

Description

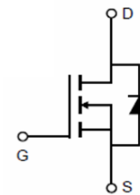
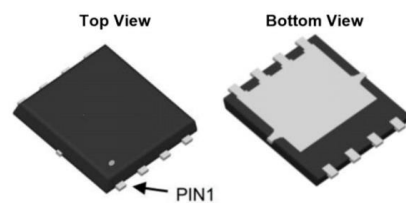
This Power MOSFET is produced using advanced TRENCH technology.

This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- $V_{DS}=30V$, $I_D=90A$
- $R_{DS(ON) TYP} = 4.2m\Omega @ V_{GS} = 10V$
- $R_{DS(ON) TYP} = 5.6m\Omega @ V_{GS} = 4.5V$
- Very Low On-resistance $R_{DS(ON)}$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

PDFN5*6-8L



Schematic diagram

Applications

- PWM Application
- Load Switch
- Power Management

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Package Marking and Ordering Information

| Device | Marking | Package | Packing | Reel (pcs) |
|----------|---------|---------|---------|------------|
| SL90N03R | | PDFN5*6 | Reel | 5000 |

Absolute Maximum Ratings

| Parameter | | Symbol | Value | Unit |
|---|-------------------------|----------------|------------|------------------|
| Drain-source Voltage | | V_{DS} | 30 | V |
| Gate-source Voltage | | V_{GS} | ± 20 | V |
| Continuous Drain Current | $T_C=25^\circ\text{C}$ | I_D | 90 | A |
| | $T_C=100^\circ\text{C}$ | | 58 | |
| Pulsed Drain Current($T_C=25^\circ\text{C}$, T_p Limited By T_{jmax}) ^(note1) | | I_{DM} | 360 | A |
| Maximum Power Dissipation($T_C=25^\circ\text{C}$) | | P_D | 90 | W |
| Avalanche energy , single Pulse($L=0.5\text{mH}$) ^(note2) | | E_{AS} | 90 | mJ |
| Operating Junction And Storage Temperature | | T_j, T_{stg} | -55 To 150 | $^\circ\text{C}$ |
| Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds | | T_L | 300 | $^\circ\text{C}$ |

Thermal Resistance

| Parameter | Symbol | Max | Unit |
|------------------|-----------------|------|--------------------|
| Junction-to-Case | $R_{\theta JC}$ | 1.67 | $^\circ\text{C/W}$ |

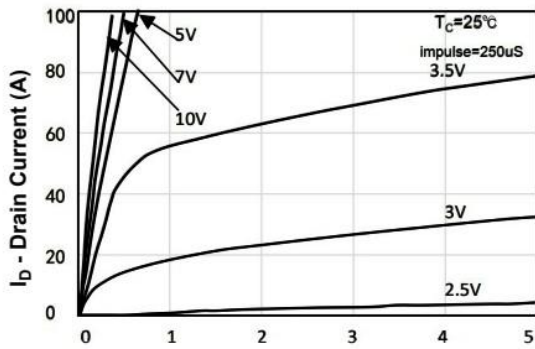
Note:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^\circ\text{C}$, $V_{DD} = 15\text{V}$, $V_G = 10\text{V}$, $R_G = 25\Omega$, $L = 0.5\text{mH}$, $I_{AS} = 19\text{A}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

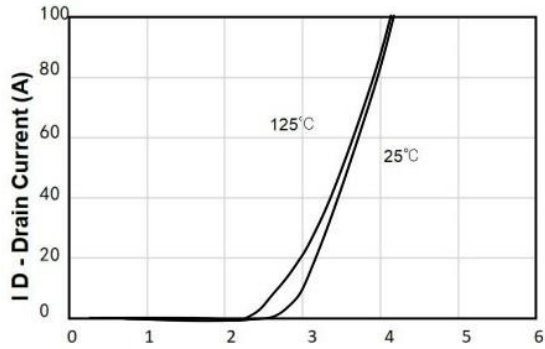
Electrical Characteristic (TC=25°C unless otherwise noted)

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|--------------|-------|------|-----------|------------|---|
| | | Min. | Typ. | Max. | | |
| Off Characteristic | | | | | | |
| Drain-source breakdown voltage | V_{DSS} | 30 | - | - | V | $V_{GS}=0V, I_D=250\mu A$ |
| Zero gate voltage drain current | I_{DSS} | - | - | 1 | μA | $V_{DS}=30V, V_{GS}=0V$ |
| | | - | - | 10 | μA | $V_{DS}=24V, TC=125^\circ C$ |
| Gate-source leakage current | I_{GSS} | - | - | ± 100 | nA | $V_{GS}=\pm 20V, V_{DS}=0V$ |
| On Characteristics | | | | | | |
| Gate threshold voltage | $V_{GS(th)}$ | 1.0 | 1.5 | 2.5 | V | $V_{DS}=V_{GS}, I_D=250\mu A$ |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 4.2 | 5.5 | m Ω | $V_{GS}=10V, I_D=30A$ |
| | | - | 5.6 | 7.3 | m Ω | $V_{GS}=4.5V, I_D=30A$ |
| Dynamic Characteristic | | | | | | |
| Input Capacitance | C_{iss} | - | 1950 | - | PF | $V_{GS}=0V, V_{DS}=15V, f=1.0MHz$ |
| Output Capacitance | C_{oss} | - | 320 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 240 | - | | |
| Switching Characteristics | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | - | 13 | - | nS | $V_{DS}=15V, V_{GS}=10V, R_G=25\Omega, I_D=30A$ |
| Turn-on Rise time | t_r | - | 36 | - | | |
| Turn-off delay time | $t_{d(off)}$ | - | 43 | - | | |
| Turn-off Fall time | t_f | - | 16 | - | | |
| Gate Total Charge | Q_G | - | 42 | - | nC | $V_{GS}=10V, V_{DS}=15V, I_D=30A$ |
| Gate-Source Charge | Q_{gs} | - | 4 | - | | |
| Gate-Drain Charge | Q_{gd} | - | 14 | - | | |
| Drain-Source Diode Characteristics | | | | | | |
| Body Diode Forward Voltage | V_{SD} | - | - | 1.2 | V | $V_{GS}=0V, I_{SD}=30A, T_J=25^\circ C$ |
| Body Diode Forward Current | I_S | - | - | 90 | A | - |
| Body Diode Reverse Recovery Time | T_{rr} | - | 16 | - | ns | $T_J=25^\circ C, I_{SD}=20A, V_{GS}=0V, di/dt=100A/\mu s$ |
| Body Diode Reverse Recovery Charge | Q_{rr} | - | 5 | - | nC | |

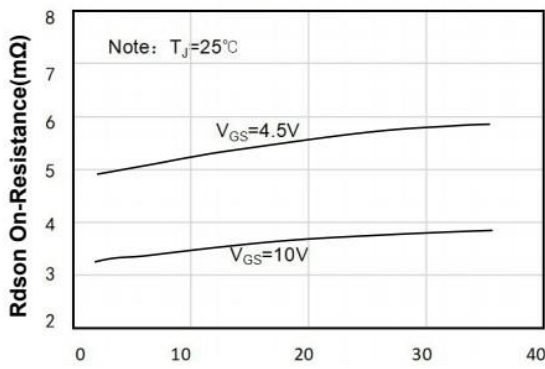
N- Channel Typical Characteristics



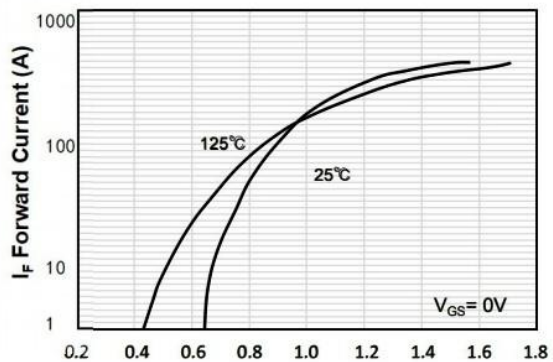
Vds Drain-Source Voltage (V)
Figure 1. On-Region Characteristics



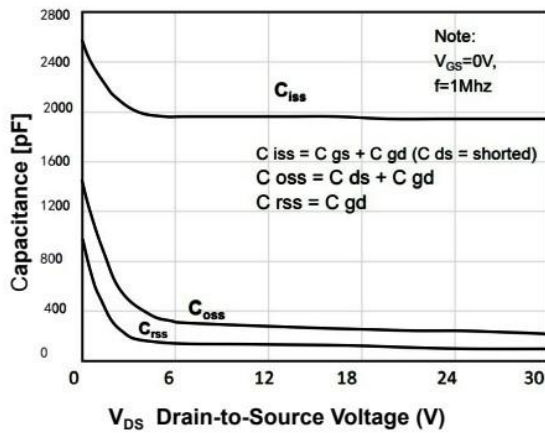
Vgs Gate-Source Voltage (V)
Figure 2. Transfer Characteristics



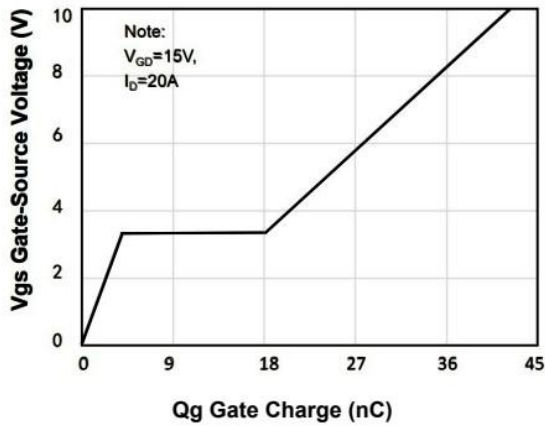
ID - Drain Current (A)
Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage



VF ,Forward Voltage [V]
Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature



VDS Drain-to-Source Voltage (V)
Figure 5. Capacitance Characteristics



Qg Gate Charge (nC)
Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

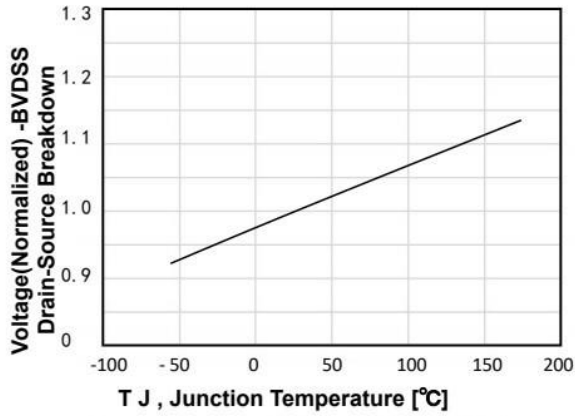


Figure 7. Breakdown Voltage Variation vs Temperature

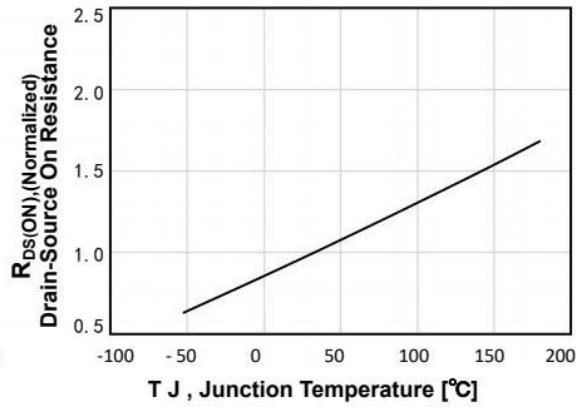


Figure 8. On-Resistance Variation vs Temperature

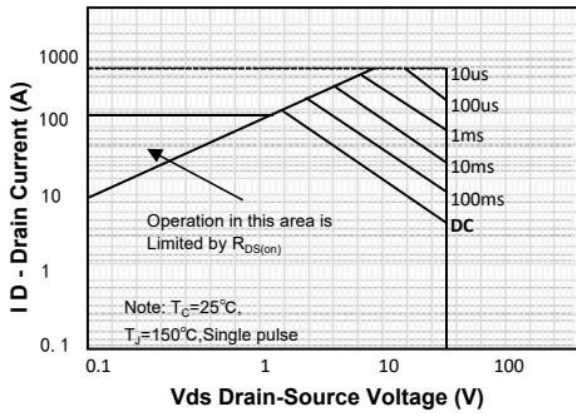


Figure 9. Maximum Safe Operating Area

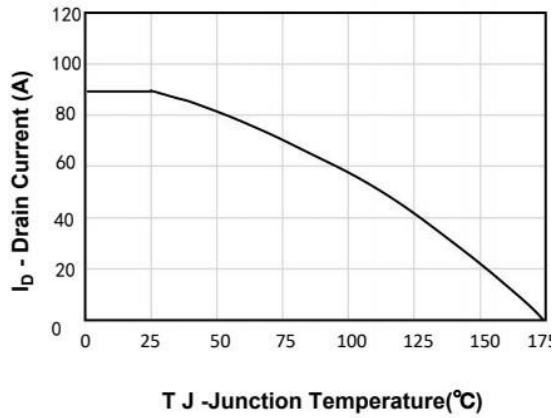


Figure 10. Maximum PContinuous Drain Current vs Case Temperature

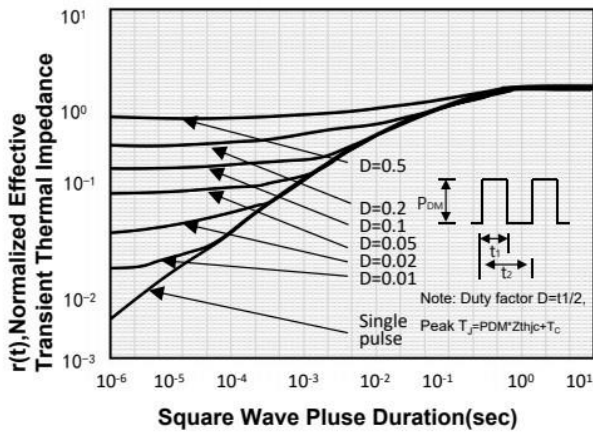
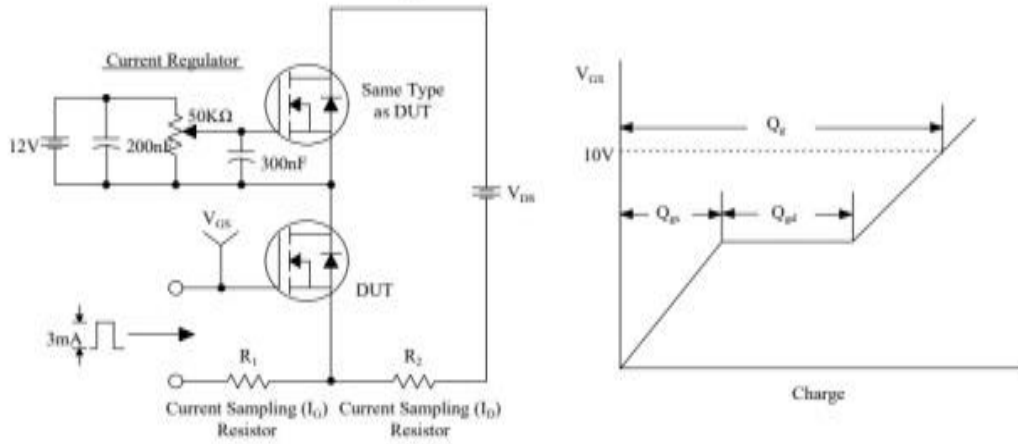
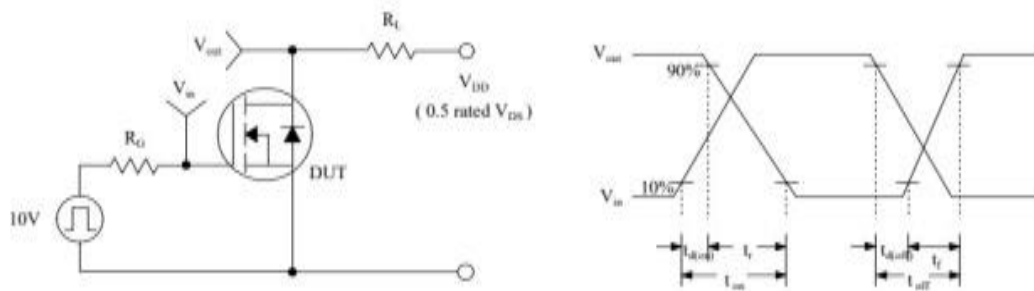


Figure 11. Transient Thermal Response Curve

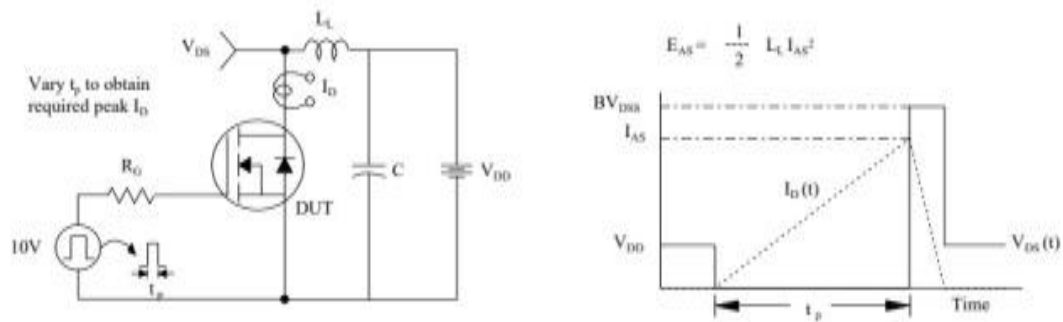
Gate Charge Test Circuit & Waveform



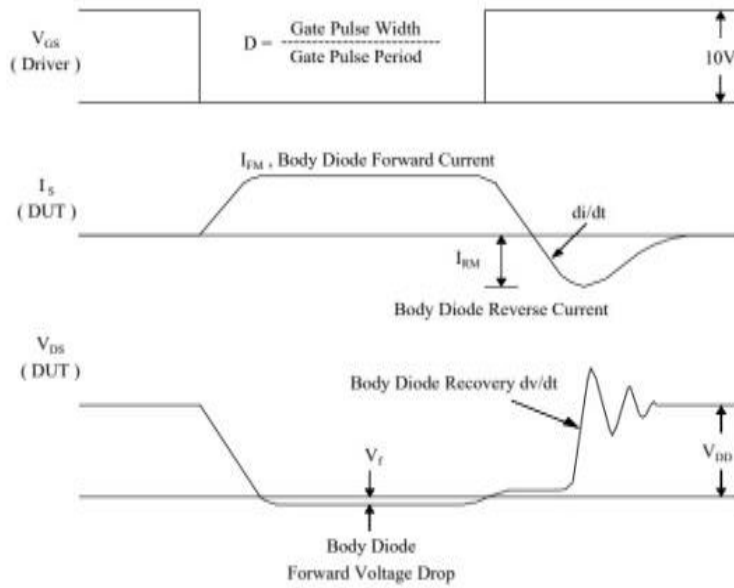
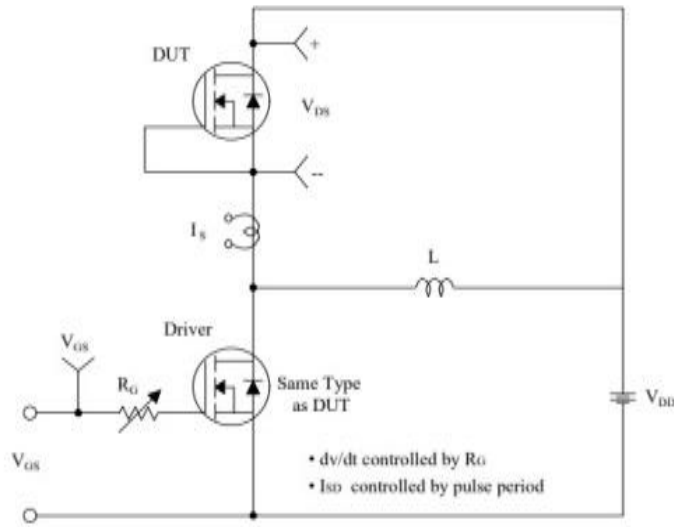
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

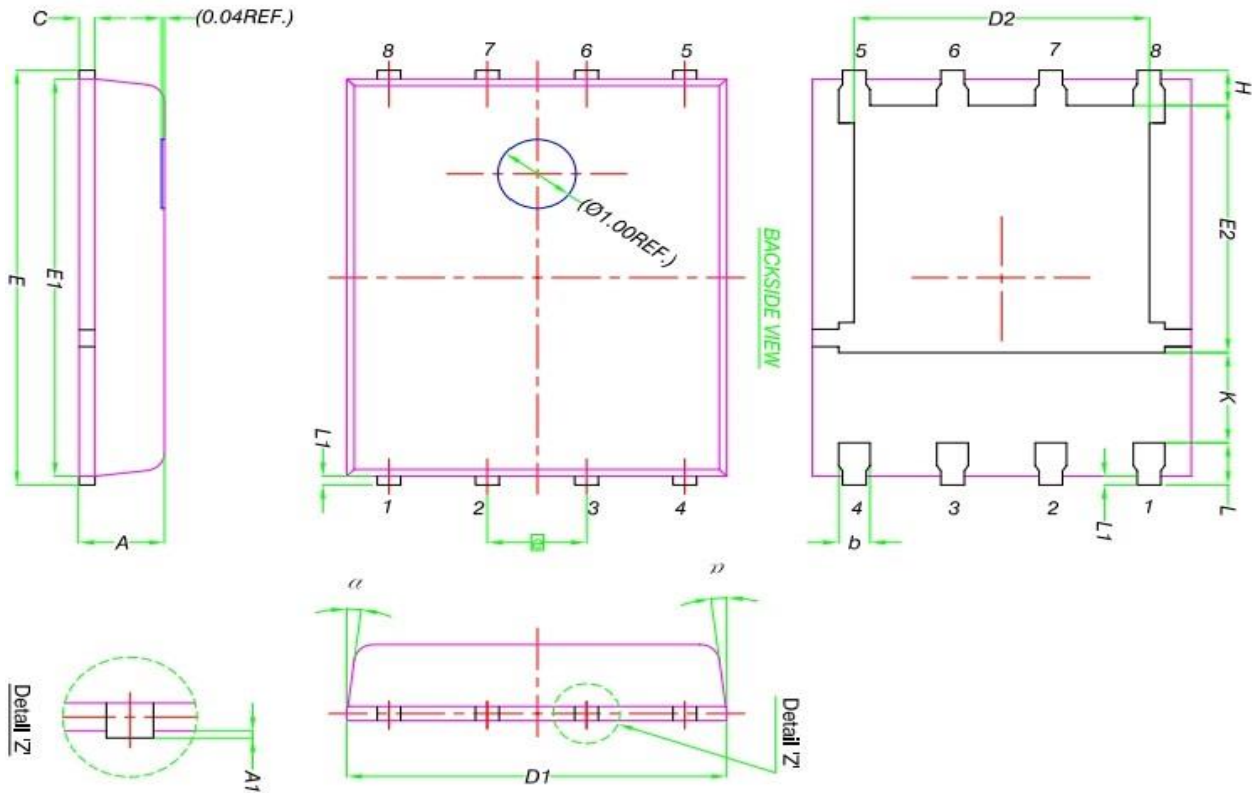


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Information

PDFN5*6-8L



| DIM. | MILLIMETERS | | |
|----------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 1.00 | 1.10 |
| A1 | 0 | - | 0.05 |
| b | 0.33 | 0.41 | 0.51 |
| C | 0.20 | 0.25 | 0.30 |
| D1 | 4.80 | 4.90 | 5.00 |
| D2 | 3.61 | 3.81 | 3.96 |
| E | 5.90 | 6.00 | 6.10 |
| E1 | 5.70 | 5.75 | 5.80 |
| E2 | 3.38 | 3.58 | 3.78 |
| e | 1.27 BSC | | |
| H | 0.41 | 0.51 | 0.61 |
| K | 1.10 | - | - |
| L | 0.51 | 0.61 | 0.71 |
| L1 | 0.06 | 0.13 | 0.20 |
| α | 0° | - | 12° |

