

1. Description

The SOP-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave soldering techniques.

2.2 Features

- Generation V Technology
- Ultra Low On-Resistance
- Surface Mount

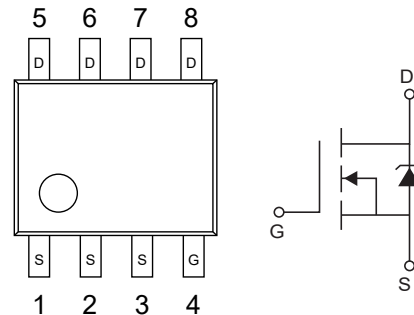
2.1 Features

- $V_{DS(V)}=30V$
- $I_D=7.3A$
- $R_{DS(ON)}<30m\Omega(V_{GS}=-10V)$
- $R_{DS(ON)}<50m\Omega(V_{GS}=-4.5V)$

3. Pinning information

| Pin | Symbol | Description |
|---------|--------|-------------|
| 1,2,3 | S | SOURCE |
| 4 | G | GATE |
| 5,6,7,8 | D | DRAIN |

SOP-8



4. Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

| Parameter | Symbol | Rating | Units |
|--|----------|--------|-------|
| Drain- Source Voltage | V_{DS} | 30 | V |
| Continuous Drain Current, $V_{GS}=10V$ | I_D | 7.3 | A |
| Continuous Drain Current, $V_{GS}=10V$ | | 5.8 | A |
| Pulsed Drain Current ① | I_{DM} | 58 | A |
| Power Dissipation | P_D | 2.5 | W |
| Power Dissipation | | 1.6 | W |



| | | | |
|---|----------------|------------|------|
| Linear Derating Factor | | 0.02 | W/°C |
| Gate-to-Source Voltage | V_{GS} | ± 20 | V |
| Gate-to-Source Voltage Single Pulse $t_p < 10\mu s$ | V_{GSM} | 30 | V |
| Single Pulse Avalanche Energy ② | E_{AS} | 70 | mJ |
| Peak Diode Recovery dv/dt ③ | dv/dt | 5 | V/ns |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | °C |

5. Thermal resistance rating

| Parameter | Symbol | Typ | Max | Units |
|-------------------------------|-----------------|-----|-----|-------|
| Maximum Junction-to-Ambient ⑤ | $R_{\theta JA}$ | | 50 | °C/W |



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°C | | 0.024 | | $\text{V}/^\circ\text{C}$ |
| Static Drain-to-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=10\text{V}$, $I_D=7.3\text{A}$ ④ | | | 30 | m Ω |
| | | $V_{GS}=4.5\text{V}$, $I_D=3.7\text{A}$ ④ | | | 50 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$ | 1 | | | V |
| Forward Transconductance | g_{FS} | $V_{DS}=15\text{V}$, $I_D=2.3\text{A}$ | 5.8 | | | S |
| Drain-to-Source Leakage Current | I_{DSS} | $V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$ | | | 1 | μA |
| | | $V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$ | | | 25 | |
| Gate-to-Source Forward Leakage | I_{GSS} | $V_{GS}=-20\text{V}$ | | | -100 | nA |
| Gate-to-Source Reverse Leakage | | $V_{GS}=20\text{V}$ | | | 100 | |
| Total Gate Charge | Q_g | $I_D=4.6\text{A}$ | | 19 | 28 | nC |
| Gate-to-Source Charge | Q_{gs} | $V_{DS}=24\text{V}$ | | 2.3 | 3.5 | |
| Gate-to-Drain ("Miller") Charge | Q_{gd} | $V_{GS}=10\text{V}$, See Fig. 10 ④ | | 6.3 | 9.5 | |
| Turn-On Delay Time | $t_{D(on)}$ | $V_{DD}=15\text{V}$ ④ | | 7 | | ns |
| Rise Time | t_r | $I_D=4.6\text{A}$ | | 35 | | |
| Turn-Off Delay Time | $t_{D(off)}$ | $R_G=6.2\Omega$ | | 21 | | |
| Fall Time | t_f | $R_D=3.2\Omega$ ④ | | 19 | | |
| Input Capacitance | C_{iss} | $V_{GS}=0\text{V}$ | | 550 | | pF |
| Output Capacitance | C_{oss} | $V_{DS}=-25\text{V}$ | | 260 | | |
| Reverse Transfer Capacitance | C_{rss} | $f=1\text{MHz}$, See Fig. 9 | | 100 | | |



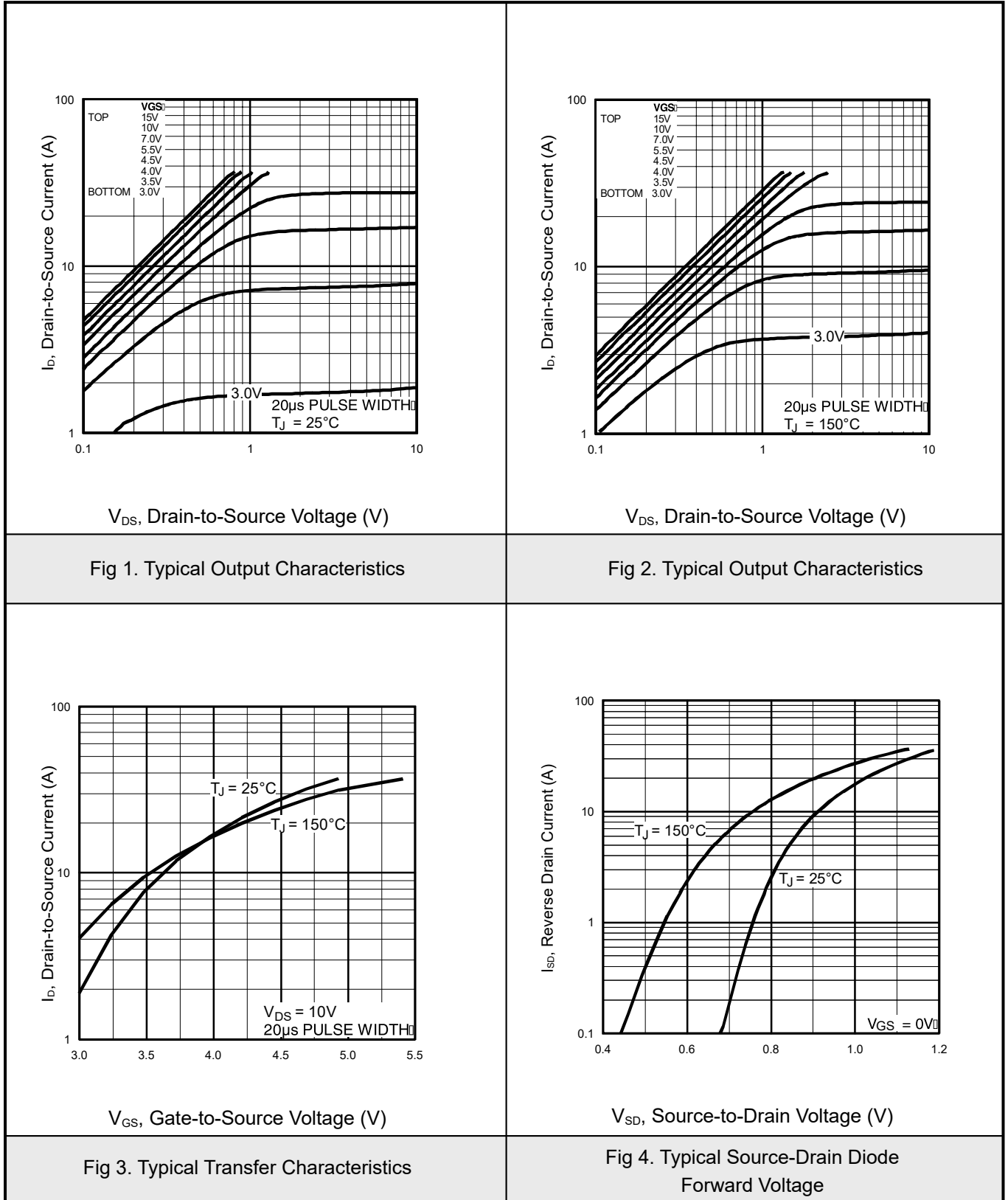
| Source-Drain Ratings and Characteristics | | | | | | |
|---|----------|---|--|----|-----|----|
| Continuous Source Current (Body Diode) | I_S | MOSFET symbol showing the integral reverse p-n junction diode. | | | 2.5 | A |
| Pulsed Source Current (Body Diode) ① | I_{SM} | | | | 58 | |
| Diode Forward Voltage | V_{SD} | $T_J=25^\circ\text{C}, I_S=4.6\text{A}, V_{GS}=0\text{V}$ ③ | | | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $T_J=25^\circ\text{C}, I_F=4.6\text{A}$ | | 48 | 73 | ns |
| Reverse Recovery Charge | Q_{rr} | $di/dt=-100\text{A}/\mu\text{s}$ ③ | | 73 | 110 | nC |

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.(See fig. 11)
- ② $V_{DD}=15\text{V}$, starting $T_J=25^\circ\text{C}$, $L=6.6\text{mH}$, $R_G=25\Omega$, $I_{AS}=4.6\text{A}$. (See Figure 8)
- ③ $I_{SD} \leq 4.6\text{A}$, $di/dt \leq 120\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$.
- ④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
- ⑤ When mounted on 1 inch square copper board, $t < 10$ sec.

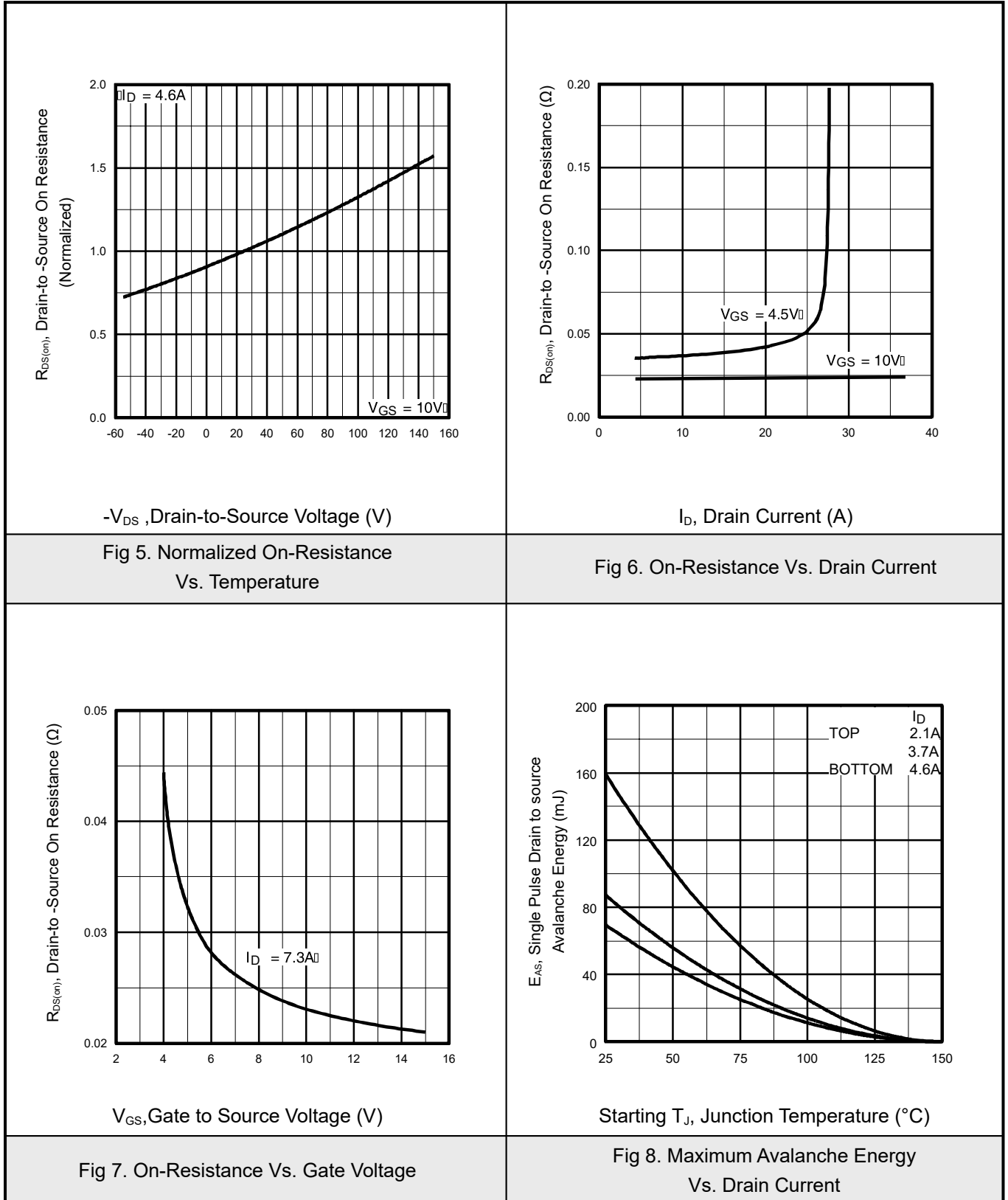


7.1 Typical Characteristics



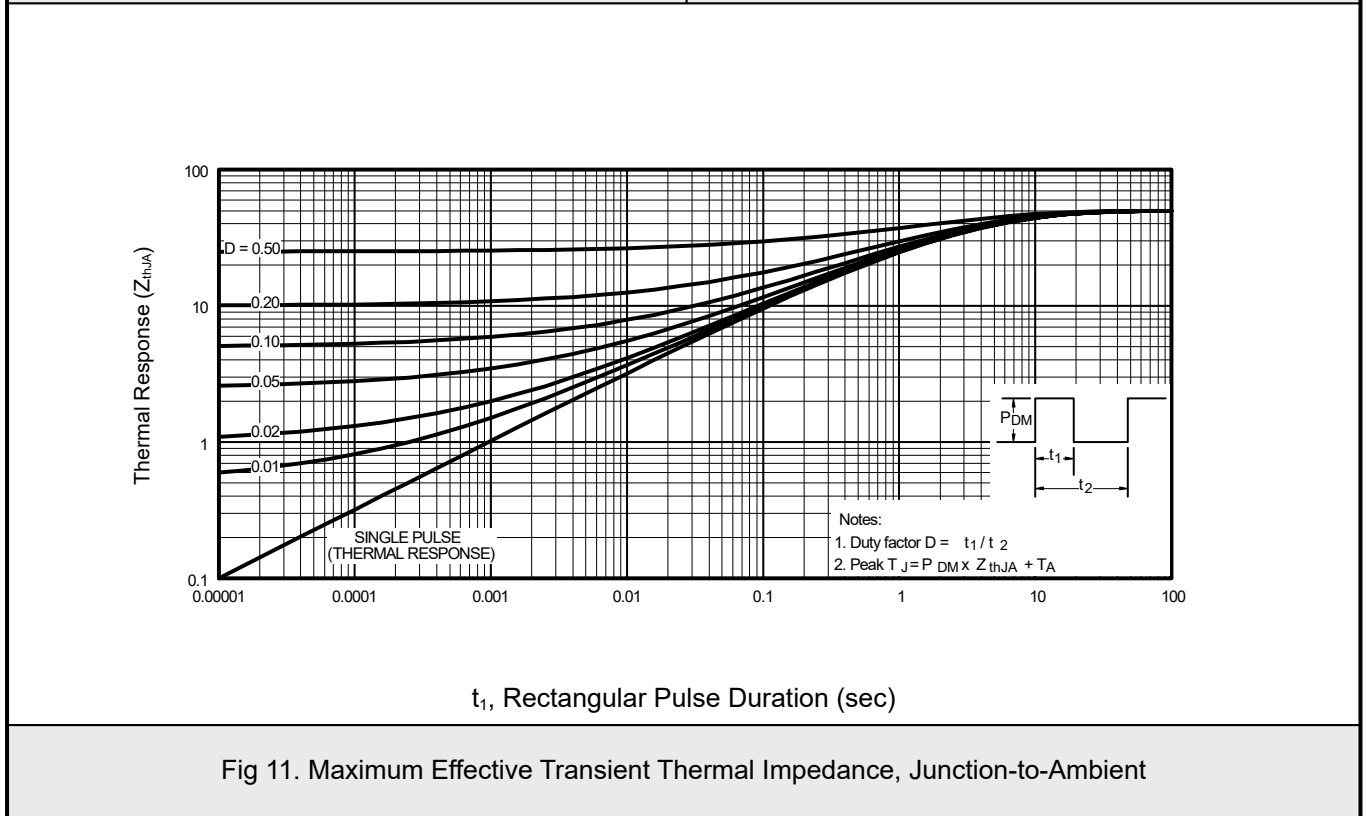
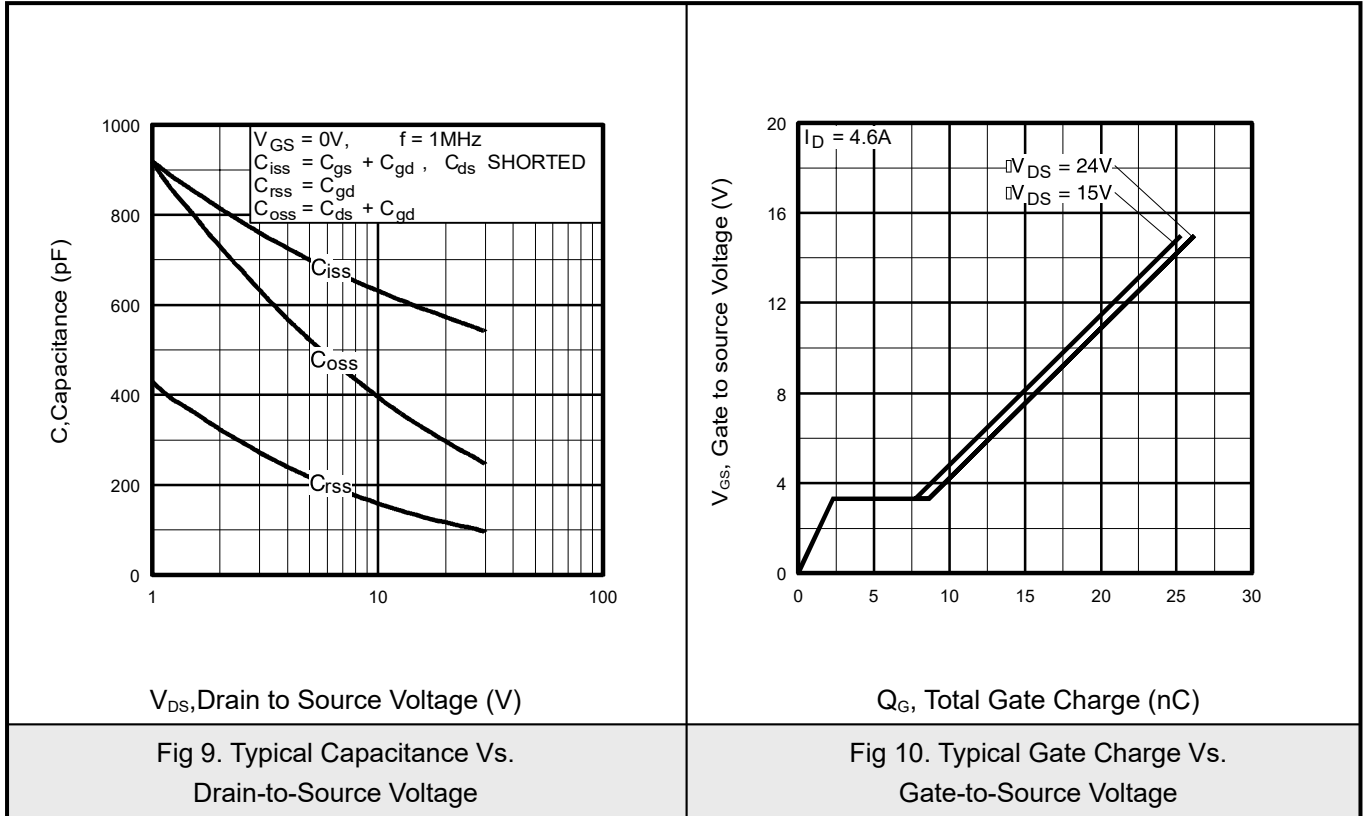


7.2 Typical Characteristics



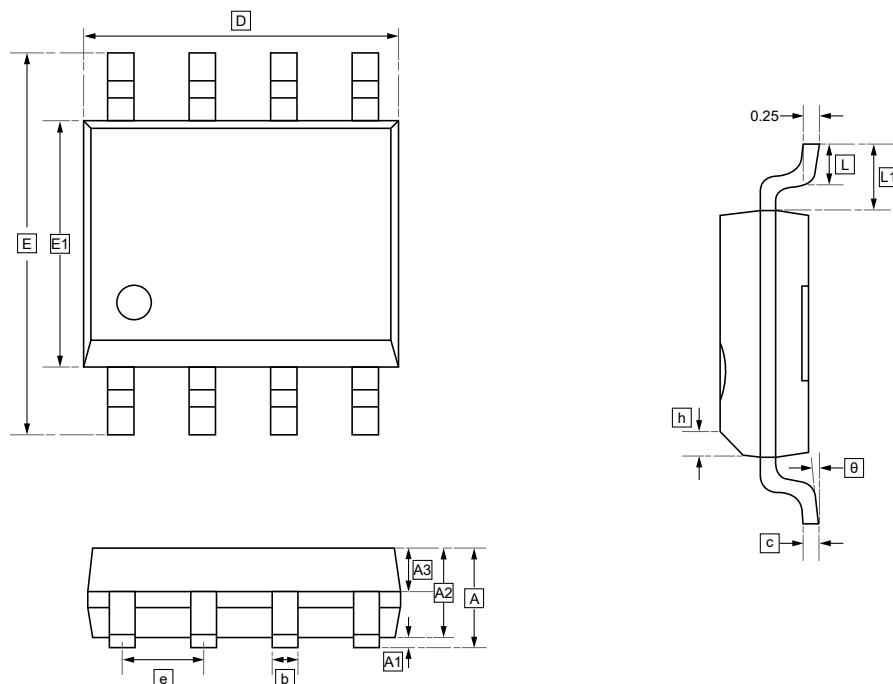


7.3 Typical Characteristics





8.SOP-8 Package Outline Dimensions



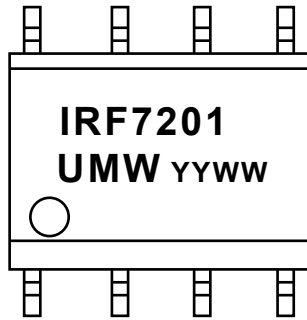
DIMENSIONS (mm are the original dimensions)

| Symbol | A | A1 | A2 | A3 | b | c | D | E | E1 | e | h | L |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|
| Min | - | 0.05 | 1.30 | 0.60 | 0.39 | 0.20 | 4.80 | 5.80 | 3.80 | 1.24 | 0.30 | 0.50 |
| Max | 1.75 | 0.20 | 1.50 | 0.70 | 0.47 | 0.24 | 5.00 | 6.20 | 4.00 | 1.30 | 0.50 | 0.80 |

| Symbol | L1 | θ |
|--------|------|----------|
| Min | 1.00 | 0° |
| Max | 1.10 | 8° |



9. Ordering information



YY: Year Code
WW: Week Code

| Order Code | Package | Base QTY | Delivery Mode |
|---------------|---------|----------|---------------|
| UMW IRF7201TR | SOP-8 | 3000 | Tape and reel |



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