

P-Channel 100 V (D-S) MOSFET


RoHS
 COMPLIANT

PRODUCT SUMMARY

| V _{DS} (V) | R _{DS(on)} (mΩ)(Typ.) | I _D (A) ^a | Q _g (Typ.) |
|---------------------|---------------------------------|---------------------------------|-----------------------|
| - 100 | 23 at V _{GS} = - 10 V | - 60 | 60 nC |
| | 25 at V _{GS} = - 4.5 V | | |

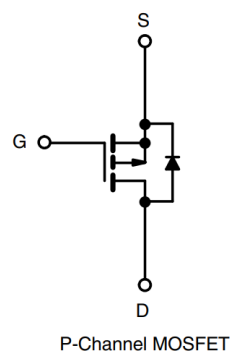
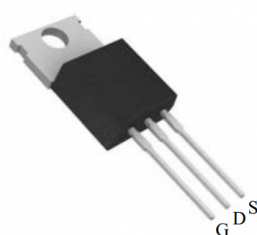
FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Advanced trench process technology

APPLICATIONS

- Portable equipment
- Battery powered systems

TO-220 Pin Configuration



ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

| PARAMETER | SYMBOL | LIMIT | UNIT |
|-----------------------------------------------------------------|-----------------------------------|---------------------------------|------|
| Drain-Source Voltage | V _{DS} | - 100 | V |
| Gate-Source Voltage | V _{GS} | ± 20 | |
| Continuous Drain Current (T _J = 150 °C) ^a | I _D | T _C = 25 °C - 60 | A |
| | | T _C = 100 °C - 36 | |
| Pulsed Drain Current ^b | I _{DM} | - 240 | |
| Single Pulse Avalanche Energy | E _{AS} | 790 | mJ |
| Maximum Power Dissipation ^c | P _D | T _C = 25 °C 215 | W |
| | | T _C = 100 °C 86 | |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | -55 to +150 | °C |

THERMAL RESISTANCE RATINGS

| PARAMETER | SYMBOL | MAX | UNIT |
|---------------------|-------------------|------|------|
| Junction-to-Ambient | R _{thJA} | 45 | °C/W |
| Junction-to-Case | R _{thJC} | 0.58 | |

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating; pulse width limited by max. junction temperature.
- P_D is based on max. junction temperature, using junction-case thermal resistance.
- The value of R_{thJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

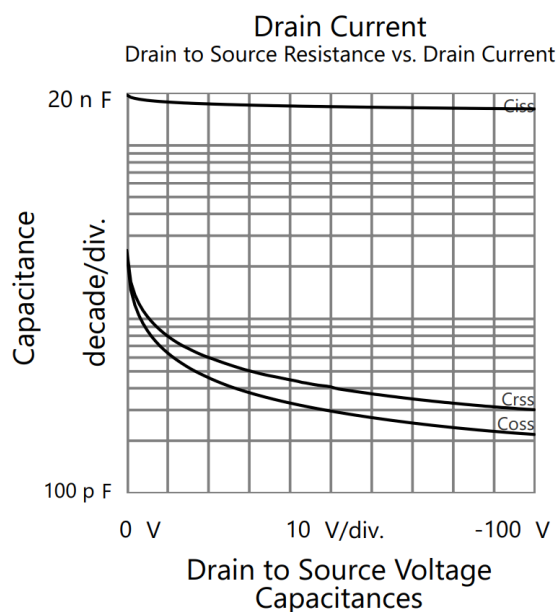
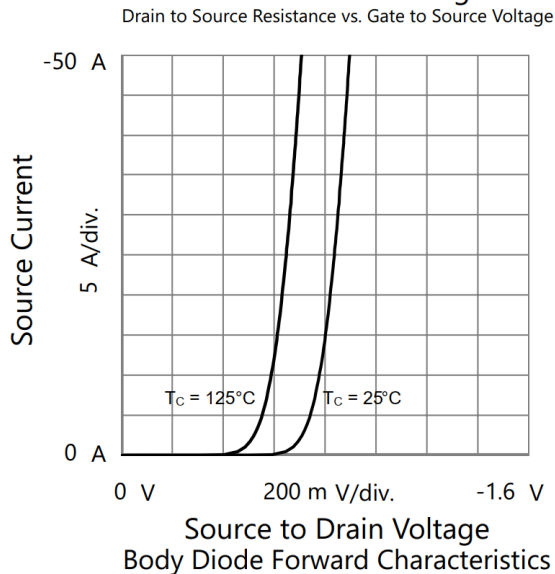
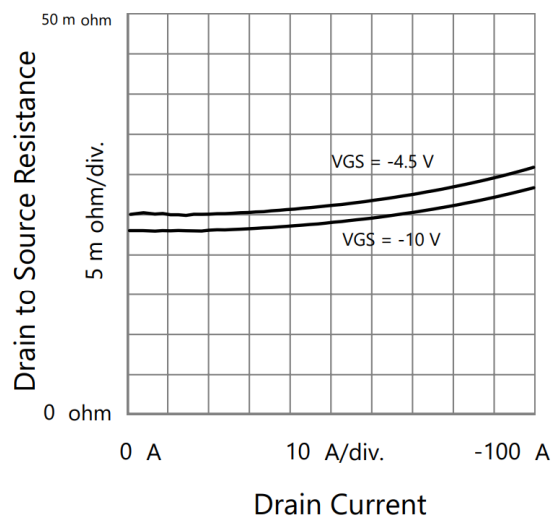
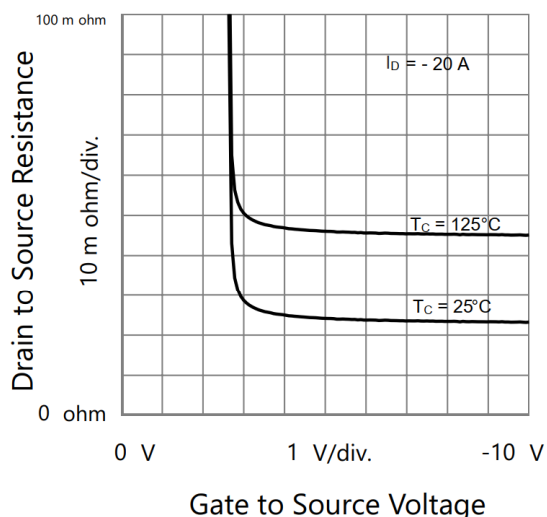
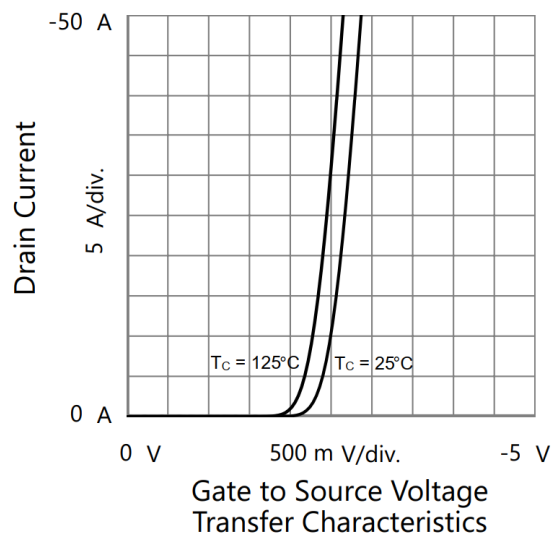
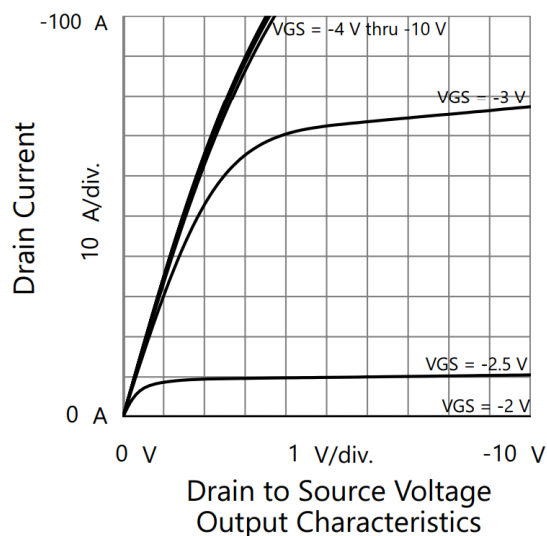
| SPECIFICATIONS (T _J = 25 °C, unless otherwise noted) | | | | | | |
|-----------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------|-------|-------|-------|------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{DS} | V _{GS} = 0 V, I _D = - 250 μA | - 100 | | | V |
| Gate-Source Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = - 250 μA | - 1 | | - 3 | V |
| Gate-Source Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = - 100 V, V _{GS} = 0 V | | | - 1 | μA |
| | | V _{DS} = - 32 V, V _{GS} = 0 V, T _J = 55 °C | | | - 10 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = - 5 V, V _{GS} = - 10 V | - 60 | | | A |
| Drain-Source On-State Resistance ^a | R _{DS(on)} | V _{GS} = - 10 V, I _D = - 20 A | | 23 | 28 | mΩ |
| | | V _{GS} = - 4.5 V, I _D = - 20 A | | 25 | 30 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = - 5 V, I _D = - 20 A | | 20 | | S |
| Dynamic ^b | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} = - 50 V, V _{GS} = 0 V, f = 1 MHz | | 16700 | | pF |
| Output Capacitance | C _{oss} | | | 295 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 400 | | |
| Total Gate Charge | Q _g | V _{DS} = - 50 V, V _{GS} = - 10 V, I _D = - 20 A | | 60 | | nC |
| Gate-Source Charge | Q _{gs} | | | 20 | | |
| Gate-Drain Charge | Q _{gd} | | | 25 | | |
| Gate Resistance | R _g | f = 1 MHz | | 1.2 | | Ω |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = - 50 V, I _D = - 20 A, V _{GEN} = - 10 V, R _g = 3 Ω | | 10 | | ns |
| Rise Time | t _r | | | 55 | | |
| Turn-Off Delay Time | t _{d(off)} | | | 30 | | |
| Fall Time | t _f | | | 45 | | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous Source-Drain Diode Current | I _S | T _C = 25 °C | | | - 40 | A |
| Pulse Diode Forward Current ^a | I _{SM} | | | | - 240 | |
| Body Diode Voltage | V _{SD} | I _S = - 1 A | | | - 1.2 | V |
| Body Diode Reverse Recovery Time | t _{rr} | I _F = - 20 A, di/dt = 100 A/μs, T _J = 25 °C | | 85 | | ns |
| Body Diode Reverse Recovery Charge | Q _{rr} | | | 130 | | nC |

Notes:

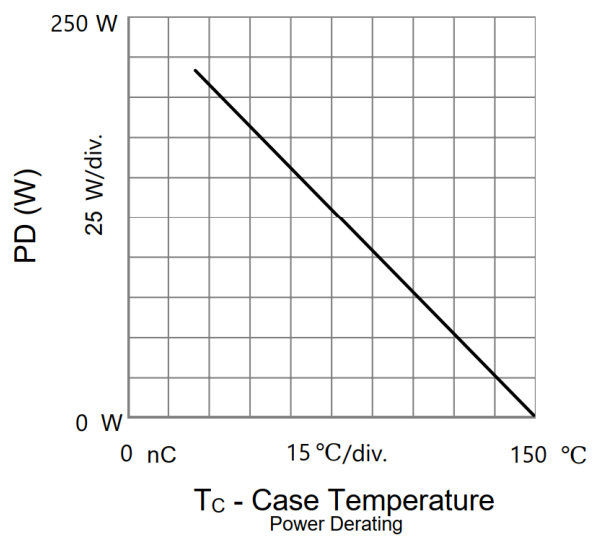
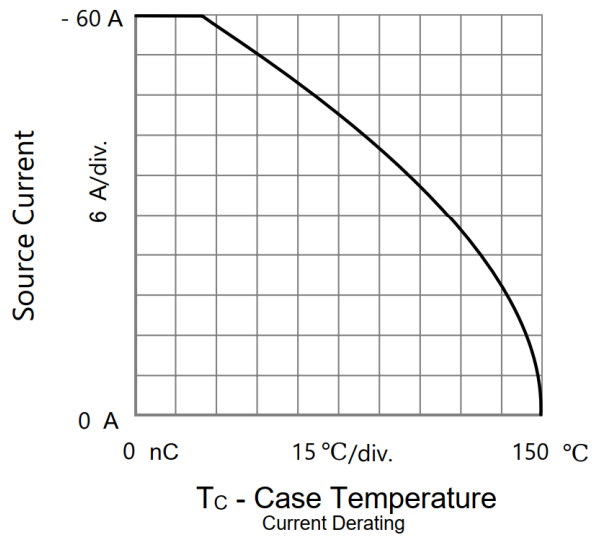
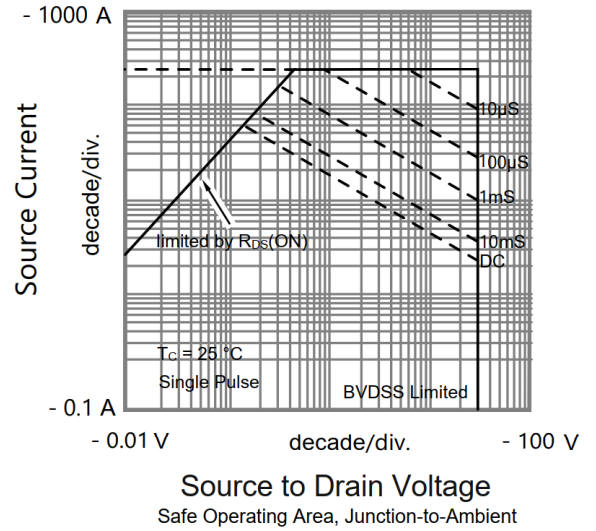
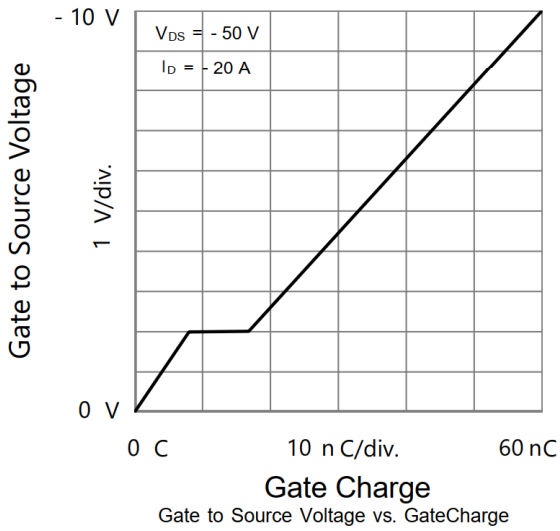
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

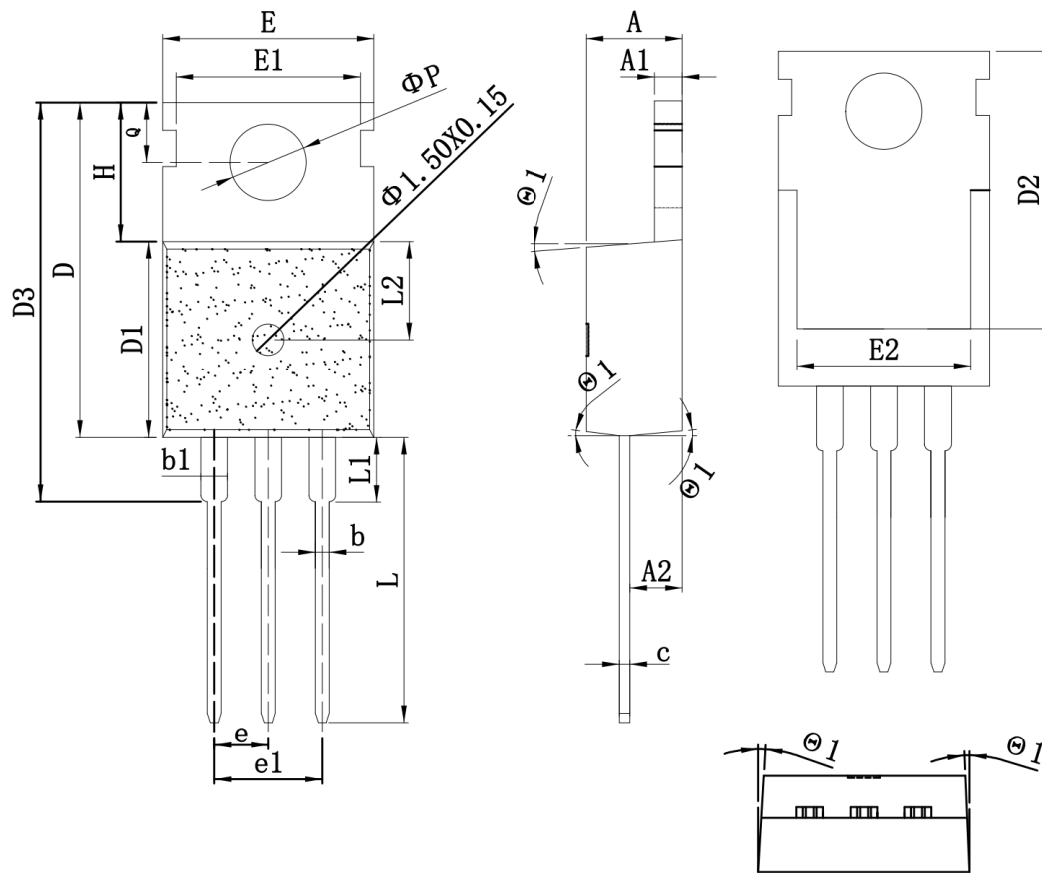
TYPICAL CHARACTERISTICS (25°C, unless otherwise noted)



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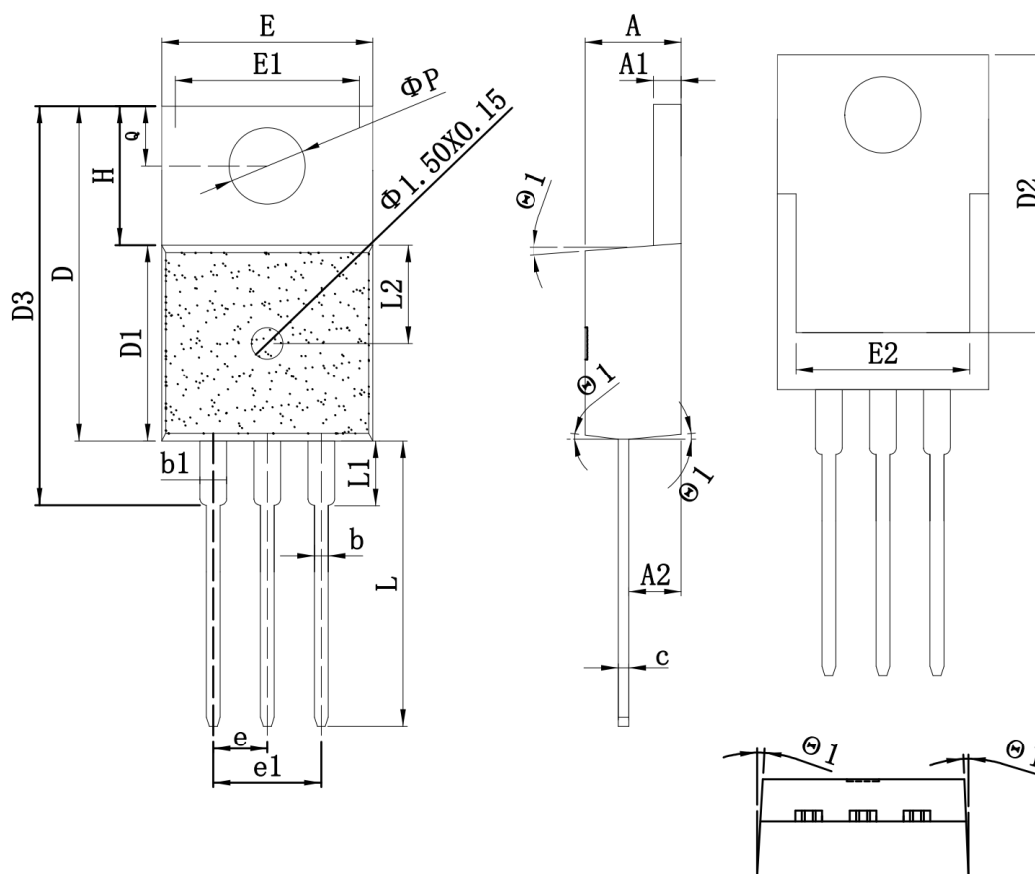
TO-220_3L-A PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | mm | | | SYMBOL | mm | | |
|--------|-------|-------|-------|--------|---------|-------|-------|
| | MIN | TYP | MAX | | MIN | TYP | MAX |
| A | 4.15 | 4.50 | 4.80 | E1 | 8.25 | 8.70 | 9.15 |
| A1 | 1.15 | 1.30 | 1.50 | E2 | 7.20 | 8.00 | 8.80 |
| A2 | 2.10 | 2.40 | 2.65 | e | 2.38 | 2.54 | 2.74 |
| b | 0.65 | 0.80 | 1.00 | e1 | 5.08REF | | |
| b1 | 1.10 | 1.33 | 1.80 | H | 6.20 | 6.50 | 6.90 |
| c | 0.35 | 0.50 | 0.65 | L | 12.75 | 13.28 | 13.70 |
| D | 14.25 | 15.75 | 16.15 | L1 | - | - | 3.50 |
| D1 | 8.70 | 9.20 | 9.60 | L2 | 2.30 | 4.65 | 7.00 |
| D2 | 12.30 | 13.10 | 13.85 | ΦP | 3.40 | 3.65 | 3.85 |
| D3 | 16.20 | 18.80 | 20.60 | Q | 2.50 | 2.80 | 3.00 |
| E | 8.68 | 10.02 | 11.00 | θ | 2° | - | 7° |

TO-220_3L-B PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | mm | | | SYMBOL | mm | | |
|--------|-------|-------|-------|----------|---------|-------|-------|
| | MIN | TYP | MAX | | MIN | TYP | MAX |
| A | 4.15 | 4.50 | 4.80 | E1 | 8.25 | 8.70 | 9.15 |
| A1 | 1.15 | 1.30 | 1.50 | E2 | 7.20 | 8.00 | 8.80 |
| A2 | 2.10 | 2.40 | 2.65 | e | 2.38 | 2.54 | 2.74 |
| b | 0.65 | 0.80 | 1.00 | e1 | 5.08REF | | |
| b1 | 1.10 | 1.33 | 1.80 | H | 6.20 | 6.50 | 6.90 |
| c | 0.35 | 0.50 | 0.65 | L | 12.75 | 13.28 | 13.70 |
| D | 14.25 | 15.75 | 16.15 | L1 | - | - | 3.50 |
| D1 | 8.70 | 9.20 | 9.60 | L2 | 2.30 | 4.65 | 7.00 |
| D2 | 12.30 | 13.10 | 13.85 | ϕP | 3.40 | 3.65 | 3.85 |
| D3 | 16.20 | 18.80 | 20.60 | Q | 2.50 | 2.80 | 3.00 |
| E | 8.68 | 10.02 | 11.00 | θ | 2° | - | 7° |

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