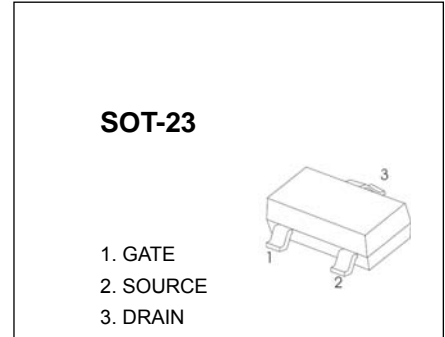




## Plastic-Encapsulate MOSFETS

N-Channel 50-V(D-S) MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
50V	3.5Ω@10V	220mA
	6Ω@4.5V	



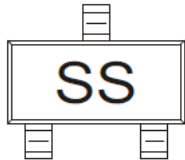
### FEATURE

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

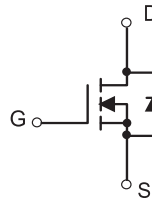
### APPLICATION

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

### MARKING



### Equivalent Circuit



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	50	V
Continuous Gate-Source Voltage	$V_{GSS}$	±20	
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	$^\circ\text{C}/\text{W}$
Operating Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 ~+150	



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# SOT-23

# BSS138



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## MOSFET ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	50			V
Gate-body leakage	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$			$\pm 500$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 50V, V_{GS} = 0V$			0.5	$\mu A$
		$V_{DS} = 30V, V_{GS} = 0V$			100	nA
<b>On characteristics</b>						
Gate-threshold voltage (note 1)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1mA$	0.80		1.50	V
Static drain-source on-resistance (note 1)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 0.22A$			3.50	$\Omega$
		$V_{GS} = 4.5V, I_D = 0.22A$			6	
Forward transconductance (note 1)	$g_{FS}$	$V_{DS} = 10V, I_D = 0.22A$	0.12			S
<b>Dynamic characteristics (note 2)</b>						
Input capacitance	$C_{ISS}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$		27		pF
Output capacitance	$C_{OSS}$			13		
Reverse transfer capacitance	$C_{RSS}$			6		
<b>Switching characteristics</b>						
Turn-on delay time (note 1,2)	$t_{d(on)}$	$V_{DD} = 30V, V_{DS} = 10V, I_D = 0.29A, R_{GEN} = 6\Omega$			5	ns
Rise time (note 1,2)	$t_r$				18	
Turn-off delay time (note 1,2)	$t_{d(off)}$				36	
Fall time (note 1,2)	$t_f$				14	
<b>Drain-source body diode characteristics</b>						
Body diode forward voltage (note 1)	$V_{SD}$	$I_S = 0.44A, V_{GS} = 0V$			1.4	V

**Notes:**

1. Pulse Test ; Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
2. These parameters have no way to verify.



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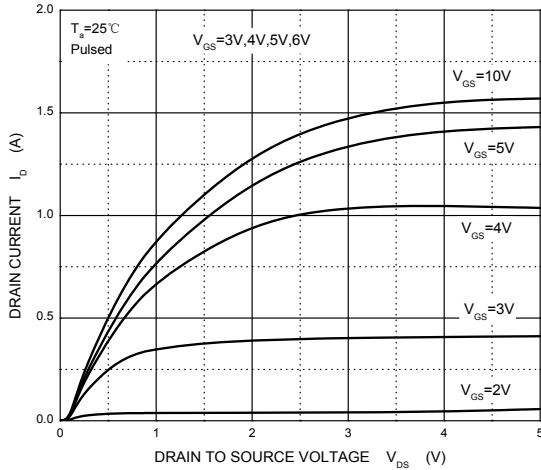
# BSS138



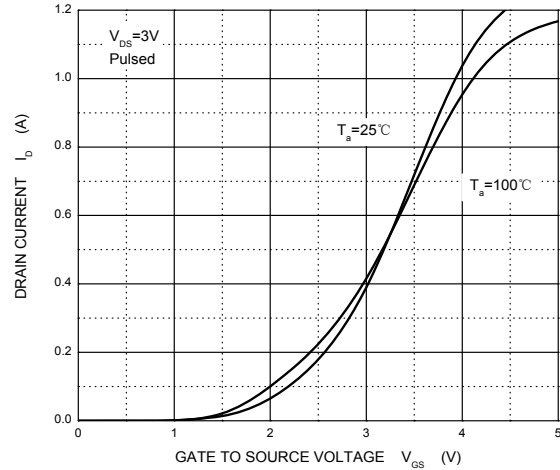
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## Typical Characteristics

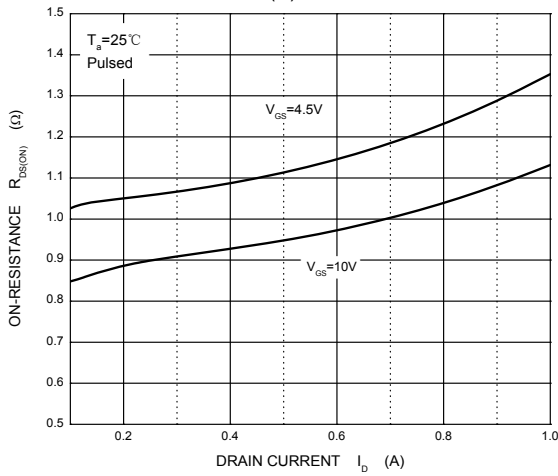
**Output Characteristics**



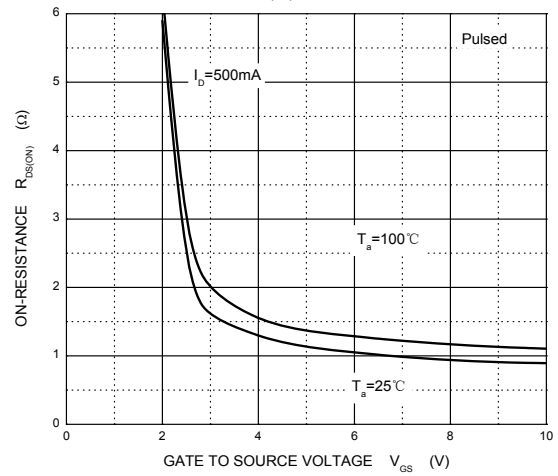
**Transfer Characteristics**



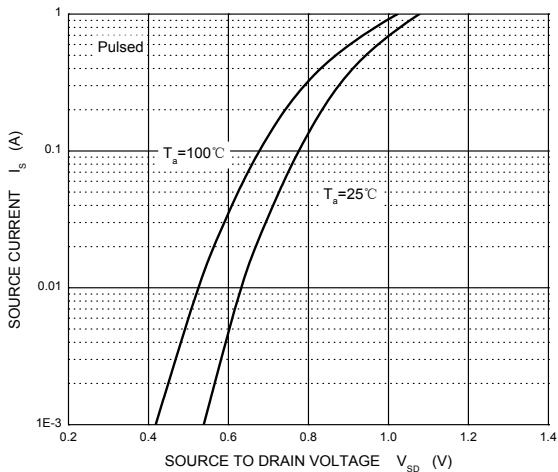
**$R_{DS(ON)}$  —  $I_D$**



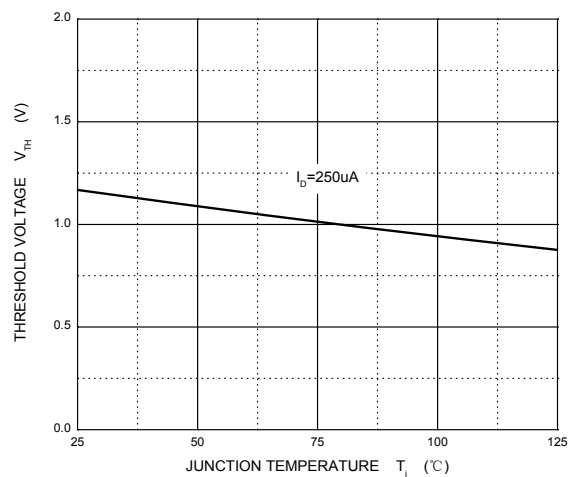
**$R_{DS(ON)}$  —  $V_{GS}$**



**$I_S$  —  $V_{SD}$**



**Threshold Voltage**

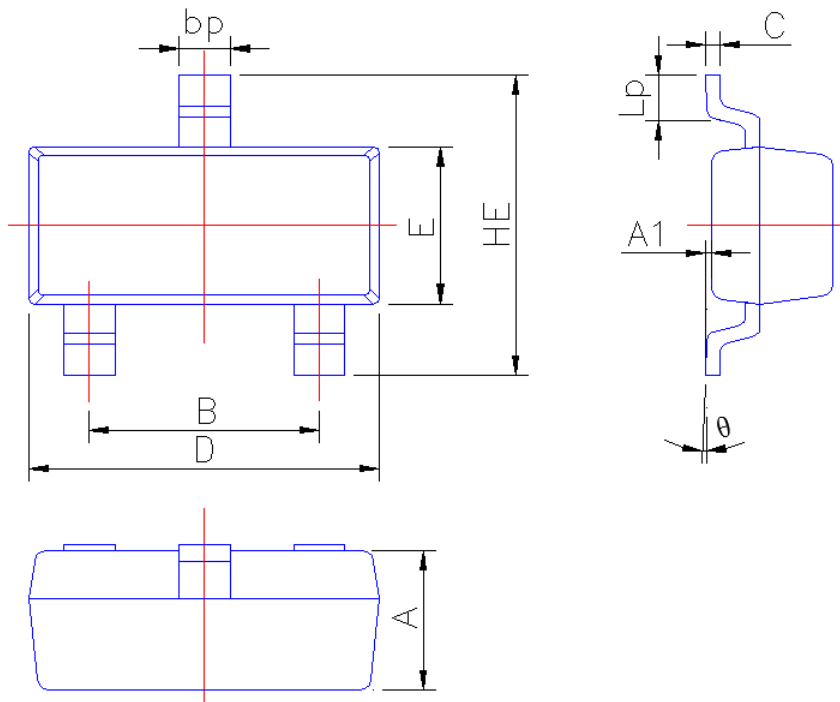




## PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



Symbol	Dimension in Millimeters	
	Min	Max
A	0.90	1.10
A1	0.013	0.100
B	1.80	2.00
bp	0.35	0.50
C	0.09	0.150
D	2.80	3.00
E	1.20	1.40
HE	2.20	2.80
Lp	0.20	0.50
$\theta$	0°	5°