# P-Channel Enhancement Mode MOSFET

## 1 Features

- $V_{DS}$ = -20V, $I_D$ = -0.65A
- $R_{DS(ON)}$ = 580mΩ @ $V_{GS}$ = -4.5V
- $R_{DS(ON)}$ = 850mΩ @ $V_{GS}$ = -2.5V
- $R_{DS(ON)}$ = 1300mΩ @ $V_{GS}$ = -1.8V
- High Power and current handing capability
- ESD Protected Up to 2.0KV (HBM)
- Package DFN1006-3L

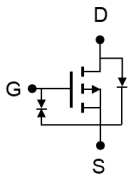
## 2 Applications

- PWM applications
- Load switch
- Power management

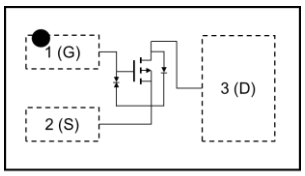
## 3 Description

The SLMN320V1CP provide the best combination of fast switching, low on-resistance and cost-effectiveness. The MOSFET uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -0.62V. This device is suitable for use as a load switch or in high power applications.

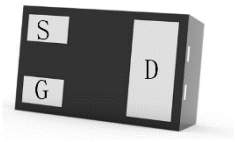
## 4 Pin Configuration and Top View




Schematic Diagram




Top View




DFN1006-3L

## 5 Device Information

| PART NUMBER | PACKAGE | BODY SIZE (NOM) |
|---|---|---|
| SLMN320V1CP | DFN1006-3L | 1.00 mm x 0.60mm |

## 6 Absolute maximum Ratings @25℃

| RATING | SYMBOL | VALUE | UNITS |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Continuous Drain Current | $I_D$ | -0.65 | A |
| Pulsed Drain Current | $I_{DP}$ | -2.6 | A |
| Total power dissipation | $P_D$ | 280 | mW |
| Channel temperature | $T_J$ | 150 | ℃ |
| Range of storage temperature | $T_{STG}$ | -55 to +150 | ℃ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 445 | ℃/W |

## 7 Electrical characteristics (@25℃ unless otherwise specified)

| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $I_D$ = -250μA, $V_{GS}$ = 0V | -20 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA | -0.35 | -0.62 | -1.2 | V |
| Drain Cut Off Current | $I_{DSS}$ | $V_{DS}$ = -20V, $V_{GS}$ = 0V | | | -1 | μA |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±10V, $V_{DS}$ = 0V | | | ±10 | μA |
| Drain-Source ON Resistance | $R_{DS(ON)}$ | $V_{GS}$ = -4.5V, $I_D$ = -0.5A | | 580 | 850 | mΩ |
| | | $V_{GS}$ = -2.5V, $I_D$= -0.3A | | 850 | 1200 | mΩ |
| | | $V_{GS}$ = -1.8V, $I_D$= -0.2A | | 1300 | 2000 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Total Gate Charge | $Q_G$ | $V_{DS}$ = -10V, $I_D$ = -0.5A, $V_{GS}$ = -4.5V | | 1.8 | | nC |
| Gate-Source Charge | $Q_{GS}$ | | | 0.6 | | nC |
| Gate-Drain Charge | $Q_{GD}$ | | | 0.8 | | nC |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$ = -10V, $V_{GS}$ = 0V, f = 1.0MHz | | 124 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 10 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 16 | | pF |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}$ = -4.5V, $V_{DS}$ = -10V $I_D$=0.5A, $R_G$ =3Ω | | 5 | | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 27 | | ns |
| Rise Time | $t_r$ | | | 6.2 | | ns |
| Fall Time | $t_f$ | | | 12 | | ns |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Source-Drain Diode Forward Voltage | $V_{SD}$ | $I_S$ = -0.6A, $V_{GS}$ = 0V | | -0.8 | -1.2 | V |

## 8 Typical Characteristics

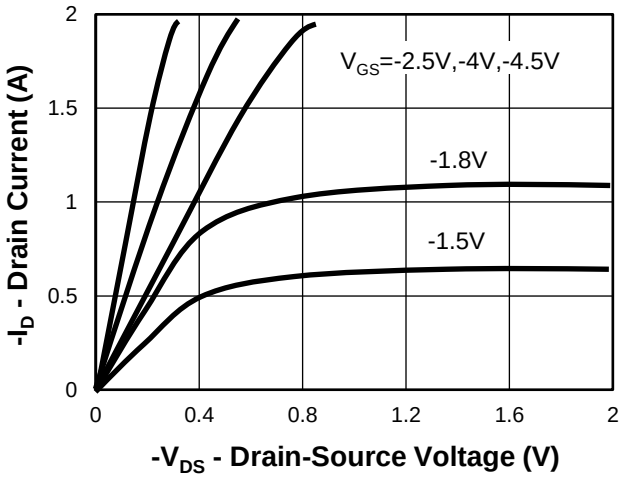



Fig 1: Output Characteristics

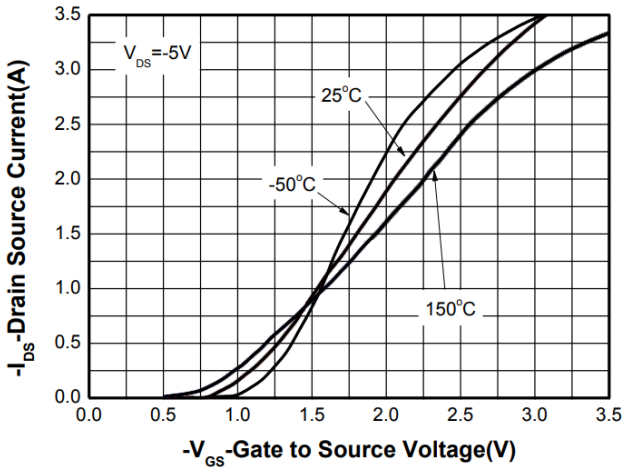



Fig 2: Transfer Characteristics

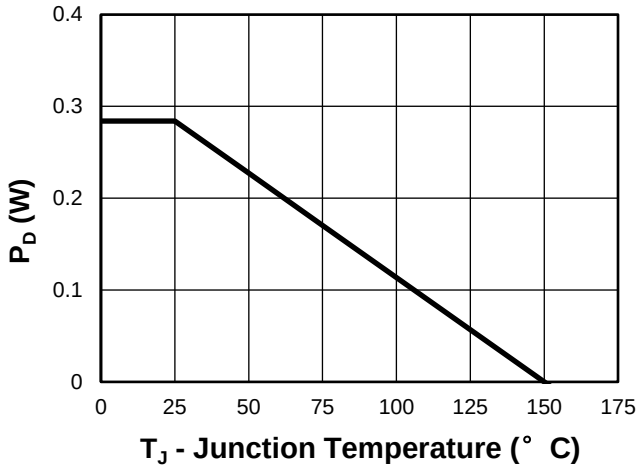



Fig 3: Power Dissipation

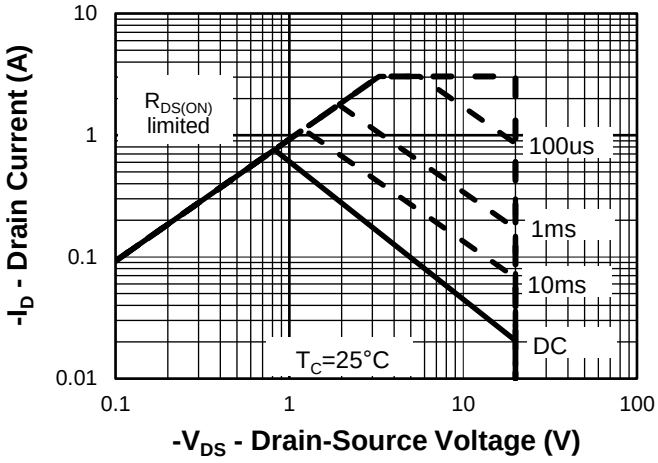



Fig 4: Safe Operation Area(SOA)

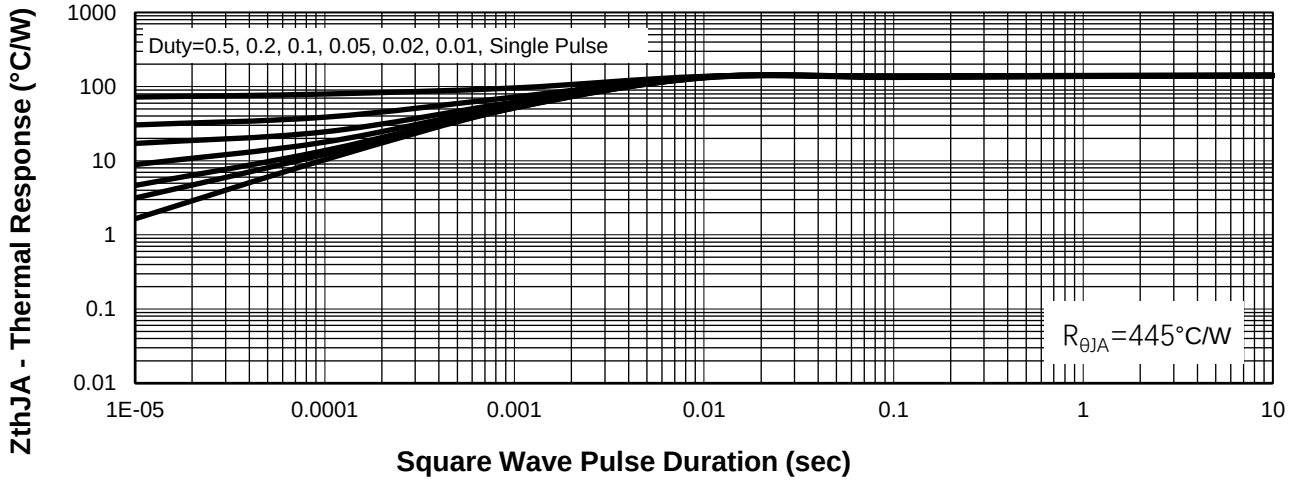



Fig 5: Thermal Transient Impedance

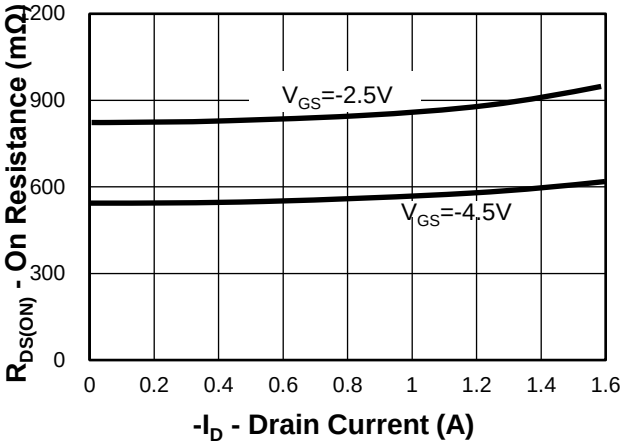



**Fig 6: Rdson vs. Drain Current Characteristics**

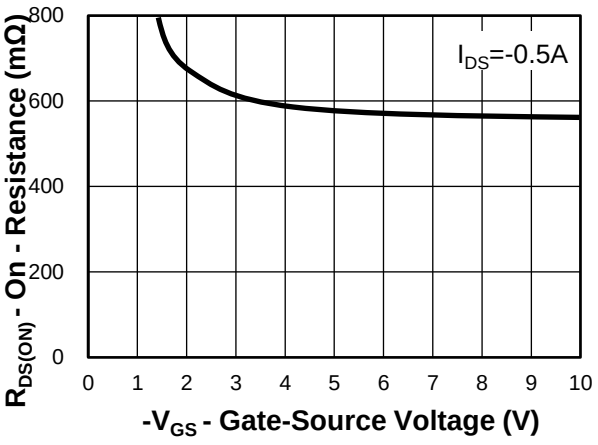



**Fig 7: Gate-Source on Resistance**

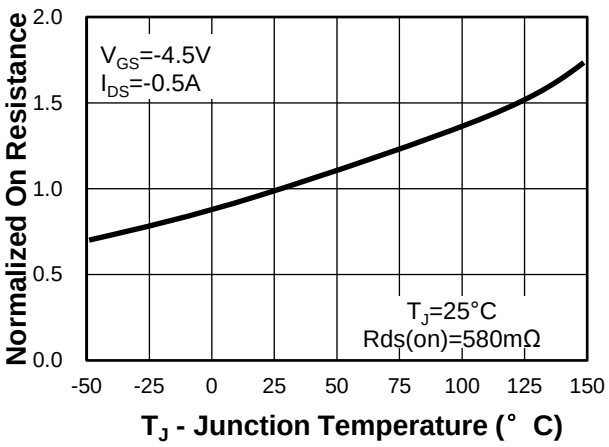



**Fig 8: Rdson vs. Junction Tem Characteristics**

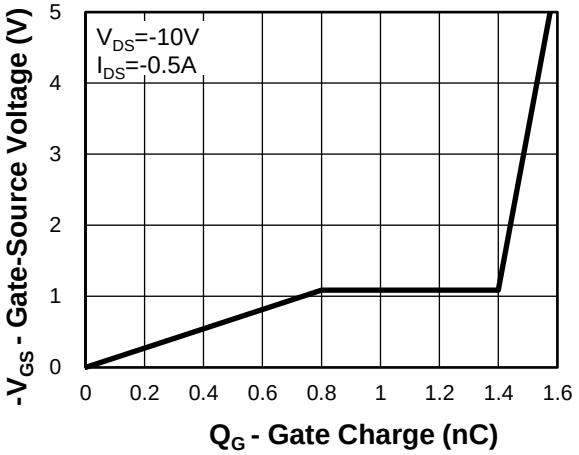



**Fig 9: Gate Charge Characteristics**

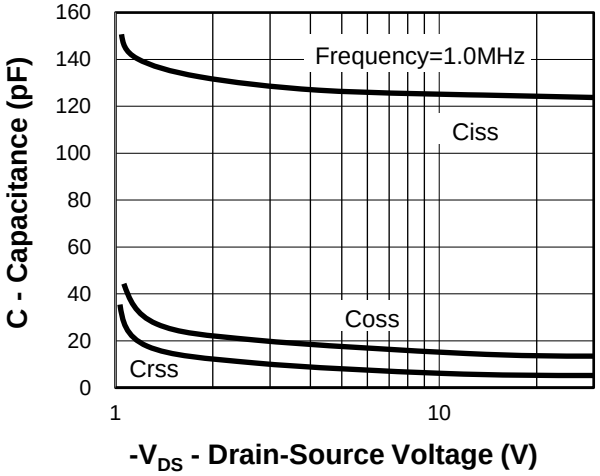



**Fig 10: Capacitance Characteristics**

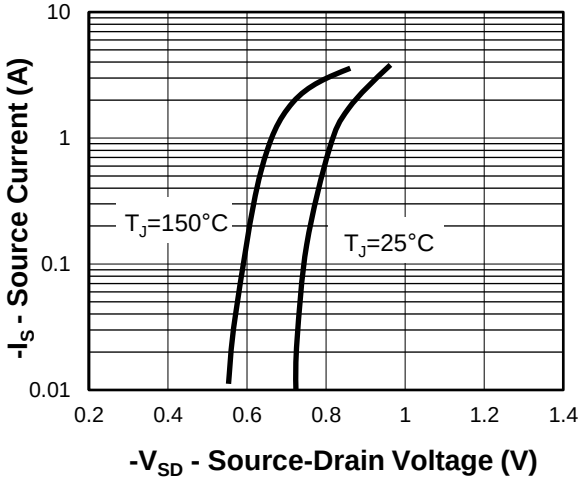
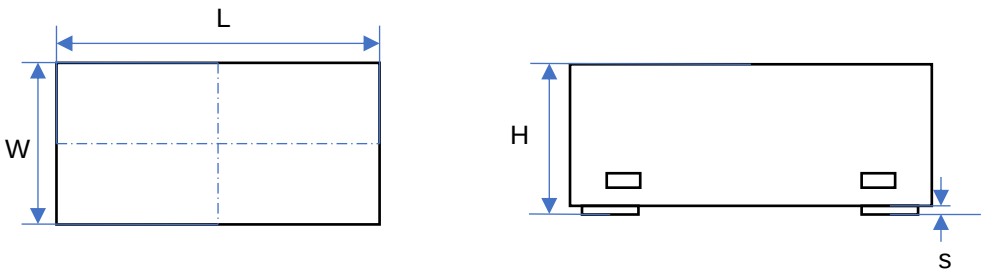


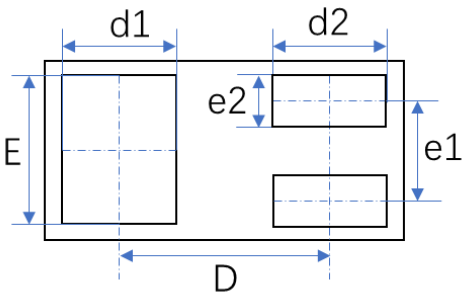

**Fig 11: Power dissipation**

## 9 Product dimension

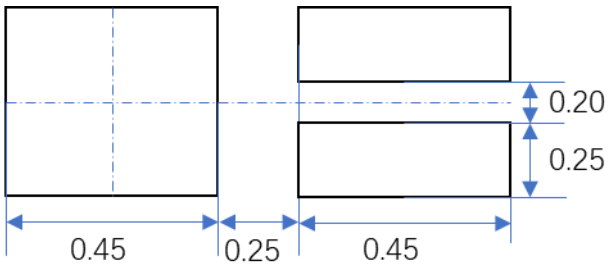
**DFN1006-3L**




| DIM | UNITS (mm) | | |
|---|---|---|---|
| | MIN. | TYP. | MAX. |
| L | 0.95 | 1.00 | 1.05 |
| W | 0.55 | 0.60 | 0.65 |
| H | 0.45 | 0.52 | 0.58 |
| s | 0.00 | - | 0.05 |
| D | - | 0.65 | - |
| E | 0.45 | 0.50 | 0.55 |
| d1 | 0.20 | 0.25 | 0.30 |
| d2 | 0.20 | 0.25 | 0.30 |
| e1 | - | 0.35 | - |
| e2 | 0.10 | 0.15 | 0.20 |




## 10 PCB Layout Footprints (Units: mm)




## 11 Ordering Information

| Part Number | Packaging | Reel Size |
|---|---|---|
| SLMN320V1CP | 10000/Tape & Reel | 7 inch |