

● General Description

The AGM12N10MNA combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

This device is ideal for load switch and battery protection applications.

● Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance
- 100% Avalanche tested
- 100% DVDS tested

● Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Product Summary

| BVDSS | RDSON | ID |
|-------|-------|-----|
| 100V | 11Ω | 55A |

PDFN5*6 Pin Configuration

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|-------------|----------------|-----------|------------|----------|
| AGM12N10MNA | AGM12N10MNA | PDFN5*6 | 330mm | 12mm | 3000 |

Table 1. Absolute Maximum Ratings (TA=25°C)

| Symbol | Parameter | Value | Unit |
|-------------|---|------------|------|
| VDS | Drain-Source Voltage (VGS=0V) | 100 | V |
| VGS | Gate-Source Voltage (VDS=0V) | ±20 | V |
| ID | Drain Current-Continuous(Tc=25°C) (Note 1) | 55 | A |
| | Drain Current-Continuous(Tc=100°C) | 35 | A |
| IDM (pluse) | Drain Current-Pulsed (Note 2) | 210 | A |
| PD | Maximum Power Dissipation(Tc=25°C) | 96 | w |
| | Maximum Power Dissipation(Tc=100°C) | 38 | w |
| EAS | Avalanche energy (Note 3) | 6.0 | mJ |
| TJ,TSTG | Operating Junction and Storage Temperature Range | -55 To 150 | °C |

Table 2. Thermal Characteristic

| Symbol | Parameter | Typ | Max | Unit |
|--------|---|-----|-----|------|
| RθJA | Thermal Resistance Junction-ambient (Steady State) ¹ | --- | 20 | °C/W |
| RθJC | Thermal Resistance Junction-Case ¹ | --- | 1.3 | °C/W |

Table 3. Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|----------------------------------|------------------------------------|-----|------|------|------|
| On/Off States | | | | | | |
| BVDSS | Drain-Source Breakdown Voltage | VGS=0V ID=250μA | 100 | -- | -- | V |
| IDSS | Zero Gate Voltage Drain Current | VDS=100V,VGS=0V | -- | -- | 1.0 | μA |
| IGSS | Gate-Body Leakage Current | VGS=±20V,VDS=0V | -- | -- | ±100 | nA |
| VGS(th) | Gate Threshold Voltage | VDS=VGS,ID=250μA | 1.2 | 1.6 | 2.2 | V |
| gFS | Forward Transconductance | VDS=5V,ID=15A | -- | 21 | -- | S |
| RDS(on) | Drain-Source On-State Resistance | VGS=10V, ID=20A | -- | 11 | 15 | mΩ |
| | | VGS=4.5V, ID=15A | -- | 13 | 16 | mΩ |
| Dynamic Characteristics | | | | | | |
| Ciss | Input Capacitance | VDS=40V,VGS=0V, F=1MHZ | -- | 1191 | -- | pF |
| Coss | Output Capacitance | | -- | 188 | -- | pF |
| Crss | Reverse Transfer Capacitance | | -- | 35 | -- | pF |
| Rg | Gate resistance | VGS=0V, VDS=0V,f=1.0MHz | -- | 10.1 | -- | Ω |
| Switching Times | | | | | | |
| td(on) | Turn-on Delay Time | VGS=10V,VDS=50V, ID=10A,RGEN=5Ω | -- | 16 | -- | nS |
| tr | Turn-on Rise Time | | -- | 18 | -- | nS |
| td(off) | Turn-Off Delay Time | | -- | 32 | -- | nS |
| tf | Turn-Off Fall Time | | -- | 10 | -- | nS |
| Qg | Total Gate Charge | VGS=10V, VDS=50V, ID=10A | -- | 21.8 | -- | nC |
| Qgs | Gate-Source Charge | | -- | 3.7 | -- | nC |
| Qgd | Gate-Drain Charge | | -- | 5.0 | -- | nC |
| Source-Drain Diode Characteristics | | | | | | |
| ISD | Source-Drain Current(Body Diode) | | -- | -- | 55 | A |
| VSD | Forward on Voltage | VGS=0V,IS=10A | -- | -- | 1.2 | V |
| trr | Reverse Recovery Time | Is=10A , | -- | 43 | -- | ns |
| Qrr | Reverse Recovery Charge | VDD=50V,dI/dt=100A/μs | -- | 90 | -- | nc |

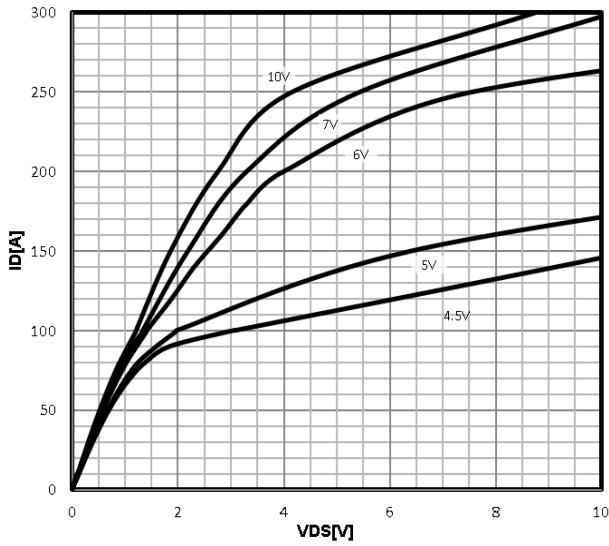
Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

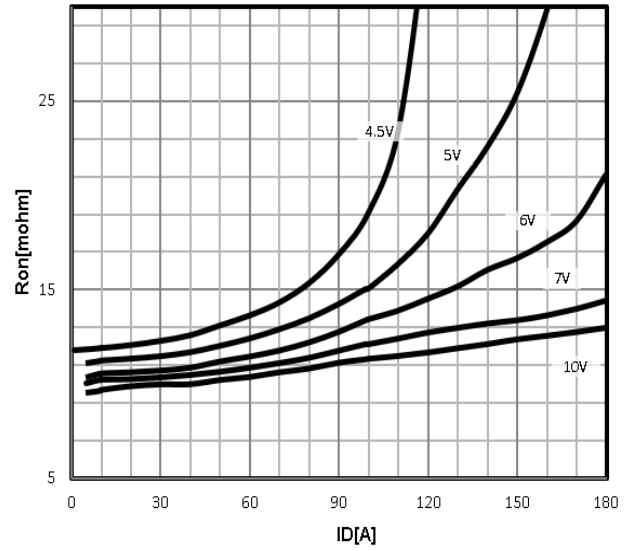
Notes 3.EAS condition: T_J=25°C,VDD=50V,Vgs=10V,ID=11A, L=0.1mH,RG=25ohm

Characteristics Curve:

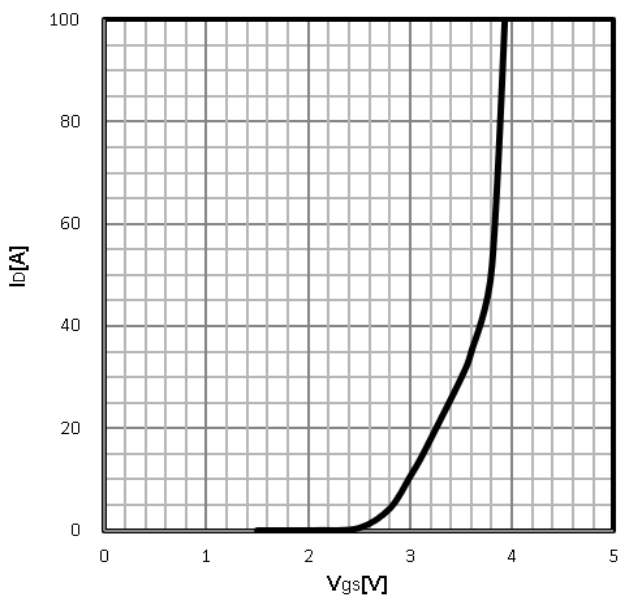
Typ. output characteristics
 $I_D = f(V_{DS})$



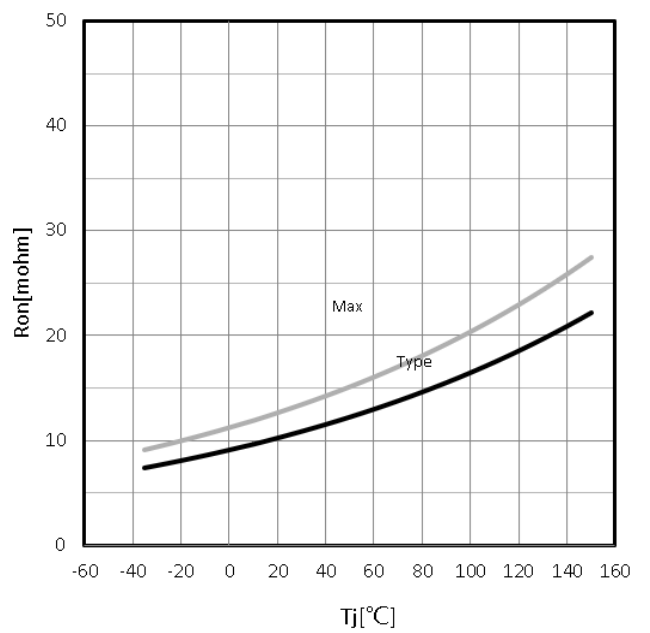
Typ. drain-source on resistance
 $R_{DS(on)} = f(I_D)$



Typ. transfer characteristics
 $I_D = f(V_{GS})$

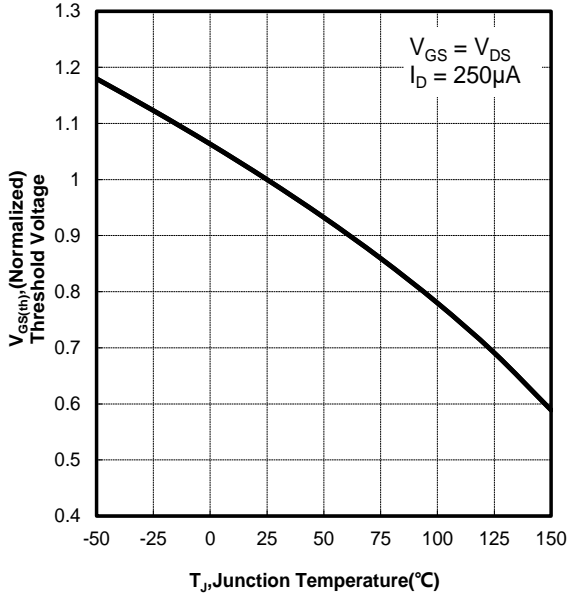


Drain-source on-state resistance
 $R_{DS(on)} = f(T_j); I_D = 20A; V_{GS} = 10V$

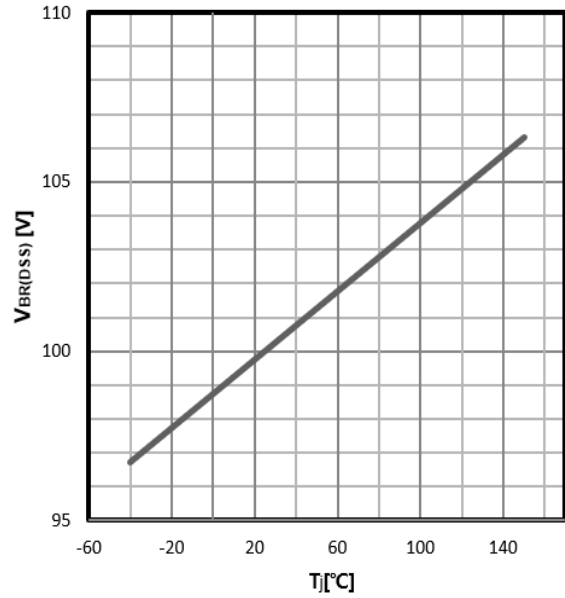


Gate Threshold Voltage

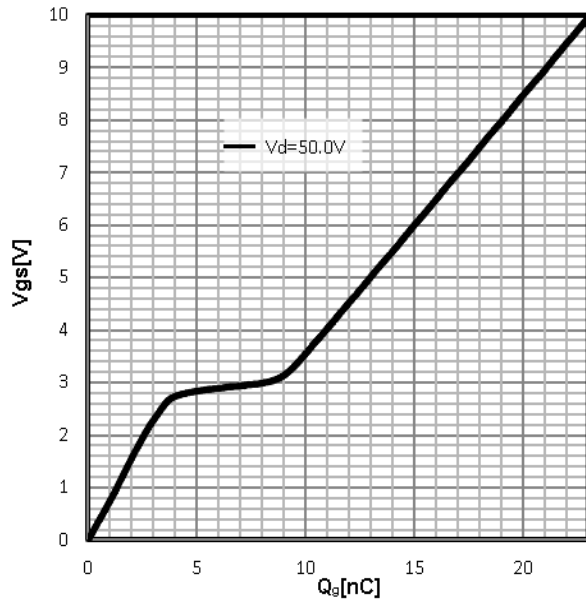
$$V_{TH} = f(T_j); I_D = 250\mu A$$


Drain-source breakdown voltage

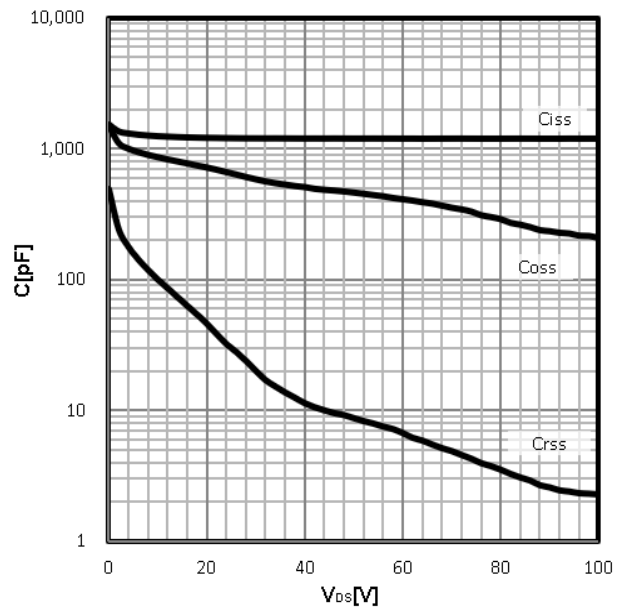
$$V_{BR(DSS)} = f(T_j); I_D = 250\mu A$$


Typ. gate charge

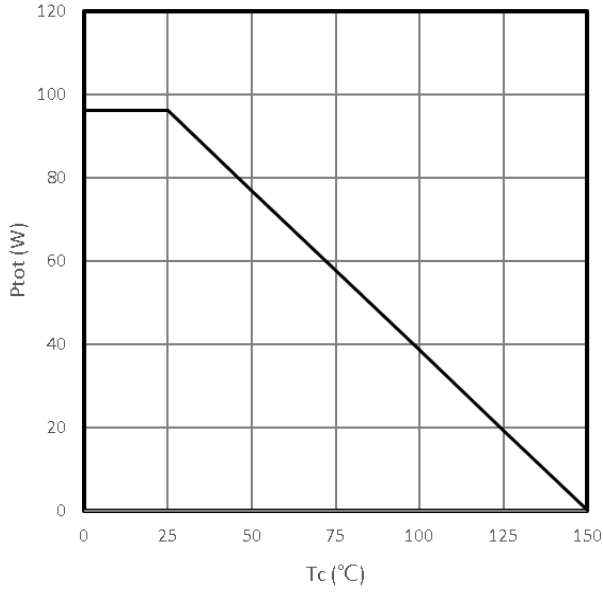
$$V_{GS} = f(Q_g); I_D = 10A$$


Typ. capacitances

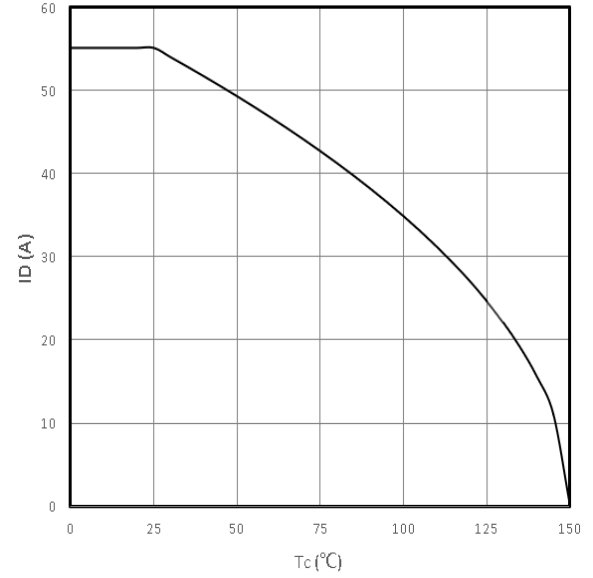
$$C = f(V_{DS}); V_{GS} = 0V; f = 1MHz$$



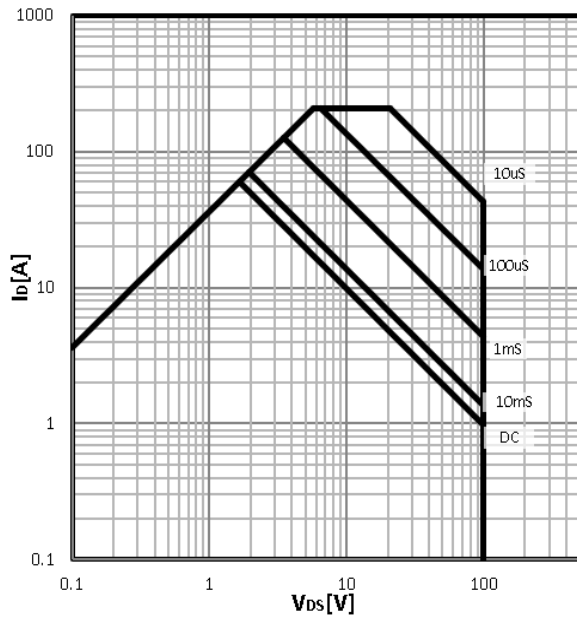
Power Dissipation
 $P_{tot}=f(T_C)$



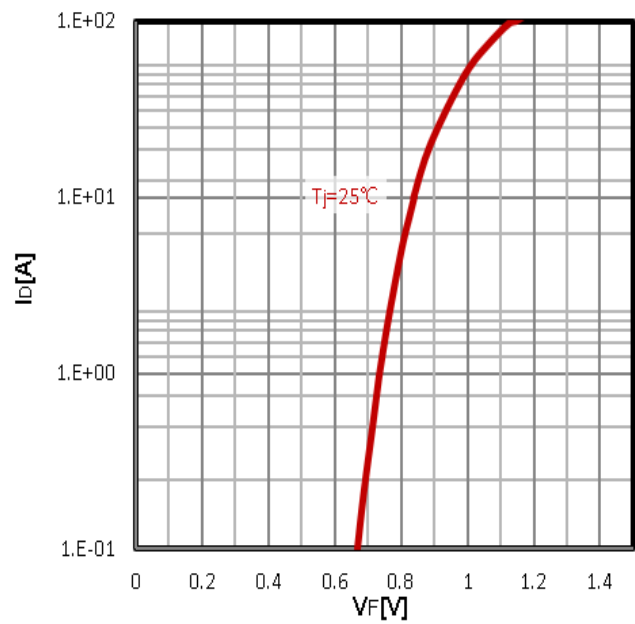
Maximum Drain Current
 $I_D=f(T_C)$



Safe operating area
 $I_D=f(V_{DS})$

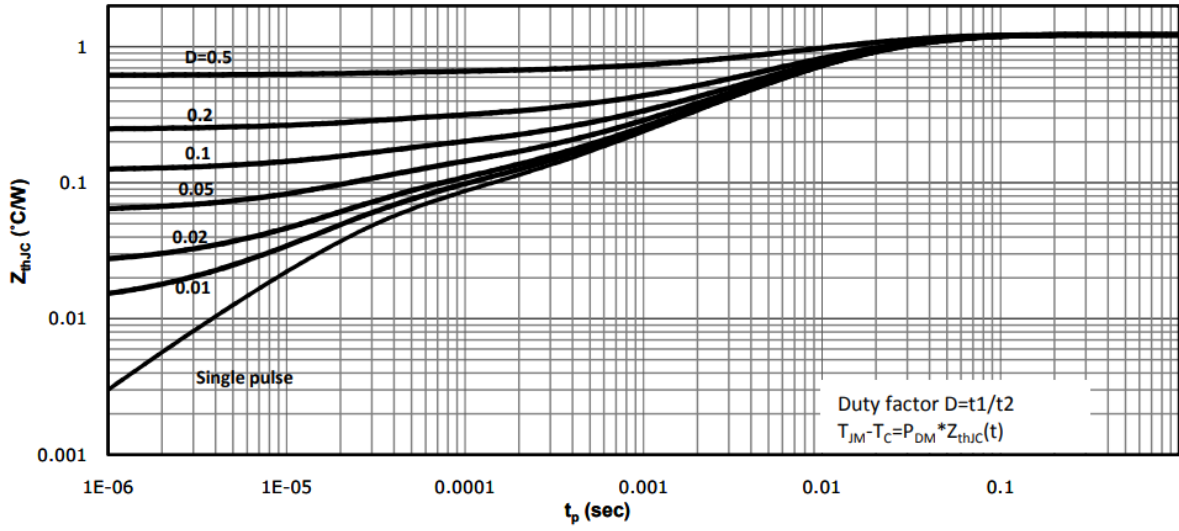


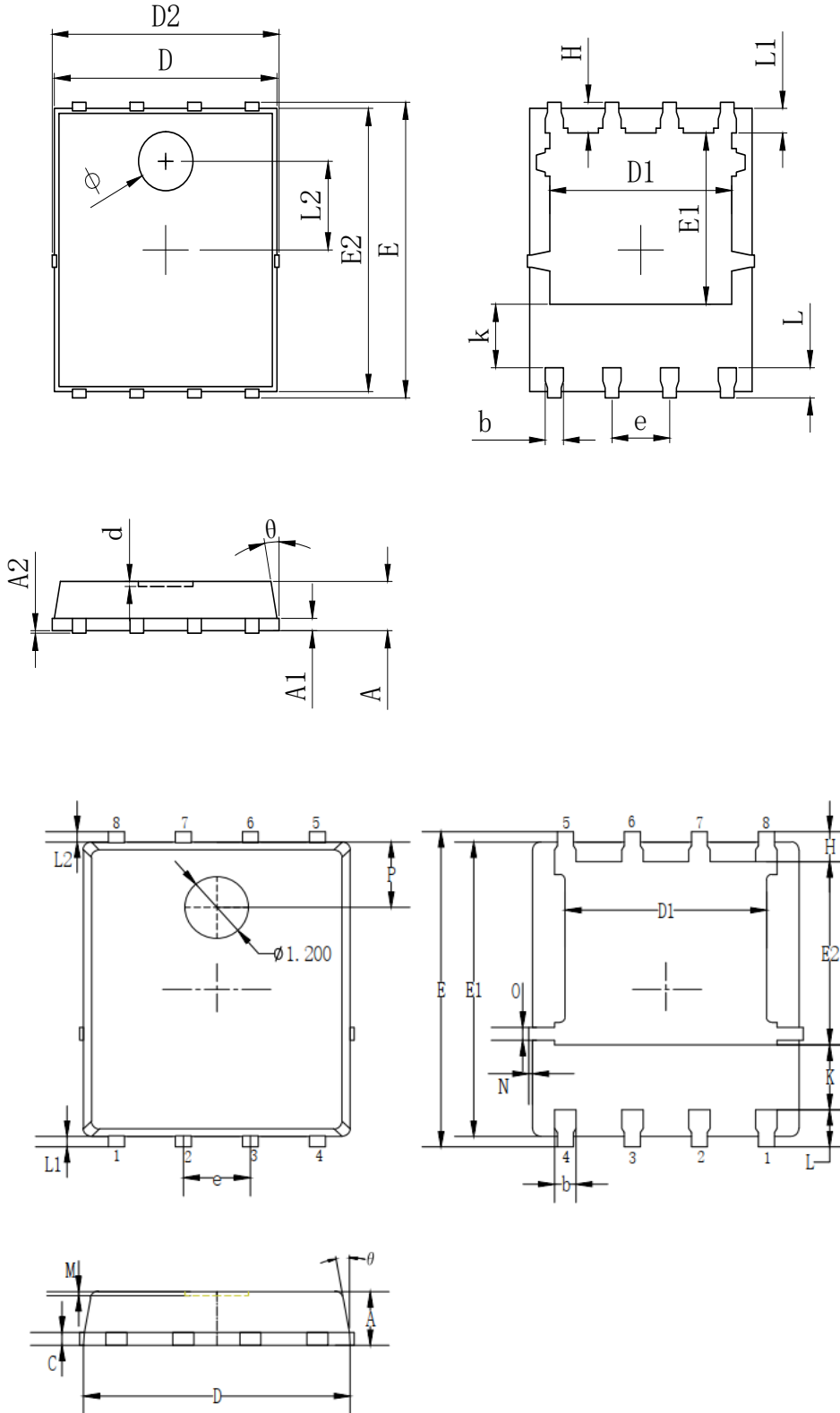
Body Diode Forward Voltage Variation
 $I_F=f(V_{GS})$



Max. transient thermal impedance

$$Z_{thJC} = f(t_p)$$



•Dimensions (PDFN5*6)


| SYMBOL | MILLIMETER | | |
|----------|------------|-------|-------|
| | MIN | Typ. | MAX |
| A | 0.900 | 1.000 | 1.100 |
| A1 | 0.254 REF. | | |
| A2 | 0° 0.05 | | |
| D | 4.824 | 4.900 | 4.976 |
| D1 | 3.910 | 4.010 | 4.110 |
| D2 | 4.924 | 5.000 | 5.076 |
| E | 5.924 | 6.000 | 6.076 |
| E1 | 3.375 | 3.475 | 3.575 |
| E2 | 5.674 | 5.750 | 5.826 |
| b | 0.350 | 0.400 | 0.450 |
| e | 1.270 TYP. | | |
| L | 0.534 | 0.610 | 0.686 |
| L1 | 0.424 | 0.500 | 0.576 |
| L2 | 1.800 REF. | | |
| k | 1.190 | 1.290 | 1.390 |
| H | 0.549 | 0.625 | 0.701 |
| θ | 8° | 10° | 12° |
| ϕ | 1.100 | 1.200 | 1.300 |
| d | | | 0.100 |

| Symbols | Millimeters | | |
|----------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 1.05 | 1.20 |
| b | 0.35 | 0.40 | 0.50 |
| C | 0.20 | 0.25 | 0.35 |
| D | 4.90 | 5.05 | 5.20 |
| D1 | 3.72 | 3.82 | 3.92 |
| E | 6.00 | 6.15 | 6.30 |
| E1 | 5.60 | 5.75 | 5.90 |
| E2 | 3.47 | 3.57 | 3.67 |
| e | 1.27 BSC. | | |
| H | 0.48 | 0.58 | 0.68 |
| K | 1.17 | 1.27 | 1.37 |
| L | 0.64 | 0.74 | 0.84 |
| L1/L2 | 0.20 REF. | | |
| θ | 8° | 10° | 12° |
| M | 0.08 REF. | | |
| N | 0 | - | 0.15 |
| O | 0.25 REF. | | |
| P | 1.28 REF. | | |


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