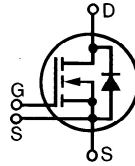


Polar™ HiPerFET™ Power MOSFET

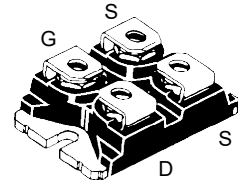
IXFN140N20P

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



$$\begin{aligned} V_{DSS} &= 200V \\ I_{D25} &= 115A \\ R_{DS(on)} &\leq 18m\Omega \\ t_{rr} &\leq 200ns \end{aligned}$$

miniBLOC
E153432



G = Gate D = Drain
S = Source

Either Source Terminal S can be used as the Source Terminal or the Kelvin Source (Gate Return) Terminal.

| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|-------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 175°C | 200 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 175°C , $R_{GS} = 1M\Omega$ | 200 | V |
| V_{GSS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 115 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM} | 280 | A |
| I_A | $T_C = 25^\circ\text{C}$ | 60 | A |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 4 | J |
| dv/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 175^\circ\text{C}$ | 10 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 680 | W |
| T_J | | -55 ... +175 | $^\circ\text{C}$ |
| T_{JM} | | 175 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +175 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS | $t = 1\text{min}$ | 2500 V~ |
| | $I_{ISOL} \leq 1\text{mA}$ | $t = 1\text{s}$ | 3000 V~ |
| M_d | Mounting Torque | 1.5/13 | Nm/lb.in |
| | Terminal Connection Torque | 1.3/11.5 | Nm/lb.in |
| Weight | | 30 | g |

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- Low Package Inductance
- Avalanche Rated
- Low $R_{DS(ON)}$ and Q_G
- Fast Intrinsic Diode

Advantages

- Easy to Mount
- Space Savings
- High Power Density

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|---------------------------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 250\mu\text{A}$ | 200 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4\text{mA}$ | 2.5 | | V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0V$ | | | 25 μA 250 μA |
| | $T_J = 150^\circ\text{C}$ | | | |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 70A$, Note 1 $V_{GS} = 15V$, $I_D = 140A$, Note 1 | | 14 | 18 m Ω m Ω |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{V}$, $I_D = 70\text{A}$, Note 1 | 50 | 84 | S |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 7500 | pF |
| C_{oss} | | | 1630 | pF |
| C_{rss} | | | 280 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 70\text{A}$ $R_G = 3.3\Omega$ (External) | | 30 | ns |
| t_r | | | 35 | ns |
| $t_{d(off)}$ | | | 150 | ns |
| t_f | | | 90 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 70\text{A}$ | | 240 | nC |
| Q_{gs} | | | 50 | nC |
| Q_{gd} | | | 110 | nC |
| R_{thJC} | | | 0.22 | $^\circ\text{C/W}$ |
| R_{thCS} | | 0.05 | | $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{V}$ | | | 140 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | 280 A |
| V_{SD} | $I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 25\text{A}$, $-di/dt = 150\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ | | | 200 ns |
| Q_{RM} | | | 0.6 | μC |
| I_{RM} | | | 6.0 | A |

Note 1: Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.

Littelfuse reserves the right to change limits, test conditions, and dimensions.

| | | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|--------------|--------------|-------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065 B1 | 6,683,344 | 6,727,585 | 7,005,734 B2 | 7,157,338B2 |
| | 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123B1 | 6,534,343 | 6,710,405B2 | 6,759,692 | 7,063,975B2 | |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505 | 6,710,463 | 6,771,478 B2 | 7,071,537 | |

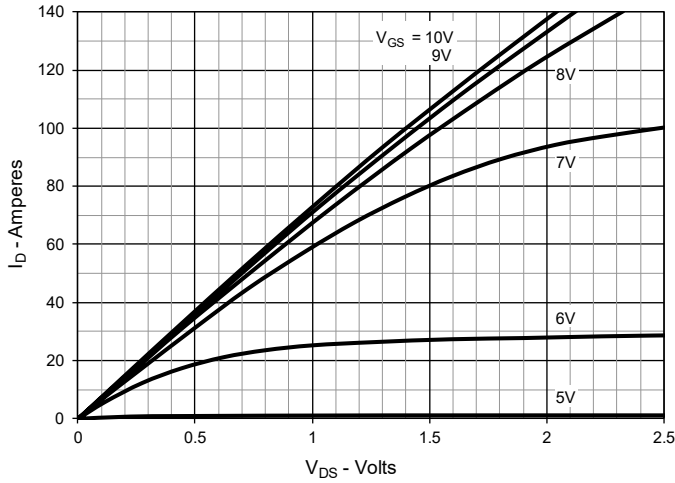
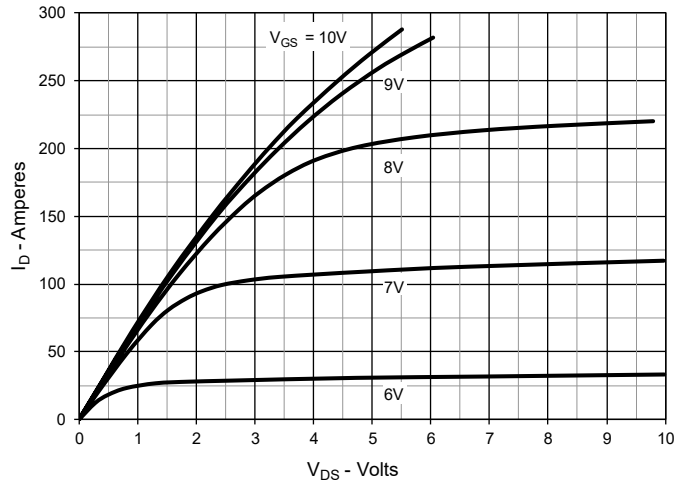
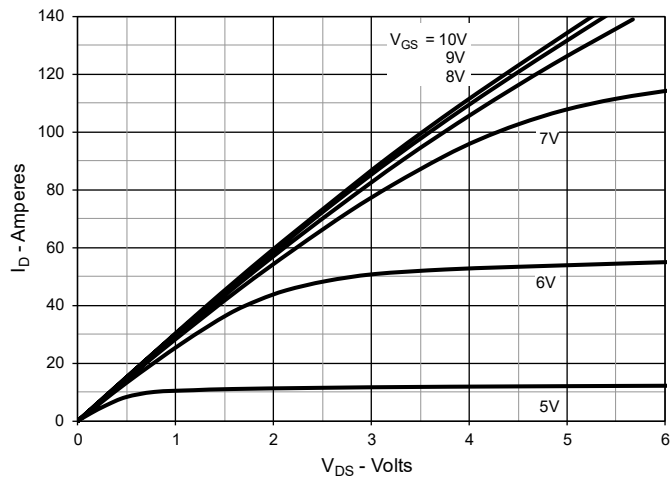
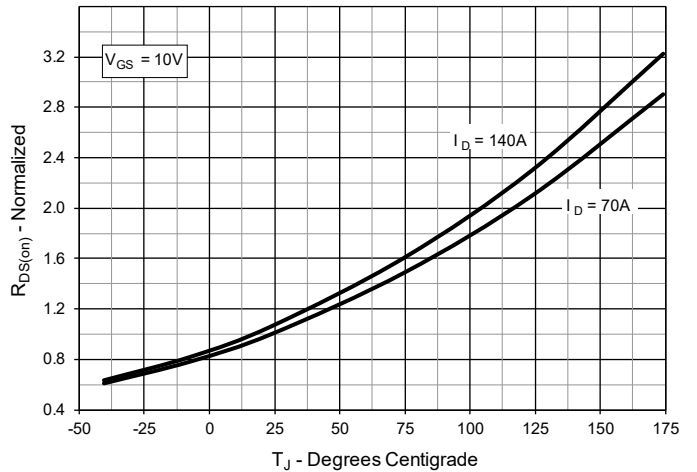
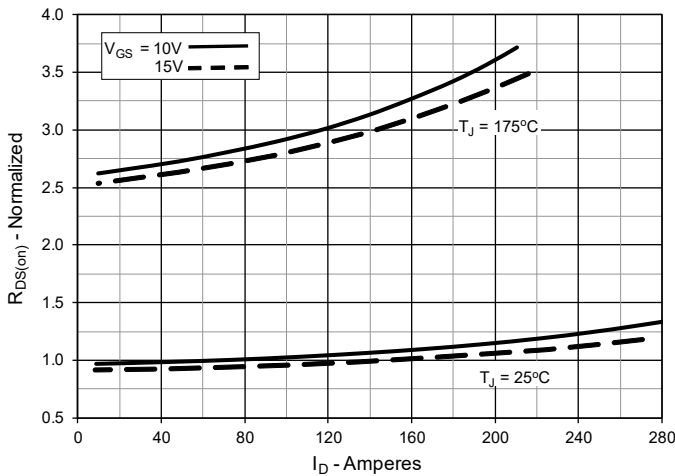
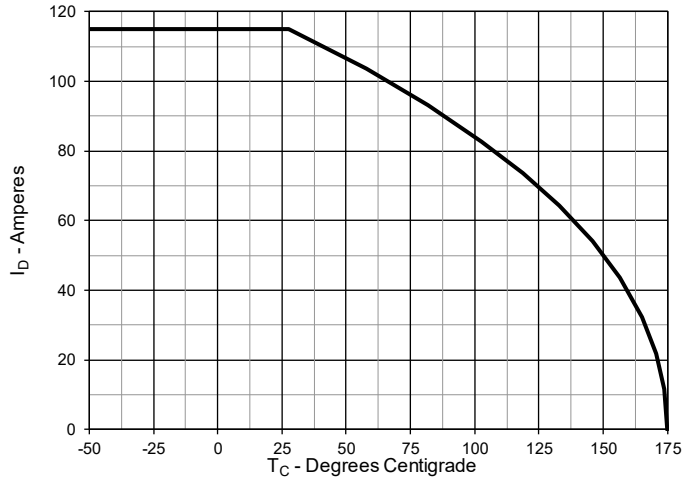
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 70\text{A}$ Value vs. Junction Temperature

Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 70\text{A}$ Value vs. Drain Current

Fig. 6. Maximum Drain Current vs. Case Temperature


Fig. 7. Input Admittance

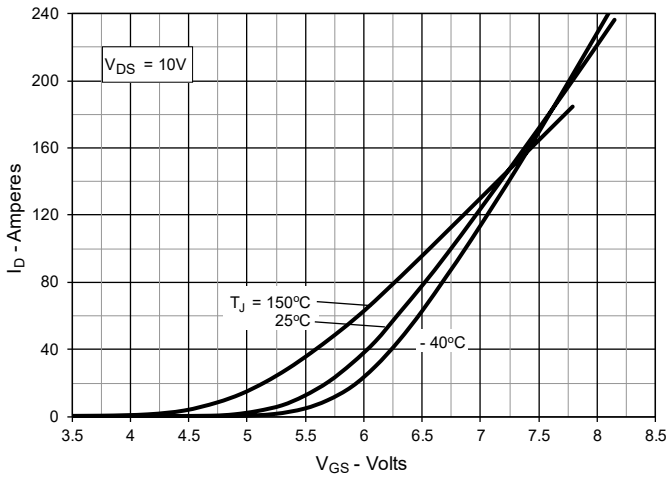


Fig. 8. Transconductance

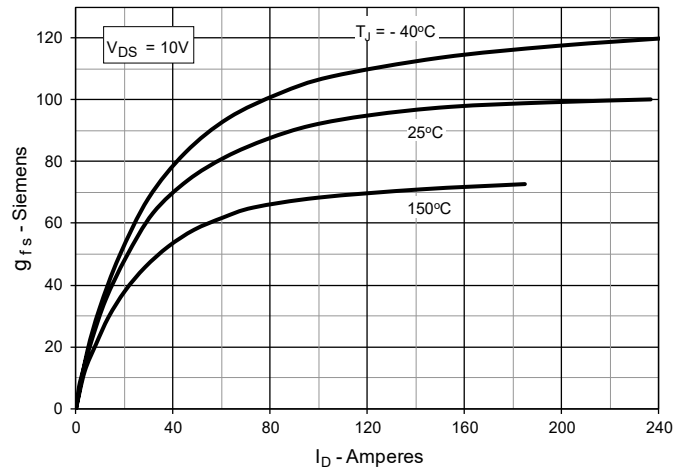


Fig. 9. Forward Voltage Drop of Intrinsic Diode

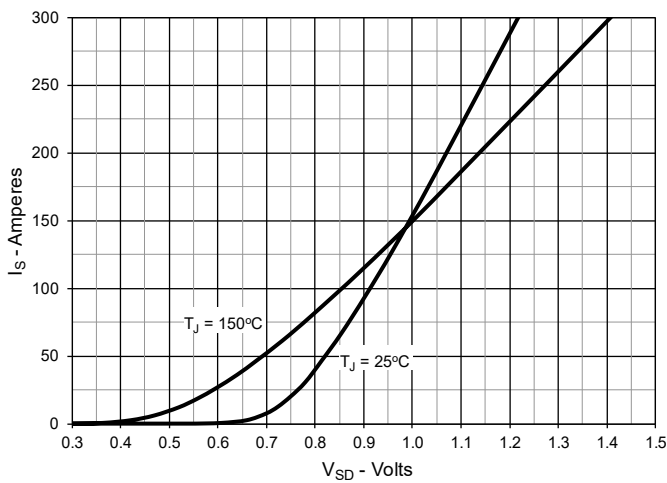


Fig. 10. Gate Charge

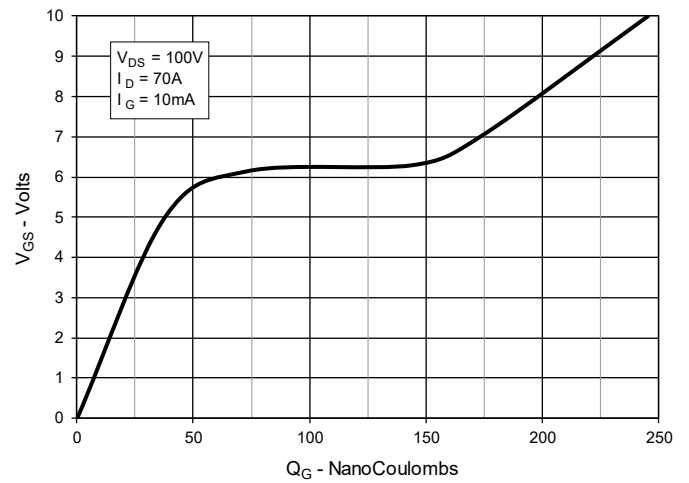


Fig. 11. Capacitance

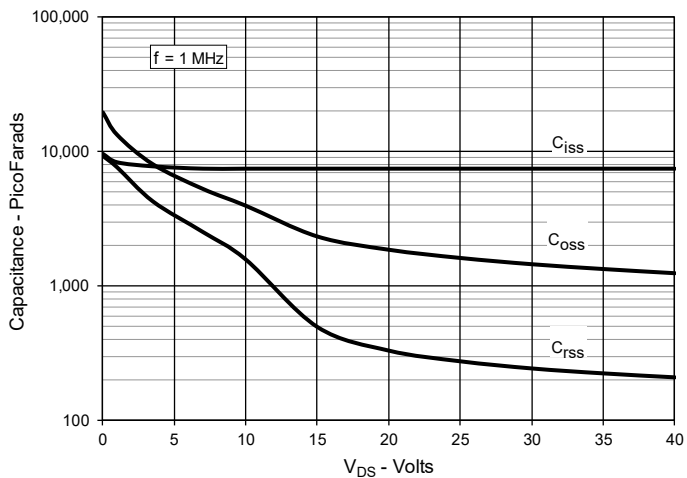


Fig. 12. Forward-Bias Safe Operating Area

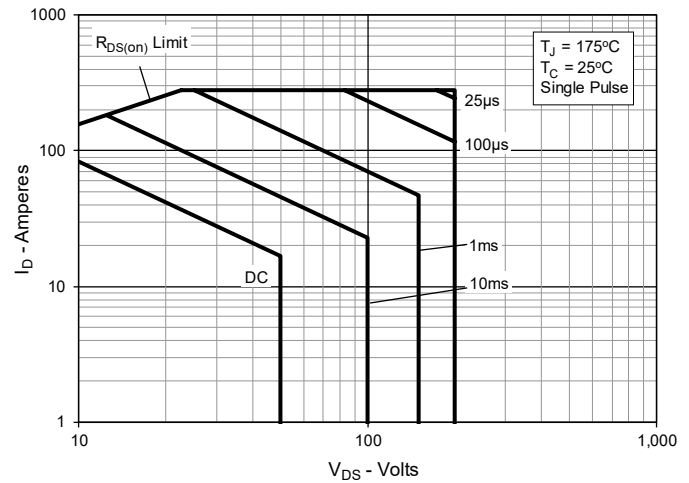
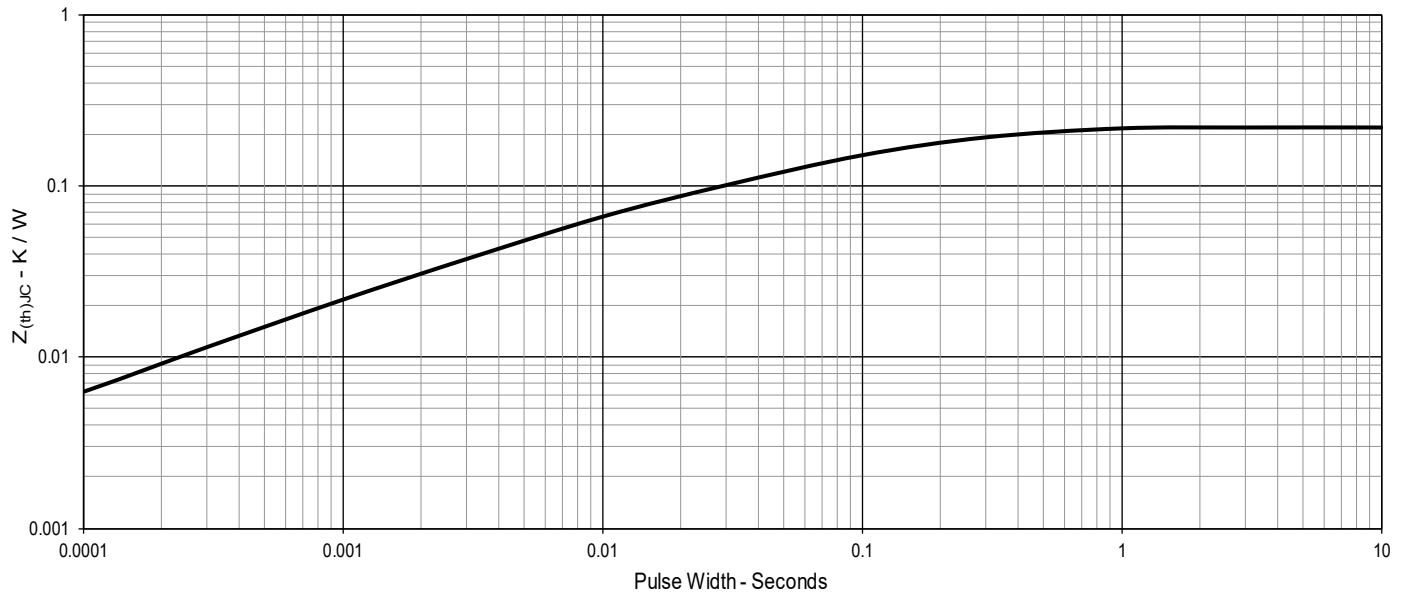
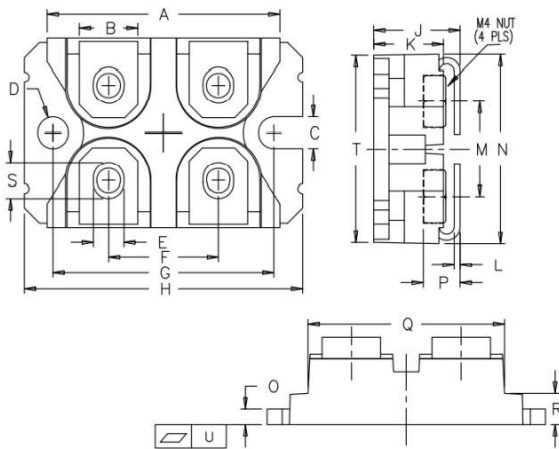


Fig. 13. Maximum Transient Thermal Impedance



SOT-227 miniBLOC


| SYM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.240 | 1.255 | 31.50 | 31.88 |
| B | .307 | .323 | 7.80 | 8.20 |
| C | .161 | .169 | 4.09 | 4.29 |
| D | .161 | .169 | 4.09 | 4.29 |
| E | .161 | .169 | 4.09 | 4.29 |
| F | .587 | .595 | 14.91 | 15.11 |
| G | 1.186 | 1.193 | 30.12 | 30.30 |
| H | 1.496 | 1.505 | 38.00 | 38.23 |
| J | .460 | .481 | 11.68 | 12.22 |
| K | .351 | .378 | 8.92 | 9.60 |
| L | .030 | .033 | 0.76 | 0.84 |
| M | .496 | .506 | 12.60 | 12.85 |
| N | .990 | 1.001 | 25.15 | 25.42 |
| O | .078 | .084 | 1.98 | 2.13 |
| P | .195 | .235 | 4.95 | 5.97 |
| Q | 1.045 | 1.059 | 26.54 | 26.90 |
| R | .155 | .174 | 3.94 | 4.42 |
| S | .186 | .191 | 4.72 | 4.85 |
| T | .968 | .987 | 24.59 | 25.07 |
| U | -.002 | .004 | -0.05 | 0.1 |