SamHop Microelectronics Corp.

# STT04N20

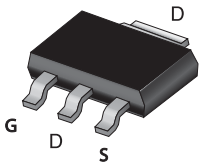
Ver 1.0

## N-Channel Logic Level Enhancement Mode Field Effect Transistor

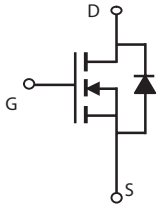
| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DSS}$ | $I_D$ | $R_{DS(ON)}$ (Ω) Max |
| 200V | 1A | 1.8 @ VGS=10V |
| | | 2.0 @ VGS=4.5V |

### FEATURES

- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- Surface Mount Package.




STT SERIES
SOT - 223




### ABSOLUTE MAXIMUM RATINGS ($T_A$=25°C unless otherwise noted)

| Symbol | Parameter | | Limit | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | | 200 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Drain Current-Continuous [a] | $T_A$=25°C | 1 | A |
| | | $T_A$=70°C | 0.8 | A |
| $I_{DM}$ | -Pulsed [b] | | 6.6 | A |
| $P_D$ | Maximum Power Dissipation [a] | $T_A$=25°C | 3 | W |
| | | $T_A$=70°C | 1.9 | W |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature Range | | -55 to 150 | °C |

### THERMAL CHARACTERISTICS

| | | | |
|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient [a] | 42 | °C/W |

## ELECTRICAL CHARACTERISTICS ($T_A$=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 200 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=160V , $V_{GS}$=0V | | | 1 | uA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$= ±20V , $V_{DS}$=0V | | | ±100 | nA |
| **ON CHARACTERISTICS** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$ , $I_D$=250uA | 1 | 1.8 | 2.5 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=10V , $I_D$=0.5A | | 1.4 | 1.8 | ohm |
| | | $V_{GS}$=4.5V , $I_D$=0.5A | | 1.6 | 2.0 | ohm |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=10V , $I_D$=0.5A | | 7.5 | | S |
| **DYNAMIC CHARACTERISTICS** [c] | | | | | | |
| $C_{ISS}$ | Input Capacitance | $V_{DS}$=25V,$V_{GS}$=0V f=1.0MHz | | 385 | | pF |
| $C_{OSS}$ | Output Capacitance | | | 21 | | pF |
| $C_{RSS}$ | Reverse Transfer Capacitance | | | 12 | | pF |
| **SWITCHING CHARACTERISTICS** [c] | | | | | | |
| $t_{D(ON)}$ | Turn-On Delay Time | $V_{DD}$=100V $I_D$=0.5A $V_{GS}$=10V $R_{GEN}$= 6 ohm | | 8.3 | | ns |
| tr | Rise Time | | | 10 | | ns |
| $t_{D(OFF)}$ | Turn-Off Delay Time | | | 20 | | ns |
| tf | Fall Time | | | 4.5 | | ns |
| $Q_g$ | Total Gate Charge | $V_{DS}$=100V,$I_D$=0.5A,$V_{GS}$=10V | | 5.7 | | nC |
| | | $V_{DS}$=100V,$I_D$=0.5A,$V_{GS}$=4.5V | | 3 | | nC |
| $Q_{gs}$ | Gate-Source Charge | $V_{DS}$=100V,$I_D$=0.5A, $V_{GS}$=10V | | 0.9 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | | 1.2 | | nC |
| **DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V,$I_S$=0.5A | | 0.81 | 1.2 | V |

### Notes

a.Surface Mounted on FR4 Board,t ≤ 10sec.
b.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.
c.Guaranteed by design, not subject to production testing.

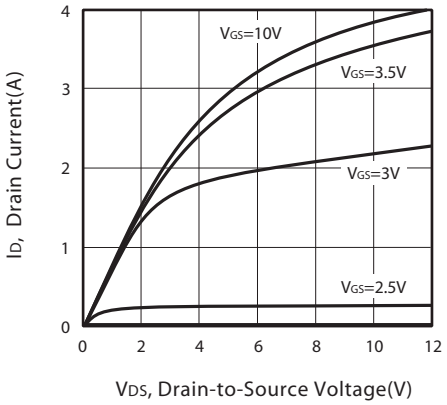



Figure 1. Output Characteristics

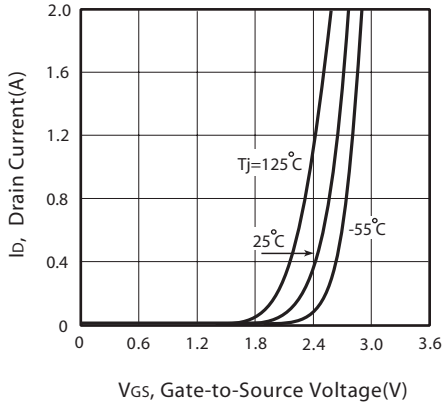



Figure 2. Transfer Characteristics

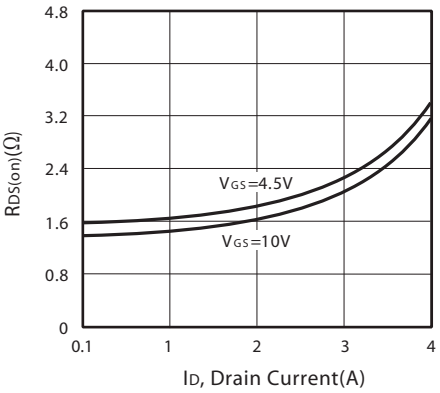



Figure 3. On-Resistance vs. Drain Current and Gate Voltage

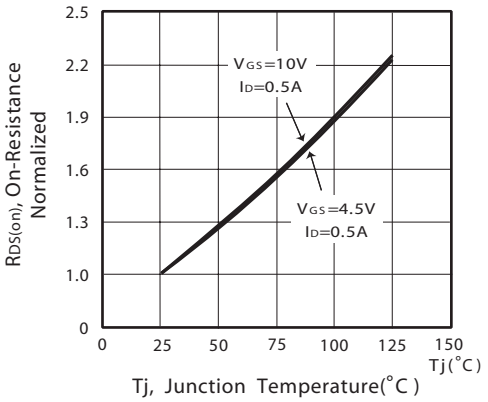



Figure 4. On-Resistance Variation with Drain Current and Temperature

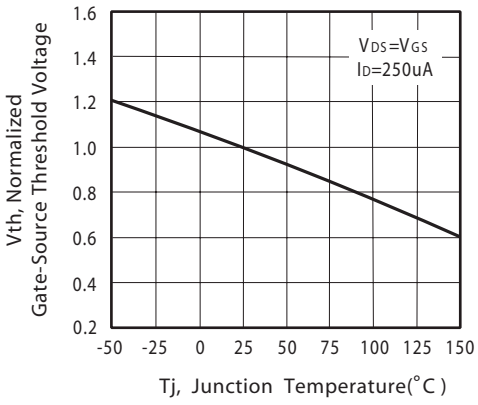



Figure 5. Gate Threshold Variation with Temperature

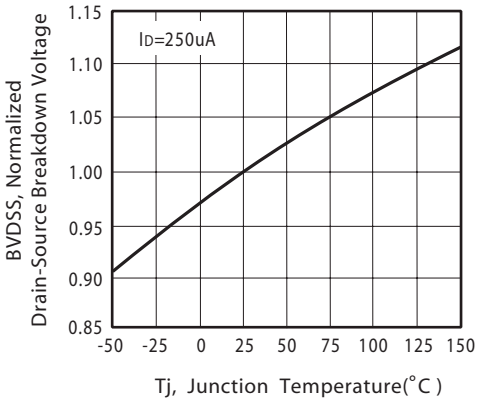



Figure 6. Breakdown Voltage Variation with Temperature

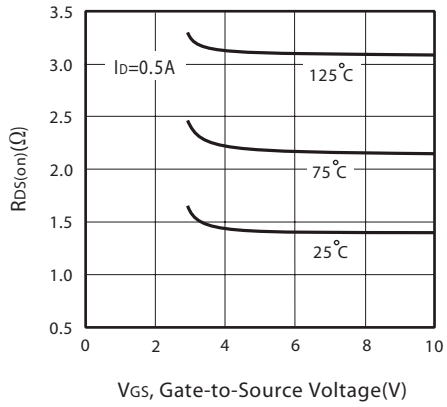



Figure 7. On-Resistance vs. Gate-Source Voltage

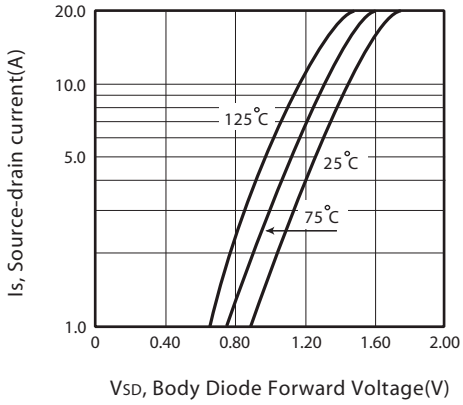



Figure 8. Body Diode Forward Voltage Variation with Source Current

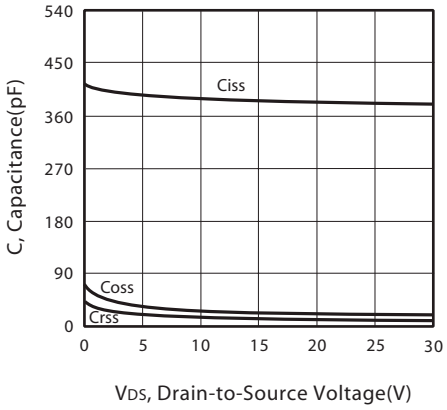



Figure 9. Capacitance

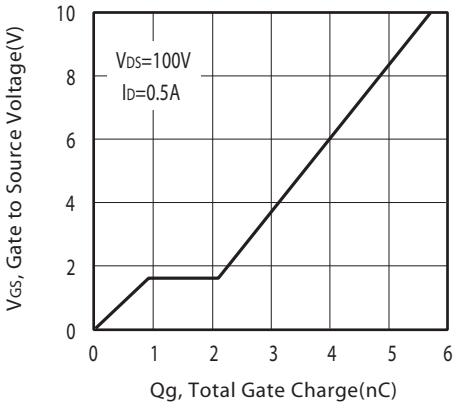



Figure 10. Gate Charge

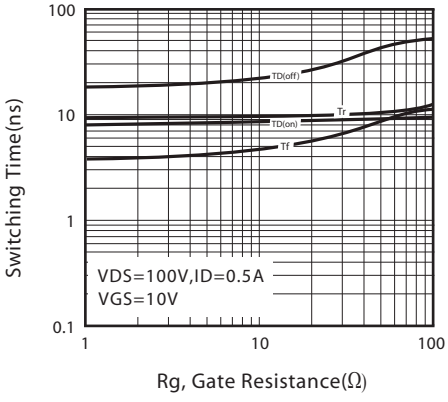



Figure 11. switching characteristics

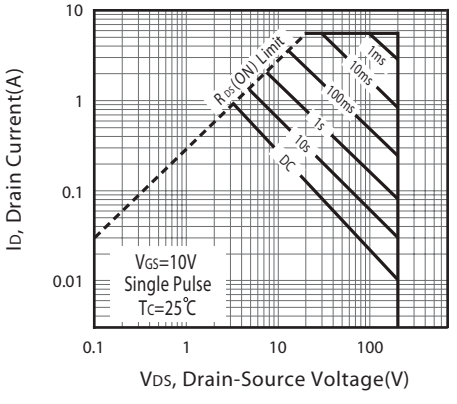



Figure 12. Maximum Safe Operating Area

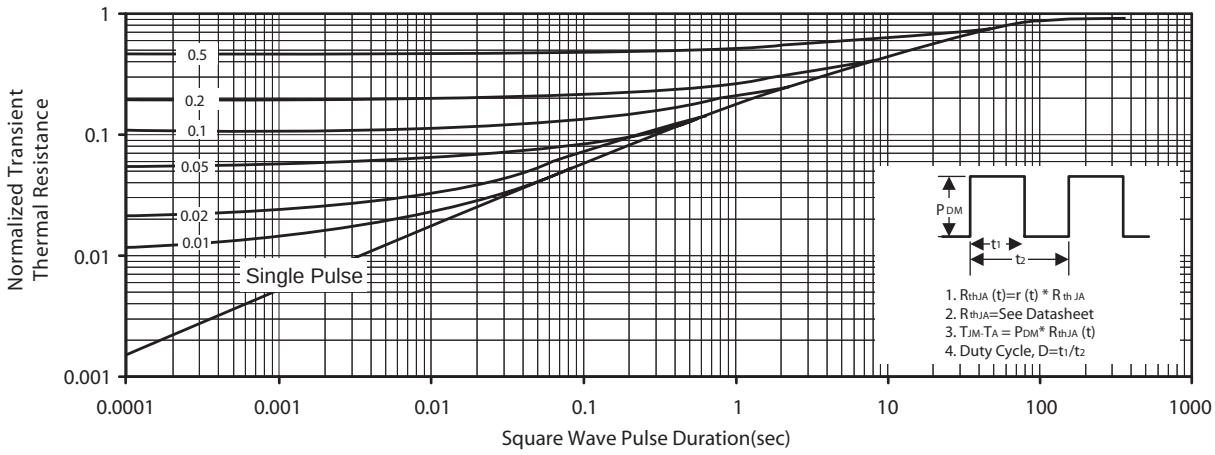
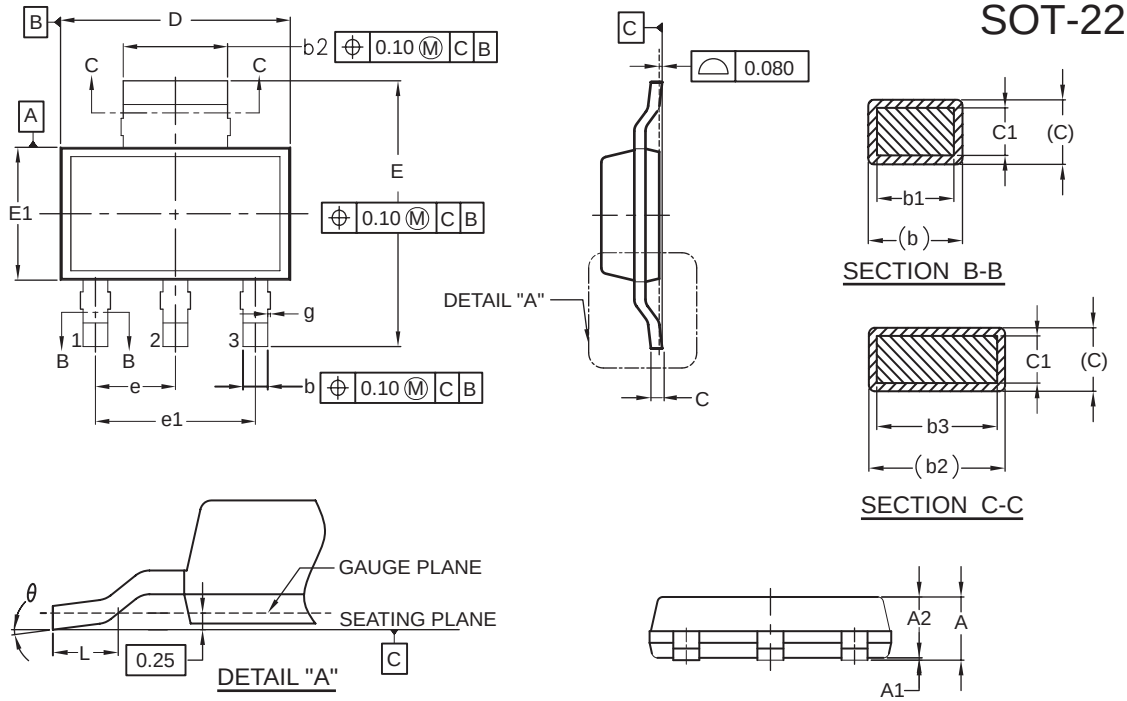



Figure 13. Normalized Thermal Transient Impedance Curve

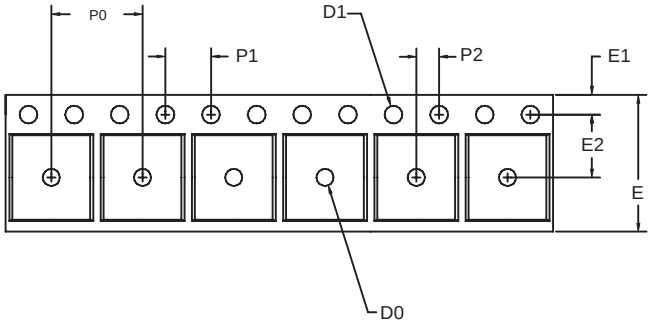
## SOT-223

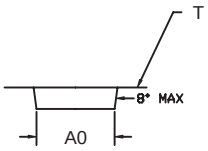


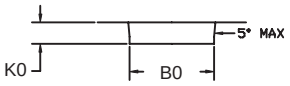

| SYMBOL | COMMON | | | | | |
|---|---|---|---|---|---|---|
| | DIMENSIONS MILLIMETER | | | DIMENSIONS INCHE | | |
| | MIN. | MOM. | MAX. | MIN. | MOM. | MAX. |
| A | — | — | 1.80 | — | — | 0.0709 |
| A1 | 0.02 | — | 0.10 | 0.0008 | — | 0.0039 |
| A2 | 1.50 | 1.60 | 1.70 | 0.0591 | 0.0630 | 0.0669 |
| b | 0.66 | 0.76 | 0.84 | 0.0260 | 0.0300 | 0.0330 |
| b1 | 0.60 | 0.71 | 0.79 | 0.0236 | 0.0280 | 0.0311 |
| b2 | 2.90 | 3.00 | 3.10 | 0.1142 | 0.1181 | 0.1220 |
| b3 | 2.84 | 2.95 | 3.05 | 0.1118 | 0.1161 | 0.1200 |
| g | — | — | 0.06 | — | — | 0.0020 |
| c | 0.23 | 0.30 | 0.35 | 0.0090 | 0.1181 | 0.1378 |
| c1 | 0.23 | 0.28 | 0.33 | 0.0090 | 0.0110 | 0.0130 |
| D | 6.30 | 6.50 | 6.70 | 0.2480 | 0.2560 | 0.2638 |
| E | 6.70 | 7.00 | 7.30 | 0.2638 | 0.2760 | 0.2874 |
| E1 | 3.30 | 3.50 | 3.70 | 0.1300 | 0.1378 | 0.1457 |
| e | 2.30 BSC | | | 0.0906 BSC | | |
| e1 | 4.60 BSC | | | 0.1811 BSC | | |
| L | 0.81 | — | — | 0.0319 | — | — |
| θ | 0° | — | 10° | 0° | — | 10° |

# SOT-223 Tape and Reel Data

## SOT-223 Carrier Tape



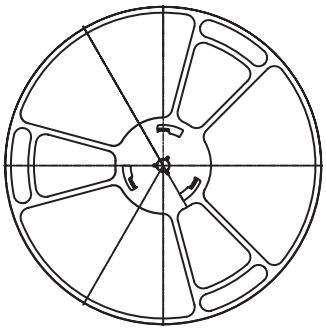



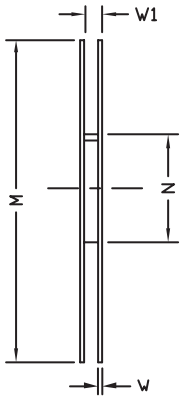



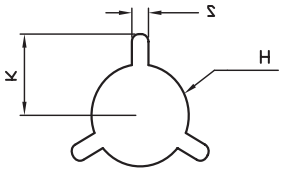

unit:㎜

| PACKAGE | A0 | B0 | K0 | D0 | D1 | E | E1 | E2 | P0 | P1 | P2 | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ——— | 6.83 ±0.1 | 7.42 ±0.1 | 1.88 ±0.1 | 1.50 + 0.25 | 1.60 + 0.1 | 12.0 + 0.3 - 0.1 | 1.75 ±0.1 | 5.50 ±0.5 | 8.0 ±0.1 | 4.00 ±0.1 | 2.00 ±0.05 | 0.292 ±0.02 |

## SOT-223 Reel






UNIT:㎜

| REEL SIZE | M | N | W | W1 | H | K | S | G | R | V |
|---|---|---|---|---|---|---|---|---|---|---|
| $\phi$330 ± 0.5 | ——— | $\phi$97.0 ± 1.0 | 2.2 | 13.0 + 1.5 | $\phi$13.0 + 0.5 - 0.2 | 10.6 | 2.0 ±0.5 | ——— | ——— | ——— |