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BSS138LT1G
Power MOSFET
200 mA, 50 V

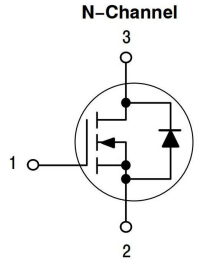
N−Channel SOT−23

Typical applications are DC−DC converters, power management in portable and battery−powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

Features

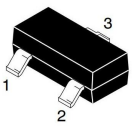
- Low Threshold Voltage ($V_{GS(th)}$: 0.5 V−1.5 V) Makes it Ideal for Low Voltage Applications
- Miniature SOT−23 Surface Mount Package Saves Board Space
- These Devices are Pb−Free and are RoHS Compliant

200 mA, 50 V
$R_{DS(on)}$ = 3.5 Ω



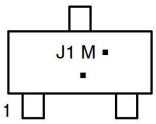
MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain−to−Source Voltage	V_{DSS}	50	Vdc
Gate−to−Source Voltage − Continuous	V_{GS}	± 20	Vdc
Drain Current − Continuous @ T_A = 25°C − Pulsed Drain Current ($t_p \le 10$ μs)	 I_D I_{DM}	 200 800	mA
Total Power Dissipation @ T_A = 25°C	P_D	225	mW
Operating and Storage Temperature Range	T_J, T_{stg}	− 55 to 150	°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Maximum Lead Temperature for Soldering Purposes, for 10 seconds	T_L	260	°C



SOT−23
CASE 318
STYLE 21

MARKING DIAGRAM



J1 = Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain–to–Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = 250 μAdc)		$V_{(BR)DSS}$	50	–	–	Vdc
Zero Gate Voltage Drain Current		I_{DSS}				μAdc
(V_{DS} = 25 Vdc, V_{GS} = 0 Vdc, 25°C)			–	–	0.1	
(V_{DS} = 50 Vdc, V_{GS} = 0 Vdc, 25°C)			–	–	0.5	
(V_{DS} = 50 Vdc, V_{GS} = 0 Vdc, 150°C)			–	–	5.0	
Gate–Source Leakage Current (V_{GS} = ± 20 Vdc, V_{DS} = 0 Vdc)		I_{GSS}	–	–	±0.1	μAdc
ON CHARACTERISTICS (Note 1)						
Gate–Source Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0 mAdc)		$V_{GS(th)}$	0.5	–	1.5	Vdc
Static Drain–to–Source On–Resistance		$r_{DS(on)}$				Ω
(V_{GS} = 2.75 Vdc, I_D < 200 mAdc, T_A = –40°C to +85°C)			–	5.6	10	
(V_{GS} = 5.0 Vdc, I_D = 200 mAdc)			–	–	3.5	
Forward Transconductance (V_{DS} = 25 Vdc, I_D = 200 mAdc, f = 1.0 kHz)		g_{fs}	100	–	–	mmhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 25 Vdc, V_{GS} = 0, f = 1 MHz)	C_{iss}	–	40	50	pF
Output Capacitance	(V_{DS} = 25 Vdc, V_{GS} = 0, f = 1 MHz)	C_{oss}	–	12	25	
Transfer Capacitance	(V_{DG} = 25 Vdc, V_{GS} = 0, f = 1 MHz)	C_{rss}	–	3.5	5.0	
SWITCHING CHARACTERISTICS (Note 2)						
Turn–On Delay Time	(V_{DD} = 30 Vdc, I_D = 0.2 Adc,)	$t_{d(on)}$	–	–	20	ns
Turn–Off Delay Time		$t_{d(off)}$	–	–	20	

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperature.

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TYPICAL ELECTRICAL CHARACTERISTICS

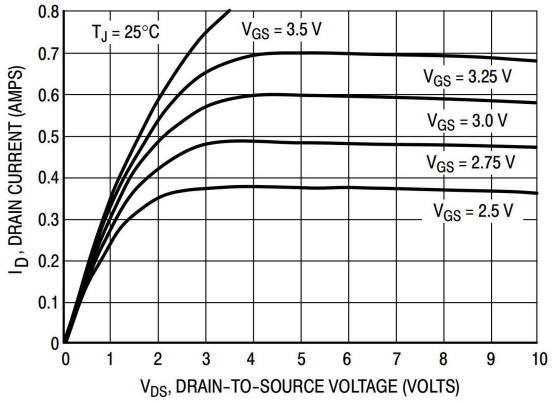


Figure 1. On−Region Characteristics

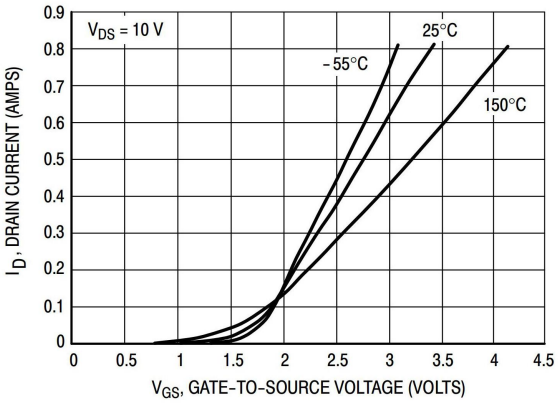


Figure 2. Transfer Characteristics

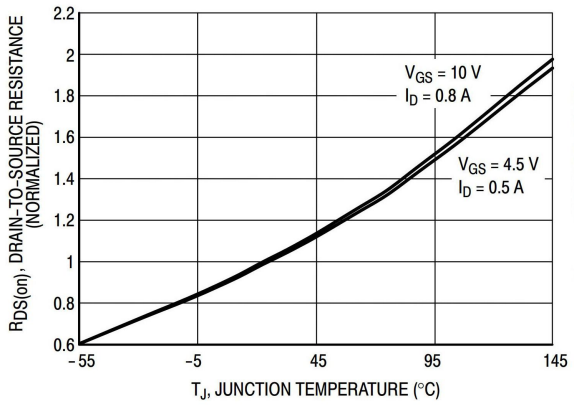


Figure 3. On−Resistance Variation with Temperature

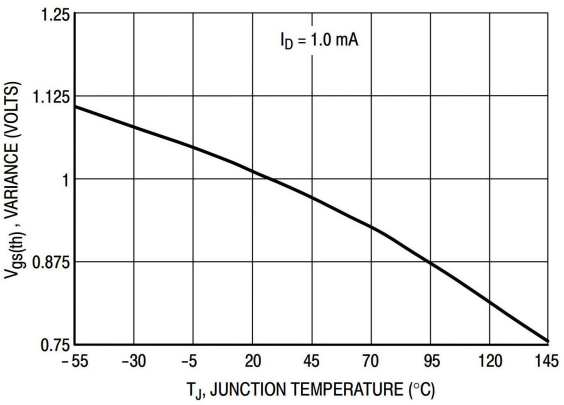


Figure 4. Threshold Voltage Variation with Temperature

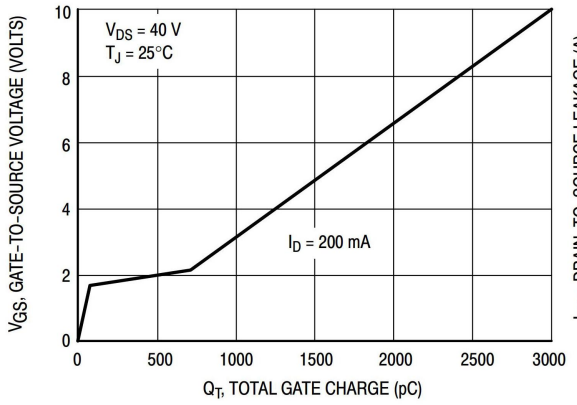


Figure 5. Gate Charge

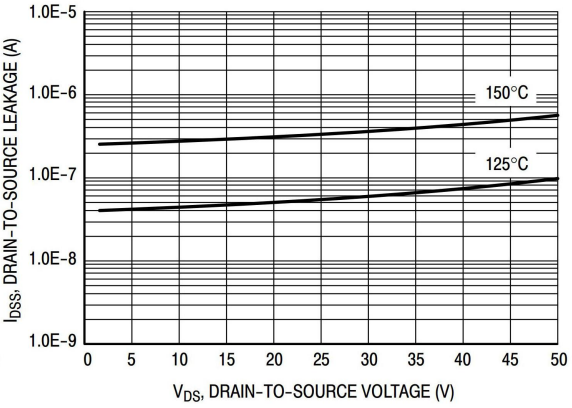


Figure 6. IDSS

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TYPICAL ELECTRICAL CHARACTERISTICS

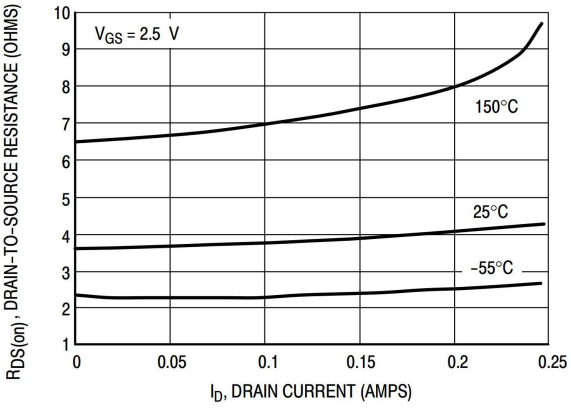


Figure 7. On−Resistance versus Drain Current

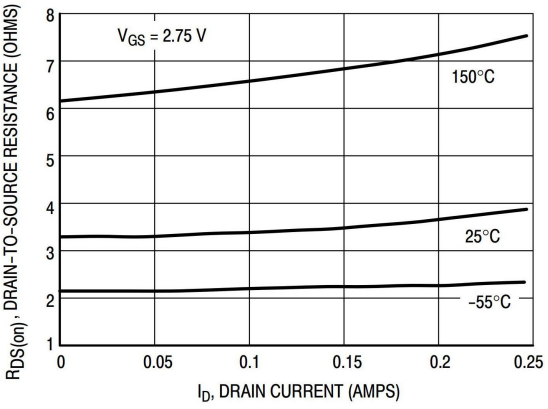


Figure 8. On−Resistance versus Drain Current

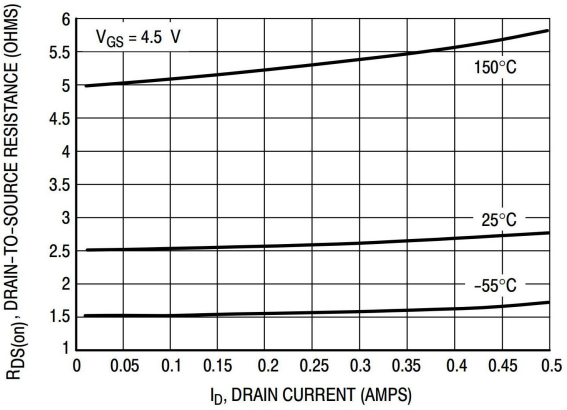


Figure 9. On−Resistance versus Drain Current

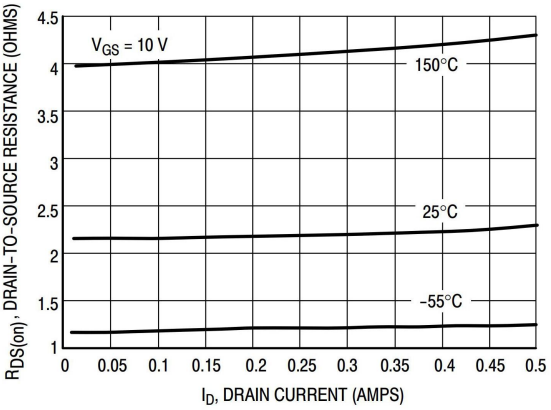


Figure 10. On−Resistance versus Drain Current

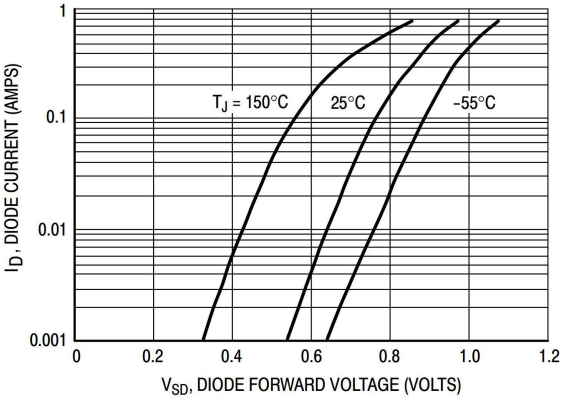


Figure 11. Body Diode Forward Voltage

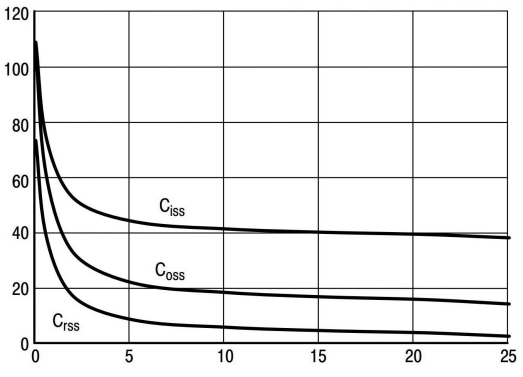


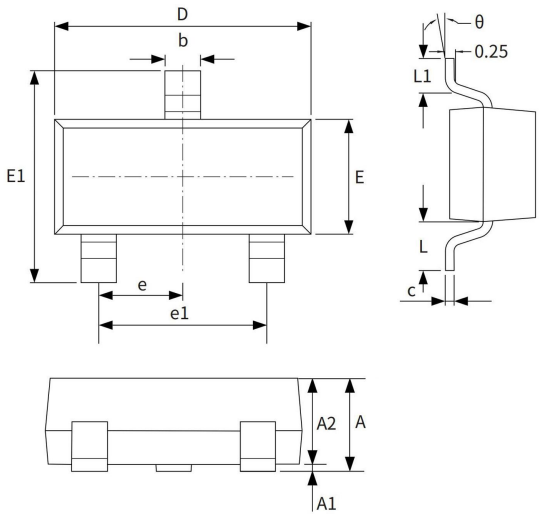
Figure 12. Capacitance

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Ordering Information

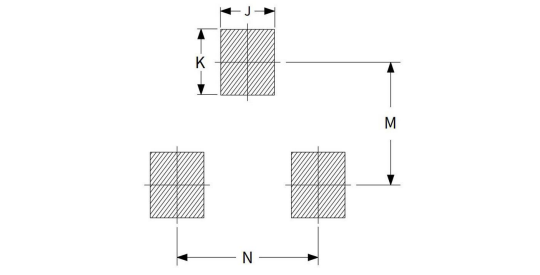
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-23	R1	0.008	3000	30000	240000	7''

Package Outline Dimensions (SOT-23)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.15	0.035	0.045
A1	-	0.10	-	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.80	2.00	0.071	0.079
L	0.550REF		0.022REF	
L1	0.30	0.50	0.012	0.020
θ	-	8°	-	8°

Suggested Pad Layout



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
J	0.75	0.85	0.030	0.033
K	0.85	0.95	0.033	0.037
M	1.95	2.05	0.077	0.081
N	1.85	1.95	0.073	0.077