Prisemi®

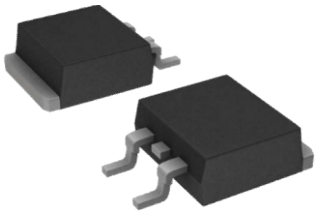
# PSMD2P06R3H

## N-Channel MOSFET

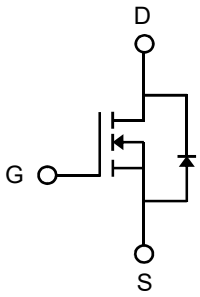
## Description

The PSMD2P06R3H uses split gate trench technology to provide excellent $R_{DS(ON)}$ low gate charge. This device is suitable for power management and high efficiency applications at high switching frequencies

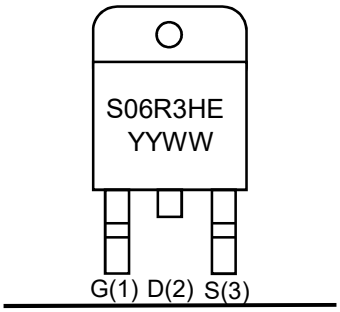
| MOSFET Product Summary | | | |
|---|---|---|---|
| $V_{DS}$(V) | $R_{DS(on)}$(mΩ) | $I_D$(A) | |
| 60 | 3.2@ $V_{GS}$ = 10V | Silicon Limited $T_C$=25℃ | 158 |
| | | Silicon Limited $T_C$=100℃ | 100 |
| | | Package Limited $T_C$=25℃ | 100 |



TO-263 (To View)




Circuit Diagram




Marking (Top View)

## Feature

- Low $R_{DS(ON)}$ - Ensures On-State Losses are Minimized
- Excellent $Q_{gd}$ x $R_{DS(ON)}$ Product(FOM)
- Advanced Technology for DC-DC Converts
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% UIS (Avalanche) Rated
- Lead-Free Finish ; RoHS Compliant
- Halogen and Antimony Free. "Green" Device

## Applications

- PWM applications
- Load switch
- Power management
- DC-DC Converters
- Wireless Chargers

## Absolute maximum rating@25℃

| Rating | | Symbol | Value | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | Silicon Limited $T_C$=25℃ | $I_D$ | 158 | A |
| | Silicon Limited $T_C$=100℃ | | 100 | |
| | Package Limited $T_C$=25℃ | | 100 | |
| Pulsed Drain Current[1)] | | $I_{DM}$ | 380 | A |
| Total Power Dissipation[2)] | | $P_D$ | 92 | W |
| Avalanche Current[5)] | | $I_{AS}$ | 75.5 | A |
| Avalanche Energy[5)] | | $E_{AS}$ | 285 | mJ |
| Thermal Resistance , Junction-case | | $R_{\theta JC}$ | 1.36 | ℃/W |
| Thermal Resistance Junction-to-Ambient @ Steady State[2)] | | $R_{\theta JA}$ | 43.65 | ℃/W |
| Junction and Storage Temperature Range | | $T_J, T_{STG}$ | -55~+150 | ℃ |

## Electrical characteristics per line@25℃ (unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$= 0V, $I_D$= 250μA | 60 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$= 60V,$V_{GS}$= 0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$= 0V | - | - | ±100 | nA |
| On Characteristics[3] | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$= 250μA | 2.0 | 3.0 | 4.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$= 10V, $I_D$= 20A | - | 3.2 | 4.5 | mΩ |
| Dynamic Parameters[4] | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$= 30V,$V_{GS}$= 0V, f= 1MHz | - | 3122 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 888 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 36 | - | |
| Switching Parameters[4] | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}$ = 30V, $V_{GS}$ = 10V, $R_G$ = 10Ω,$I_D$ = 20A | - | 8.7 | - | ns |
| Turn-on Rise Time | $t_r$ | | - | 14.5 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 109.2 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 46.5 | - | |
| Total Gate Charge | $Q_g$ | $V_{DS}$= 30V,$I_D$= 20A, $V_{GS}$= 10V | - | 54.2 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 6.7 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 8.9 | - | |
| Gate Resistance | $R_g$ | $V_{GS}$=0V, $V_{DS}$=0V,f=1MHz | - | 1.36 | - | Ω |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage[3] | $V_{SD}$ | $V_{GS}$= 0V,$I_S$= 20A | - | 0.83 | 1.1 | V |

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.
5. This single-pulse measurement was taken under the following condition (L=100uH,$V_{GS}$=10V,$V_{DS}$=50V)while it's value is limited by $T_{J\_Max}$=150℃.

## Typical Characteristics

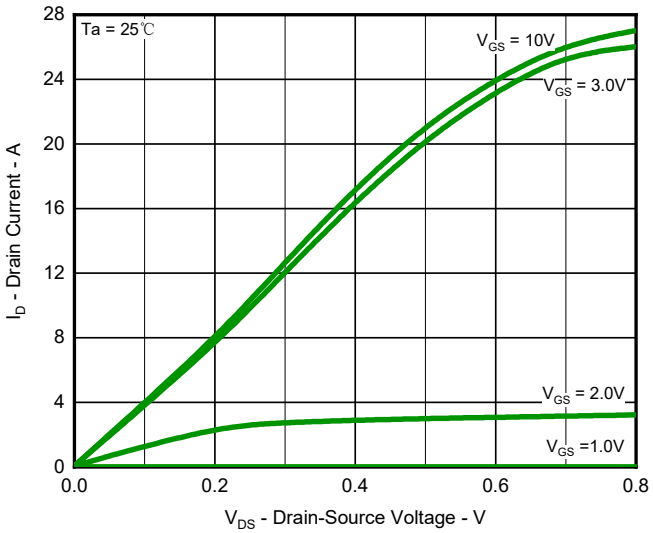



**Fig.1 Output Characteristics**

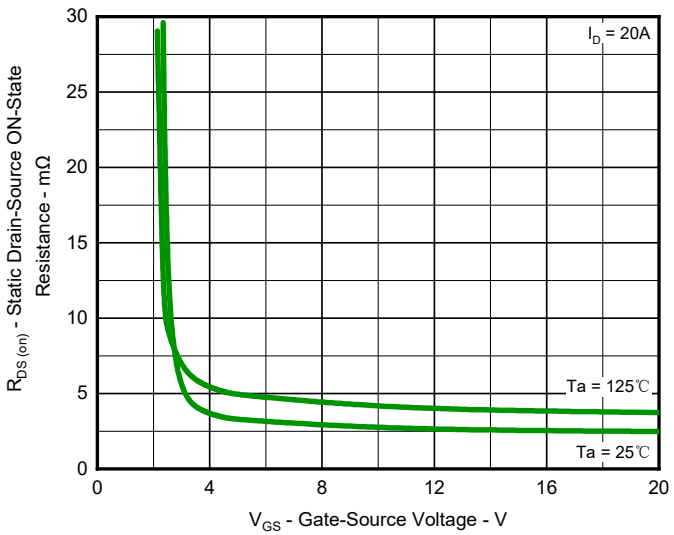



**Fig.2 On-Resistance vs. Gate-Source Voltage**

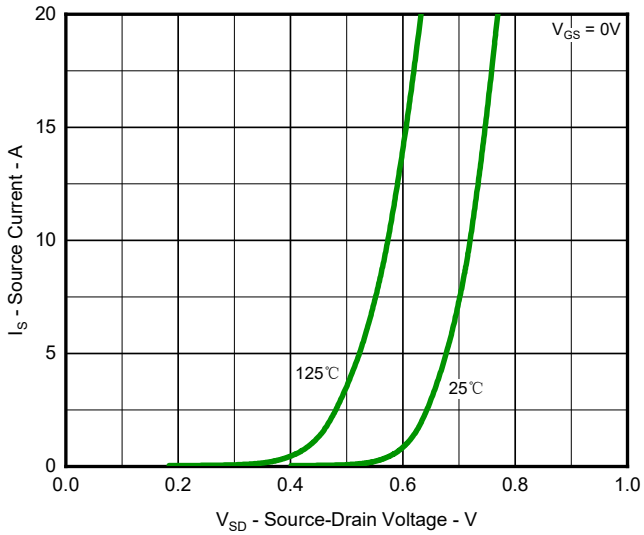



**Fig.3 Diode Forward Voltage vs. Current**

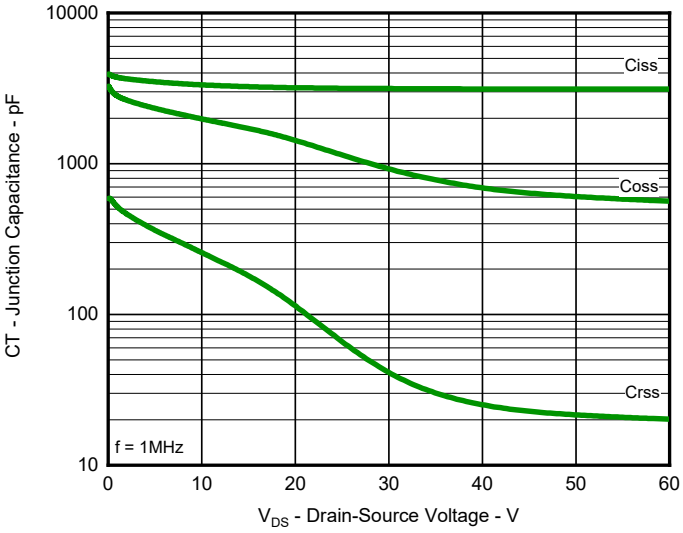



**Fig.4 Typical Junction Capacitance**

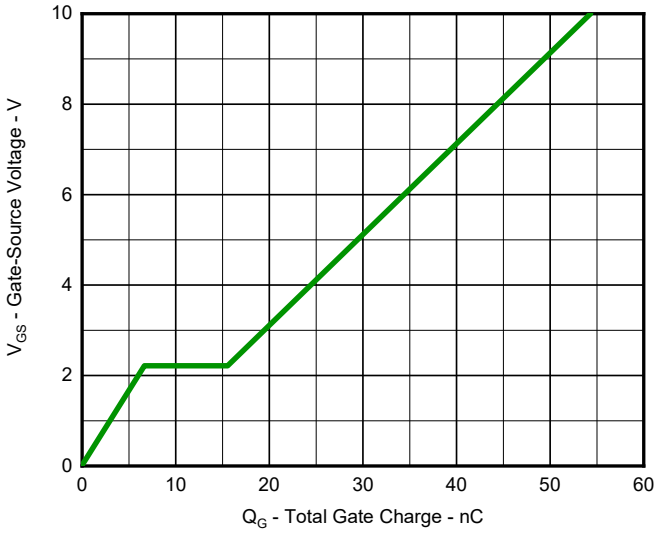



**Fig.5 Gate Charge Characteristics**

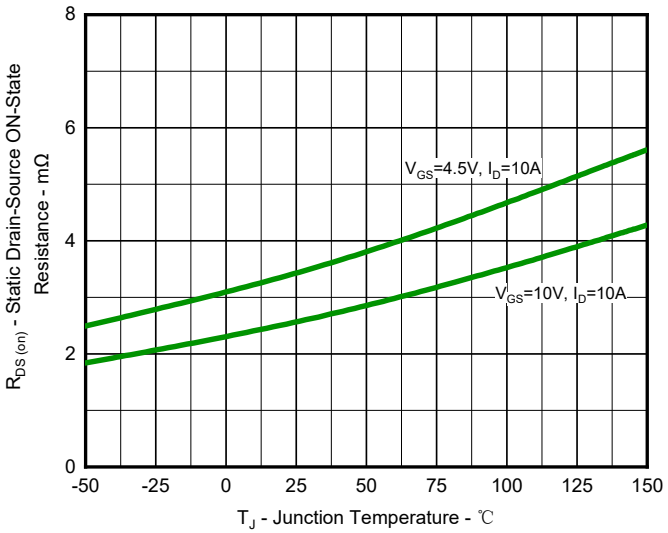



**Fig.6 On-Resistance Variation with Temperature**

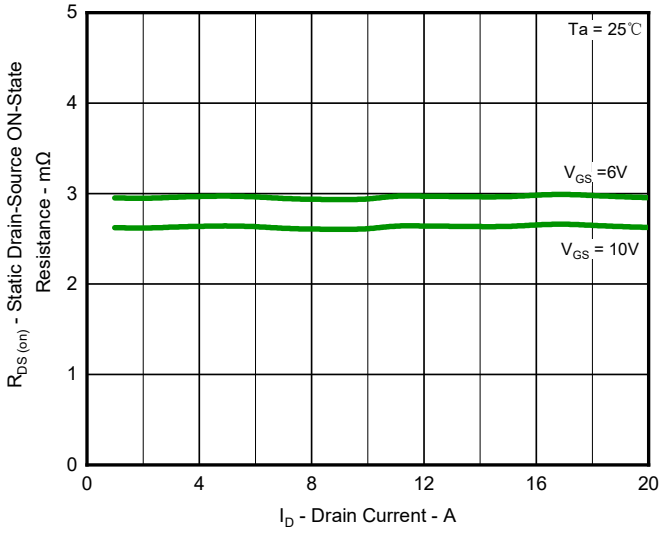



**Fig.7 Typical On-Resistance vs Drain Current**

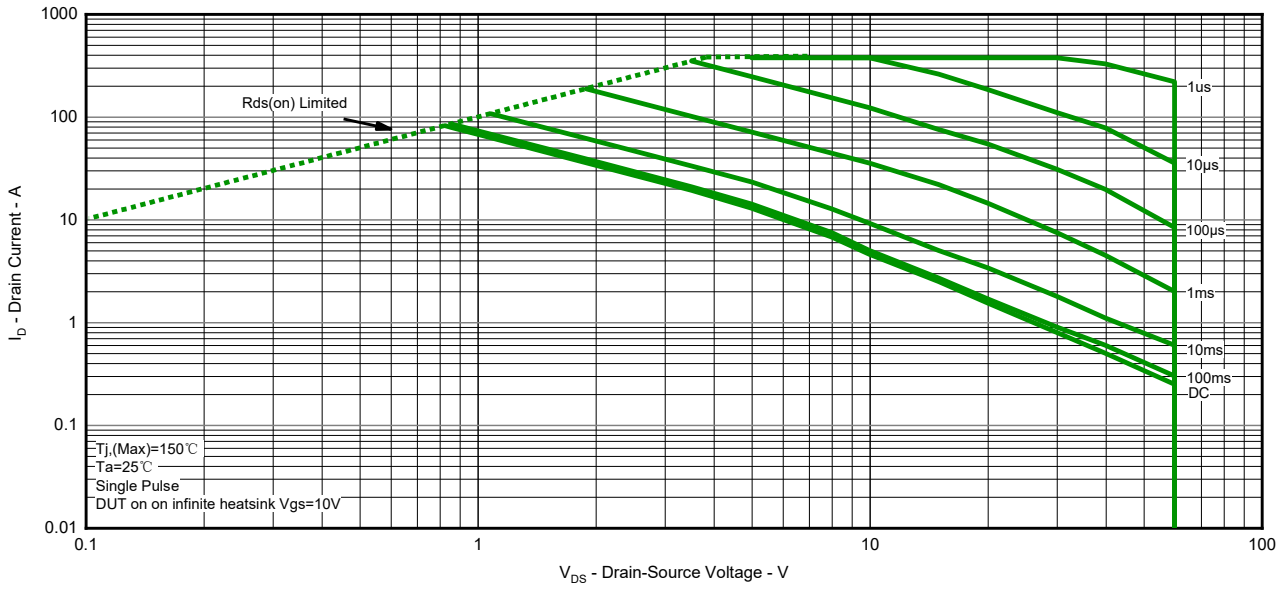



**Fig.8 Safe Operation Area**

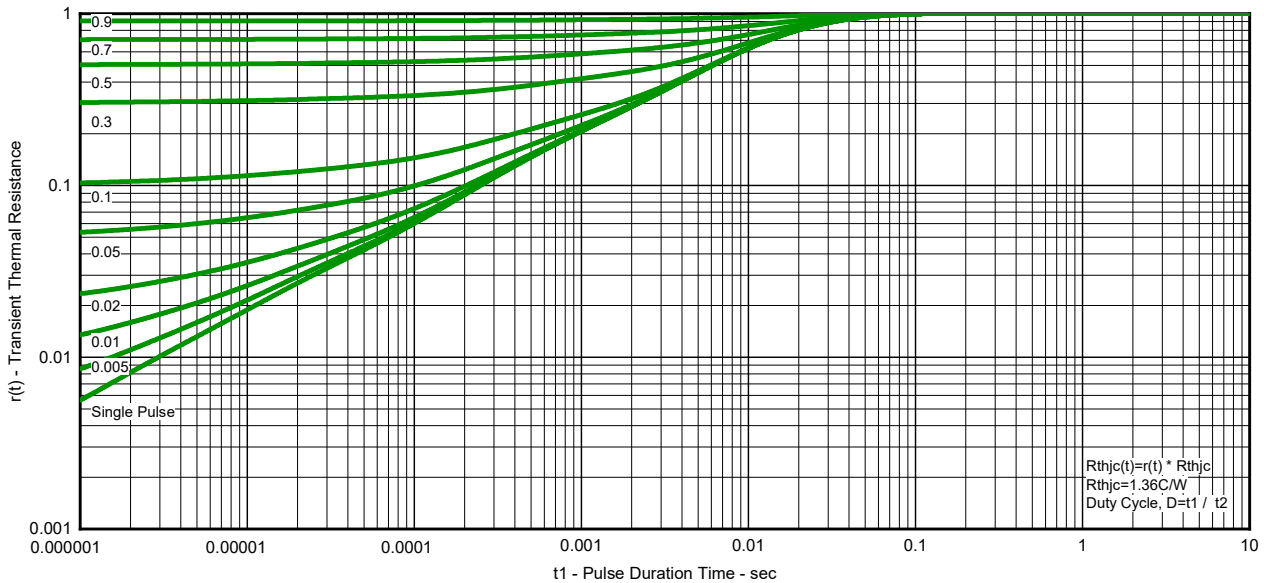
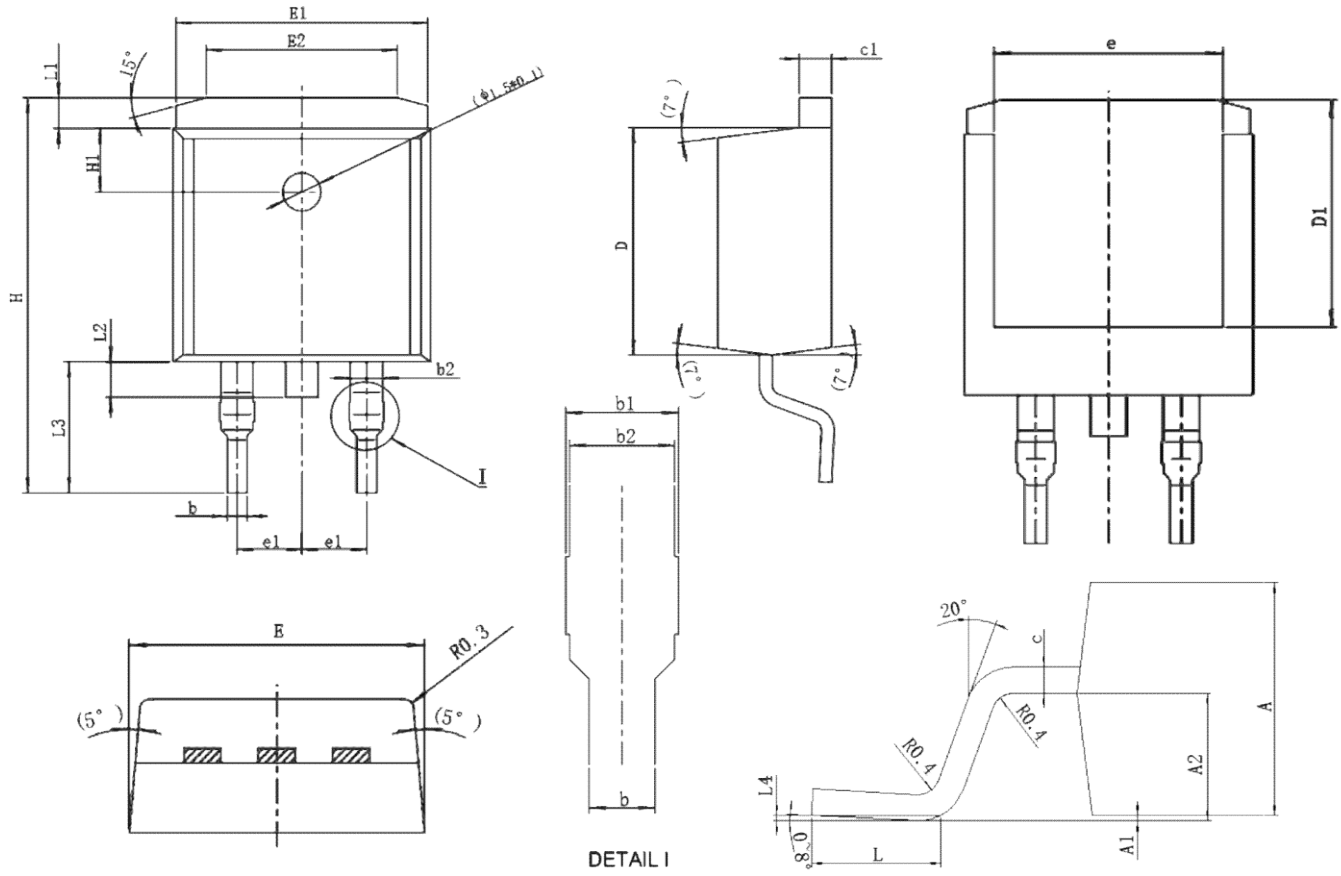



**Fig.9 Transient Thermal Resistance**

## Product Dimension (TO-263)




| Dim | Millimeters | | Inches | | Dim | Millimeters | | Inches | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 4.56 | 4.58 | 0.180 | 0.180 | E1 | 9.85 | 9.91 | 0.388 | 0.390 |
| A1 | 0.02 | 0.22 | 0.001 | 0.009 | E2 | 7.40 | 7.60 | 0.291 | 0.299 |
| A2 | 2.34 | 2.67 | 0.092 | 0.105 | e | 7.50 | 8.50 | 0.295 | 0.335 |
| b | 0.75 | 0.85 | 0.030 | 0.033 | e1 | 2.53 | 2.55 | 0.100 | 0.100 |
| b1 | 1.27 | 1.47 | 0.050 | 0.058 | H | 15.30 | 15.70 | 0.602 | 0.618 |
| b2 | 1.22 | 1.32 | 0.048 | 0.052 | H1 | 2.40 | 2.60 | 0.094 | 0.102 |
| c | 0.51 | 0.53 | 0.020 | 0.021 | L | 2.44 | 2.64 | 0.096 | 0.104 |
| c1 | 1.29 | 1.32 | 0.051 | 0.052 | L1 | 1.10 | 1.30 | 0.043 | 0.051 |
| D | 9.14 | 9.16 | 0.360 | 0.361 | L2 | 1.20 | 1.70 | 0.047 | 0.067 |
| D1 | 7.93 | 7.95 | 0.312 | 0.313 | L3 | 5.14 | 5.16 | 0.202 | 0.203 |
| E | 10.00 | 10.20 | 0.394 | 0.402 | L4 | 0.11 | 0.13 | 0.004 | 0.005 |

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