# 30V 2.7mΩ N-Ch Power MOSFET

## Features

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- High Current Capability
- 100% UIS Tested, 100% $R_g$ Tested

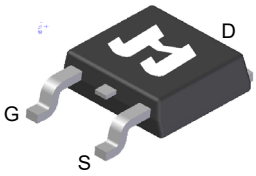
## Product Summary

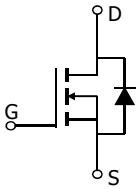
| Parameter | Value | Unit |
|---|---|---|
| $V_{DS}$ | 30 | V |
| $V_{GS(th)\_Typ}$ | 1.6 | V |
| $I_D$ (@ $V_{GS}$ = 10V) (1) | 118 | A |
| $R_{DS(ON)\_Typ}$ (@ $V_{GS}$ = 10V) | 2.7 | mΩ |

## Applications

- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC Sub-systems
- Motor Driving, Quick/Wireless Charging

TO252-3L Top View



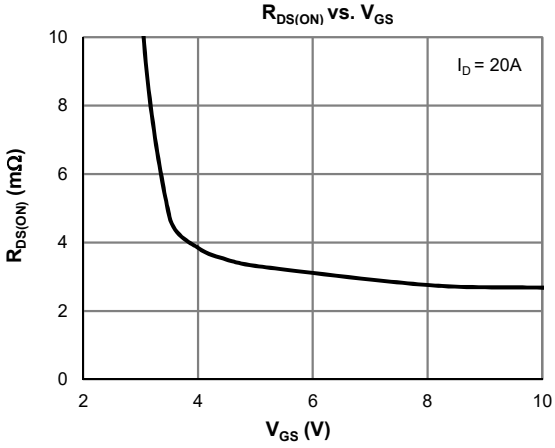



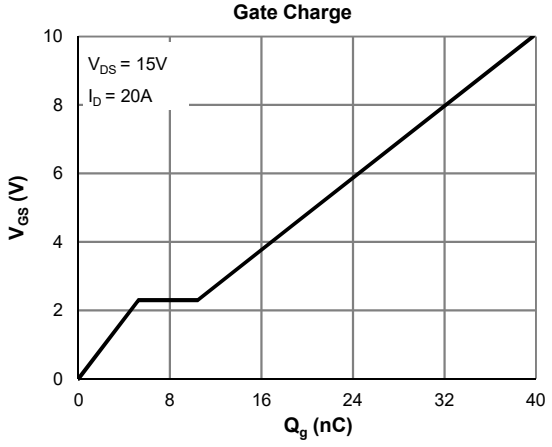

## Ordering Information

| Device | Package | # of Pins | Marking | MSL | $T_J$ (°C) | Media | Quantity (pcs) |
|---|---|---|---|---|---|---|---|
| JMSL0303AK-13 | TO252-3L | 3 | SL0303A | 1 | -55 to 150 | 13-inch Reel | 2500 |

## Absolute Maximum Ratings (@ $T_A$ = 25°C unless otherwise specified)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-to-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current (1) | $T_C$ = 25°C | $I_D$ | 118 | A |
| | $T_C$ = 100°C | | 75 | |
| Continuous Drain Current (6) | $T_C$ = 25°C | $I_D$ | 80 | A |
| Pulsed Drain Current (2) | | $I_{DM}$ | 385 | A |
| Avalanche Current (3) | | $I_{AS}$ | 25 | A |
| Avalanche Energy (3) | | $E_{AS}$ | 94 | mJ |
| Power Dissipation (4) | $T_C$ = 25°C | $P_D$ | 74 | W |
| | $T_C$ = 100°C | | 29 | |
| Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | °C |



## Electrical Characteristics (@ $T_J$ = 25°C unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$ = 1mA, $V_{GS}$ = 0V | 30 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 24V, $V_{GS}$ = 0V | | | 1.0 | μA |
| | | $T_J$ = 55°C | | | 5.0 | |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1.2 | 1.6 | 2.5 | V |
| Static Drain-Source ON-Resistance | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | | 2.7 | 3.5 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 15A | | 3.5 | 4.5 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ = 5V, $I_D$ = 20A | | 128 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = 1A, $V_{GS}$ = 0V | | 0.69 | 1.0 | V |
| Diode Continuous Current | $I_S$ | $T_C$ = 25°C | | | 74 | A |
| **DYNAMIC PARAMETERS** (5) | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 15V, f = 1MHz | | 2526 | | pF |
| Output Capacitance | $C_{oss}$ | | | 1924 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 186 | | pF |
| Gate Resistance | $R_g$ | $V_{GS}$ = 0V, $V_{DS}$= 0V, f = 1MHz | | 1.5 | | Ω |
| **SWITCHING PARAMETERS** (5) | | | | | | |
| Total Gate Charge (@ $V_{GS}$ = 10V) | $Q_g$ | $V_{GS}$ = 0 to 10V<br>$V_{DS}$ = 15V, $I_D$ = 20A | | 40 | | nC |
| Total Gate Charge (@ $V_{GS}$ = 4.5V) | $Q_g$ | | | 18.8 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 5.3 | | nC |
| Gate Drain Charge | $Q_{gd}$ | | | 5.2 | | nC |
| Turn-On DelayTime | $t_{D(on)}$ | $V_{GS}$ = 10V, $V_{DS}$ = 15V<br>$R_L$ = 0.75Ω, $R_{GEN}$ = 6Ω | | 7.1 | | ns |
| Turn-On Rise Time | $t_r$ | | | 8.4 | | ns |
| Turn-Off DelayTime | $t_{D(off)}$ | | | 38 | | ns |
| Turn-Off Fall Time | $t_f$ | | | 22 | | ns |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$ = 20A, $dI_F/dt$ = 100A/μs | | 48 | | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | $I_F$ = 20A, $dI_F/dt$ = 100A/μs | | 45 | | nC |

## Thermal Performance

| Parameter | Symbol | Typ. | Max. | Unit |
|---|---|---|---|---|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 38 | 45 | °C/W |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.3 | 1.7 | °C/W |

**Notes:**

1. Computed continuous current assumes the condition of $T_{J\_Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J\_Max}$ = 150°C.
3. This single-pulse measurement was taken under the following condition [L = 300μH, $V_{GS}$ = 10V, $V_{DS}$ = 30V] while its value is limited by $T_{J\_Max}$ = 150°C.
4. The power dissipation $P_D$ is based on $T_{J\_Max}$ = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.
6. Continuous current rating is limited by the package used.

## Typical Electrical & Thermal Characteristics

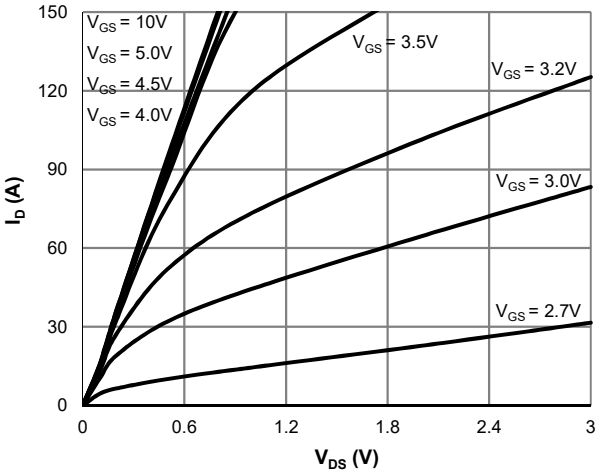



**Figure 1: Saturation Characteristics**

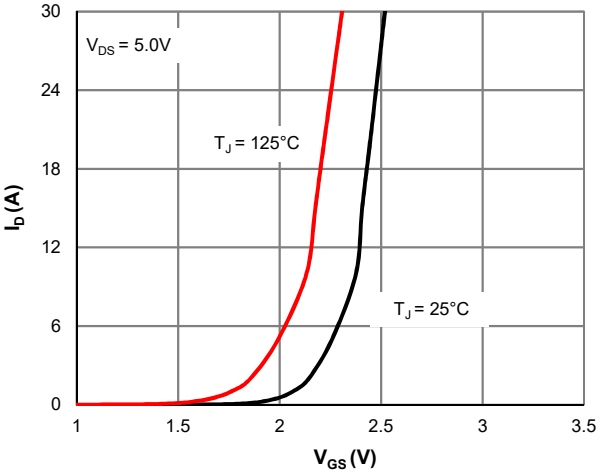



**Figure 2: Transfer Characteristics**

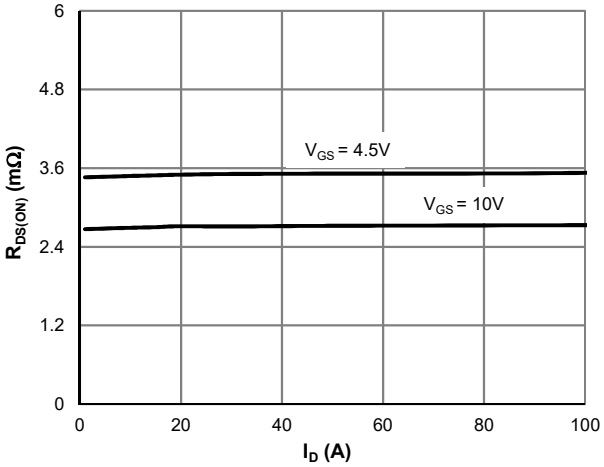



**Figure 3: $R_{DS(ON)}$ vs. Drain Current**

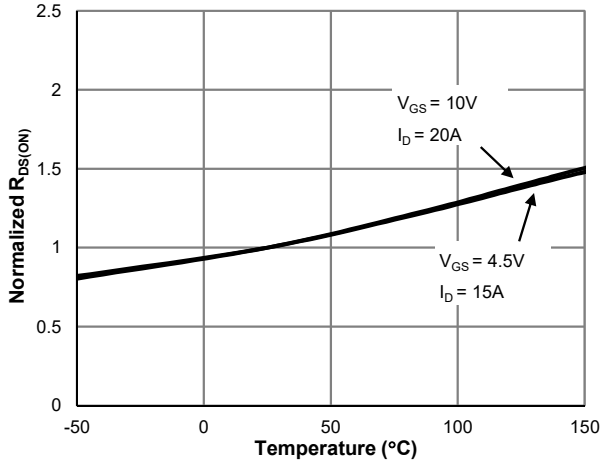



**Figure 4: $R_{DS(ON)}$ vs. Junction Temperature**

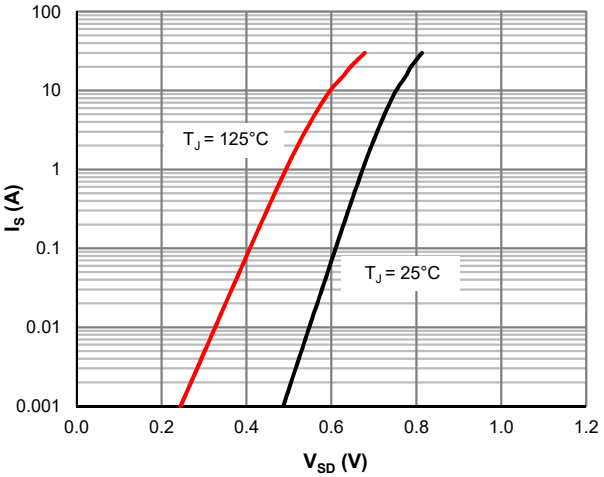



**Figure 5: Body-Diode Characteristics**

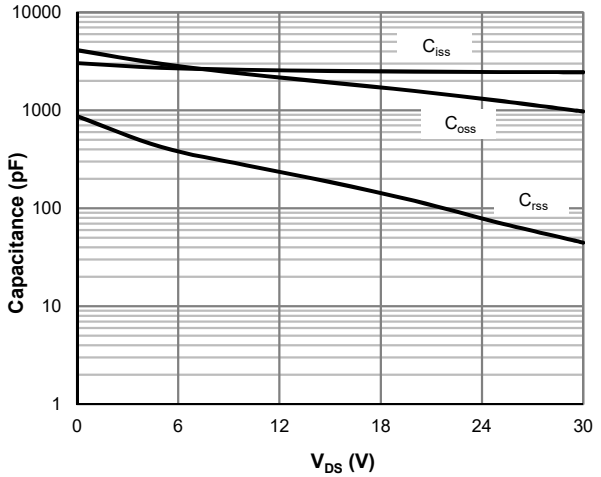



**Figure 6: Capacitance Characteristics**

## Typical Electrical & Thermal Characteristics

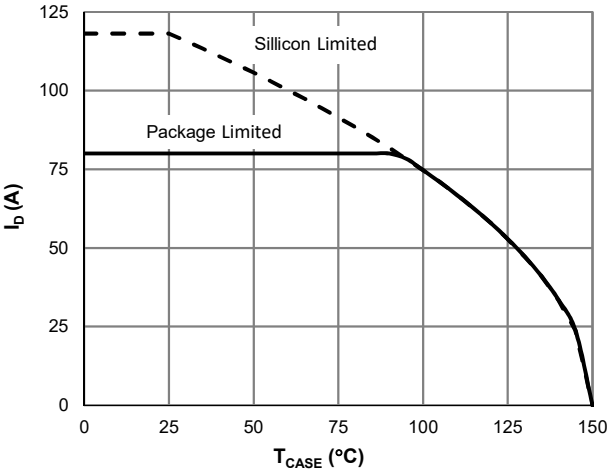



**Figure 7: Current De-rating**

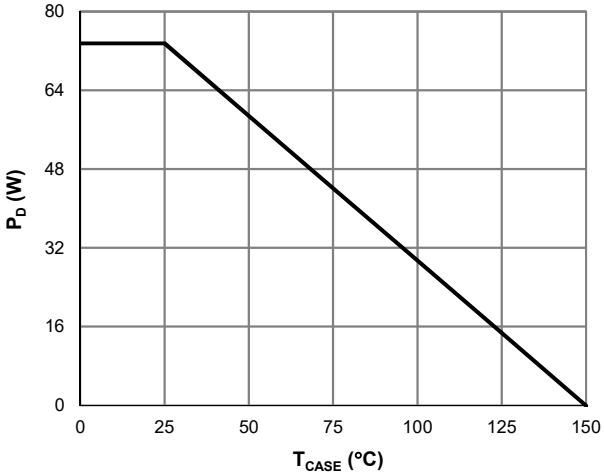



**Figure 8: Power De-rating**

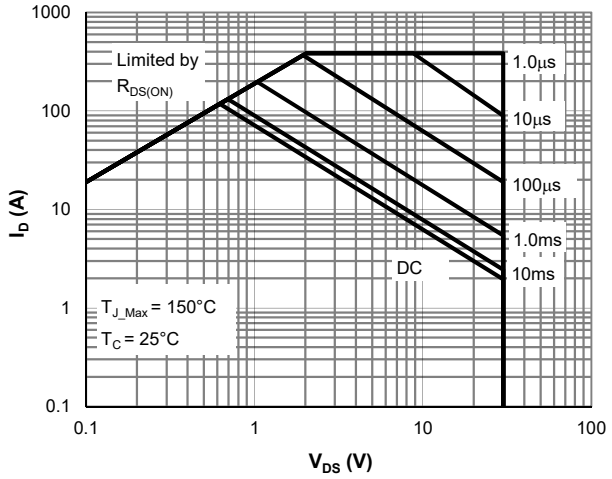



**Figure 9: Maximum Safe Operating Area**

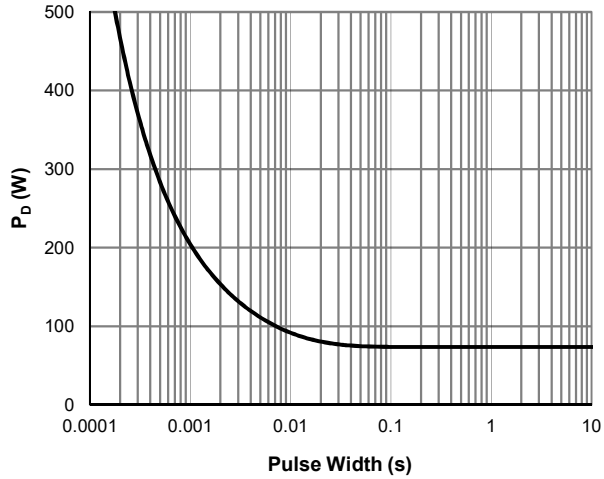



**Figure 10: Single Pulse Power Rating, Junction-to-Case**

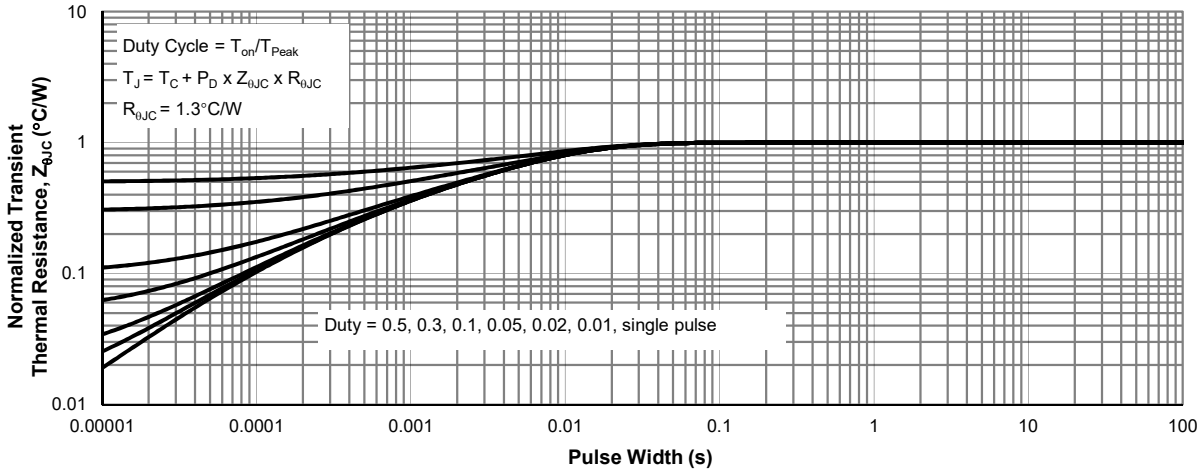
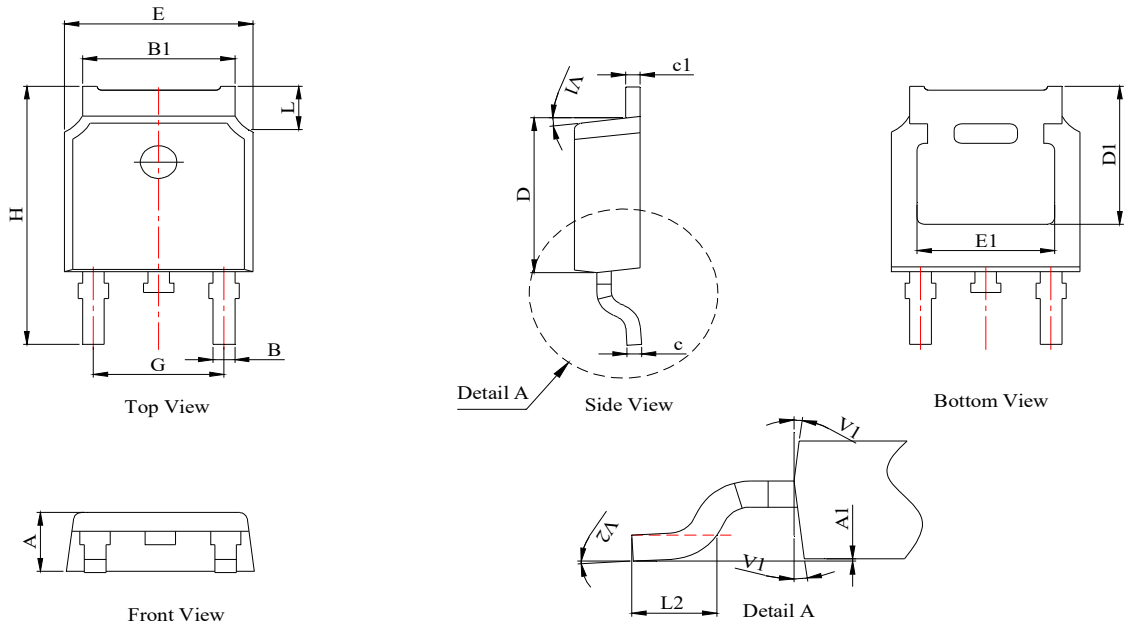



**Figure 11: Normalized Maximum Transient Thermal Impedance**

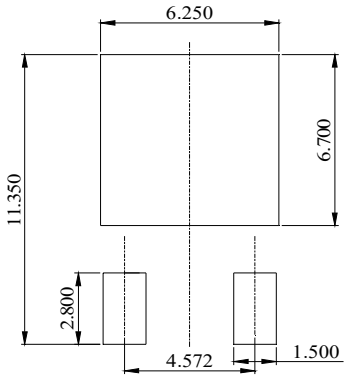
## TO252-3L Package Information

### Package Outline




| DIM. | MILLIMETER | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 2.10 | | 2.50 |
| A1 | 0 | - | 0.10 |
| B | 0.66 | | 0.86 |
| B1 | 5.18 | | 5.48 |
| c | 0.40 | | 0.60 |
| c1 | 0.44 | | 0.58 |
| D | 5.90 | | 6.30 |
| D1 | | 5.30REF | |
| E | 6.40 | | 6.80 |
| E1 | 4.63 | | |
| G | 4.47 | | 4.67 |
| H | 9.50 | | 10.70 |
| L | 1.09 | | 1.21 |
| L2 | 1.35 | | 1.65 |
| V1 | | 7° | |
| V2 | 0° | - | 6° |

### Recommended Footprint




DIMENSIONS:MILLIMETERS