



## 85V/160A N-Channel Power MOSFET

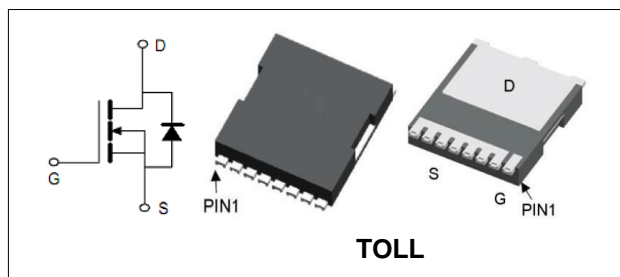
### Features

- New technology for high voltage device.
- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested

|               |     |    |
|---------------|-----|----|
| BVDSS         | 85  | V  |
| ID            | 160 | A  |
| RDSON@VGS=10V | 2.3 | mΩ |

### Applications

- DC/DC Converter
- Motor control and drives
- Battery management



### Order Information

| Product   | Package | Marking   | Reel Size | Reel    | Carton   |
|-----------|---------|-----------|-----------|---------|----------|
| PGT08N028 | TOLL    | PGT08N028 | 13inch    | 1500PCS | 12000PCS |

### Absolute Maximum Ratings

| Symbol   | Parameter   | Rating     | Unit |   |
|--|---|------------|------|---|
| <b>Common Ratings (TC=25°C Unless Otherwise Noted)</b> |   |            |      |   |
| $V_{(BR)DSS}$  | Drain-Source Breakdown Voltage                      | 85         | V    |   |
| $V_{GS}$   | Gate-Source Voltage                                 | ±20        | V    |   |
| $T_J$  | Maximum Junction Temperature                        | 150        | °C   |   |
| $T_{STG}$  | Storage Temperature Range                           | -55 to 150 | °C   |   |
| $I_S$  | Diode Continuous Forward Current                    | TC =25°C   | 160  | A |
| <b>Mounted on Large Heat Sink</b>                      |   |            |      |   |
| $E_{AS}$   | Single Pulse Avalanche Energy (Note1)               | 466        | mJ   |   |
| $I_{DM}$   | Pulse Drain Current Tested (Sillicon Limit) (Note2) | TC =25°C   | 640  | A |
| $I_D$  | Continuous Drain current                            | TC =25°C   | 160  | A |
| $P_D$  | Maximum Power Dissipation                           | TC =25°C   | 250  | W |
| $R_{θjc}$  | Thermal Resistance Junction-to-Case (Note3)         | 0.5        | °C/W |   |



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| Symbol   | Parameter                                | Condition                     | Min. | Typ. | Max. | Unit |
|--|--|-------------------------------|------|------|------|------|
| <b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>          |  |                               |      |      |      |      |
| V <sub>(BR)DSS</sub>   | Drain- Source Breakdown Voltage          | VGS=0V ID=250μA               | 85   | --   | --   | V    |
| I <sub>DSS</sub>   | Zero Gate Voltage Drain current          | VDS=85V,VGS=0V                | --   | --   | 1    | μA   |
| I <sub>GSS</sub>   | Gate-Body Leakage Current                | VGS=±20V,VDS=0V               | --   | --   | ±100 | nA   |
| V <sub>GS(TH)</sub>  | Gate Threshold Voltage                   | VDS=VGS,ID=250μA              | 2    | 3    | 4    | V    |
| R <sub>DS(ON)</sub>  | Drain-Source On-State Resistance (Note4) | VGS=10V, ID=80A               | --   | 2.3  | 2.8  | mΩ   |
| <b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated) (Note5)</b> |  |                               |      |      |      |      |
| C <sub>iss</sub>   | Input Capacitance                        | VDS=40V,                      | --   | 7900 | --   | pF   |
| C <sub>oss</sub>   | Output Capacitance                       | VGS=0V,                       | --   | 1450 | --   | pF   |
| C <sub>rss</sub>   | Reverse Transfer Capacitance             | F=1MHz                        | --   | 335  | --   | pF   |
| Q <sub>g</sub>   | Total Gate Charge                        | VDS=40V,                      | --   | 120  | --   | nC   |
| Q <sub>gs</sub>  | Gate-Source Charge                       | ID=80A,                       | --   | 48   | --   | nC   |
| Q <sub>gd</sub>  | Gate-Drain Charge                        | VGS=10V                       | --   | 35   | --   | nC   |
| <b>Switching Characteristics (Note5)</b>   |  |                               |      |      |      |      |
| t <sub>d(on)</sub>   | Turn-on Delay Time                       | VDD=40V,<br>RL=3Ω,<br>VGS=10V | --   | 37   | --   | nS   |
| t <sub>r</sub>   | Turn-on Rise Time                        |                               | --   | 45   | --   | nS   |
| t <sub>d(off)</sub>  | Turn-off Delay Time                      |                               | --   | 85   | --   | nS   |
| t <sub>f</sub>   | Turn-off Fall Time                       |                               | --   | 49   | --   | nS   |
| R <sub>G</sub>   | Gate resistance                          | F=1MHz                        | --   | 1.6  | --   | Ω    |
| <b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>        |  |                               |      |      |      |      |
| V <sub>SD</sub>  | Forward on voltage                       | IS=80A,VGS=0V                 | --   | --   | 1.2  | V    |
| t <sub>rr</sub>  | Reverse Recovery Time                    | IF=30A,<br>di/dt=100A/μs      | --   | 100  | --   | nS   |
| Q <sub>rr</sub>  | Reverse Recovery Charge                  |                               | --   | 323  | --   | nC   |

Note:

- Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25° C, R<sub>G</sub> = 25Ω, V<sub>D</sub> =42.5V, VGS =10V. Part not recommended for use above this value.
- Repetitive Rating: Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.



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Typical Characteristics

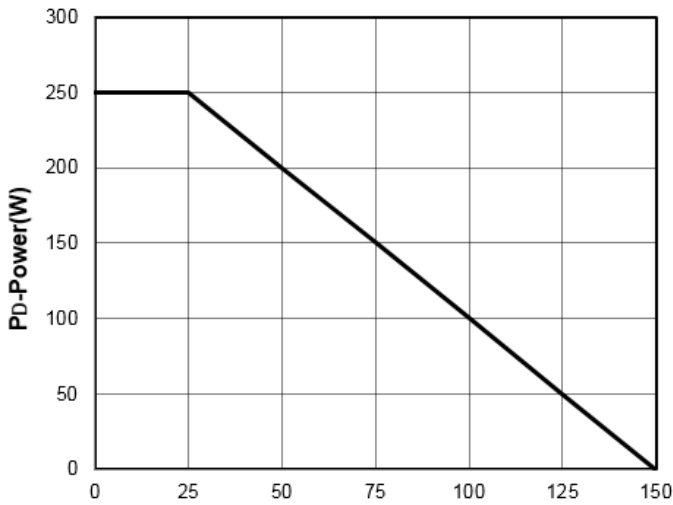


Figure1: T<sub>J</sub>- Junction Temperature (°C)

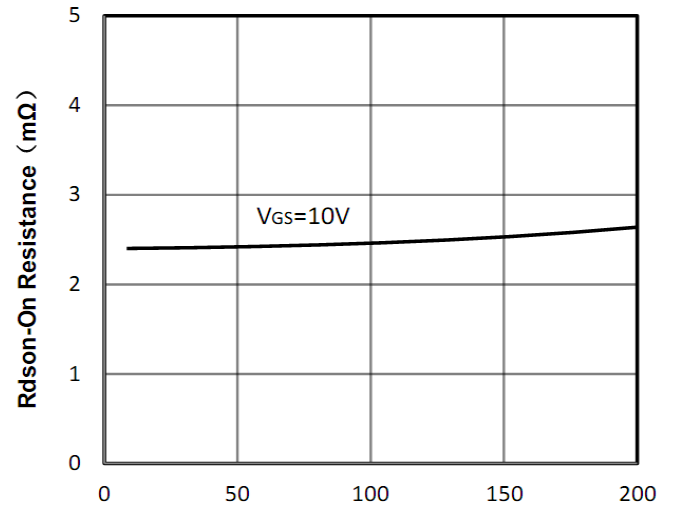


Figure2: I<sub>D</sub>- Drain Current (A)

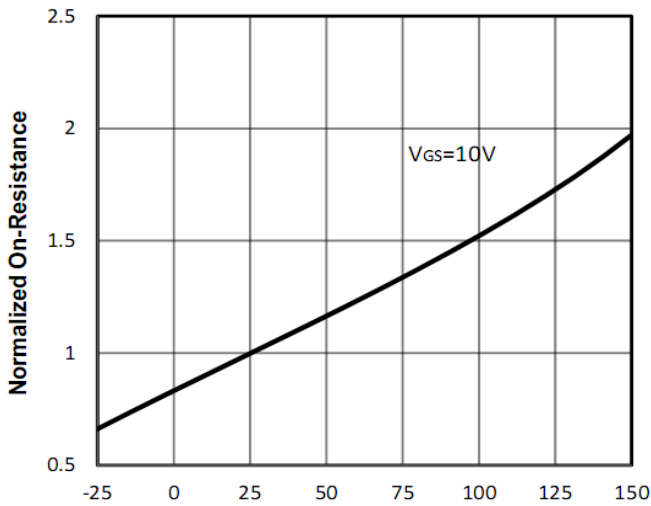


Figure3: T<sub>J</sub>- Junction Temperature (°C)

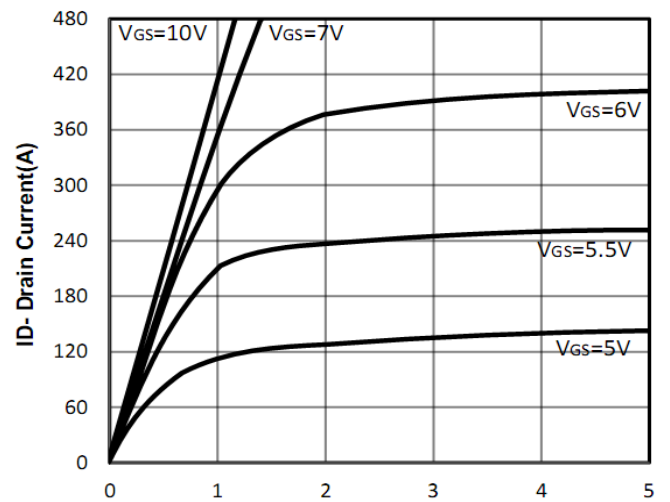


Figure4: V<sub>DS</sub>- Drain-Source Voltage (V)

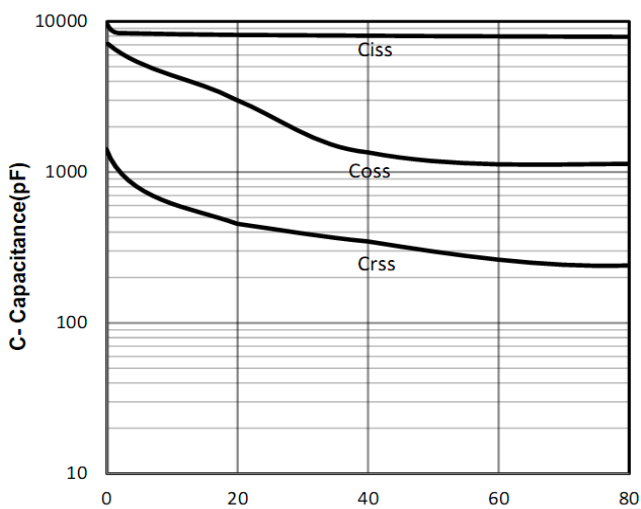


Figure5: V<sub>DS</sub>- Drain -Source Voltage (V)

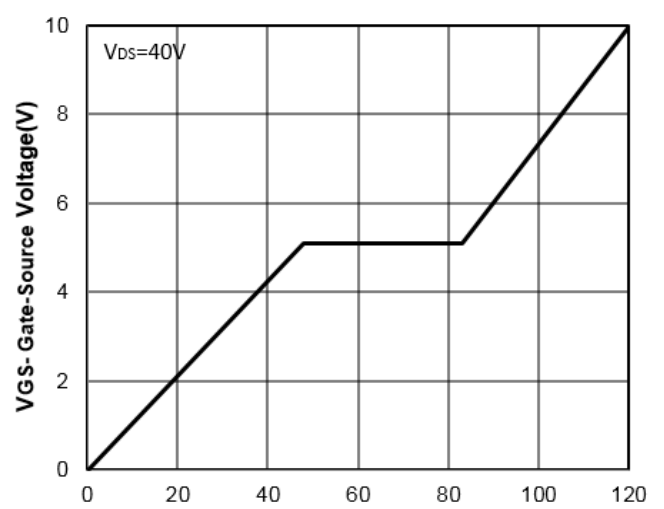


Figure6: Q<sub>G</sub>- Gate Charge (nC)



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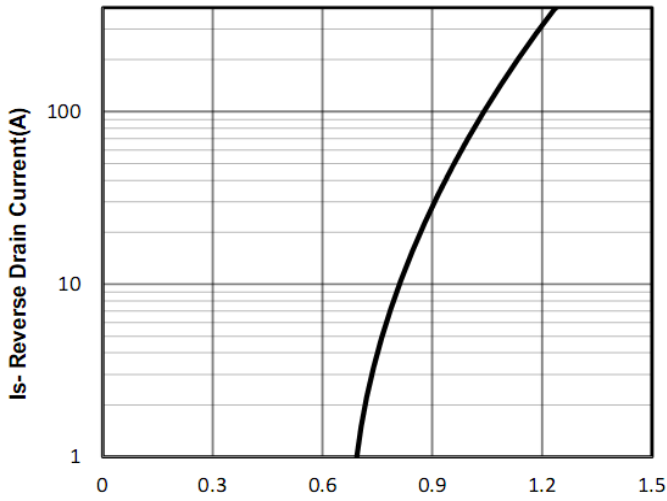


Figure7: Vsd- Source-Drain Voltage (V)

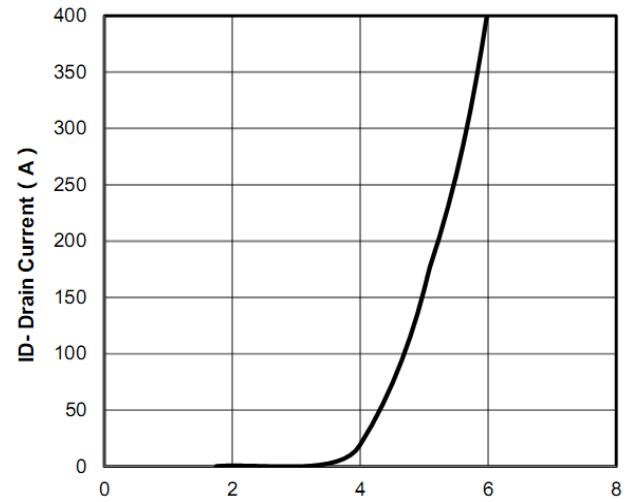


Figure8: Vgs- Gate-Source Voltage (V)

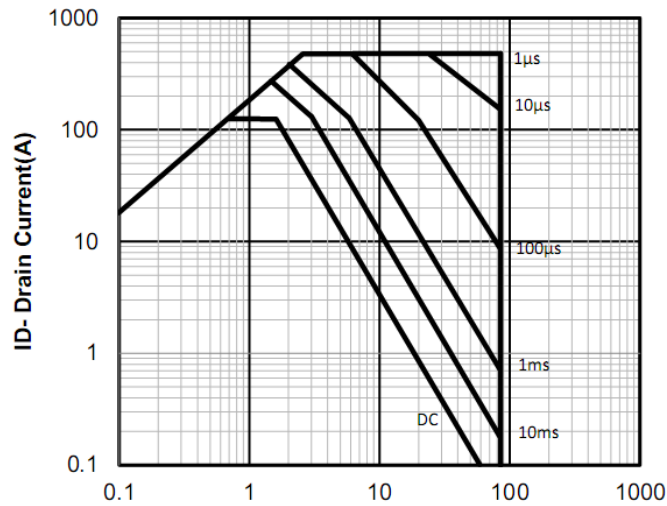


Figure9: Vds- Drain-Source Voltage (V)

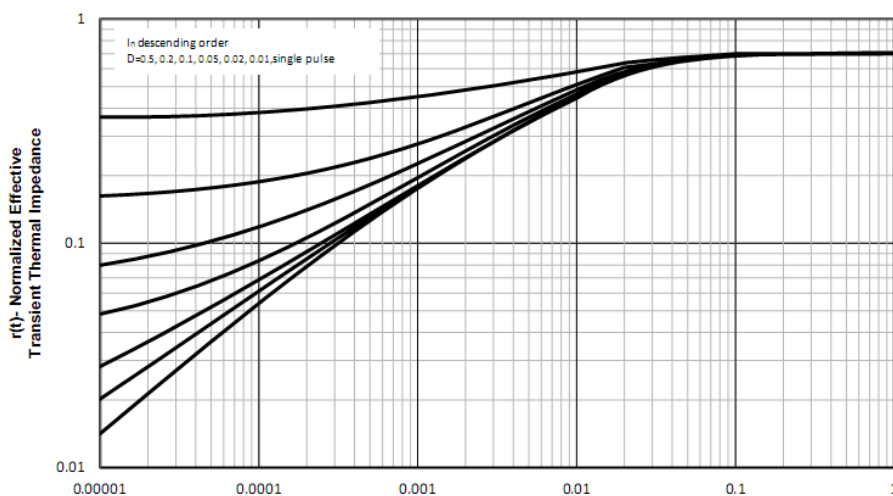


Figure10: Square Wave Pulse Duration (sec)

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### Test Circuit and Waveform:

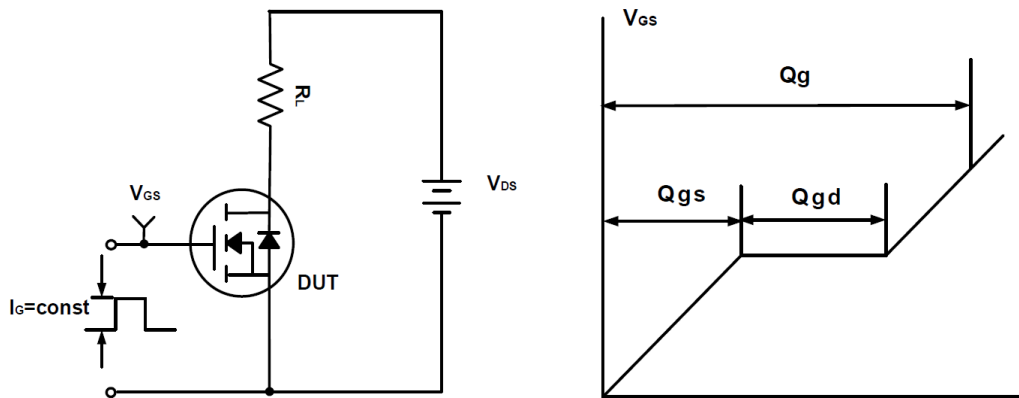


Figure A Gate Charge Test Circuit & Waveforms

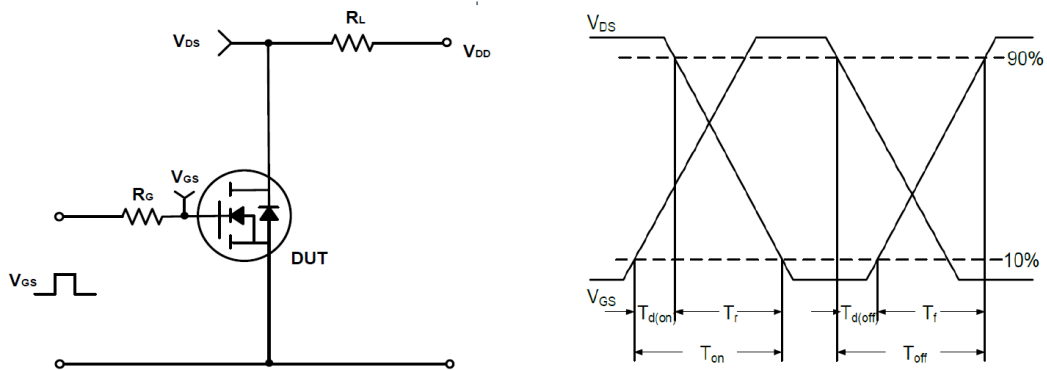


Figure B Switching Test Circuit & Waveforms

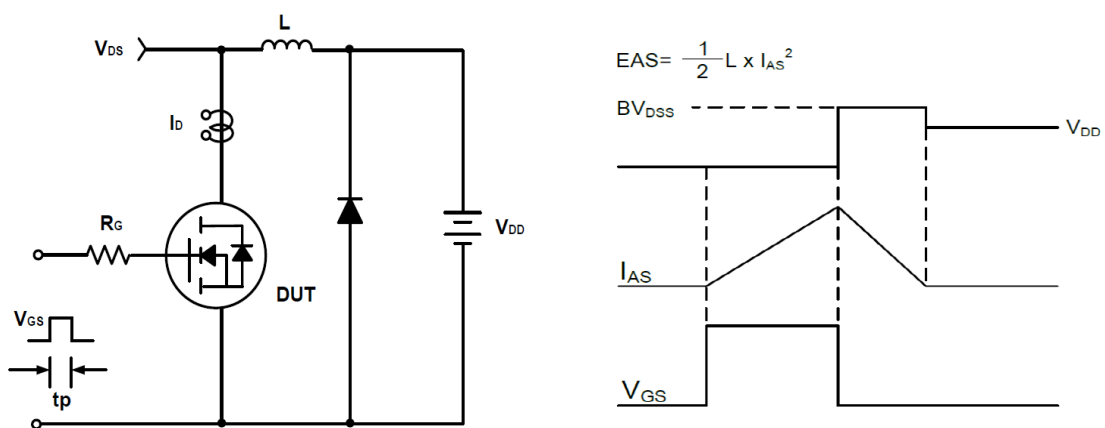
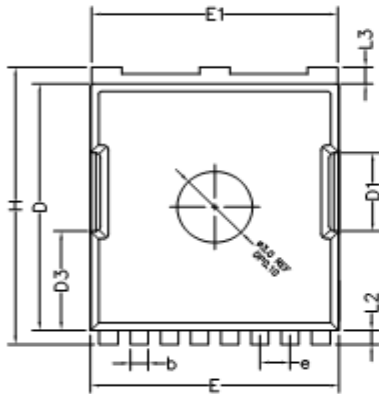


Figure C Unclamped Inductive Switching Circuit & Waveforms

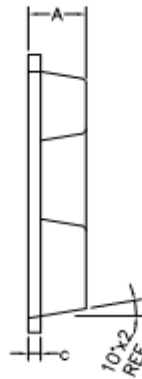


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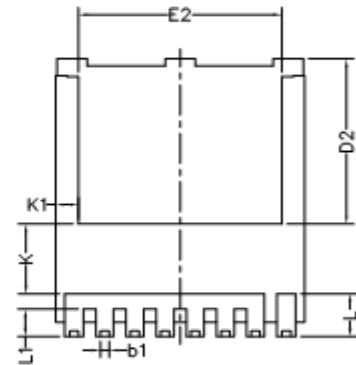
TOLL Package Outline Dimensions (Units: mm)



TOP VIEW



SIDE VIEW



BOTTEM VIEW



SIDE VIEW

| COMMON DIMENSIONS<br>(UNITS OF MEASURE IS mm) |            |        |        |
|---|------------|--------|--------|
|   | MIN        | NORMAL | MAX    |
| A   | 2.200      | 2.300  | 2.400  |
| b   | 0.600      | 0.700  | 0.900  |
| b1  | 0.300      | —      | 0.500  |
| c   | 0.400      | 0.500  | 0.600  |
| D   | 10.280     | 10.380 | 10.480 |
| D1  | 3.200      | 3.300  | 3.400  |
| D2  | 6.850      | 6.950  | 7.050  |
| D3  | 4.18REF    |        |        |
| E   | 9.800      | 9.900  | 10.000 |
| E1  | 9.700      | 9.800  | 9.900  |
| E2  | 8.000      | 8.100  | 8.200  |
| e   | 1.200BSC   |        |        |
| H   | 11.480     | 11.680 | 11.880 |
| L   | 1.600      | 1.800  | 2.100  |
| L1  | 1.000      | 1.150  | 1.300  |
| L2  | 0.600 TYPE |        |        |
| L3  | 0.600 TYPE |        |        |
| K   | 2.900 TYPE |        |        |
| K1  | 0.900 TYPE |        |        |