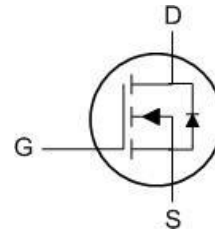




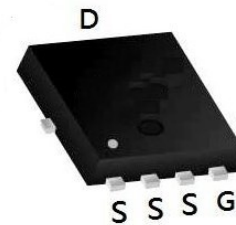
- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology



Description

The WLQ120N03F is the high cell density trenched N-ch MOSFETs, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications. The WLQ120N03F meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PDFN5060-8L Pin Configuration



Product Summary

| BVDSS | R _{DS(on)} | I _D |
|-------|---------------------|----------------|
| 30V | 3.0mΩ | 120 A |

Absolute Maximum Ratings

| Symbol | Parameter | Rating | | Units |
|---------------------------------------|--|------------|--------------|-------|
| | | 10s | Steady State | |
| V _{DS} | Drain-Source Voltage | 30 | | V |
| V _{GS} | Gate-Source Voltage | ±20 | | V |
| I _D @T _C =25°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 120 | | A |
| I _D @T _C =100°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 75 | | A |
| I _{DM} | Pulsed Drain Current ² | 384 | | A |
| EAS | Single Pulse Avalanche Energy ³ | 198 | | mJ |
| I _{AS} | Avalanche Current | 53.8 | | A |
| P _D @T _C =25°C | Total Power Dissipation ⁴ | 62.5 | | W |
| P _D @T _A =25°C | Total Power Dissipation ⁴ | 6 | 2.42 | W |
| T _{STG} | Storage Temperature Range | -55 to 175 | | °C |
| T _J | Operating Junction Temperature Range | -55 to 175 | | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ | --- | 62 | °C/W |
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ (t ≤ 10s) | --- | 25 | °C/W |
| R _{θJC} | Thermal Resistance Junction-Case ¹ | --- | 2.4 | °C/W |



Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|----------------------------------|---|------|----------|----------|------|
| Static Characteristics | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _{DS} =250μA | 30 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =24V, V _{GS} =0V T _J =85°C | - | - | 1 30 | μA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _{DS} =250μA | 1.4 | 1.7 | 2.5 | V |
| I _{GSS} | Gate Leakage Current | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| R _{DS(ON)} ^d | Drain-Source On-state Resistance | V _{GS} =10V, I _{DS} =20A T _J =125°C | - | 3 4.4 | 3.8 - | mΩ |
| | | V _{GS} =4.5V, I _{DS} =15A | - | 4.0 | 5.5 | |
| Gfs | Forward Transconductance | V _{DS} =5V, I _{DS} =10A | - | 24.6 | - | S |
| Diode Characteristics | | | | | | |
| V _{SD} ^d | Diode Forward Voltage | I _{SD} =20A, V _{GS} =0V | - | 0.8 | 1.1 | V |
| t _{rr} | Reverse Recovery Time | I _{DS} =20A, di _{SD} /dt=100A/μs | - | 35.6 | - | ns |
| t _a | Charge Time | | - | 19.3 | - | |
| t _b | Discharge Time | | - | 16.3 | - | |
| Q _{rr} | Reverse Recovery Charge | | - | 26 | - | |
| Dynamic Characteristics ^e | | | | | | |
| R _G | Gate Resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | - | 1 | 2 | Ω |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz | - | 2485 | 2971 | pF |
| C _{oss} | Output Capacitance | | - | 850 | - | |
| C _{rss} | Reverse Transfer Capacitance | | - | 85 | - | |
| t _{d(ON)} | Turn-on Delay Time | V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω | - | 12.4 | 23 | ns |
| t _r | Turn-on Rise Time | | - | 9.5 | 18 | |
| t _{d(OFF)} | Turn-off Delay Time | | - | 27.2 | 49 | |
| t _f | Turn-off Fall Time | | - | 35.2 | 64 | |
| Gate Charge Characteristics ^e | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =15V, V _{GS} =10V, I _{DS} =20A | - | 20.6 | 28.8 | nC |
| Q _g | Total Gate Charge | V _{DS} =15V, V _{GS} =4.5V, I _{DS} =20A | - | 9.8 | - | |
| Q _{gth} | Threshold Gate Charge | | - | 1.8 | - | |
| Q _{gs} | Gate-Source Charge | | - | 3.8 | - | |
| Q _{gd} | Gate-Drain Charge | | - | 3.7 | - | |

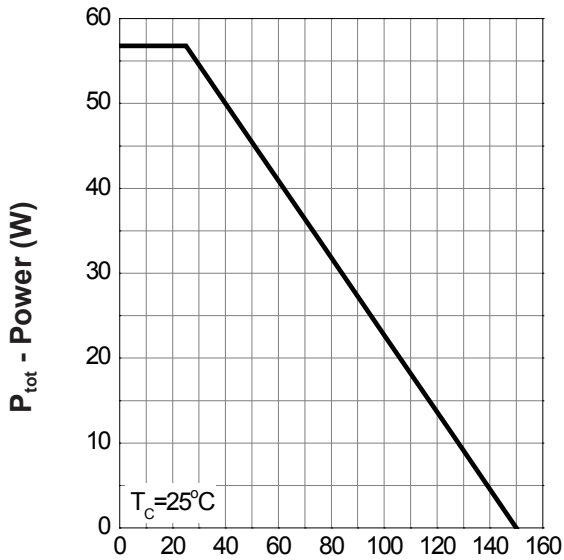
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.

Note e : Guaranteed by design, not subject to production testing.



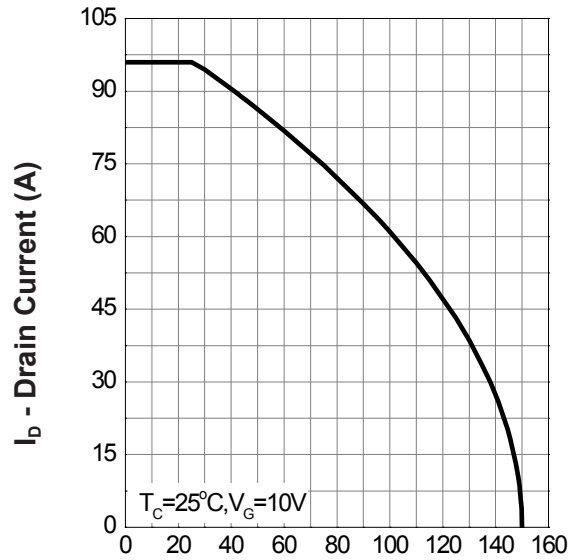
Typical Operating Characteristics

Power Dissipation



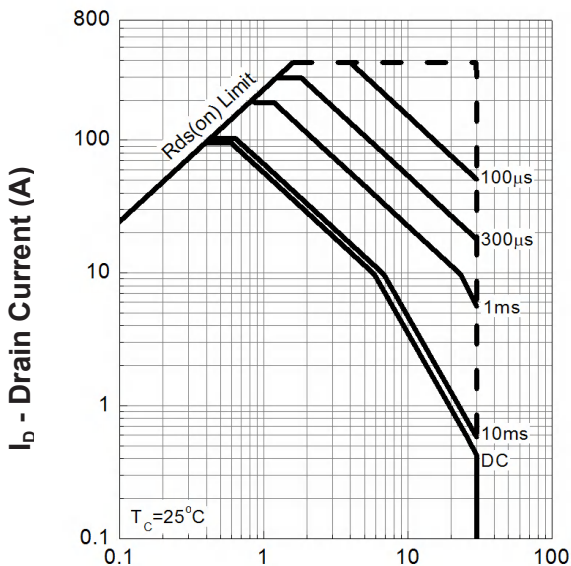
T_j - Junction Temperature (°C)

Drain Current



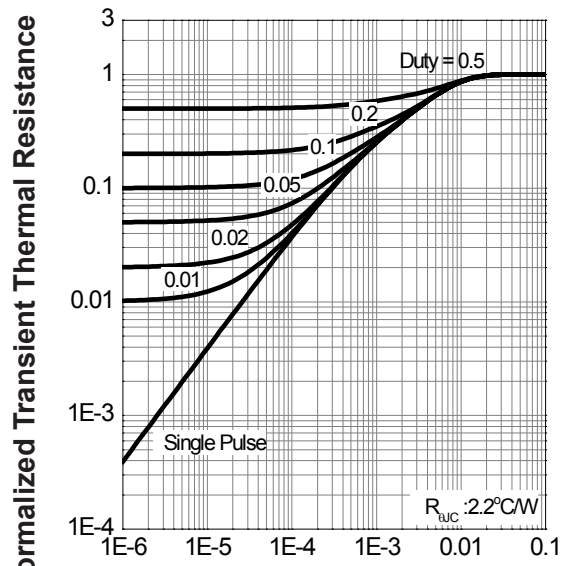
T_j - Junction Temperature (°C)

Safe Operation Area



V_{DS} - Drain - Source Voltage (V)

Thermal Transient Impedance

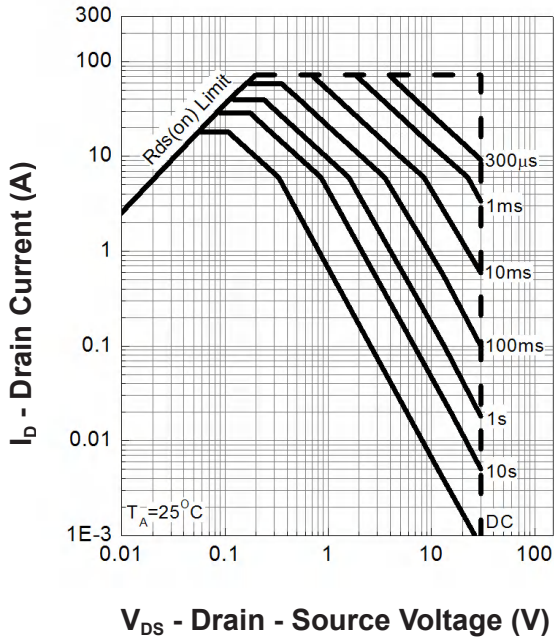


Square Wave Pulse Duration (sec)

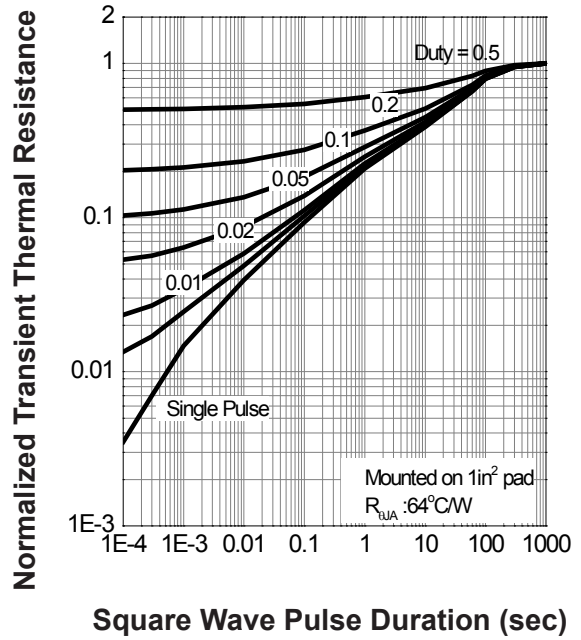


Typical Operating Characteristics(Cont.)

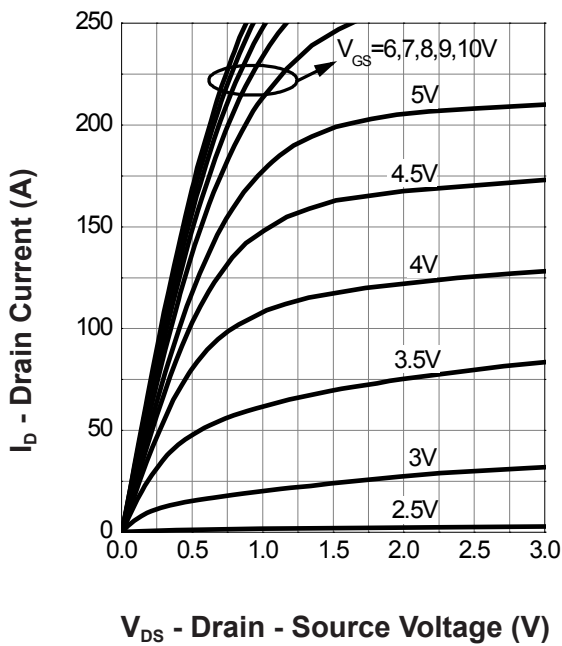
Safe Operation Area



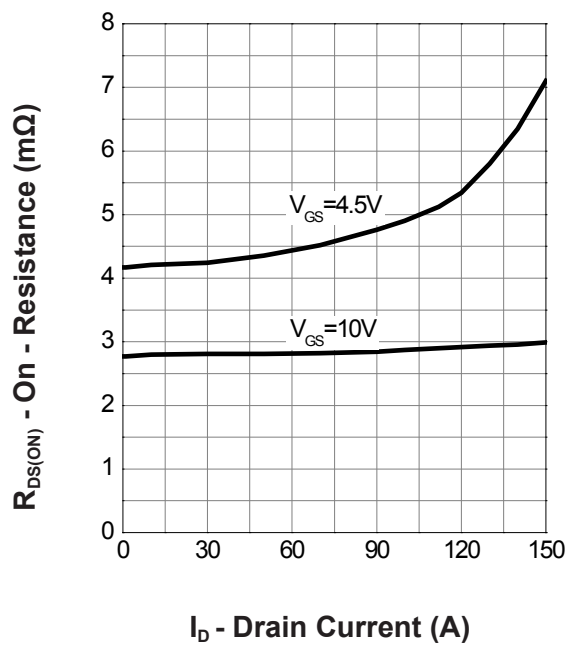
Thermal Transient Impedance



Output Characteristics



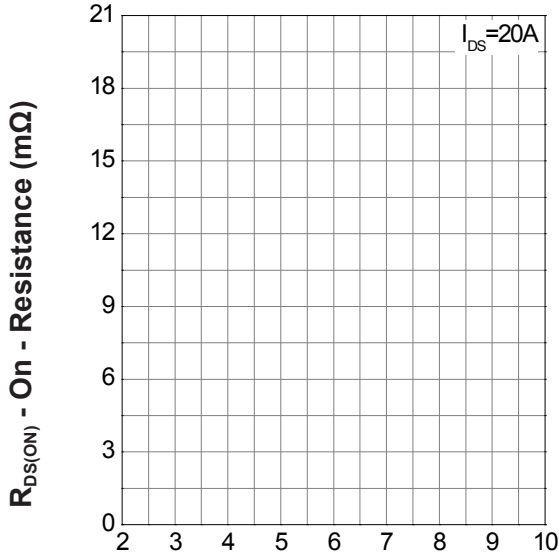
Drain-Source On Resistance





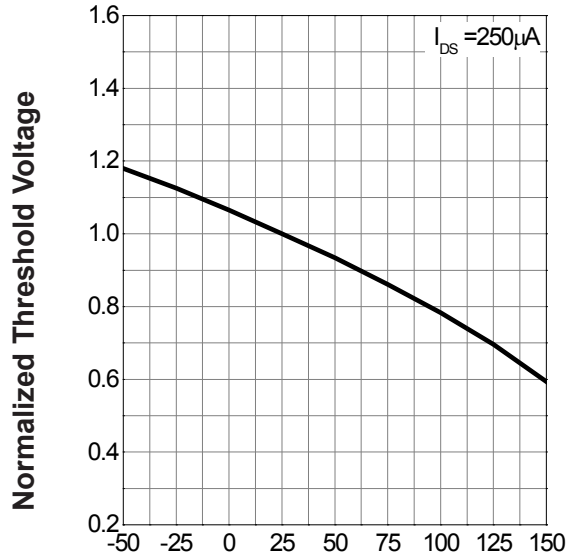
Typical Operating Characteristics(Cont.)

Gate-Source On Resistance



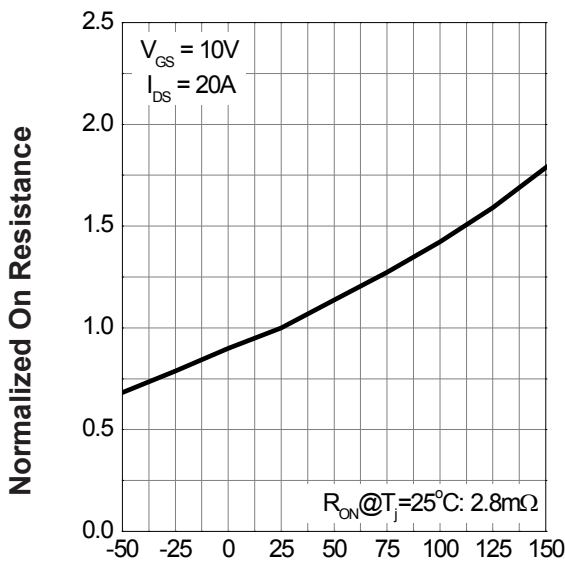
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage



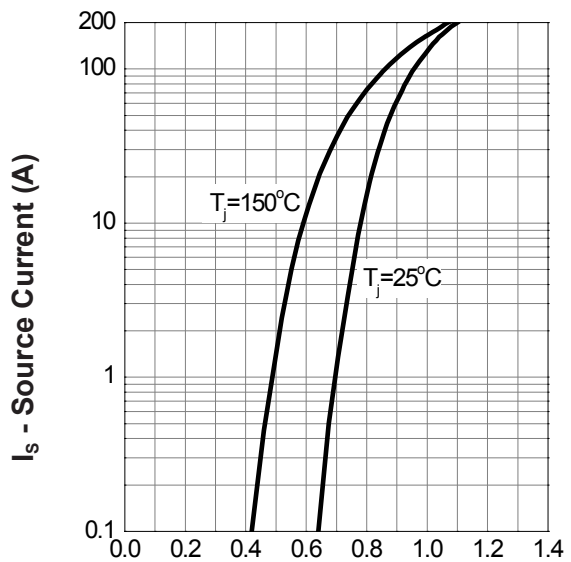
T_j - Junction Temperature ($^{\circ}C$)

Drain-Source On Resistance



T_j - Junction Temperature ($^{\circ}C$)

Source-Drain Diode Forward

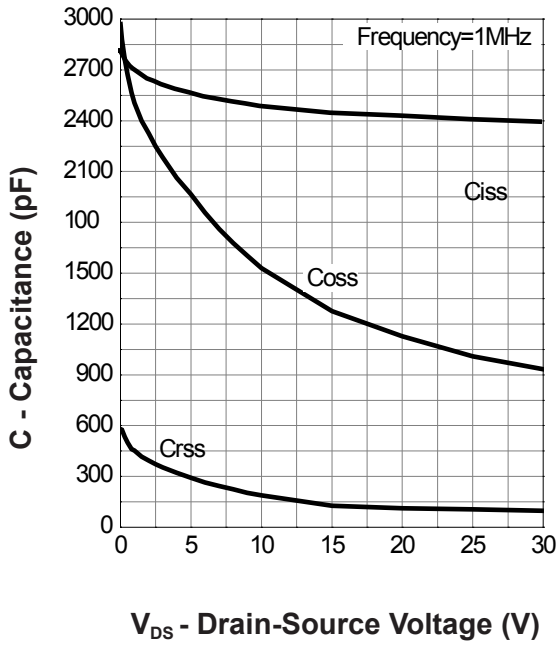


V_{SD} - Source - Drain Voltage (V)

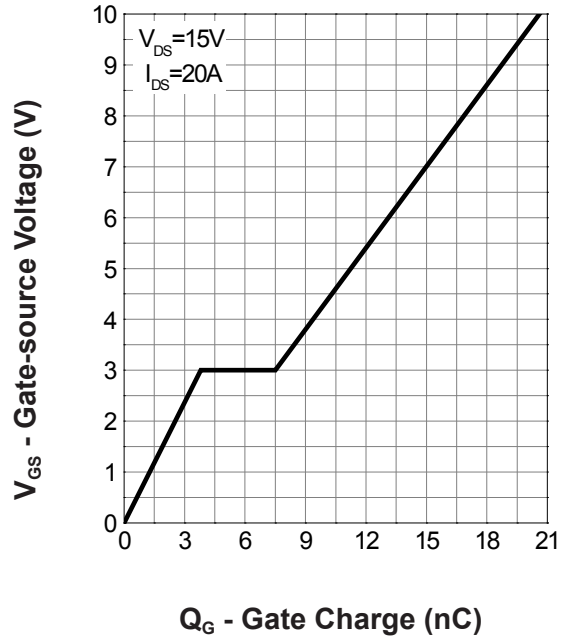


Typical Operating Characteristics(Cont.)

Capacitance

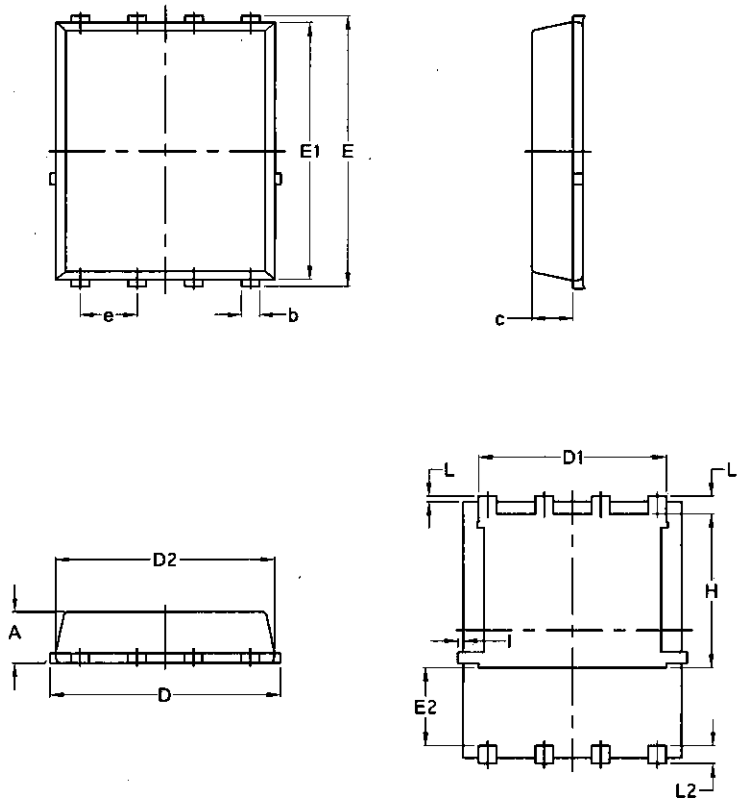


Gate Charge





Package Mechanical Data-PDFN5060-8L-Single



| Symbol | Common | | | |
|--------|----------|--------|----------|--------|
| | mm | | Inch | |
| | Min | 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 |



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