

BSS138

50V N-Channel MOSFET

0.22A 50V; $R_{DS(ON)typ}=1.0\Omega@10V$, $R_{DS(ON)typ}=1.1\Omega@4.5V$

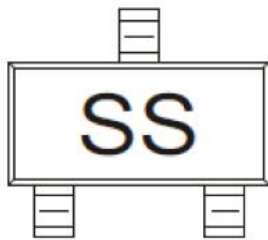
FEATURE

- High density cell design for extremely low $R_{DS(on)}$
- Rugged and Reliable

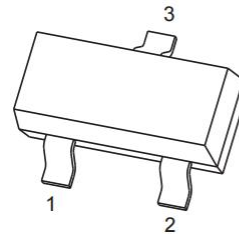
Application

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

MARKING:

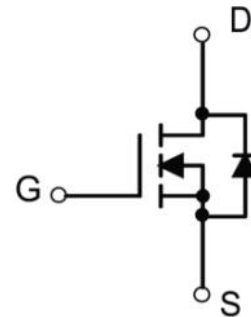


SOT-23



1. GATE
2. SOURCE
3. DRAIN

Schematic diagram



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

| Parameter | Symbol | Value | Unit |
|---|-----------------|----------|--------------------|
| Drain-Source Voltage | V_{DS} | 50 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | I_D | 0.22 | A |
| Power Dissipation | P_D | 0.35 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 357 | $^\circ\text{C/W}$ |
| Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55~+150 | $^\circ\text{C}$ |

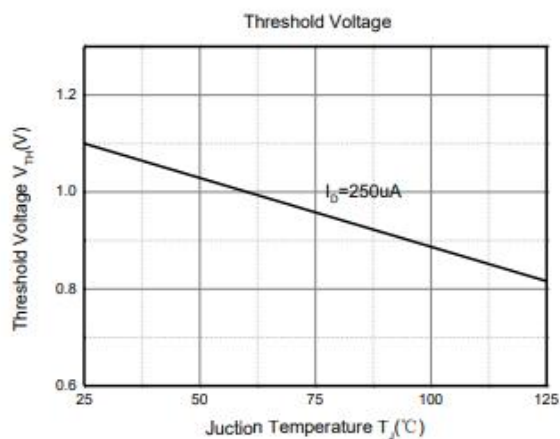
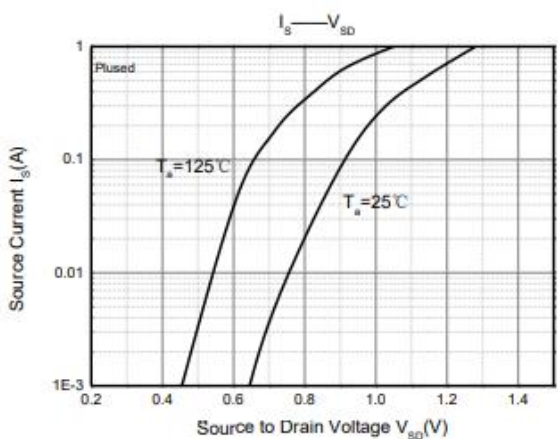
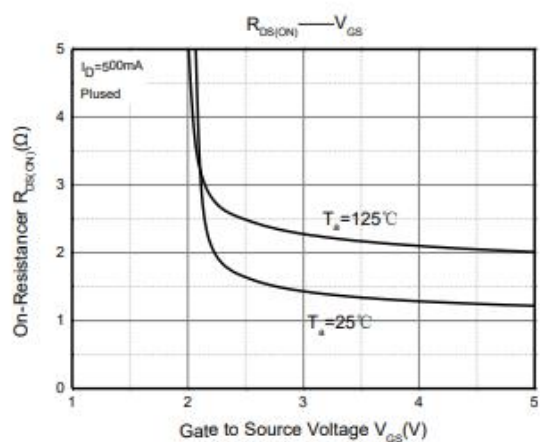
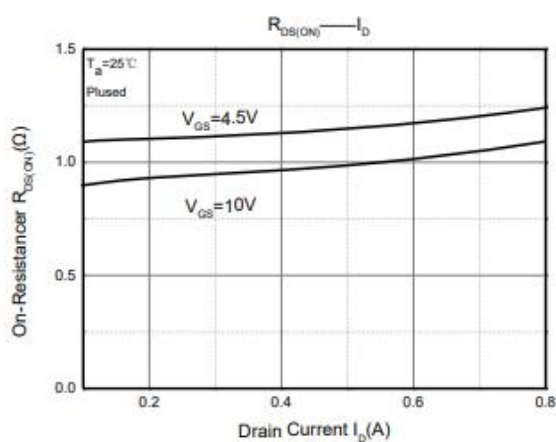
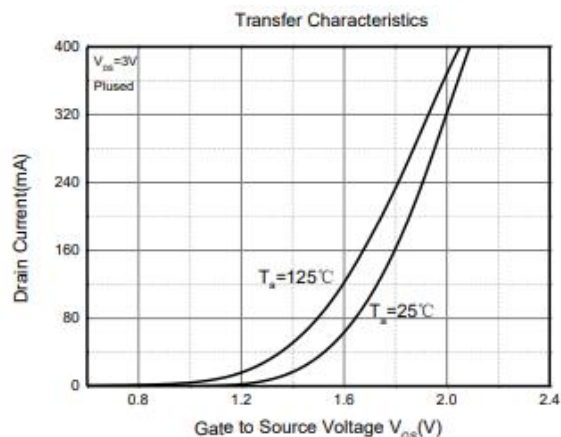
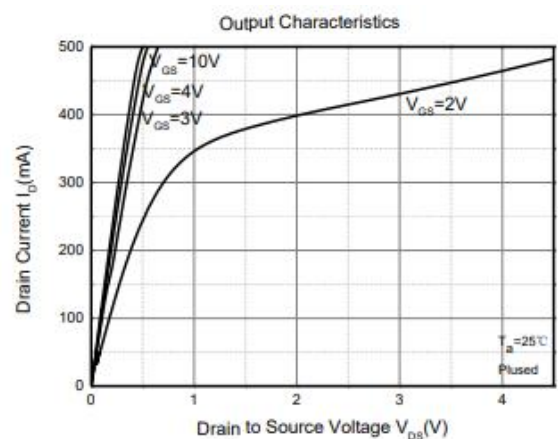
MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|----------------------|--|-----|------|------|------|
| STATIC CHARACTERISTICS | | | | | | |
| Drain-source breakdown voltage | V _{(BR)DSS} | V _{GS} = 0V, I _D = 250μA | 50 | | | V |
| Zero gate voltage drain current | I _{DSS1} | V _{DS} = 50V, V _{GS} = 0V | | | 0.5 | μA |
| | I _{DSS2} | V _{DS} = 30V, V _{GS} = 0V | | | 100 | nA |
| Gate-body leakage current | I _{GSS} | V _{GS} = ±20V, V _{DS} = 0V | | | ±100 | nA |
| Gate threshold voltage ⁽¹⁾ | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250μA | 0.5 | 0.95 | 1.5 | V |
| Drain-source on-resistance ⁽¹⁾ | R _{DS(on)} | V _{GS} = 10V, I _D = 0.22A | | 1.0 | 3.0 | Ω |
| | | V _{GS} = 4.5V, I _D = 0.22A | | 1.1 | 5.0 | |
| Forward tranconductance ⁽¹⁾ | g _{FS} | V _{DS} = 10V, I _D = 0.22A | | 0.13 | | S |
| DYNAMIC CHARACTERISTICS⁽²⁾ | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} = 25V, V _{GS} = 0V, f = 1MHz | | 26.5 | | pF |
| Output Capacitance | C _{oss} | | | 12.9 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 5.9 | | |
| SWITCHING CHARACTERISTICS^(1,2) | | | | | | |
| Turn-on delay time | t _{d(on)} | V _{GS} = 10V, V _{DD} = 30V, I _D = 0.29A, R _G = 6Ω | | | 5 | ns |
| Turn-on rise time | t _r | | | | 18 | |
| Turn-off delay time | t _{d(off)} | | | | 36 | |
| Turn-off fall time | t _f | | | | 14 | |
| SOURCE-DRAIN DIODE CHARACTERISTICS⁽¹⁾ | | | | | | |
| Diode Forward Voltage | V _{SD} | I _S = 0.44A, V _{GS} = 0V | | 1.15 | 1.4 | V |

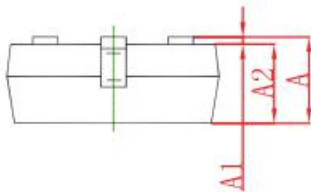
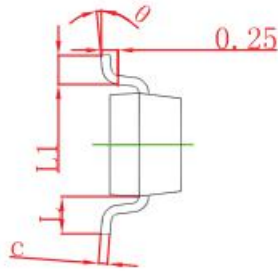
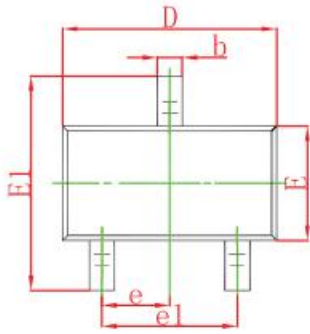
Notes:

1. Pulse Test ; Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. These parameters have no way to verify.

Typical Electrical and Thermal Characteristics



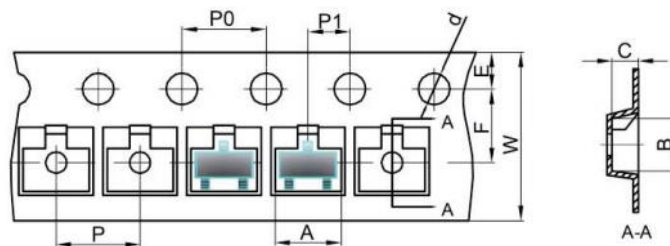
SOT-23 Package Information



| 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° |

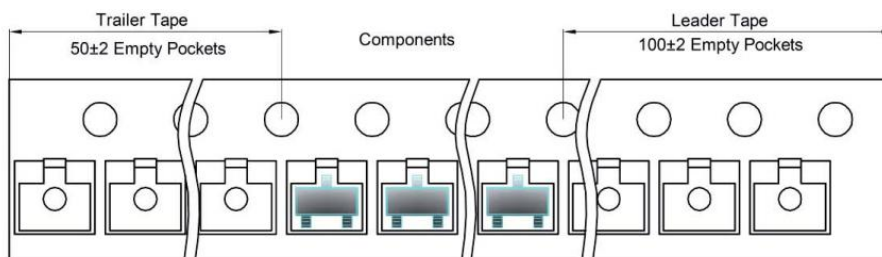
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

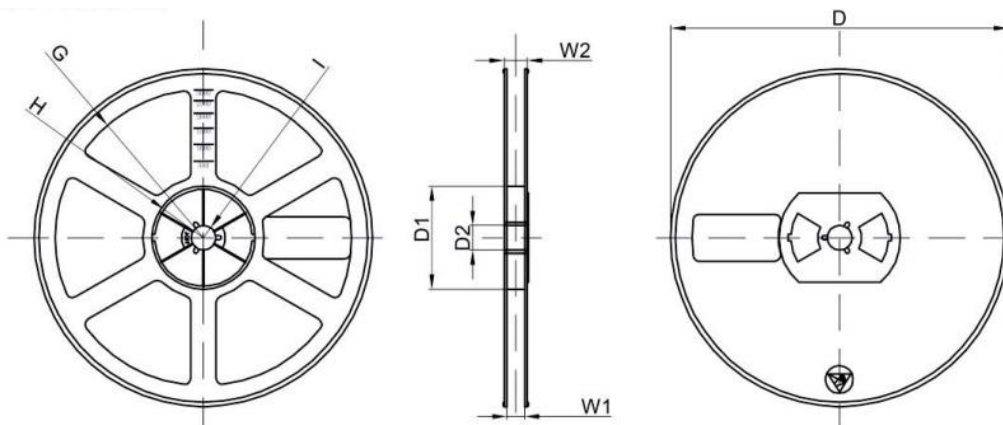


| Dimensions are in millimeter | | | | | | | | | | |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

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 | |