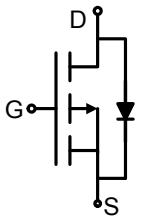
# N-Channel Enhancement Mode Power MOSFET

## Description

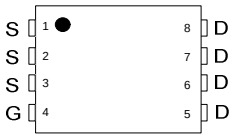
The JSM2622 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V.




**Schematic diagram**

## General Features

- $V_{DS}$ = 20V,$I_D$ = 50A
  $R_{DS(ON)\ Typ}$ =4.5mΩ@ $V_{GS}$=10V
  $R_{DS(ON)\ Typ}$ =5.0mΩ@ $V_{GS}$=4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package




**Pin assignment**

## Application

- Battery Switch
- Load switch
- Power management

**PDFN3333-8 top view**

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## Absolute Maximum Ratings ($T_A$=25℃unless otherwise noted)

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Continuous Drain Current ($T_J$ =150℃) | $T_A$ =25℃ | $I_D$ | 50 | A |
| | $T_A$ =70℃ | | 20 | |
| Drain Current-Pulsed (Note 1) | | $I_{DM}$ | 145 | A |
| Maximum Power Dissipation | | $P_D$ | 21 | W |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55 To 150 | ℃ |

## Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 2.1 | ℃/W |

## Electrical Characteristics ($T_C$=25℃unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 20 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=20V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 0.5 | 0.75 | 1.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=15 A | - | 4.5 | 6.5 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=10A | | 5.0 | 8.5 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=10V,$I_D$=15A | 10 | - | - | S |
| **Dynamic Characteristics** (Note4) | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=10V,$V_{GS}$=0V, F=1.0MHz | - | 2000 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 500 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 200 | - | PF |
| **Switching Characteristics** (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=10V,$I_D$=2A,$R_L$=1Ω $V_{GS}$=4.5V,$R_G$=3Ω | - | 6.4 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 17.2 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 29.6 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 16.8 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=10V,$I_D$=15A, $V_{GS}$=10V | - | 27 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 6.5 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 6.4 | | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=15A | - | | 1.2 | V |
| Diode Forward Current (Note 2) | $I_S$ | | - | - | 50 | A |
| Reverse Recovery Time | $t_{rr}$ | TJ = 25°C, IF = 15A di/dt = 100A/μs (Note3) | - | 25 | - | nS |
| Reverse Recovery Charge | Qrr | | - | 24 | - | nC |
| Forward Turn-On Time | $t_{on}$ | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

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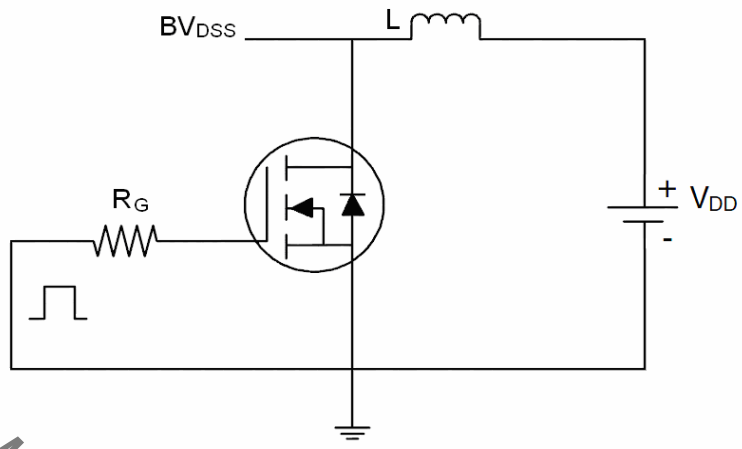
### Notes:

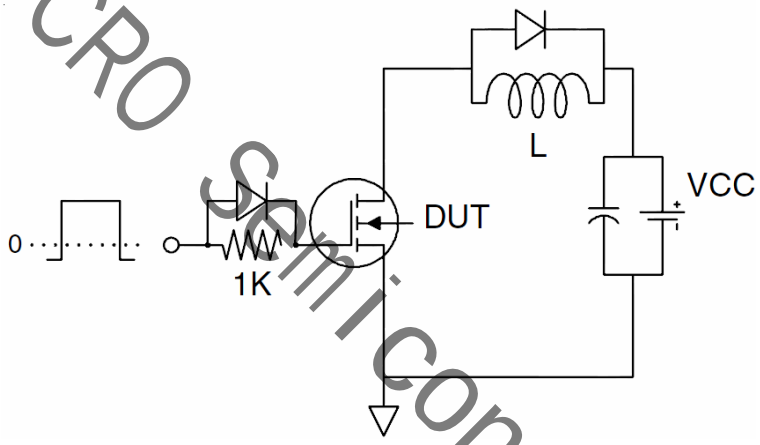
**1.** Repetitive Rating: Pulse width limited by maximum junction temperature.
**2.** Surface Mounted on FR4 Board, t ≤ 10 sec.
**3.** Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
**4.** Guaranteed by design, not subject to production
**5.** $E_{AS}$ condition : Tj=25℃,$V_{DD}$=10V,$V_G$=10V,L=0.5mH,Rg=25Ω，

## Test circuit

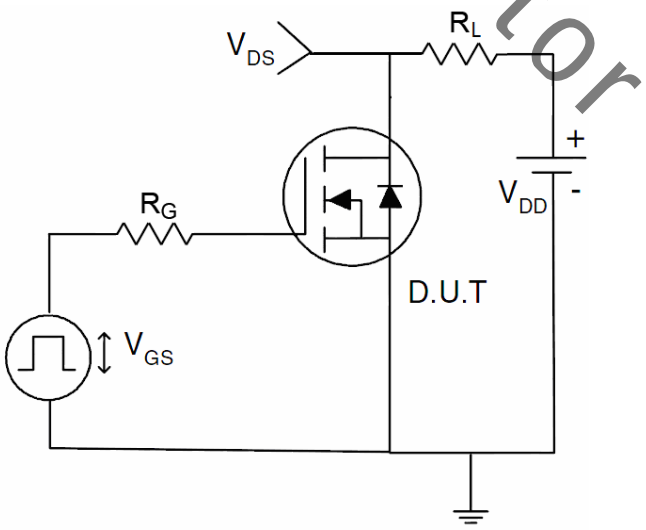
### 1) $E_{AS}$ Test Circuit




### 2) Gate Charge Test Circuit




### 3) Switch Time Test Circuit

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## Typical Electrical and Thermal Characteristics (Curves)

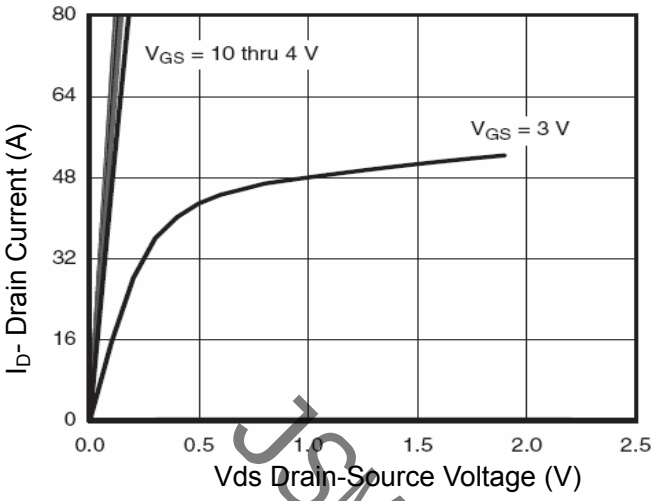


**Figure 1 Output Characteristics**

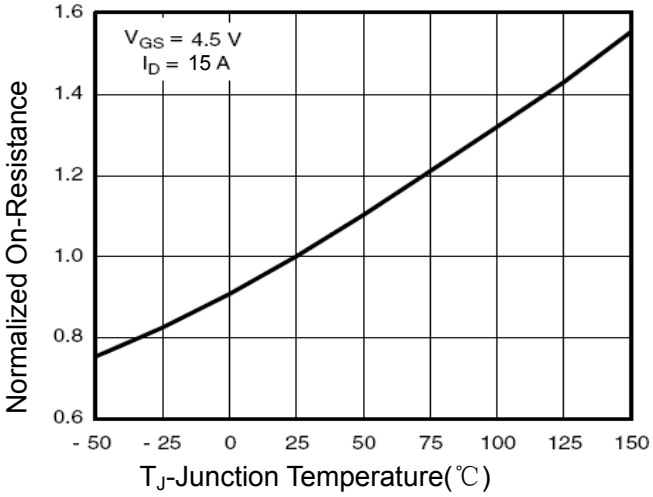


**Figure 4 Rdson-JunctionTemperature**

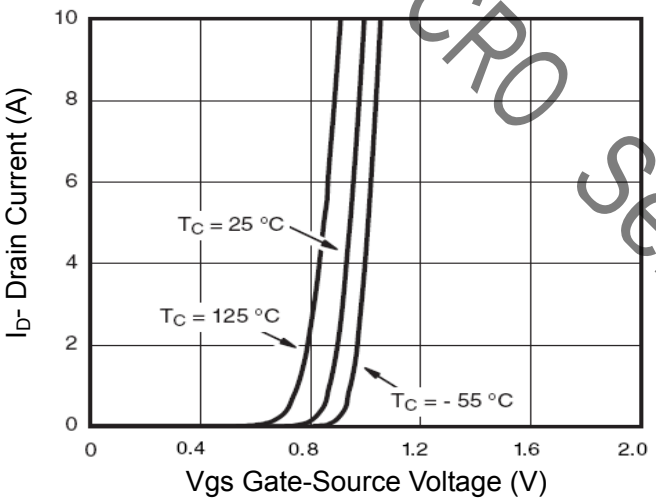


**Figure 2 Transfer Characteristics**

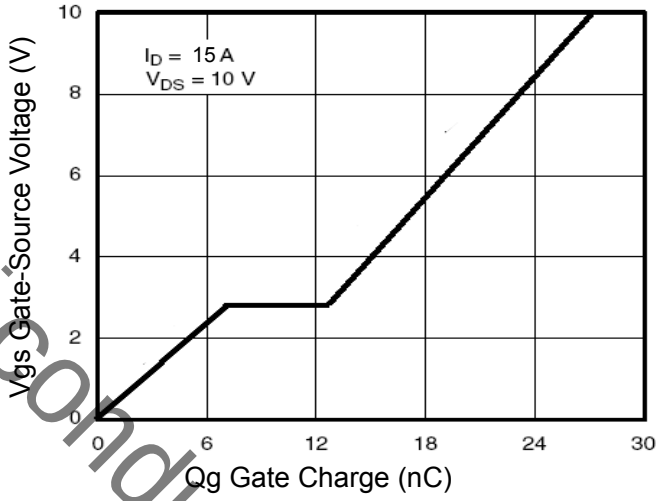


**Figure 5 Gate Charge**

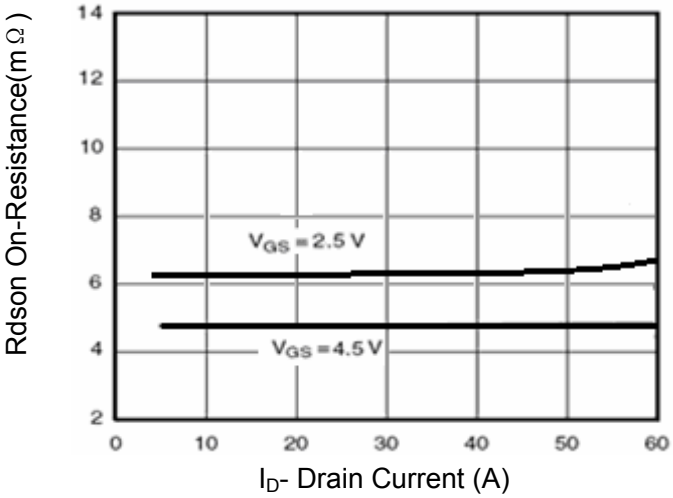


**Figure 3 Rdson- Drain Current**

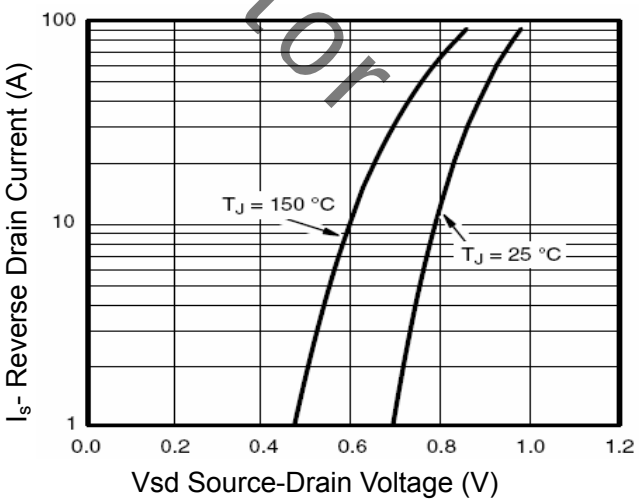


**Figure 6 Source- Drain Diode Forward**

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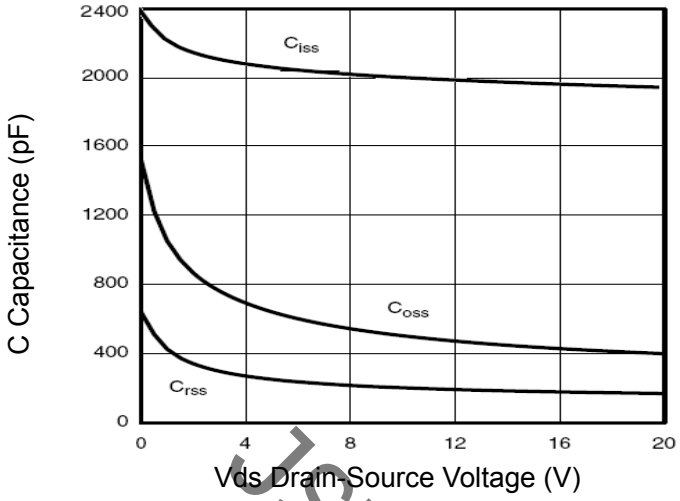


**Figure 7 Capacitance vs Vds**

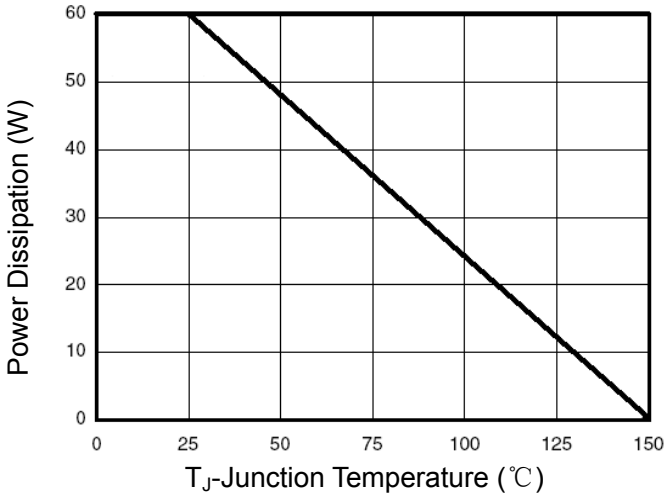


**Figure 9 Power De-rating**

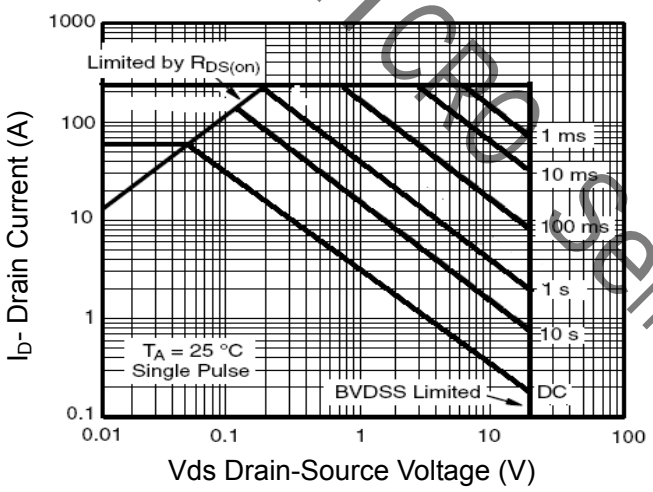


**Figure 8 Safe Operation Area**

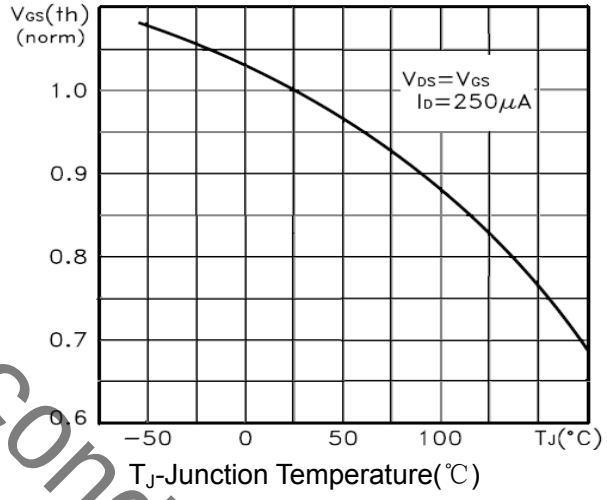


**Figure 10 $V_{GS(th)}$ vs Junction Temperature**

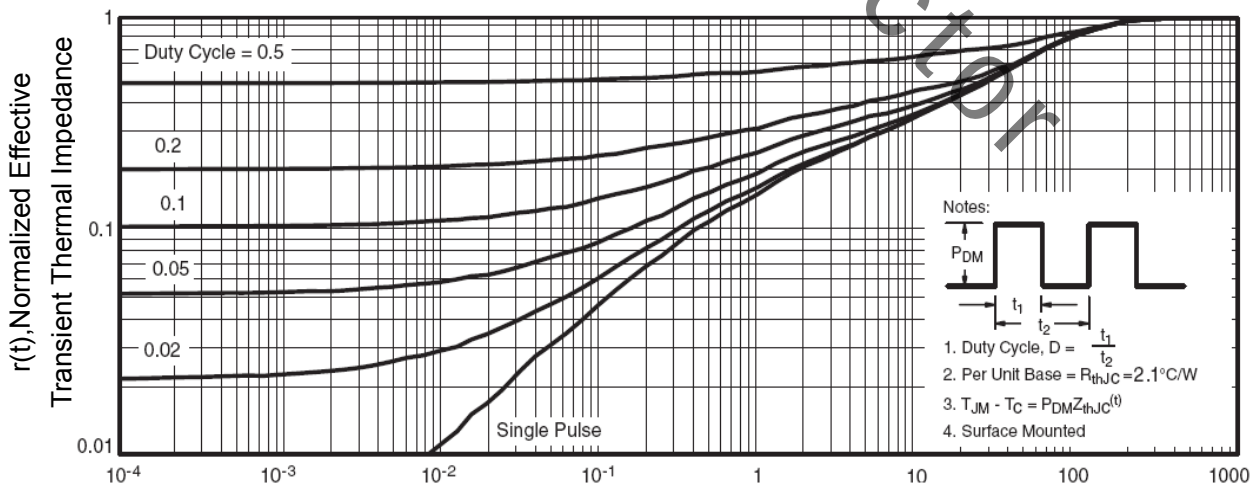


**Figure 11 Normalized Maximum Transient Thermal Impedance**

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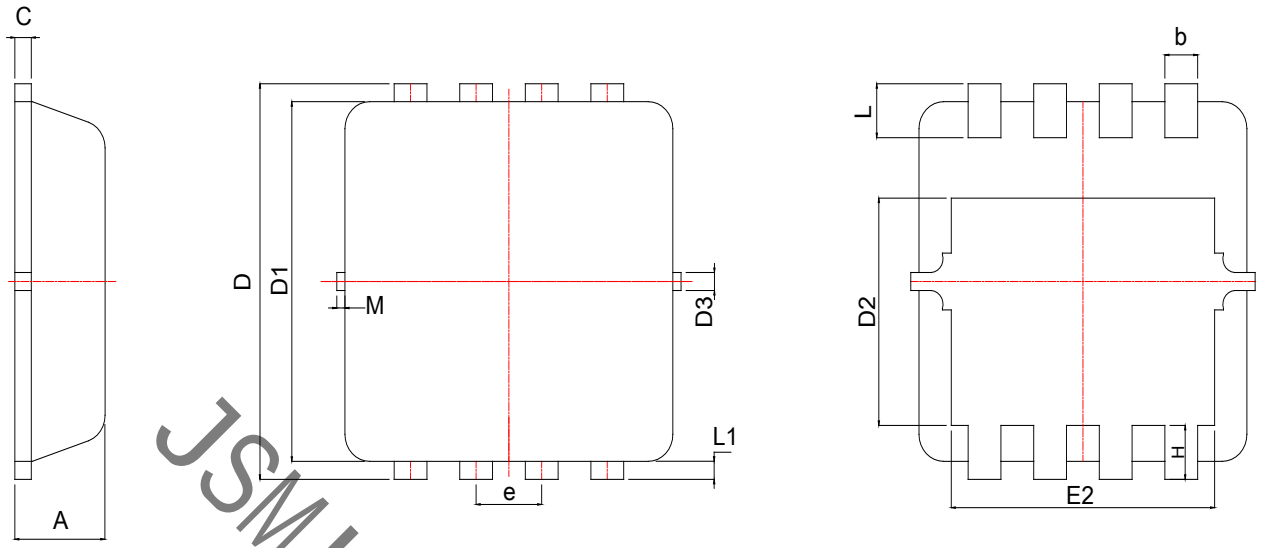
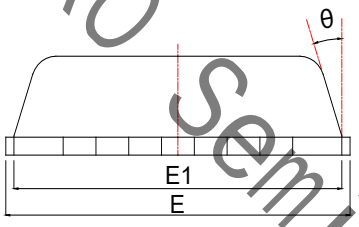
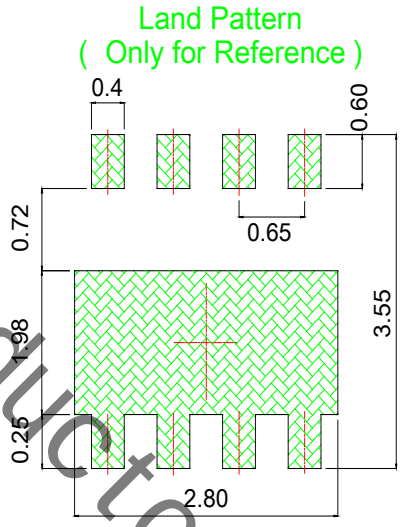
## Package Information

# PDFN3333

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| SYMBOL | MM | | | INCH | | | SYMBOL | MM | | | INCH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX | | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 | 0.028 | 0.030 | 0.031 | E1 | 3.00 | 3.15 | 3.20 | 0.118 | 0.122 | 0.126 |
| b | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 | E2 | 2.39 | 2.49 | 2.59 | 0.094 | 0.098 | 0.102 |
| c | 0.10 | 0.15 | 0.25 | 0.004 | 0.007 | 0.010 | e | 0.65BSC | | | 0.026BSC | | |
| D | 3.25 | 3.35 | 3.45 | 0.128 | 0.132 | 0.136 | H | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| D1 | 3.00 | 3.10 | 3.20 | 0.118 | 0.122 | 0.126 | L | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| D2 | 1.78 | 1.88 | 1.98 | 0.070 | 0.074 | 0.078 | L1 | * | 0.13 | * | * | 0.005 | * |
| D3 | * | 0.13 | * | * | 0.005 | * | θ | * | 10° | 12° | * | 10° | 12° |
| E | 3.20 | 3.30 | 3.40 | 0.126 | 0.130 | 0.134 | M | * | * | 0.15 | * | * | 0.006 |