

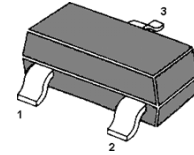
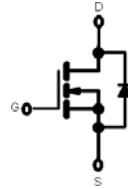
SOT-23 Plastic-Encapsulate MOSFETS

BSS138 N-Channel 50-V(D-S) MOSFET

APPLICATION

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

Equivalent Circuit



1. Gate 2. Source 3. Drain
 SOT-23 Plastic Package

FEATURE

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

MARKING: SS

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

Parameter	Symbo	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	$^\circ\text{C/W}$
Operating Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 ~ +150	

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

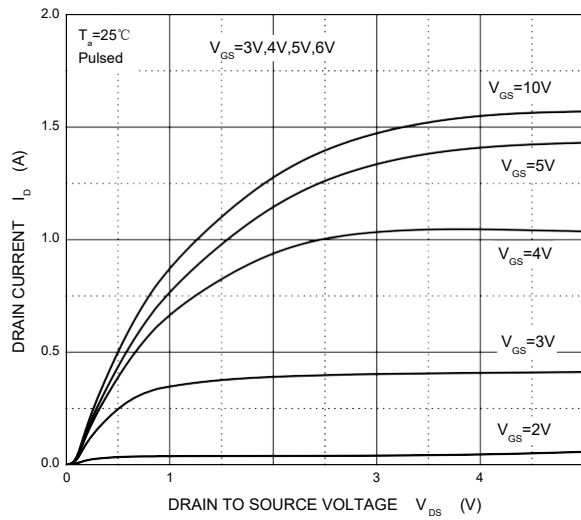
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	50			V
Gate-body leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 50V, V_{GS} = 0V$			0.5	μA
		$V_{DS} = 30V, V_{GS} = 0V$			100	nA
On characteristics						
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	Ω
		$V_{GS} = 4.5V, I_D = 0.22A$			6	
Forward transconductance (note 1)	g_{FS}	$V_{DS} = 10V, I_D = 0.22A$	0.12			S
Dynamic characteristics (note 2)						
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		
Switching characteristics						
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	
Drain-source body diode characteristics						
Body diode forward voltage (note 1)	V_{SD}	$I_S = 0.44A, V_{GS} = 0V$			1.4	V

Notes:

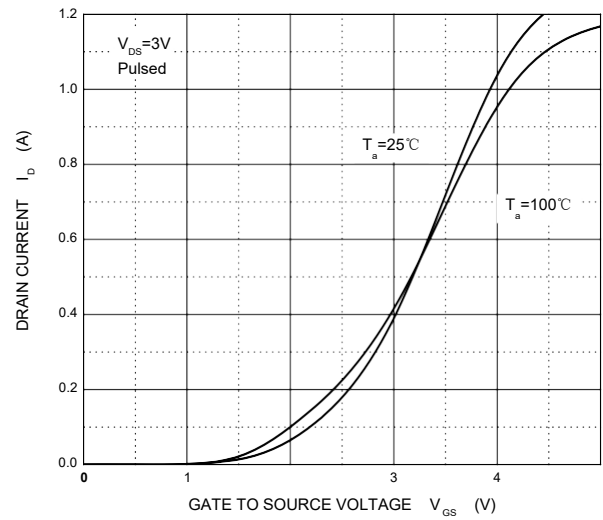
1. Pulse Test ; Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
2. These parameters have no way to verify.

Typical Characteristics

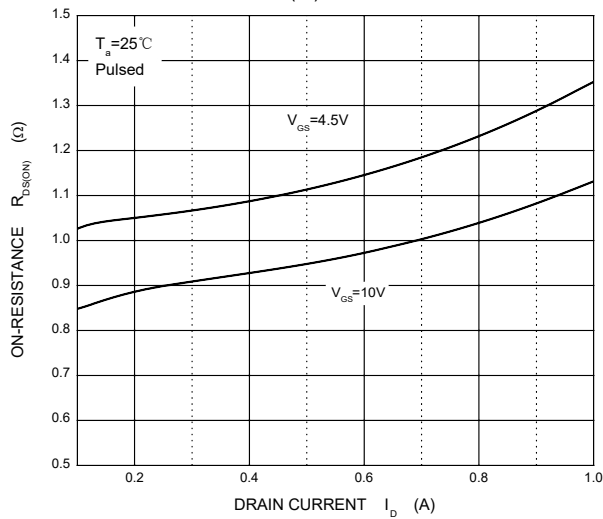
Output Characteristics



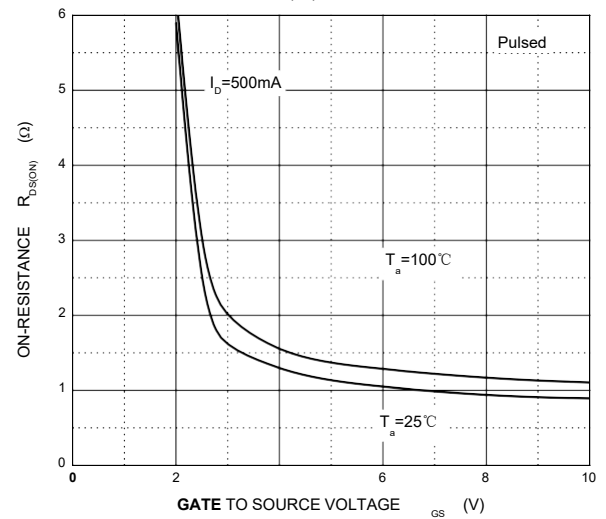
Transfer Characteristics



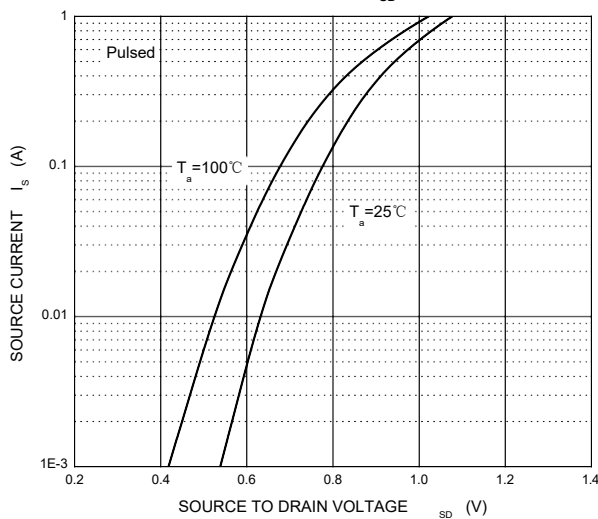
$R_{DS(ON)}$ — I_D



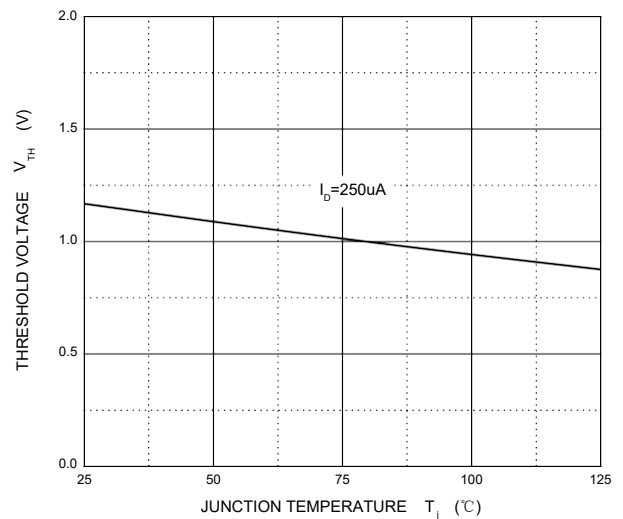
$R_{DS(ON)}$ — V_{GS}



I_S — V_{SD}



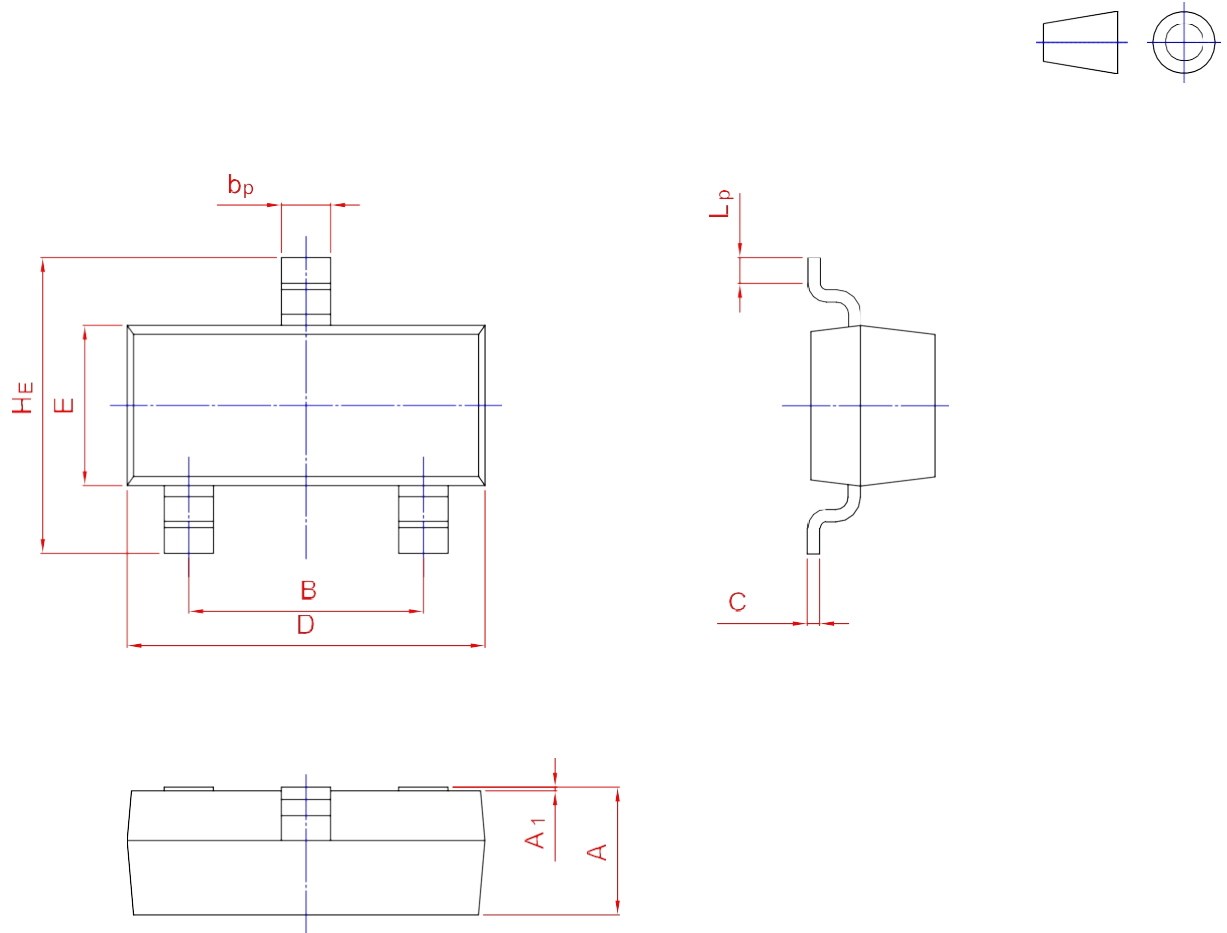
Threshold Voltage



PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



UNIT	A	B	bp	C	D	E	HE	A1	Lp
mm	1.40 0.95	2.04 1.78	0.50 0.35	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20