

# N-CHANNEL POWER MOSFET

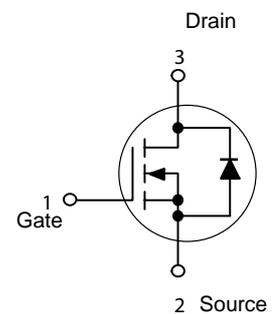
## BSS123

### FEATURE

- Pb-Free Package is available.
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

### DEVICE MARKING AND ORDERING INFORMATION

| Device | Marking | Shipping       |
|--------|---------|----------------|
| BSS123 | SA      | 3000/Tape&Reel |



### MAXIMUM RATINGS

| Rating                                   | Symbol    | Value    | Unit |
|--|-----------|----------|------|
| Drain-Source Voltage                     | $V_{DSS}$ | 100      | Vdc  |
| Gate-Source Voltage                      | $V_{GS}$  | $\pm 20$ | Vdc  |
| - Continuous                             | $V_{GSM}$ | $\pm 40$ | Vpk  |
| - Non-repetitive ( $t_p \leq 50 \mu s$ ) |           |          |      |
| Drain Current                            | $I_D$     | 0.17     | Adc  |
| Continuous (Note 1.)                     | $I_{DM}$  | 0.68     |      |
| Pulsed (Note 2.)                         |           |          |      |

### THERMAL CHARACTERISTICS

| Characteristic                                  | Symbol          | Max         | Unit           |
|---|-----------------|-------------|----------------|
| Total Device Dissipation FR-5 Board (Note 3.)   | $P_D$           | 225         | mW             |
| $T_A = 25^\circ C$<br>Derate above $25^\circ C$ |                 | 1.8         | mW/ $^\circ C$ |
| Thermal Resistance, Junction to Ambient         | $R_{\theta JA}$ | 556         | $^\circ C/W$   |
| Junction and Storage Temperature                | $T_J, T_{stg}$  | -55 to +150 | $^\circ C$     |

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $\leq 2.0\%$ .
3. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

**OFF CHARACTERISTICS**

|   |               |        |        |          |                 |
|---|---------------|--------|--------|----------|-----------------|
| Drain–Source Breakdown Voltage<br>( $V_{GS} = 0, I_D = 250 \mu\text{Adc}$ )   | $V_{(BR)DSS}$ | 100    | –      | –        | Vdc             |
| Zero Gate Voltage Drain Current<br>( $V_{GS} = 0, V_{DS} = 100 \text{ Vdc}$ ) $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$ | $I_{DSS}$     | –<br>– | –<br>– | 15<br>60 | $\mu\text{Adc}$ |
| Gate–Body Leakage Current<br>( $V_{GS} = 20 \text{ Vdc}, V_{DS} = 0$ )  | $I_{GSS}$     | –      | –      | 50       | nAdc            |

**ON CHARACTERISTICS** (Note 4.)

|  |              |     |     |     |          |
|--|--------------|-----|-----|-----|----------|
| Gate Threshold Voltage<br>( $V_{DS} = V_{GS}, I_D = 1.0 \text{ mAdc}$ )                    | $V_{GS(th)}$ | 0.8 | –   | 2.0 | Vdc      |
| Static Drain–Source On–Resistance<br>( $V_{GS} = 10 \text{ Vdc}, I_D = 100 \text{ mAdc}$ ) | $r_{DS(on)}$ | –   | 5.0 | 6.0 | $\Omega$ |
| Forward Transconductance<br>( $V_{DS} = 25 \text{ Vdc}, I_D = 100 \text{ mAdc}$ )          | $g_{fs}$     | 80  | –   | –   | mmhos    |

**DYNAMIC CHARACTERISTICS**

|  |           |   |     |   |    |
|--|-----------|---|-----|---|----|
| Input Capacitance<br>( $V_{DS} = 25 \text{ Vdc}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )            | $C_{iss}$ | – | 20  | – | pF |
| Output Capacitance<br>( $V_{DS} = 25 \text{ Vdc}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )           | $C_{oss}$ | – | 9.0 | – | pF |
| Reverse Transfer Capacitance<br>( $V_{DS} = 25 \text{ Vdc}, V_{GS} = 0, f = 1.0 \text{ MHz}$ ) | $C_{rss}$ | – | 4.0 | – | pF |

**SWITCHING CHARACTERISTICS(4)**

|                     |   |              |   |    |   |    |
|---------------------|---|--------------|---|----|---|----|
| Turn–On Delay Time  | ( $V_{CC} = 30 \text{ Vdc}, I_C = 0.28 \text{ Adc},$<br>$V_{GS} = 10 \text{ Vdc}, R_{GS} = 50 \Omega$ ) | $t_{d(on)}$  | – | 20 | – | ns |
| Turn–Off Delay Time |   | $t_{d(off)}$ | – | 40 | – | ns |

**REVERSE DIODE**

|  |          |   |   |     |   |
|--|----------|---|---|-----|---|
| Diode Forward On–Voltage<br>( $I_D = 0.34 \text{ Adc}, V_{GS} = 0 \text{ Vdc}$ ) | $V_{SD}$ | – | – | 1.3 | V |
|--|----------|---|---|-----|---|

4. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

TYPICAL ELECTRICAL CHARACTERISTICS

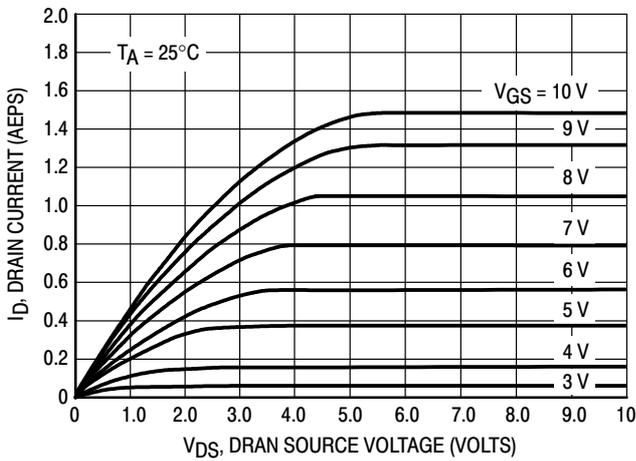


Figure 1. Ohmic Region

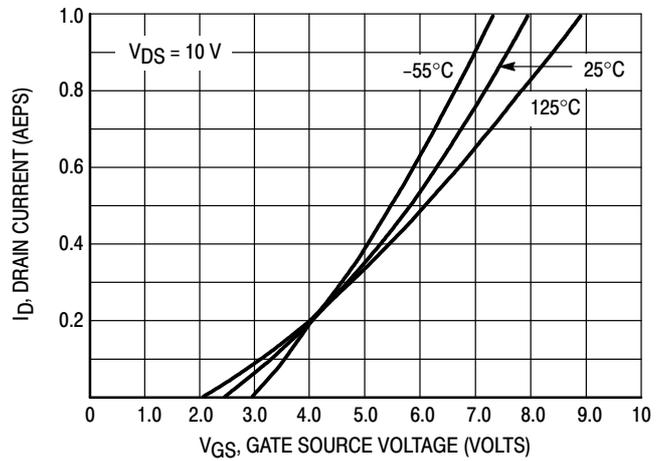


Figure 2. Transfer Characteristics

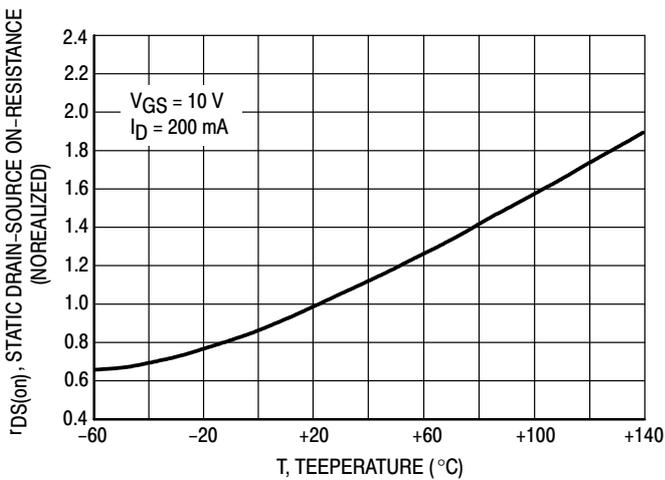


Figure 3. Temperature versus Static Drain-Source On-Resistance

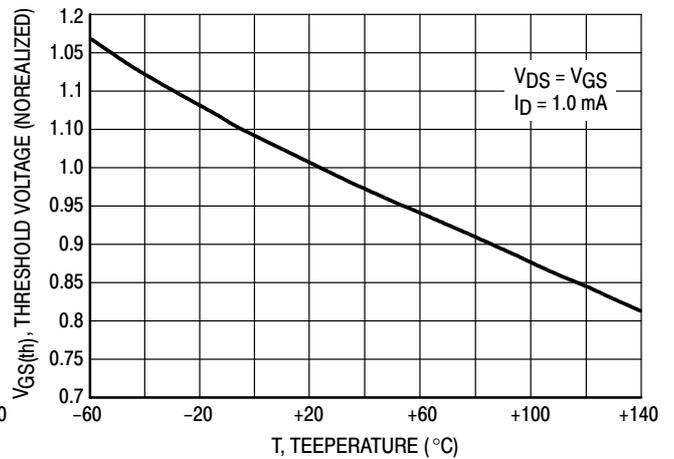
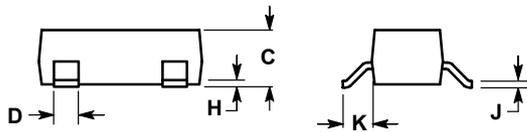
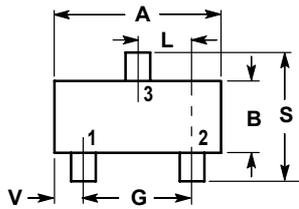


Figure 4. Temperature versus Gate Threshold Voltage

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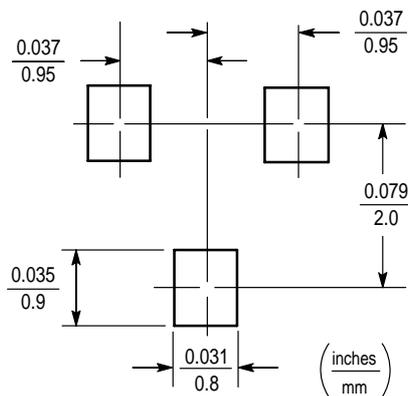


NOTES:

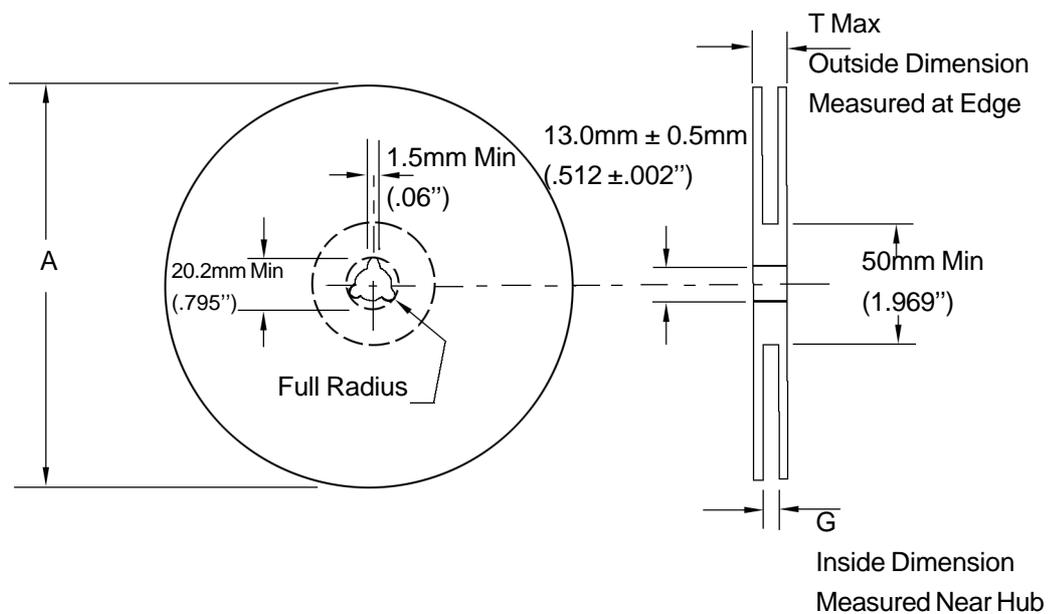
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES |        | MILLIMETERS |       |
|-----|--------|--------|-------------|-------|
|     | MIN    | MAX    | MIN         | MAX   |
| A   | 0.1102 | 0.1197 | 2.80        | 3.04  |
| B   | 0.0472 | 0.0551 | 1.20        | 1.40  |
| C   | 0.0350 | 0.0440 | 0.89        | 1.11  |
| D   | 0.0150 | 0.0200 | 0.37        | 0.50  |
| G   | 0.0701 | 0.0807 | 1.78        | 2.04  |
| H   | 0.0005 | 0.0040 | 0.013       | 0.100 |
| J   | 0.0034 | 0.0070 | 0.085       | 0.177 |
| K   | 0.0140 | 0.0285 | 0.35        | 0.69  |
| L   | 0.0350 | 0.0401 | 0.89        | 1.02  |
| S   | 0.0830 | 0.1039 | 2.10        | 2.64  |
| V   | 0.0177 | 0.0236 | 0.45        | 0.60  |

- PIN 1. Gate  
2. Source  
3. Drain



## EMBOSED TAPE AND REEL DATA FOR DISCRETES



| Size  | A Max              | G   | T Max              |
|-------|--------------------|---|--------------------|
| 8 mm  | 330mm<br>(12.992") | 8.4mm+1.5mm, -0.0<br>(.33"+.059", -0.00)    | 14.4mm<br>(.56")   |
| 12mm  | 330mm<br>(12.992") | 12.4mm+2.0mm, -0.0<br>(.49 "+ .079", -0.00) | 18.4mm<br>(.72")   |
| 16mm  | 360mm<br>(14.173") | 16.4mm+2.0mm, -0.0<br>(.646"+.078", -0.00)  | 22.4mm<br>(.882")  |
| 24 mm | 360mm<br>(14.173") | 24.4mm+2.0mm, -0.0<br>(.961"+.070", -0.00)  | 30.4mm<br>(1.197") |

### Reel Dimensions

Metric Dimensions Govern — English are in parentheses for reference only

### Storage Conditions

Temperature: 5 to 40 Deg.C (20 to 30 Deg. C is preferred)

Humidity: 30 to 80 RH (40 to 60 is preferred )

Recommended Period: One year after manufacturing

(This recommended period is for the soldering condition only. The characteristics and reliabilities of the products are not restricted to this limitation)

## Shipment Specification

