

## 1.Description

This N-Channel 2.5V specified MOSFET is produced using ON Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance.

## 2.Features

- $V_{DS}=20V$
- $I_D=1.7A$
- $R_{DS(ON)}<55m\Omega(V_{GS}=-4.5V)$
- $R_{DS(ON)}<65m\Omega(V_{GS}=2.5V)$

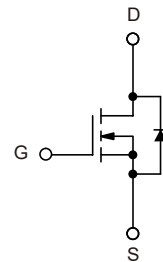
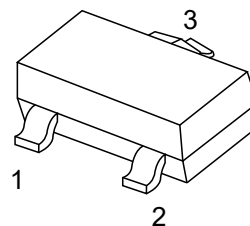
## 3.Application

- Battery protection
- Load switch
- Battery management

## 4.Pinning information

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1   | G      | GATE        |
| 2   | S      | SOURCE      |
| 3   | D      | DRAIN       |

SOT-23



## 5.Maximum ratings ( $T_A=25^{\circ}C$ unless otherwise noted)

| Parameter                                                    | Symbol          | Rating   | Units         |
|--------------------------------------------------------------|-----------------|----------|---------------|
| Drain-Source Voltage                                         | $V_{DS}$        | 20       | V             |
| Gate-Source Voltage                                          | $V_{GS}$        | $\pm 8$  | V             |
| Continuous Drain Current                                     | $I_D$           | 1.7      | A             |
| Pulsed Drain Current (note 1)                                | $I_{DM}$        | 10       | A             |
| Power Dissipation                                            | $P_D$           | 1        | W             |
| Thermal Resistance from Junction to Ambient ( $t \leq 10s$ ) | $R_{\theta JA}$ | 250      | $^{\circ}C/W$ |
| Operating Junction                                           | $T_J$           | 150      | $^{\circ}C$   |
| Storage Temperature                                          | $T_{STG}$       | -55~+150 | $^{\circ}C$   |



## 6. $T_A=25^\circ\text{C}$ unless otherwise specified

| Parameter                                 | Symbol        | Conditions                                 | Min | Typ | Max       | Units      |
|-------------------------------------------|---------------|--------------------------------------------|-----|-----|-----------|------------|
| Static                                    |               |                                            |     |     |           |            |
| Drain-source breakdown voltage            | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                  | 20  |     |           | V          |
| Gate-source threshold voltage             | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$              | 0.4 |     | 1.5       | V          |
| Gate-source leakage                       | $I_{GSS}$     | $V_{GS}=\pm 8V, V_{DS}=0V$                 |     |     | $\pm 100$ | nA         |
| Zero gate voltage drain current           | $I_{DSS}$     | $V_{DS}=16V, V_{GS}=0V$                    |     |     | 1         | $\mu A$    |
| Drain-source on-state resistancea         | $R_{DS(ON)}$  | $V_{GS}=4.5V, I_D=1.7A$                    |     | 45  | 5         | m $\Omega$ |
|                                           |               | $V_{GS}=2.5V, I_D=1.5A$                    |     | 55  | 65        | m $\Omega$ |
| Forward transconductance (note 3)         | $g_{FS}$      | $V_{DS}=4.5V, I_D=1.7A$                    |     | 7   |           | S          |
| Diode forward voltage (note 3)            | $V_{SD}$      | $I_S=1A, V_{GS}=0V$                        |     | 0.8 | 1.2       | V          |
| Dynamic                                   |               |                                            |     |     |           |            |
| Input Capacitance                         | $C_{iss}$     | $V_{DS}=10V, V_{GS}=0V, f=1MHz$            |     | 310 |           | pF         |
| Output Capacitance                        | $C_{oss}$     |                                            |     | 80  |           | pF         |
| Reverse Transfer Capacitance              | $C_{rss}$     |                                            |     | 40  |           | pF         |
| Total gate charge                         | $Q_g$         | $V_{DS}=10V, V_{GS}=4.5V, I_D=1.7A$        |     | 3.5 |           | nC         |
| Gate-source charge                        | $Q_{gs}$      |                                            |     | 0.6 |           | nC         |
| Gate-drain charge                         | $Q_{gd}$      |                                            |     | 1   |           | nC         |
| Switchingbtr                              |               |                                            |     |     |           |            |
| Turn-on delay time                        | $t_{D(on)}$   | $V_{DS}=10V, R_L=3.5\Omega, I_D\approx 1A$ |     | 5   |           | ns         |
| Rise time                                 | $t_r$         |                                            |     | 8.5 |           | ns         |
| Turn-off delay time                       | $t_{D(off)}$  | $V_{GEN}=4.5V, R_{GEN}=3\Omega$            |     | 11  |           | ns         |
| Fall time                                 | $t_f$         |                                            |     | 3   |           | ns         |
| Drain-source body diode characteristicstr |               |                                            |     |     |           |            |
| Continuous Source-Drain Diode Current     | $I_S$         | $T_c=25^{\circ}C$                          |     |     | 0.42      | A          |
| Pulsed Diode forward Curren               | $I_{SM}$      |                                            |     | 0.7 | 1.2       | A          |

1. Repetitive rating : Pulse width limited by junction temperature.

3. Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .2. Surface Mounted on FR4 Board,  $t < 10$  sec

4. Guaranteed by design, not subject to production testing



## 7.1 Typical Characteristics

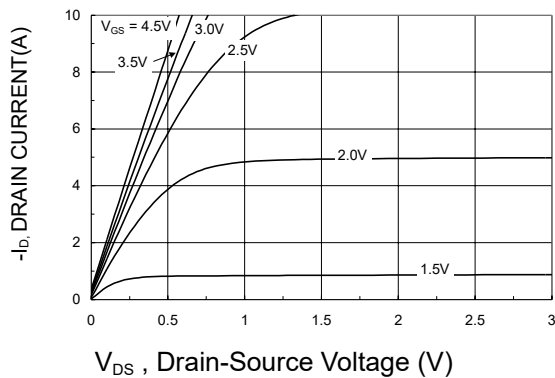


Figure 1: On-Region Characteristics.

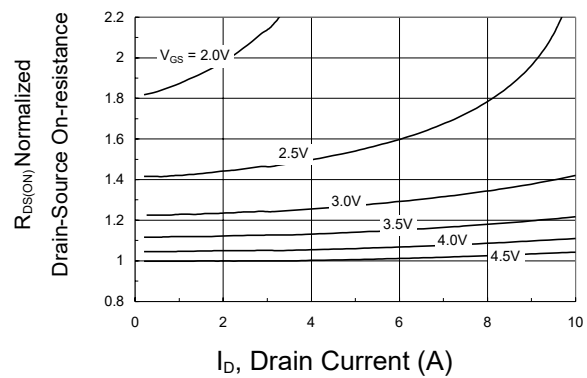


Figure 2: On-Resistance Variation with Drain Current and Gate Voltage.

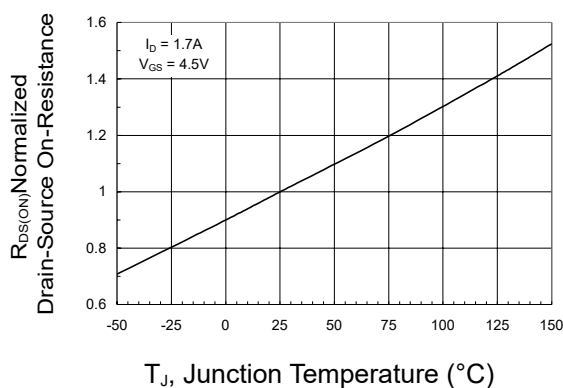


Figure 3: On-Resistance Variation with Temperature.

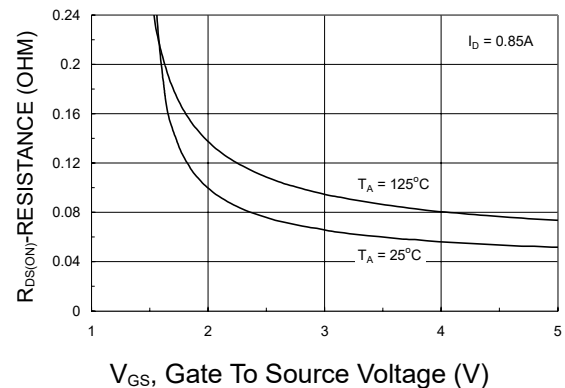


Figure 4: On-Resistance Variation with Gate-to-Source Voltage.

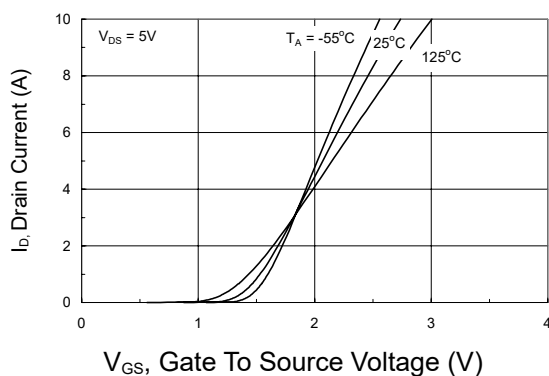


Figure 5: Transfer Characteristics.

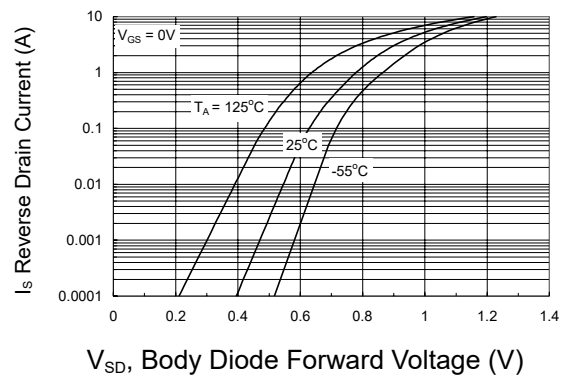


Figure 6: . Body Diode Forward Voltage Variation with Source Current and Temperature.



## 7.2 Typical Characteristics

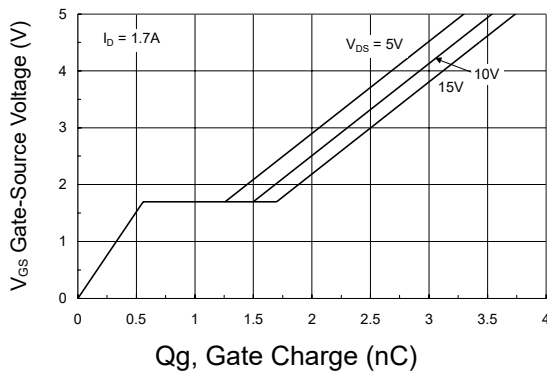


Figure 7: Gate-Charge Characteristics

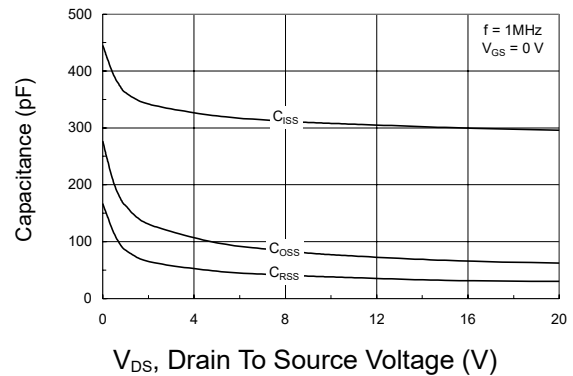


Figure 8: Capacitance Characteristics

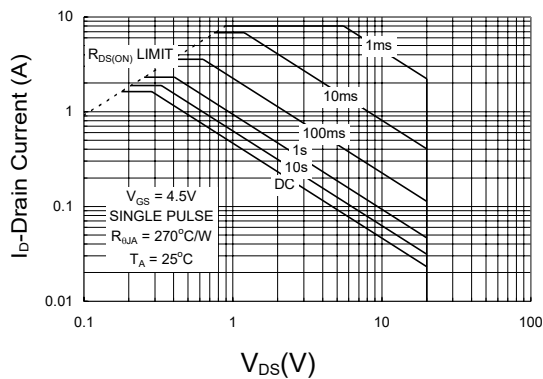


Figure 9: Maximum Safe Operating Area.

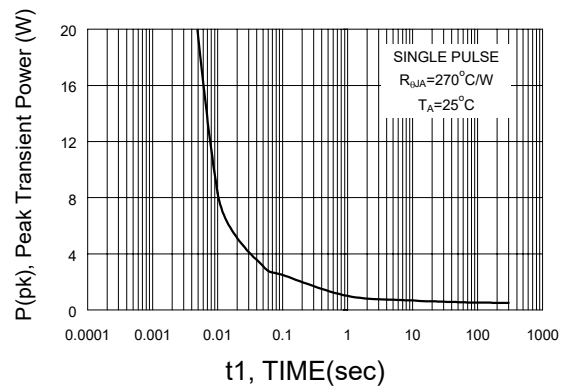


Figure 10: Single Pulse Maximum Power Dissipation.

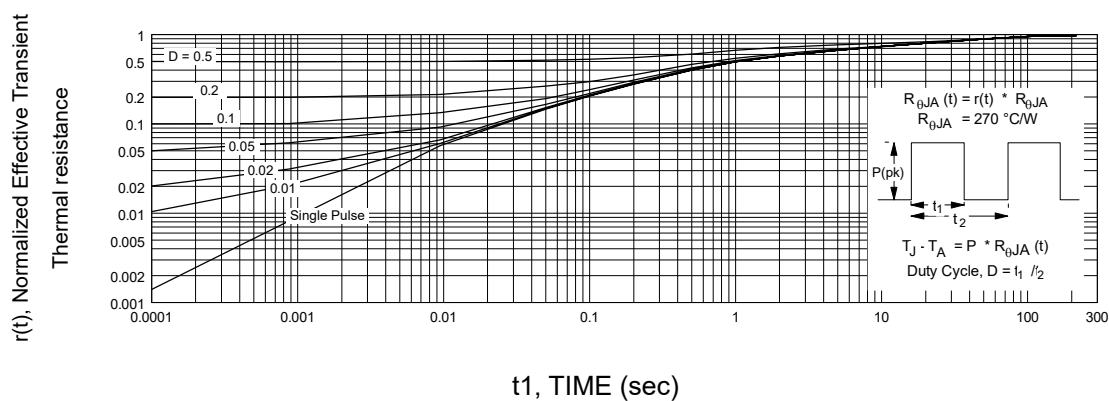
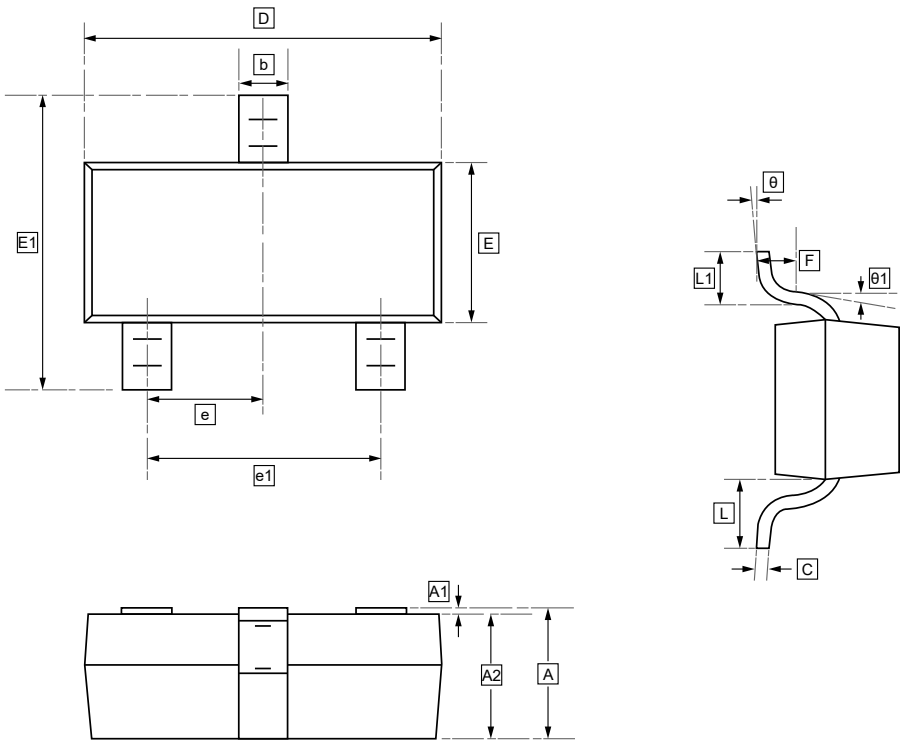


Figure 11. Transient Thermal Response Curve.



8.SOT-23 Package Outline Dimensions



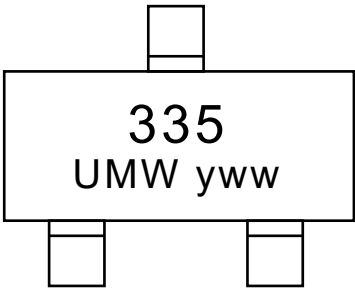
DIMENSIONS (mm are the original dimensions)

| Symbol | A    | A1   | A2   | b    | C    | D    | E    | E1   | e    | e1   | L    | L1   |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|
| Min    | 0.90 | 0.00 | 0.90 | 0.30 | 0.08 | 2.80 | 1.20 | 2.25 | 0.95 | 1.80 | 0.55 | 0.30 |
| Max    | 1.15 | 0.10 | 1.05 | 0.50 | 0.15 | 3.00 | 1.40 | 2.55 | TYP. | 2.00 | REF  | 0.50 |

| Symbol | F    | θ  | θ1  |
|--------|------|----|-----|
| Min    | 0.25 | 0° | 2°  |
| Max    |      | 8° | 12° |



9.Ordering Information



yww: Batch Code

| Order Code  | Package | Base QTY | Delivery Mode |
|-------------|---------|----------|---------------|
| UMW FDN335N | SOT-23  | 3000     | Tape and reel |



## 10.Disclaimer

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