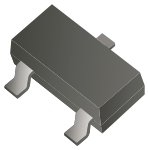
MOSFET

BSS138A-P2-HF

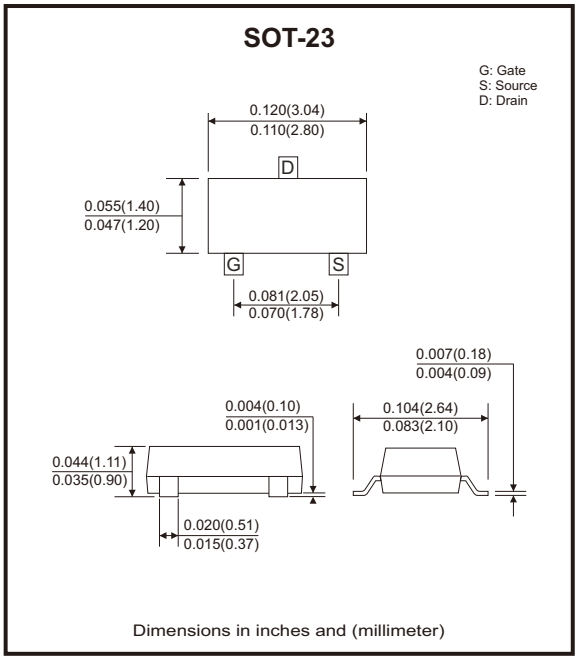
N-Channel
RoHS Device
Halogen Free



Features

- High density cell design for low $R_{DS(ON)}$.
- Voltage controlled small signal switch.
- Rugged and reliable.
- ESD protected.

SOT-23

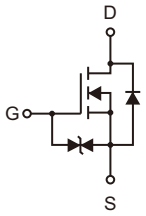


Dimensions in inches and (millimeter)

Mechanical data

- Case: SOT-23, molded plastic.
- Terminals: Solderable per MIL-STD-750, method 2026.
- Mounting position: Any.

Circuit Diagram



Maximum Ratings (at T_A=25°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	I_D	0.22	A
Power dissipation	P_D	350	mW
Thermal resistance junction to ambient	$R_{\theta JA}$	357	°C/W
Operating junction temperature range	T_J	-55 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Electrical Characteristics (at T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	50			V
Gate threshold voltage (Note 1)	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.8	1.0	1.45	V
Gate-body leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±10	μA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 48V, V_{GS} = 0V			1	μA
Drain-source on-resistance (Note 1)	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 0.2A		1.3	4	Ω
	$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5A		1.1	3	Ω
Diode forward voltage (Note 1)	V_{SD}	V_{GS} = 0V, I_S = 0.5A	0.5		1.3	V
Forward transconductance (Note 1)	g_{FS}	V_{DS} = 10V, I_D = 0.2A	100			mS
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz		22.8		pF
Output capacitance	C_{oss}			3.5		
Reverse transfer capacitance	C_{rss}			2.9		
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD} = 30V, V_{GEN} = 10V, R_G = 25Ω, R_L = 60Ω, I_D = 0.5A		3.8		ns
Turn-off delay time	$t_{d(off)}$			19		

Notes: 1. Pulse width ≤ 300μs, duty cycle ≤ 2%.

Typical Rating and Characteristic Curves (BSS138A-P2-HF)

Fig.1 - Output Characteristics

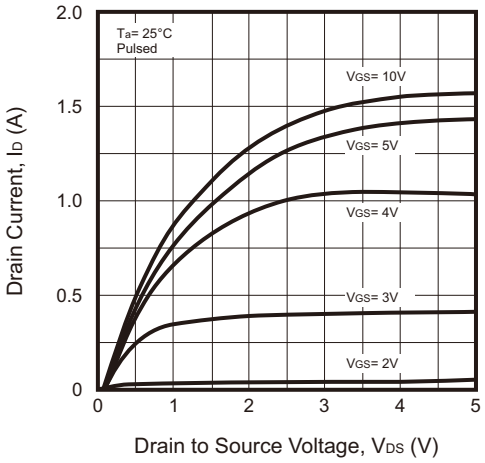


Fig.2 - Transfer Characteristics

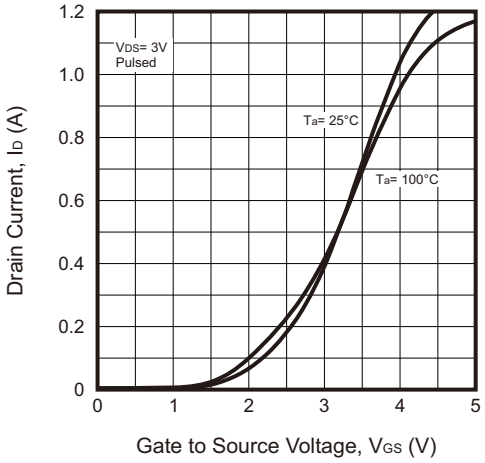


Fig.3 - On-Resistance vs. Drain Current

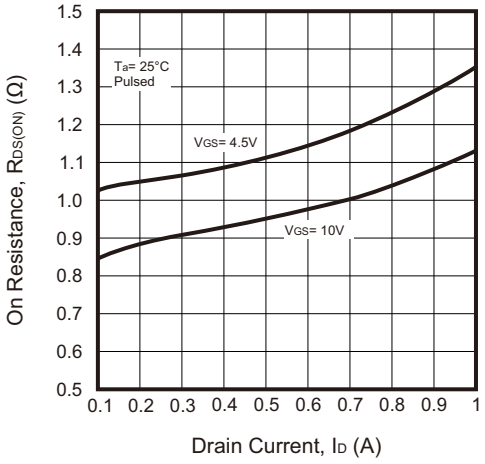


Fig.4 - On-Resistance vs. Gate to Source Voltage

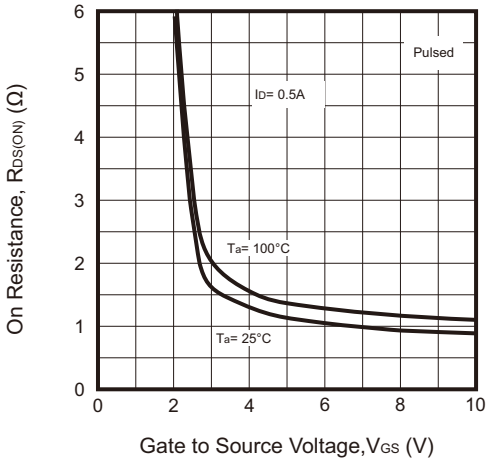


Fig.6 - IS — VSD

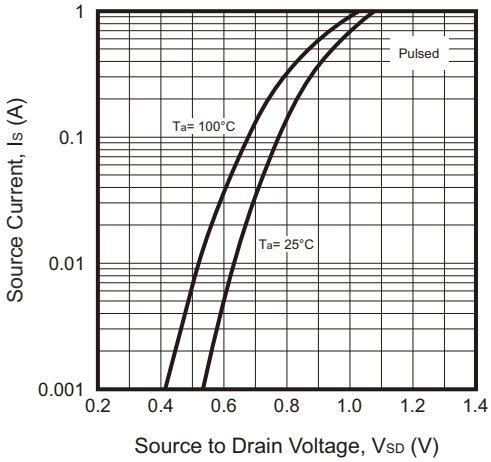
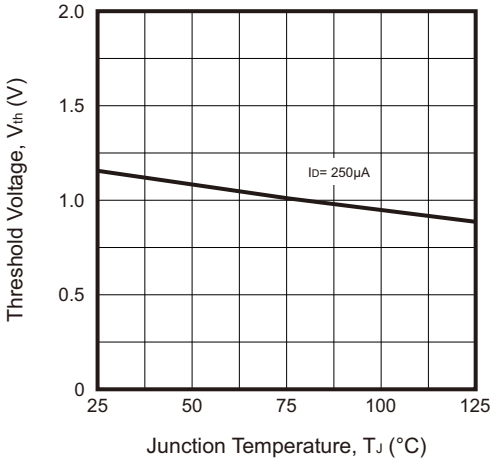
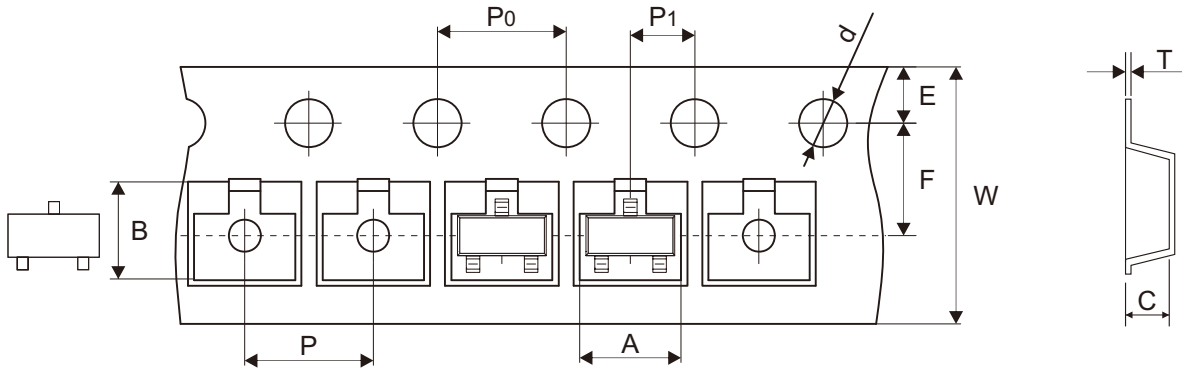
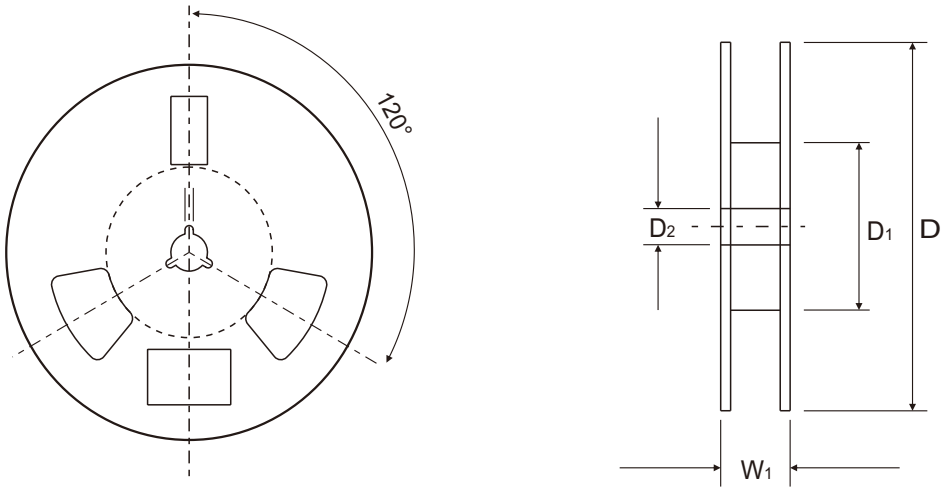


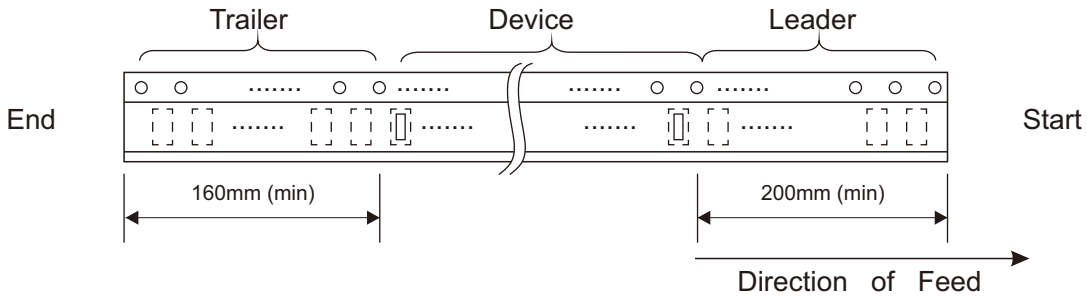
Fig.7 - Threshold Voltage Characteristics



Reel Taping Specification





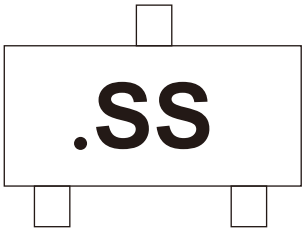


	SYMBOL	A	B	C	d	D	D1	D2
SOT-23	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 + 0.08 − 0.10	1.50 + 0.10 − 0.00	178.00 ± 2.00	50.00 ± 0.50	13.00 ± 0.25
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 + 0.003 − 0.004	0.059 + 0.004 − 0.000	7.008 ± 0.079	1.969 ± 0.020	0.512 ± 0.010

	SYMBOL	E	F	P	P0	P1	T	W	W1
SOT-23	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.20 ± 0.02	8.00 + 0.30 − 0.10	9.50 ± 0.50
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.008 ± 0.001	0.315 + 0.012 − 0.004	0.374 ± 0.020

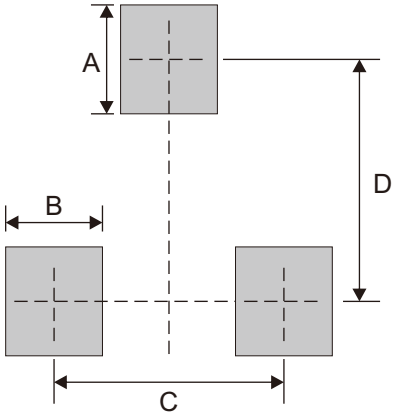
Marking Code

Part Number	Marking Code
BSS138A-P2-HF	.SS



Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	1.90	0.075
D	2.00	0.079



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7