

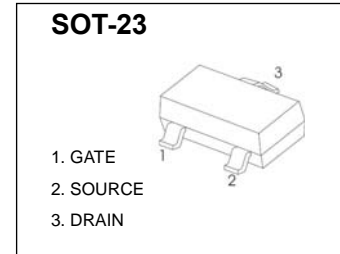


DONGGUAN NANJING ELECTRONICS LTD.,

SOT-23 Plastic-Encapsulate MOSFETS

NJMN0040 N-Channel Enhancement Mode Field Effect Transistor

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| 40V | 45mΩ@ 10 | 3.5A |
| | 65mΩ@4.5V | |
| | 82mΩ@2.5V | |



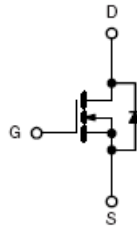
FEATURE

- High dense cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

APPLICATION

- Load/Power Switching
- Interfacing Switching

Equivalent Circuit



Maximum ratings ($T_a=25^{\circ}C$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|----------|---------------|
| Drain-Source Voltage | V_{DS} | 40 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current | I_D | 3.5 | A |
| Drain Current-Pulsed ^① | I_{DM} | 18 | A |
| Power Dissipation | P_D | 1250 | mW |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 100 | $^{\circ}C/W$ |
| Operation Junction and Storage Temperature Range | T_J, T_{STG} | -55~+150 | $^{\circ}C$ |

MOSFET ELECTRICAL CHARACTERISTICS

$T_a=25\text{ }^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---------------|--|-----|-----|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 40 | | | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 32V, V_{GS} = 0V, T_J = 25\text{ }^\circ\text{C}$ | | | 1 | μA |
| | | $V_{DS} = 32V, V_{GS} = 0V, T_J = 125\text{ }^\circ\text{C}$ | | | 1 | mA |
| Gate-source leakage current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ± 100 | nA |
| On characteristics | | | | | | |
| Drain-source on-resistance ^② | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 3.5A$ | | 36 | 45 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 3.0A$ | | 56 | 65 | m Ω |
| | | $V_{GS} = 2.5V, I_D = 2.5A$ | | | 82 | m Ω |
| Forward transconductance | g_{FS} | $V_{DS} = 5V, I_D = 3.5A$ | 8 | | | S |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.0 | 1.4 | 2.5 | V |
| Dynamic Characteristics ^③ | | | | | | |
| Input capacitance | C_{iss} | $V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$ | | 315 | 820 | pF |
| Output capacitance | C_{oss} | | | 69 | | pF |
| Reverse transfer capacitance | C_{rss} | | | 39 | | pF |
| Gate resistance | R_g | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$ | | 3.6 | | Ω |
| Switching Characteristics ^③ | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{GS} = 10V, V_{DS} = 20V, I_D = 1A, R_{GEN} = 6\Omega$ | | 5 | 10 | ns |
| Turn-on rise time | t_r | | | 12 | 20 | ns |
| Turn-off delay time | $t_{d(off)}$ | | | 20 | 25 | ns |
| Turn-off fall time | t_f | | | 15 | 20 | ns |
| Total Gate Charge | Q_g | $V_{DS} = 20V, I_D = 3.5A, V_{GS} = 0V$ | | 6.4 | 10 | nC |
| Gate-Source Charge | Q_{gs} | | | 0.7 | | nC |
| Gate-Drain Charge | Q_{gd} | | | 2.1 | | nC |
| Drain-source diode characteristics and maximum ratings | | | | | | |
| Diode forward voltage ^② | V_{SD} | $I_S = 1A, V_{GS} = 0V$ | | 0.8 | 1.2 | V |
| Continuous drain-source diode forward current | I_S | | | | 1.0 | A |
| Pulsed drain-source diode forward current ^① | I_{SM} | | | | 18 | A |

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
3. Guaranteed by design, not subject to production testing.

Typical Characteristics

Fig1. $I_D - V_{DS}$

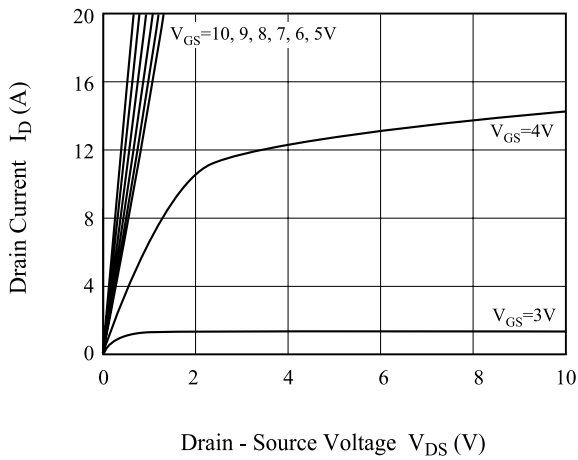


Fig2. $R_{DS(ON)} - I_D$

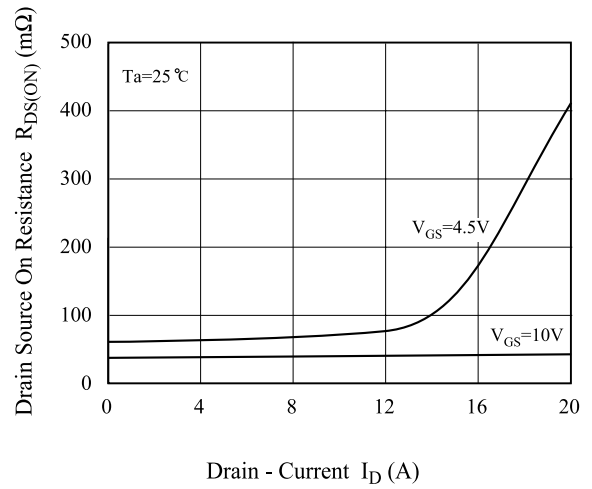


Fig3. $I_D - V_{GS}$

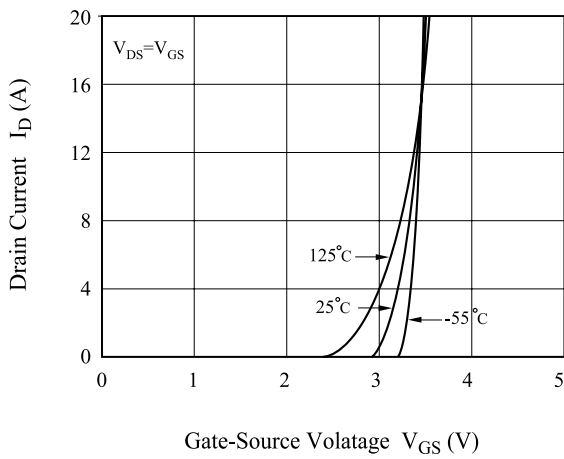


Fig4. $R_{DS(ON)} - T_j$

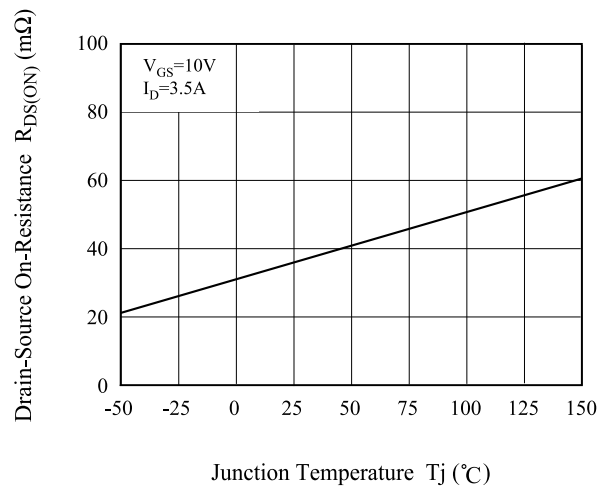


Fig5. $V_{th} - T_j$

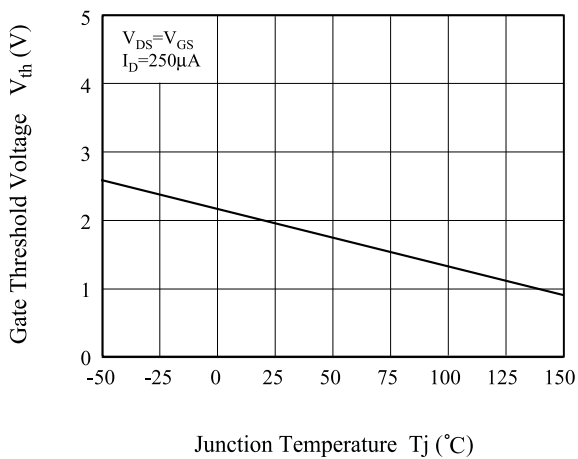
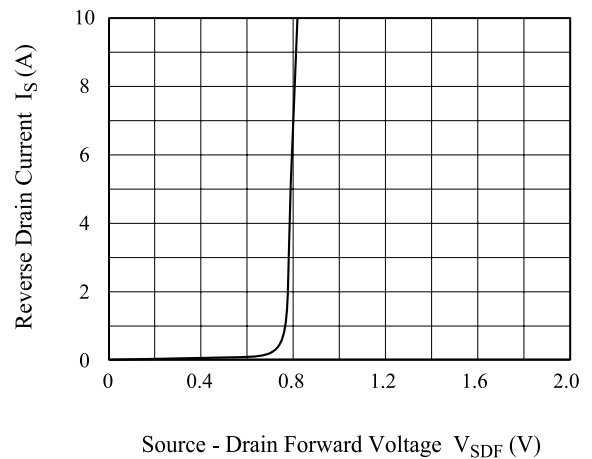


Fig6. $I_S - V_{SDF}$



Typical Characteristics

Fig7. $V_{GS} - Q_g$

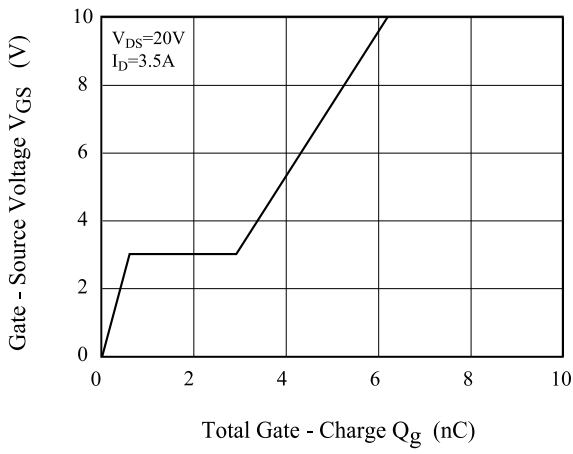


Fig8. $C - V_{DS}$

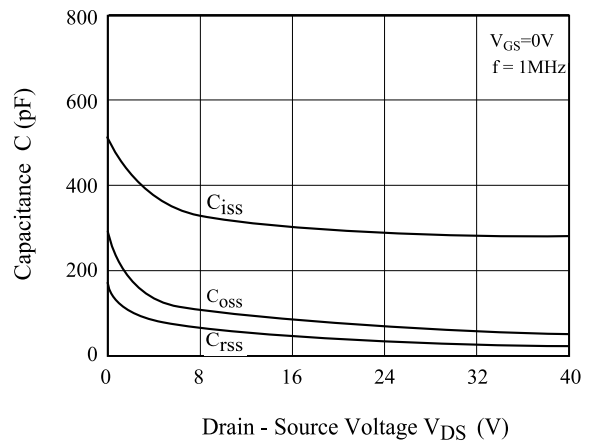


Fig9. Safe Operation Area

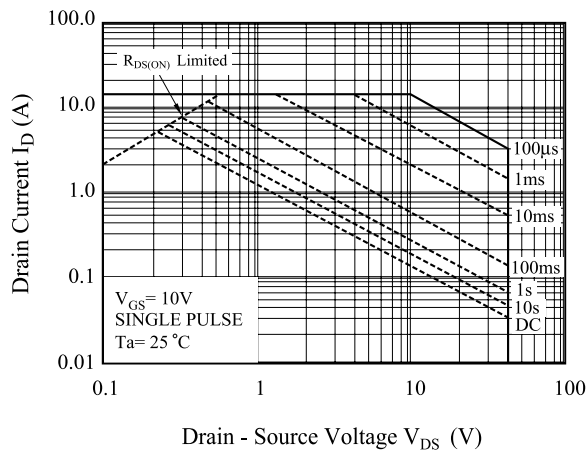
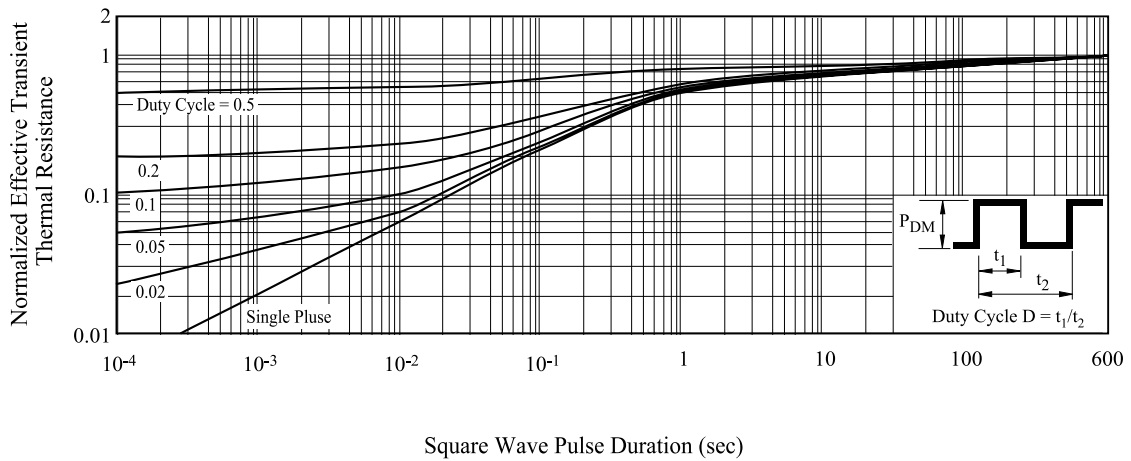
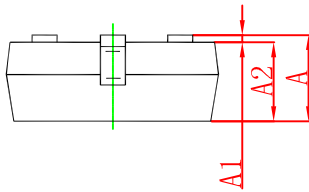
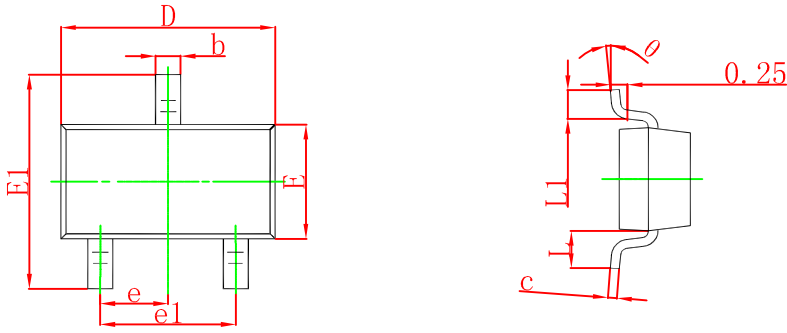


Fig10. Transient Thermal Response Curve

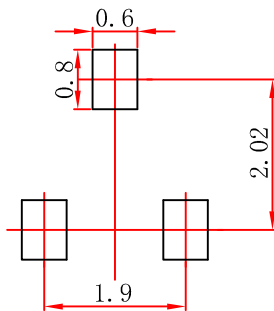


SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

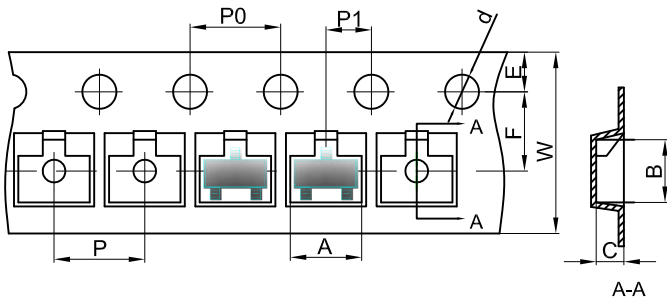
SOT-23 Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.

SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape



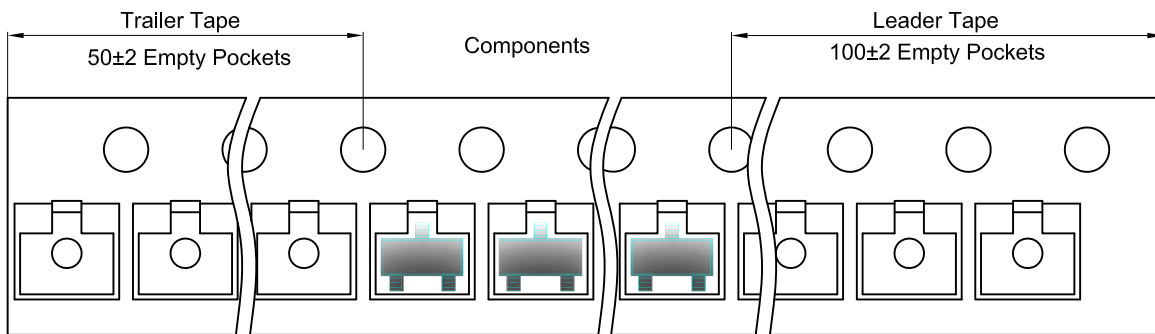
Packaging Description:

SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

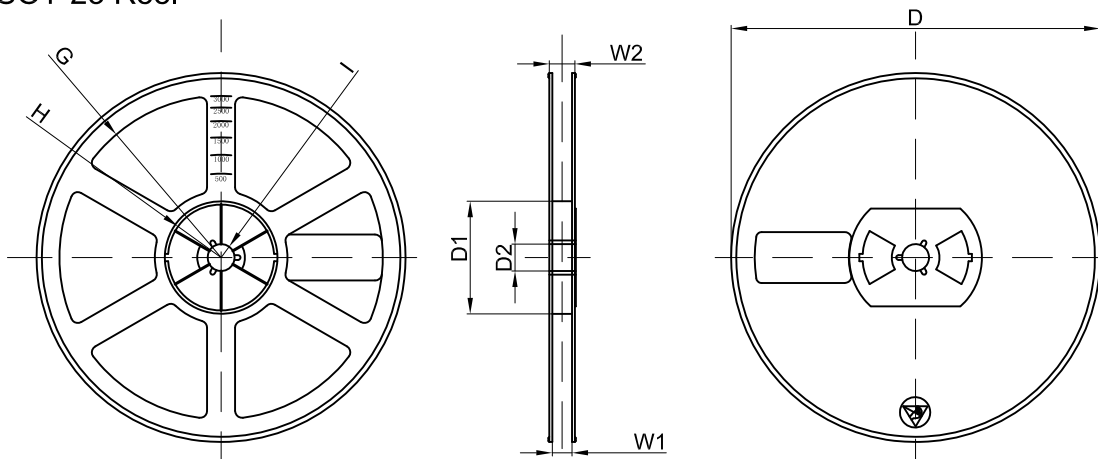
Dimensions are in millimeter

| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
|----------|------|------|------|-------|------|------|------|------|------|------|
| SOT-23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

SOT-23 Tape Leader and Trailer



SOT-23 Reel



Dimensions are in millimeter

| Reel Option | D | D1 | D2 | G | H | I | W1 | W2 |
|-------------|---------|-------|-------|--------|--------|-------|------|-------|
| 7"Dia | Ø178.00 | 54.40 | 13.00 | R78.00 | R25.60 | R6.50 | 9.50 | 12.30 |

| REEL | Reel Size | Box | Box Size(mm) | Carton | Carton Size(mm) | G.W.(kg) |
|----------|-----------|------------|--------------|-------------|-----------------|----------|
| 3000 pcs | 7 inch | 30,000 pcs | 203×203×195 | 120,000 pcs | 438×438×220 | |