BSS138LTN

N-Ch 50V Fast Switching MOSFET

V_{DS}=50V, I_D=0.2A, $R_{DS(ON)}$=3000mΩ

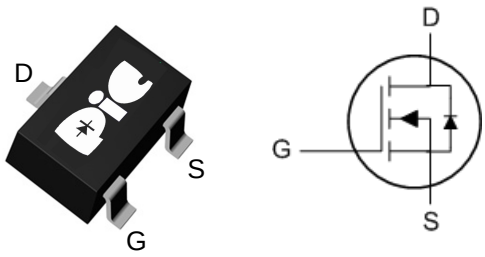
➢ General Description

This BSS138LTN N-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent Rds(On) performance and efficiency for power switching and load switching application., this device also comply with the RoHS and Green Product requirement with full function reliability approved.

➢ Feature

- ●Super Low Gate Charge
- ●Green Device Available
- ●Excellent CdV/dt effect decline
- ●Advanced high cell density Trench technology
- ●SOT-23 Package design

➢ SOT-23



➢ Application

- ●Load Switch
- ●Portable instrument
- ●MB / NB / 3C device

➢ Absolute Maximum Ratings

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 ($t_p \leq 10$ 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

➢ Electrical Characteristics (T_J=25°C Unless otherwise noted)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	50			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=1mA	0.7		1.5	V
I_{GSS}	Gate-Body Leakage	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=50V, V_{GS}=0V			0.5	μA
$R_{DS(ON)}$	Drain-Source On-Resistance*	V_{GS}=10V, I_D=200mA		1.3	3	Ω
		V_{GS}=5V, I_D=200mA		1.4	3.5	
		V_{GS}=2.75V, I_D=150mA		1.6	7	
V_{SD}	Diode Forward Voltage *	I_S=0.44A, V_{GS}=0V		0.8	1.4	V
DYNAMIC						
Qg	Total Gate Charge	V_{DS}=25V, V_{GS}=10V, I_D=0.22A		7.03	12.0	nC
Qgs	Gate-Source Charge			1.84	3.5	
Qgd	Gate-Drain Charge			0.65	2.0	
Rg	Gate Resistance	V_{DS}=0V, V_{GS}=0V, f=1MHz		8.7	20	Ω
Ciss	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz		42	90	pF
Coss	Output Capacitance			15	50	
Crss	Reverse Transfer Capacitance			3	28	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=30V, R_L=103Ω, I_D=0.29A, V_{GS}=10V, R_{GEN}=6Ω		4.63	9	ns
tr	Turn-On Rise Time			6.8	14	
$t_{d(off)}$	Turn-Off Delay Time			18.9	38	
t_f	Turn-Off Fall Time			11.4	22	

1. **Pulse test; pulse width ≦ 300us, duty cycle≦ 2%**
2. **Switching characteristics are independent of operating junction temperature.**

➢ Typical Characteristics

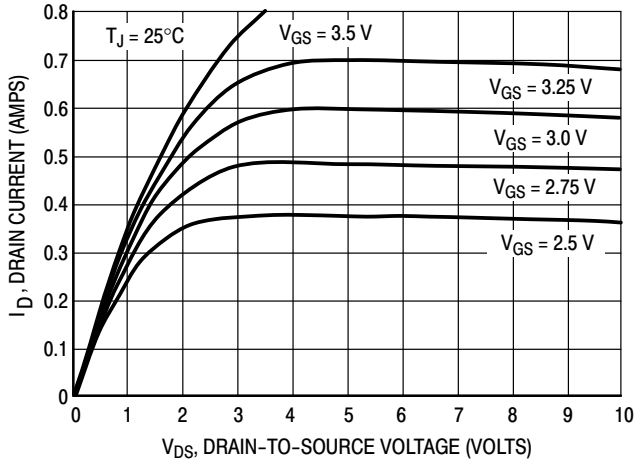


Figure 1. On−Region Characteristics

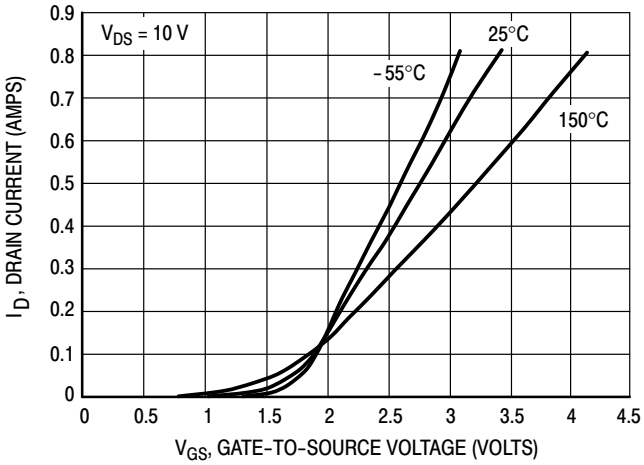


Figure 2. Transfer Characteristics

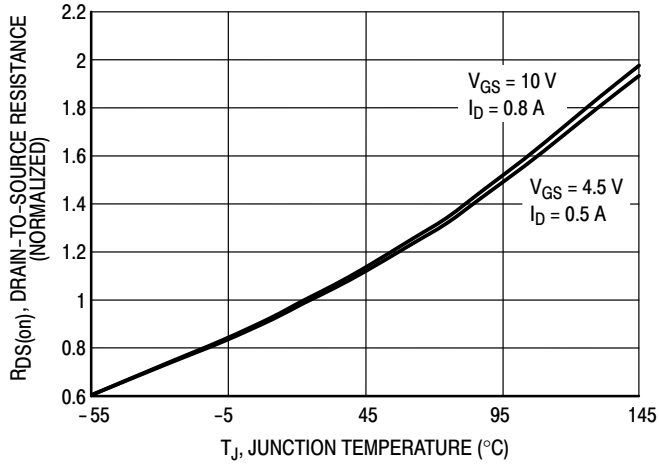


Figure 3. On−Resistance Variation with Temperature

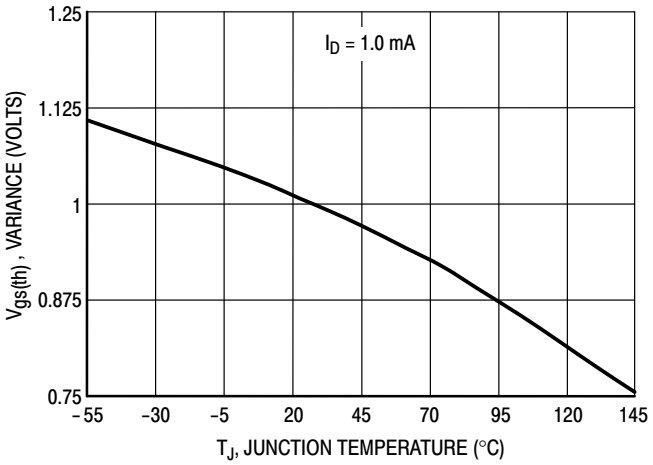


Figure 4. Threshold Voltage Variation with Temperature

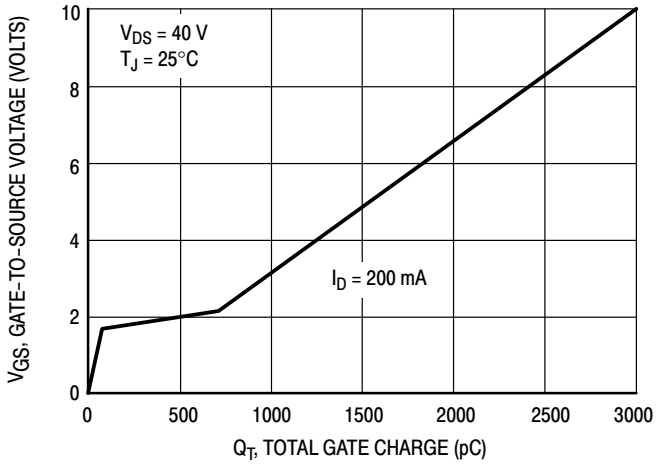


Figure 5. Gate Charge

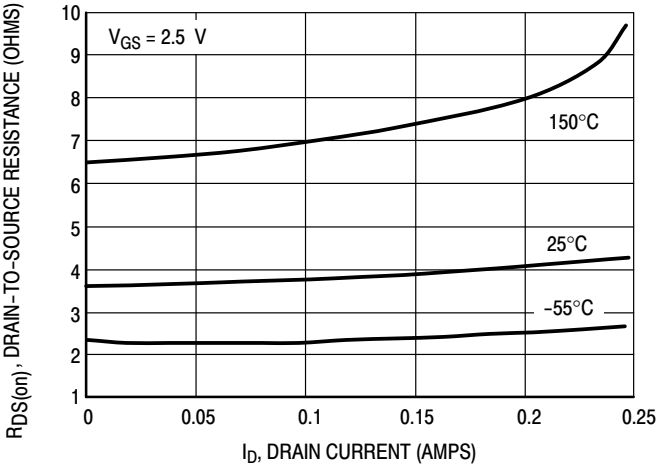


Figure 6. On−Resistance versus Drain Current

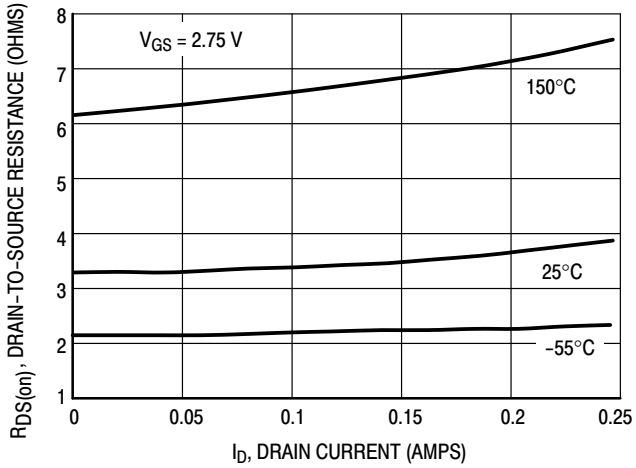


Figure 7. On−Resistance versus Drain Current

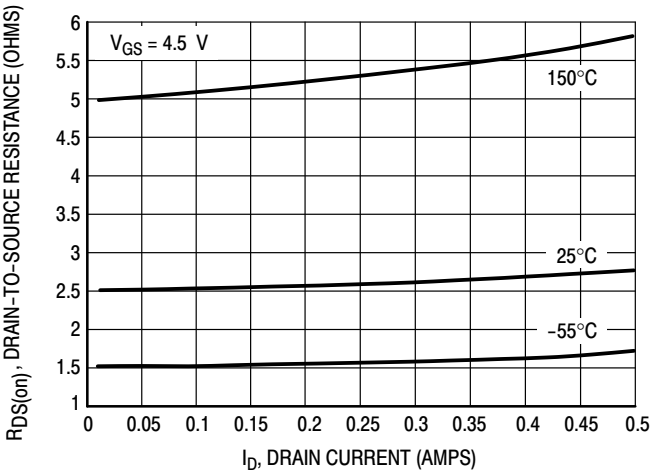


Figure 8. On−Resistance versus Drain Current

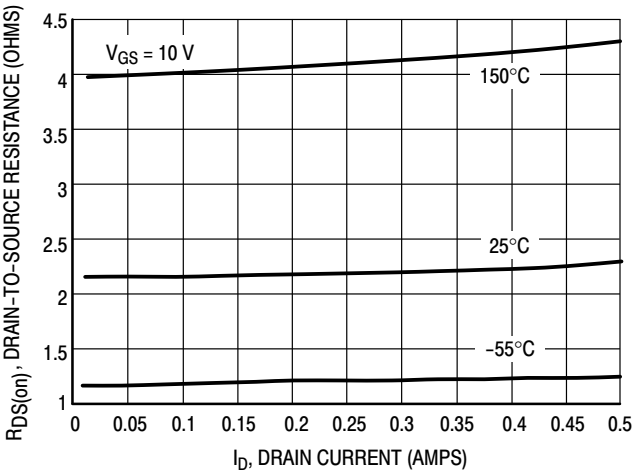


Figure 9. On −Resistance versus Drain Current

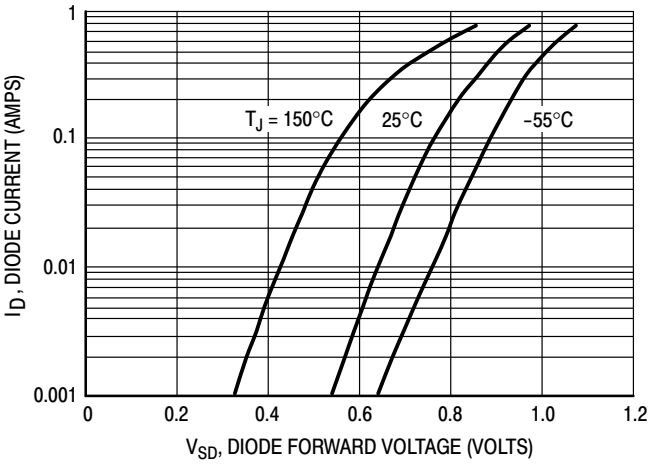


Figure 10. Body Diode Forward Voltage

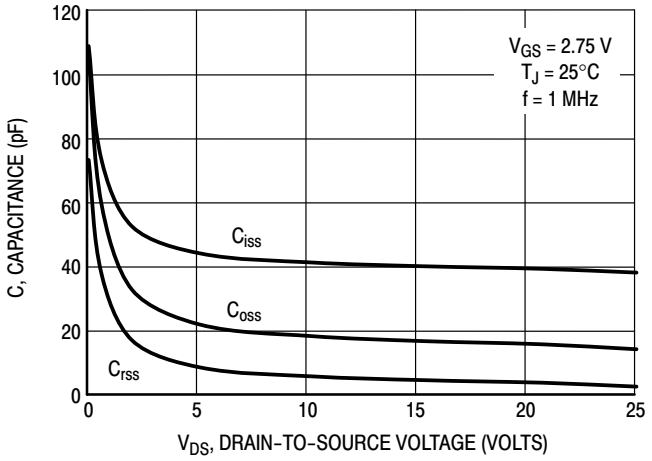
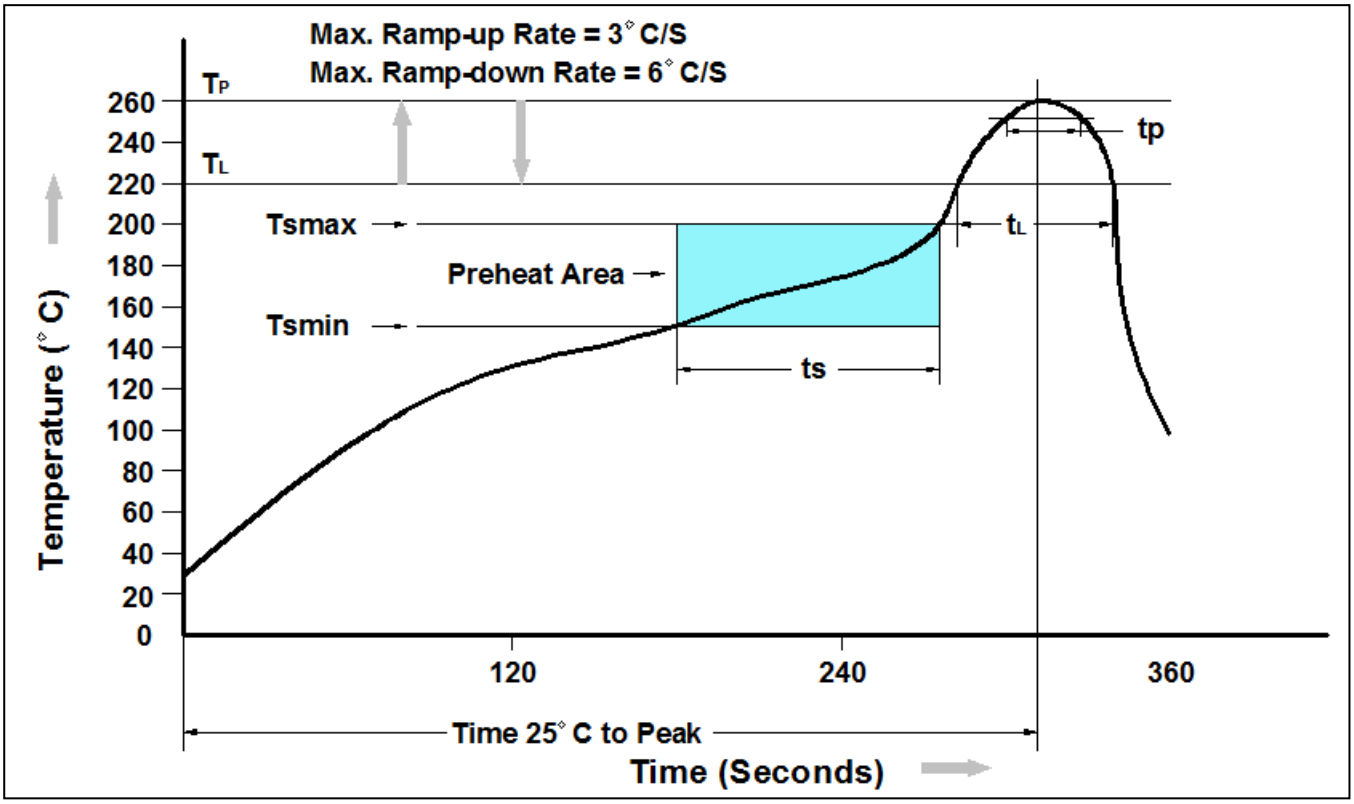


Figure 12. Capacitance

➢ Recommand IR Reflow Soldering Thermal Profile

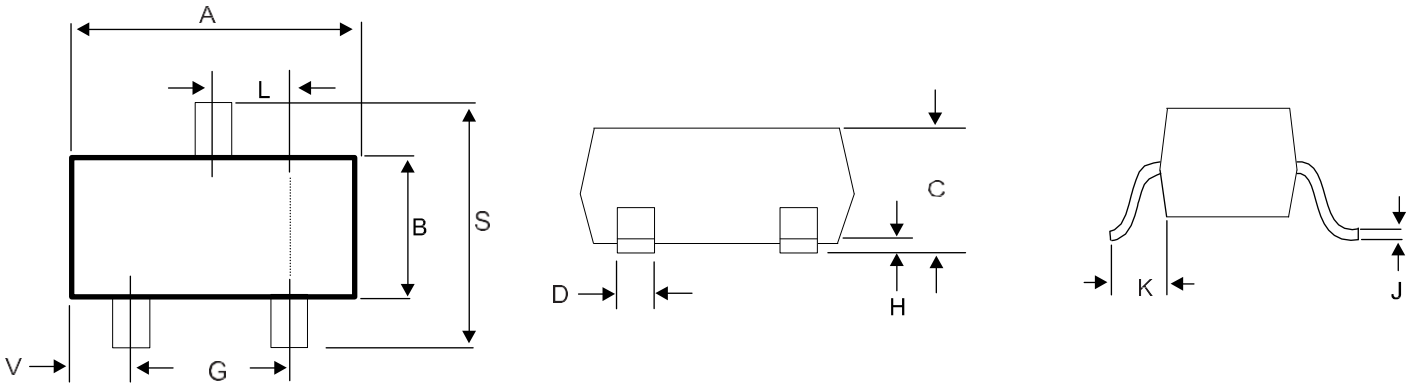


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Average Ramp-up Rate (tL to tP)	3°C/second max.
Liquidous Temperature (TL)	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (tP) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

➢ Ordering Information

Part Number	Description	Quantity
BSS138LTN	SOT-23 Reel	3000 pcs

➢ Package Information (SOT-23)



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.5
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.007	–	0.018	–
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

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