

N-Channel MOSFET

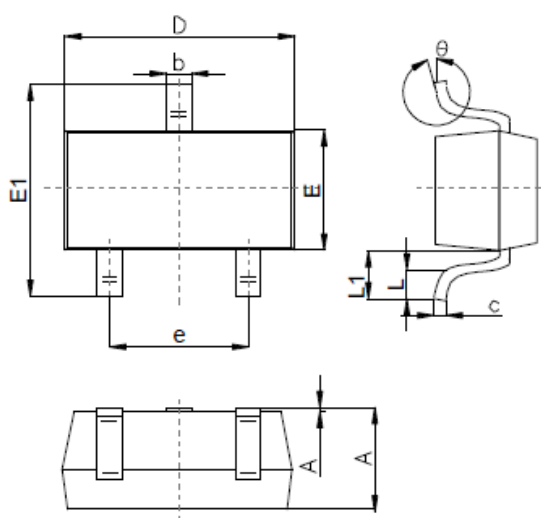
Primary characteristics			
Symbol	Parameter	Value	Unit
I_D	Continuous drain current (@ $T_a=25^\circ\text{C}$)	340	mA
V_{DS}	Drain source voltage	50	V
$R_{DS(on)}$ @ $V_{GS}=4.5\text{V}$	Static drain-source on-resistance	3.0	Ω

Features

- **SOT-23** case for easy automatic insertion
- Pb-free and **RoHS** compliant
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage
- Voltage controlled small signal switch

Application

- Battery operated systems
- Solid-state relays
- Direct logic-level interface: TTL/CMOS

Case dimensions											
											
SOT-23 (TO-236AB)											
Unit	A	A ₁ max	b	c	D	E	E1	e	L	L ₁	θ
mm	0.9 - 1.4	0.1	0.30 - 0.50	0.08 - 0.20	2.9 ±0.2	1.2 - 1.6	2.25 - 2.80	1.9 ±0.1	0.10 - 0.50	0.40 - 0.55	0° - 10°

Absolute maximum ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)			
Characteristic	Symbol	Value	Unit
Drain-source voltage	V_{DS}	50	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current	I_D	340	mA
Pulsed drain current ¹	I_{DM}	1.5	A
Power Dissipation ²	P_D	350	mW
Operating junction temperature range	T_J, T_{STG}	-55 ~ 150	°C
Thermal resistance junction-ambient ²	$R_{\theta JA}$	357	°C/W

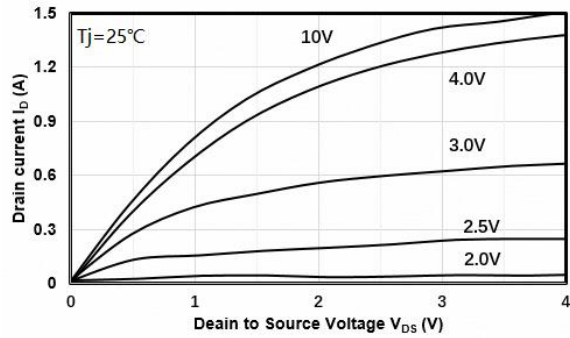
Electrical characteristics (T _A = 25°C)						
Characteristic	Test condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Drain-source breakdown voltage	V _{GS} =0V, I _D =250μA	V _{DSS}	50	-	-	V
Zero gate voltage drain current	V _{DS} =50V, V _{GS} =0V	I _{DSS}	-	-	1.0	μA
Gate-body leakage current	V _{GS} =±20V, V _{DS} =0V	I _{GSS}	-	-	±100	nA
Gate threshold voltage	V _{DS} =V _{GS} , I _D =250μA	V _{GS(th)}	0.8	1.2	1.6	V
Static drain-source on-state resistance ³	V _{GS} =10V, I _D =300mA	R _{DS(ON)}	-	1.1	2.5	Ω
	V _{GS} =4.5V, I _D =200mA		-	2.2	3.0	
Dynamic electrical characteristics						
Characteristic	Test condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Input capacitance	V _{DS} =25V V _{GS} =0V f=1.0MHz	C _{iss}	-	28.5	-	pF
Output capacitance		C _{oss}	-	2.7	-	
Reverse transfer capacitance		C _{rss}	-	1.78	-	
Total gate charge	V _{DS} =25V V _{GS} =10V I _D =300mA	Q _g	-	1.7	2.5	nC
Gate source charge		Q _{GS}	-	0.4	-	
Gate drain charge		Q _{gd}	-	0.24	-	
Switching characteristics						
Characteristic	Test condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Turn on delay time	V _{DS} =25V V _{GS} =10V I _D =300mA R _G =6.0Ω	t _{d(ON)}	-	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	-	
Source drain diode characteristics						
Characteristic	Test condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Maximum body-diode continuous current	T _A =25°C	I _{SD}	-	-	340	mA
Diode forward voltage	I _S =300mA, V _{GS} =0V	V _{SD}	-	-	1.2	V

Notes:

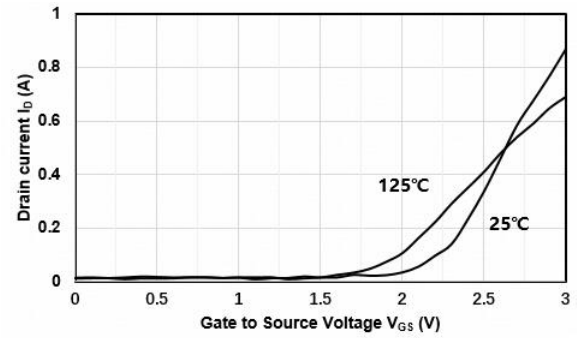
1. Pulse width limited by maximum allowable junction temperature.
2. The value of PD&RθJA is measured with the device mounted on 1 in2 FR-4 board with 2oz. Copper, double sided, in a still air environment with T_a=25°C.
3. Pulse test; Pulse width ≤ 300μs, duty cycle ≤ 2%

Typical characteristics

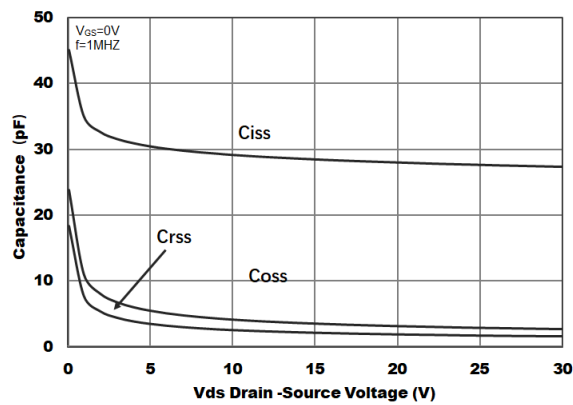
Output Characteristics



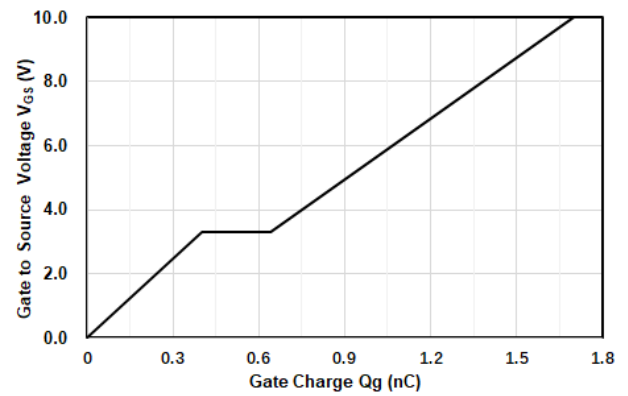
Transfer Characteristics



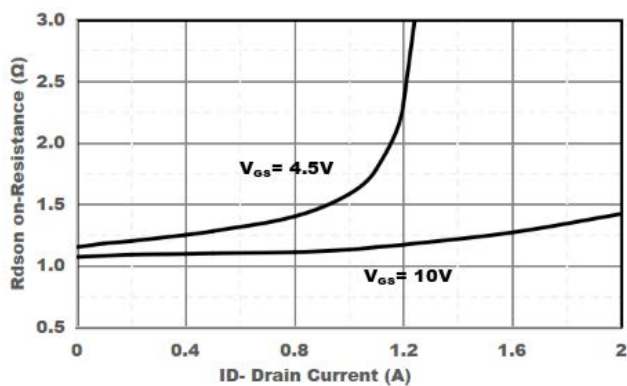
Capacitance Characteristics



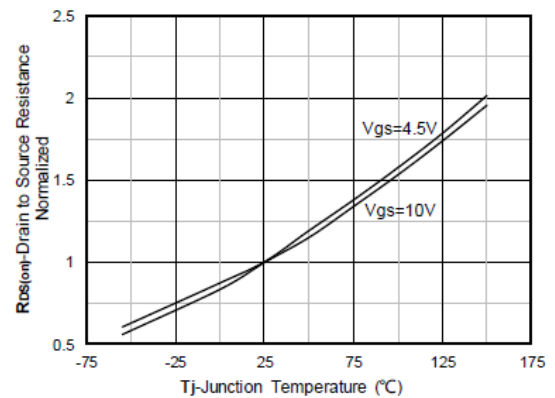
Gate Charge



Drain-Source on Resistance

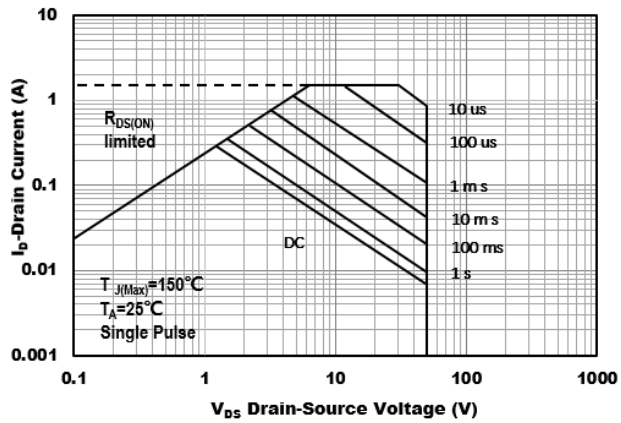


Drain-Source on Resistance

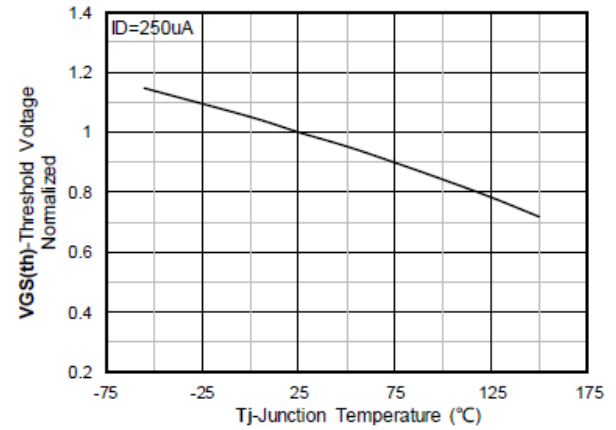


Typical characteristics

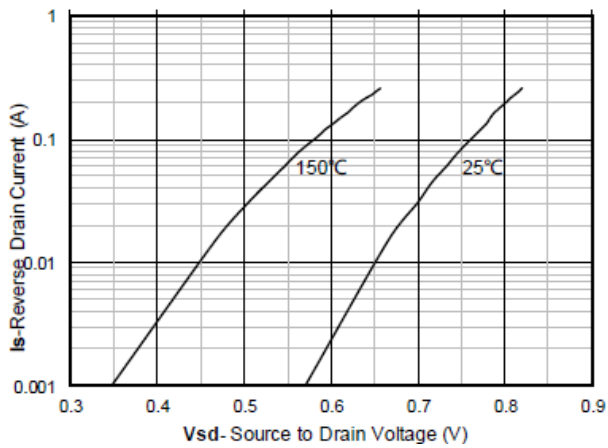
Safe Operation Area



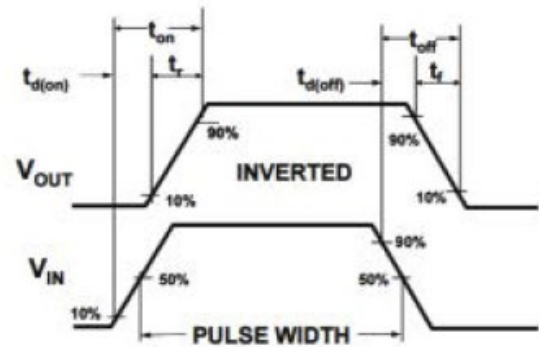
Normalized Threshold voltage

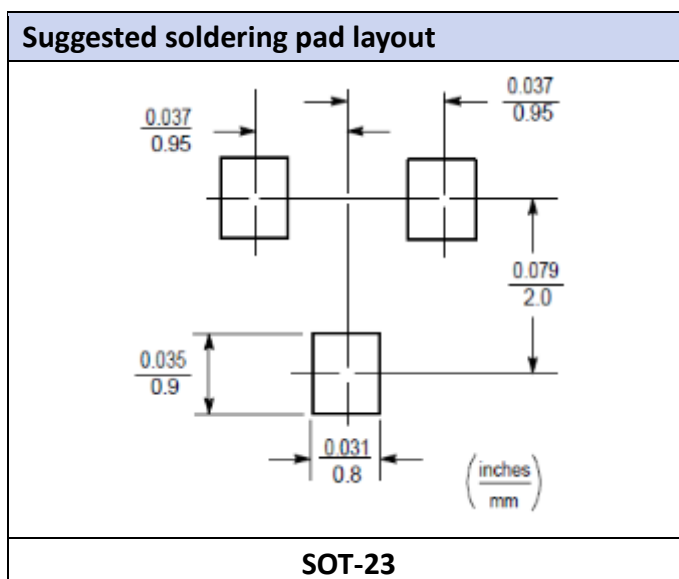


Forward characteristics of reverse diode



Switching wave





Ordering information			
Part Number	Package	Shipping Quantity	Dimensions
BSS138	SOT-23	3000 pcs / 7" reel	---

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