

55V N-Channel MOSFETs

General Description

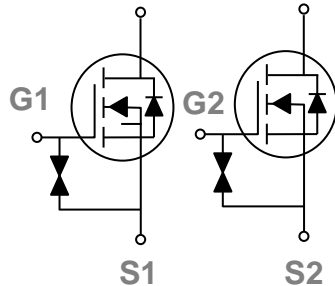
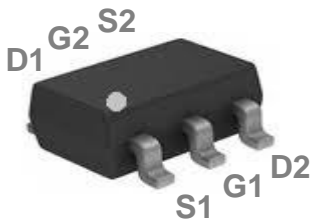
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
55V	1.1Ω	0.3A

Features

- 55V,0.3A, RDS(ON) =1.1Ω@VGS=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded

SOT-363 Dual Pin Configuration



Applications

- Motor Drive
- Power Tools
- LED Lighting

Absolute Maximum Ratings (Tc=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 _C =25°C)	0.3	A
	Drain Current – Continuous (T _C =100°C)	0.2	A
I _{DM}	Drain Current – Pulsed ¹	1.2	A
P _D	Power Dissipation (T _C =25°C)	0.35	W
	Power Dissipation – Derate above 25°C	0.003	W/°C
T _{STG}	Storage Temperature Range	-50 to 150	°C
T _J	Operating Junction Temperature Range	-50 to 150	°C

Thermal Characteristics

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



BSS138DW

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Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	55	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C, $I_D=1mA$	---	0.04	---	V/°C
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=55V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	μA
		$V_{DS}=40V, V_{GS}=0V, T_J=125^\circ C$	---	---	100	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 10	μA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=0.5A$	---	1.1	1.5	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.8	1.0	1.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/°C
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=0.1A$	---	0.24	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge ^{2,3}	$V_{DS}=30V, V_{GS}=10V, I_D=0.2A$	---	1.1	2	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	0.1	0.2	
Q_{gd}	Gate-Drain Charge ^{2,3}		---	0.23	0.5	
$T_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega$ $I_D=0.2A$	---	3	6	ns
T_r	Rise Time ^{2,3}		---	5	10	
$T_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	14	27	
T_f	Fall Time ^{2,3}		---	9	17	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, F=1MHz$	---	30.6	45	pF
C_{oss}	Output Capacitance		---	5.5	10	
C_{rss}	Reverse Transfer Capacitance		---	4	8	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	0.3	A
I_{SM}	Pulsed Source Current		---	---	1.2	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.3	V
t_{rr}	Reverse Recovery Time ²	$V_{GS}=30V, I_S=1A, di/dt=100A/\mu s$	---	---	---	ns
Q_{rr}	Reverse Recovery Charge ²	$T_J=25^\circ C$	---	---	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=1mH, I_{AS}=7A, R_G=25\Omega, \text{Starting } T_J=25^\circ C$
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

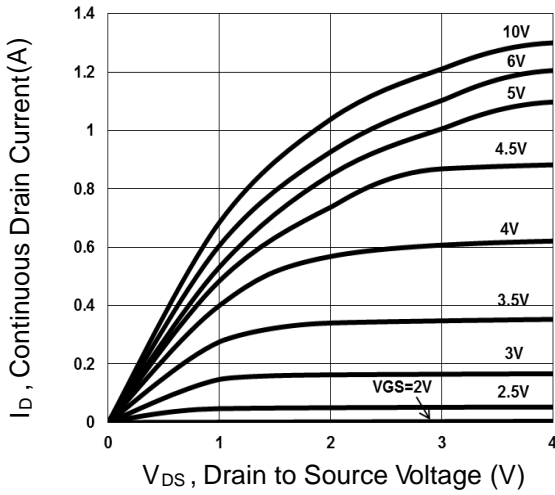


Fig.1 Output Characteristics

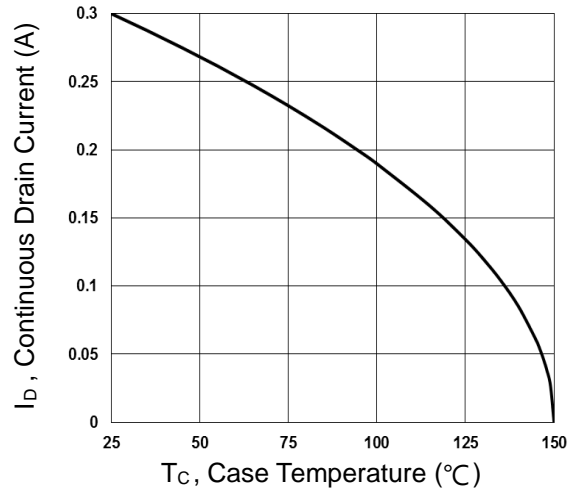


Fig.2 Continuous Drain Current vs. T_C

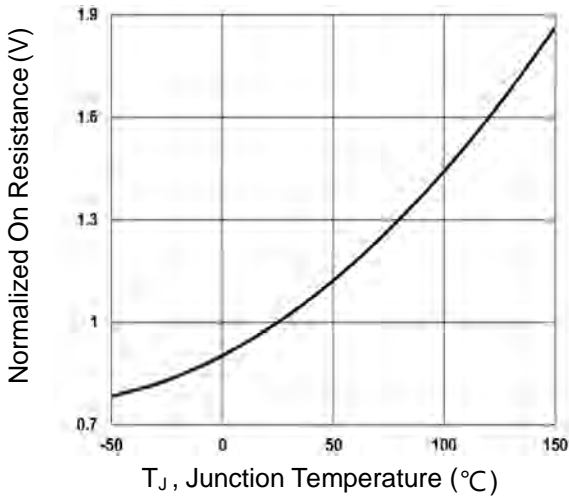


Fig.3 Normalized $R_{DS(on)}$ vs. T_J

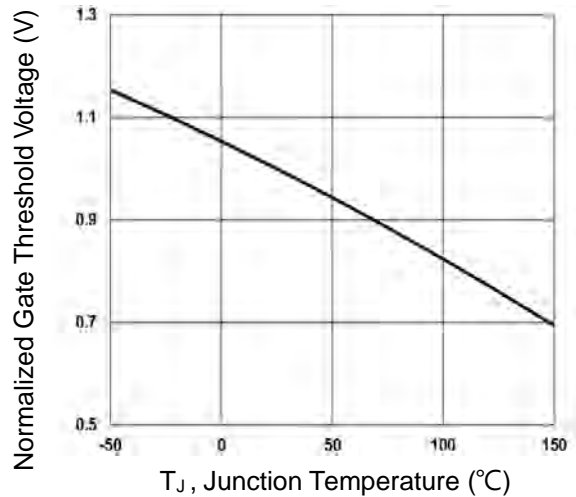


Fig.4 Normalized V_{th} vs. T_J

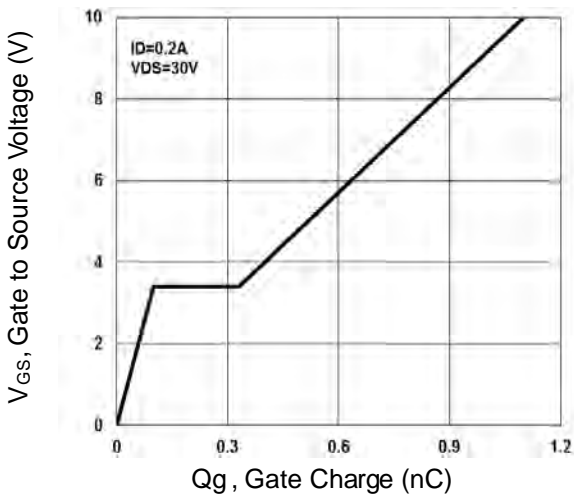


Fig.5 Gate Charge Waveform

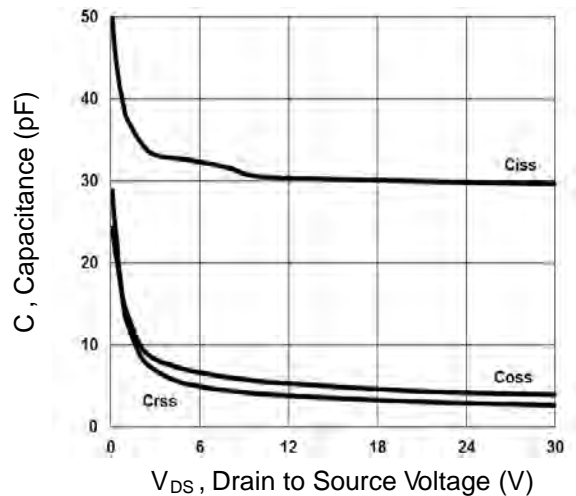


Fig.6 Capacitance Characteristics

Typical Performance Characteristics(Con.)

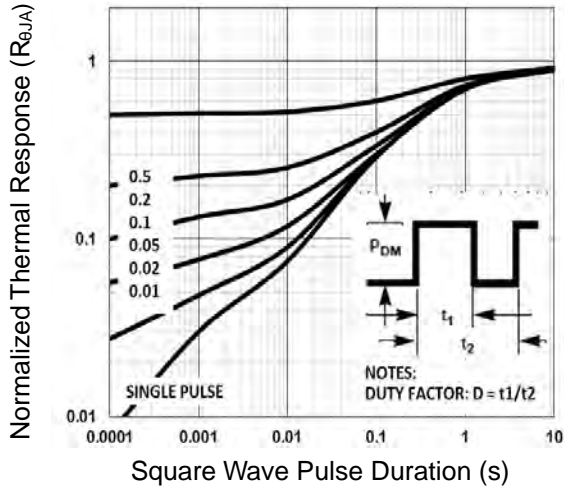


Fig.7 Normalized Transient Impedance

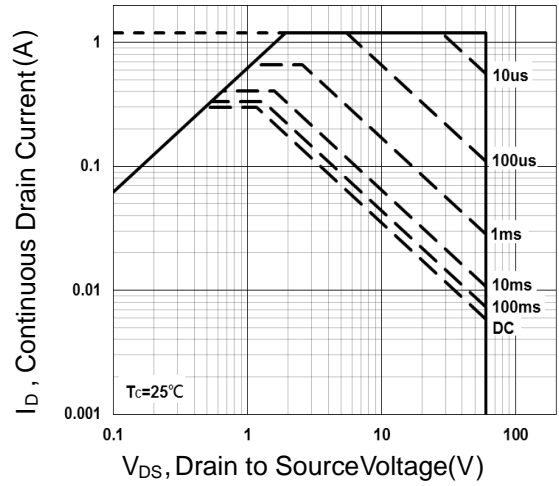
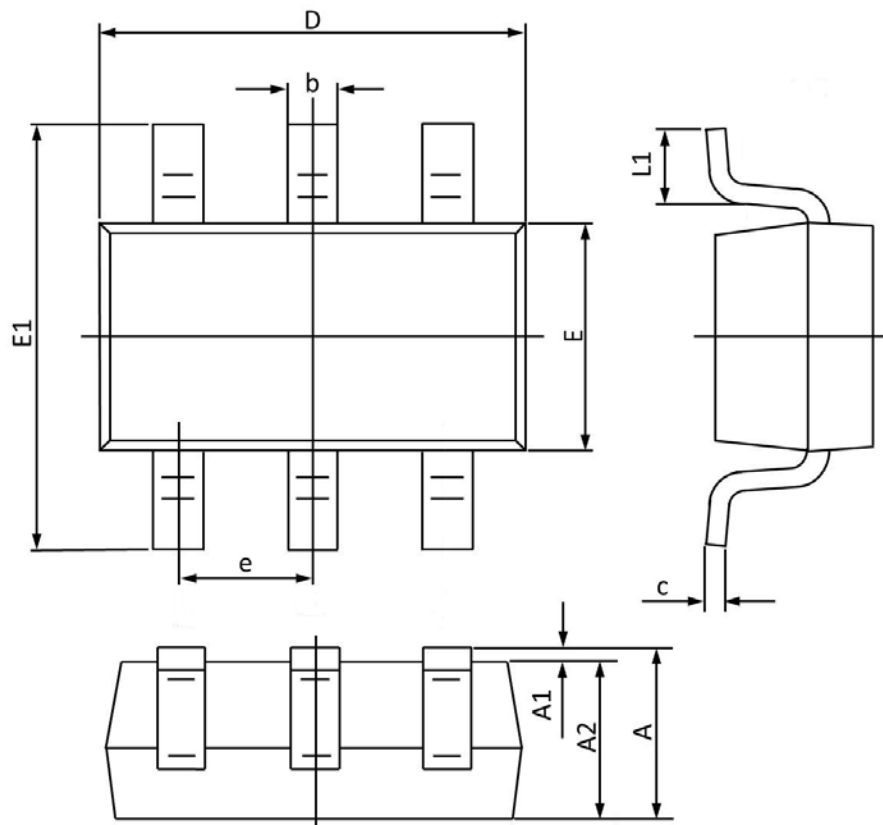


Fig.8 Maximum Safe Operation Area

SOT-363 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
A1	0.100	0.000	0.004	0.000
A2	1.000	0.800	0.039	0.031
b	0.330	0.100	0.013	0.004
c	0.250	0.100	0.010	0.004
D	2.200	1.800	0.087	0.071
E	1.350	1.150	0.053	0.045
E1	2.400	1.800	0.094	0.071
e	0.65BSC		0.026BSC	
L1	0.350	0.100	0.014	0.004