

## 1.Features

- $V_{DS(V)}=30V$
- $R_{DS(ON)}<40m\Omega(V_{GS}=4.5V)$
- $R_{DS(ON)}<55m\Omega(V_{GS}=2.5V)$

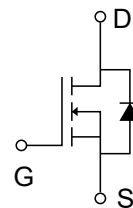
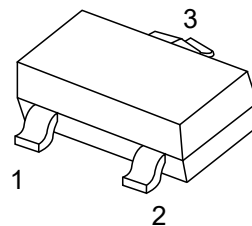
## 2.Benefits

- Multi-vendor compatibility
- Environmentally friendly
- Increased reliability

## 3.Pinning information

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

### SOT-23



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

| Parameter                                |                   | Symbol         | Value      | Units          |
|------------------------------------------|-------------------|----------------|------------|----------------|
| Drain-Source Voltage                     |                   | $V_{DS}$       | 30         | V              |
| Continuous Drain Current, $V_{GS}$ @ 10V | $T_A=25^{\circ}C$ | $I_D$          | 3.4        | A              |
| Continuous Drain Current, $V_{GS}$ @ 10V | $T_A=70^{\circ}C$ |                | 2.7        |                |
| Pulsed Drain Current                     |                   | $I_{DM}$       | 17         |                |
| Maximum Power Dissipation                | $T_A=25^{\circ}C$ | $P_D$          | 1.3        | W              |
| Maximum Power Dissipation                | $T_A=70^{\circ}C$ |                | 0.8        |                |
| Linear Derating Factor                   |                   |                | 0.01       | W/ $^{\circ}C$ |
| Gate-to-Source Voltage                   |                   | $V_{GS}$       | $\pm 12$   | V              |
| Junction and Storage Temperature Range   |                   | $T_J, T_{STG}$ | -55 to 150 | $^{\circ}C$    |



## 5. Thermal resistance rating

| Parameter                           | Symbol          | Typ | Max | Units |
|-------------------------------------|-----------------|-----|-----|-------|
| Junction-to-Ambient ③               | $R_{\theta JA}$ |     | 100 | °C/W  |
| Junction-to-Ambient ( $t < 10s$ ) ④ | $R_{\theta JA}$ |     | 99  | °C/W  |

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ Surface mounted on 1 in square Cu board.



## 6. Electrical Characteristics $T_J=25^{\circ}\text{C}$

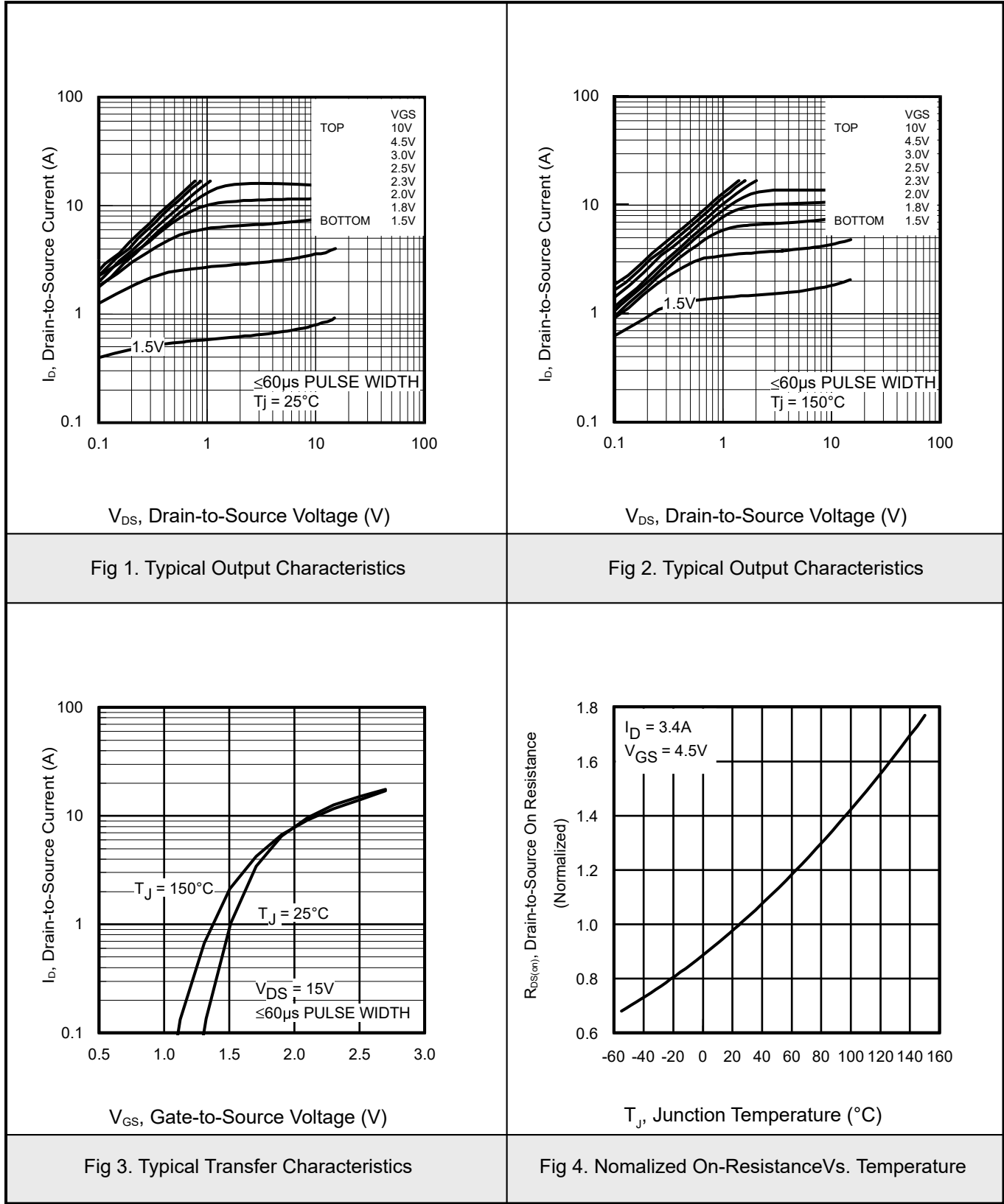
| Parameter                            | Symbol                          | Conditions                                                           | Min | Typ  | Max  | Units                 |
|--------------------------------------|---------------------------------|----------------------------------------------------------------------|-----|------|------|-----------------------|
| Drain-Source Breakdown Voltage       | $V_{(BR)DSS}$                   | $I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$                            | 30  |      |      | V                     |
| Breakdown Voltage Temp. Coefficient  | $\Delta V_{(BR)DSS}/\Delta T_J$ | $I_D=1\text{mA}$ , Reference to $25^{\circ}\text{C}$                 |     | 0.02 |      | V/ $^{\circ}\text{C}$ |
| Static Drain-to-Source On-Resistance | $R_{DS(ON)}$                    | $V_{GS}=4.5\text{V}$ , $I_D=3.4\text{A}$ ②                           |     | 30   | 40   | m $\Omega$            |
|                                      |                                 | $V_{GS}=2.5\text{V}$ , $I_D=2.7\text{A}$ ②                           |     | 40   | 55   |                       |
| Gate Threshold Voltage               | $V_{GS(th)}$                    | $V_{DS}=V_{GS}$ , $I_D=10\mu\text{A}$                                | 0.5 | 0.8  | 1.1  | V                     |
| Drain-to-Source Leakage Current      | $I_{DSS}$                       | $V_{DS}=24\text{V}$ , $V_{GS}=0\text{V}$                             |     |      | 1    | $\mu\text{A}$         |
|                                      |                                 | $V_{DS}=24\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=125^{\circ}\text{C}$ |     |      | 150  |                       |
| Gate-to-Source Forward Leakage       | $I_{GSS}$                       | $V_{GS}=12\text{V}$                                                  |     |      | 100  | nA                    |
| Gate-to-Source Reverse Leakage       |                                 | $V_{GS}=-12\text{V}$                                                 |     |      | -100 |                       |
| Internal Gate Resistance             | $R_G$                           |                                                                      |     | 3.9  |      | $\Omega$              |
| Forward Transconductance             | $g_{fs}$                        | $V_{DS}=10\text{V}$ , $I_D=3.4\text{A}$                              | 9.5 |      |      | S                     |
| Total Gate Charge                    | $Q_g$                           | $V_{DS}=15\text{V}$                                                  |     | 2.9  |      | nC                    |
| Gate-to-Source Charge                | $Q_{gs}$                        | $V_{GS}=4.5\text{V}$ ②                                               |     | 0.13 |      |                       |
| Gate-to-Drain ("Miller") Charge      | $Q_{gd}$                        | $I_D=3.4\text{A}$                                                    |     | 1.1  |      |                       |
| Turn-On Delay Time                   | $t_{D(on)}$                     | $V_{DD}=15\text{V}$ ②                                                |     | 3.3  |      | ns                    |
| Rise Time                            | $t_r$                           | $I_D=1\text{A}$                                                      |     | 4    |      |                       |
| Turn-Off Delay Time                  | $t_{D(off)}$                    | $R_G=6.8\Omega$                                                      |     | 12   |      |                       |
| Fall Time                            | $t_f$                           | $V_{GS}=4.5\text{V}$                                                 |     | 4.9  |      |                       |
| Input Capacitance                    | $C_{iss}$                       | $V_{GS}=0\text{V}$                                                   |     | 270  |      | pF                    |
| Output Capacitance                   | $C_{oss}$                       | $V_{DS}=24\text{V}$                                                  |     | 32   |      |                       |
| Reverse Transfer Capacitance         | $C_{rss}$                       | $f=1\text{MHz}$                                                      |     | 21   |      |                       |



| Source-Drain Ratings and Characteristics  |          |                                                                         |                                                               |     |     |    |
|-------------------------------------------|----------|-------------------------------------------------------------------------|---------------------------------------------------------------|-----|-----|----|
| Continuous Source Current<br>(Body Diode) | $I_S$    | MOSFET symbol<br>showing the<br>integral reverse<br>p-n junction diode. |                                                               |     | 1.3 | A  |
| Pulsed Source Current<br>(Body Diode) ①   | $I_{SM}$ |                                                                         |                                                               |     | 17  |    |
| Diode Forward Voltage                     | $V_{SD}$ |                                                                         | $T_J=25^{\circ}\text{C}, I_S=3.4\text{A}, V_{GS}=0\text{V}$ ② |     | 1.2 | V  |
| Reverse Recovery Time                     | $t_{rr}$ |                                                                         | $T_J=25^{\circ}\text{C}, V_R=24\text{V}, I_F=1.3\text{A}$     | 8.8 | 13  | ns |
| Reverse Recovery Charge                   | $Q_{rr}$ |                                                                         | $dI/dt=100\text{A}/\mu\text{s}$ ②                             | 2.7 | 4.1 | nC |

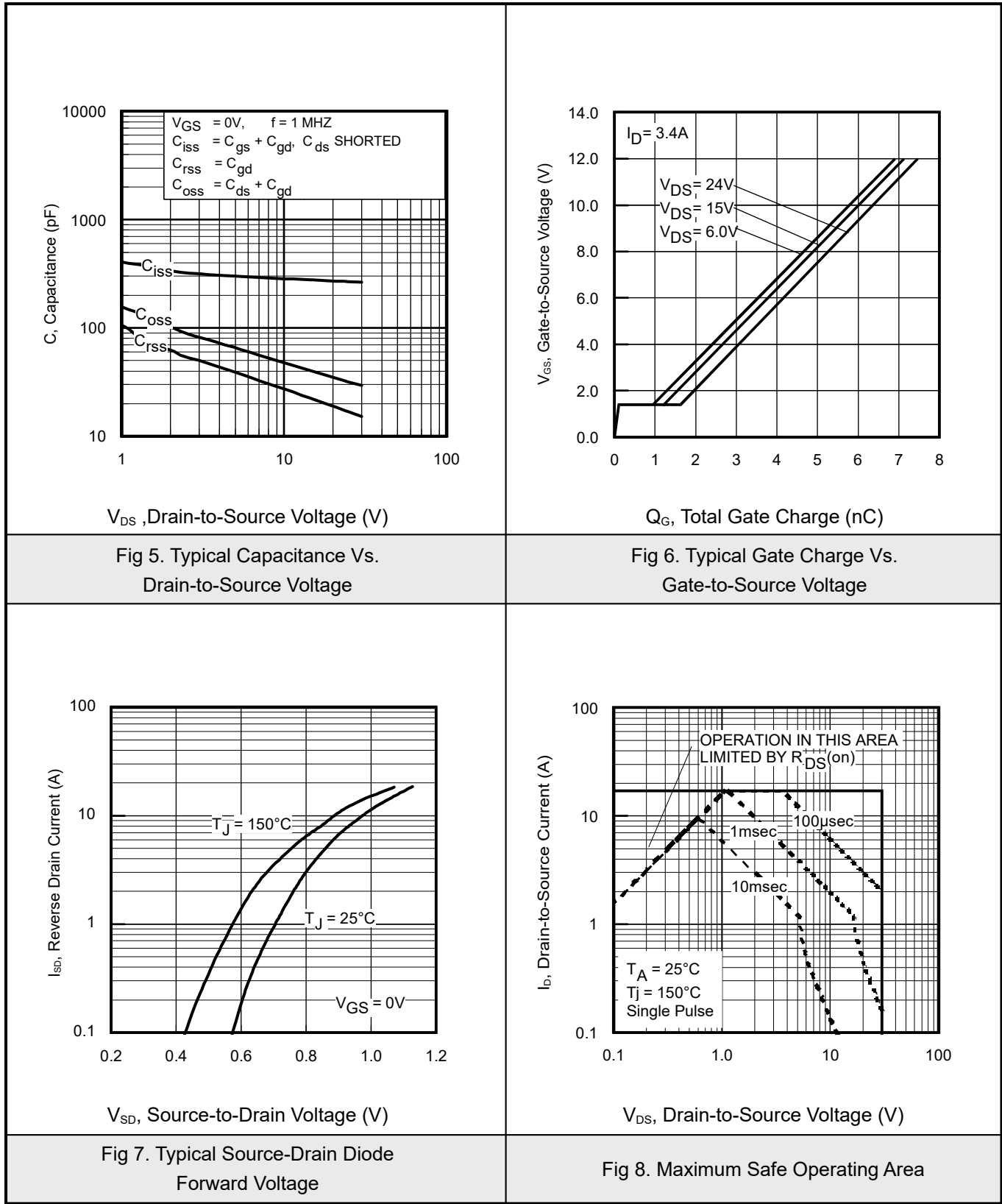


7.1 Typical Characteristics



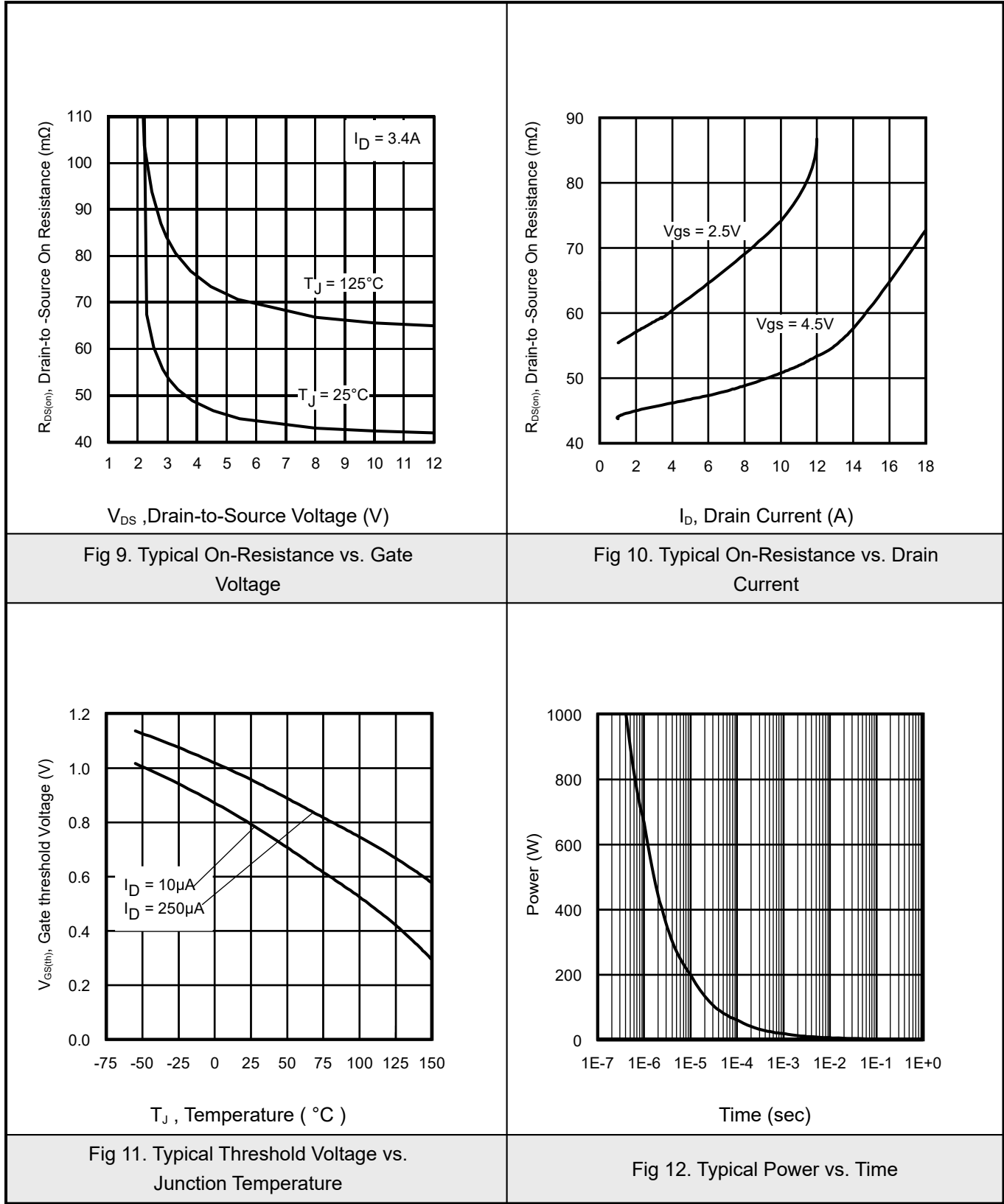


7.2Typical Characteristics





7.3Typical Characterisitics





7.4Typical Characterisitics

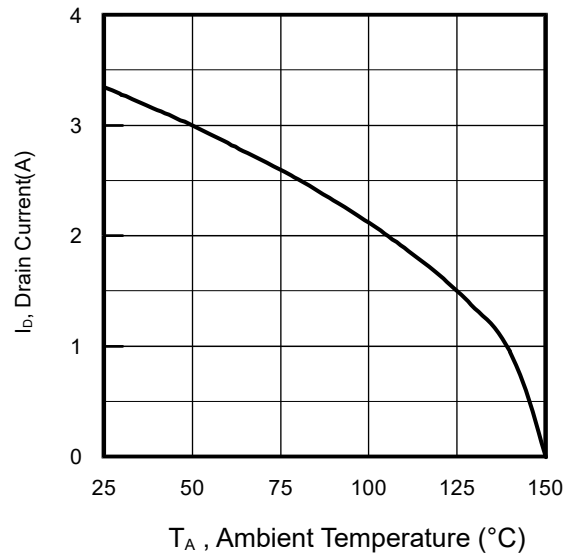


Fig 13. Maximum Drain Current vs. Ambient Temperature

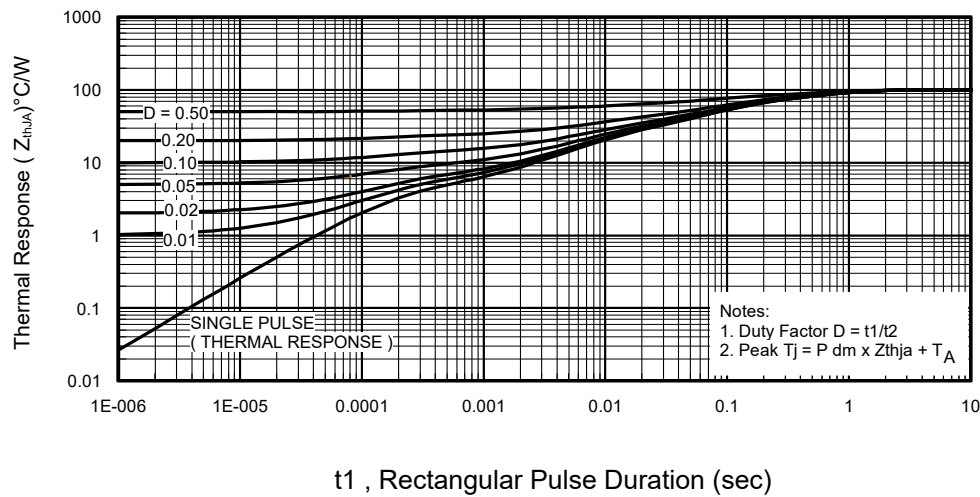


Fig 14. Typical Effective Transient Thermal Impedance, Junction-to-Ambient



## 7.5 Typical Characteristics

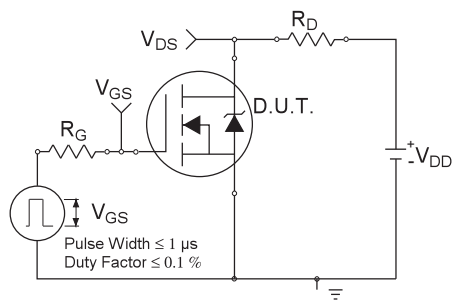


Fig 15a. Switching Time Test Circuit

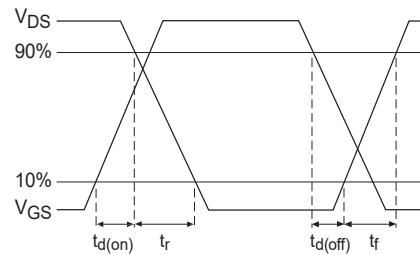


Fig 15b. Switching Time Waveforms

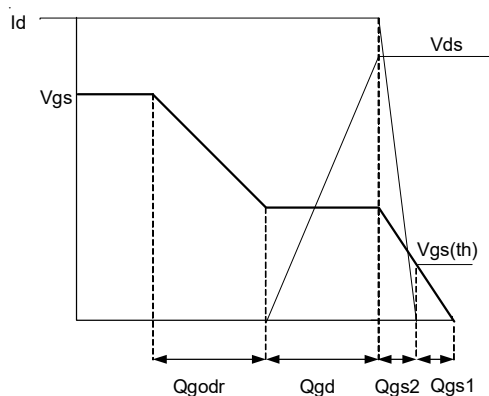


Fig 16a. Basic Gate Charge Waveform

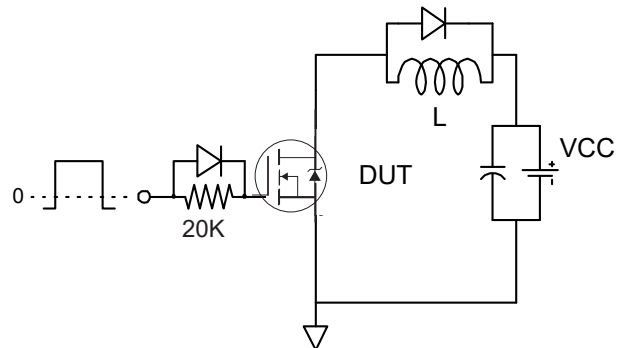
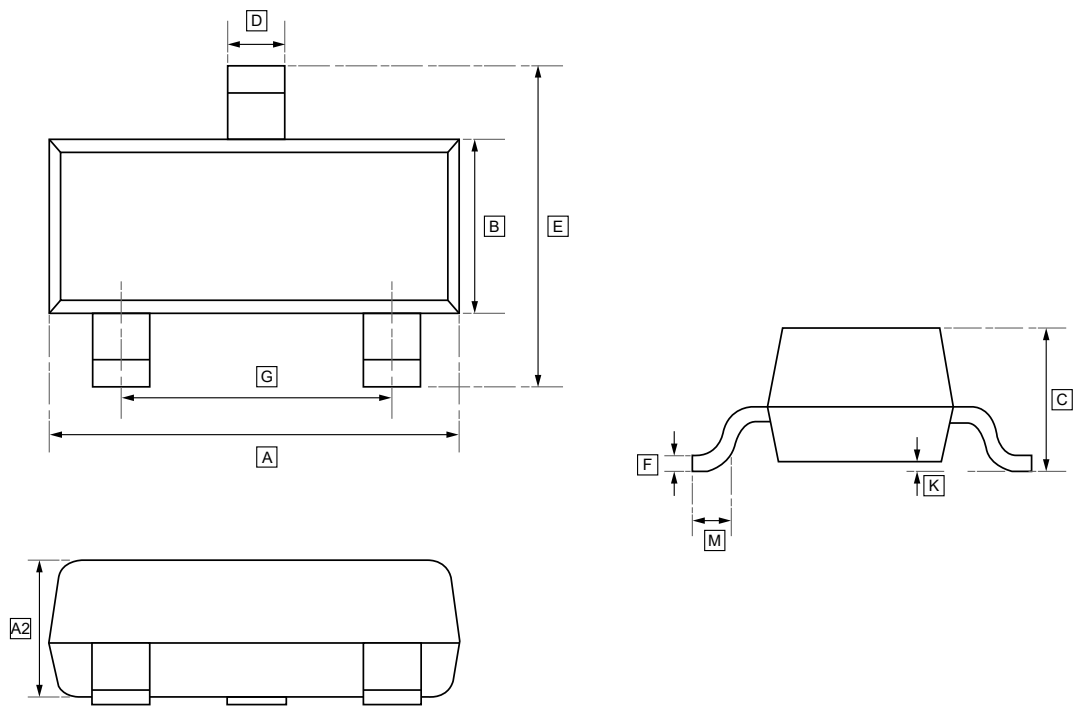


Fig 16b. Gate Charge Test Circuit



8.SOT-23 Package Outline Dimensions

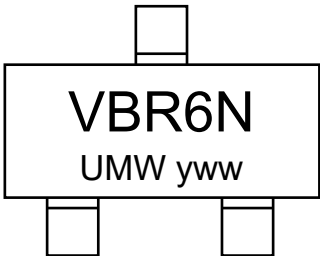


DIMENSIONS (mm are the original dimensions)

| Symbol | A    | B    | C    | D    | E    | G    | K    | M    | A2   | F     |
|--------|------|------|------|------|------|------|------|------|------|-------|
| Min    | 2.85 | 1.20 | 0.90 | 0.40 | 2.25 | 1.80 | 0.00 | 0.30 | 0.95 | 0.095 |
| Max    | 3.04 | 1.40 | 1.10 | 0.50 | 2.55 | 2.00 | 0.10 | -    | 1.05 | 0.115 |



9.Ordering information



yww: Batch Code

| Order Code      | Package | Base QTY | Delivery Mode |
|-----------------|---------|----------|---------------|
| UMW IRLML6346TR | SOT-23  | 3000     | Tape and reel |



## 10.Disclaimer

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