● General Description

The ZMD68311S combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

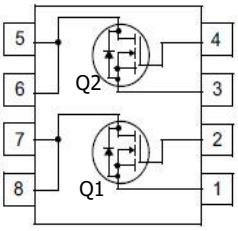
● Features

- ■ Advance high cell density Trench technology
- ■Low $R_{DS(ON)}$ to minimize conductive loss
- ■Low Gate Charge for fast switching
- ■Dual DIE in one package

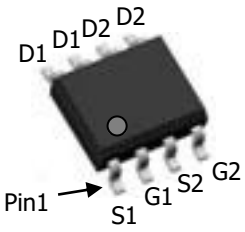
●Application

- ■ Power Management in Notebook Computer,
- ■ Portable Equipment and Battery Powered Systems

● Product Summary



V_{DS1} =30V
V_{DS2} =30V
$R_{DS(ON)1}$ =10mΩ
$R_{DS(ON)2}$ =8mΩ
I_{D1} =11A
I_{D2} =14A



SOP8

●Ordering Information:

Part NO.	ZMD68311S
Marking	ZMD68311
Packing Information	REEL TAPE
Basic ordering unit (pcs)	4000

●Absolute Maximum Ratings (T_C =25℃) (Q1)

Parameter	**Symbol**	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_{D@}$TC=25℃	11	A
	$I_{D@}$TC=75℃	8.4	A
	$I_{D@}$TC=100℃	6.9	A
Pulsed Drain Current ①	I_{DM}	25	A
Total Power Dissipation	P_D@TC=25℃	30	W
Total Power Dissipation	P_D@TA=25℃	1.2	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy	E_{AS}	60	mJ

●Thermal resistance(Q1)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	4	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	90	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	°C

●Electronic Characteristics(Q1)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250uA	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS} =0V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=11A		10	12	mΩ
		V_{GS}=4.5V, I_D=10A		14	17	mΩ
Forward Transconductance	g_{FS}	V_{DS} =25V, I_D=10A		9		s
Source-drain voltage	V_{SD}	Is=11A			1.28	V

●Electronic Characteristics(Q1)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	Ciss	f = 1MHz	-	750	-	pF
Output capacitance	Coss		-	195	-	
Reverse transfer capacitance	Crss		-	95	-	

●Gate Charge characteristics(T_a = 25℃)(Q1)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Qg	VDD = 25V	-	12	-	nC
Gate - Source charge	Qgs	ID = 5A	-	4	-	
Gate - Drain charge	Qgd	VGS = 10V	-	6	-	

●Absolute Maximum Ratings (T_C =25℃) (Q2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	20	V
Continuous Drain Current	$I_{D@}$TC=25℃	14	A
	$I_{D@}$TC=75℃	10.6	A
	$I_{D@}$TC=100℃	8.8	A
Pulsed Drain Current ①	I_{DM}	30	A
Total Power Dissipation	P_D@TC=25℃	30	W
Total Power Dissipation	P_D@TA=25℃	1.2	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy	E_{AS}	65	mJ

●Thermal resistance(Q2)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	4	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	90	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° C

●Electronic Characteristics(Q2)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V,I_D =250uA	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS} =0V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=14A		8	10	mΩ
		V_{GS}=4.5V, I_D=12A		10.5	13	mΩ
Forward Transconductance	g_{FS}	V_{DS} =25V, I_D=10A		12		s
Source-drain voltage	V_{SD}	Is=14A			1.28	V

●Electronic Characteristics(Q2)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz	-	1150	-	pF
Output capacitance	C_{oss}		-	230	-	
Reverse transfer capacitance	C_{rss}		-	113	-	

●Gate Charge characteristics(T_a = 25℃)(Q2)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	V_{DD} = 25V	-	16	-	nC
Gate - Source charge	Q_{gs}	I_D = 5A	-	6	-	
Gate - Drain charge	Q_{gd}	V_{GS} = 10V	-	8	-	

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

• Channel characteristics curve(Q1)

Fig.1 Power Dissipation

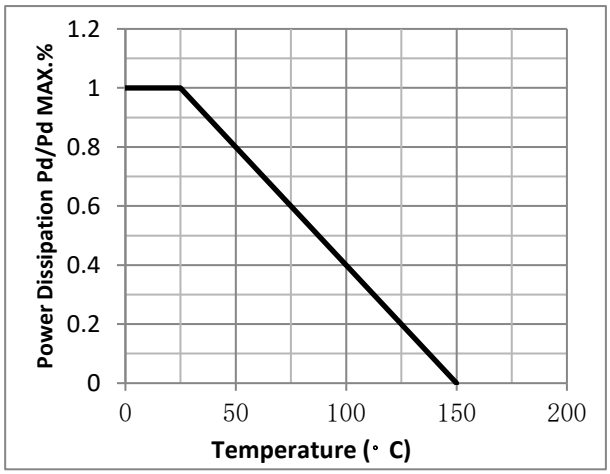


Fig.2 Typical output Characteristics

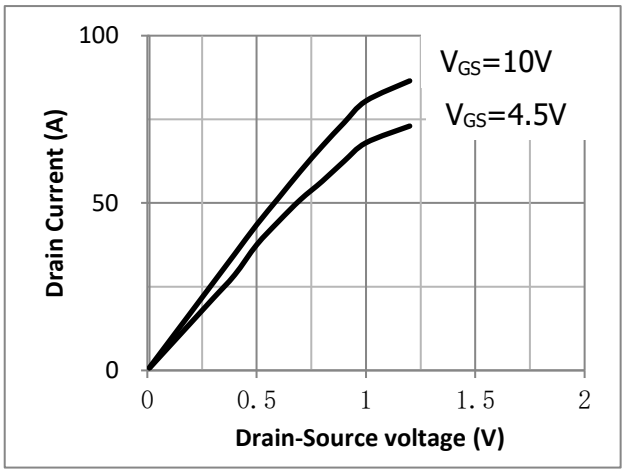


Fig.3 Threshold Voltage V.S Junction Temperature

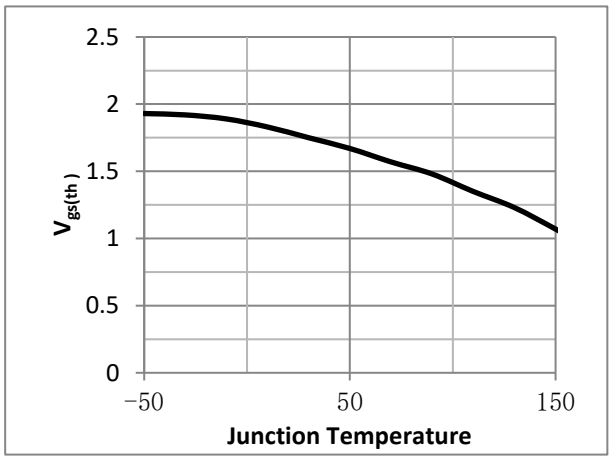


Fig.4 Resistance V.S Drain Current

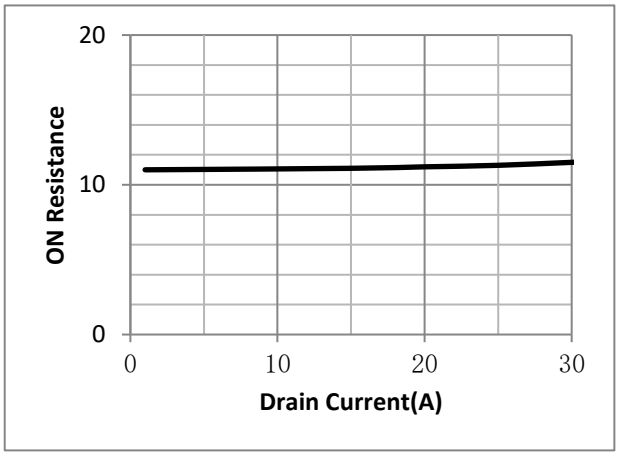


Fig.5 On-Resistance VS Gate Source Voltage

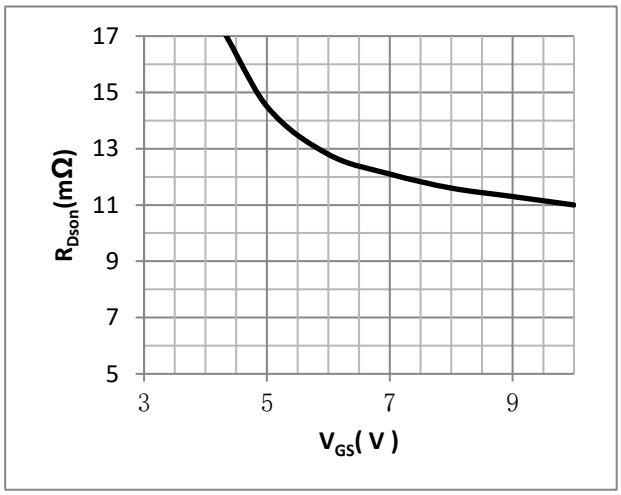
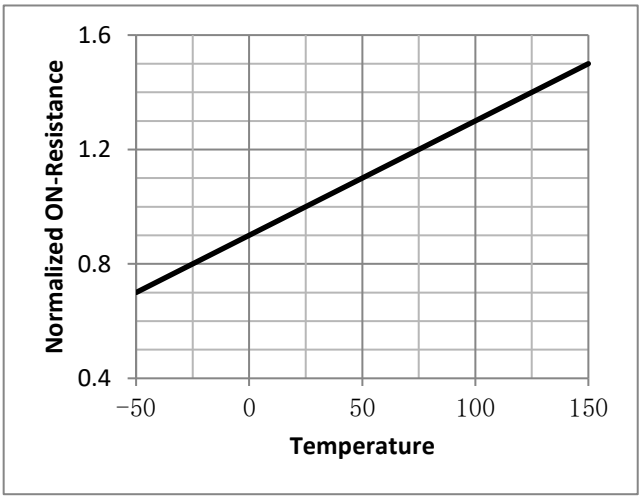


Fig.6 On-Resistance V.S Junction Temperature



• Channel characteristics curve(Q2)

Fig.7 Power Dissipation

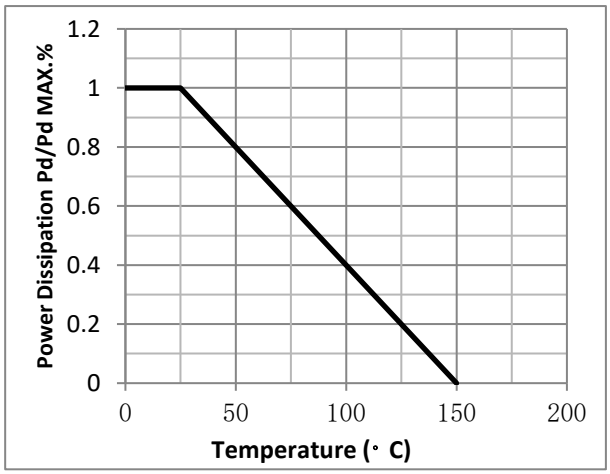


Fig.8 Typical output Characteristics

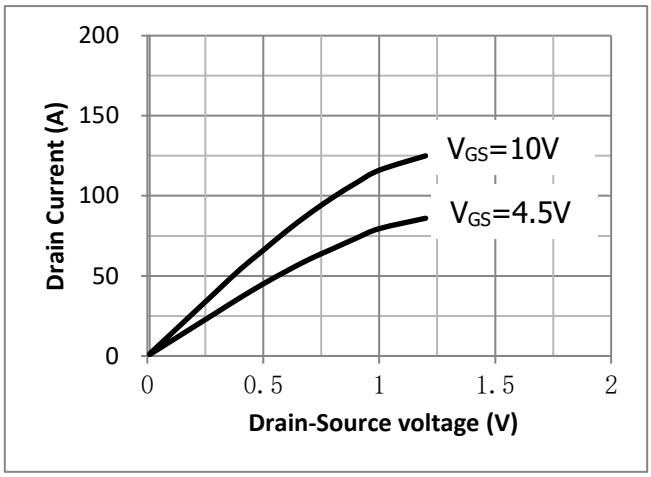


Fig.9 Threshold Voltage V.S Junction Temperature

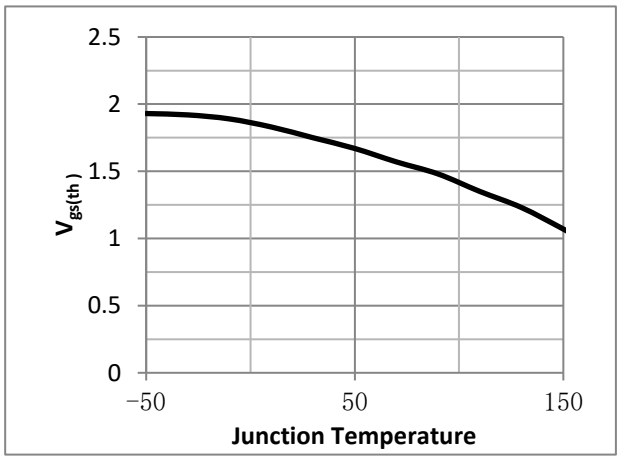


Fig.10 Resistance V.S Drain Current

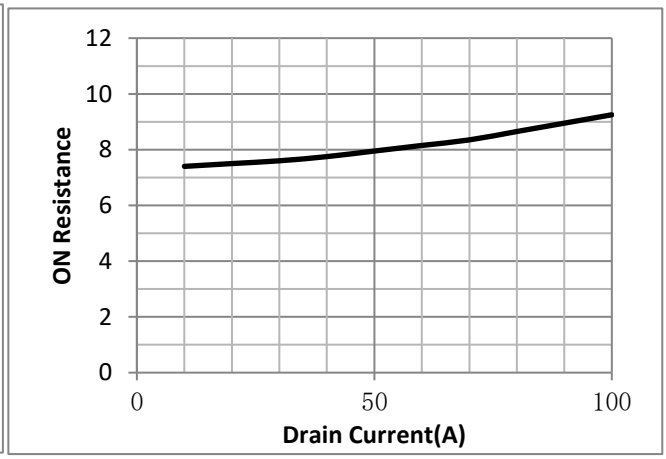


Fig.11 On-Resistance VS Gate Source Voltage

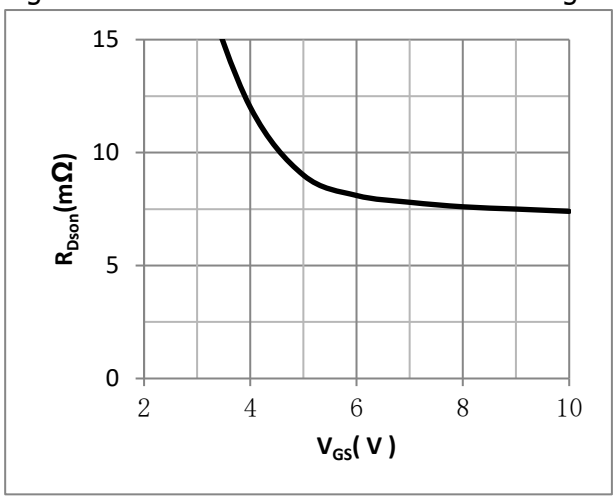


Fig.12 On-Resistance V.S Junction Temperature

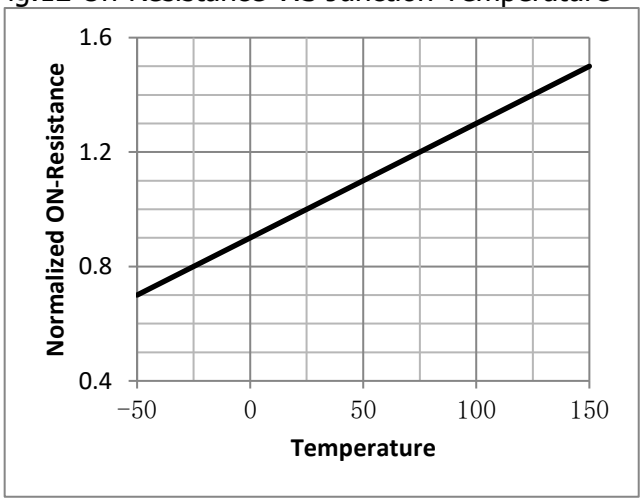


Fig.13 Switching Time Measurement Circuit

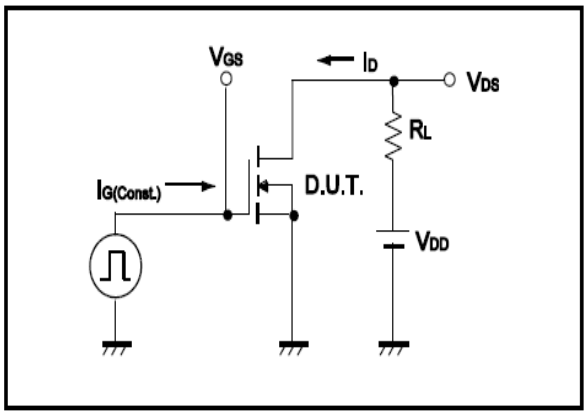


Fig.14 Gate Charge Waveform

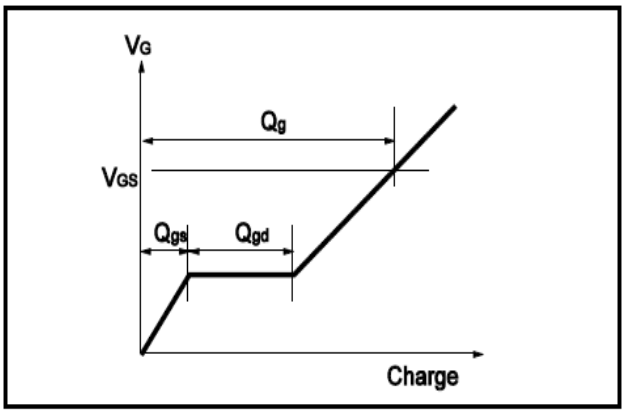


Fig.15 Switching Time Measurement Circuit

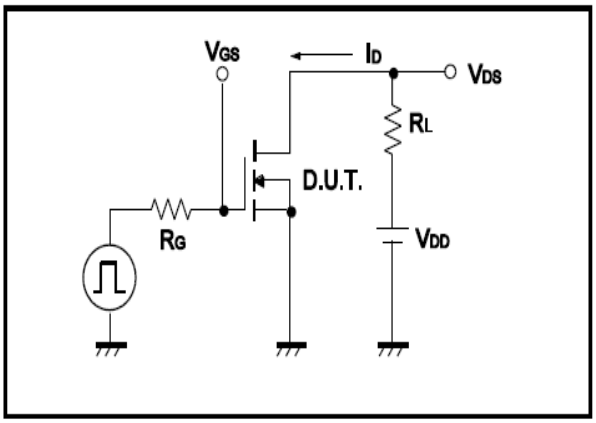


Fig.16 Gate Charge Waveform

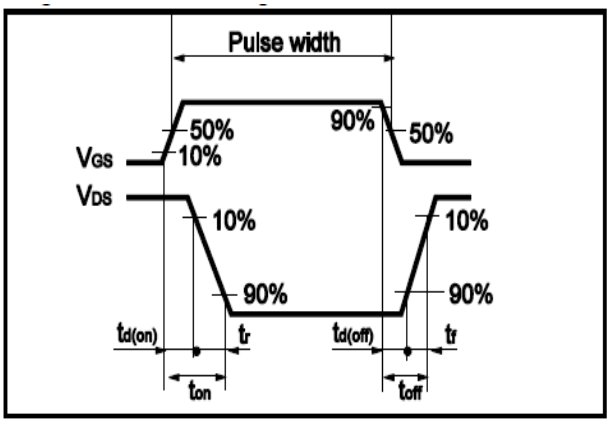


Fig.17 Avalanche Measurement Circuit

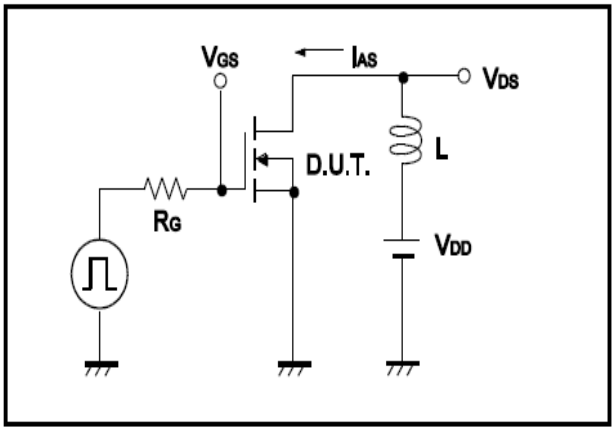
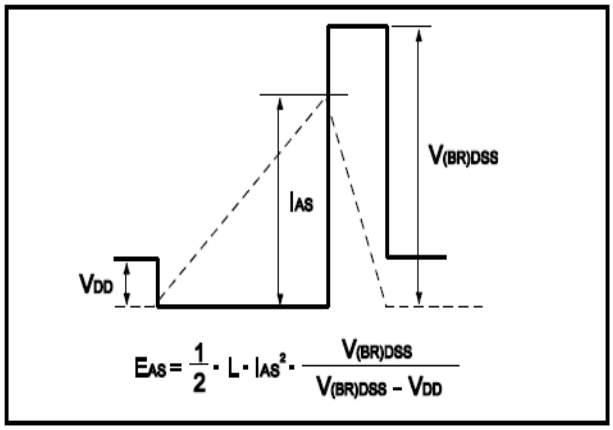


Fig.18 Avalanche Waveform



●Dimensions(SOP8)

Unit: mm

SYMBOL	min	TYP	max	SYMBOL	min		max
A	4.80		5.25	C	1.30		1.75
A1	0.37		0.49	C1	0.55		0.75
A2		1.27		C2	0.55		0.65
A3		0.41		C3	0.05		0.20
B	5.80		6.20	C4	0.10	0.20	0.23
B1	3.80		4.10	D		1.05	
B2		5.00		D1	0.40		0.62