

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## BSS138AKDW

Product specification

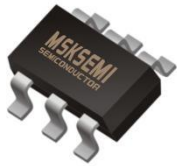
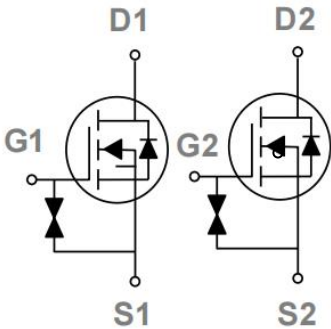

**General Features**

- 55V,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

**Application**

- Motor Drive
- Power Tools
- LED Lighting

**Reference News**

PACKAGE OUTLINE	Pin Configuration	Marking
		
SOT-363		

**Absolute Maximum Ratings (TA=25°C unless otherwise noted)**

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	55	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current – Continuous (TA=25°C)	0.3	A
	Drain Current – Continuous (TA=70°C)	0.2	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	0.9	A
P <sub>D</sub>	Power Dissipation (TA=25°C)	0.28	W
	Power Dissipation – Derate above 25°C	0.002	W/ °C
T <sub>STG</sub>	Storage Temperature Range	-50 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-50 to 150	°C

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to ambient	---	450	°C/ W

**Electrical Characteristics (TJ=25°C , unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	55	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =1mA	---	0.04	---	V/ °C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =55V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V	---	---	±10	uA

## On Characteristics

RDS(ON)	Static Drain-Source On-Resistance	VGS=10V , ID=0.3A	---	1.2	1.5	$\Omega$
		VGS=4.5V , ID=0.2A	---	1.3	2.2	$\Omega$
VGS(th)	Gate Threshold Voltage	VGS=VDS , ID =250uA	0.8	1.1	1.6	V
$\Delta$ VGS(th)	VGS(th) Temperature Coefficient		---	-4	---	mV/ C
gfs	Forward Transconductance	VDS=10V , ID=0.1A	---	0.24	---	S

## Dynamic and switching Characteristics

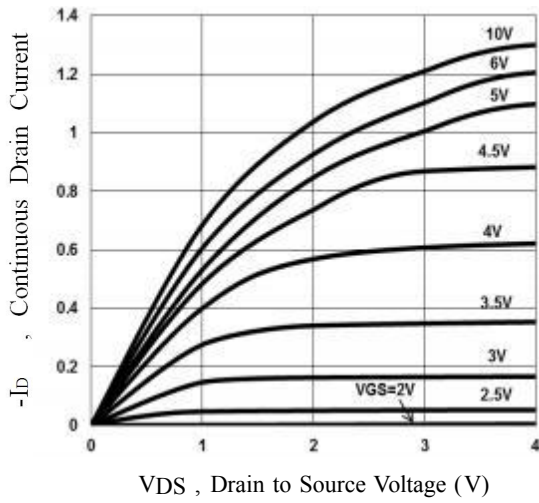
Qg	Total Gate Charge <sup>2, 3</sup>	VDS=55V , VGS=10V , ID=0.2A	---	1.1	---	nC
Qgs	Gate-Source Charge <sup>2, 3</sup>		---	0.1	---	
Qgd	Gate-Drain Charge <sup>2, 3</sup>		---	0.23	---	
Td(on)	Turn-On Delay Time <sup>2, 3</sup>	VDD=55V , VGS=10V , RG=6 $\Omega$ ID=0.2A	---	3	---	ns
Tr	Rise Time <sup>2, 3</sup>		---	5	---	
Td(off)	Turn-Off Delay Time <sup>2, 3</sup>		---	14	---	
Tf	Fall Time <sup>2, 3</sup>		---	9	---	
Ciss	Input Capacitance	VDS=10V , VGS=0V , F=1MHz	---	30.6	---	pF
Coss	Output Capacitance		---	5.5	---	
Crss	Reverse Transfer Capacitance		---	4	---	

## Drain- Source Diode Characteristics and Maximum Ratings

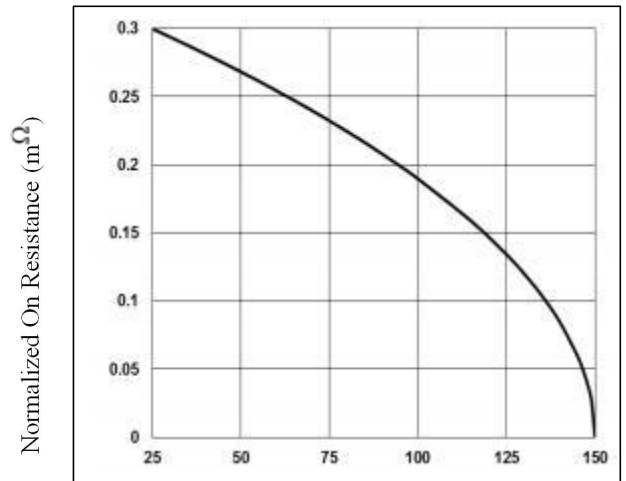
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
IS	Continuous Source Current	VG=VD=0V , Force Current	---	---	0.3	A
ISM	Pulsed Source Current		---	---	0.6	A
VSD	Diode Forward Voltage	VGS=0V , IS=1A , TJ=25C	---	---	1.4	V

Note :

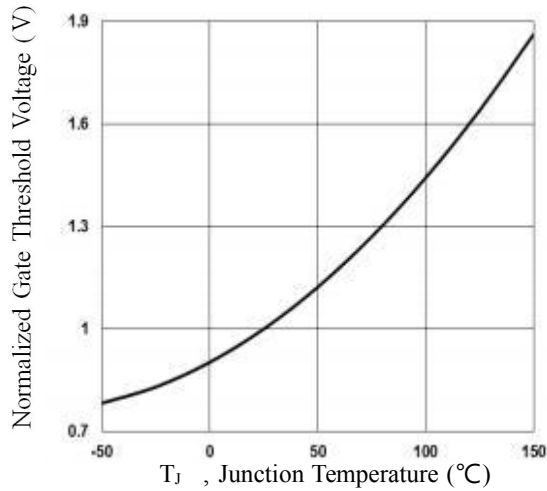
- 1 . Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$  .
3. Essentially independent of operating temperature.



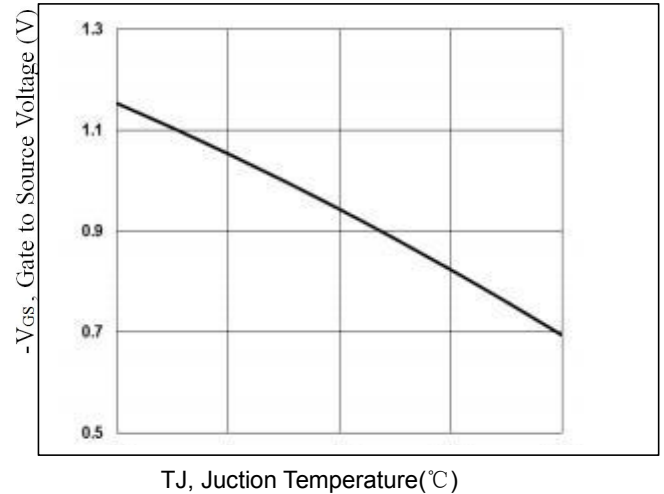
**Fig. 1 Output Characteristics**



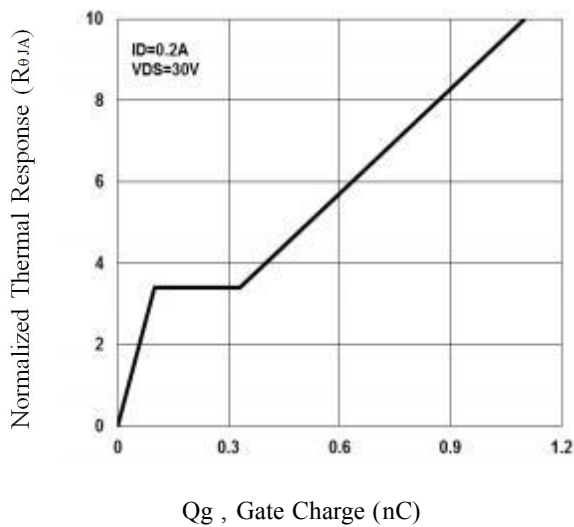
**Fig. 2 Continuous Drain Current vs.  $T_J$**



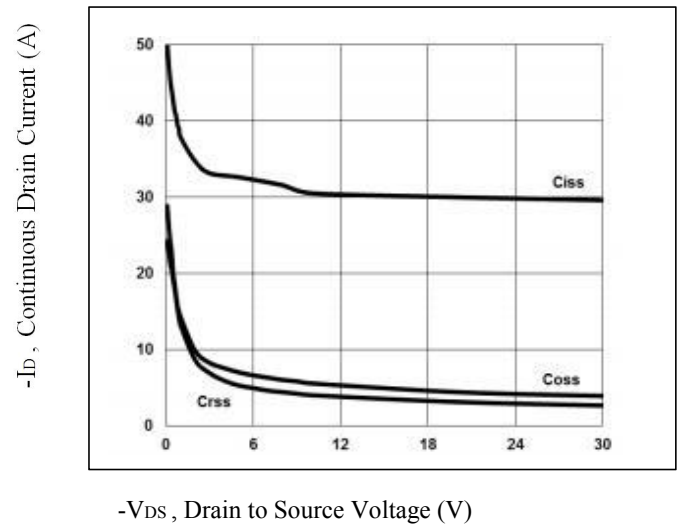
**Fig. 3 Normalized  $R_{DS(on)}$  vs.  $T_J$**



**Fig. 4 Normalized  $V_{th}$  vs.  $T_J$**



**Fig. 5 Gate Charge Waveform**



**Fig. 6 Capacitance Characteristics**

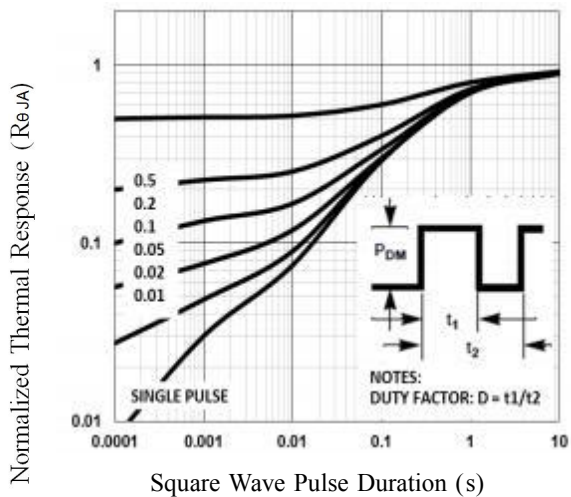


Fig. 7 Normalized Transient Impedance

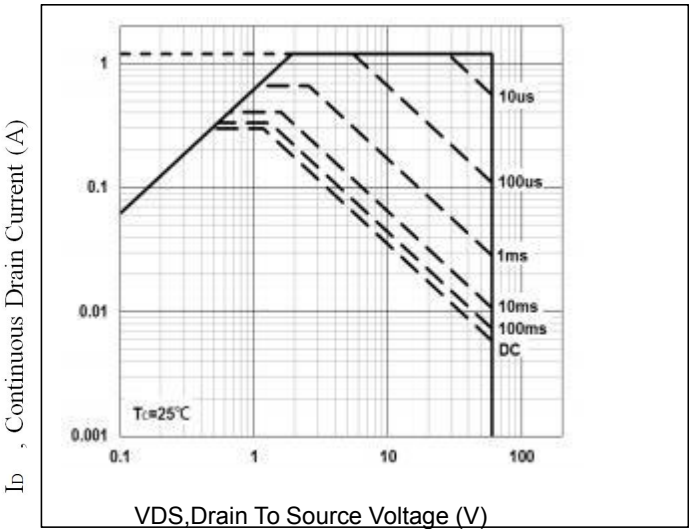


Fig. 8 Maximum Safe Operation Area

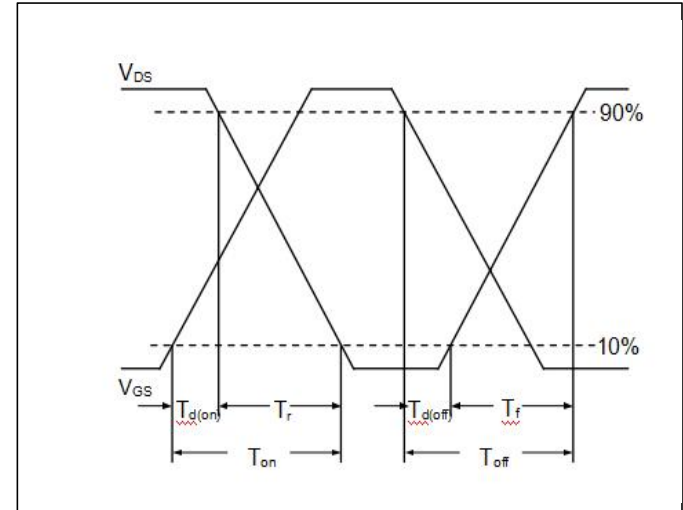
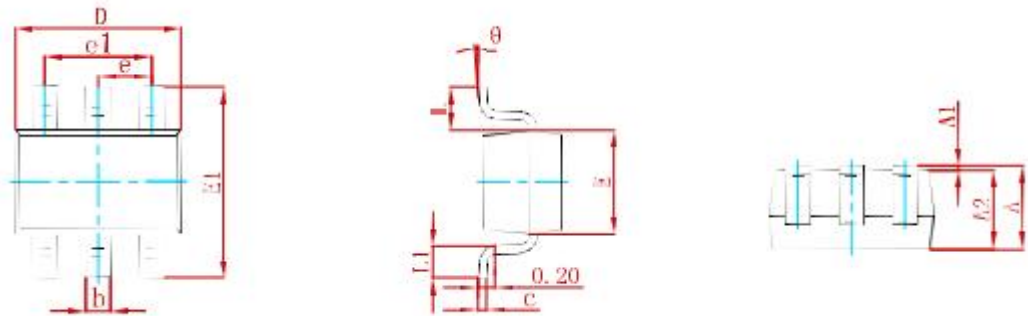


Fig. 9 Switching Time Waveform

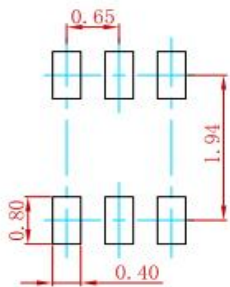


PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
g	0°	8°	0°	8°

Suggested Pad Layout



Note:  
1.Controlling dimension:in millimeters.  
2.General tolerance± 0.05mm.  
3.The pad layout is for reference purposes only.

REEL SPECIFICATION

P/N	PKG	QTY
BSS138AKDW	SOT-363	3000



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