

TM003EN05I3

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

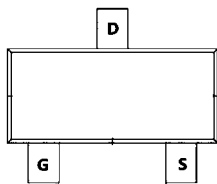
$V_{DS}=50V$ $I_D=0.3A$
 $R_{DS(ON)}=1300\text{ m}\Omega(\text{Typ.}) @ V_{GS}=10V$

ESD protection

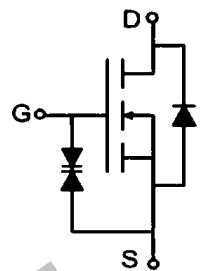
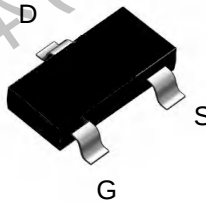
100% UIS Tested
100% R_g Tested



I3:SOT-323



Marking: KN



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	50	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V$	0.3	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V$	0.24	A
I_{DM}	Pulsed Drain Current	0.8	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	0.3	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	400	$^\circ\text{C/W}$
R	Thermal Resistance Junction Case	---	---	$^\circ\text{C/W}$

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Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	50	—	—	V
I _{DSS}	Zero Gate Voltage Drain Current(T _A =25°C)	V _{DS} =50V, V _{GS} =0V	—	—	1	μA
	Zero Gate Voltage Drain Current(T _A =125°C)	V _{DS} =40V, V _{GS} =0V	—	—	100	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V	—	—	±10	uA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.6	1.2	1.5	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =0.3A	—	1300	4	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =0.2A	—	1500	5	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =3.3V, I _D =0.1A	—	1800	6	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	—	12	—	pF
C _{oss}	Output Capacitance		—	3.2	—	pF
C _{rss}	Reverse Transfer Capacitance		—	0.8	—	pF
Q _g	Total Gate Charge	V _{DS} =30V I _D =0.3A, V _{GS} =4.5V	—	0.58	—	nC
Q _{gs}	Gate Source Charge		—	0.12	—	nC
Q _{gd}	Gate Drain Charge		—	0.21	—	nC
Switching Characteristics						
t _{d(on)}	Turn on Delay Time	V _{DD} =30V, I _D =0.3A, R _G =3.3Ω, V _{GS} =10V	—	4.5	—	ns
t _r	Turn on Rise Time		—	3.1	—	ns
t _{d(off)}	Turn Off Delay Time		—	15	—	ns
t _f	Turn Off Fall Time		—	3.3	—	ns
Source Drain Diode Characteristics						
I _{SD}	Source drain current(Body Diode)	T _A =25°C	—	—	0.3	A
V _{SD}	Forward on voltage	T _J =25°C, I _{SD} =0.2A, V _{GS} =0V	—	0.87	1.2	V

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Typical Characteristics

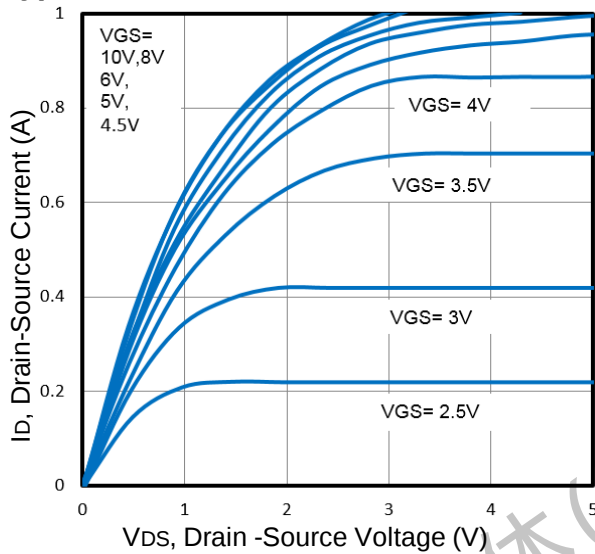


Fig1. Typical Output Characteristics

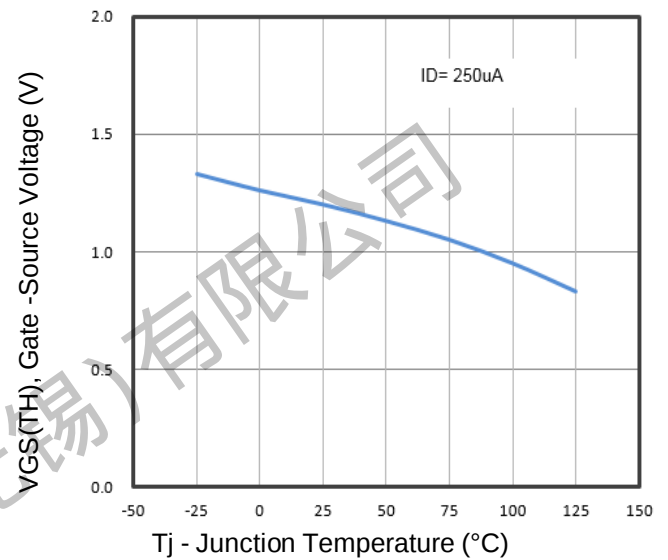


Fig2. Normalized Threshold Voltage Vs. Temperature

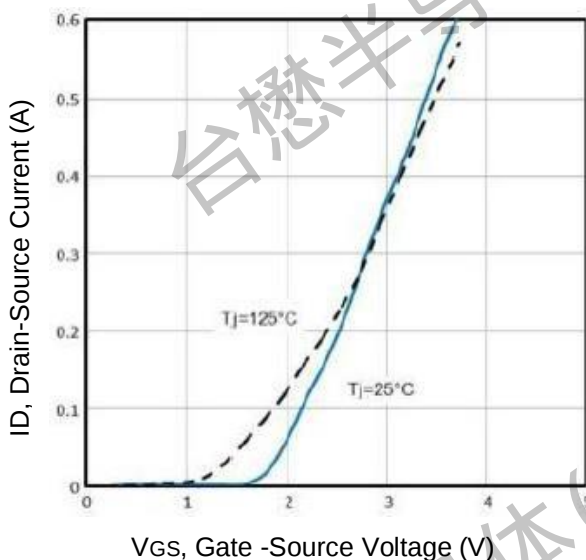


Fig3. Typical Transfer Characteristics

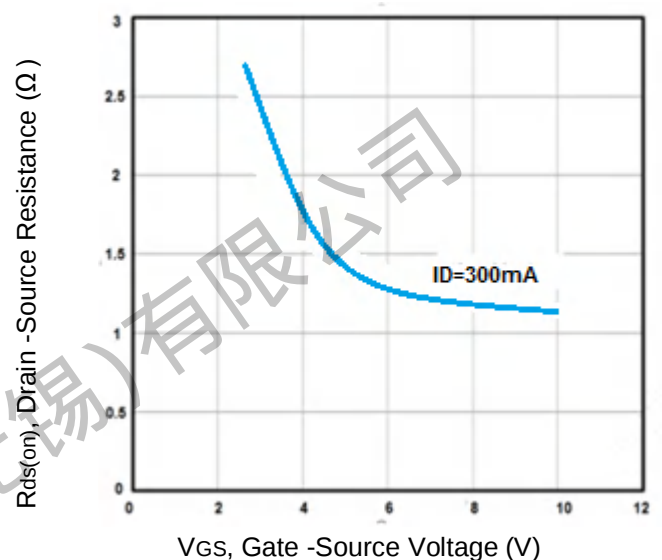


Fig4. $R_{ds(on)}$ vs Gate-Source Voltage

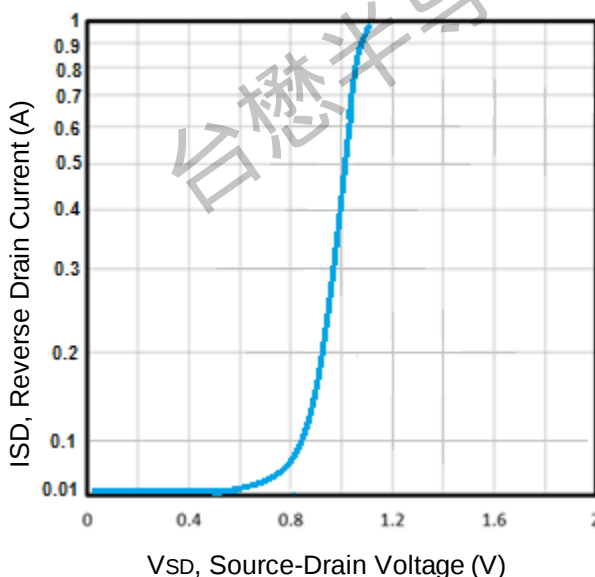


Fig5. Typical Source-Drain Diode Forward Voltage

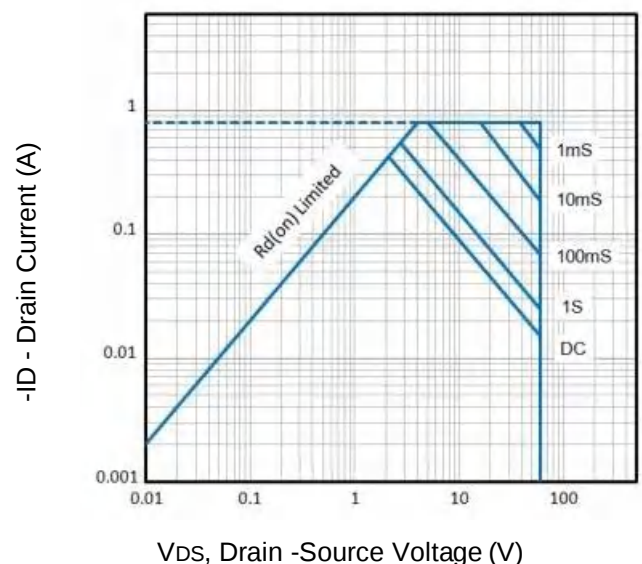


Fig6. Maximum Safe Operating Area

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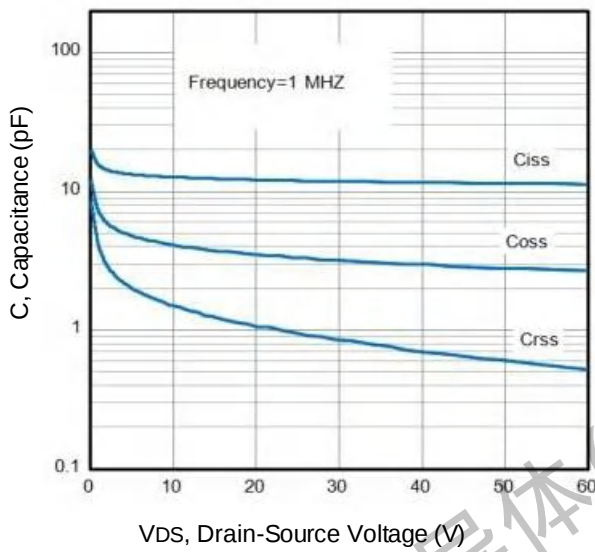


Fig7. Typical Capacitance Vs. Drain-Source Voltage

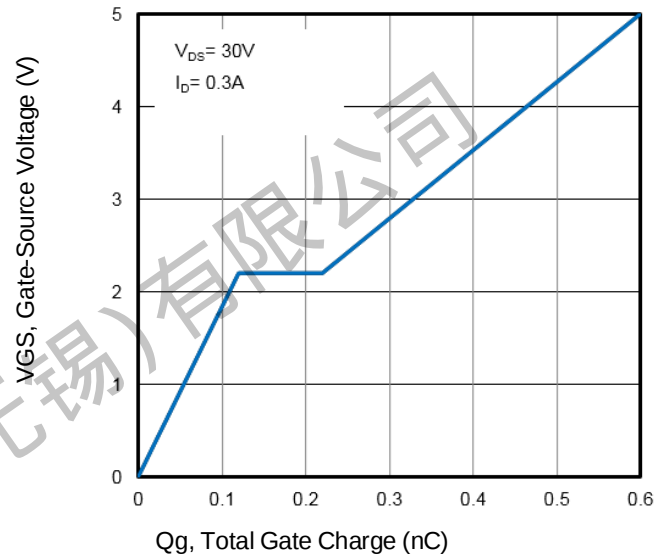


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

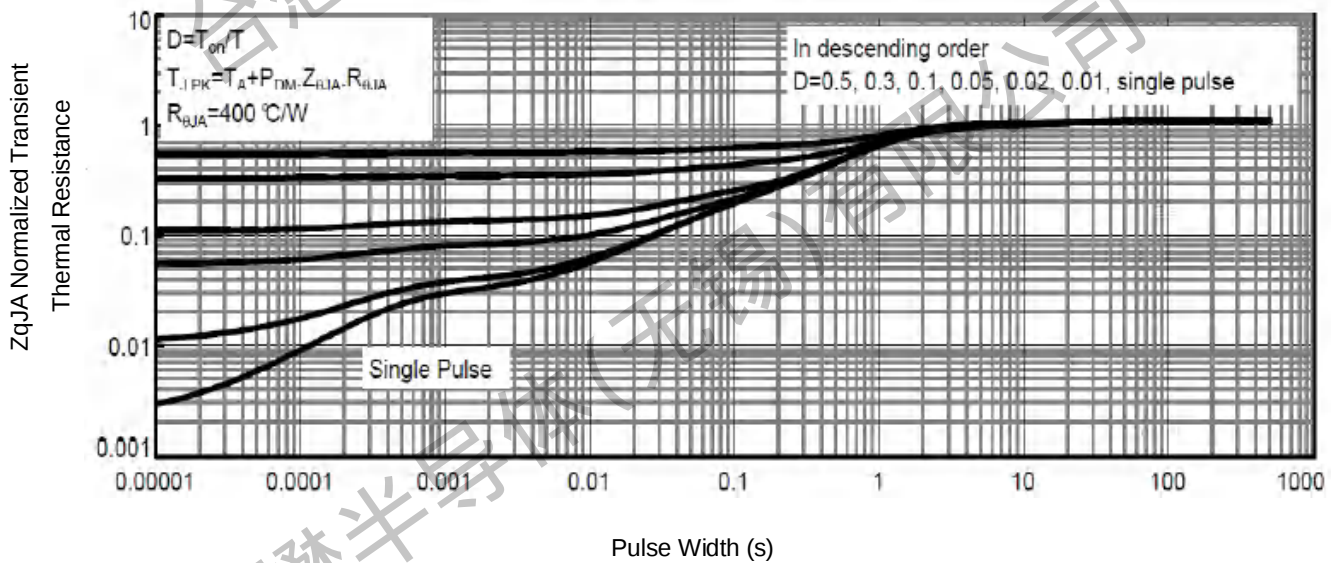
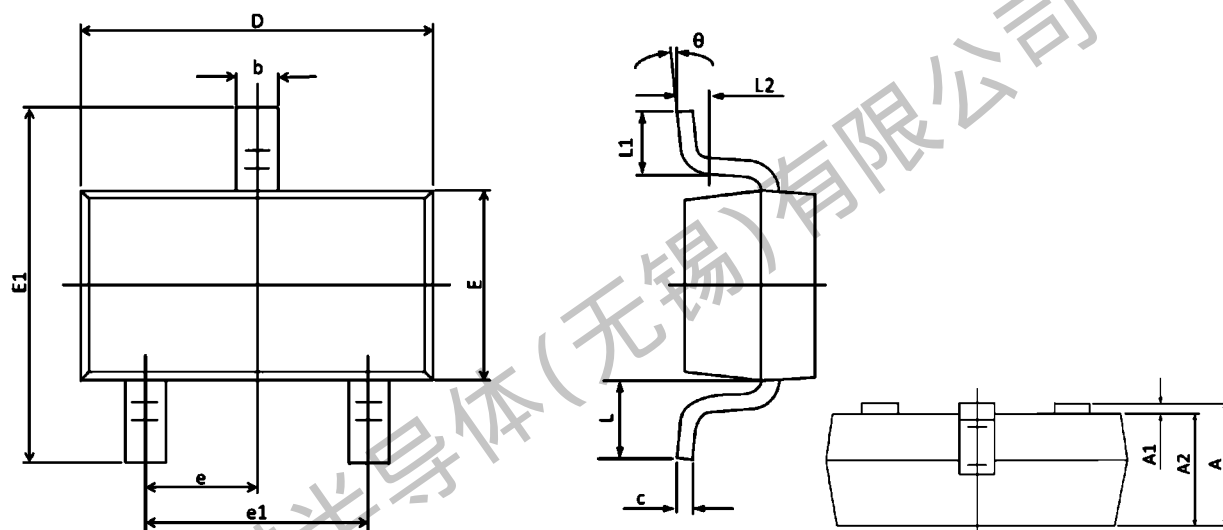


Fig9. Normalized Maximum Transient Thermal Impedance

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Package Mechanical Data:SOT-323



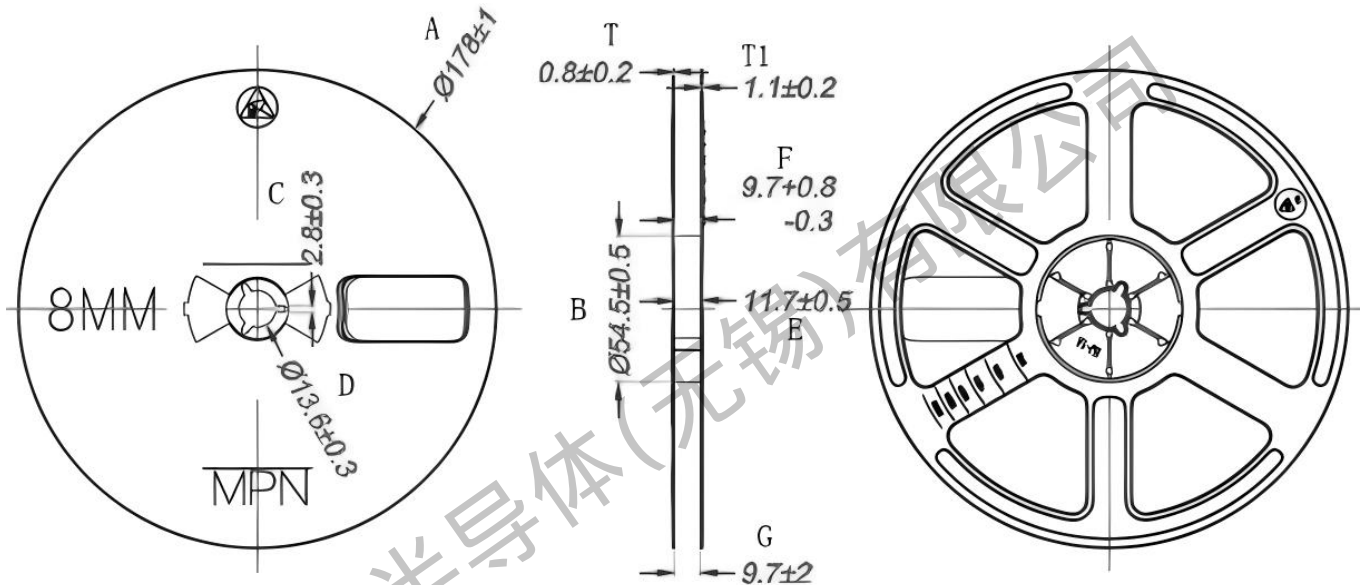
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
A1	0.100	0.000	0.004	0.000
A2	1.000	0.800	0.039	0.031
b	0.400	0.200	0.016	0.008
c	0.250	0.080	0.010	0.003
D	2.200	1.800	0.087	0.071
E	1.350	1.150	0.053	0.045
E1	2.450	1.800	0.096	0.071
e	0.65BSC		0.026BSC	
e1	1.400	1.200	0.055	0.047
L	0.525REF.		0.021REF.	
L1	0.460	0.150	0.018	0.006
L2	0.200	0.000	0.008	0.000
θ	8°	0°	8°	0°

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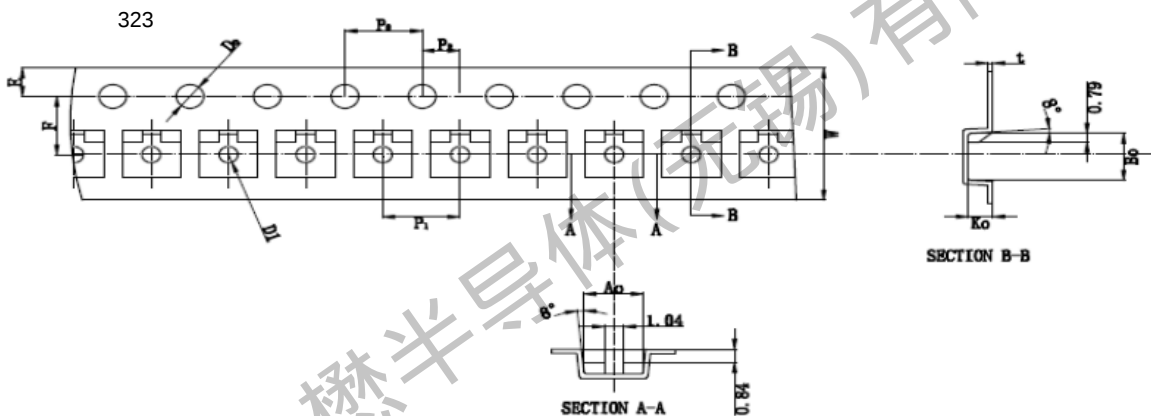
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Tape & Reel Information

Dimensions in mm



PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2	A0	B0	K0	T
SOT-	8.00	4.00	1.75	3.50	1.55	1.00	4.00	40.00	2.00	3.17	2.77	1.28	0.20
Tolerance	+0.3/-0.1	±0.1	±0.1	±0.05	±0.1	±0.1	±0.1	±0.2	±0.05	±0.1	±0.1	±0.1	±0.03



Package Marking and Ordering Information:

Product	Package	Marking	Packing
BSS138KW	SOT323	KN	3000PCS/Reel

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Revision history:

Date	Rev	Description	Page
2023.06.05	23.06	Original	