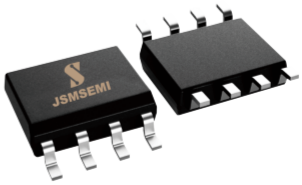
## Description：

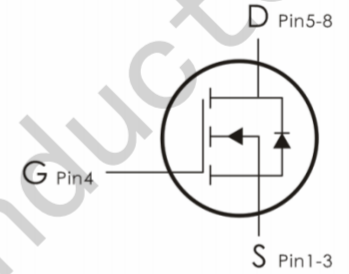
This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.




## Features：

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




## Absolute Maximum Ratings：($T_J$=25℃ 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℃) | 20 | A |
| | Drain Current – Continuous ($T_A$=75℃) | 15.2 | |
| $I_{DM}$ | Drain Current – Pulsed① ($T_A$=25℃) | 76 | |
| $I_S$ | Diode continuous forward current($T_A$=25℃) | 5 | |
| $P_D$ | Power Dissipation ($T_A$=25℃) | 3.1 | W |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | -50 to +150 | ℃ |

## Thermal Characteristics：

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

## Electrical Characteristics: ($T_J$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | 30 | --- | --- | V |
| $I_{DSS}$ | Drain-Source Leakage Current($T_A$=25℃) | $V_{DS}$=30V , $V_{GS}$=0V | --- | --- | 1 | uA |
| | Drain-Source Leakage Current($T_A$=125℃) | $V_{DS}$=24V , $V_{GS}$=0V | --- | --- | 100 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | --- | --- | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | GATE-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 1 | 1.6 | 2.5 | V |
| $R_{DS(ON)}$ | Static Drain-Source On Resistance② | $V_{GS}$=10V,$I_D$=15A | --- | 5.2 | 6.5 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=8A | --- | 7.5 | 9.5 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V, $V_{GS}$=0V, f=1MHz | --- | 1320 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 205 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 135 | --- | |
| Rg | Gate Resistance | f=1MHz | --- | 4.4 | --- | Ω |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=15V, $I_D$=3A, $R_G$=3.3Ω, $V_{GS}$=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 Voltage② | $V_{GS}$=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/μs | --- | 20 | --- | Nc |

**Notes:**

① Pulse width limited by maximum allowable junction temperature

②Pulse width ≤ 300μs; duty cycle≤ 2%.

## Typical Characteristics: ($T_C$=25℃ unless otherwise noted)

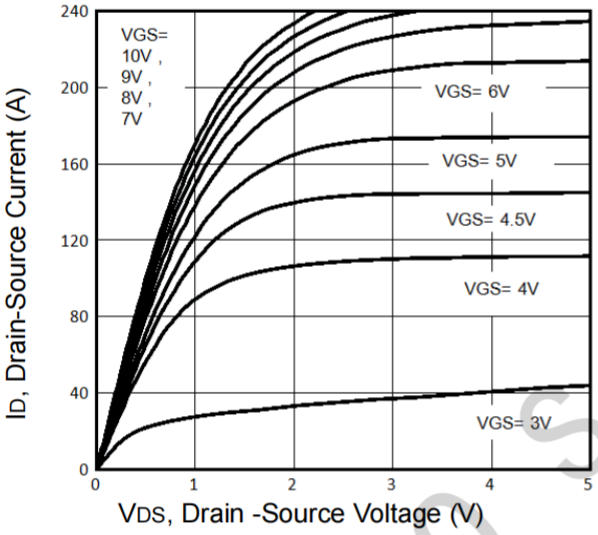



**Fig1.** Typical Output Characteristics

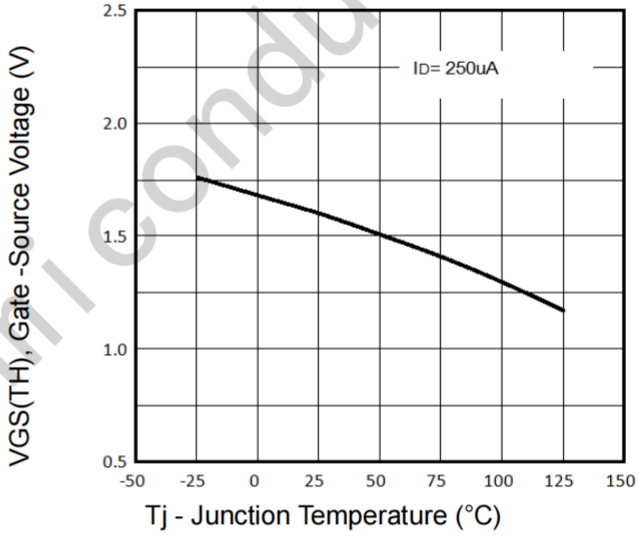



**Fig2.** VGS(TH) Voltage Vs. Temperature

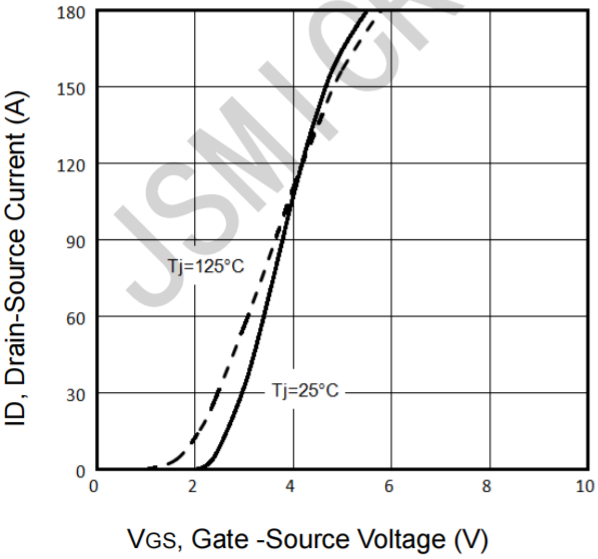



**Fig3.** Typical Transfer Characteristics

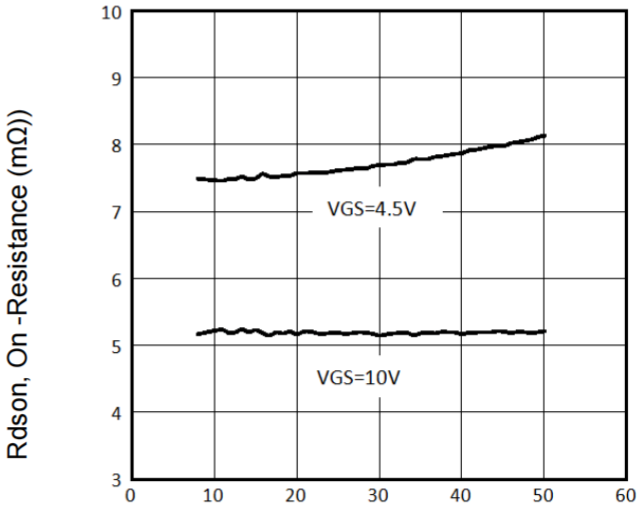



**Fig4.** On-Resistance vs. Drain Current and Gate Voltage

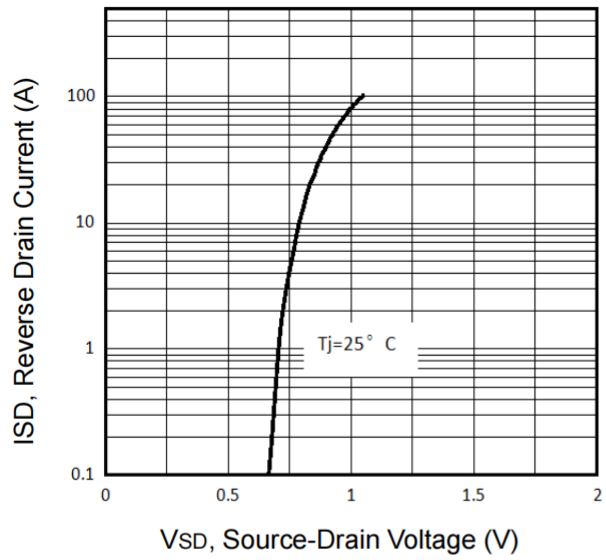



**Fig5.** Typical Source-Drain Diode Forward Voltage

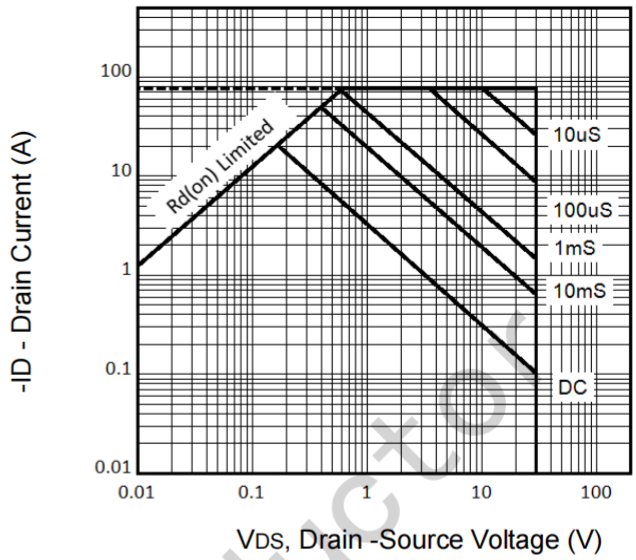



**Fig6.** Maximum Safe Operating Area

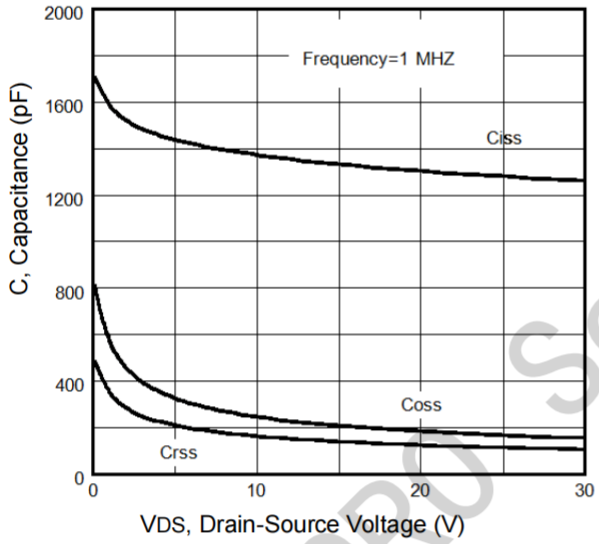



**Fig7.** Typical Capacitance Vs. Drain-Source Voltage

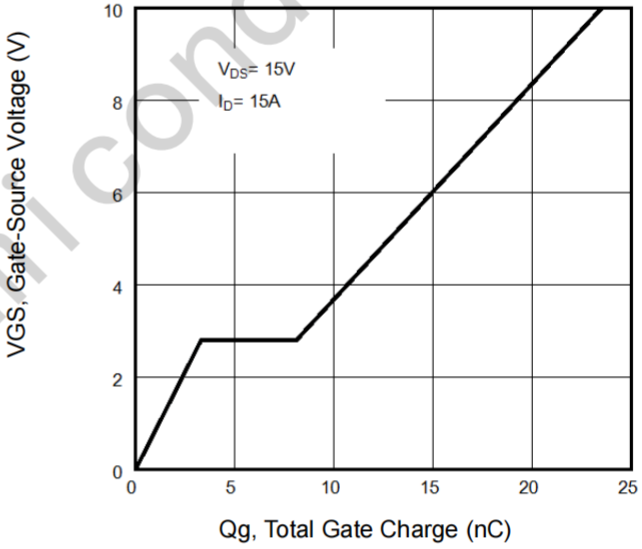



**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage

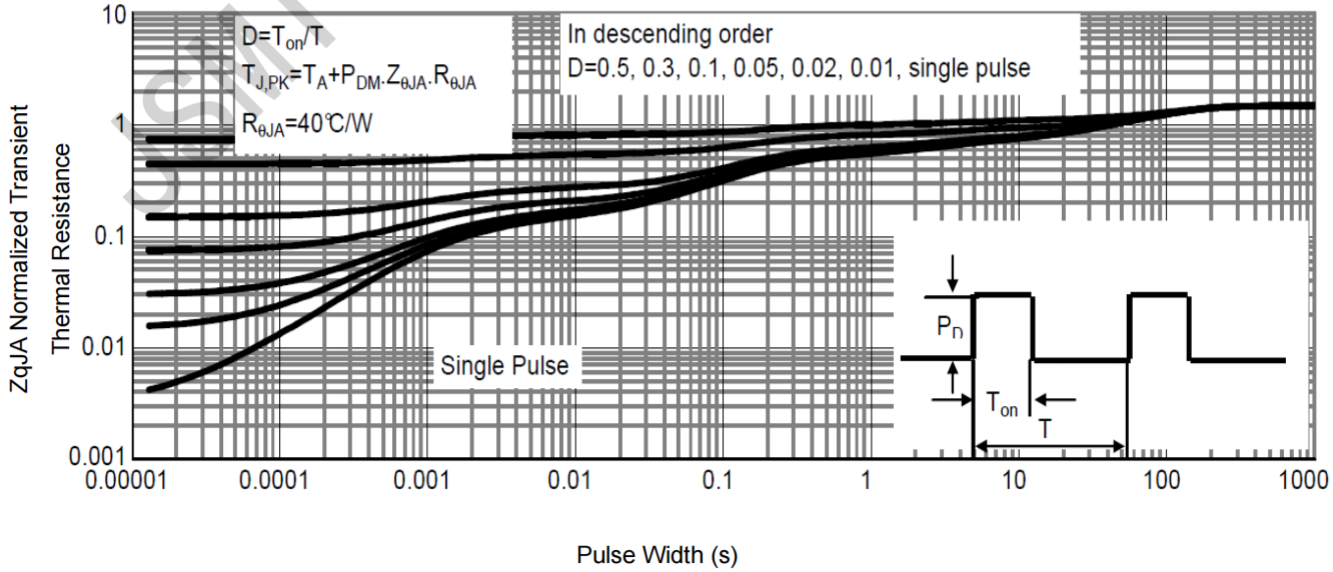
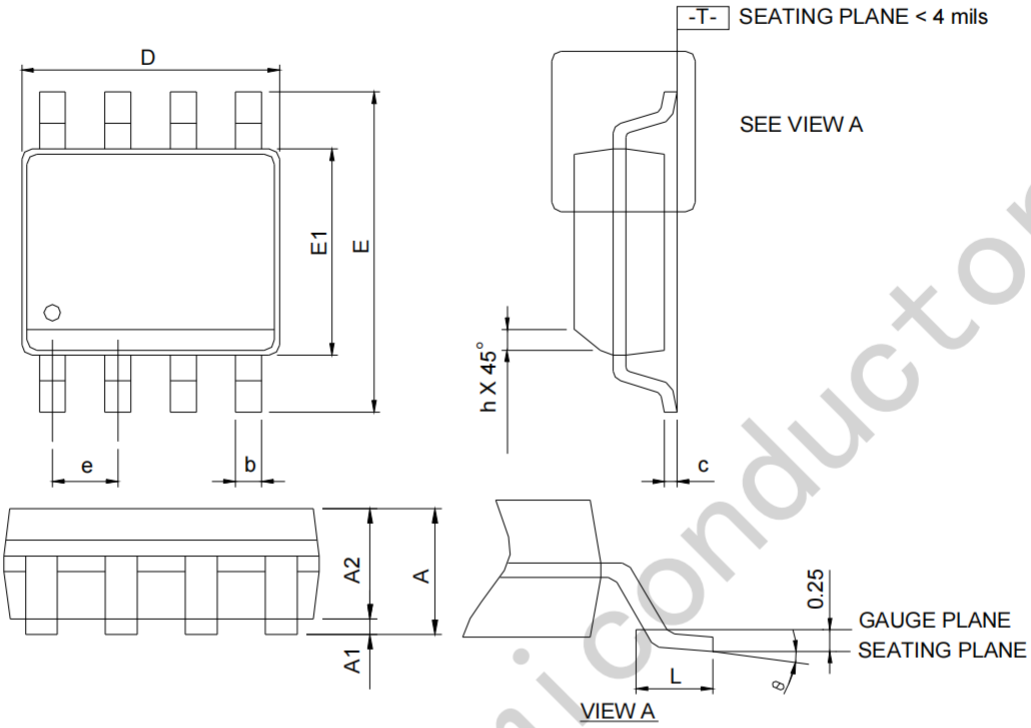



**Fig9.** Normalized Maximum Transient Thermal Impedance

## Package Information

SOP-8




| SYMBOL | 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° |

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.

**RECOMMENDED LAND PATTERN**