



SOT-23 Plastic-Encapsulate Mosfets

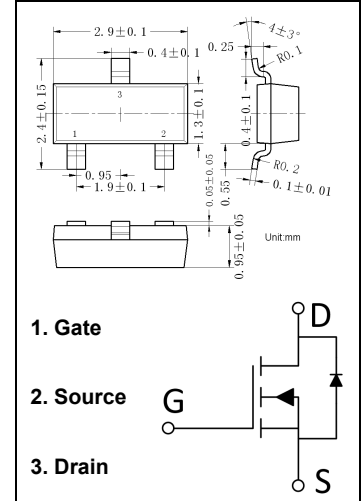
BSS138 N-Channel Mosfet

Features

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

Application

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



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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source voltage	50	V
V_{GSS}	Gate-Source voltage	± 20	
I_D	Continuous Drain Current	0.22	A
I_{DM}	Pulsed Drain Current ($t_p=10\mu s$)	0.88	A
P_D	Power Dissipation	0.35	W
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	357	$^{\circ}\text{C}/\text{W}$
T_J	Operating Temperature	150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics (T_a=25°C unless otherwise specified)

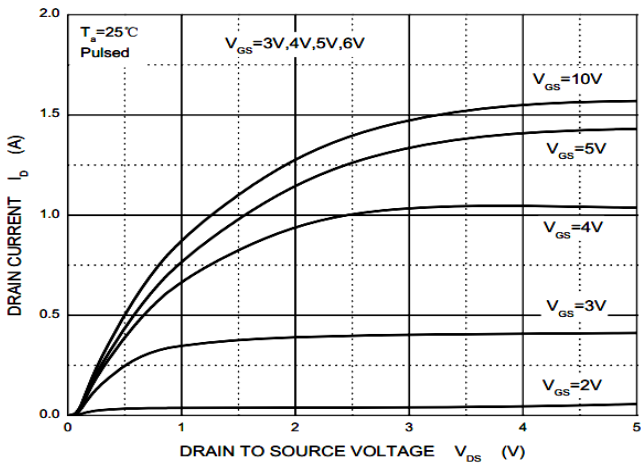
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	50			V
I _{GSS}	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 50V, V _{GS} = 0V			0.5	μA
		V _{DS} = 30V, V _{GS} = 0V			100	nA
On Characteristics						
V _{GS(th)}	Gate-Threshold Voltage ¹⁾	V _{DS} = V _{GS} , I _D = 1mA	0.8		1.5	V
R _{DS(on)}	Static Drain-Source On-Resistance ¹⁾	V _{GS} = 10V, I _D = 0.22A		1.0	3.5	Ω
		V _{GS} = 4.5V, I _D = 0.22A		1.25	6.0	
		V _{GS} = 2.5V, I _D = 0.10A		2.00	8.0	
g _{fs}	Forward Trans conductance ¹⁾	V _{DS} = 10V, I _D = 0.22A	0.12			S
Dynamic Characteristics ²⁾						
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1.0MHz		27		pF
C _{oss}	Output Capacitance			13		
C _{rss}	Reverse Transfer Capacitance			6		
Q _g	Total Gate Charge	V _{DS} =25V, I _D =0.2A, V _{GS} = 4.5V		0.6		nC
Q _{gs}	Gate-Source Charge			0.22		
Q _{gd}	Gate-Drain Charge			0.2		
Switching Characteristics ^{1,2)}						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 30V, V _{DS} = 10V, I _D =0.29A, R _{GEN} = 6Ω			5	ns
t _r	Rise Time				18	
t _{d(off)}	Turn-Off Delay Time				36	
t _f	Fall Time				14	
Drain-source body diode characteristics						
V _{SD}	Body diode forward voltage ¹⁾	I _S = 0.44A, V _{GS} = 0V			1.4	V

Notes

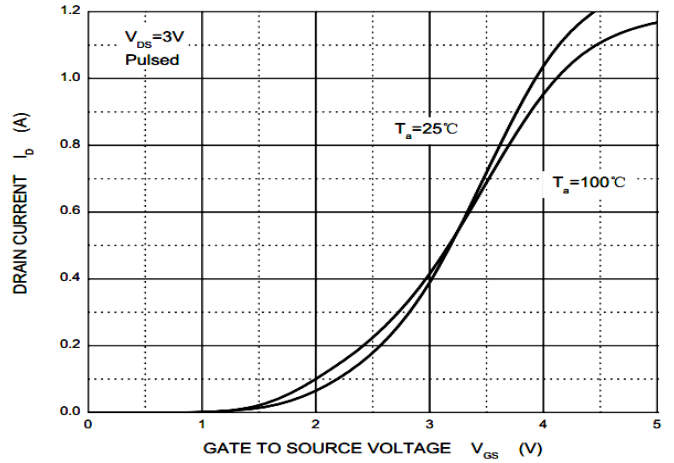
1. Pulse Test ; Pulse Width ≤300μs, Duty Cycle ≤2%.
2. These parameters have no way to verify.

Typical Characteristics

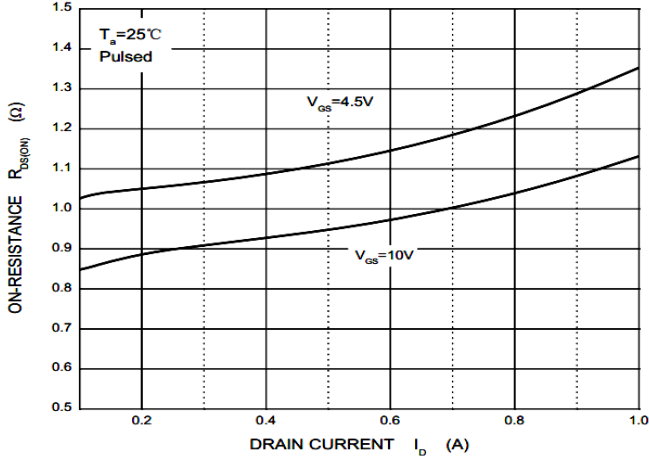
Output Characteristics



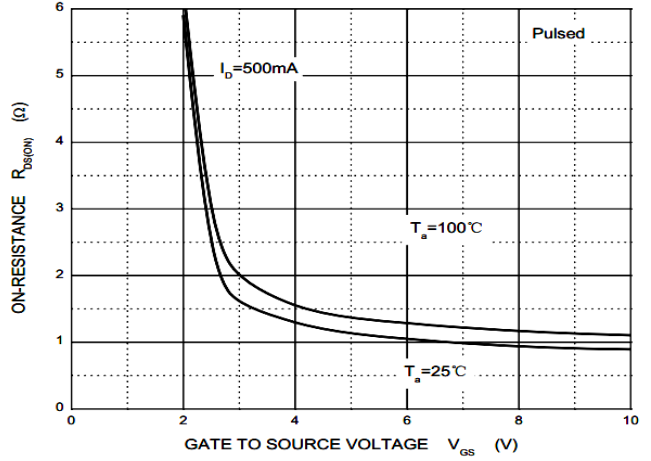
Transfer Characteristics



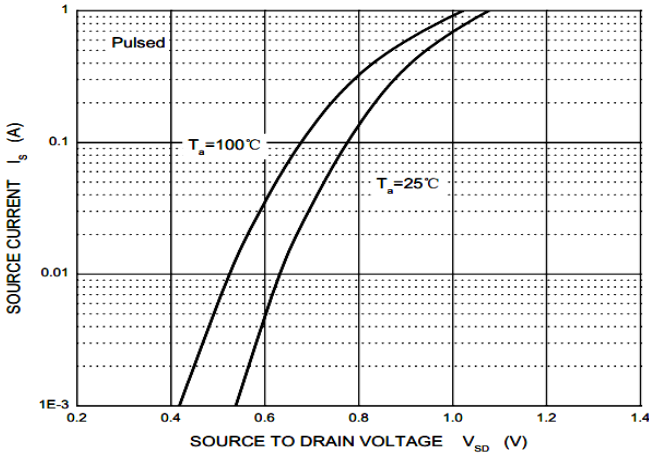
$R_{DS(ON)}$ — I_D



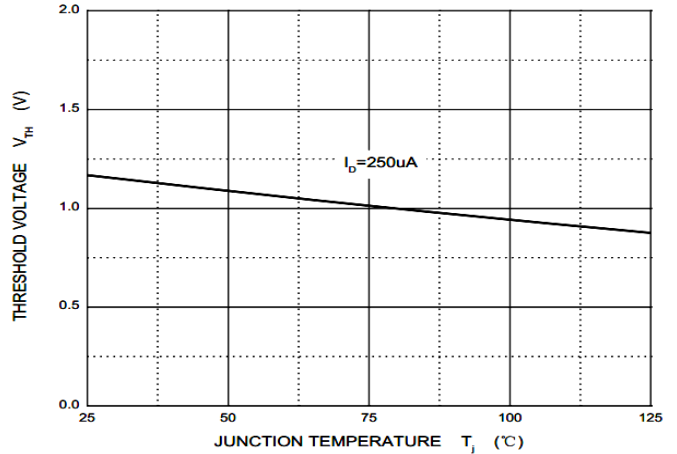
$R_{DS(ON)}$ — V_{GS}



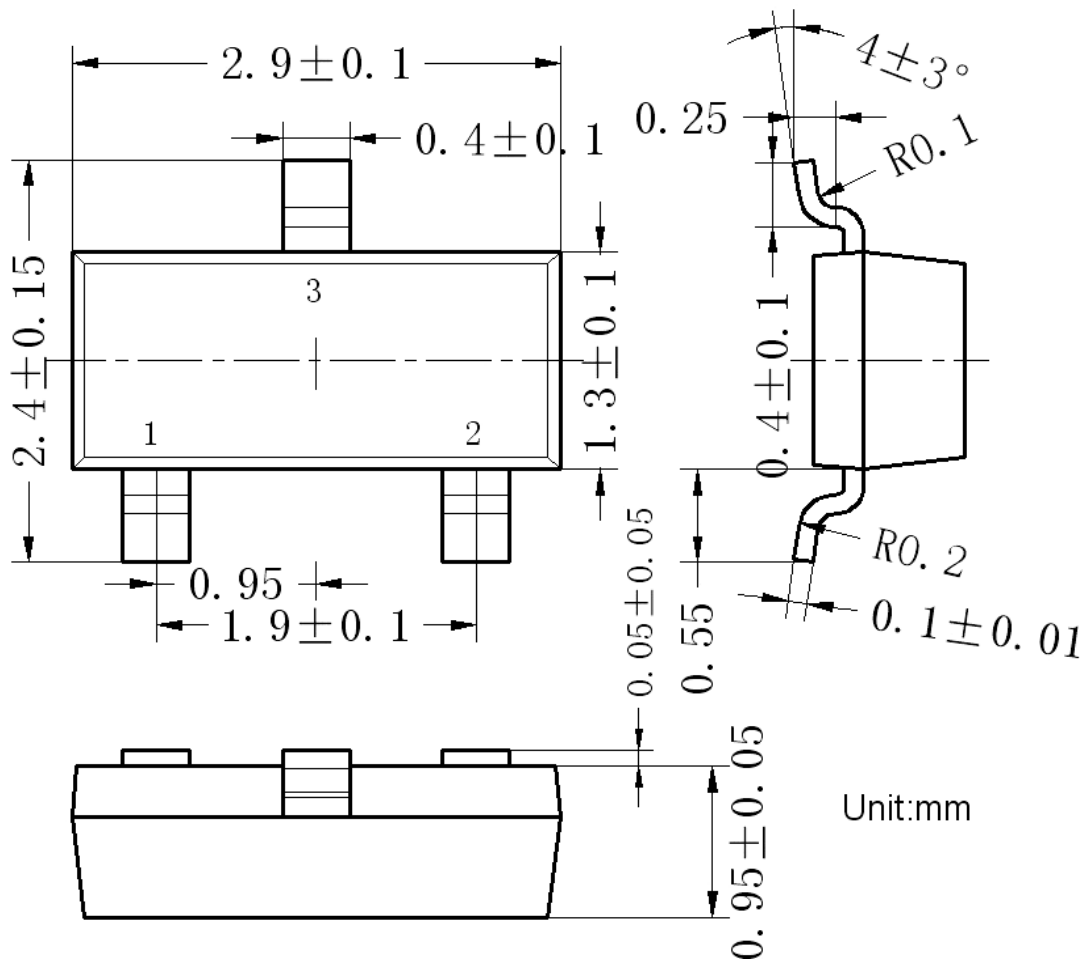
I_S — V_{SD}



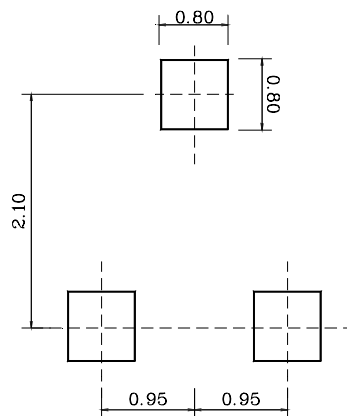
Threshold Voltage



SOT-23 Package Information

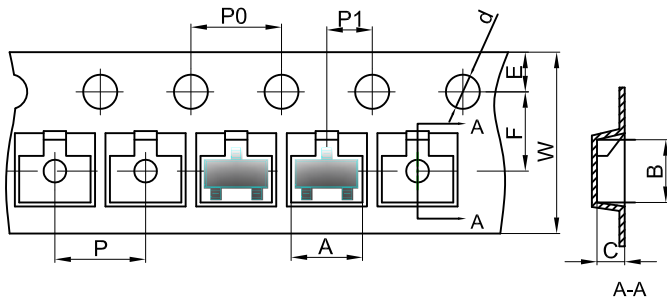


Recommend PCB solder land [Unit: mm]



SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

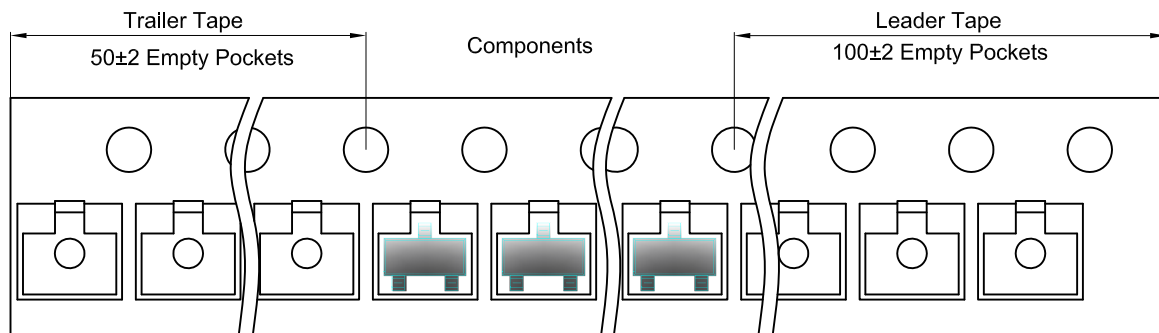


Packaging Description:

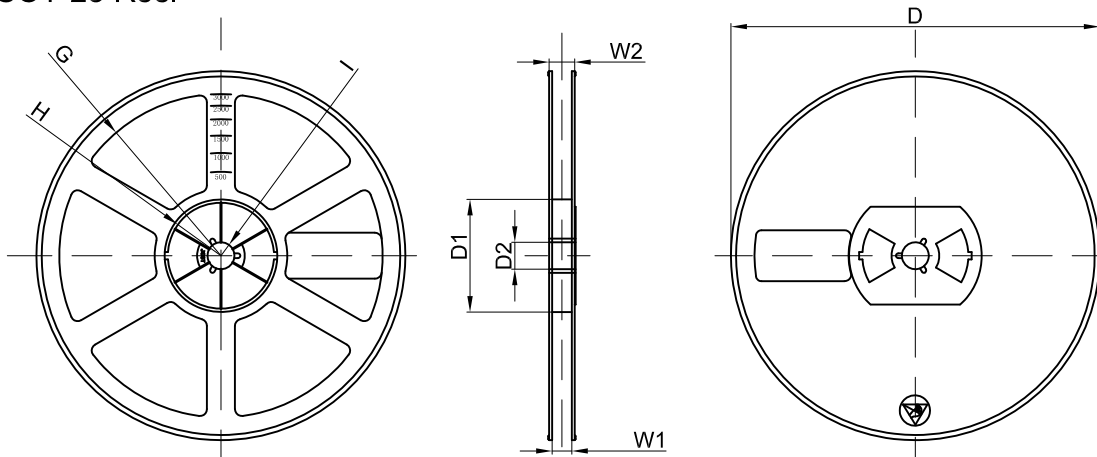
SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23 Tape Leader and Trailer



SOT-23 Reel

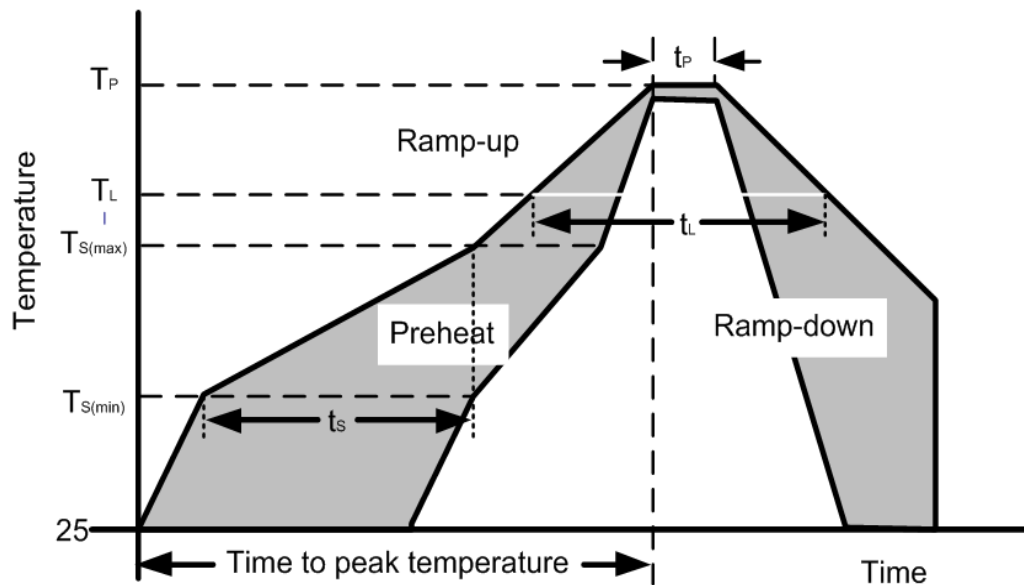


Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	45,000 pcs	203×203×195	180,000 pcs	438×438×220	

Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	Temperature Min ($T_{S(min)}$)	150°C
	Temperature Max ($T_{S(max)}$)	200°C
	Time (min to max) (t_s)	60 – 190 secs
		5°C/second max
		5°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Temperature (t_L)	60 – 150 seconds
		260+0/-5 °C
Time within actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



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