

P-Channel 20-V (D-S) MOSFET

| PRODUCT SUMMARY | | |
|---------------------|----------------------------------|--------------------|
| V _{DS} (V) | r _{DS(on)} (Ω) | I _D (A) |
| -20 | 0.054 @ V _{GS} = -4.5 V | -5.9 |
| | 0.075 @ V _{GS} = -2.5 V | -5.0 |

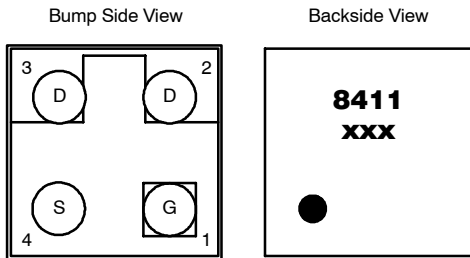
FEATURES

- TrenchFET® Power MOSFET
- New MICRO FOOT® Chipscale Packaging
Reduces Footprint Area Profile (0.62 mm) and On-Resistance Per Footprint Area

APPLICATIONS

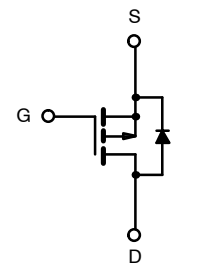
- Load Switch
- Battery Switch
- Charger Switch
- PA Switch

MICRO FOOT



Device Marking: 8411
xxx = Date/Lot Traceability Code

Ordering Information: Si8411DB-T1



P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED) | | | | | |
|---|-----------------------------------|-----------------------|--------------|------|---|
| Parameter | Symbol | 5 secs | Steady State | Unit | |
| Drain-Source Voltage | V _{DS} | -20 | | V | |
| Gate-Source Voltage | V _{GS} | ±12 | | | |
| Continuous Drain Current (T _J = 150°C) ^a | I _D | T _A = 25°C | -5.9 | -4.3 | A |
| | | T _A = 70°C | -4.7 | -3.4 | |
| Pulsed Drain Current | I _{DM} | -25 | | | |
| continuous Source Current (Diode Conduction) ^a | I _S | -2.5 | -1.3 | | |
| Maximum Power Dissipation ^a | P _D | T _A = 25°C | 2.77 | 1.47 | W |
| | | T _A = 70°C | 1.77 | 0.94 | |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | -55 to 150 | | °C | |
| Package Reflow Conditions ^b | VPR | 215 | | | |
| | IR/Convection | 220 | | | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|-------------------|--------------|---------|------|------|
| Parameter | Symbol | Typical | Maximum | Unit | |
| Maximum Junction-to-Ambient ^a | R _{thJA} | t ≤ 5 sec | 35 | 45 | °C/W |
| | | Steady State | 72 | 85 | |
| Maximum Junction-to-Foot (drain) | R _{thJF} | 16 | 20 | | |

Notes

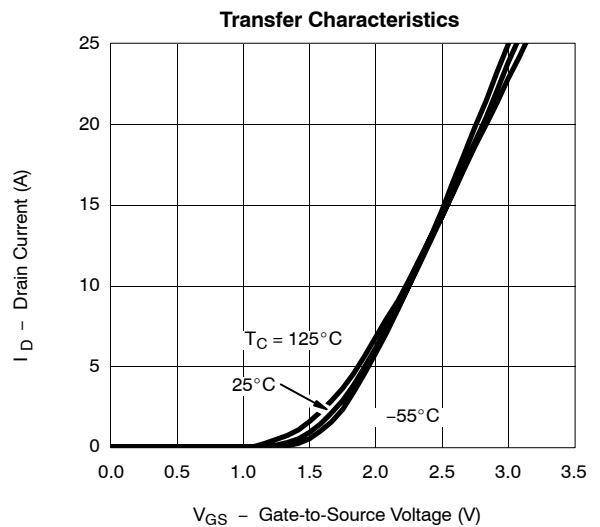
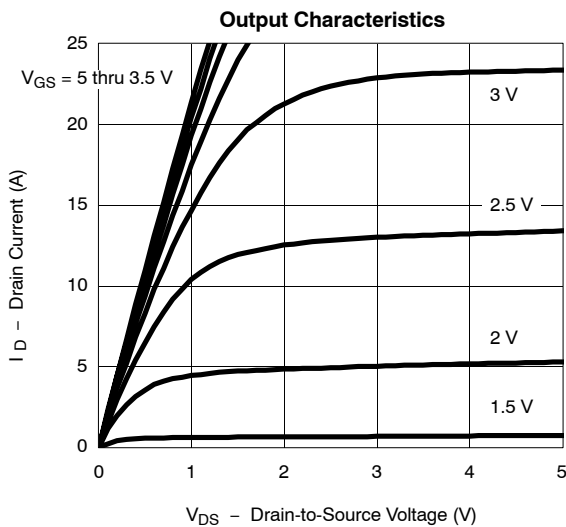
- Surface Mounted on 1" x 1" FR4 Board.
- Refer to IPC/JEDEC (J-STD-020A), no manual or hand soldering.

| SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED) | | | | | | |
|--|---------------------|--|------|-------|-------|------|
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
| Static | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = -250 μA | -0.6 | | -1.4 | V |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±12 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = -20 V, V _{GS} = 0 V | | | -1 | μA |
| | | V _{DS} = -20 V, V _{GS} = 0 V, T _J = 70 °C | | | -5 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} ≤ -5 V, V _{GS} = -4.5 V | -5 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = -4.5 V, I _D = -1 A | | 0.045 | 0.054 | Ω |
| | | V _{GS} = -2.5 V, I _D = -1 A | | 0.065 | 0.075 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = -10 V, I _D = -1 A | | 7 | | S |
| Diode Forward Voltage ^a | V _{SD} | I _S = -1 A, V _{GS} = 0 V | | -0.8 | -1.1 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q _g | V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -1 A | | 14 | 21 | nC |
| Gate-Source Charge | Q _{gs} | | | 1.7 | | |
| Gate-Drain Charge | Q _{gd} | | | 5.1 | | |
| Gate Resistance | R _g | | | 18 | | Ω |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = -10 V, R _L = 10 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _G = 6 Ω | | 31 | 50 | ns |
| Rise Time | t _r | | | 50 | 75 | |
| Turn-Off Delay Time | t _{d(off)} | | | 105 | 160 | |
| Fall Time | t _f | | | 90 | 135 | |
| Source-Drain Reverse Recovery Time | t _{rr} | I _F = -1 A, di/dt = 100 A/μs | | 85 | 130 | |

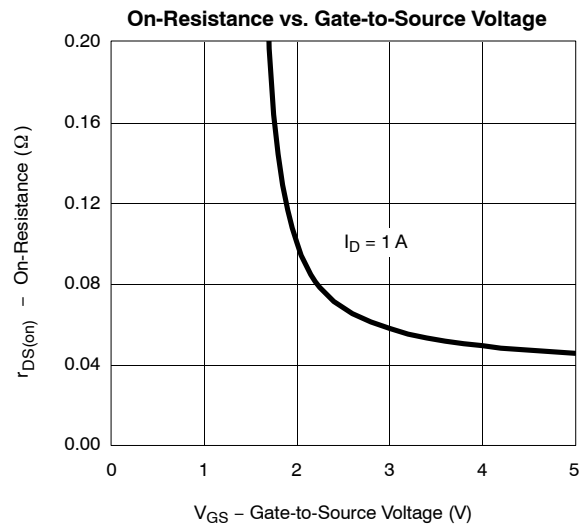
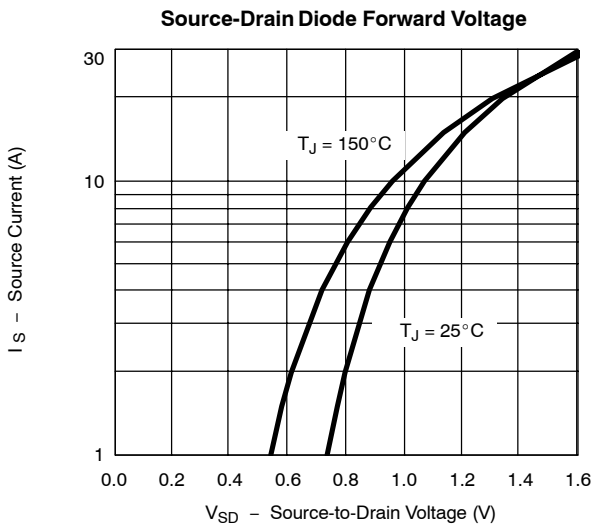
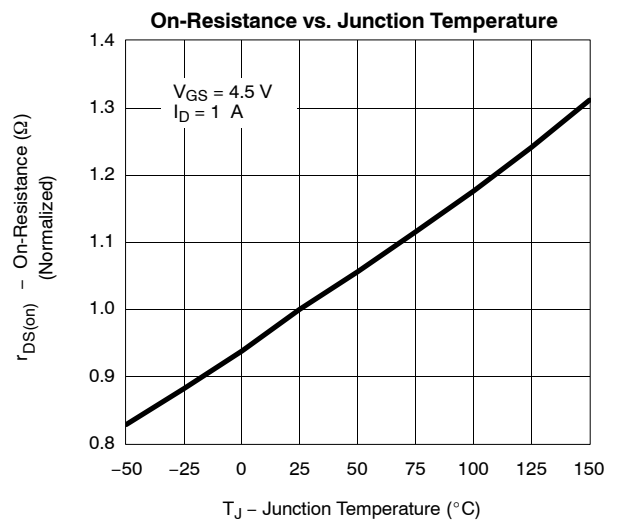
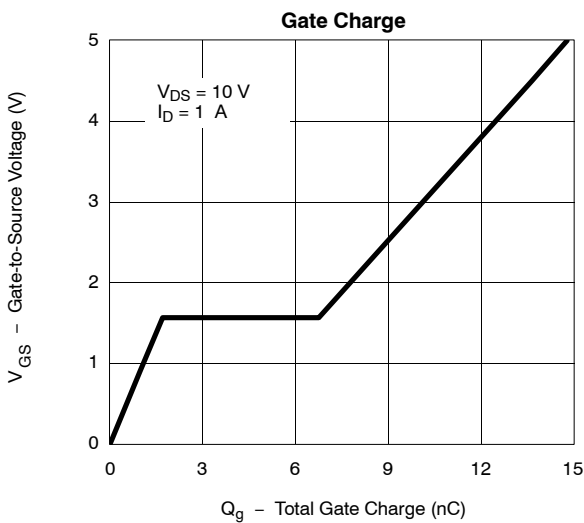
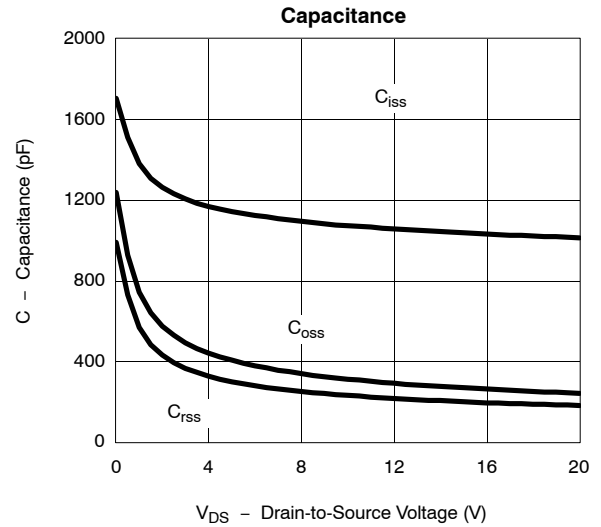
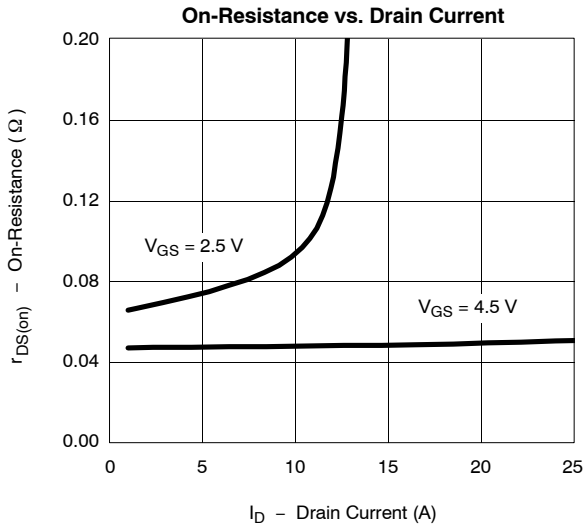
Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

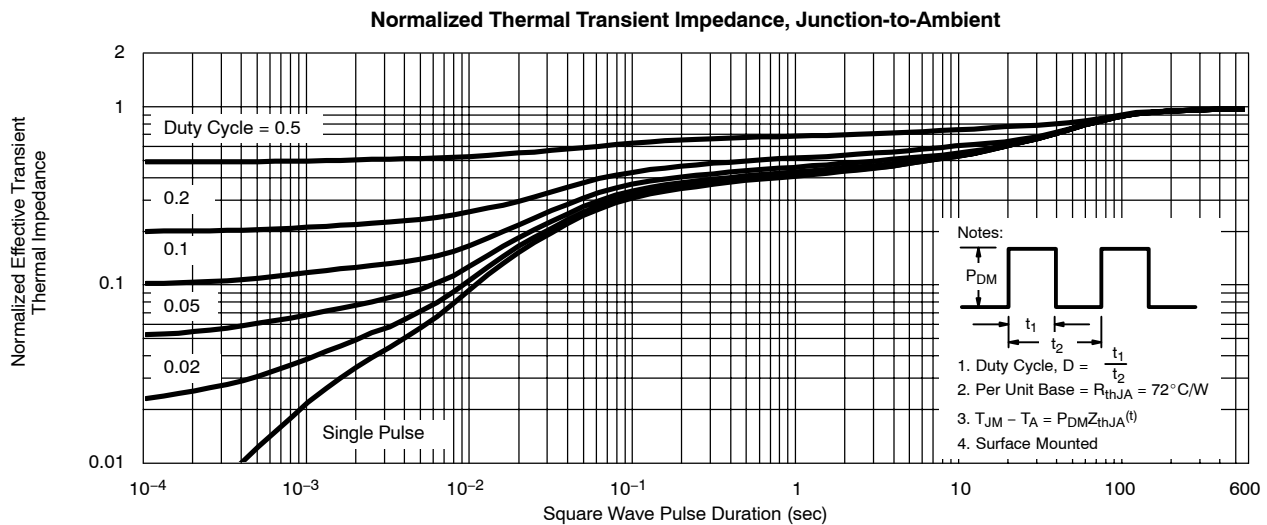
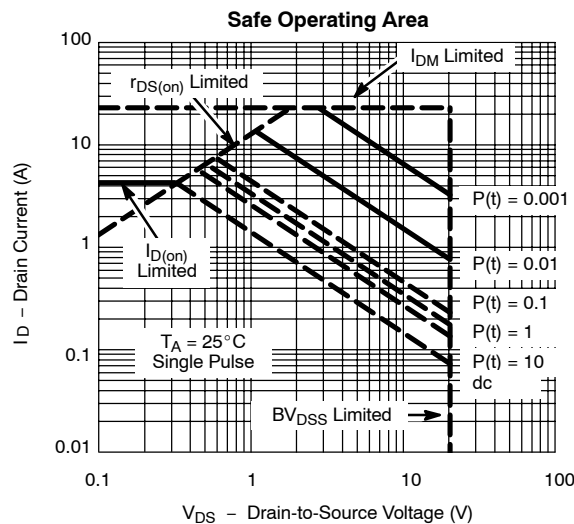
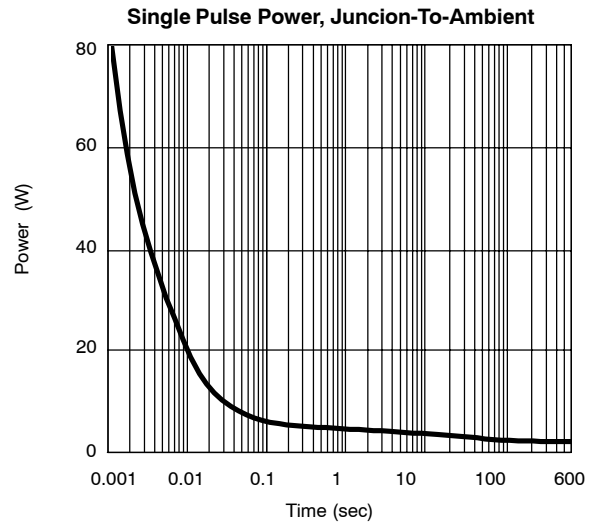
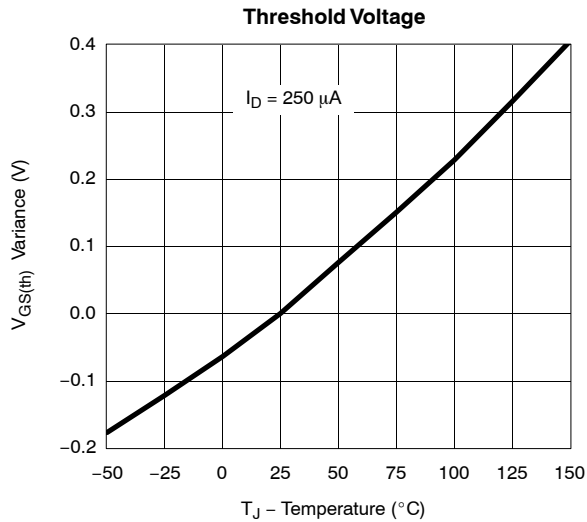
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



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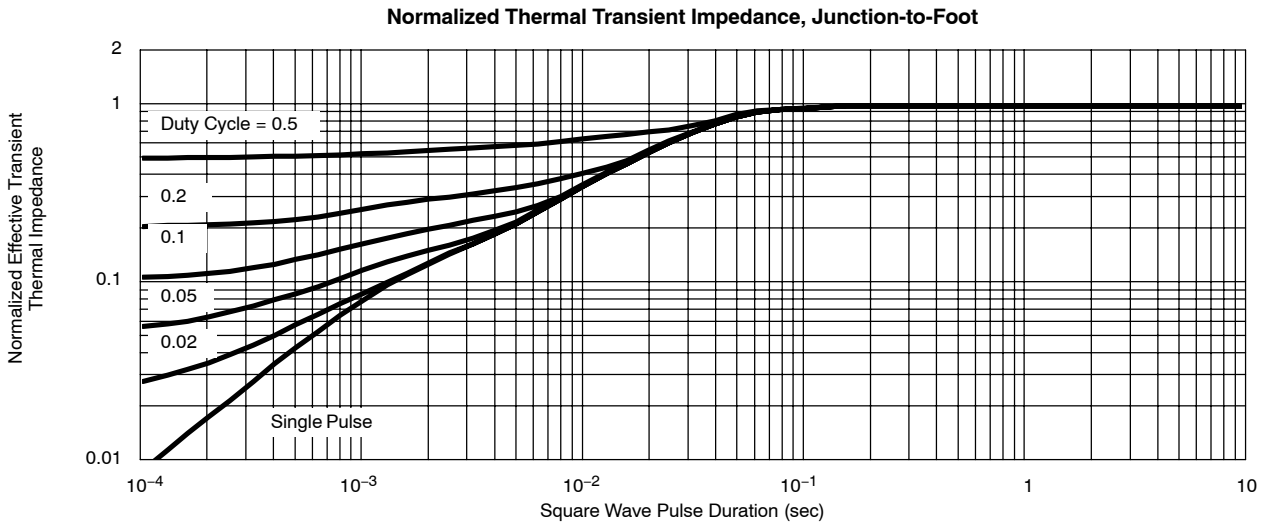


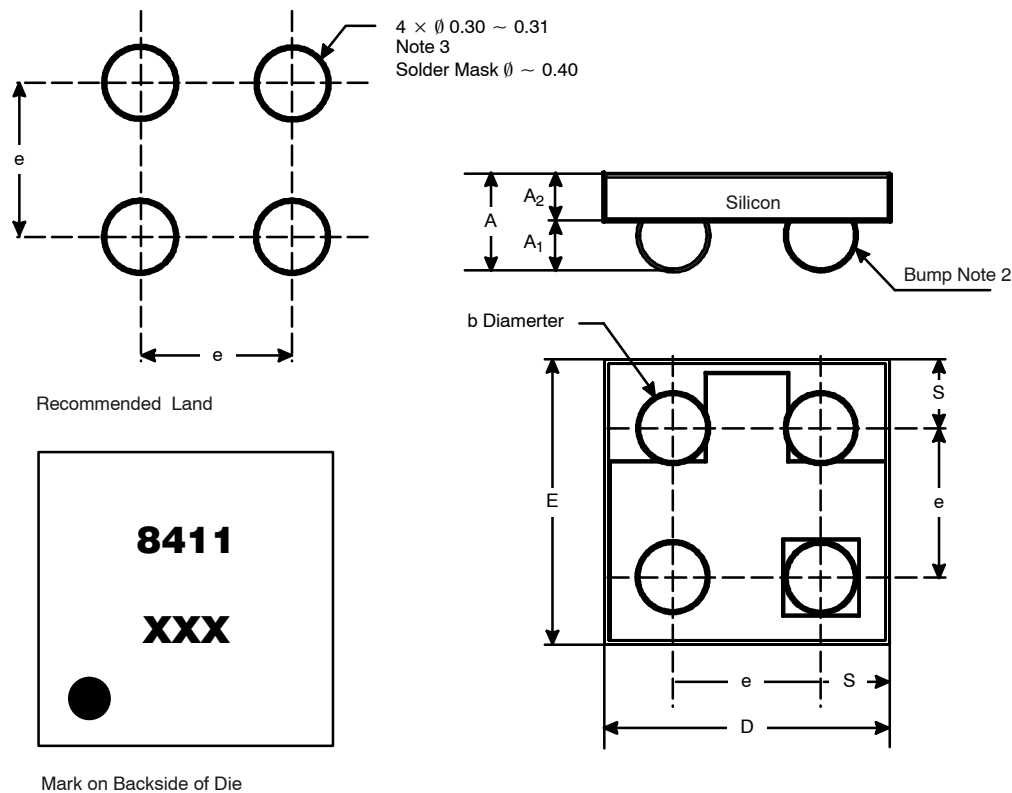
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PACKAGE OUTLINE
MICRO FOOT: 4-BUMP (2 X 2, 0.8-mm PITCH)

NOTES (Unless Otherwise Specified):

1. Laser mark on the silicon die back, coated with a thin metal.
2. Bumps are Eutectic solder 63/57 Sn/Pb.
3. Non-solder mask defined copper landing pad.
4. The flat side of wafers is oriented at the bottom.

| Dim | MILLIMETERS* | | INCHES | |
|----------------------|--------------|-------|--------|--------|
| | Min | Max | Min | Max |
| A | 0.600 | 0.650 | 0.0236 | 0.0256 |
| A₁ | 0.260 | 0.290 | 0.0102 | 0.0114 |
| A₂ | 0.340 | 0.360 | 0.0134 | 0.0142 |
| b | 0.370 | 0.410 | 0.0146 | 0.0161 |
| D | 1.520 | 1.600 | 0.0598 | 0.0630 |
| E | 1.520 | 1.600 | 0.0598 | 0.0630 |
| e | 0.750 | 0.850 | 0.0295 | 0.0335 |
| S | 0.370 | 0.380 | 0.0146 | 0.0150 |

* Use millimeters as the primary measurement.