

**BSS138**

Preliminary

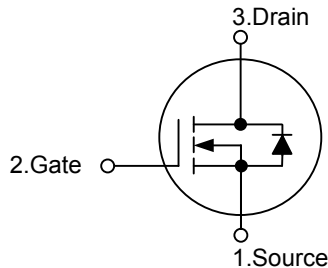
Power MOSFET**N-CHANNEL LOGIC LEVEL
ENHANCEMENT MODE**■ **DESCRIPTION**

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**

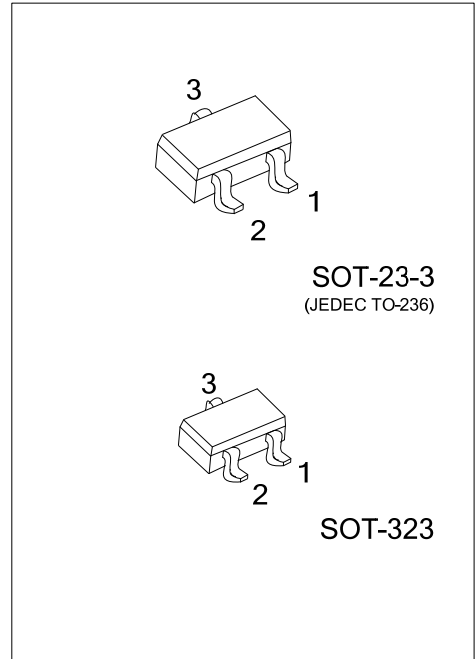
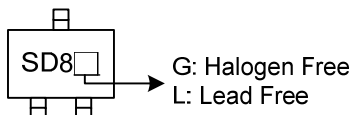
- * $R_{DS(ON)}=0.7\Omega$ @ $V_{GS}=10V$
- * $R_{DS(ON)}=1\Omega$ @ $V_{GS}=4.5V$
- * Low Capacitance
- * Low Gate Charge
- * Fast Switching Capability
- * Avalanche Energy Specified

■ **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

BSS138L-AE2-R (1) Packing Type (2) Package Type (3) Lead Free		(1) R: Tape Reel (2) AE2: SOT-23-3. AL3: SOT-323 (3) G: Halogen Free, L: Lead Free
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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_{DS}	50	V
Gate-Source Voltage		V_{GS}	± 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} =0V, I _D =250μA	50			V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		72		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =50V, V _{GS} =0V			0.5	μA
		V _{DS} =30V, V _{GS} =0V			0.1	
Gate–Body Leakage, Forward	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS (Note)						
Gate-Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =1m A	0.8	1.3	1.5	V
Gate Threshold Voltage Temperature Coefficient	ΔV _{GS(TH)} /ΔT _J	I _D =1mA, Referenced to 25°C		-2		mV/°C
Static Drain–Source On–Resistance	R _{DS(ON)}	V _{GS} =10 V, I _D =0.22A		0.7	3.5	Ω
		V _{GS} =4.5 V, I _D =0.22A		1.0	6.0	
On-State Drain Current	I _{D(ON)}	V _{GS} =10 V, V _{DS} =5V	0.2			A
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =0.22A	0.12	0.5		S
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		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} =25V, V _{GS} =10V, I _D =0.22A		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} =30V, I _D =0.29A, V _{GS} =10V, R _G =6Ω,		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} = 0V, I _S =0.44A (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 cycle $\leq 2\%$

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