>GS</sub> = 20 V, V <sub>DS</sub> = 0 V                                                   |     |      | 100  | nA    |
| On Characteristics                                     |                                                       |                                                                                                 |     |      |      |       |
| V <sub>GS(th)</sub>                                    | Gate Threshold Voltage                                | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>b</sub> = −250 μA                                    | −1  | −1.7 | −3   | V     |
| R <sub>DS(on)</sub>                                    | Static Drain–Source On–Resistance                     | V <sub>GS</sub> = −10 V, I <sub>b</sub> = −5.3 A                                                |     | 54   | 59   | mΩ    |
|                                                        |                                                       | V <sub>GS</sub> = −4.5 V, I <sub>b</sub> = −4.2 A                                               |     | 84   | 89   |       |
| I <sub>D(on)</sub>                                     | On–State Drain Current                                | V <sub>GS</sub> = −10 V, V <sub>DS</sub> = −5.0 V                                               | −20 |      |      | A     |
| g <sub>FS</sub>                                        | Forward Transconductance                              | V <sub>DS</sub> = −5 V, I <sub>b</sub> = −5 A                                                   |     | 10   |      | S     |
| Dynamic Characteristics                                |                                                       |                                                                                                 |     |      |      |       |
| C <sub>iss</sub>                                       | Input Capacitance                                     | V <sub>DS</sub> = −15 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz                                     |     | 528  |      | pF    |
| C <sub>oss</sub>                                       | Output Capacitance                                    |                                                                                                 |     | 132  |      | pF    |
| C <sub>rss</sub>                                       | Reverse Transfer Capacitance                          |                                                                                                 |     | 70   |      | pF    |
| Switching Characteristics                              |                                                       |                                                                                                 |     |      |      |       |
| t <sub>d(on)</sub>                                     | Turn–On Delay Time                                    | V <sub>DD</sub> = −15 V, I <sub>b</sub> = −1 A, V <sub>GS</sub> = −10 V, R <sub>GEN</sub> = 6 Ω |     | 7    |      | ns    |
| t <sub>r</sub>                                         | Turn–On Rise Time                                     |                                                                                                 |     | 13   |      | ns    |
| t <sub>d(off)</sub>                                    | Turn–Off Delay Time                                   |                                                                                                 |     | 14   |      | ns    |
| t <sub>f</sub>                                         | Turn–Off Fall Time                                    |                                                                                                 |     | 9    |      | ns    |
| Q <sub>g</sub>                                         | Total Gate Charge                                     | V <sub>DS</sub> = −15 V, I <sub>b</sub> = −5 A, V <sub>GS</sub> = −5 V                          |     | 6.0  | 9    | nC    |
| Q <sub>gs</sub>                                        | Gate–Source Charge                                    |                                                                                                 |     | 2.2  |      | nC    |
| Q <sub>gd</sub>                                        | Gate–Drain Charge                                     |                                                                                                 |     | 2.0  |      | nC    |
| Drain–Source Diode Characteristics and Maximum Ratings |                                                       |                                                                                                 |     |      |      |       |
| I <sub>S</sub>                                         | Maximum Continuous Drain–Source Diode Forward Current |                                                                                                 |     |      | −1.3 | A     |
| V <sub>SD</sub>                                        | Drain–Source Diode Forward Voltage                    | V <sub>GS</sub> = 0 V, I <sub>S</sub> = −2.6 A                                                  |     | −0.8 | −1.2 | V     |

**Notes:**

- $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.

## Typical Characteristics

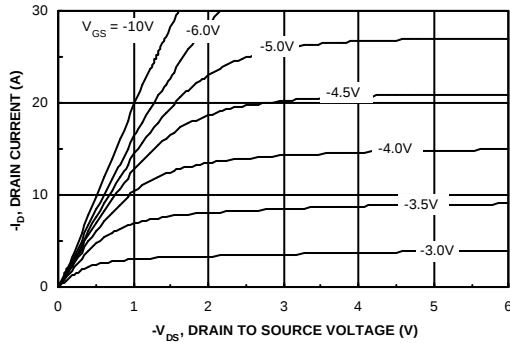


Figure 1. On-Region Characteristics.

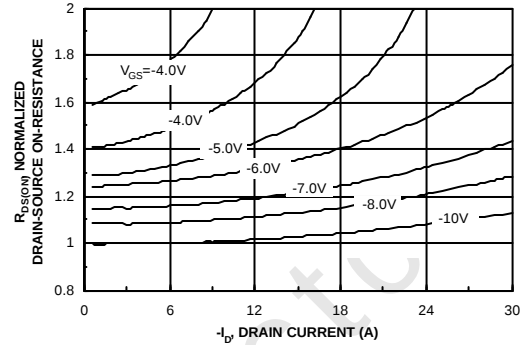


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

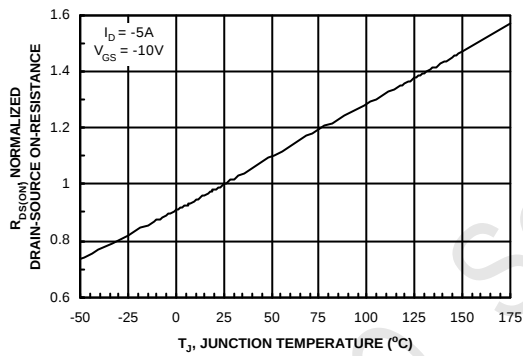


Figure 3. On-Resistance Variation with Temperature.

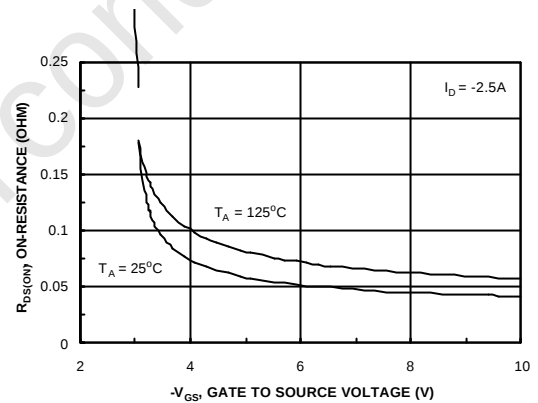


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

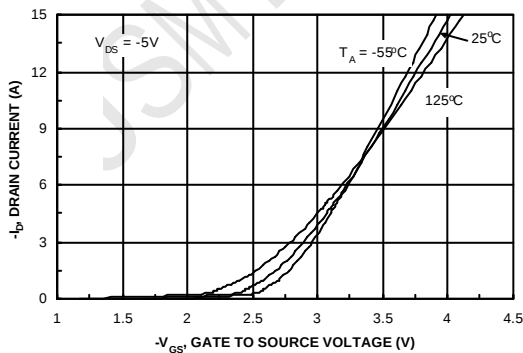


Figure 5. Transfer Characteristics.

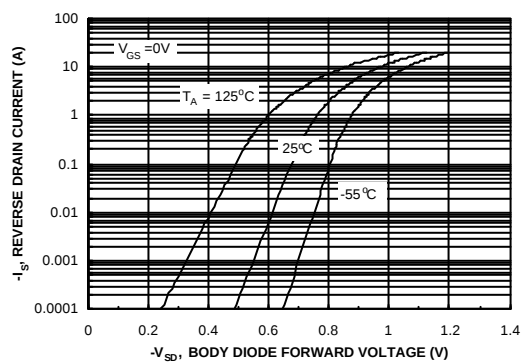


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

### Typical Characteristics

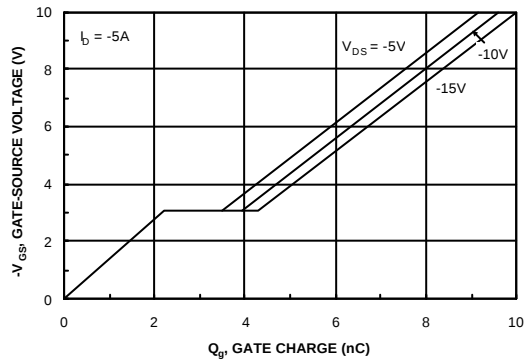


Figure 7. Gate Charge Characteristics.

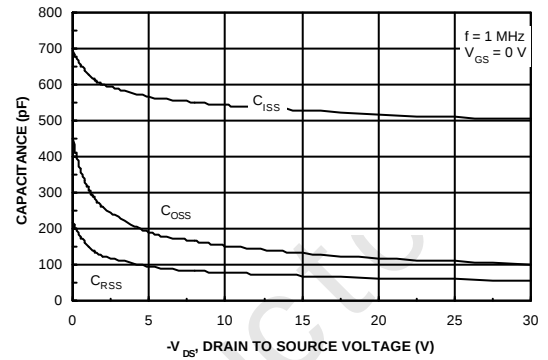


Figure 8. Capacitance Characteristics.

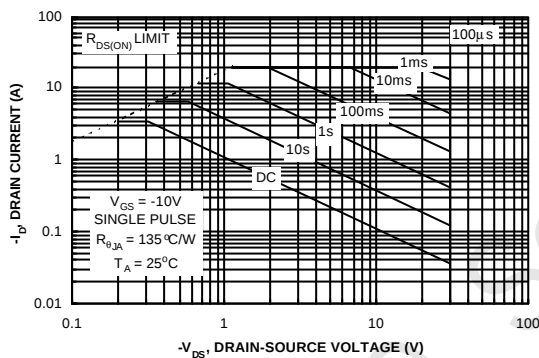


Figure 9. Maximum Safe Operating Area.

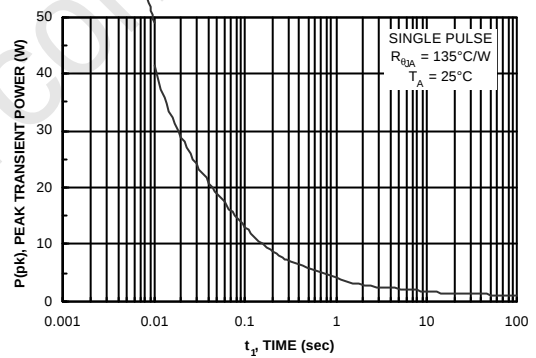


Figure 10. Single Pulse Maximum Power Dissipation.

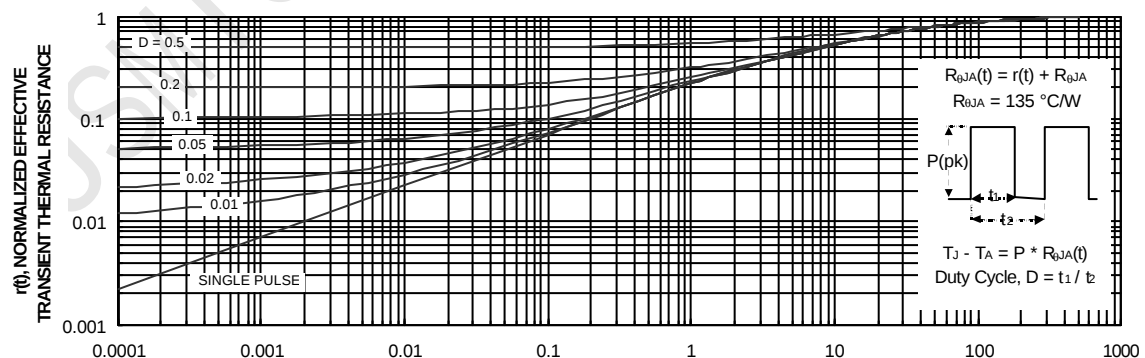
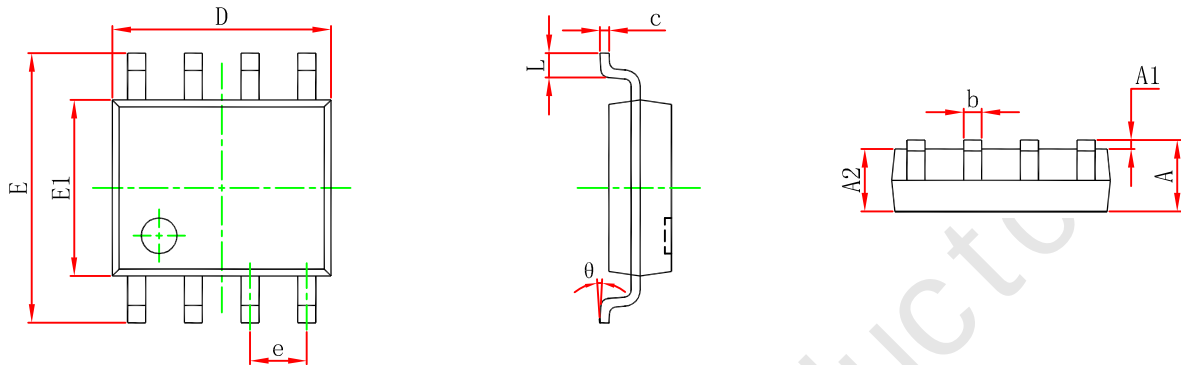


Figure 11. Transient Thermal Response Curve.

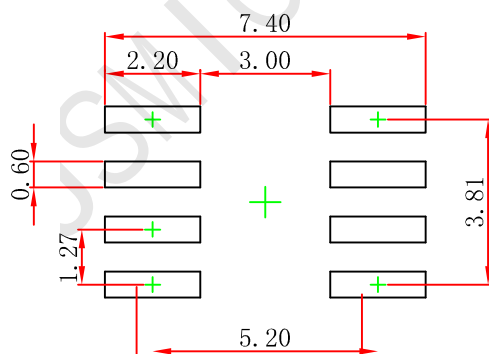
Thermal characterization performed using the conditions described in Note 1c.  
 Transient thermal response will change depending on the circuit board design.

### SOP8 Package Outline Dimensions



| 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°    |

### SOP8 Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.