

## 1.Description

The is the single P-Channel logic enhancement mode power field effect transistors to provide excellent  $R_{DS(ON)}$ , low gate charge and low gate resistance. It's up to -30V operation voltage is well suited in switching mode power supply, SMPS, notebook computer power management and other battery powered circuits.

## 2.Features

- $R_{DS(ON)} < 25m\Omega (V_{GS}=10V)$
- $R_{DS(ON)} < 40m\Omega (V_{GS}=4.5V)$
- Super high density cell design for extremely low
- $R_{DS(ON)}$  Exceptional on-resistance and maximum DC current

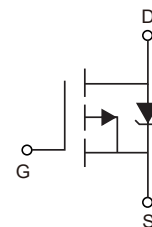
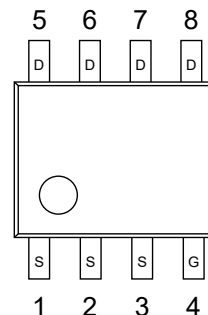
## 3.Applications

- Switching power supply, SMPS
- Battery Powered System
- DC/DC Converter
- DC/AC Converter
- Load Switch

## 4.Pinning information

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

SOP-8



## 5.Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

| Parameter                     | Symbol         | Rating     | Units            |
|-------------------------------|----------------|------------|------------------|
| Drain-Source Voltage          | $V_{DS}$       | -30        | V                |
| Gate-Source Voltage           | $V_{GS}$       | $\pm 20$   | V                |
| Drain Current-Continuous      | $I_D$          | -5.1       | A                |
| Drain Current-Pulsed (Note 1) | $I_{DM}$       | -20        | A                |
| Maximum Power Dissipation     | $P_D$          | 2.5        | W                |
| Storage Temperature Range     | $T_J, T_{STG}$ | -55 to 150 | $^\circ\text{C}$ |



6.Thermal resistance rating

| Parameter                                       | Symbol          | Typ | Max | Units |
|-------------------------------------------------|-----------------|-----|-----|-------|
| Thermal Resistance,Junction-to-Ambient (Note 2) | $R_{\theta JA}$ |     | 50  | °C/W  |



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

| Parameter                          | Symbol              | Conditions                                                                                | Min | Typ | Max  | Units |
|------------------------------------|---------------------|-------------------------------------------------------------------------------------------|-----|-----|------|-------|
| Static characteristics             |                     |                                                                                           |     |     |      |       |
| Drain-source breakdown voltage     | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                                               | -30 | -33 |      | V     |
| Zero gate voltage drain current    | I <sub>DSS</sub>    | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V                                                |     |     | -1   | μA    |
| Gate-source leakage current        | I <sub>GSS</sub>    | V <sub>DS</sub> =±20V, V <sub>GS</sub> =0V                                                |     |     | ±100 | nA    |
| On Characteristics (Note 3)        |                     |                                                                                           |     |     |      |       |
| Gate Threshold Voltage             | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                 | -1  |     | -2   | V     |
| Drain-Source On-State Resistance   | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-5.1A                                              |     | 20  | 25   | mΩ    |
|                                    |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4.2A                                             |     | 25  | 40   | mΩ    |
| Forward Transconductance           | g <sub>FS</sub>     | V <sub>DS</sub> =-15V, I <sub>D</sub> =-4.5A                                              | 4   | 7   |      | S     |
| Dynamic Characteristics (Note4)    |                     |                                                                                           |     |     |      |       |
| Input Capacitance                  | C <sub>iss</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f =1MHz                                       |     | 520 |      | pF    |
| Output Capacitanc                  | C <sub>oss</sub>    |                                                                                           |     | 130 |      | pF    |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                                                                           |     | 70  |      | pF    |
| Switching Characteristics (Note 4) |                     |                                                                                           |     |     |      |       |
| Tum-on Delay Time                  | t <sub>D(on)</sub>  | V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V<br>I <sub>D</sub> =-1A, R <sub>GEN</sub> =6Ω |     | 7   |      | ns    |
| Tum-on Rise Time                   | t <sub>r</sub>      |                                                                                           |     | 13  |      | ns    |
| Tum-Off Delay Time                 | t <sub>D(off)</sub> |                                                                                           |     | 14  |      | ns    |
| Tum-Off Fall Time                  | t <sub>f</sub>      |                                                                                           |     | 9   |      | ns    |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-5.1A, V <sub>GS</sub> =-10V                       |     | 11  |      | nC    |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                                                                           |     | 2.2 |      | nC    |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                                                                           |     | 3   |      | nC    |
| Drain-Source Diode Characteristics |                     |                                                                                           |     |     |      |       |
| Diode Forward Voltage (Note 3)     | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>D</sub> =-5.1A                                                |     |     | -1.2 | V     |



8.1 Typical Characteristics

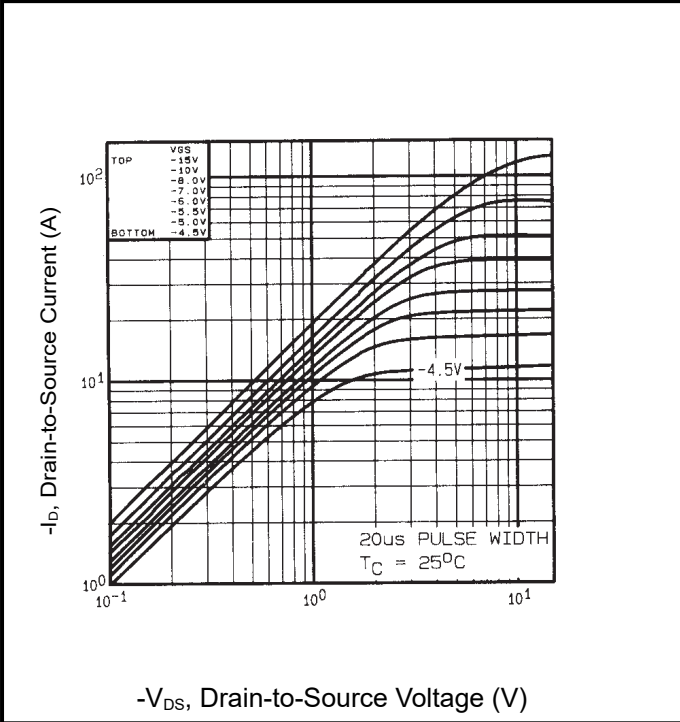


Fig 1. Typical Output Characteristics

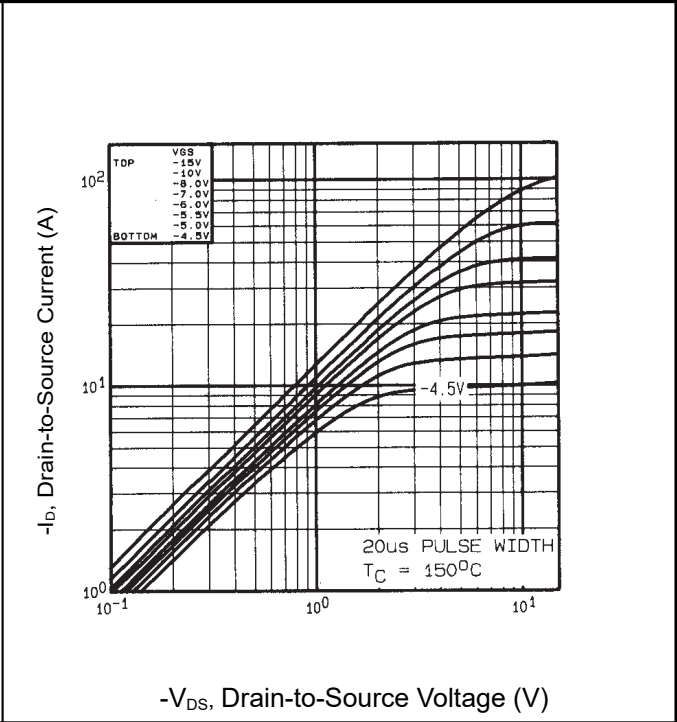


Fig 2. Typical Output Characteristics

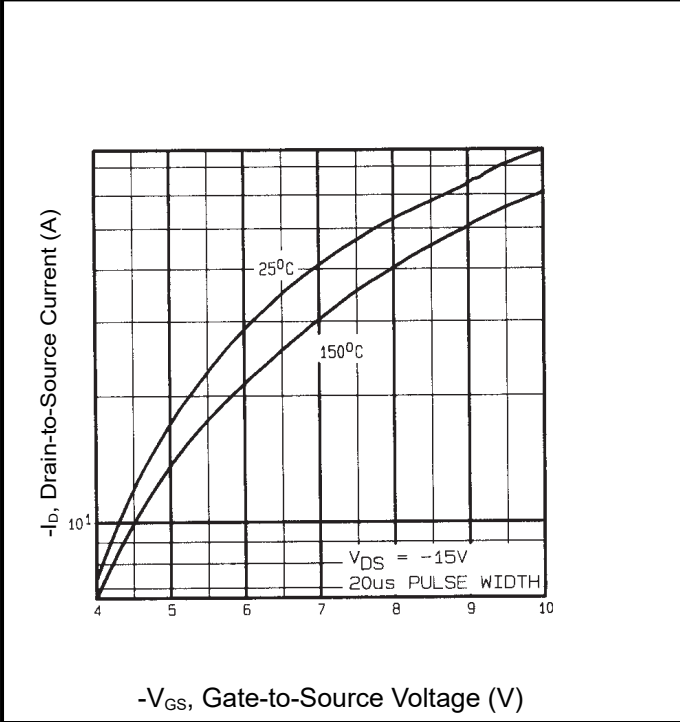


Fig 3. Typical Transfer Characteristics

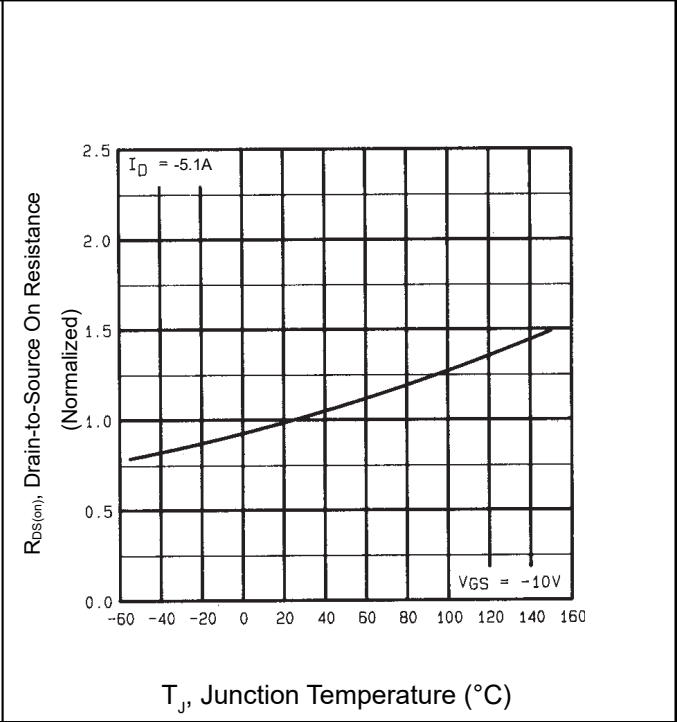
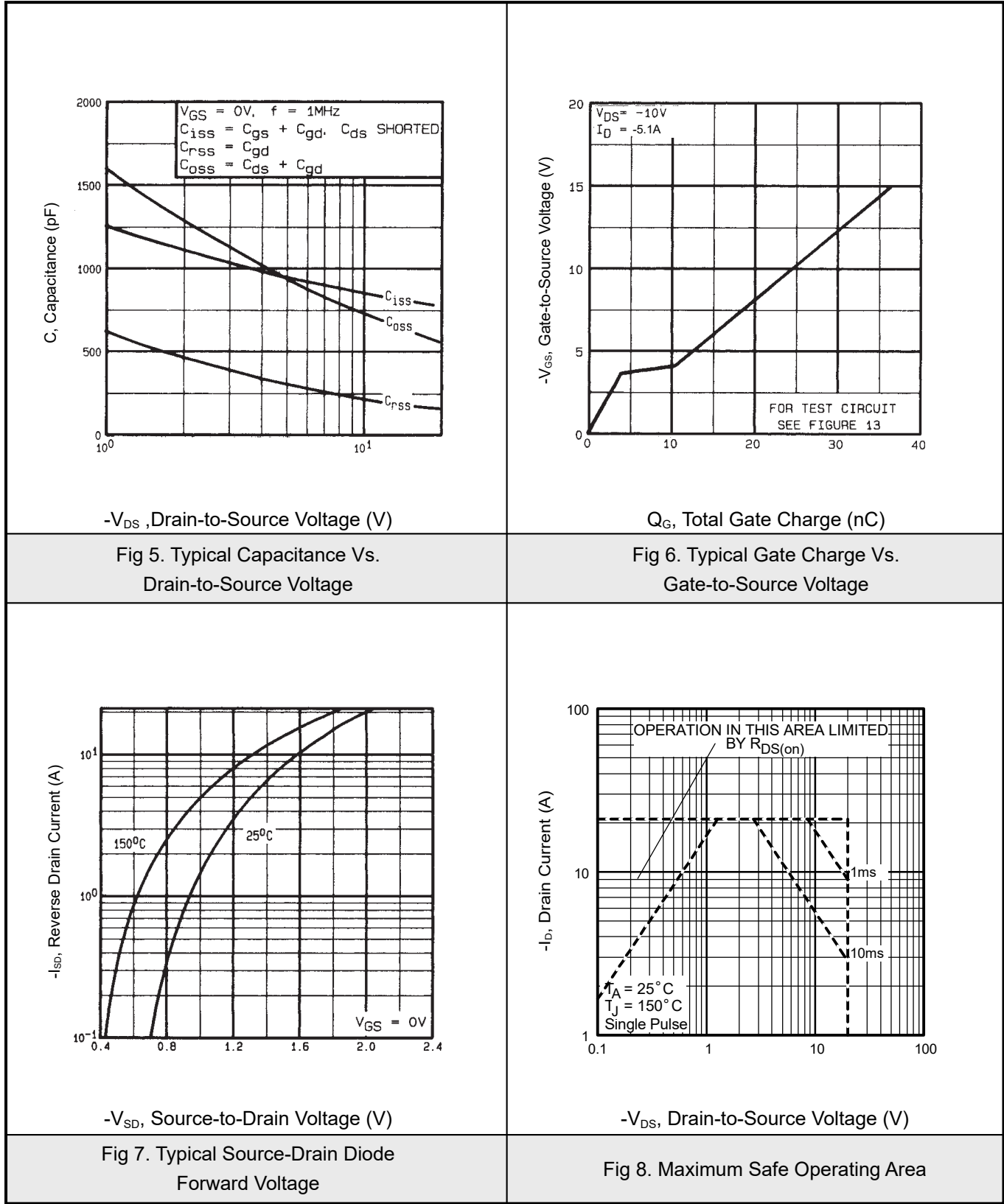


Fig 4. Normalized On-Resistance Vs. Temperature



8.2 Typical Characteristics





8.3 Typical Characteristics

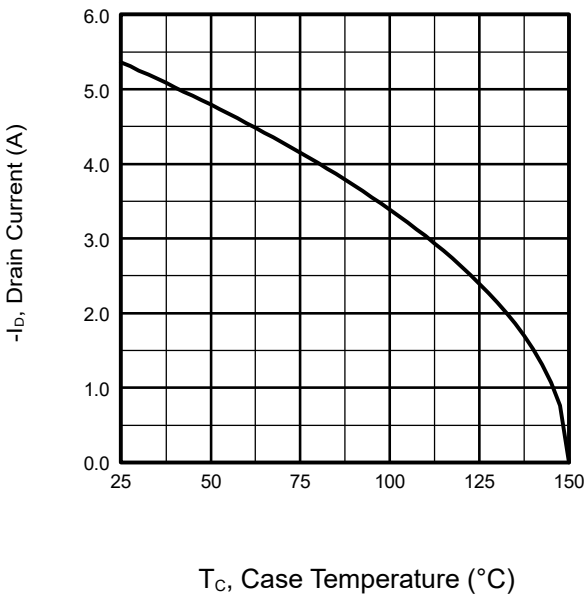


Fig 9. Maximum Drain Current Vs. AmbientTemperature

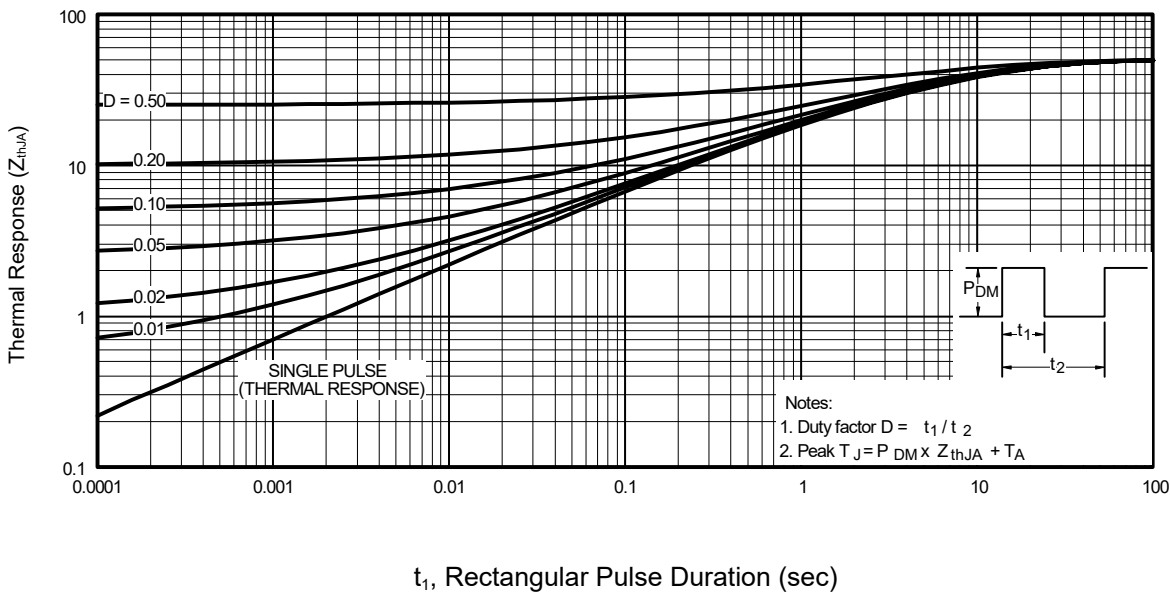
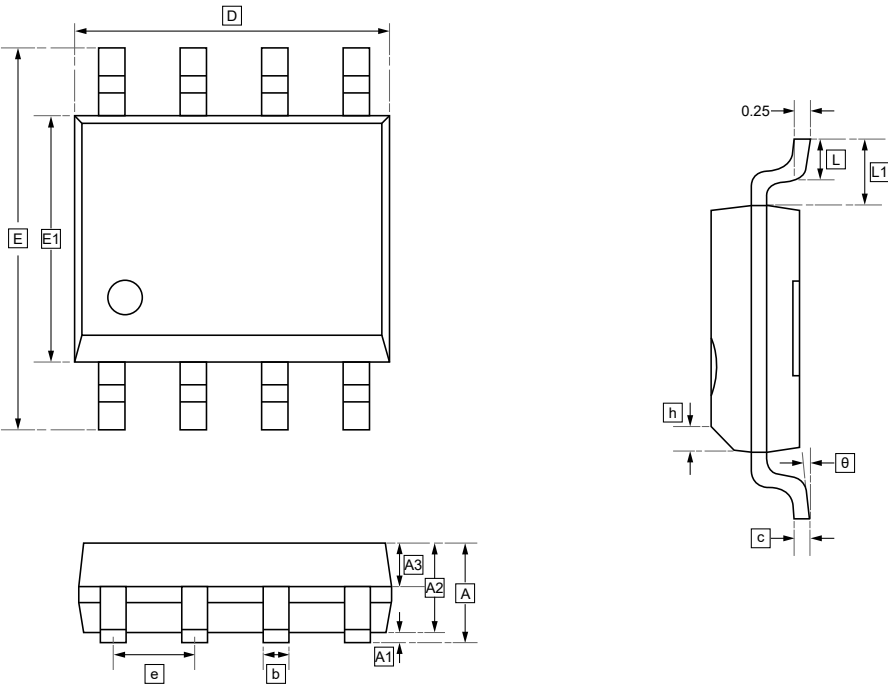


Fig 10. Maximum Effective Transient Themmal Impedance, Junction-to-Ambient



9.SOP-8 Package Outline Dimensions



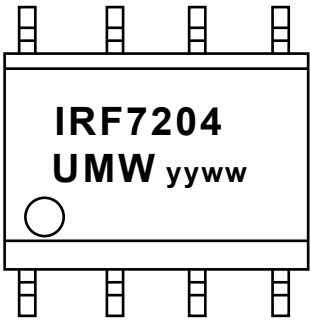
DIMENSIONS (mm are the original dimensions)

| 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° |



10.Ordering information



yy: Year Code  
ww: Week Code

| Order Code    | Package | Base QTY | Delivery Mode |
|---------------|---------|----------|---------------|
| UMW IRF7204TR | SOP-8   | 3000     | Tape and reel |



## 11.Disclaimer

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