

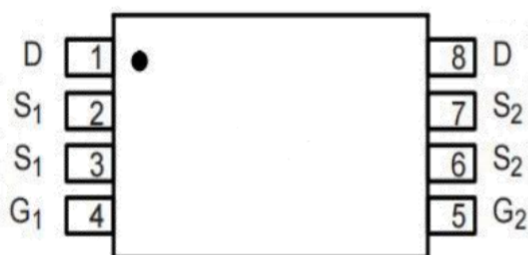
### Product Summary

- $V_{DS}$  20 V
- $I_{DS}$  7 A
- $R_{DS(ON)}$  (@  $V_{GS} = 4.5V$ )  $\leq 14m\Omega$
- $R_{DS(ON)}$  (@  $V_{GS} = 2.5V$ )  $\leq 17m\Omega$

### Application

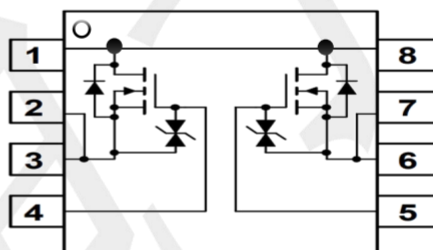
- Battery protection
- Battery Powered Systems
- Power management
- Motor Control
- Portable Power Adaptors

### Package and Pin Configuration



TSSOP-8

### Circuit diagram



### Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted)

| PARAMETER                            | SYMBOL    | LIMIT       | UNIT       |
|--------------------------------------|-----------|-------------|------------|
| Drain-Source Voltage                 | $V_{DS}$  | 20          | V          |
| Gate-Source Voltage                  | $V_{GS}$  | $\pm 10$    | V          |
| Continuous Drain Current             | $I_D$     | 7           | A          |
| Pulsed Drain Current                 | $I_{DM}$  | 23          | A          |
| Maximum Power Dissipation            | $P_D$     | 1.25        | W          |
| Operating Junction Temperature Range | $T_J$     | -55 to +150 | $^\circ C$ |
| Storage Temperature Range            | $T_{stg}$ | -55 to +150 | $^\circ C$ |

### Thermal Characteristic

| PARAMETER                              | Symbol          | Value | Unit         |
|----------------------------------------|-----------------|-------|--------------|
| Junction-to-Ambient Thermal Resistance | $R_{\theta JA}$ | 111   | $^\circ C/W$ |

Note : The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

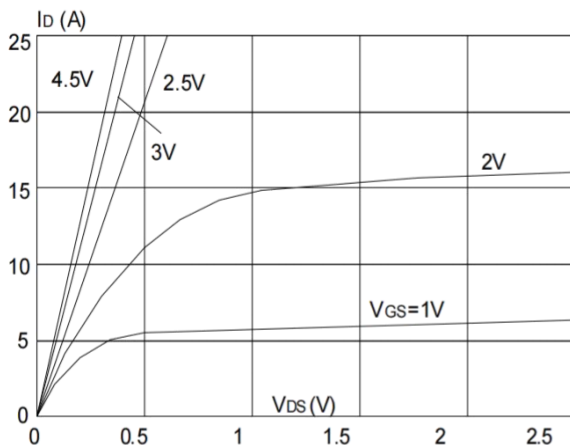
| PARAMETER                                               | CONDITIONS                                       | SYMBOL       | MIN | TYP  | MAX       | UNIT       |
|---------------------------------------------------------|--------------------------------------------------|--------------|-----|------|-----------|------------|
| Static                                                  |                                                  |              |     |      |           |            |
| Drain-Source Breakdown Voltage                          | $V_{GS}=0V, I_D=250\mu A$                        | $BV_{DSS}$   | 20  | --   | --        | V          |
| Gate-Source Threshold Voltage                           | $V_{DS}=V_{GS}, I_D=250\mu A$                    | $V_{GS(th)}$ | 0.5 | 0.7  | 1.2       | V          |
| Gate-Source Leakage                                     | $V_{DS}=0V, V_{GS}=\pm 20V$                      | $I_{GSS}$    | --  | --   | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current                         | $V_{DS}=16V, V_{GS}=0V$                          | $I_{DSS}$    | --  | 0.1  | 1.0       | $\mu A$    |
|                                                         | $V_{DS}=16V, T_J=55^{\circ}C$                    |              | --  | 1.0  | 5.0       | $\mu A$    |
| Drain-Source On-State Resistance (Note 1)               | $V_{GS}=4.5V, I_D=4.5A$                          | $R_{DS(on)}$ | --  | 12   | 14        | m $\Omega$ |
|                                                         | $V_{GS}=2.5V, I_D=3.5A$                          |              | --  | 15   | 17        |            |
| Dynamic (Note 2)                                        |                                                  |              |     |      |           |            |
| Total Gate Charge (Note 3)                              | $V_{DS}=10V, I_D=7A, V_{GS}=4.5V$                | $Q_g$        | --  | 11.4 | --        | nC         |
| Gate-Source Charge (Note 3)                             |                                                  | $Q_{gs}$     | --  | 1.9  | --        |            |
| Gate-Drain Charge (Note 3)                              |                                                  | $Q_{gd}$     | --  | 3.6  | --        |            |
| Input Capacitance                                       | $V_{DS}=8V, V_{GS}=0V, F=1.0MHz$                 | $C_{iss}$    | --  | 956  | --        | pF         |
| Output Capacitance                                      |                                                  | $C_{oss}$    | --  | 200  | --        |            |
| Reverse Transfer Capacitance                            |                                                  | $C_{rss}$    | --  | 150  | --        |            |
| Switching                                               |                                                  |              |     |      |           |            |
| Turn-On Delay Time (Note 3)                             | $V_{DD}=10V, I_D=3.5A, V_{GS}=4.5V, R_G=6\Omega$ | $t_{d(on)}$  | --  | 8.1  | --        | nS         |
| Rise Time (Note 3)                                      |                                                  | $t_r$        | --  | 17   | --        |            |
| Turn-Off Delay Time (Note 3)                            |                                                  | $t_{d(off)}$ | --  | 27   | --        |            |
| Fall Time (Note 3)                                      |                                                  | $t_f$        | --  | 8.8  | --        |            |
| Source-Drain Diode Ratings and Characteristics (Note 2) |                                                  |              |     |      |           |            |
| Forward Voltage                                         | $V_{GS}=0V, I_F=1.7A$                            | $V_{SD}$     | --  | 0.7  | 1.2       | V          |
| Continuous Source Current                               | Integral reverse diode in the MOSFET             | $I_S$        | --  | --   | 7         | A          |
| Pulsed Current (Note 1)                                 |                                                  | $I_{SM}$     | --  | --   | 23        | A          |

Notes:

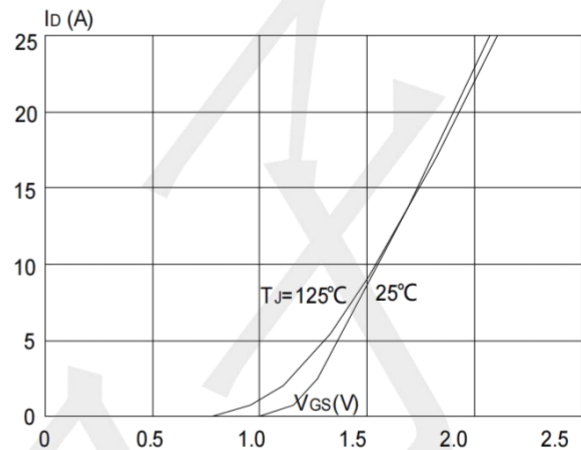
1. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.
3. Independent of operating temperature

## Typical Performance Characteristics

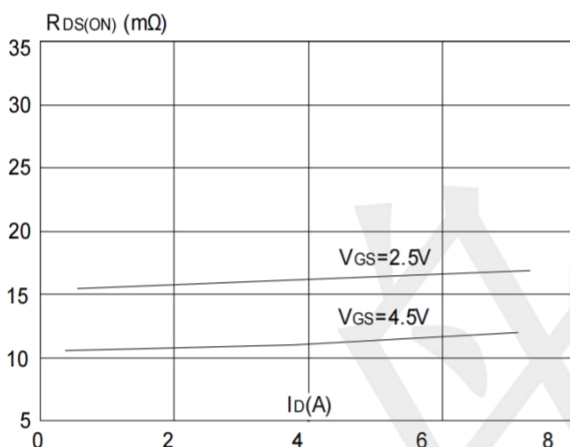
**Figure 1: Output Characteristics**



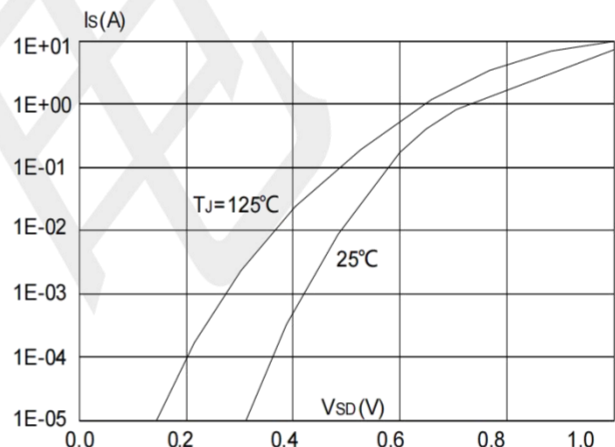
**Figure 2: Typical Transfer Characteristics**



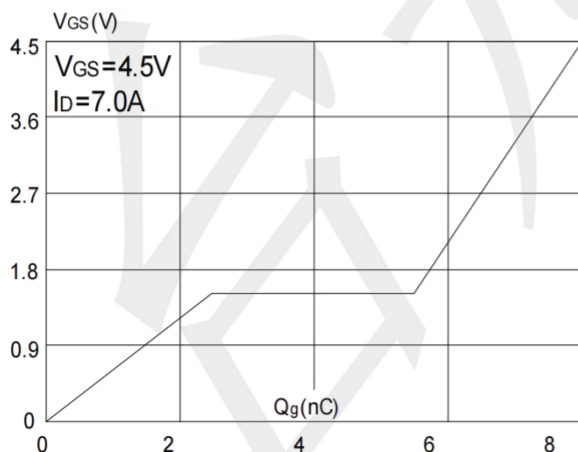
**Figure 3: On-resistance vs. Drain Current**



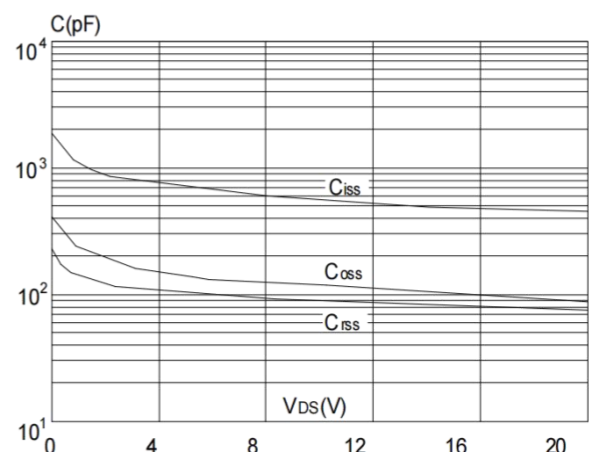
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

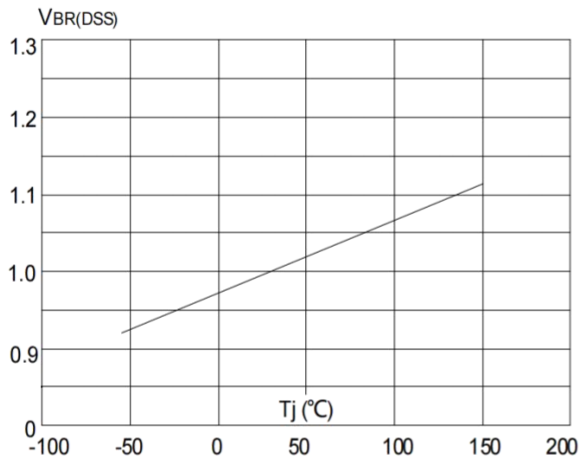


**Figure 6: Capacitance Characteristics**

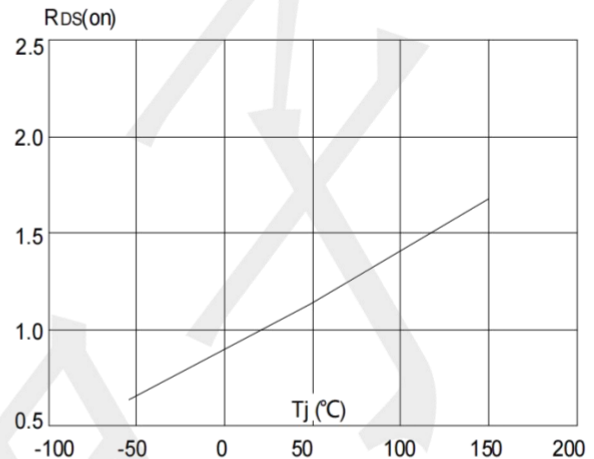


## Typical Performance Characteristics

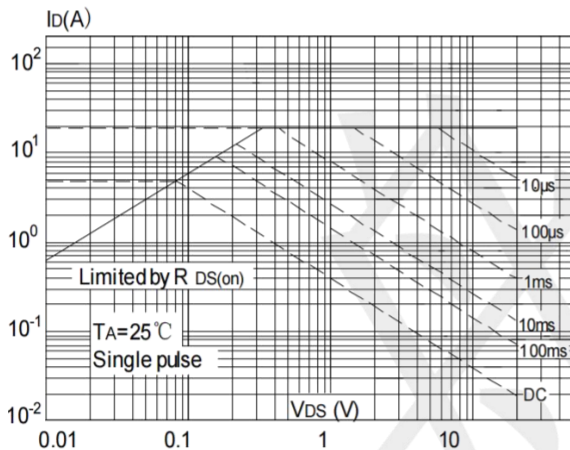
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



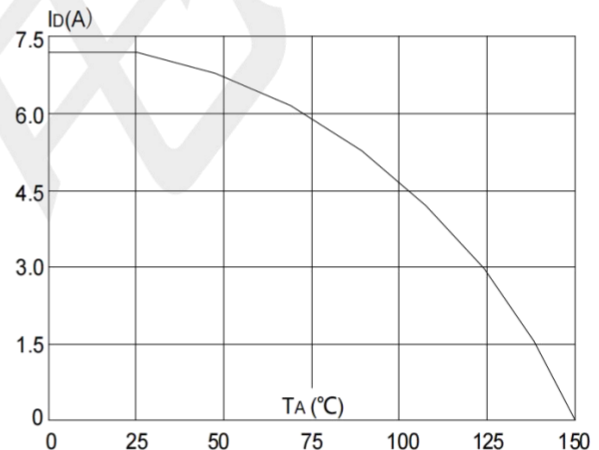
**Figure 8:** Normalized on Resistance vs. Junction Temperature



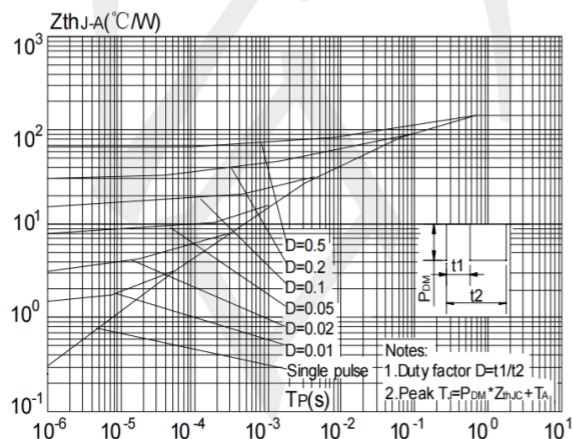
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

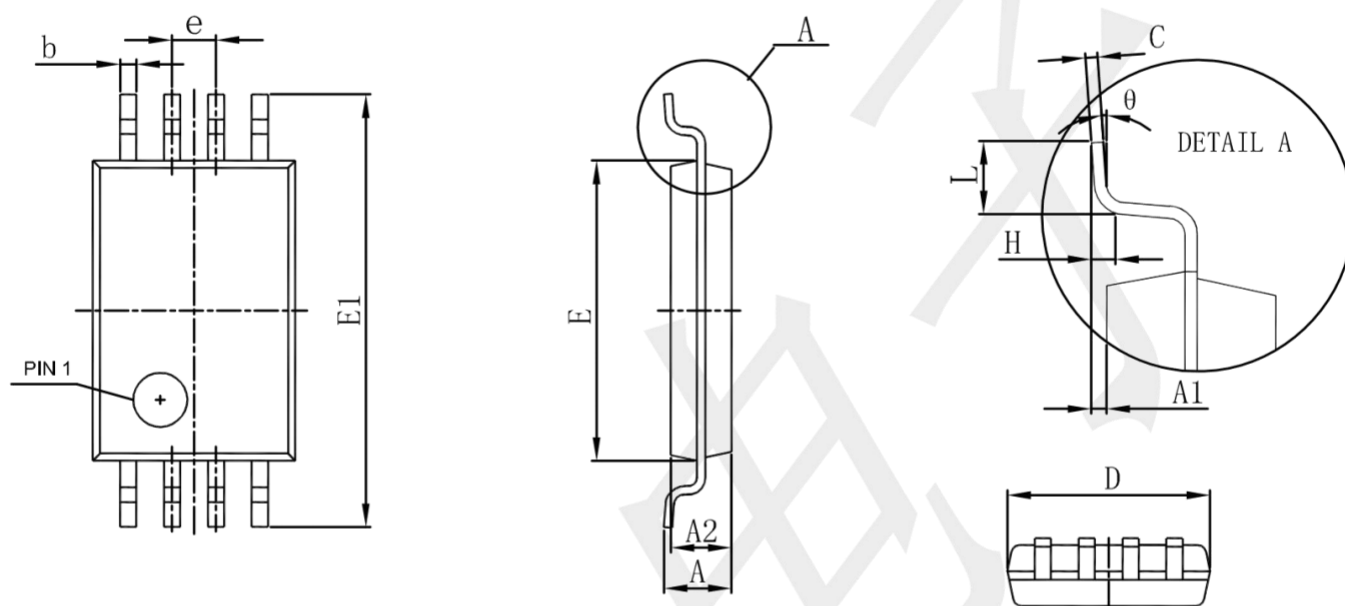


**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## Package Information

### TSSOP-8



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| D      | 2.900                     | 3.100 | 0.114                | 0.122 |
| E      | 4.300                     | 4.500 | 0.169                | 0.177 |
| b      | 0.190                     | 0.300 | 0.007                | 0.012 |
| c      | 0.090                     | 0.200 | 0.004                | 0.008 |
| E1     | 6.250                     | 6.550 | 0.246                | 0.258 |
| A      |                           | 1.200 |                      | 0.047 |
| A2     | 0.800                     | 1.000 | 0.031                | 0.039 |
| A1     | 0.050                     | 0.150 | 0.002                | 0.006 |
| e      | 0.65 (BSC)                |       | 0.026 (BSC)          |       |
| L      | 0.500                     | 0.700 | 0.020                | 0.028 |
| H      | 0.25(TYP)                 |       | 0.01(TYP)            |       |
| θ      | 1°                        | 7°    | 1°                   | 7°    |