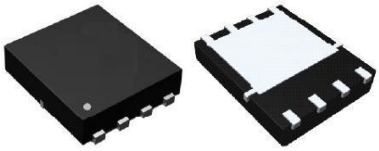
CAN CIRCLE SEMI

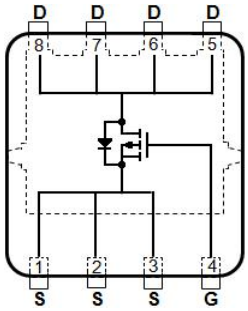
# CSM320P20D3-3

## 30V P-Channel Enhancement Mode MOSFET

| Voltage | -30 V | Current | -20 A |
|---|---|---|---|

DFN3333-8L






### Features

- $R_{DS(ON)}$ , $V_{GS}$@-10V, $I_D$@-10A<12mΩ
- $R_{DS(ON)}$ , $V_{GS}$@-4.5V, $I_D$@-8A<18mΩ
- Advanced Trench Process Technology
- High density cell design for ultralow on-resistance

- Mechanical Data
- Case : DFN3333-8L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.001 ounces, 0.03 grams

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

| PARAMETER | | SYMBOL | LIMIT | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | -20 | A |
| Pulsed Drain Current (Note 1) | $T_C$=25°C | $I_{DM}$ | -80 | |
| Power Dissipation | $T_C$=25°C | $P_D$ | 59.5 | W |

| | | | | |
|---|---|---|---|---|
| Power Dissipation | $T_A$=25°C | $P_D$ | 2.1 | W |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~150 | °C |
| Typical Thermal Resistance (Note 4,5) | Junction to Case | $R_{\theta JC}$ | 2.1 | °C/W |
| | Junction to Ambient | $R_{\theta JA}$ | 59.5 | |

- 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 | -30 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250uA | -1 | -1.52 | -2.5 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V, $I_D$=-10A | - | 10 | 12 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-8A | - | 13.5 | 18 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-30V, $V_{GS}$=0V | - | - | -1.0 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| **Dynamic** (Note 6) | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-30V, $I_D$=-10A, $V_{GS}$=-4.5V (Note 1,2) | - | 23 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 8.5 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 9 | - | |
| Input Capacitance | Ciss | $V_{DS}$=-25V, $V_{GS}$=0V, f=1.0MHZ | - | 2767 | - | pF |
| Output Capacitance | Coss | | - | 247 | - | |
| Reverse Transfer Capacitance | Crss | | - | 139 | - | |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DS}$=-20V, $I_D$=-1A, $V_{GS}$=-10V, $R_G$=6Ω (Note 1,2) | - | 23 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 10 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 135 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 50 | - | |
| **Drain-Source Diode** | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | --- | - | - | -46 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-1A, $V_{GS}$=0V | - | -0.7 | -1 | V |

NOTES :

1. Pulse width≤300us, Duty cycle≤2%
2. Essentially independent of operating temperature typical characteristics
3. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial $T_J$ =25°C.
4. The maximum current rating is package limited
5. $R_{\Theta JA}$ 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$^2$ with 2oz.square pad of copper
6. Guaranteed by design, not subject to production testing.

# CSM320P20D3-3

## TYPICAL CHARACTERISTIC CURVES

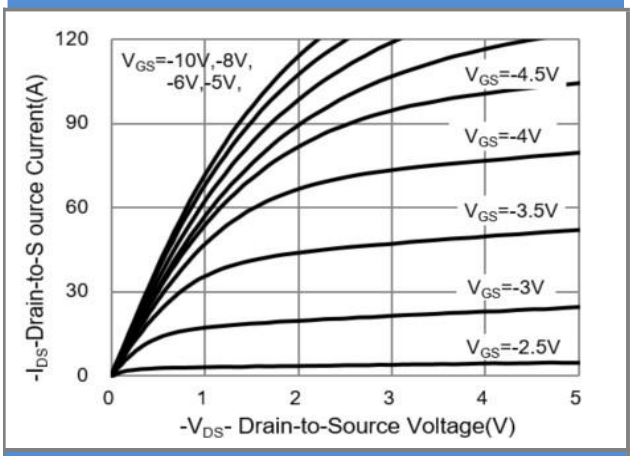


Fig.1 On-Region Characteristics

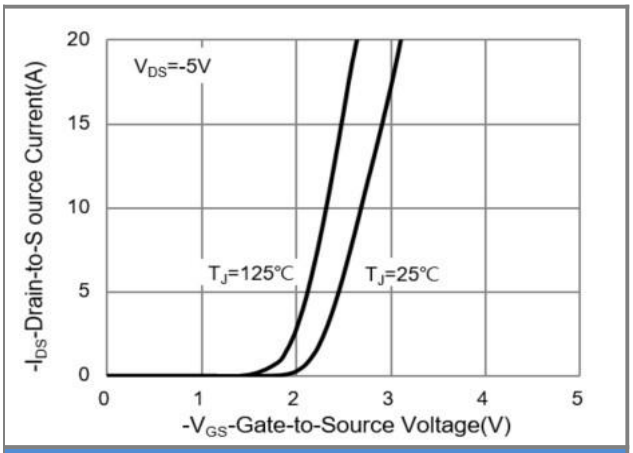


Fig.2 Transfer Characteristics

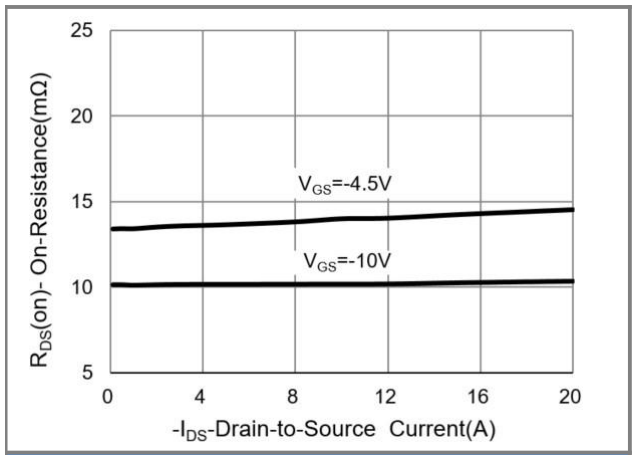


Fig.3 On-Resistance vs. Drain Current

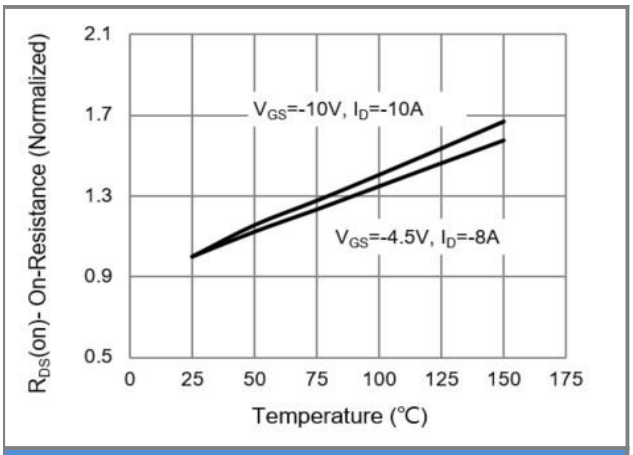


Fig.4 On-Resistance vs. Junction temperature

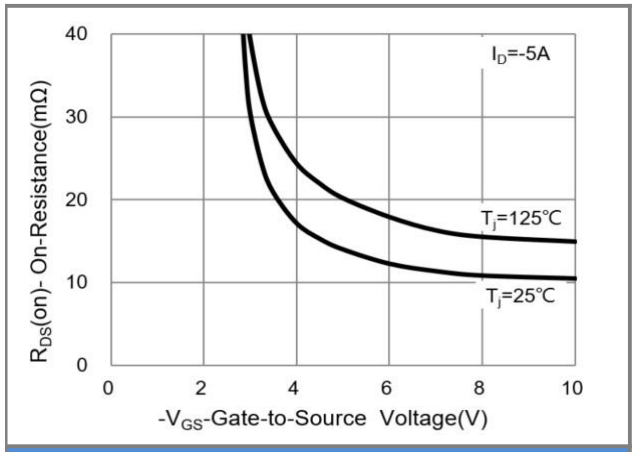


Fig.5 On-Resistance Variation with $V_{GS}$

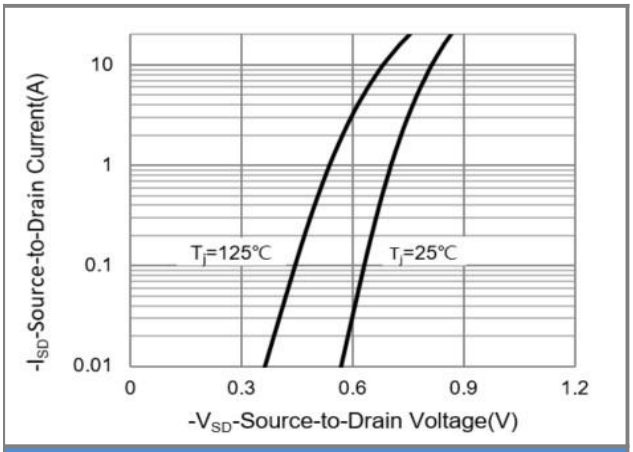


Fig.6 Source-Drain Diode Forward Voltage

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## TYPICAL CHARACTERISTIC CURVES

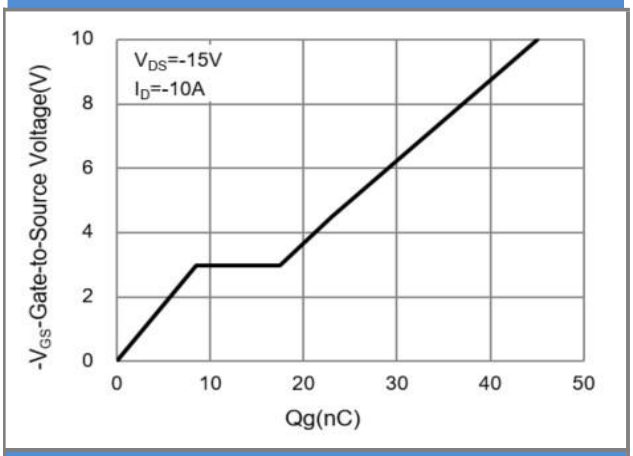


Fig.7 Gate-Charge Characteristics

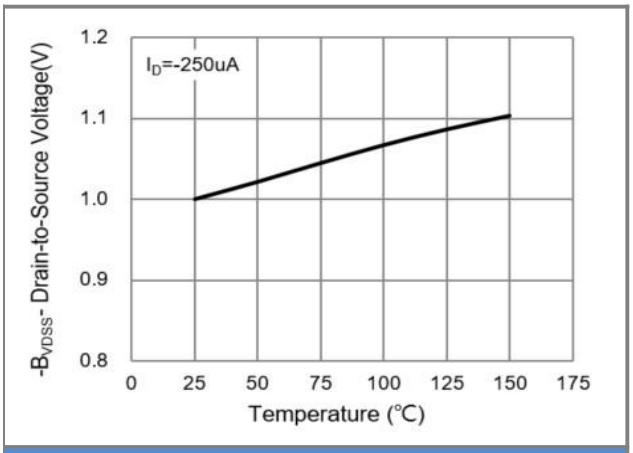


Fig.8 Breakdown Voltage Variation vs. Temperature

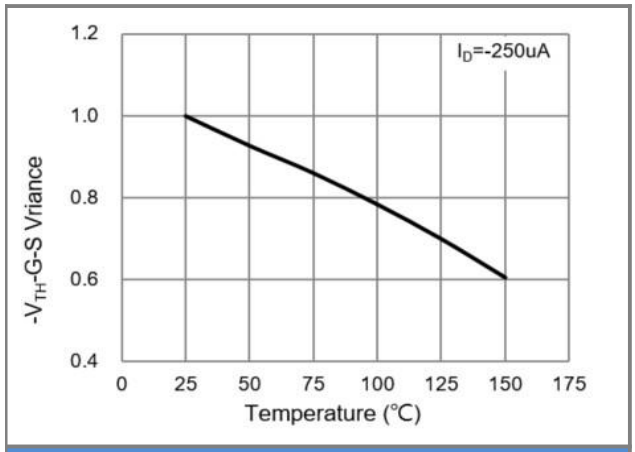


Fig.9 Threshold Voltage Variation with Temperature

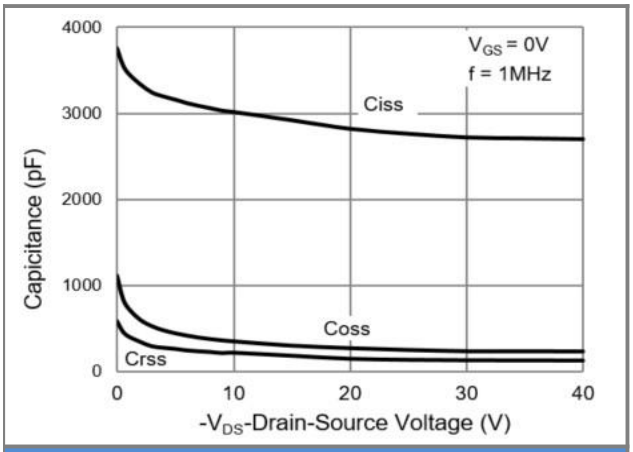


Fig.10 Capacitance vs. Drain-Source Voltage

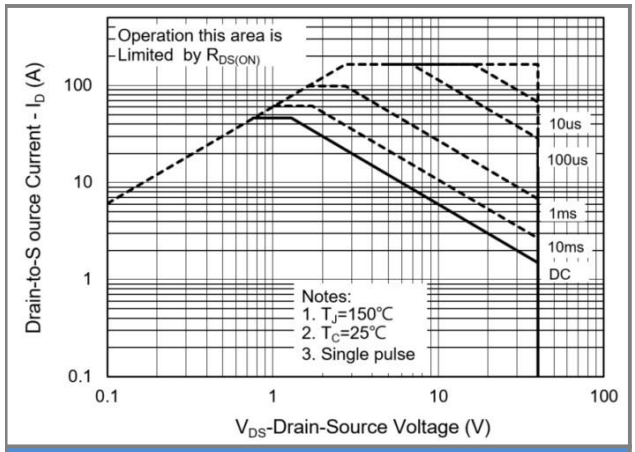


Fig.11 Maximum Safe Operating Area

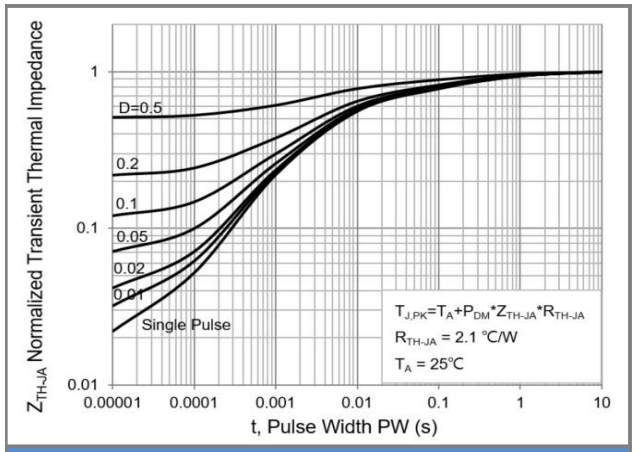


Fig.12 Normalized Transient Thermal Impedance

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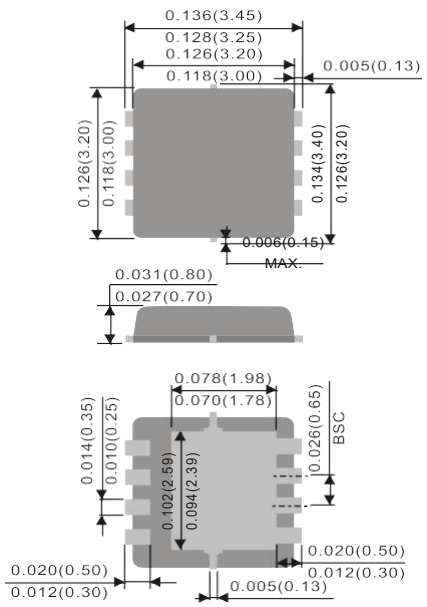
## Part No Packing Code Version

| Part No Packing Code | Package Type | Packing Type |
|---|---|---|
| CSM320P20D3-3 | DFN3333-8L | 5K pcs / 13” reel |

## Packaging Information & Mounting Pad Layout

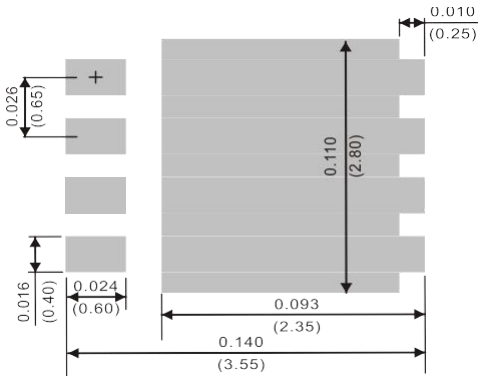
### DFN3333-8L Dimension

Unit: inch(mm)




### DFN3333-8L Pad Layout

Unit: inch(mm)



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