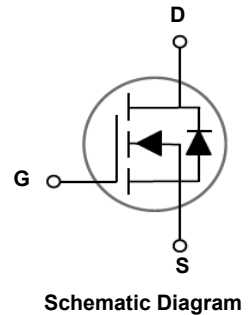
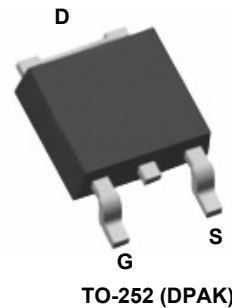


### Main Product Characteristics

|              |               |
|--------------|---------------|
| $V_{DS}$     | 200V          |
| $R_{DS(ON)}$ | 145m $\Omega$ |
| $I_D$        | 18A           |



### Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The GSGD2018 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter  | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Drain-Source Voltage                                 | $V_{DS}$        | 200         | V                         |
| Gate-Source Voltage                                  | $V_{GS}$        | $\pm 20$    | V                         |
| Drain Current-Continuous                             | $I_D$           | 18          | A                         |
| Drain Current-Continuous ( $T_C=100^\circ\text{C}$ ) |                 | 12.7        | A                         |
| Drain Current-Pulsed <sup>1</sup>                    | $I_{DM}$        | 72          | A                         |
| Maximum Power Dissipation                            | $P_D$           | 140         | W                         |
| Derating Factor                                      |                 | 0.93        | W/ $^\circ\text{C}$       |
| Single Pulse Avalanche Energy <sup>5</sup>           | $E_{AS}$        | 80          | mJ                        |
| Thermal Resistance, Junction to Case <sup>2</sup>    | $R_{\theta JC}$ | 1.07        | $^\circ\text{C}/\text{W}$ |
| Storage Temperature Range                            | $T_{STG}$       | -55 To +175 | $^\circ\text{C}$          |
| Operating Junction Temperature Range                 | $T_J$           | -55 To +175 | $^\circ\text{C}$          |

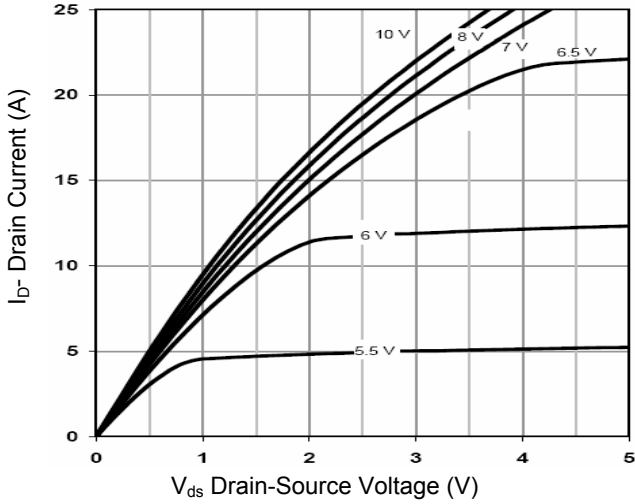
### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise specified)

| Parameter  | Symbol              | Conditions  | Min. | Typ. | Max. | Unit |
|--|---------------------|---|------|------|------|------|
| <b>Off Characteristics</b>                               |                     |   |      |      |      |      |
| Drain-Source Breakdown Voltage                           | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA  | 200  | -    | -    | V    |
| Zero Gate Voltage Drain Current                          | I <sub>DSS</sub>    | V <sub>DS</sub> =200V, V <sub>GS</sub> =0V  | -    | -    | 1    | μA   |
| Gate-Body Leakage Current                                | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V  | -    | -    | ±100 | nA   |
| <b>On Characteristics<sup>3</sup></b>                    |                     |   |      |      |      |      |
| Gate Threshold Voltage                                   | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                              | 2.5  | 3.5  | 4.5  | V    |
| Drain-Source On-State Resistance                         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =18A   | -    | 145  | 155  | mΩ   |
| Forward Transconductance                                 | g <sub>FS</sub>     | V <sub>DS</sub> =5V, I <sub>D</sub> =18A  | 15   | -    | -    | S    |
| <b>Dynamic and Switching Characteristics<sup>4</sup></b> |                     |   |      |      |      |      |
| Input Capacitance  | C <sub>iss</sub>    | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V,<br>F=1MHz                                 | -    | 483  | -    | pF   |
| Output Capacitance                                       | C <sub>oss</sub>    |   | -    | 42   | -    |      |
| Reverse Transfer Capacitance                             | C <sub>rss</sub>    |   | -    | 1    | -    |      |
| Turn-On Delay Time                                       | t <sub>d(on)</sub>  | V <sub>DD</sub> =100V, R <sub>L</sub> =8Ω<br>V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω | -    | 4    | -    | nS   |
| Turn-On Rise Time  | t <sub>r</sub>      |   | -    | 5    | -    |      |
| Turn-Off Delay Time                                      | t <sub>d(off)</sub> |   | -    | 10   | -    |      |
| Turn-Off Fall Time                                       | t <sub>f</sub>      |   | -    | 2    | -    |      |
| Total Gate Charge  | Q <sub>g</sub>      | V <sub>DS</sub> =100V, I <sub>D</sub> =18A,<br>V <sub>GS</sub> =10V                   | -    | 9.2  | -    | nC   |
| Gate-Source Charge                                       | Q <sub>gs</sub>     |   | -    | 3.8  | -    |      |
| Gate-Drain Charge  | Q <sub>gd</sub>     |   | -    | 2.3  | -    |      |
| <b>Drain-Source Diode Characteristics</b>                |                     |   |      |      |      |      |
| Diode Forward Voltage <sup>3</sup>                       | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =18A  | -    | -    | 1.2  | V    |
| Diode Forward Current <sup>2</sup>                       | I <sub>S</sub>      |   | -    | -    | 18   | A    |
| Reverse Recovery Time                                    | t <sub>rr</sub>     | T <sub>J</sub> =25°C, I <sub>F</sub> =18A,<br>di/dt=100A/μs <sup>3</sup>              | -    | 25   | -    | nS   |
| Reverse Recovery Charge                                  | Q <sub>rr</sub>     |   | -    | 110  | -    | nC   |

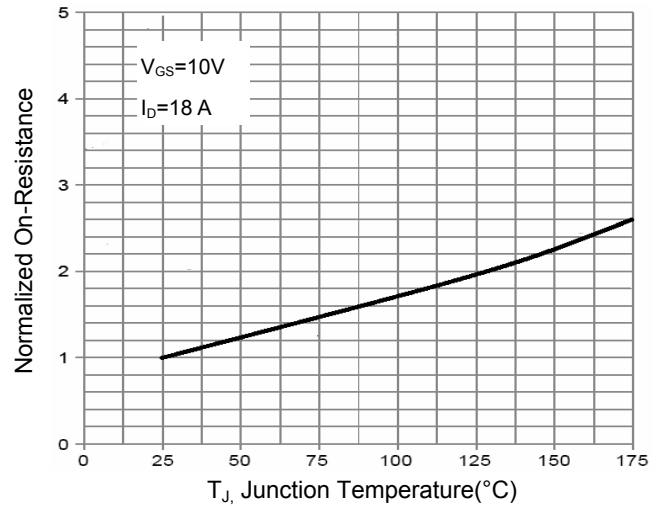
Notes:

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.
5. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω

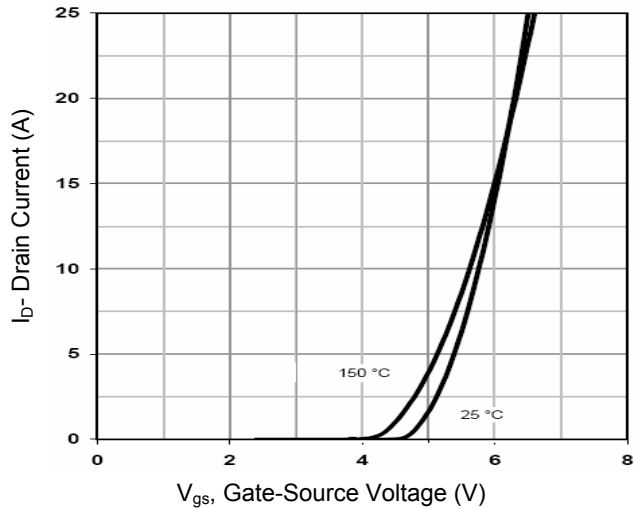
**Typical Electrical and Thermal Characteristic Curves**



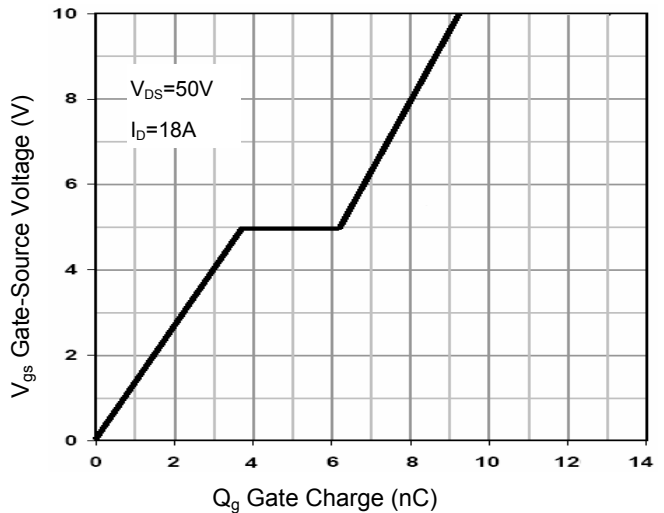
**Figure 1. Output Characteristics**



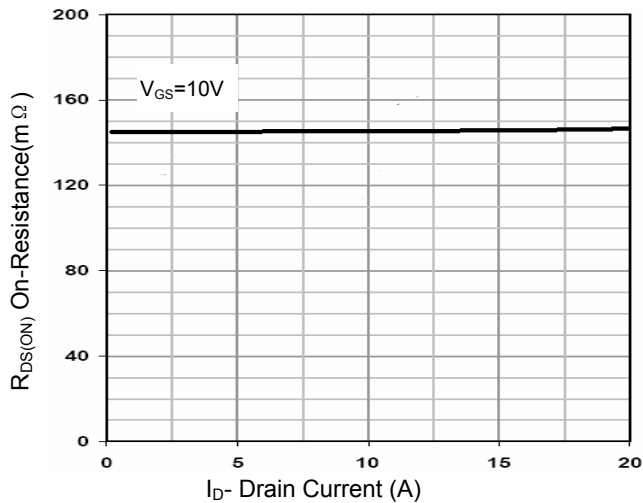
**Figure 2.  $R_{DS(ON)}$ -Junction Temperature**



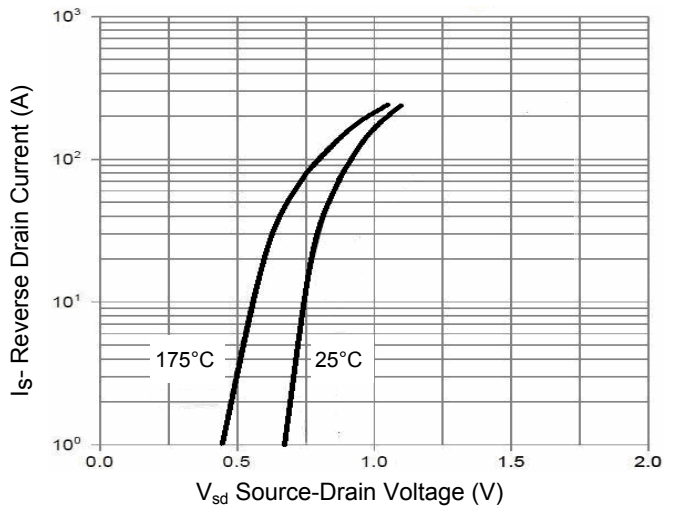
**Figure 3. Transfer Characteristics**



**Figure 4. Gate Charge**

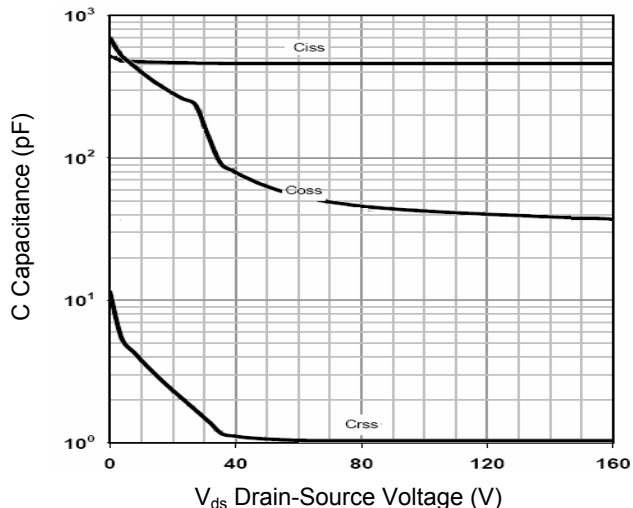


**Figure 5.  $R_{DS(ON)}$ - Drain Current**

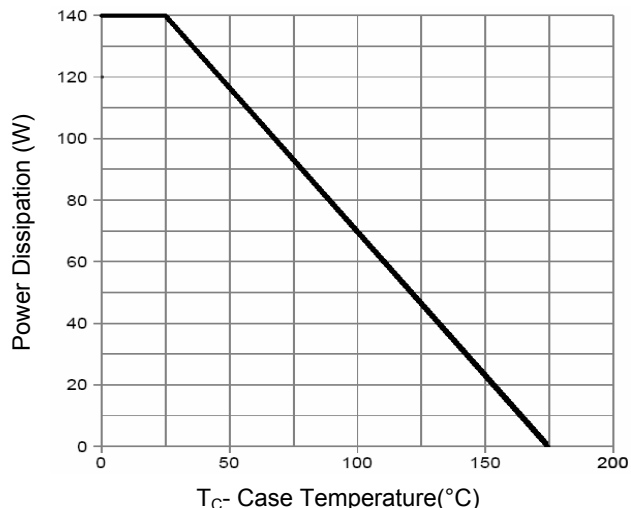


**Figure 6. Source- Drain Diode Forward**

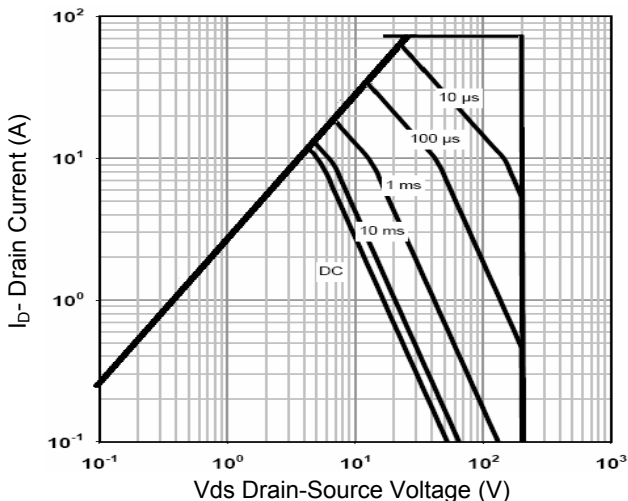
**Typical Electrical and Thermal Characteristic Curves**



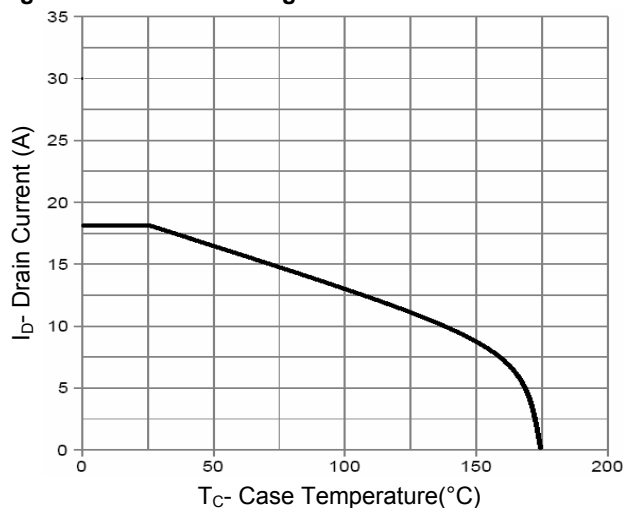
**Figure 7. Capacitance vs Vds**



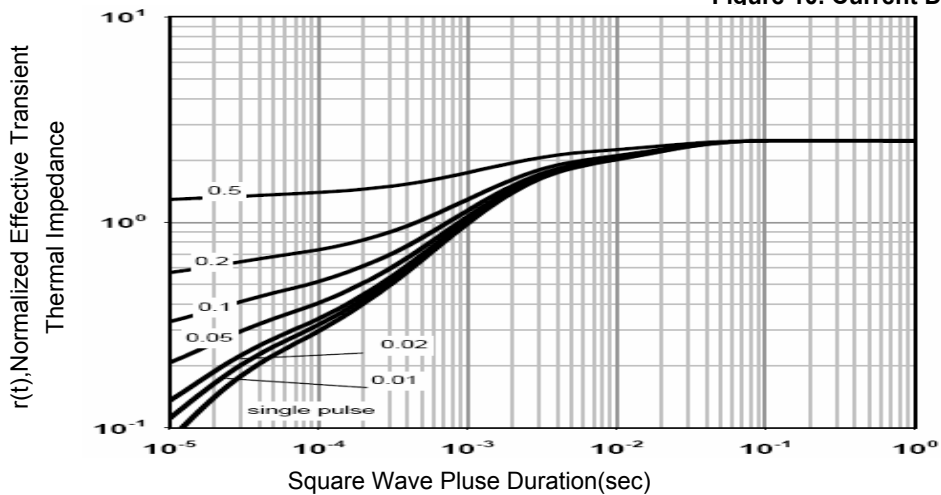
**Figure 8. Power De-Rating**



**Figure 9. Safe Operation Area**

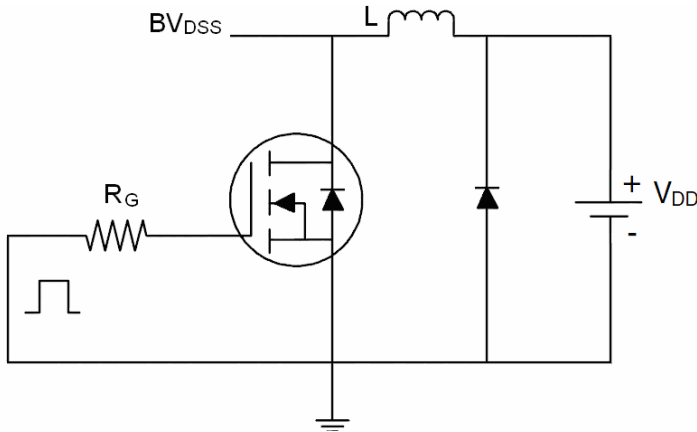


**Figure 10. Current De-Rating**

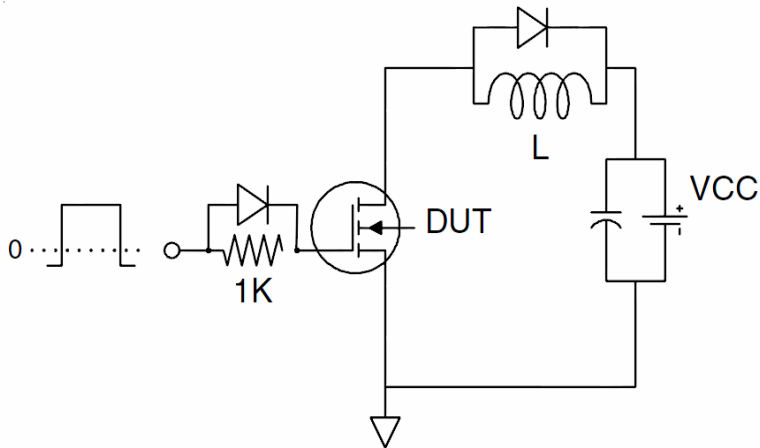


**Figure 11. Normalized Maximum Transient Thermal Impedance**

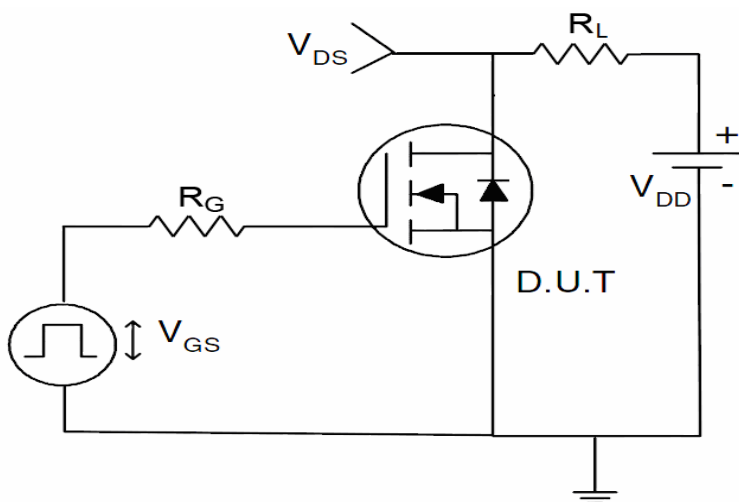
**Typical Electrical and Thermal Characteristic Curves**



**Figure 12. E<sub>AS</sub> Test Circuit**

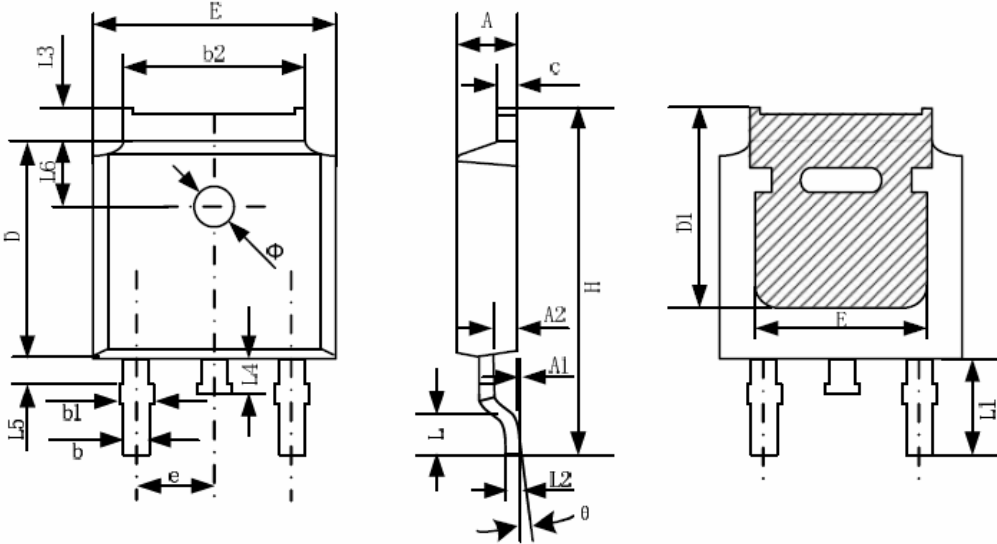


**Figure 13. Gate Charge Test Circuit**



**Figure 14. Switch Time Test Circuit**

**Package Outline Dimensions (TO-252/DPAK)**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 2.20                      | 2.38  | 0.087                | 0.094 |
| A1     | 0.00                      | 0.10  | 0.000                | 0.004 |
| A2     | 0.90                      | 1.10  | 0.035                | 0.043 |
| b      | 0.72                      | 0.85  | 0.028                | 0.033 |
| b1     | 0.72                      | 0.90  | 0.028                | 0.035 |
| b2     | 5.13                      | 5.46  | 0.202                | 0.215 |
| c      | 0.47                      | 0.60  | 0.019                | 0.024 |
| D      | 6.00                      | 6.20  | 0.236                | 0.244 |
| D1     | 5.25                      | --    | 0.207                | --    |
| E      | 6.50                      | 6.70  | 0.256                | 0.264 |
| E1     | 4.70                      | --    | 0.185                | --    |
| e      | 2.19                      | 2.39  | 0.086                | 0.094 |
| H      | 9.80                      | 10.40 | 0.386                | 0.409 |
| L      | 1.40                      | 1.70  | 0.055                | 0.067 |
| L1     | 2.90 REF                  |       | 0.114 REF            |       |
| L2     | 0.508 BSC                 |       | 0.020 BSC            |       |
| L3     | 0.90                      | 1.25  | 0.035                | 0.049 |
| L4     | 0.60                      | 1.00  | 0.024                | 0.039 |
| L5     | 0.15                      | 0.75  | 0.006                | 0.030 |
| L6     | 1.80 REF                  |       | 0.071 REF            |       |
| Φ      | 1.20                      | 1.40  | 0.047                | 0.055 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |