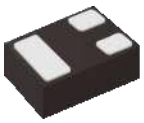
CAN CIRCLE SEMI

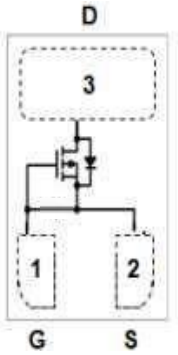
# CSM3139DF1006-3

## 20V P-Channel Enhancement Mode MOSFET

| Voltage | -20 V | Current | -1000mA |
|---|---|---|---|

DFN1006-3L






## Features

- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc.
- Green molding compound

## Mechanical Data

- Case: DFN1006-3L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.00002 ounces, 0.0007 grams

## Maximum Ratings and Thermal Characteristics ($T_A$=25°C unless otherwise noted)

| PARAMETER | | SYMBOL | LIMIT | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | |
| Continuous Drain Current (Note 4) | | $I_D$ | -1000 | mA |
| Pulsed Drain Current (Note 1) | | $I_{DM}$ | -1500 | |
| Power Dissipation | $T_a$=25°C | $P_D$ | 500 | mW |
| | Derate above 25°C | | 4 | mW/ °C |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~150 | °C |
| Typical Thermal Resistance Junction to Ambient (Note 3,4) | | $R_{\theta JA}$ | 250 | °C/W |

Limited only By Maximum Junction Temperature

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## Electrical Characteristics ($T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=-250uA | -20 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250uA | -0.3 | -0.6 | -1 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=-4.5V, $I_D$=-300mA | - | 450 | 500 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-200mA | - | 630 | 820 | |
| | | $V_{GS}$=-1.8V, $I_D$=-100mA | - | 810 | 1200 | |
| | | $V_{GS}$=-1.5V, $I_D$=-100mA | - | 1020 | 1600 | |
| | | $V_{GS}$=-1.2V, $I_D$=-100mA | - | 1670 | 3000 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-20V, $V_{GS}$=0V | - | - | -1 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V, $V_{DS}$=0V | - | - | ±10 | |
| **Dynamic** (Note 5) | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-10V, $I_D$=-200mA, $V_{GS}$=-4.5V (Note 2) | - | 1.1 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 0.2 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 0.1 | - | |
| Input Capacitance | Ciss | $V_{DS}$=-10V, $V_{GS}$=0V, f=1MHZ | - | 51 | - | pF |
| Output Capacitance | Coss | | - | 15 | - | |
| Reverse Transfer Capacitance | Crss | | - | 2.2 | - | |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DD}$=-10V, $I_D$=-200mA, $V_{GS}$=-4.5V, $R_G$=6Ω (Note 2) | - | 4.3 | - | ns |
| Turn-On Rise Time | tr | | - | 20 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 33 | - | |
| Turn-Off Fall Time | tf | | - | 25 | - | |
| **Drain-Source Diode** | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | --- | - | - | -300 | mA |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-300mA, $V_{GS}$=0V | - | -0.85 | -1 | V |

NOTES:

1. Pulse width≤300us, Duty cycle≤2%
2. Essentially independent of operating temperature typical characteristics.
3. $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper.
4. The maximum current rating is package limited.
5. Guaranteed by design, not subject to production testing.

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## TYPICAL CHARACTERISTIC CURVES

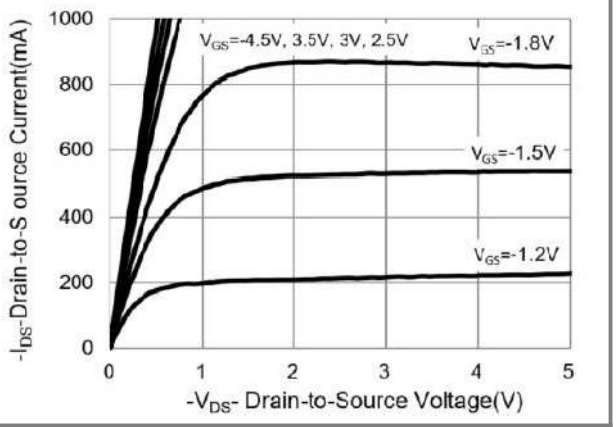



Fig.1 On-Region Characteristics

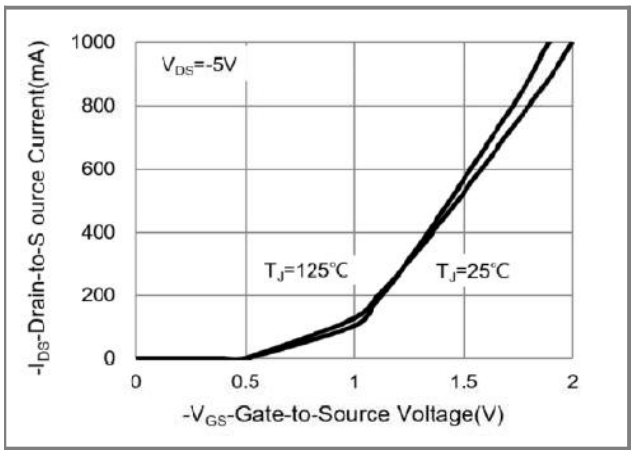



Fig.2 Transfer Characteristics

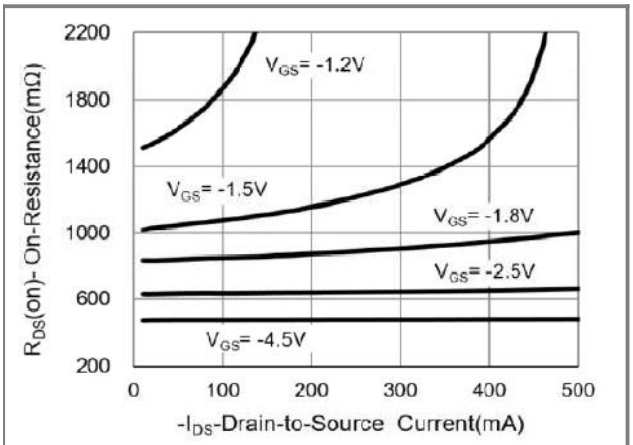



Fig.3 On-Resistance vs. Drain Current

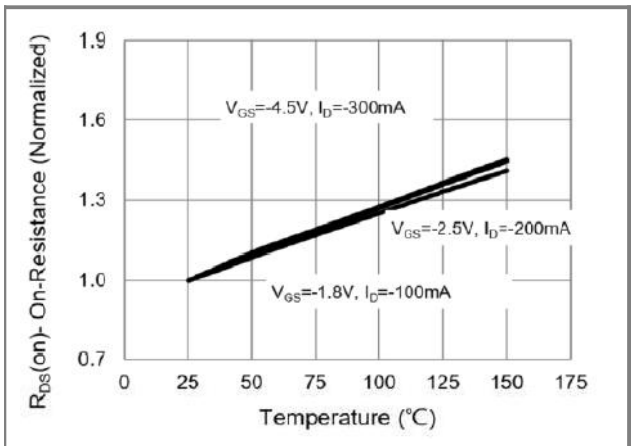



Fig.4 On-Resistance vs. Junction temperature

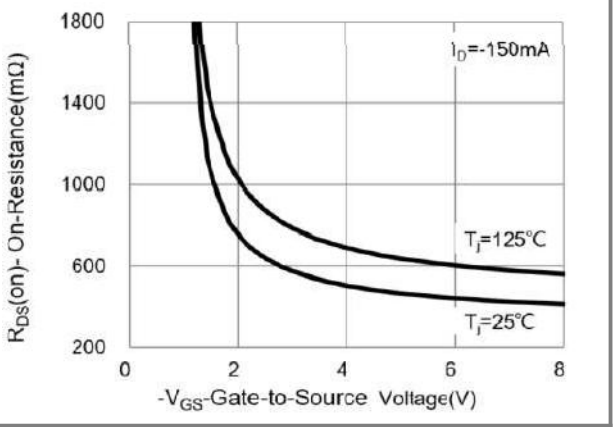



Fig.5 On-Resistance Variation with $V_{GS}$

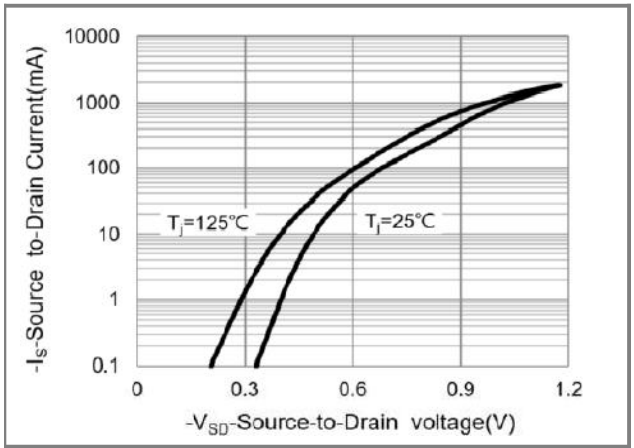



Fig.6 Body Diode Characteristics

# CSM3139DF1006-3

## TYPICAL CHARACTERISTIC CURVES

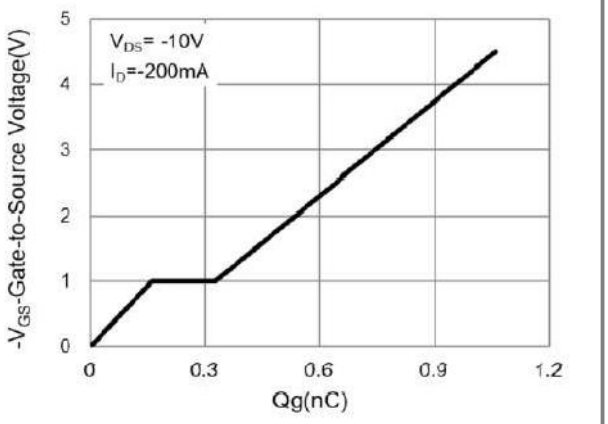



Fig.7 Gate-Charge Characteristics

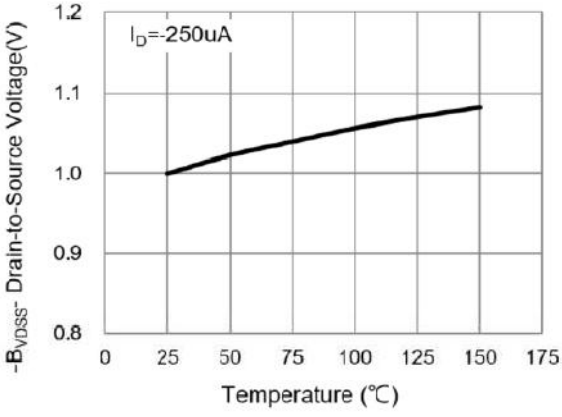



Fig.8 Breakdown Voltage Variation vs. Temperature

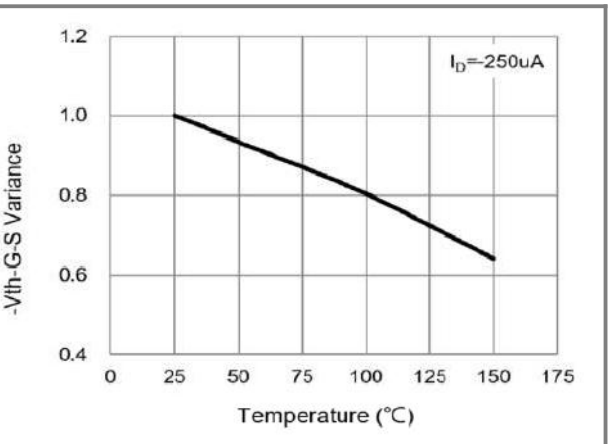



Fig.9 Threshold Voltage Variation with Temperature

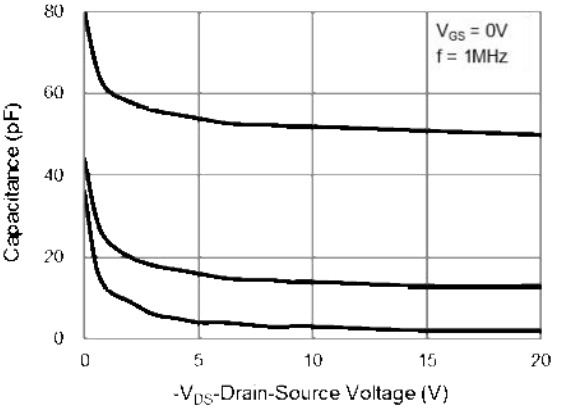



Fig.10 Capacitance vs. Drain-Source Voltage

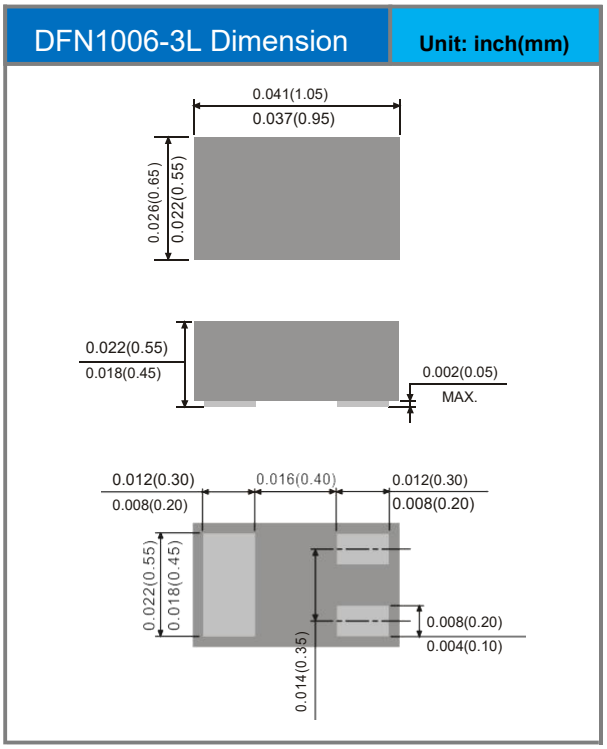
# CSM3139DF1006-3

## Part No Packing Code Version

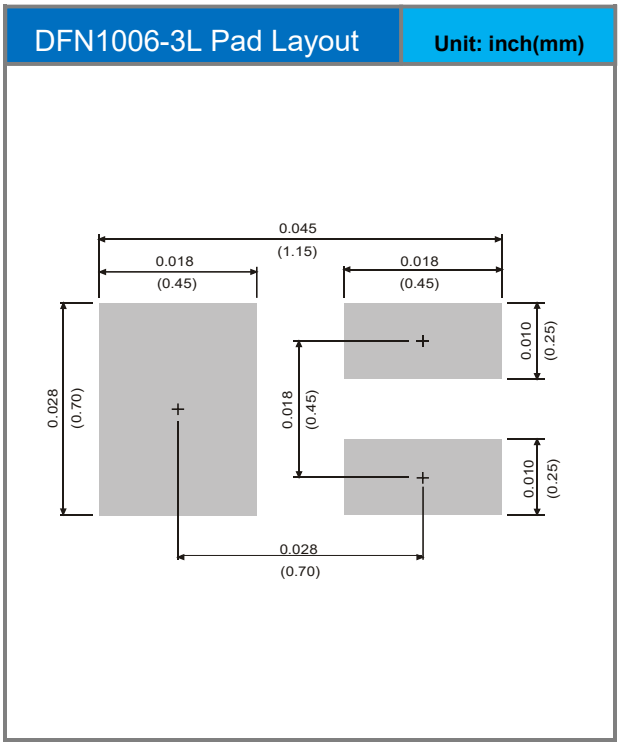
| Part No Packing Code | Package Type | Packing Type |
|---|---|---|
| CSM3139DF1006-3 | DFN1006-3L | 10K / 7" Reel |

## Packaging Information & Mounting Pad Layout

DFN1006-3L Dimension — Unit: inch(mm)




DFN1006-3L Pad Layout — Unit: inch(mm)



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