

General Description

This MOSFET has been designed to minimize the Drain-source on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

Features

- Low $R_{DS(ON)}$ & FOM
- Low Input Capacitance
- Extremely low switching loss
- Excellent reliability and uniformity



Applications

- DC/DC Converter
- Load switch for portable devices

Key Performance Parameters

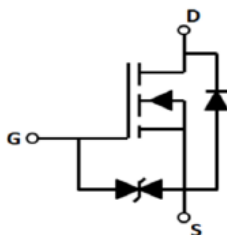
Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(ON), max} @ V_{GS}=10V$	3.0	Ω

Marking Information

Product Name	Package	Marking
BSS138KW	SOT-323	K1XX

Package & Pin information

SOT-323 (Top View)



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	300	mA
Pulsed Drain Current ¹⁾	$I_{D,pulse}$	1	A
Power Dissipation	P_D	401	mW
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-ambient ²⁾	$R_{\theta JA}$	312	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_j=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	60			V	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	0.5		1.2	V	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(on)}$		1.8	3.0	Ω	$V_{GS}=10\text{ V}, I_D=0.3\text{ A}$
			1.9	3.4		$V_{GS}=4.5\text{ V}, I_D=0.2\text{ A}$
			2.2	4.5		$V_{GS}=2.5\text{ V}, I_D=0.1\text{ A}$
Gate-source leakage current	I_{GSS}			10	μA	$V_{GS}=20\text{ V}$
				-10		$V_{GS}=-20\text{ V}$
Drain-source leakage current	I_{DSS}			1	μA	$V_{DS}=60\text{ V}, V_{GS}=0\text{ V}$

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		18.5		pF	$V_{GS}=0\text{ V}$, $V_{DS}=25\text{ V}$, $f=1\text{ MHz}$
Output capacitance	C_{oss}		3.5		pF	
Reverse transfer capacitance	C_{rss}		1.9		pF	
Turn-on Delay Time	$t_{d(on)}$		4.4		ns	$V_{GS}=10\text{ V}$, $V_{DS}=25\text{ V}$, $R_G=3\ \Omega$, $I_D=0.3\text{ A}$
Turn-Off Delay Time	$t_{d(off)}$		10.2		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total Gate Charge	Q_g		3.2		nC	$V_{GS}=4.5\text{ V}$, $V_{DS}=25\text{ V}$, $I_D=0.3\text{ A}$
Gate-Source Charge	Q_{gs}		0.2		nC	
Gate-Drain Charge	Q_{gd}		0.2		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	I_{SD}			0.3	A	$T_A=25^\circ\text{C}$
Diode forward voltage ²⁾	V_{SD}		0.85	1.2	V	$I_S=0.3\text{ A}$, $V_{GS}=0\text{ V}$

Note: 1) Pulse width limited by maximum allowable junction temperature.

2) Repetitive Rating: Pulse width limited by maximum junction temperature.

Electrical Characteristics Diagrams

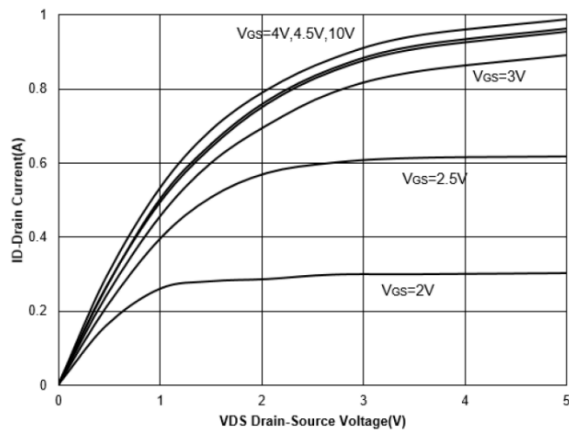


Figure 1. Typ. output characteristics

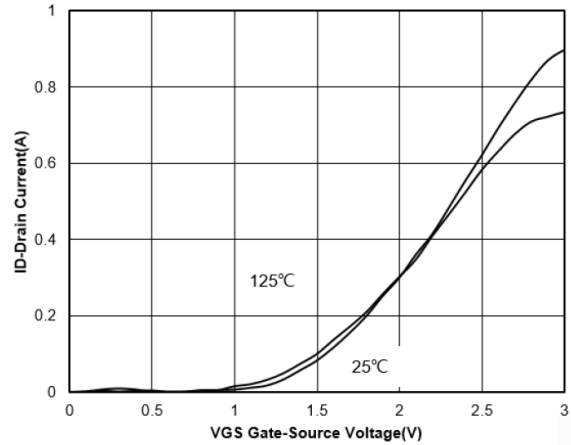


Figure 2. Typ. transfer characteristics

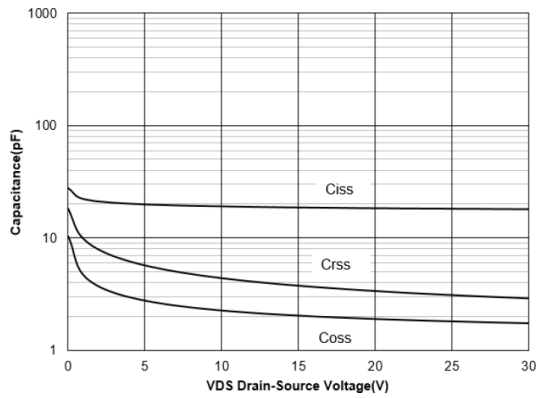


Figure 3. Typ. capacitances

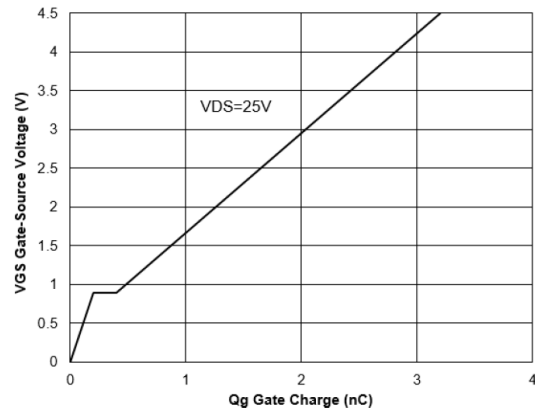


Figure 4. Gate Charge

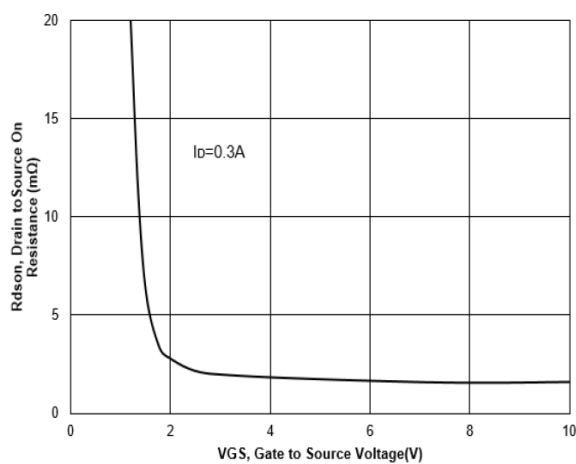


Figure 5. Drain-source on Resistance

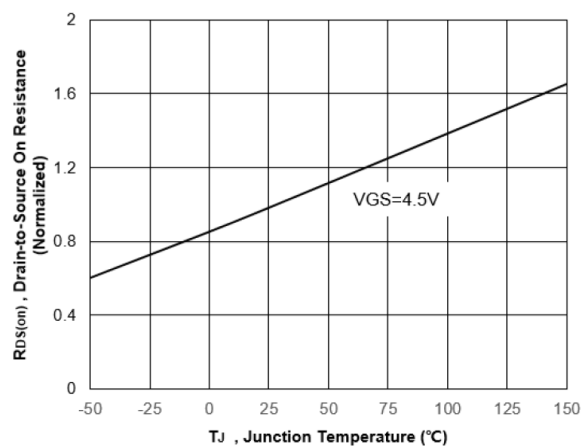
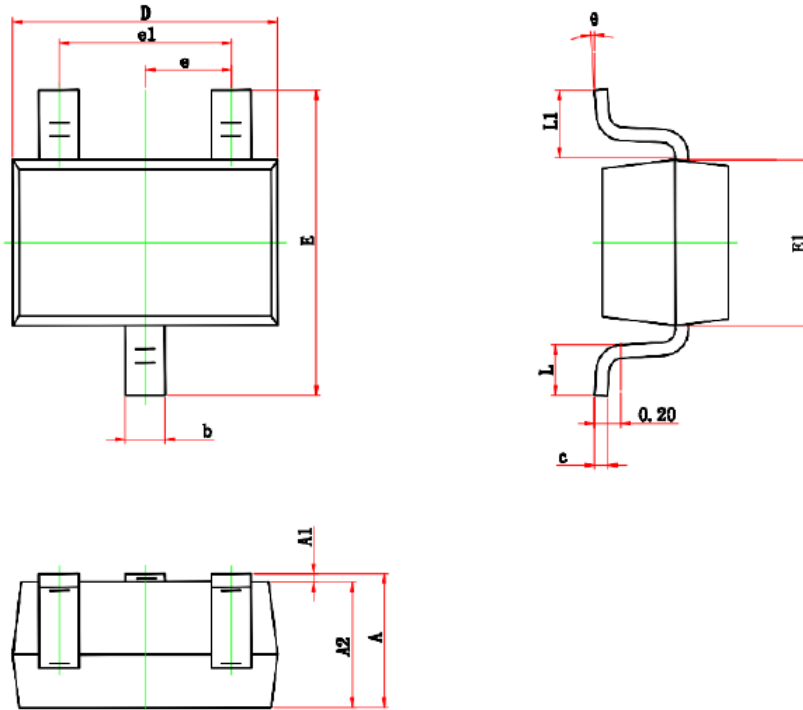


Figure 6. Normalized On-Resistance vs. Temperature

Package Information



(Unit : mm)

SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	--	1.10	0.035	--	0.043
A1	0.00	--	0.10	0.000	--	0.004
A2	0.90	--	1.00	0.035	--	0.039
b	0.20	--	0.40	0.008	--	0.016
c	0.08	--	0.15	0.003	--	0.006
D	2.00	--	2.20	0.079	--	0.087
E	2.15	--	2.45	0.085	--	0.096
E1	1.15	--	1.35	0.045		0.053
e	0.65 TYP			0.026 TYP		
e1	1.20	--	1.40	0.047	--	0.055
L	0.26	--	0.46	0.010	--	0.018
L1	0.525 REF			0.021 REF		
Θ	0°	--	8°	0°	--	8°

Version: SOT-323-V package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOT-323-V	3000	15	45000	4	180000

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