# GSM3910D

## 30V N-Channel MOSFET

### Product Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

### Features

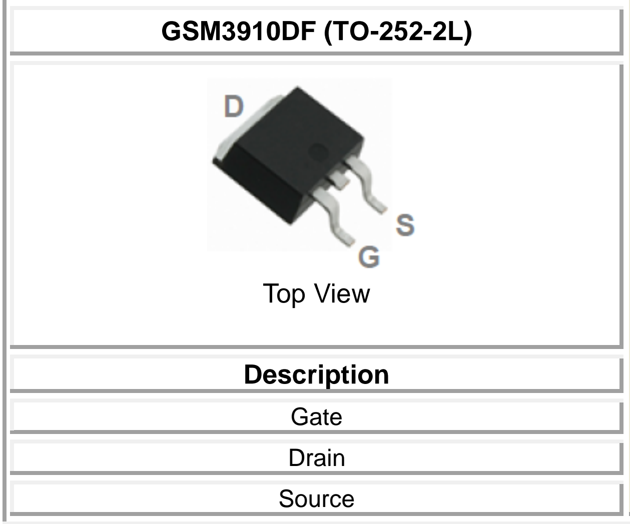
- 30V, 45A, RDS(ON) =12mΩ@VGS = 10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- 100% EAS Guaranteed

### Applications

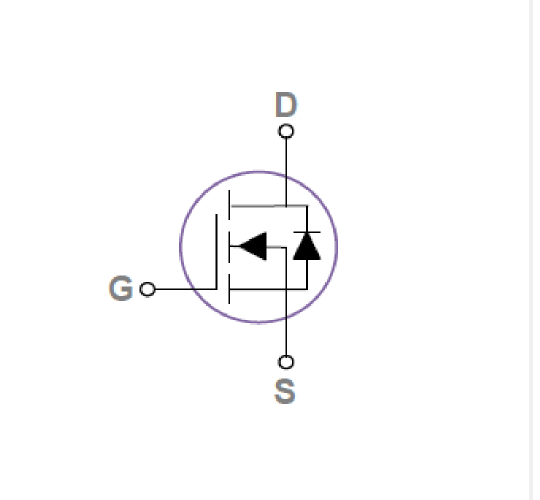
- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

### Packages & Pin Assignments

**GSM3910DF (TO-252-2L)**

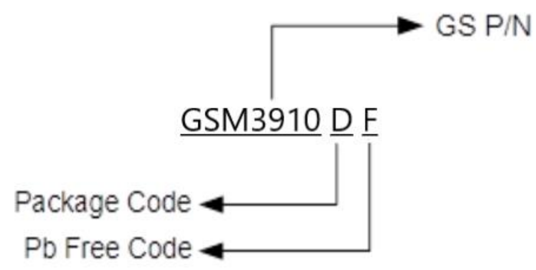


Top View



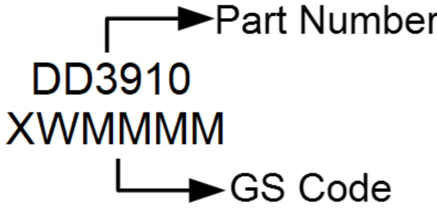

| Description |
|---|
| Gate |
| Drain |
| Source |

## Ordering Information




| Part Number | Package | Quantity Reel |
|---|---|---|
| GSM3910DF | TO-252-2L | 2500 PCS |

## Marking Information




## Absolute Maximum Ratings

Tc=25ºC Unless otherwise noted

| Symbol | Parameter | | Typical | Unit |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current | Tc=25℃ | 45 | A |
| | | Tc=100℃ | 28 | |
| $I_{DM}$ | Pulsed Drain Current[1] | | 180 | A |
| EAS | Single Pulse Avalanche Energy[2] | | 13 | mJ |
| IAS | Single Pulse Avalanche Current[2] | | 16 | A |
| $P_D$ | Power Dissipation (Tc=25℃) | | 33 | W |
| | Power Dissipation (Derate above 25℃) | | 0.26 | W/℃ |
| $T_J$ | Operating Junction Temperature Range | | -55 to +150 | ℃ |
| $T_{STG}$ | Storage Temperature Range | | -55 to +150 | ℃ |
| $R_{θJA}$ | Thermal Resistance-Junction to Ambient | | 62 | ℃/W |
| $R_{θJC}$ | Thermal Resistance-Junction to Case | | 3.8 | ℃/W |

## Electrical Characteristics

Tj=25℃ Unless otherwise noted

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250uA | 30 | | | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 1.2 | 1.8 | 2.5 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±100 | nA |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=30V, $V_{GS}$=0V, $T_J$=25℃ | | | 1 | uA |
| | | $V_{DS}$=30V, $V_{GS}$=0V, $T_J$=125℃ | | | 10 | |
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V, Force Current | | | 45 | A |
| $I_{SM}$ | Pulsed Source Current | | | | 180 | |
| $R_{DS(on)}$ | Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=10A | | 9.4 | 12 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=5A | | 13 | 18 | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=10V, $I_D$=3A | | 6.4 | | S |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V, $I_S$=1A, $T_J$=25℃ | | | 1 | V |
| **Dynamic** | | | | | | |
| $Q_g$ | Total Gate Charge[3,4] | $V_{DS}$=15V, $V_{GS}$=4.5V, $I_D$=5A | | 7.4 | 12 | nC |
| $Q_{gs}$ | Gate-Source Charge[3,4] | | | 2.3 | 5 | |
| $Q_{gd}$ | Gate-Drain Charge[3,4] | | | 3 | 6 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=25V, $V_{GS}$=0V, F=1MHz | | 620 | 900 | pF |
| $C_{oss}$ | Output Capacitance | | | 85 | 125 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 60 | 90 | |
| $t_{d(on)}$ | Turn-On Time[3,4] | $V_{DD}$=15V, $I_D$=1A, $V_{GS}$=10V, $R_G$=6Ω | | 3.8 | 7 | ns |
| $t_r$ | | | | 10 | 19 | |
| $t_{d(off)}$ | Turn-Off Time[3,4] | | | 22 | 42 | |
| $t_f$ | | | | 6.6 | 13 | |
| $R_g$ | Gate Resistance | $V_{DS}$=0V, $V_{GS}$=0V, F=1MHz | | 2.8 | 5.6 | Ω |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}$=25V, $V_{GS}$=10V, L=0.1mH, $I_{AS}$=16A., $R_G$=25Ω, Starting $T_J$=25℃
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

## Typical Performance Characteristics

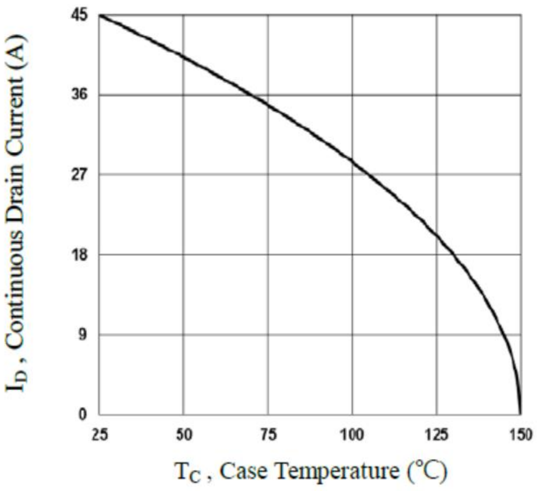



**Fig.1 Continuous Drain Current vs. $T_C$**

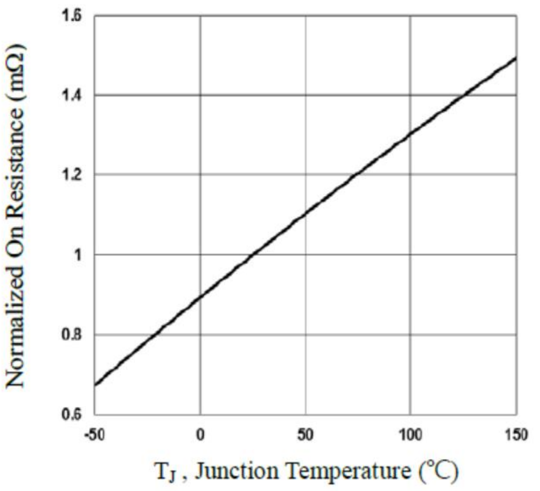



**Fig.2 Normalized RDSON vs. $T_J$**

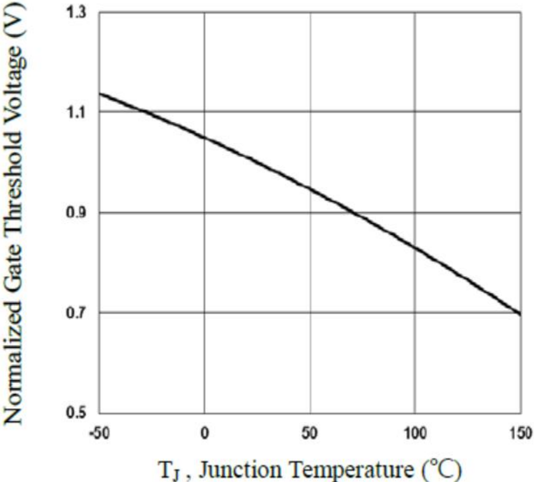



**Fig.3 Normalized $V_{th}$ vs. $T_J$**

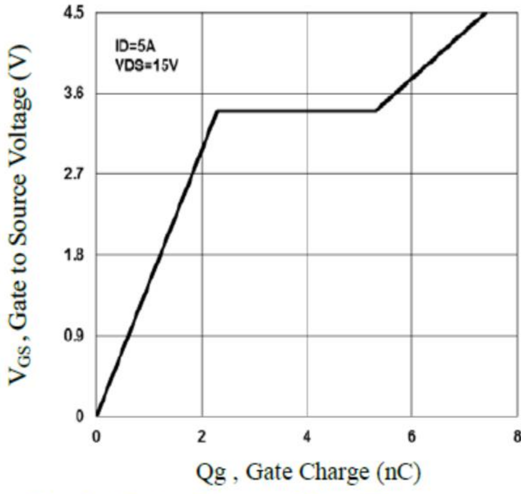



**Fig.4 Gate Charge Waveform**

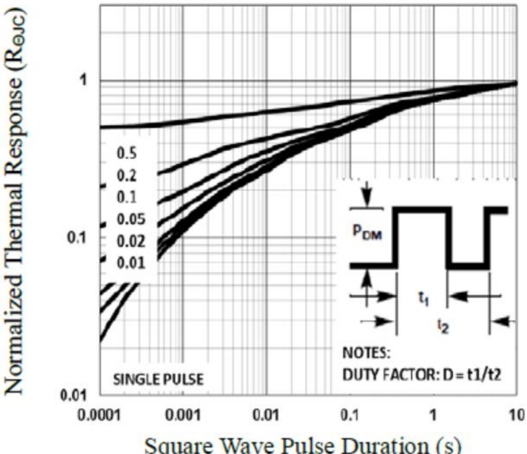



**Fig.5 Normalized Transient Response**

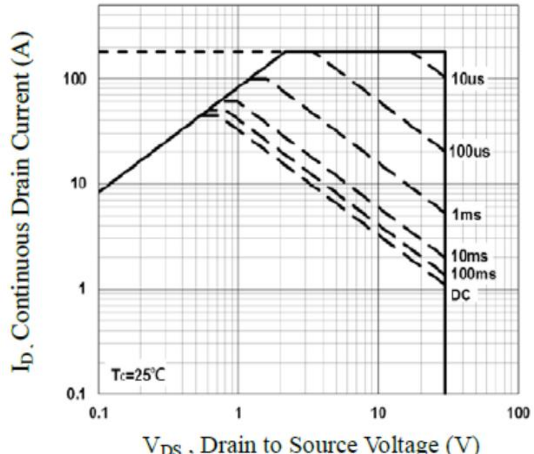



**Fig.6 Maximum Safe Operation Area**

## Typical Performance Characteristics (continue)

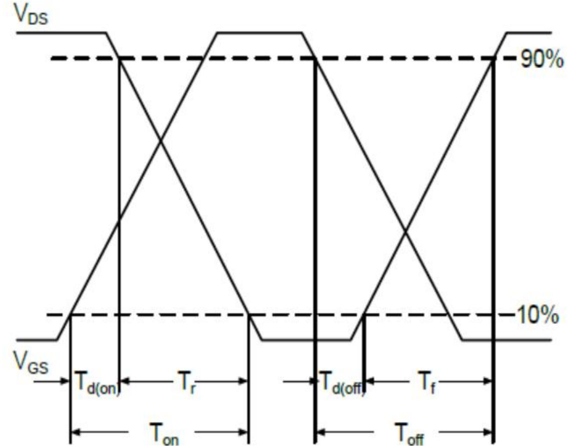



**Fig.7 Switching Time Waveform**

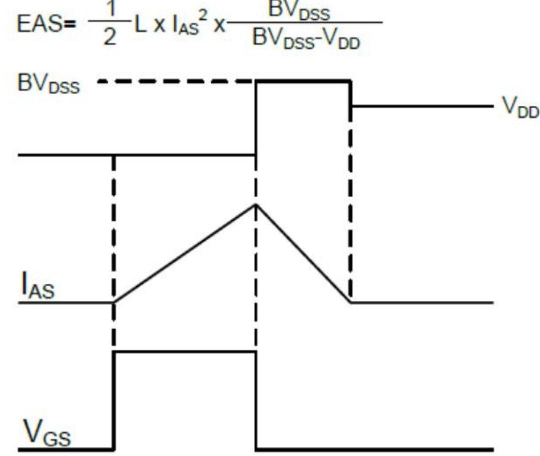
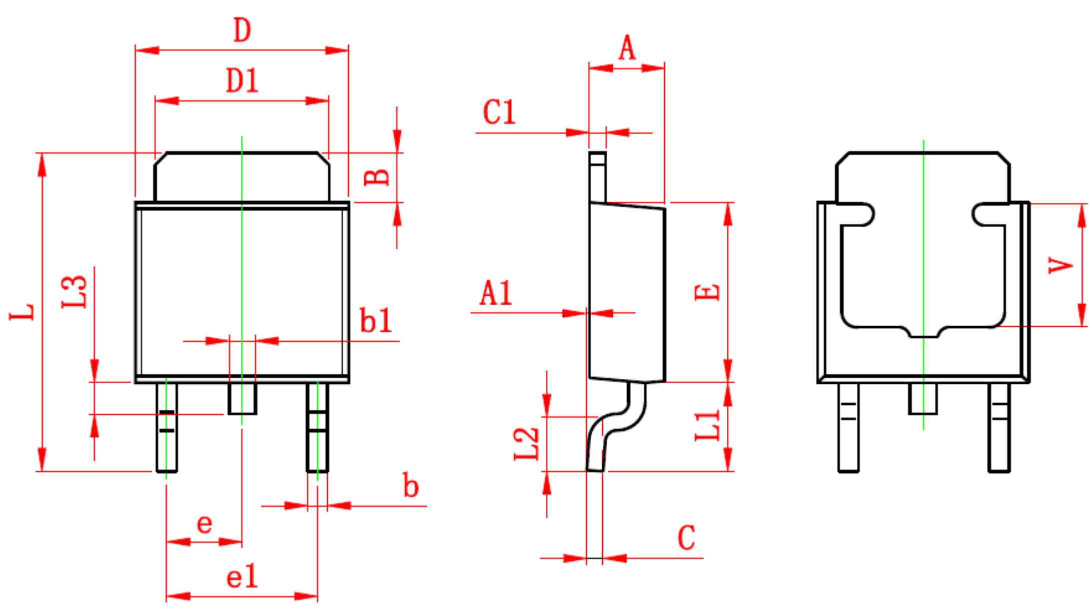



**Fig.8 EAS Waveform**

## Package Dimension

# TO-252-2L




| SYMBOL | Millimeters | | Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| B | 1.350 | 1.650 | 0.053 | 0.065 |
| b | 0.500 | 0.700 | 0.020 | 0.028 |
| b1 | 0.700 | 0.900 | 0.028 | 0.035 |
| C | 0.430 | 0.580 | 0.017 | 0.023 |
| C1 | 0.430 | 0.580 | 0.017 | 0.023 |
| D | 6.350 | 6.650 | 0.250 | 0.262 |
| D1 | 5.200 | 5.400 | 0.205 | 0.213 |
| E | 5.400 | 5.700 | 0.213 | 0.224 |
| e | 2.300 TYP. | | 0.091 TYP. | |
| e1 | 4.500 | 4.700 | 0.177 | 0.185 |
| L | 9.500 | 9.900 | 0.374 | 0.390 |
| L1 | 2.550 | 2.900 | 0.100 | 0.114 |
| L2 | 1.400 | 1.780 | 0.055 | 0.070 |
| L3 | 0.600 | 0.900 | 0.024 | 0.035 |
| V | 3.800 REF. | | 0.150 REF. | |

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