

55V N-Channel MOSFETs

General Description

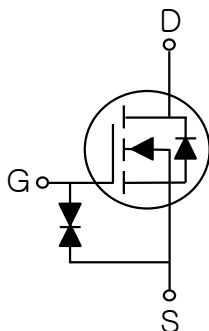
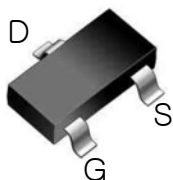
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R _{DS(ON)}	I _D
55V	1.3Ω	0.3A

Features

- 55V, 0.3A, R_{DS(ON)} = 1.3Ω@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded
- ESD protected up to 2KV

SOT-23 Pin Configuration



Applications

- Motor Drive
- Power Tools
- LED Lighting

Absolute Maximum Ratings T_c=25°C 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°C)	0.3	A
	Drain Current- Continuous (T _A =70°C)	0.16	A
I _{DM}	Drain Current- Pulsed ¹	0.8	A
P _D	Power Dissipation (T _A =25°C)	0.35	W
	Power Dissipation- Derate above 25°C	0.003	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	—	357	°C/W



BSS138K

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Electrical Characteristics (T_J=25°C , unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _b =250uA	55	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =55V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =40V , V _{GS} =0V , T _J =125°C	---	---	100	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 =0.2A	---	1.3	1.5	Ω
		V _{GS} =4.5V , I _D =0.1A	---	1.5	2.5	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _b =250uA	0.8	1.1	1.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V , I _D =0.2A	---	0.5	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =30V , V _{GS} =10V , I _b =0.2A	---	3.7		nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.9		
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	0.4		
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =30V , 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} =30V , V _{GS} =0V , F=1MHz	---	25.5		pF
C _{oss}	Output Capacitance		---	17		
C _{rss}	Reverse Transfer Capacitance		---	7.8		

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 =0.2A , T _J =25°C	---	---	1.4	V
t _{rr}	Reverse Recovery Time	V _R =50V , I _S =0.2A	---	3.4	---	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/μs , T _J =25°C	---	0.7	---	nC

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.



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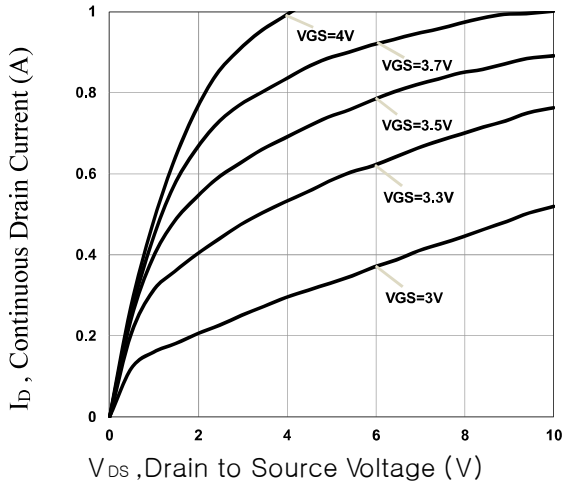


Fig.1 Typical Output Characteristics

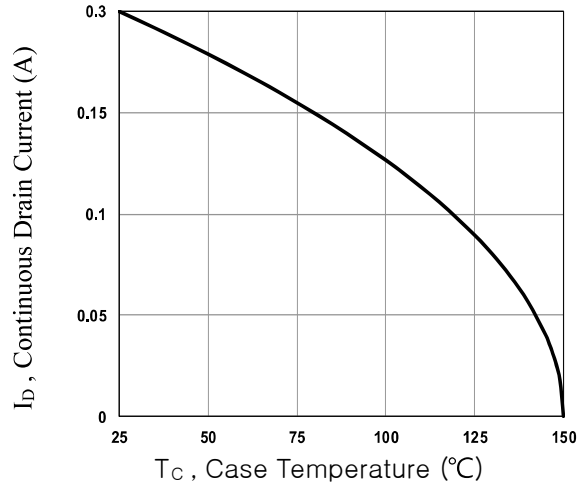


Fig.2 Continuous Drain Current vs. Tc

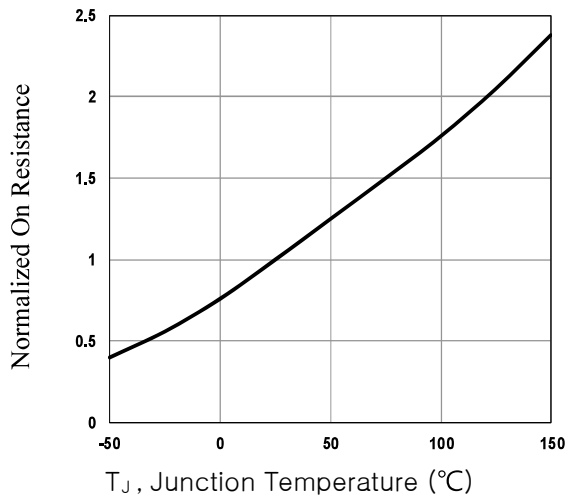


Fig.3 Normalized RDS(on) vs. Tj

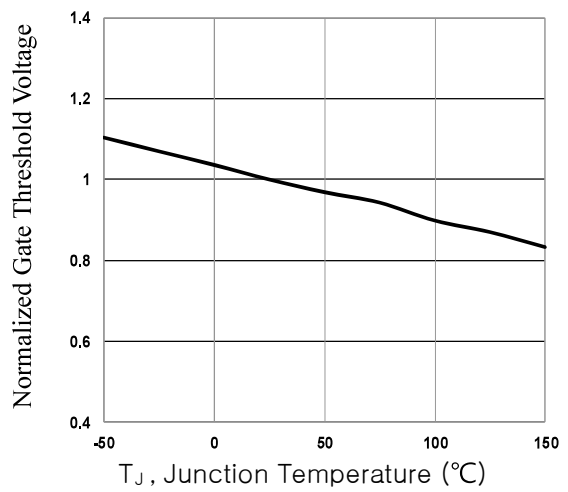


Fig.4 Normalized Vth vs. Tj

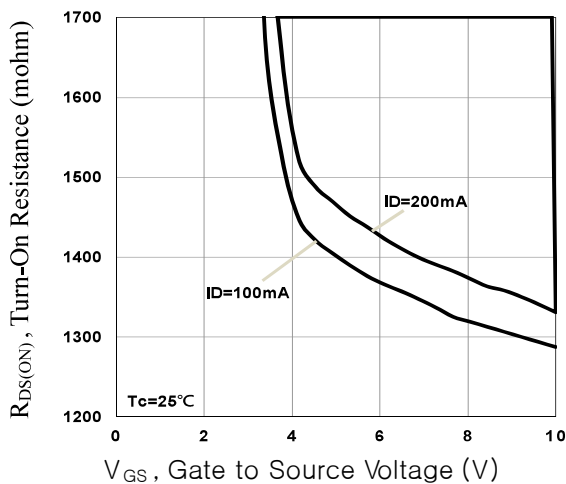


Fig.5 Turn-On Resistance vs. VGS

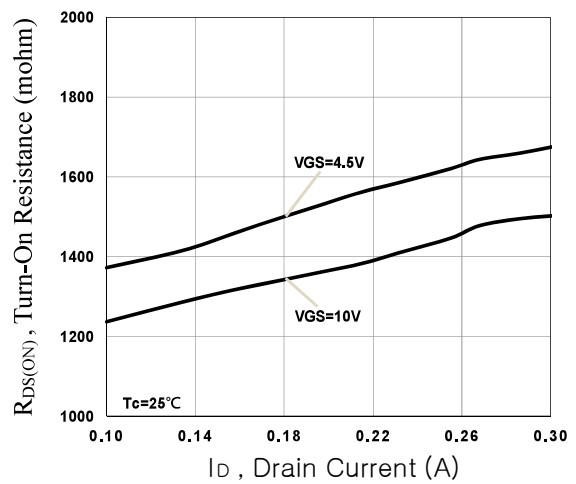


Fig.6 Turn-On Resistance vs. ID

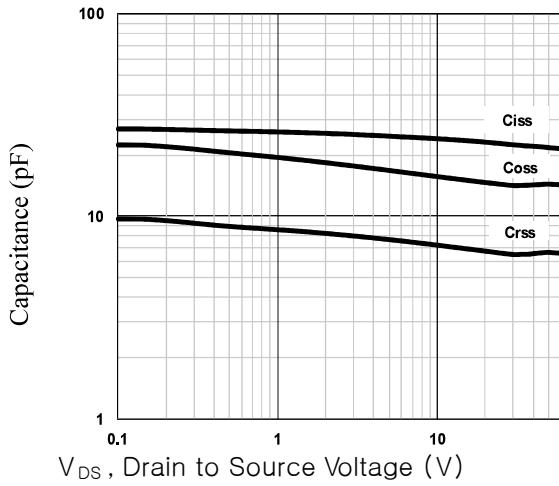


Fig.7 Capacitance Characteristics

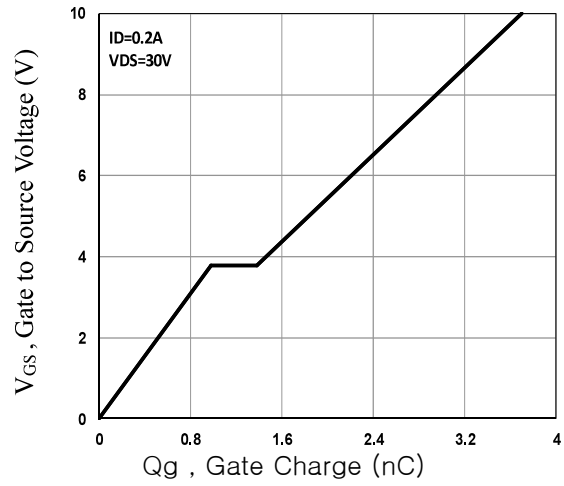


Fig.8 Gate Charge Characteristics

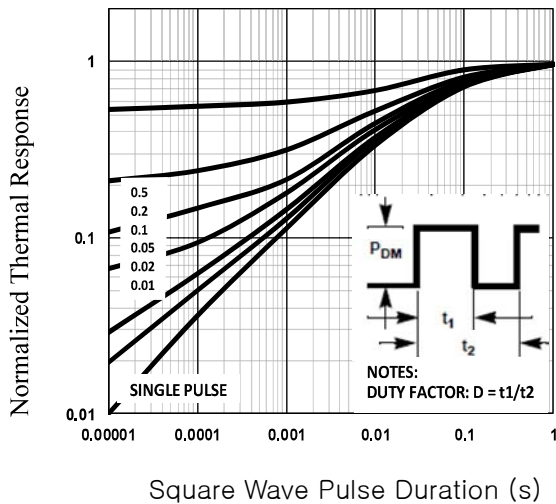


Fig.9 Normalized Transient

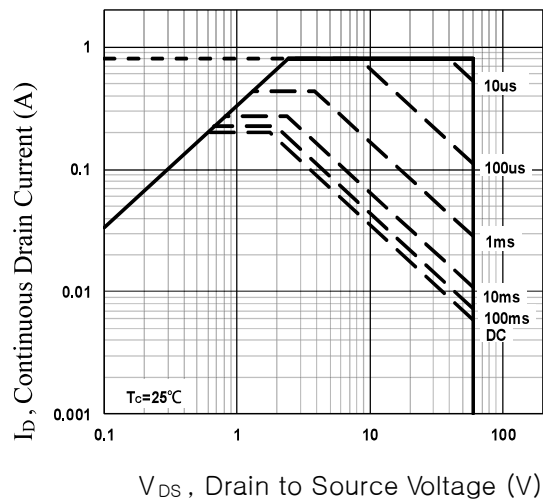
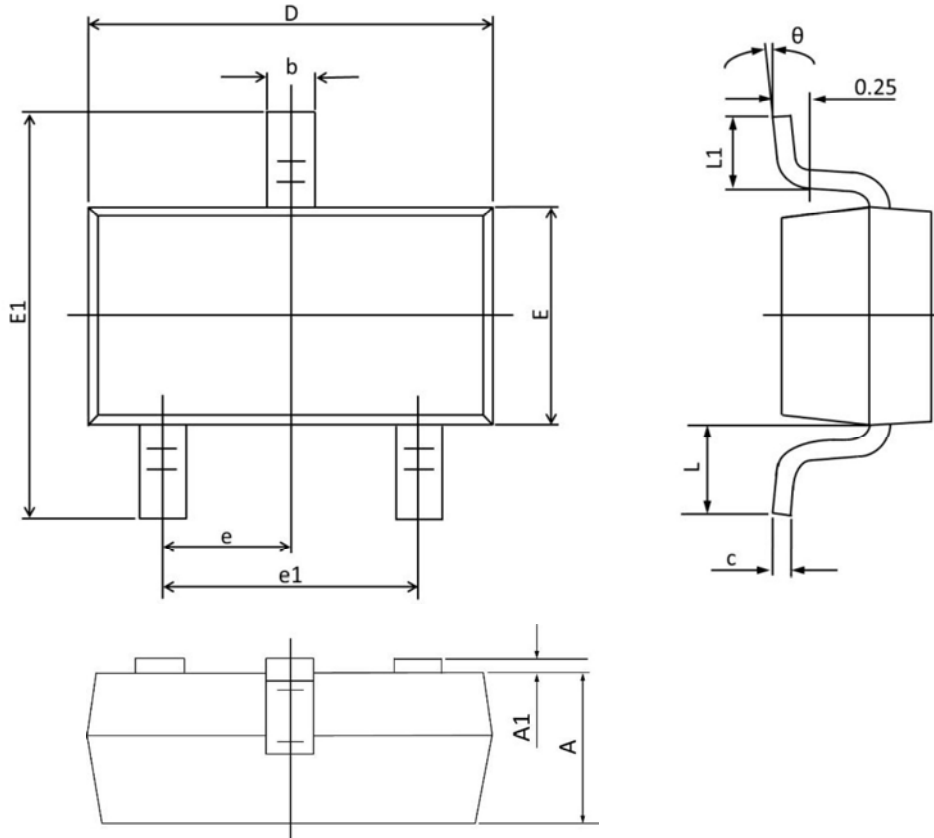


Fig.10 Maximum Safe Operation Area

SOT-23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.001	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.080	0.180	0.003	0.008
D	2.700	3.100	0.106	0.122
E	1.100	1.500	0.043	0.059
E1	2.100	2.640	0.080	0.104
e	0.950 TYP.		0.037 TYP.	
e1	1.780	2.040	0.070	0.080
L	0.550 REF.		0.022 REF.	
L1	0.100	0.500	0.004	0.020
θ	1°	10°	1°	10°