

BSS138

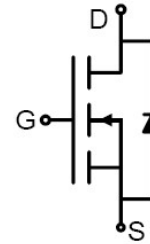
N-Channel Enhancement Mofet

Feature

- 50V,340mA
 $R_{DS(ON)} < 2.5 \Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 3.0 \Omega @ V_{GS}=4.5V$
- Advanced Trench Technology
- Lead free product is acquired
- Fast Switching Speed
- Low Input/Output Leakage

Application

- Battery operated systems
- Solid-state relays
- Direct logic-level interface



Schematic Diagram



SOT-23 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
SS.	BSS138	Sot-23	7 inch	-	3000

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 ($T_a = 25^\circ\text{C}$)	I_D	340	mA
Continuous Drain Current ($T_a = 70^\circ\text{C}$)	I_D	272	mA
Pulsed Drain Current	I_{DM}	1.5	A
Power Dissipation	P_D	0.35	W
Thermal Resistance from Junction to Ambient ⁽⁴⁾	$R_{\theta JA}$	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($T_a=25^{\circ}\text{C}$ 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 _{DSS}	V _{DS} =50V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V,V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽³⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.8	1.2	1.6	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =10V, I _D =0.3A	-	1.1	2.5	Ω
		V _{GS} =4.5V, I _D =0.2A	-	1.2	3.0	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f =1MHz	-	28.5	-	pF
Output Capacitance	C _{oss}		-	2.7	-	
Reverse Transfer Capacitance	C _{rss}		-	1.78	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =25V, I _D =0.3A, V _{GS} =10V, R _G =6Ω	-	2.6	-	ns
Turn-on rise time	t _r		-	18.8	-	
Turn-off delay time	t _{d(off)}		-	9.7	-	
Turn-off fall time	t _f		-	47	-	
Total Gate Charge	Q _g	V _D S=25V, I _D =0.3A, V _G S=10V	-	1.7	-	nC
Gate-Source Charge	Q _{gs}		-	0.4	-	
Gate-Drain Charge	Q _{gd}		-	0.24	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} =0V, I _S =0.3A	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I _S		-	-	340	mA
Reverse Recovery Time	Q _{rr}	I _F =0.3A,di _F /dt=-100A/us	-	2.65	-	nC
Reverse Recovery Charge	T _{rr}		-	12.2	-	ns

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface Mounted on FR4 Board, $t \leq 10$ sec

Test Circuit

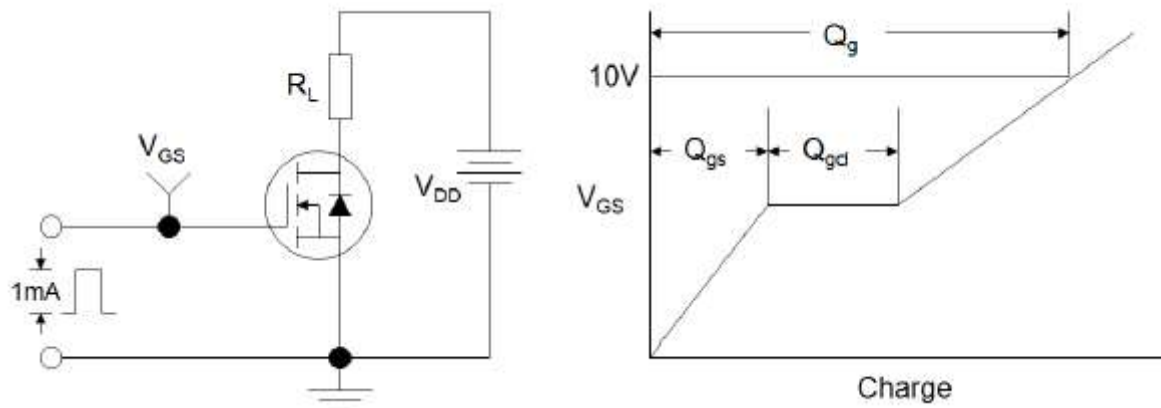


Figure1:Gate Charge Test Circuit & Waveform

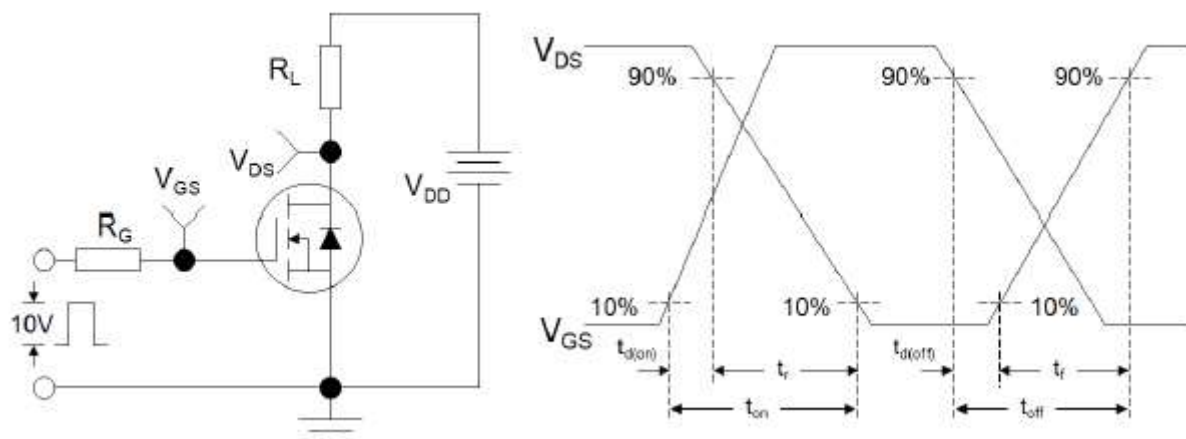


Figure 2: Resistive Switching Test Circuit & Waveforms

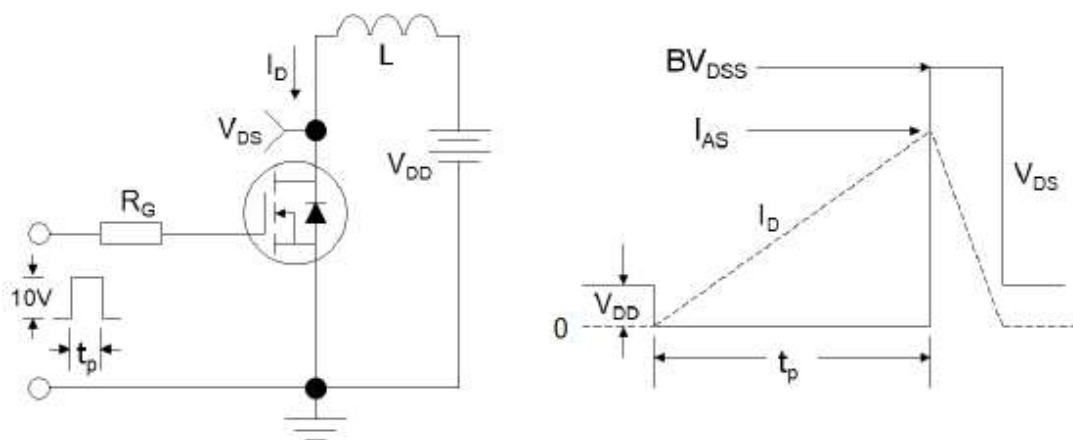


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Typical Performance Characteristics

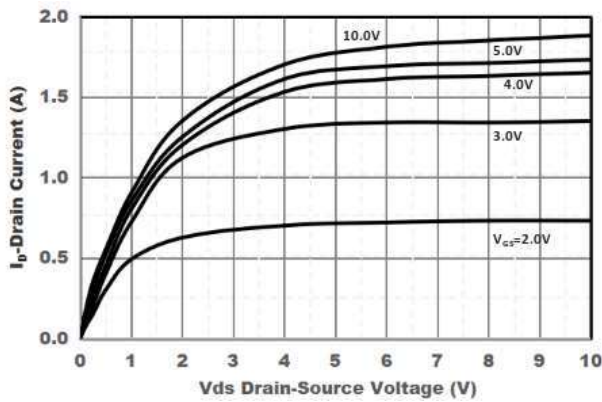


Figure1. Output Characteristics

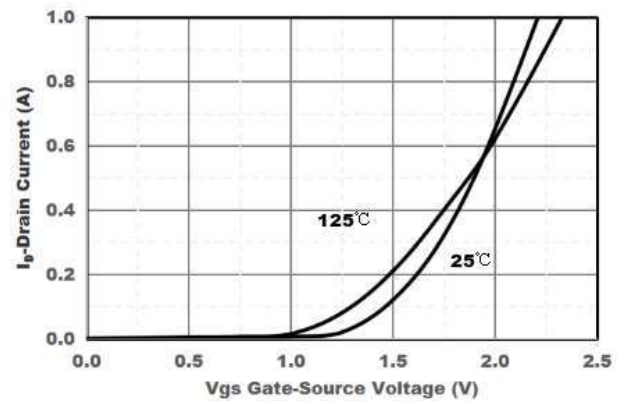


Figure2. Transfer Characteristics

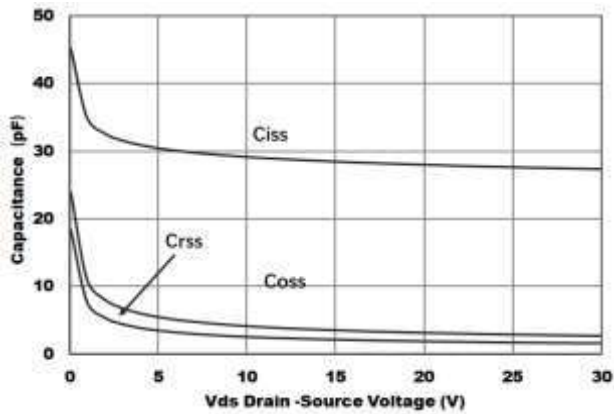


Figure3. Capacitance Characteristics

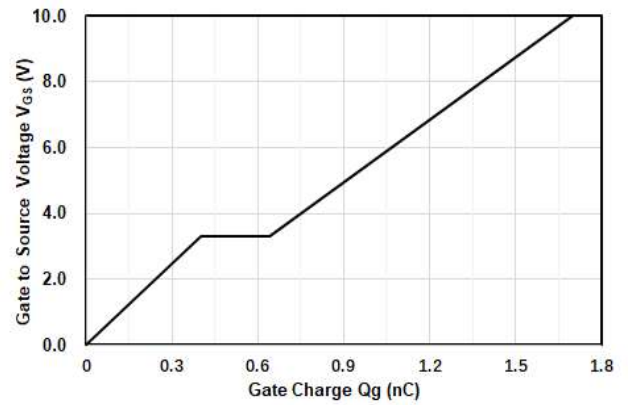


Figure4. Gate Charge

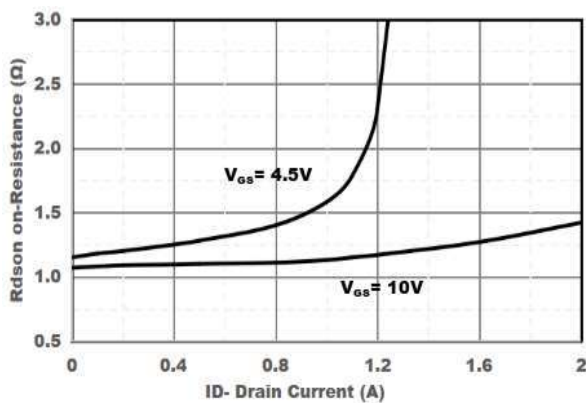


Figure5. Drain-Source on Resistance

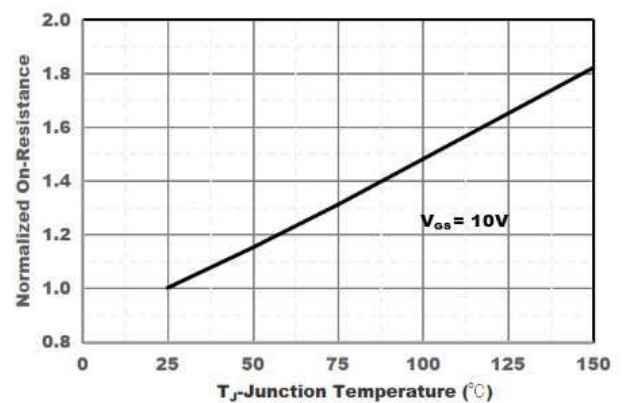


Figure6. Drain-Source on Resistance

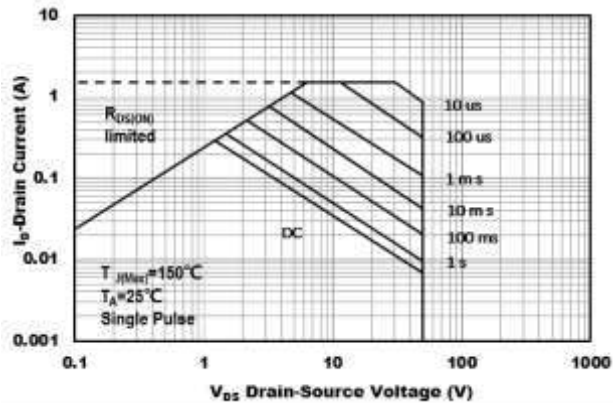


Figure7. Safe Operation Area

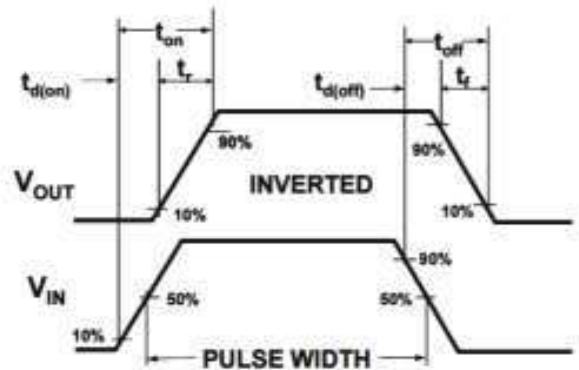
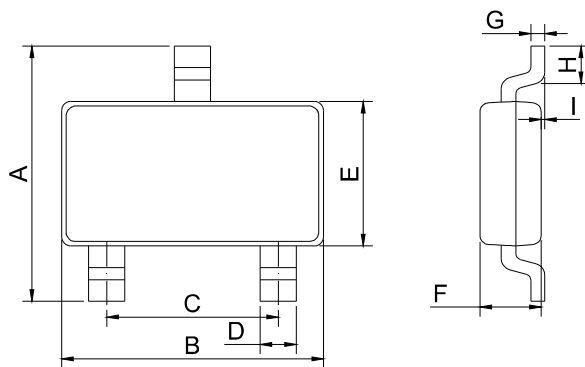


Figure8. Switching wave

SOT-23 Package Information



SOT-23

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004