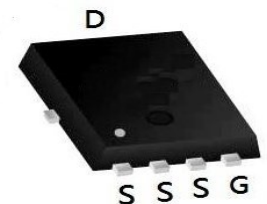


### Product Summary

| BVDSS | RDS(on) | ID  |
|-------|---------|-----|
| 40V   | 5.5mΩ   | 65A |



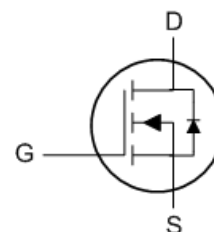
### Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(on)}$

PDFN5060-8L

### Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications



### Absolute Maximum Ratings

| Symbol                          | Parameter                                  | Rating     | Units            |
|---------------------------------|--------------------------------------------|------------|------------------|
| $V_{DS}$                        | Drain-Source Voltage                       | 40         | V                |
| $V_{GS}$                        | Gate-Source Voltage                        | $\pm 20$   | V                |
| $I_D @ T_C = 25^\circ\text{C}$  | Continuous Drain Current <sup>1</sup>      | 65         | A                |
| $I_D @ T_C = 100^\circ\text{C}$ | Continuous Drain Current <sup>1</sup>      | 35         | A                |
| $I_{DM}$                        | Pulsed Drain Current <sup>2</sup>          | 130        | A                |
| EAS                             | Single Pulse Avalanche Energy <sup>3</sup> | 48         | mJ               |
| $I_{AS}$                        | Avalanche Current                          | 35         | A                |
| $P_D @ T_C = 25^\circ\text{C}$  | Total Power Dissipation <sup>4</sup>       | 39         | W                |
| $T_{STG}$                       | Storage Temperature Range                  | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                           | Operating Junction Temperature Range       | -55 to 150 | $^\circ\text{C}$ |

### Thermal Data

| Symbol          | Parameter                                                       | Typ. | Max. | Unit               |
|-----------------|-----------------------------------------------------------------|------|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient (Steady State) <sup>1</sup> | ---  | 60   | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>                   | ---  | 3.2  | $^\circ\text{C/W}$ |

**Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**

| Symbol       | Parameter                                      | Conditions                                                | Min. | Typ. | Max.      | Unit      |
|--------------|------------------------------------------------|-----------------------------------------------------------|------|------|-----------|-----------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                 | $V_{GS}=0V$ , $I_D=250\mu A$                              | 40   | ---  | ---       | V         |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=10V$ , $I_D=12A$                                  | ---  | 5.5  | 7.5       | $m\Omega$ |
|              |                                                | $V_{GS}=4.5V$ , $I_D=10A$                                 | ---  | 8    | 13        |           |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}$ , $I_D=250\mu A$                          | 1.35 | ---  | 3         | V         |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=32V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$       | ---  | ---  | 1         | $\mu A$   |
|              |                                                | $V_{DS}=32V$ , $V_{GS}=0V$ , $T_J=55^\circ\text{C}$       | ---  | ---  | 5         |           |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 20V$ , $V_{DS}=0V$                            | ---  | ---  | $\pm 100$ | nA        |
| $R_g$        | Gate Resistance                                | $V_{DS}=0V$ , $V_{GS}=0V$ , $f=1\text{MHz}$               | ---  | 1.7  | ---       | $\Omega$  |
| $Q_g$        | Total Gate Charge (4.5V)                       | $V_{DS}=20V$ , $V_{GS}=4.5V$ , $I_D=12A$                  | ---  | 28   | ---       | nC        |
| $Q_{gs}$     | Gate-Source Charge                             |                                                           | ---  | 4    | ---       |           |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                           | ---  | 6    | ---       |           |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=15V$ , $V_{GS}=10V$ , $R_G=3.3\Omega$<br>$I_D=1A$ | ---  | 14.3 | ---       | ns        |
| $T_r$        | Rise Time                                      |                                                           | ---  | 5.6  | ---       |           |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                           | ---  | 20   | ---       |           |
| $T_f$        | Fall Time                                      |                                                           | ---  | 11   | ---       |           |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=15V$ , $V_{GS}=0V$ , $f=1\text{MHz}$              | ---  | 1048 | ---       | pF        |
| $C_{oss}$    | Output Capacitance                             |                                                           | ---  | 187  | ---       |           |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                           | ---  | 178  | ---       |           |

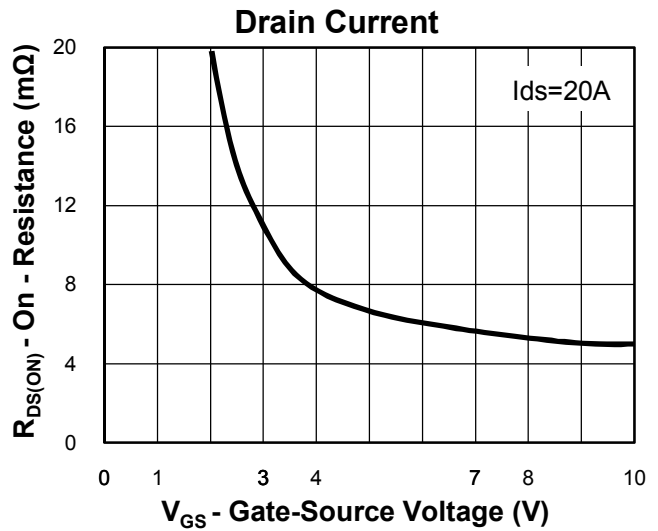
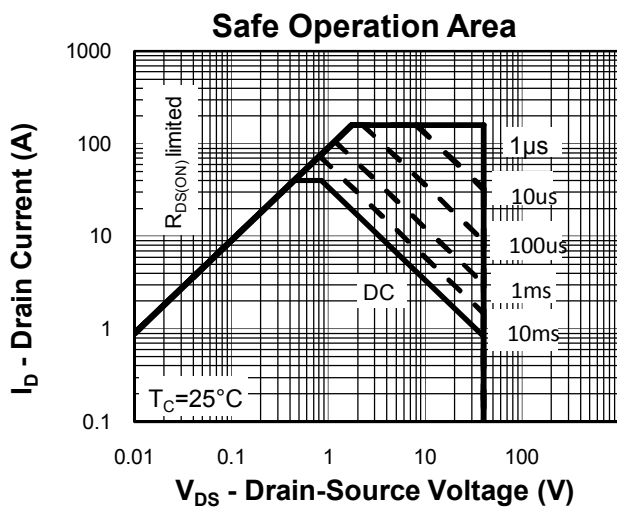
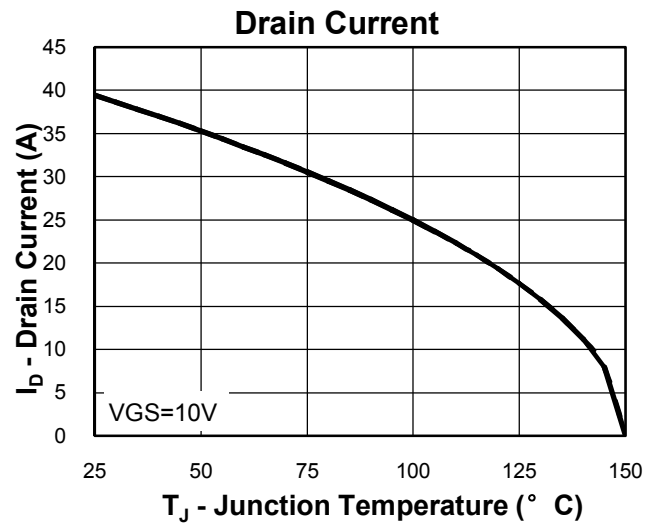
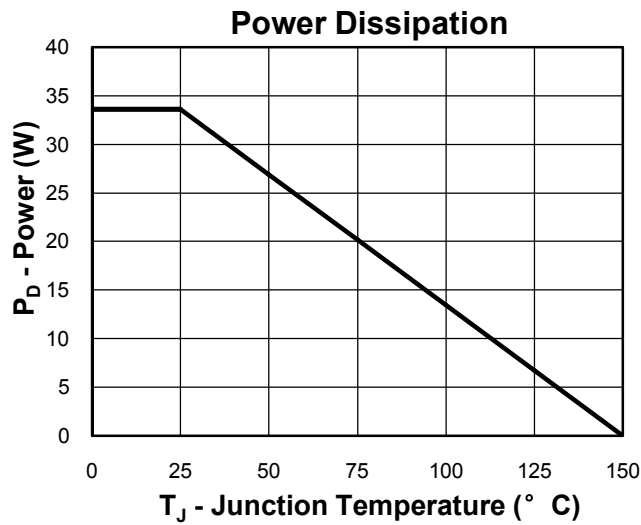
**Diode Characteristics**

| Symbol   | Parameter                                | Conditions                                      | Min. | Typ. | Max. | Unit |
|----------|------------------------------------------|-------------------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current <sup>1,5</sup> | $V_G=V_D=0V$ , Force Current                    | ---  | ---  | 65   | A    |
| $V_{SD}$ | Diode Forward Voltage <sup>2</sup>       | $V_{GS}=0V$ , $I_S=1A$ , $T_J=25^\circ\text{C}$ | ---  | ---  | 1    | V    |

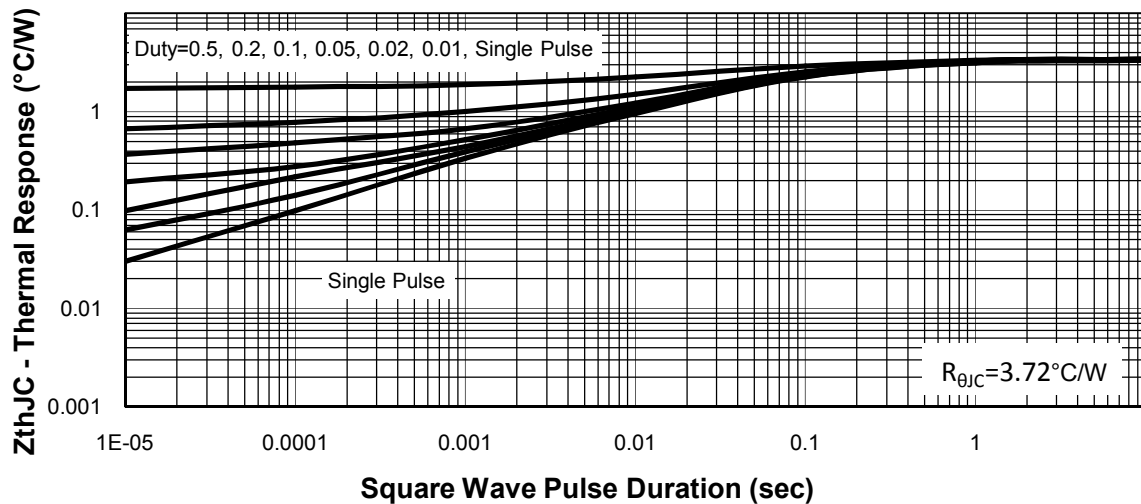
Note :

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1mH$ ,  $I_{AS}=31A$
4. The power dissipation is limited by  $150^\circ\text{C}$  junction temperature
5. The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

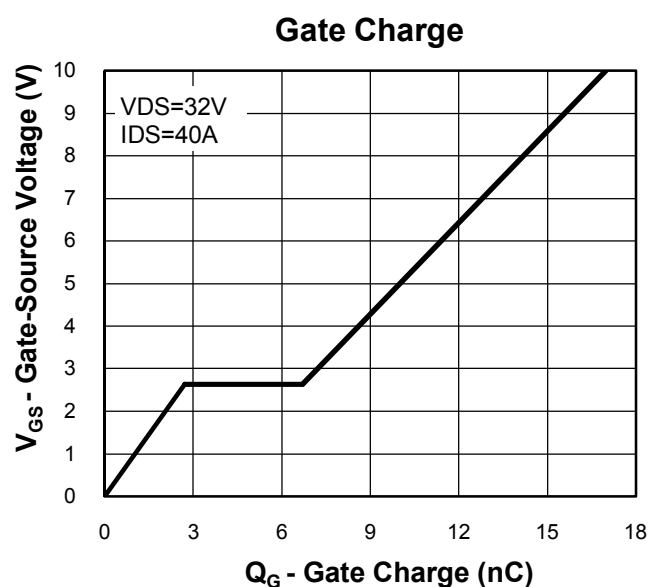
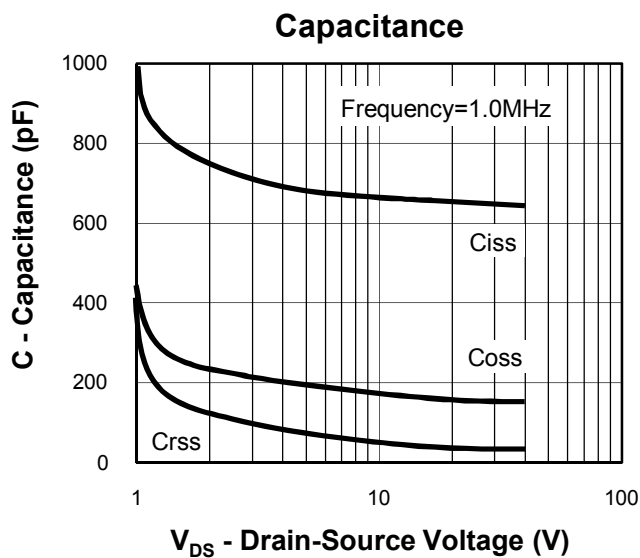
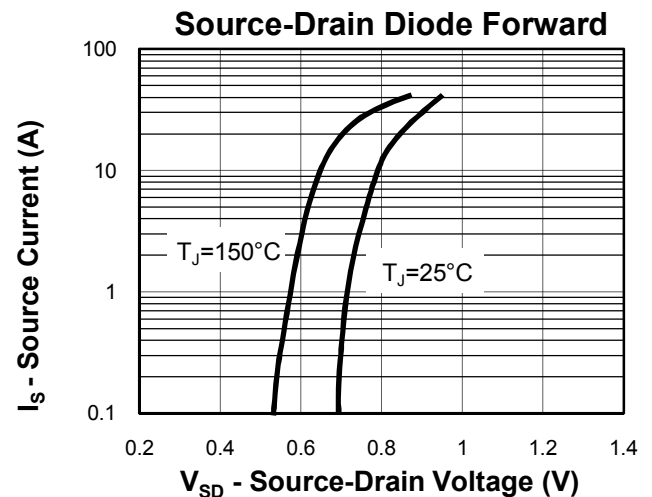
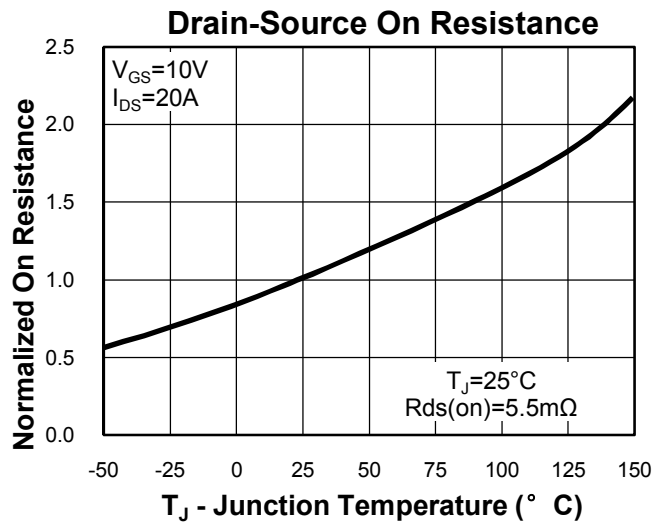
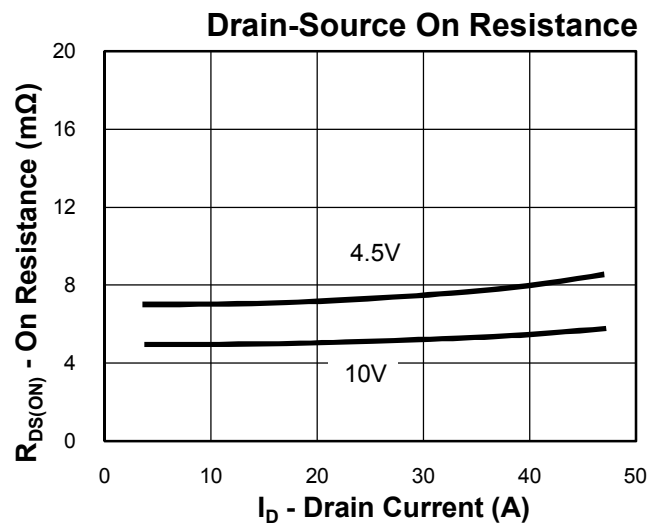
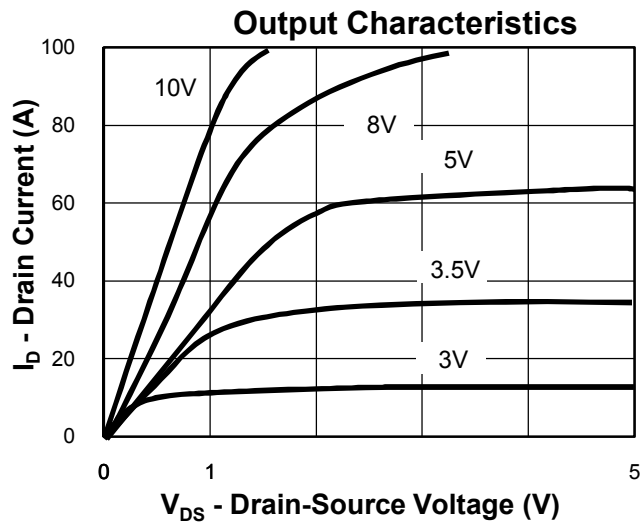
## Typical Characteristics



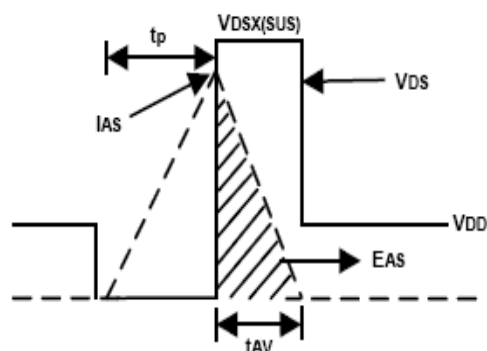
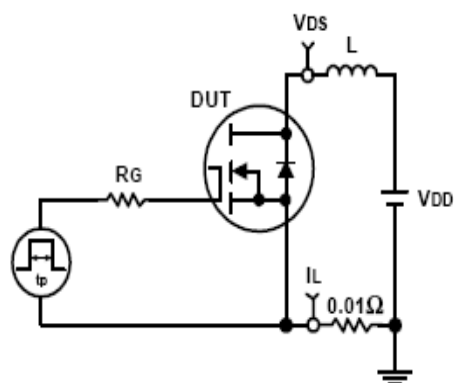
## Thermal Transient Impedance



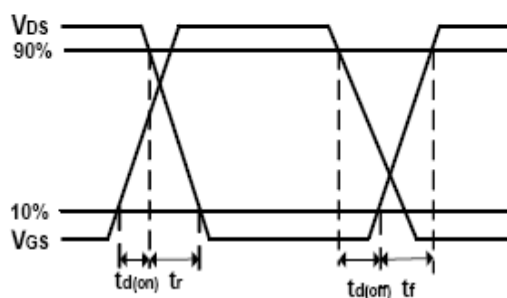
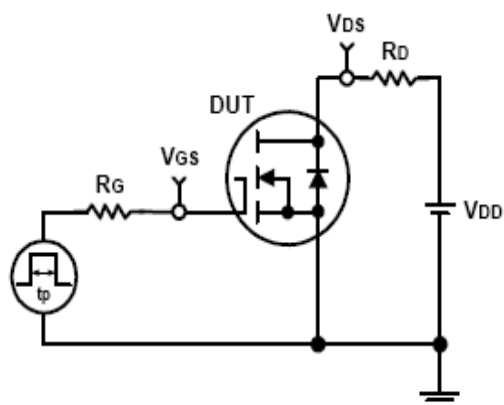
## Typical Characteristics

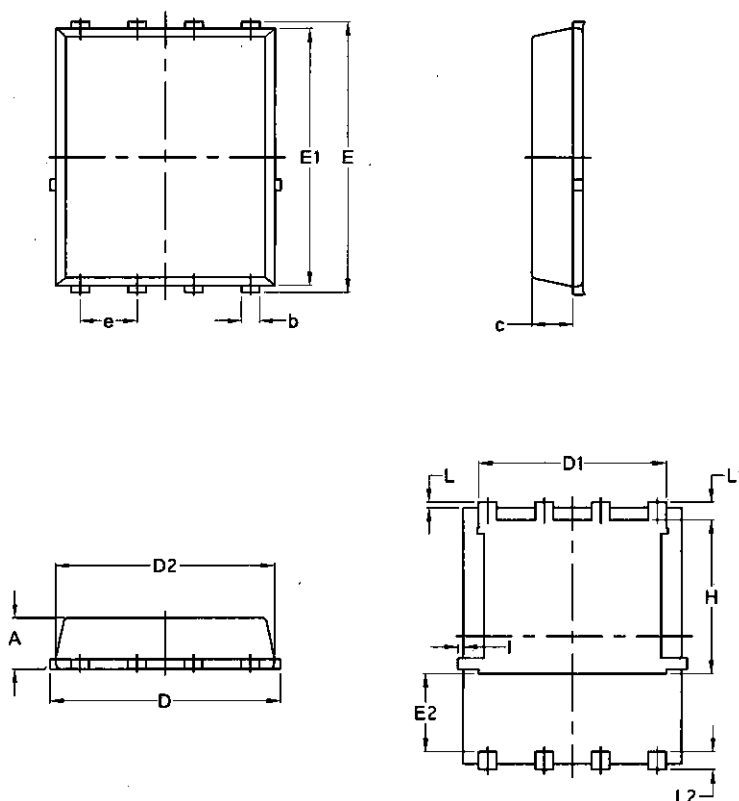


## Avalanche Test Circuit and Waveforms



## Switching Time Test Circuit and Waveforms



**Package Mechanical Data-PDFN5060-8L- Single**


| Symbol | Common   |        |          |        |
|--------|----------|--------|----------|--------|
|        | mm       |        | Inch     |        |
|        | Mim      | Max    | Min      | Max    |
| A      | 1.03     | 1.17   | 0.0406   | 0.0461 |
| b      | 0.34     | 0.48   | 0.0134   | 0.0189 |
| c      | 0.824    | 0.0970 | 0.0324   | 0.082  |
| D      | 4.80     | 5.40   | 0.1890   | 0.2126 |
| D1     | 4.11     | 4.31   | 0.1618   | 0.1697 |
| D2     | 4.80     | 5.00   | 0.1890   | 0.1969 |
| E      | 5.95     | 6.15   | 0.2343   | 0.2421 |
| E1     | 5.65     | 5.85   | 0.2224   | 0.2303 |
| E2     | 1.60     | /      | 0.0630   | /      |
| e      | 1.27 BSC |        | 0.05 BSC |        |
| L      | 0.05     | 0.25   | 0.0020   | 0.0098 |
| L1     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| L2     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| H      | 3.30     | 3.50   | 0.1299   | 0.1378 |
| I      | /        | 0.18   | /        | 0.0070 |