



BSS138

Preliminary

Power MOSFET

**N-CHANNEL LOGIC LEVEL
ENHANCEMENT MODE**

■ DESCRIPTION

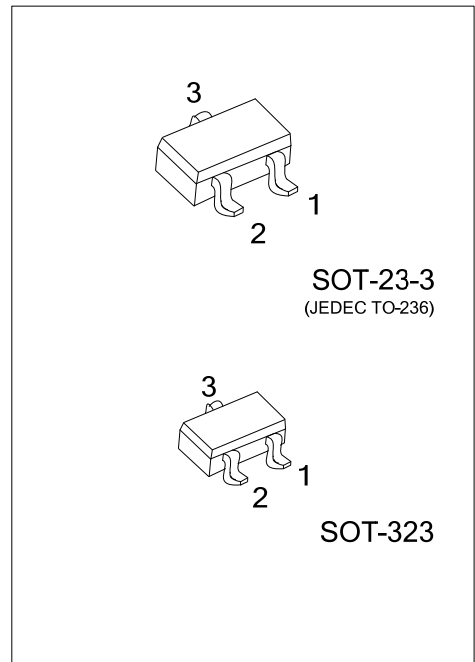
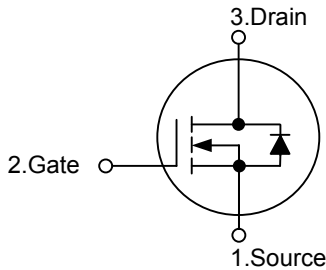
This device employs advanced MOSFET technology and features low gate charge while maintaining low on-resistance.

Optimized for switching applications, this device improves the overall efficiency of DC/DC converters and allows operation to higher switching frequencies.

■ FEATURES

- * $R_{DS(ON)}=0.7\Omega @ V_{GS}=10V$
- * $R_{DS(ON)}=1\Omega @ V_{GS}=4.5V$
- * Low Capacitance
- * Low Gate Charge
- * Fast Switching Capability
- * Avalanche Energy Specified

■ SYMBOL



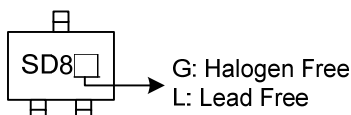
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
BSS138L-AE2-R	BSS138G-AE2-R	SOT-23-3	S	G	D	Tape Reel
BSS138L-AL3-R	BSS138G-AL3-R	SOT-323	S	G	D	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>BSS138L-AE2-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) R: Tape Reel (2) AE2: SOT-23-3. AL3: SOT-323 (3) G: Halogen Free, L: Lead Free</p>
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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	50	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current	DC	I_D	0.22	A
	Pulse		0.88	
Power Dissipation	SOT-23-3	P_D	0.36	W
	SOT-323		0.15	
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-3	θ_{JA}	350	$^\circ\text{C/W}$
	SOT-323		833	

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	50			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$, Referenced to 25°C		72		$\text{mV}/^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=50\text{V}, V_{GS}=0\text{V}$			0.5	μA
		$V_{DS}=30\text{V}, V_{GS}=0\text{V}$			0.1	
Gate-Body Leakage, Forward	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			± 100	nA
ON CHARACTERISTICS (Note)						
Gate-Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=1\text{mA}$	0.8	1.3	1.5	V
Gate Threshold Voltage Temperature Coefficient	$\Delta V_{GS(TH)}/\Delta T_J$	$I_D=1\text{mA}$, Referenced to 25°C		-2		$\text{mV}/^\circ\text{C}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=0.22\text{A}$		0.7	3.5	Ω
		$V_{GS}=4.5\text{V}, I_D=0.22\text{A}$		1.0	6.0	
On-State Drain Current	$I_{D(ON)}$	$V_{GS}=10\text{V}, V_{DS}=5\text{V}$	0.2			A
Forward Transconductance	g_{FS}	$V_{DS}=10\text{V}, I_D=0.22\text{A}$	0.12	0.5		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		27		pF
Output Capacitance	C_{OSS}			13		pF
Reverse Transfer Capacitance	C_{RSS}			6		pF
SWITCHING PARAMETERS (Note)						
Total Gate Charge	Q_G	$V_{DS}=25\text{V}, V_{GS}=10\text{V}, I_D=0.22\text{A}$		1.7	2.4	nC
Gate Source Charge	Q_{GS}			0.1		nC
Gate Drain Charge	Q_{GD}			0.4		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=30\text{V}, I_D=0.29\text{A}, V_{GS}=10\text{V}, R_G=6\Omega,$		2.5	5	ns
Turn-ON Rise Time	t_R			9	18	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			20	36	ns
Turn-OFF Fall-Time	t_F			7	14	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}, I_S=0.44\text{A}$ (Note)		0.8	1.4	V
Max. Diode Forward Current	I_S				0.22	A

Note: Pulse test, pulse width $\leq 300\mu\text{s}$, duty cycles $\leq 2\%$

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