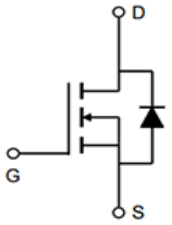
EFMICRO
Semiconductor Limited Company

BSS138

N-Channel Advanced Power MOSFET

• Product Summary

Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=10V)	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	I_D
BSS138	50V	0.88Ω	1.5Ω	0.22A



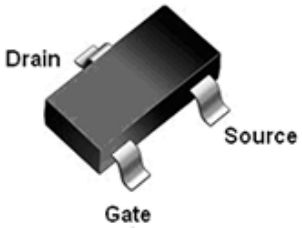
N- Channel MOSFET

• Features

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

•Application

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



SOT - 23

RoHS

HF

•Ordering Information:

Part NO.	BSS138
Marking	SS
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	50	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	0.22	A
Drain Current-Pulsed (Note 1)	I_{DM}	0.88	A
Maximum Power Dissipation	P_D	0.35	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	357	℃/W

● Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250uA	50	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=50V V_{GS}=0V	--	--	0.5	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V V_{DS}=0V	--	--	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=1mA	0.8	--	1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V I_D=0.22A	--	0.88	3.5	Ω
		V_{GS}=4.5V I_D=0.22A	--	1.5	6	Ω
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=25V V_{GS}=0V F=1.0MHz	--	27	--	PF
Output Capacitance	C_{oss}		--	13	--	PF
Reverse Transfer Capacitance	C_{rss}		--	6	--	PF
Forward Transconductance	g_{FS}	V_{DS} =10V, I_D=0.22A	0.12	--	--	mS
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V I_D=0.29A V_{GS}=5V R_G=6Ω,	--	--	5	nS
Turn-on Rise Time	t_r		--	--	18	nS
Turn-Off Delay Time	$t_{d(off)}$		--	--	36	nS
Turn-Off Fall Time	t_f		--	--	14	nS
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=0.44A	--	--	1.4	V

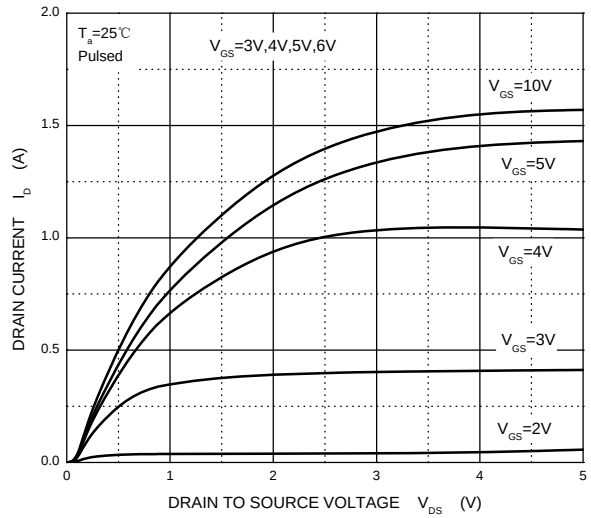
Notes:

① Pulse width limited by maximum allowable junction temperature

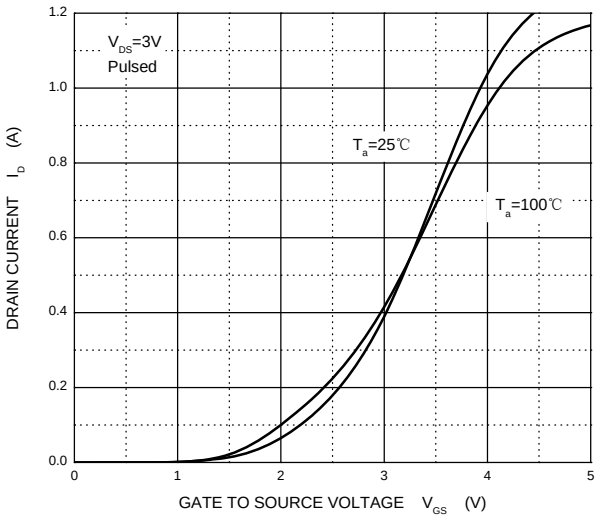
②Pulse test ; Pulse width≤300μs, duty cycle≤2%.

• Typical Characteristics

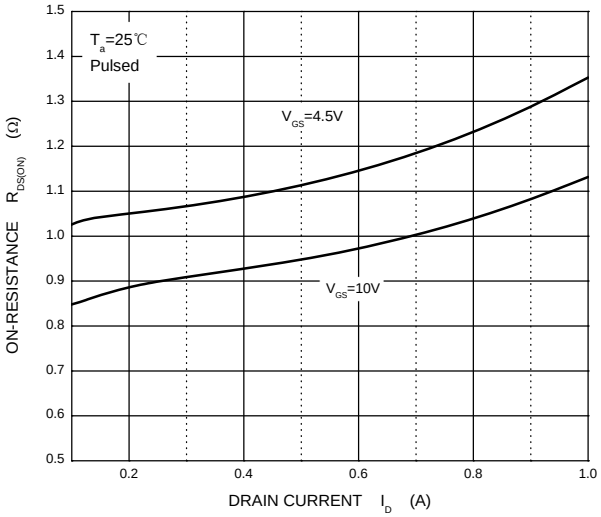
Output Characteristics



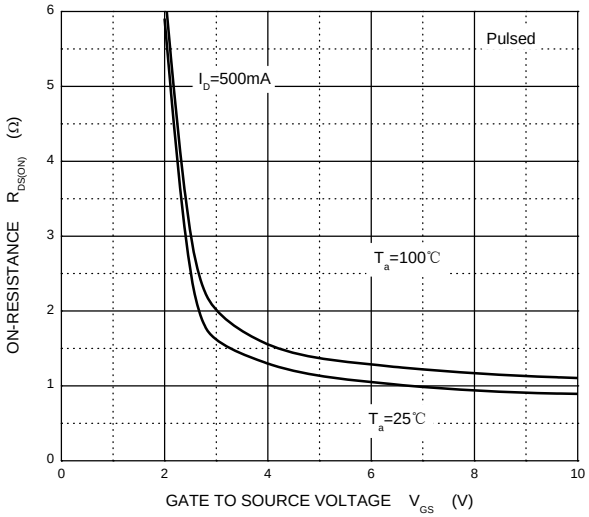
Transfer Characteristics



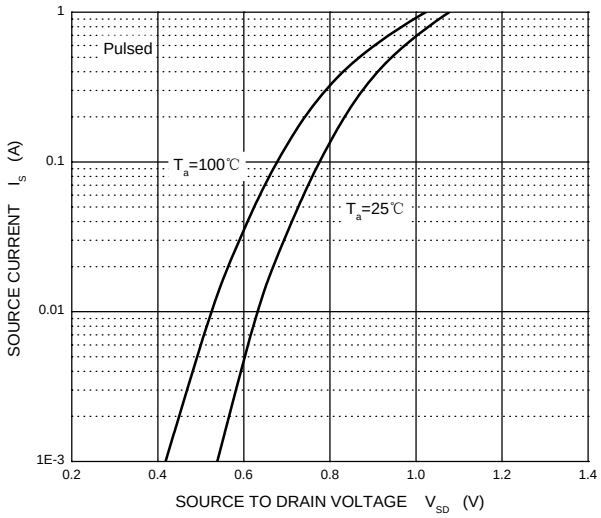
$R_{DS(ON)}$ —— I_D



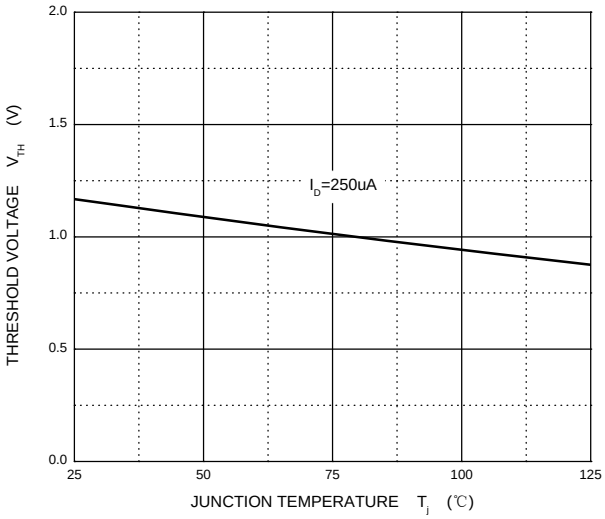
$R_{DS(ON)}$ —— V_{GS}



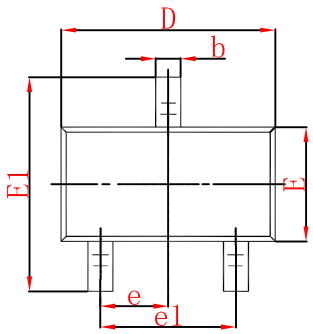
I_S —— V_{SD}

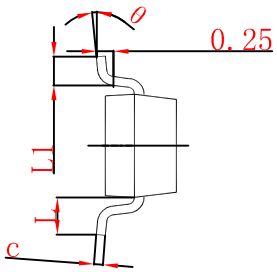


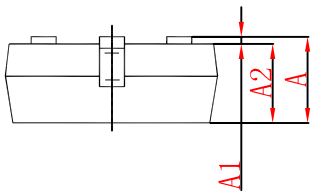
Threshold Voltage



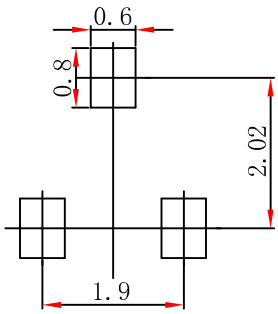
SOT-23 Package Outline Dimensions







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°



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.