

### ● General Description

The AGM301A1 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

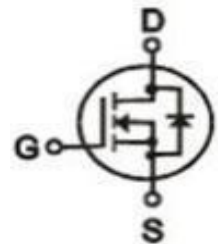
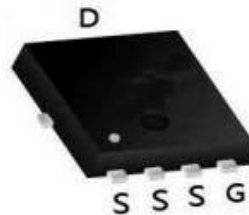
### ● Application

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

### Product Summary

| BVDSS | RDSON | ID   |
|-------|-------|------|
| 30V   | 1.5mΩ | 150A |

### PDFN5\*6 Pin Configuration



### Package Marking and Ordering Information

| Device Marking | Device   | Device Package | Reel Size | Tape width | Quantity |
|----------------|----------|----------------|-----------|------------|----------|
| AGM301A1       | AGM301A1 | PDFN5*6        | 330mm     | 12mm       | 3000     |

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

| Symbol      | Parameter  | Value      | Unit |
|-------------|--|------------|------|
| VDS         | Drain-Source Voltage (VGS=0V)                            | 30         | V    |
| VGS         | Gate-Source Voltage (VDS=0V)                             | ±20        | V    |
| ID          | Drain Current-Continuous(Tc=25°C) <b>(Note 1)</b>        | 150        | A    |
|             | Drain Current-Continuous(Tc=100°C)                       | 105        | A    |
| IDM (pluse) | Drain Current-Continuous@ Current-Pulsed <b>(Note 2)</b> | 600        | A    |
| PD          | Maximum Power Dissipation(Tc=25°C)                       | 130        | w    |
|             | Maximum Power Dissipation(Tc=100°C)                      | 52         | w    |
| EAS         | Avalanche energy <b>(Note 3)</b>                         | 1700       | 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) <sup>1</sup> | --- | 20   | °C/W |
| RθJC   | Thermal Resistance Junction-Case <sup>1</sup>                   | --- | 0.96 | °C/W |

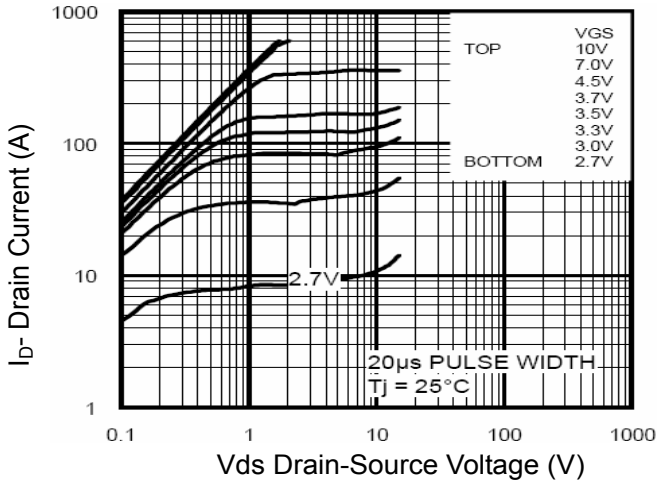
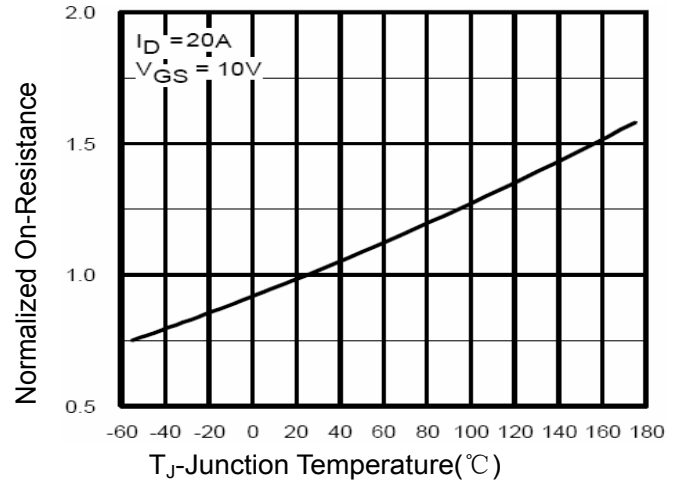
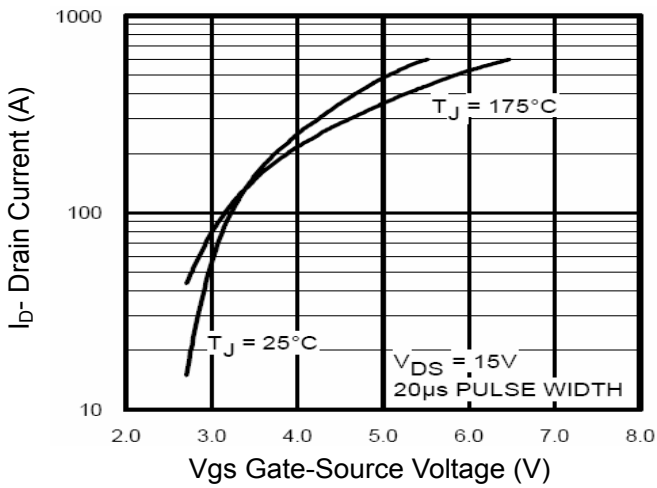
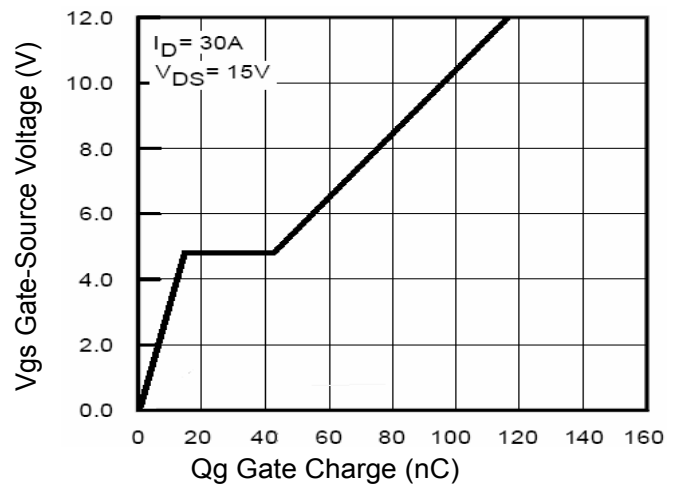
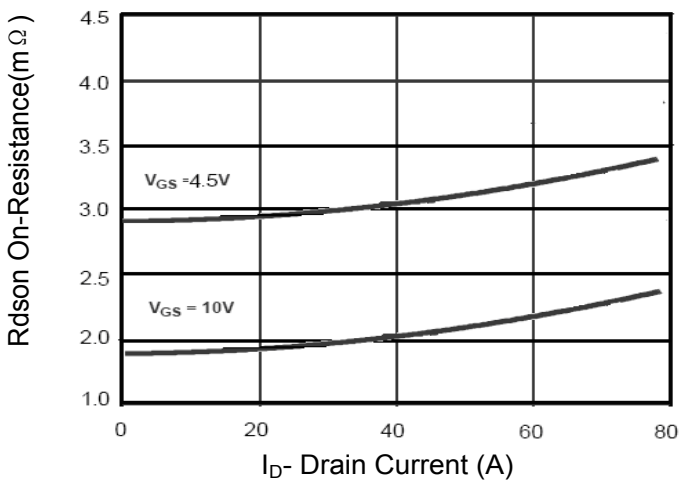
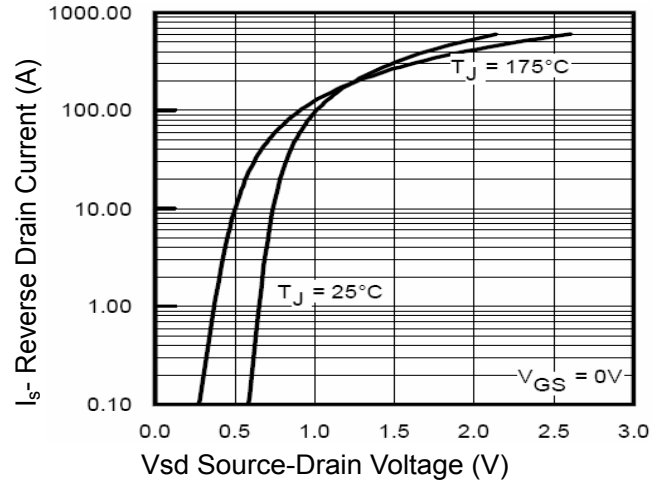
**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

| Symbol                                    | Parameter                        | Conditions                           | Min | Typ  | Max  | Unit |
|---|----------------------------------|--------------------------------------|-----|------|------|------|
| <b>On/Off States</b>                      |                                  |                                      |     |      |      |      |
| BVDSS                                     | Drain-Source Breakdown Voltage   | VGS=0V ID=250μA                      | 30  | --   | --   | V    |
| IDSS                                      | Zero Gate Voltage Drain Current  | VDS=30V, VGS=0V                      | --  | --   | 1    | μA   |
| IGSS                                      | Gate-Body Leakage Current        | VGS=±20V, VDS=0V                     | --  | --   | ±100 | nA   |
| VGS(th)                                   | Gate Threshold Voltage           | VDS=VGS, ID=250μA                    | 1.0 | 1.5  | 2.5  | V    |
| gFS                                       | Forward Transconductance         | VDS=5V, ID=15A                       | --  | 36   | --   | S    |
| RDS(on)                                   | Drain-Source On-State Resistance | VGS=10V, ID=20A                      | --  | 1.5  | 2.1  | mΩ   |
|   |                                  | VGS=4.5V, ID=15A                     | --  | 2.5  | 4.0  | mΩ   |
| <b>Dynamic Characteristics</b>            |                                  |                                      |     |      |      |      |
| Ciss                                      | Input Capacitance                | VDS=15V, VGS=0V,<br>F=1MHZ           | --  | 5600 | --   | pF   |
| Coss                                      | Output Capacitance               |                                      | --  | 800  | --   | pF   |
| Crss                                      | Reverse Transfer Capacitance     |                                      | --  | 560  | --   | pF   |
| Rg  | Gate resistance                  | VGS=0V,<br>VDS=0V, f=1.0MHz          | --  | 1.6  | --   | Ω    |
| <b>Switching Times</b>                    |                                  |                                      |     |      |      |      |
| td(on)                                    | Turn-on Delay Time               | VGS=10V, VDS=15V,<br>ID=10A, RGEN=6Ω | --  | 25   | --   | nS   |
| tr  | Turn-on Rise Time                |                                      | --  | 23   | --   | nS   |
| td(off)                                   | Turn-Off Delay Time              |                                      | --  | 90   | --   | nS   |
| tf  | Turn-Off Fall Time               |                                      | --  | 39   | --   | nS   |
| Qg  | Total Gate Charge                | VGS=10V, VDS=15V,<br>ID=12A          | --  | 99   | --   | nC   |
| Qgs                                       | Gate-Source Charge               |                                      | --  | 17   | --   | nC   |
| Qgd                                       | Gate-Drain Charge                |                                      | --  | 11   | --   | nC   |
| <b>Source-Drain Diode Characteristics</b> |                                  |                                      |     |      |      |      |
| ISD                                       | Source-Drain Current(Body Diode) |                                      | --  | --   | 150  | A    |
| VSD                                       | Forward on Voltage               | VGS=0V, IS=20A                       | --  | --   | 1.2  | V    |
| trr                                       | Reverse Recovery Time            | IF=10A , di/dt=100A/μs ,<br>TJ=25°C  | --  | 39   | --   | ns   |
| Qrr                                       | Reverse Recovery Charge          |                                      | --  | 35   | --   | 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: TJ=25°C

**Typical Electrical and Thermal Characteristics (Curves)**

**Figure 1 Output Characteristics**

**Figure 4 Rdson-Junction Temperature**

**Figure 2 Transfer Characteristics**

**Figure 5 Gate Charge**

**Figure 3 Rdson- Drain Current**

**Figure 6 Source- Drain Diode Forward**

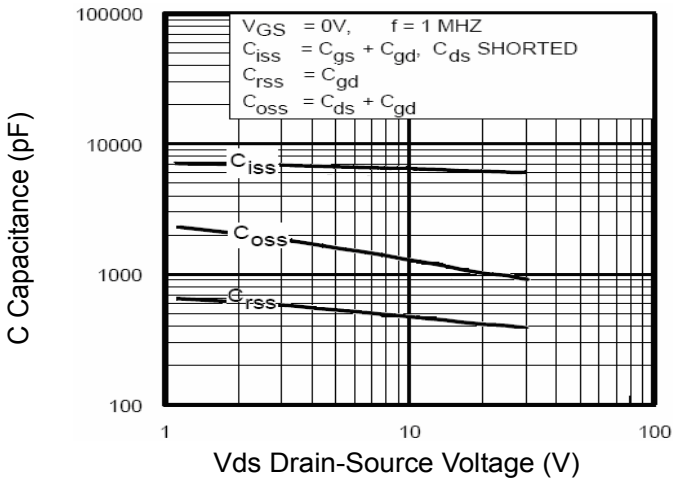


Figure 7 Capacitance vs Vds

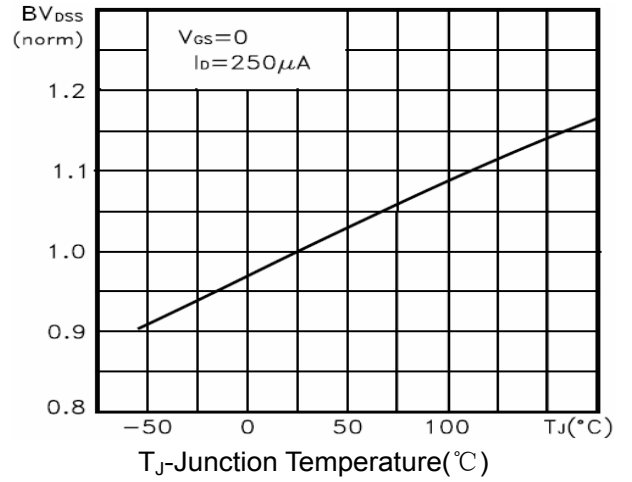


Figure 9  $BV_{DSS}$  vs Junction Temperature

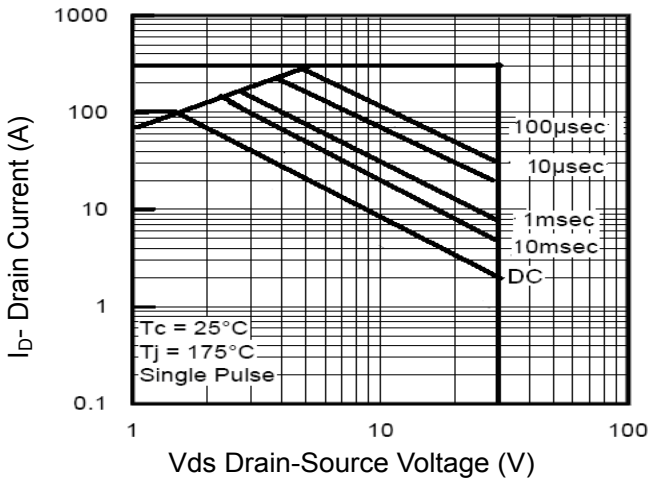


Figure 8 Safe Operation Area

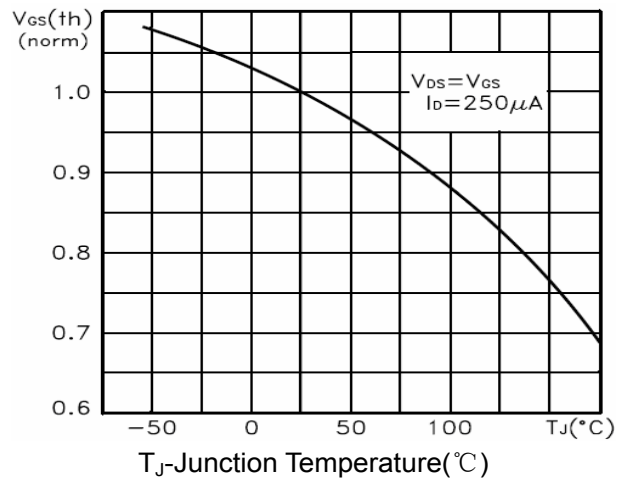


Figure 10  $V_{GS(th)}$  vs Junction Temperature

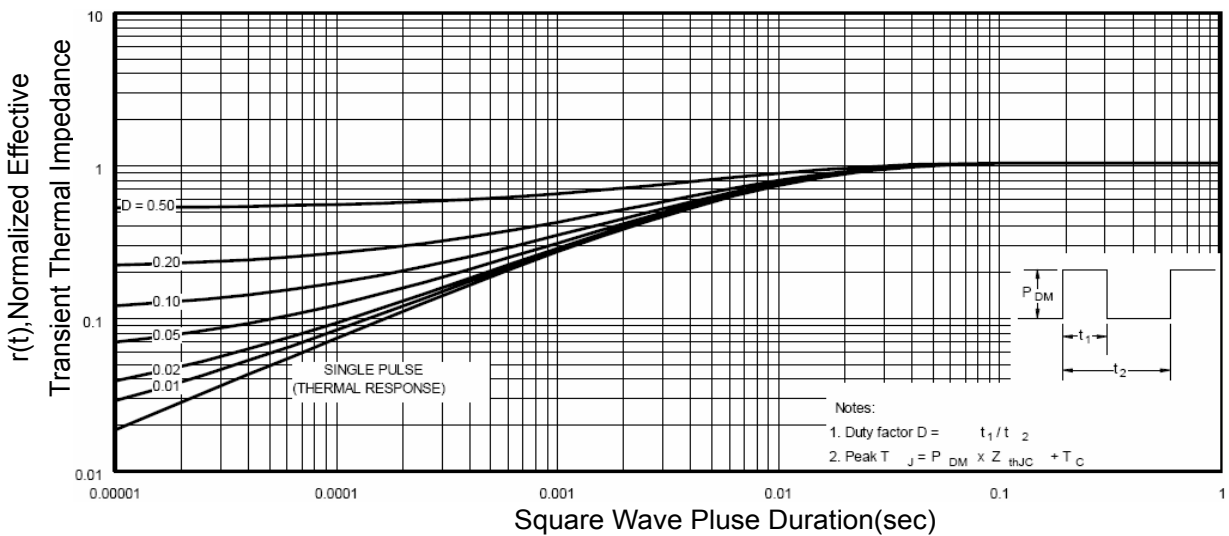
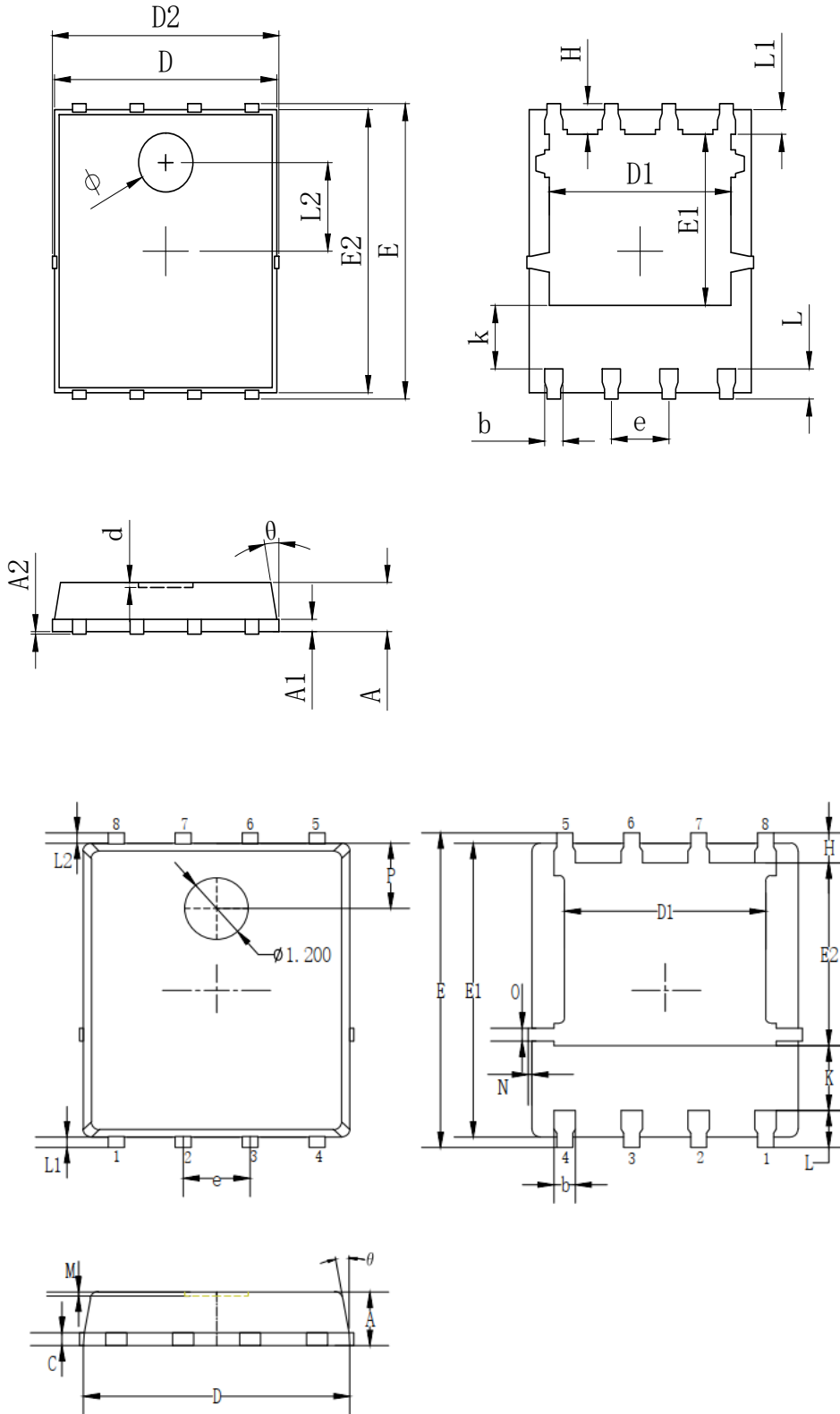


Figure 11 Normalized Maximum Transient Thermal Impedance

**•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 |
| $\theta$ | 8°         | 10°   | 12°   |
| $\phi$   | 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.   |      |      |
| $\theta$ | 8°          | 10°  | 12°  |
| M        | 0.08 REF.   |      |      |
| N        | 0           | -    | 0.15 |
| O        | 0.25 REF.   |      |      |
| P        | 1.28 REF.   |      |      |


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