

FEATURES

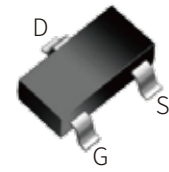
- | Energy Efficient

- | Low Threshold Voltage

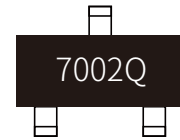
- | High-speed Switching

- | DC/DC Converter

- | Meet AEC-Q101 Requirements



SOT-23



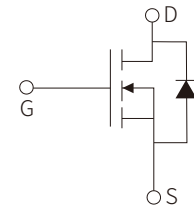
Marking

MECHANICAL DATA

- | SOT-23 Small Outline Plastic Package

- | Epoxy UL: 94V-0

- | Mounting Position: Any



Schematic Symbol

APPROVALS

| | |
|-------------|------------------------------------|
| RoHS | Compliance with 2011/65/EU |
| HF | Compliance with IEC61249-2-21:2003 |

ABSOLUTE MAXIMUM RATINGS($T_a=25^{\circ}\text{C}$)

| Parameter | Symbol | Value | Unit |
|---|-----------------|------------|-----------------------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Continuous Drain Current | I_D | 0.4 | A |
| Gate Source Voltage | V_{GS} | ± 20 | V |
| Power Dissipation | P_D | 225 | mW |
| Thermal Resistance From Junction to Ambient | $R_{\theta JA}$ | 556 | $^{\circ}\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^{\circ}\text{C}$ |

ELECTRICAL CHARACTERISTICS (T_A=25°C)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|--|----------------------|---|------|------|------|------|
| Static Characteristics | | | | | | |
| Drain-source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _{DS} =250μA | 60 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.5 | 2.0 | V |
| Drain Cut-Off Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V | | | 1 | μA |
| Gate Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA |
| Drain Source ON Resistance | R _{DS(on)} | V _{GS} =10V, I _D =0.2A | | 690 | 900 | mΩ |
| | | V _{GS} =4.5V, I _D =0.1A | | 800 | 1060 | mΩ |
| Dynamic Characteristics | | | | | | |
| Total Gate Charge | Q _g | V _{DS} =30V, V _{GS} =10V, I _D =300mA | | 1.6 | | nC |
| Gate-Source Charge | Q _{gs} | | | 0.47 | | nC |
| Gate-Drain Charge | Q _{gd} | | | 0.25 | | nC |
| Input capacitance | C _{iss} | V _{GS} =0V, V _{DS} =30V, f=1.0MHz | | 27.5 | | pF |
| Output capacitance | C _{oss} | | | 2.75 | | pF |
| Reverse transfer capacitance | C _{rss} | | | 1.9 | | pF |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =30V, V _{GS} =10V I _D =300mA, R _{GEN} =5Ω | | 3.3 | | ns |
| Turn-on Rise Time | t _r | | | 19 | | ns |
| Turn-Off Delay Time | t _{d(off)} | | | 9.6 | | ns |
| Turn-Off Fall Time | t _f | | | 49 | | ns |
| Drain Source Body Diode Characteristics | | | | | | |
| Source Drain Diode Forward Voltage | V _{SD} | I _S =115A, V _{GS} =0V | 0.55 | | 1.2 | V |
| Maximum Continuous Drain to Source Diode Forward Current | I _S | | | | 0.4 | A |

PARAMETER CHARACTERISTIC CURVE

Figure 1: Output Characteristics

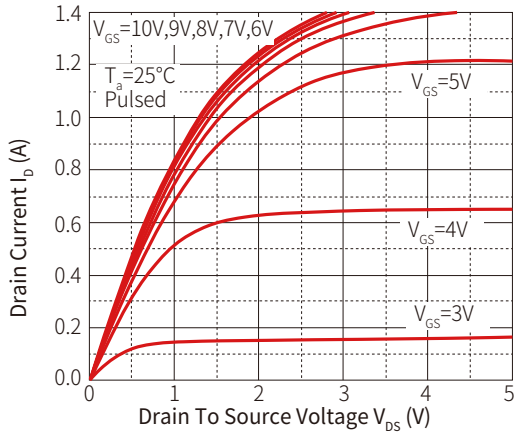


Figure 2: Typical Characteristics

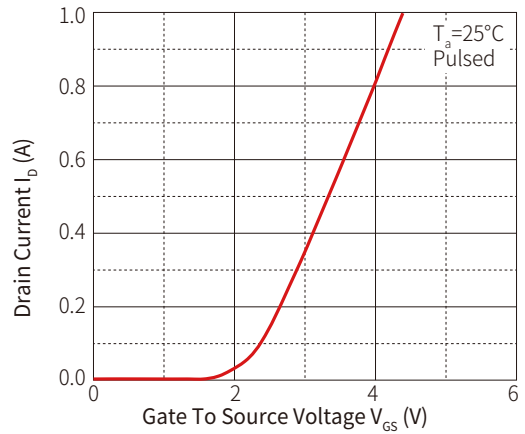


Figure 3: $R_{DS(ON)}$ vs I_D

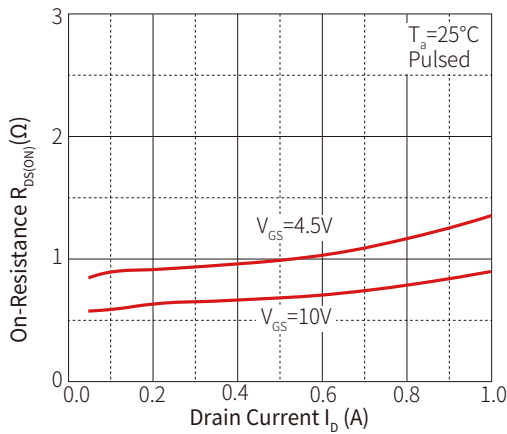


Figure 4: $R_{DS(ON)}$ vs V_{GS}

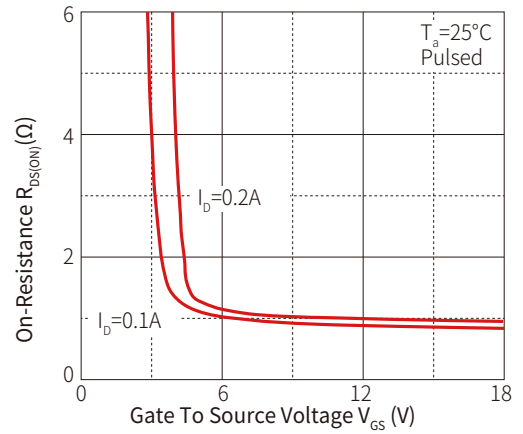


Figure 5: Drain-Source On Resistance

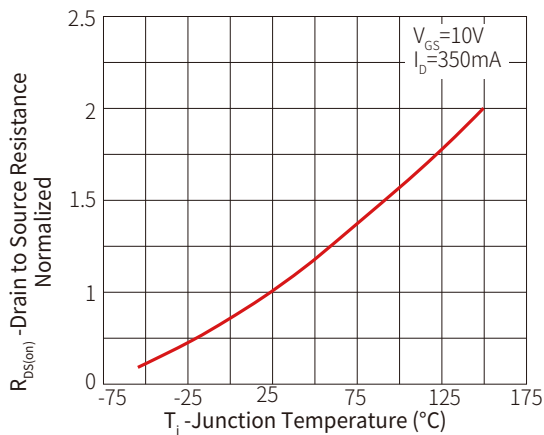


Figure 6: Drain Current

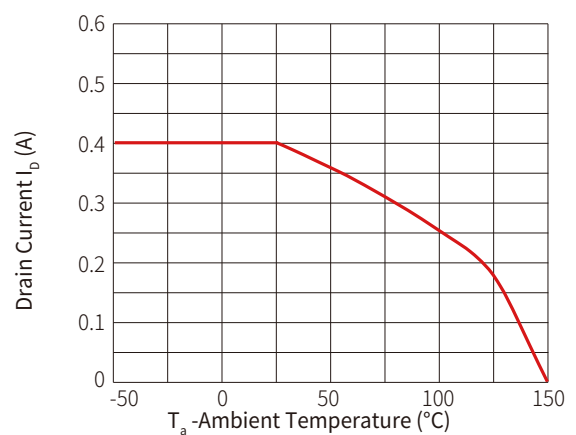


Figure 7: I_s — V_{DS}

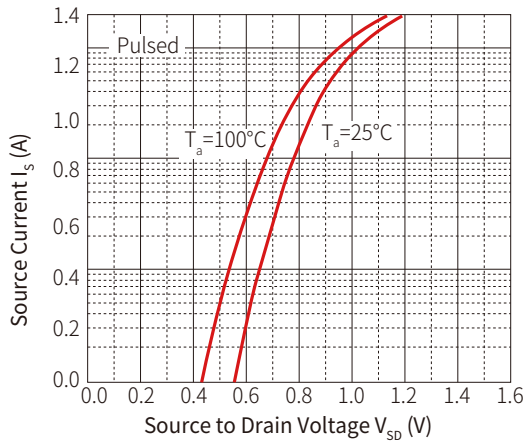


Figure 8: Threshold Voltage

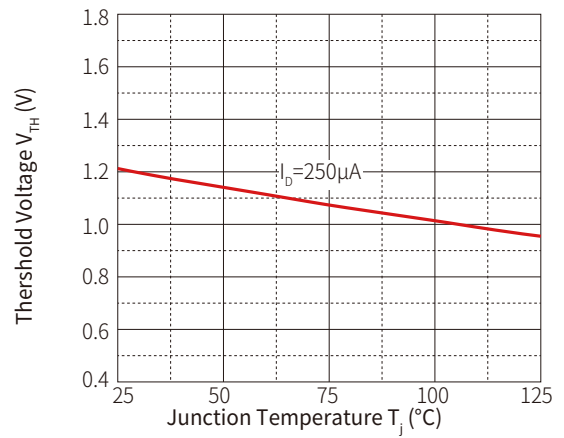


Figure 9: Capacitance

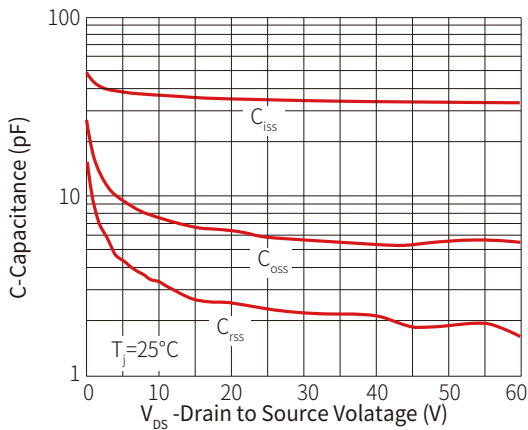


Figure 10: Gate Charge Characteristics

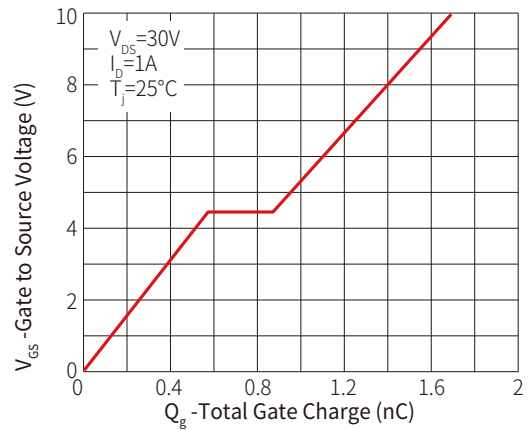


Figure 11: Normalized Breakdown Voltage vs. Junction Temperature

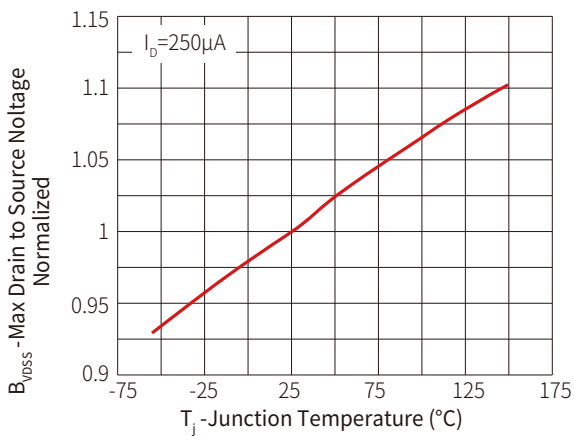


Figure 11: Power Dissipation

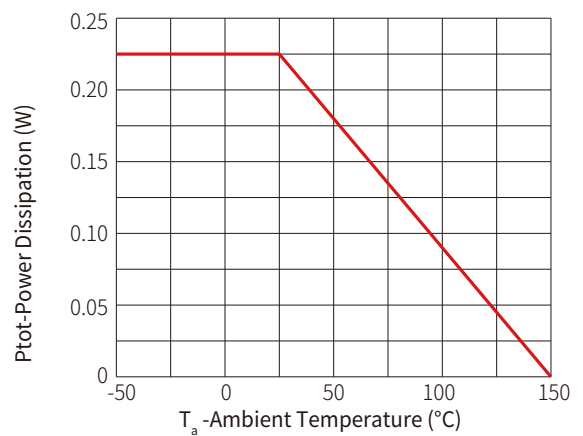
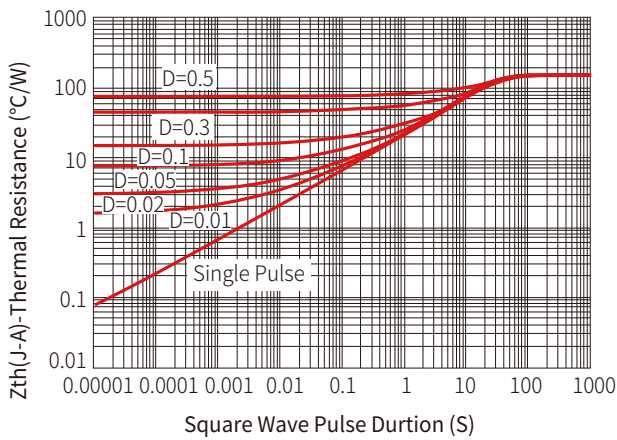
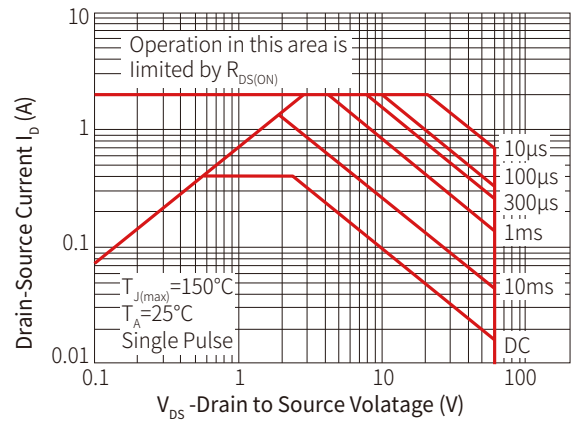
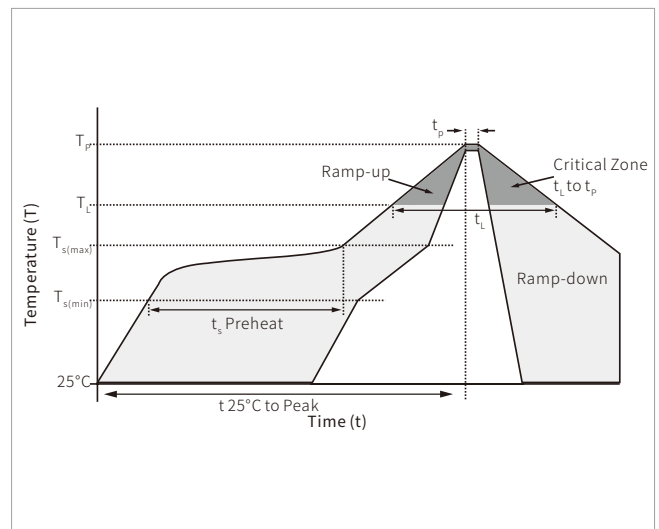


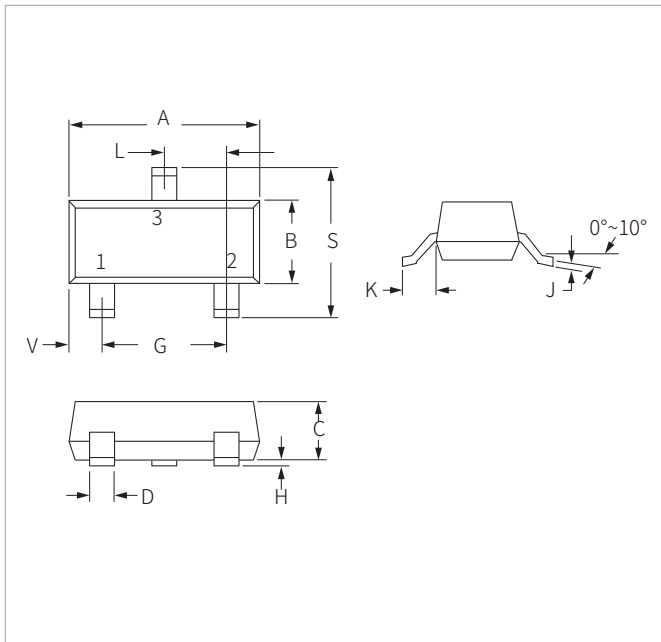
Figure 7: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Figure 8: Maximum Safe Operating Area


SOLDERING PARAMETERS

| Reflow Condition | | Lead-free assembly |
|--|----------------------------------|--------------------|
| Pre Heat | Temperature Max ($T_{s(min)}$) | 150°C |
| | Temperature Max ($T_{s(max)}$) | 200°C |
| | Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | Temperature (T_L) (Liquidus) | 217°C |
| | Time (min to max) (t_l) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260°C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 – 40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes max. |
| Do not exceed | | 260°C |

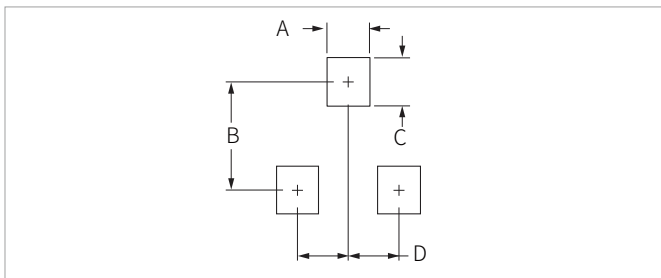


SOT-23 PACKAGE INFORMATION



| Ref. | Millimeters | | Inches | |
|------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.80 | 3.05 | 0.110 | 0.120 |
| B | 1.20 | 1.60 | 0.047 | 0.063 |
| C | 0.90 | 1.15 | 0.035 | 0.045 |
| D | 0.37 | 0.50 | 0.015 | 0.020 |
| G | 1.75 | 2.05 | 0.069 | 0.081 |
| H | 0.01 | 0.100 | 0.001 | 0.004 |
| J | 0.085 | 0.180 | 0.003 | 0.007 |
| K | 0.35 | 0.69 | 0.014 | 0.029 |
| L | 0.89 | 1.02 | 0.035 | 0.040 |
| S | 2.10 | 2.65 | 0.083 | 0.104 |
| V | 0.45 | 0.60 | 0.018 | 0.024 |

RECOMMENDED PAD LAYOUT DIMENSIONS



| Ref. | Millimeters | | Inches | |
|------|-------------|------|--------|-------|
| | Min | Max | Min | Max |
| A | 0.71 | 0.97 | 0.028 | 0.038 |
| B | 1.88 | 2.13 | 0.074 | 0.084 |
| C | 0.71 | 0.97 | 0.028 | 0.038 |
| D | 0.81 | 1.07 | 0.032 | 0.042 |

ORDERING INFORMATION

| Part Number | Component Package | QTY/Reel | Reel Size |
|-------------|-------------------|----------|-----------|
| SNM2N7002SQ | SOT-23 | 3000PCS | 7" |

Headquarters

No.3387 Shendu Road
Pujiang I&E Park
Minhang Shanghai China
201000

Hotline

400-021-5756

Web

<https://www.semiware.com>

Sales Center

Tel: 86-21-3463-7458
Email: sales18@semiware.com

Customer Service

Tel: 86-21-5484-1001
Email: sales17@semiware.com

Technical Support

Tel: 86-21-3463-7654
Email: fae01@semiware.com

Complaint & Suggestions

Tel: 86-21-3463-7172
Ext: 8868
Email: cs03@semiware.com

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Website



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