BSS138DW

General Description

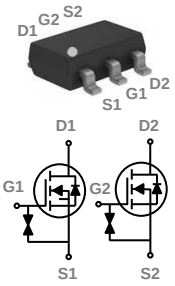
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

50V,0.3A, RDS(ON) =1.2Ω@VGS=10V
Improved dv/dt capability
Fast switching
Green Device Available
G-S ESD Protection Diode Embedded
ESD protected up to 2KV

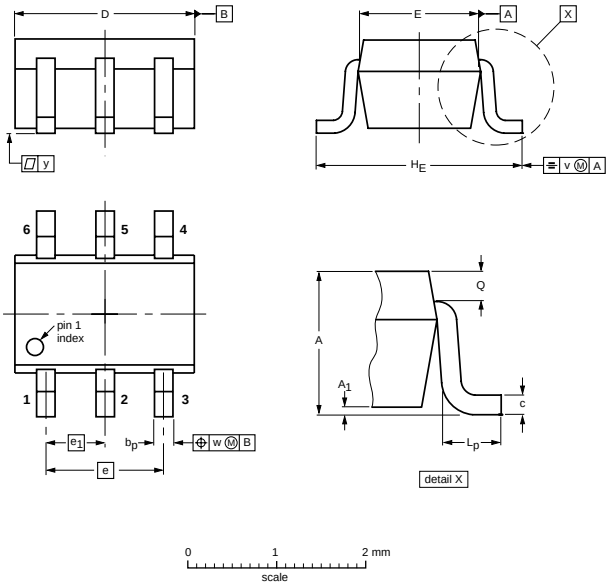
Applications

Motor Drive
Power Tools
LED Lighting



BVDSS	RDSON	ID
55V	1. 2Ω	0.3A

SOT-363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	55	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_A=25℃)	0.3	A
	Drain Current – Continuous (T_A=70℃)	0.2	A
I_{DM}	Drain Current – Pulsed[1]	0.9	A
P_D	Power Dissipation (T_A=25℃)	0.28	W
	Power Dissipation – Derate above 25℃	0.002	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	450	℃/W

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Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	55	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.04	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=55V , V_{GS}=0V , T_J=25℃	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±10	uA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=0.3A	---	1.2	1.5	Ω
		V_{GS}=4.5V , I_D=0.2A	---	1.3	2.2	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.8	1.1	1.6	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/℃
gfs	Forward Transconductance	V_{DS}=10V , I_D=0.1A	---	0.24	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=55V , V_{GS}=10V , I_D=0.2A	---	1.1	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	0.1	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	0.23	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=55V , V_{GS}=10V , R_G=6Ω , I_D=0.2A	---	3	---	ns
T_r	Rise Time[2,3]		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	14	---	
T_f	Fall Time[2,3]		---	9	---	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz	---	30.6	---	pF
C_{oss}	Output Capacitance		---	5.5	---	
C_{rss}	Reverse Transfer Capacitance		---	4	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	0.3	A
I_{SM}	Pulsed Source Current		---	---	0.6	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.4	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

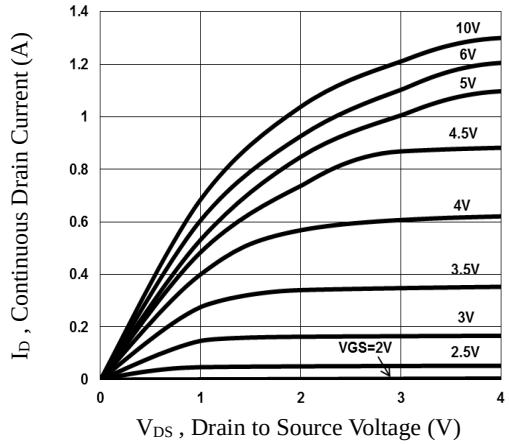

Fig.1 Output Characteristics

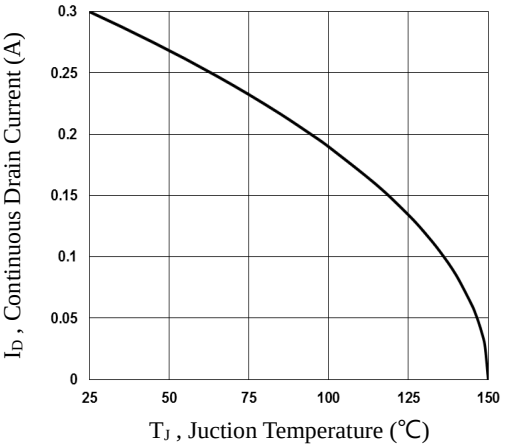

Fig.2 Continuous Drain Current vs. T_J

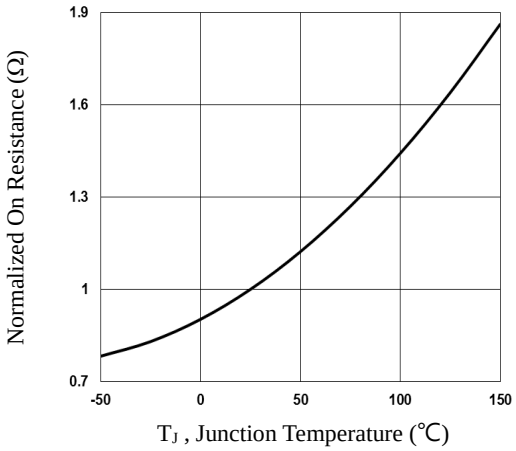

Fig.3 Normalized RDSON vs. T_J

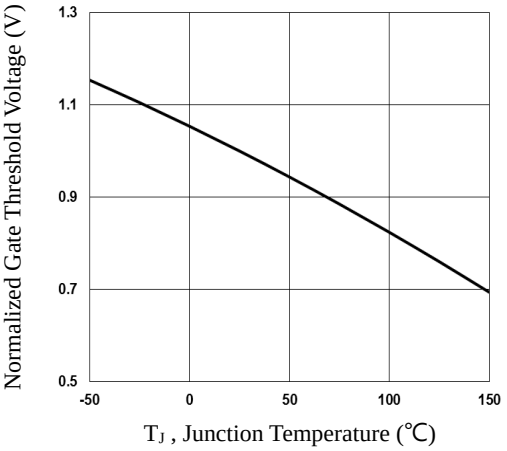

Fig.4 Normalized V_{th} vs. T_J

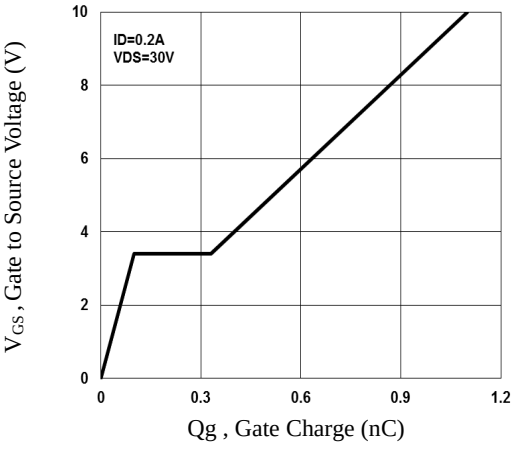

Fig.5 Gate Charge Waveform

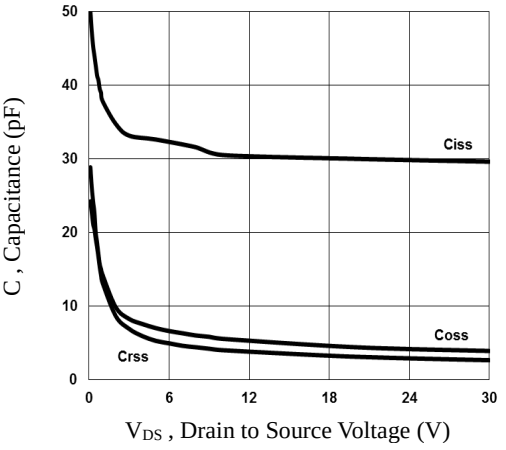

Fig.6 Capacitance Characteristics

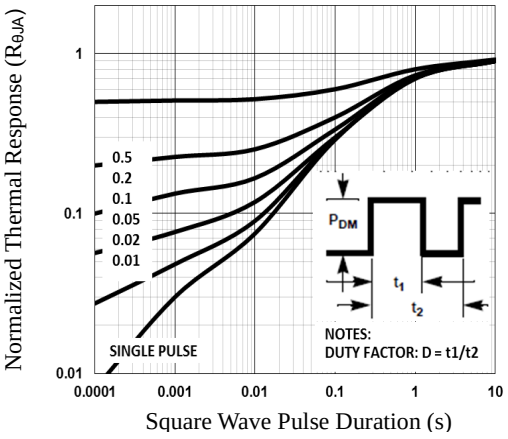

Fig.7 Normalized Transient Impedance

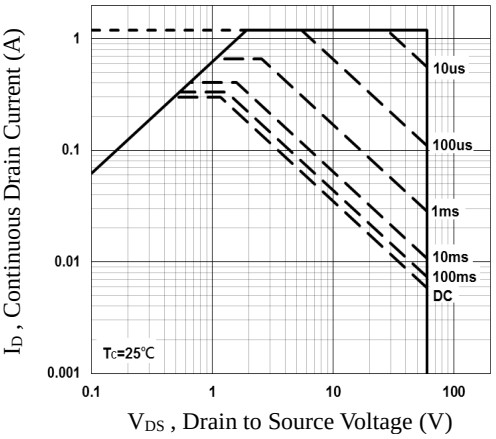

Fig.8 Maximum Safe Operation Area

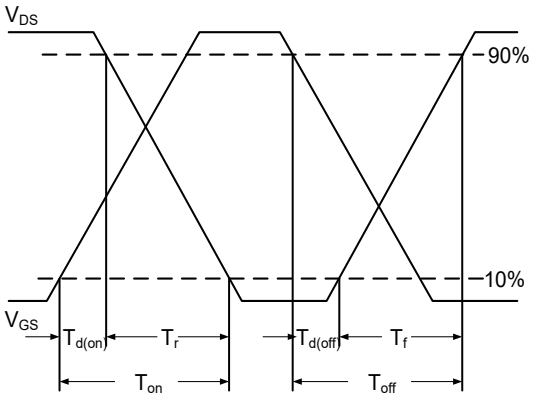

Fig.9 Switching Time Waveform