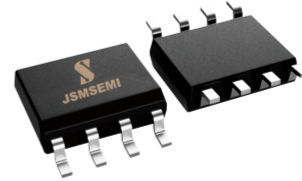


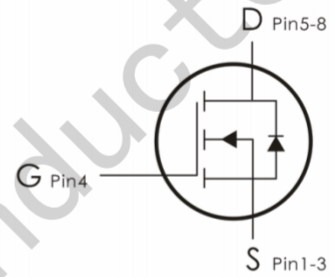
Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.



Features:

- 1) $V_{DS}=30V, I_D=20A, R_{DS(ON)} < 6.5m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.



Absolute Maximum Ratings: ($T_J=25^\circ C$ unless otherwise noted)

| Symbol | Parameter | Ratings | Units |
|----------------|--|-------------|------------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_A=25^\circ C$) | 20 | A |
| | Drain Current – Continuous ($T_A=75^\circ C$) | 15.2 | |
| I_{DM} | Drain Current – Pulsed ^① ($T_A=25^\circ C$) | 76 | |
| I_S | Diode continuous forward current ($T_A=25^\circ C$) | 5 | |
| P_D | Power Dissipation ($T_A=25^\circ C$) | 3.1 | W |
| T_J, T_{STG} | Operating and Storage Junction Temperature Range | -50 to +150 | $^\circ C$ |

Thermal Characteristics:

| Symbol | Parameter | Max | Units |
|-----------------|---|-----|--------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 40 | $^\circ C/W$ |

Electrical Characteristics: ($T_J=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|-----|------|-----------|------------------|
| Off Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\ \mu\text{A}$ | 30 | --- | --- | V |
| I_{DSS} | Drain-Source Leakage Current($T_A=25^\circ\text{C}$) | $V_{DS}=30V, V_{GS}=0V$ | --- | --- | 1 | μA |
| | Drain-Source Leakage Current($T_A=125^\circ\text{C}$) | $V_{DS}=24V, V_{GS}=0V$ | --- | --- | 100 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | GATE-Source Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$ | 1 | 1.6 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source On Resistance ^② | $V_{GS}=10V, I_D=15A$ | --- | 5.2 | 6.5 | $\text{m}\Omega$ |
| | | $V_{GS}=4.5V, I_D=8A$ | --- | 7.5 | 9.5 | $\text{m}\Omega$ |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=15V, V_{GS}=0V,$ $f=1\text{MHz}$ | --- | 1320 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 205 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 135 | --- | |
| R_g | Gate Resistance | $f=1\text{MHz}$ | --- | 4.4 | --- | Ω |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}=15V, I_D=3A$ $R_G=3.3\ \Omega, V_{GS}=10V$ | --- | 11 | --- | ns |
| t_r | Rise Time | | --- | 30 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 24 | --- | ns |
| t_f | Fall Time | | --- | 8 | --- | ns |
| Q_g | Total Gate Charge | $V_{GS}=10V, V_{DS}=15V,$ $I_D=15A$ | --- | 23.5 | --- | nC |
| Q_{gs} | Gate-Source Charge | | --- | 3.3 | --- | nC |
| Q_{gd} | Gate-Drain "Miller" Charge | | --- | 4.8 | --- | nC |
| Drain-Source Diode Characteristics | | | | | | |
| V_{SD} | Source-Drain Diode Forward Voltage ^② | $V_{GS}=0V, I_{SD}=12A$ | --- | 0.81 | 1.2 | V |

| | | | | | | |
|------------|------------------------------------|-------------------------|-----|----|-----|----|
| Trr | Body Diode Reverse Recovery Time | $I_{SD}=10A, V_{GS}=0V$ | --- | 31 | --- | Ns |
| Qrr | Body Diode Reverse Recovery Charge | $di/dt=100A/\mu s$ | --- | 20 | --- | Nc |

Notes:

- ① Pulse width limited by maximum allowable junction temperature
- ② Pulse width $\leq 300 \mu s$; duty cycle $\leq 2\%$.

Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

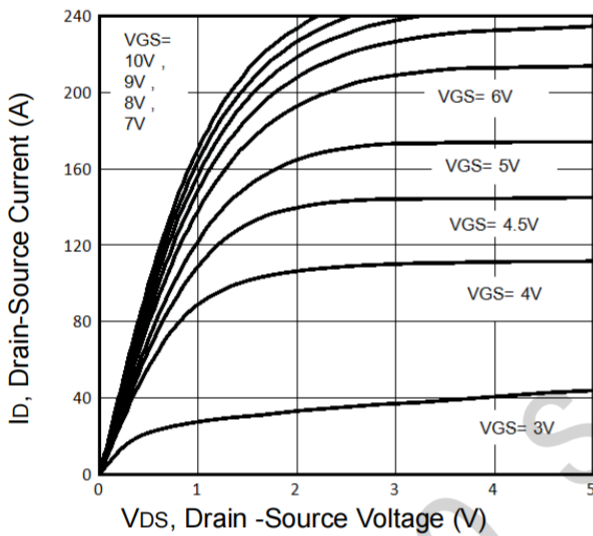


Fig1. Typical Output Characteristics

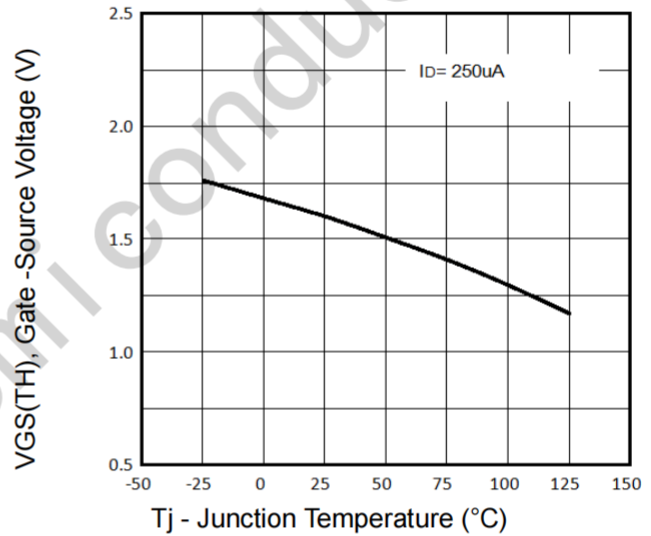


Fig2. VGS(TH) Voltage Vs. Temperature

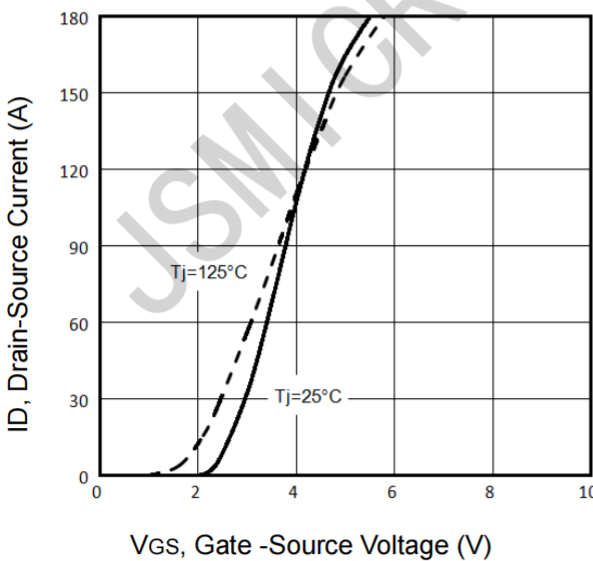


Fig3. Typical Transfer Characteristics

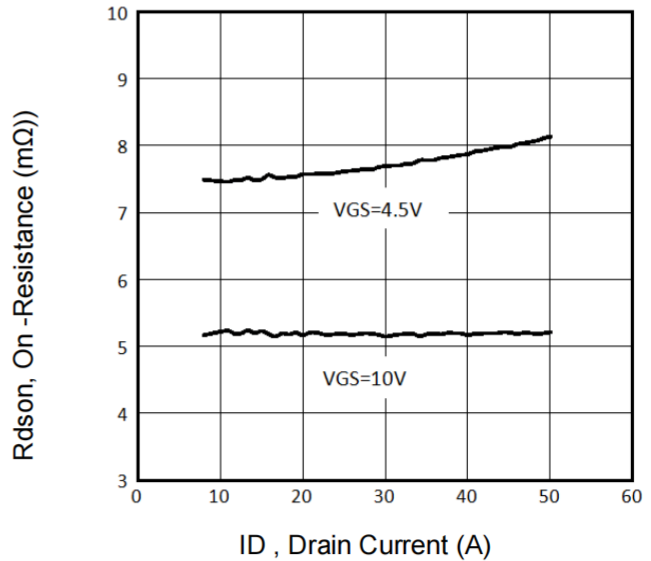


Fig4. On-Resistance vs. Drain Current and Gate Voltage

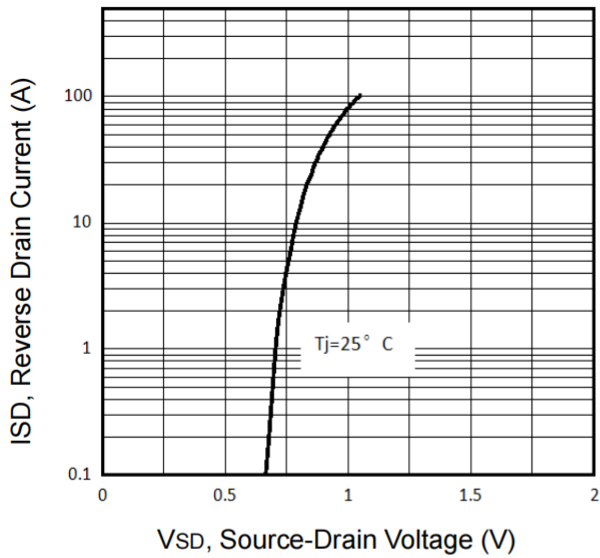


Fig5. Typical Source-Drain Diode Forward Voltage

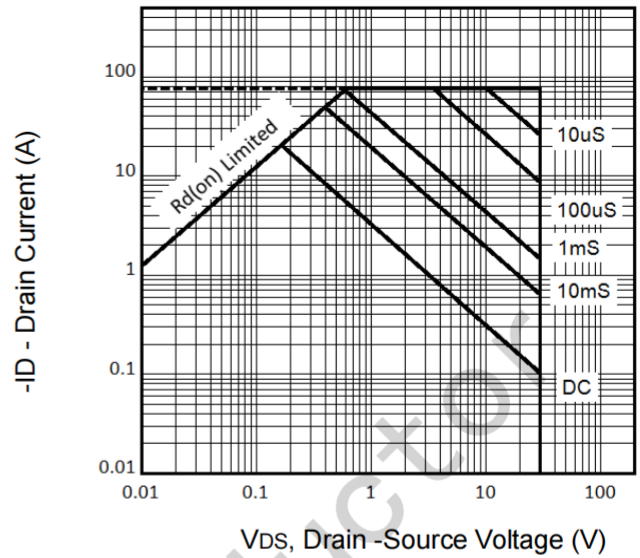


Fig6. Maximum Safe Operating Area

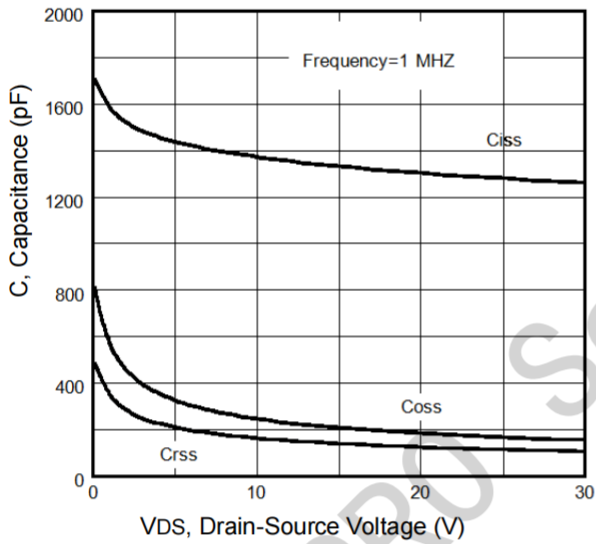


Fig7. Typical Capacitance Vs. Drain-Source Voltage

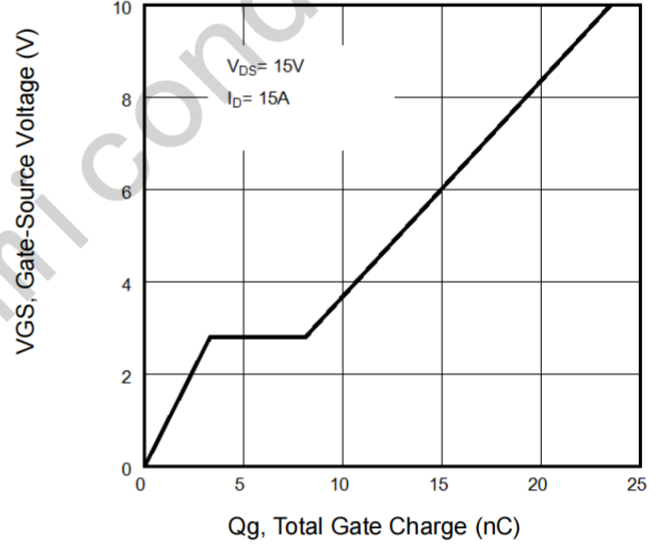


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

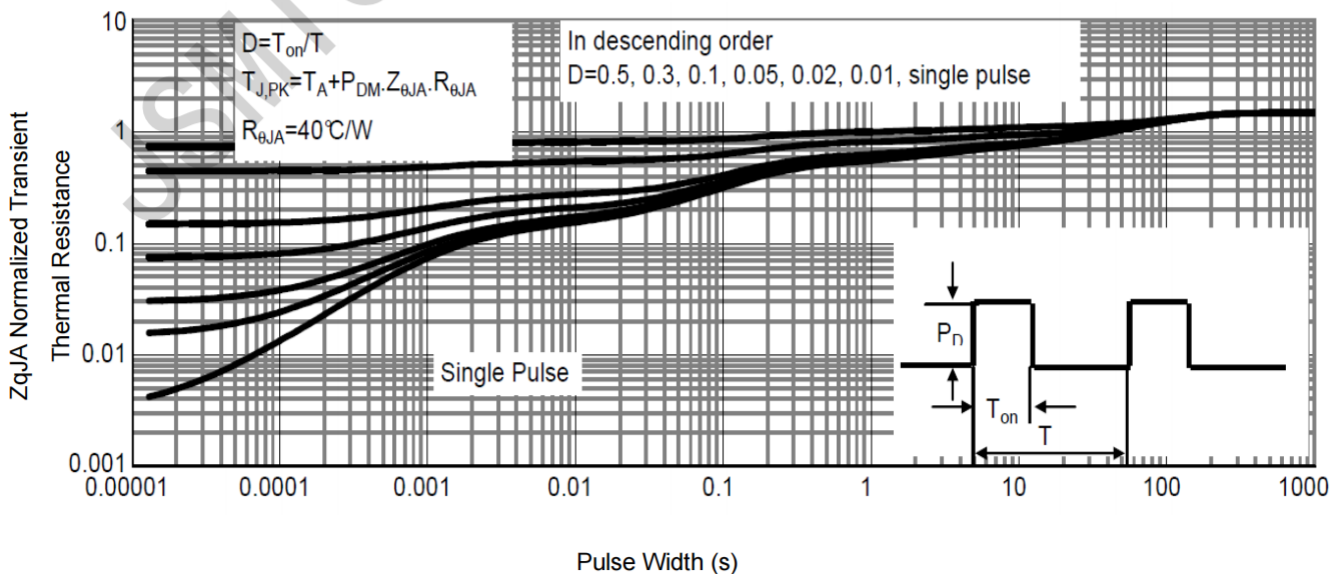
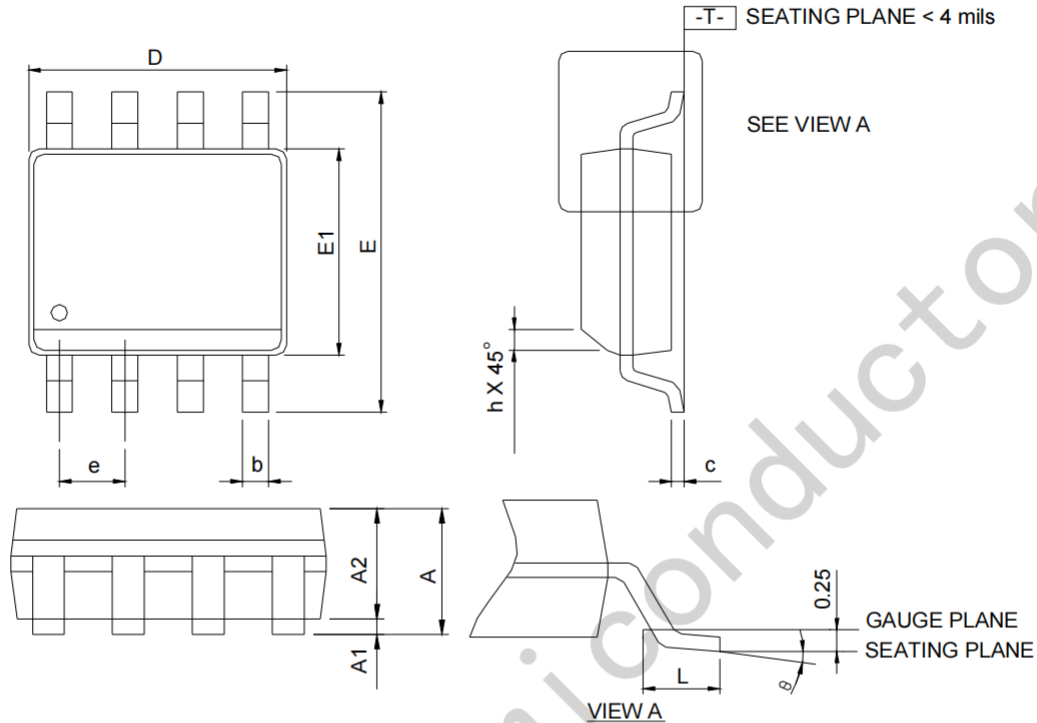


Fig9. Normalized Maximum Transient Thermal Impedance

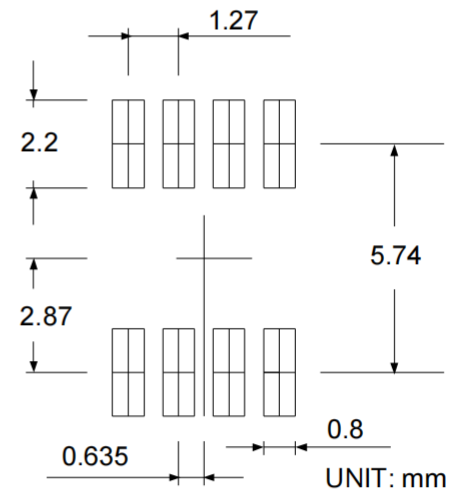
Package Information

SOP-8



| SYMBOLS | SOP-8 | | | |
|---------|-------------|------|-----------|-------|
| | MILLIMETERS | | INCHES | |
| | MIN. | MAX. | MIN. | MAX. |
| A | - | 1.75 | - | 0.069 |
| A1 | 0.10 | 0.25 | 0.004 | 0.010 |
| A2 | 1.25 | - | 0.049 | - |
| b | 0.31 | 0.51 | 0.012 | 0.020 |
| c | 0.17 | 0.25 | 0.007 | 0.010 |
| D | 4.80 | 5.00 | 0.189 | 0.197 |
| E | 5.80 | 6.20 | 0.228 | 0.244 |
| E1 | 3.80 | 4.00 | 0.150 | 0.157 |
| e | 1.27 BSC | | 0.050 BSC | |
| h | 0.25 | 0.50 | 0.010 | 0.020 |
| L | 0.40 | 1.27 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

RECOMMENDED LAND PATTERN



Note: 1. Follow JEDEC MS-012 AA.

2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.

3. Dimension "E" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.