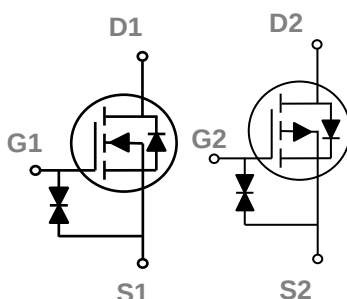


General Description

These N+P dual 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.

SOT563 Dual Pin Configuration



Features

- Fast switching
- Green Device Available
- Suit for 1.5V Gate Drive Applications

Applications

- Notebook
- Load Switch
- Networking
- Hand-held Instruments

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

Symbol	Parameter	Rating		Units
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	± 8	± 8	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	800	-400	mA
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	510	-250	mA
I_{DM}	Drain Current – Pulsed ¹	3.2	-1.6	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	312	312	mW
	Power Dissipation – Derate above 25°C	2.5	2.5	mW/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

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

N-CH Electrical Characteristics (T_J=25 °C, unless otherwise)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	-0.01	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =16V, V _{GS} =0V, T _J =125°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±6V, V _{DS} =0V	---	---	±20	uA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =0.5A	---	200	300	mΩ
		V _{GS} =2.5V, I _D =0.4A	---	235	400	
		V _{GS} =1.8V, I _D =0.2A	---	295	550	
		V _{GS} =1.5V, I _D =0.1A	---	365	800	
		V _{GS} =1.2V, I _D =0.1A	---	600	1500	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.3	0.6	1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3	---	mV/°C

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =10V, V _{GS} =4.5V, I _D =0.5A	---	1	2	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.26	0.5	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	0.2	0.4	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =10V, V _{GS} =4.5V, R _G =10Ω I _D =0.5A	---	5	10	ns
T _r	Rise Time ^{2, 3}		---	3.5	7	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	14	28	
T _f	Fall Time ^{2, 3}		---	6	12	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, F=1MHz	---	38.2	75	pF
C _{oss}	Output Capacitance		---	14.4	28	
C _{rss}	Reverse Transfer Capacitance		---	6	12	

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	---	---	0.8	A
I _{SM}	Pulsed Source Current		---	---	1.6	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =0.2A, T _J =25°C	---	---	1	V

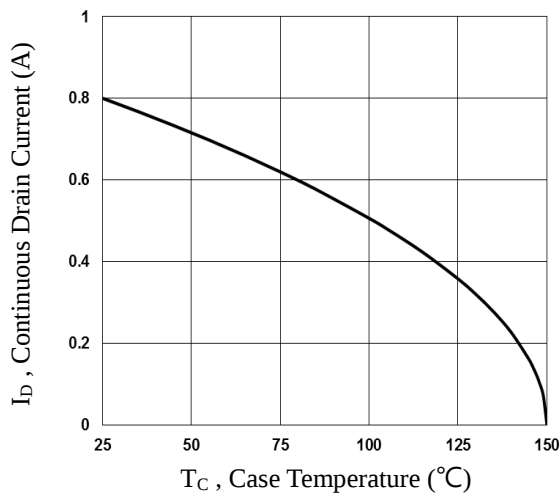


Fig.1 Continuous Drain Current vs. T_c

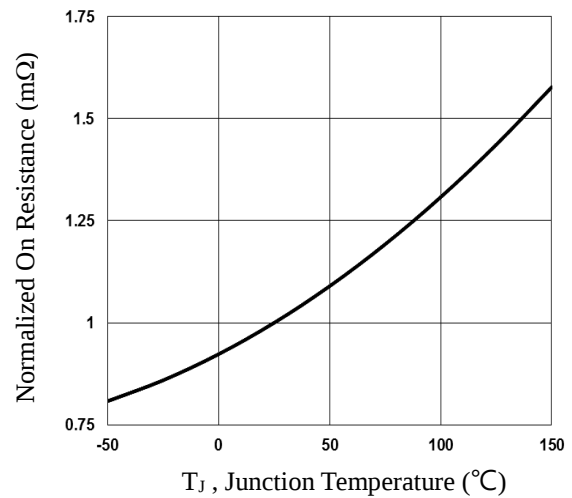


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

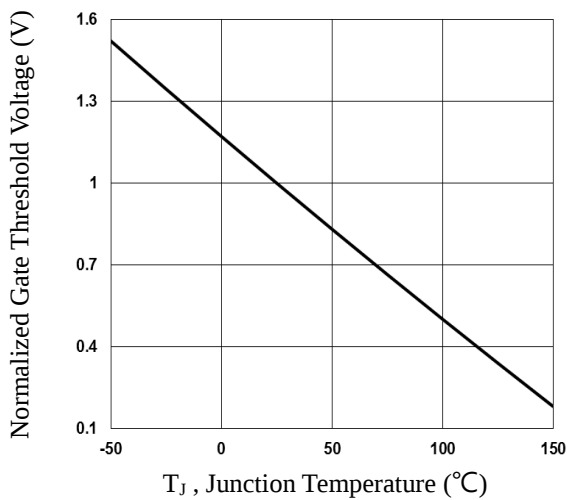


Fig.3 Normalized V_{th} vs. T_j

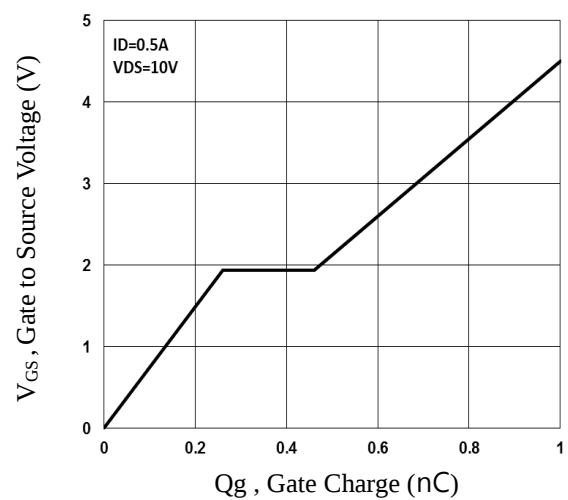


Fig.4 Gate Charge Waveform

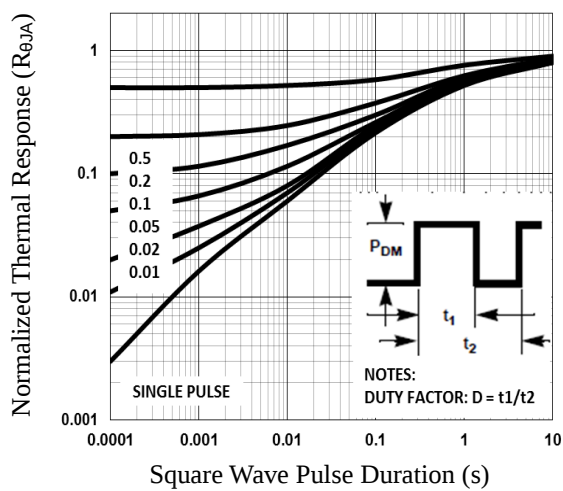


Fig.5 Normalized Transient Impedance

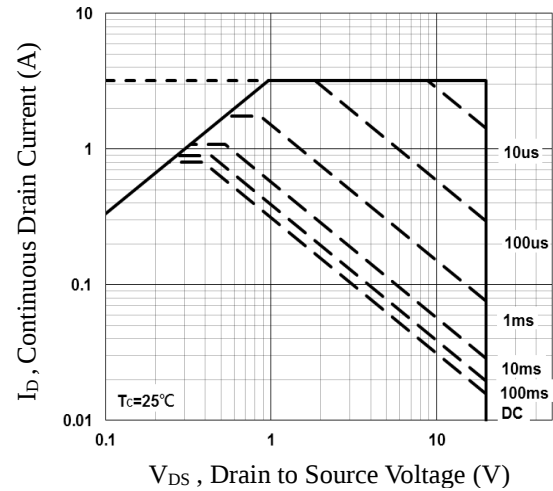


Fig.6 Maximum Safe Operation Area

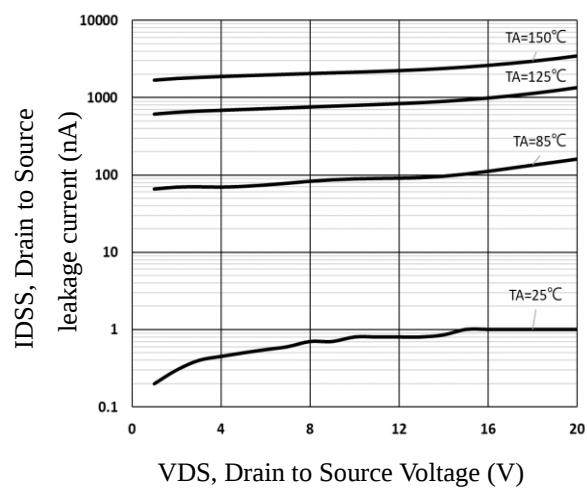


Fig.7 Leakage Current vs. V_{DS}

P-CH Electrical Characteristics (T_J=25 °C, unless otherwise
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.01	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =125°C	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±8V, V _{DS} =0V	---	---	±20	uA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-0.3A	---	440	600	mΩ
		V _{GS} =-2.5V, I _D =-0.2A	---	610	850	
		V _{GS} =-1.8V, I _D =-0.1A	---	810	1200	
		V _{GS} =-1.5V, I _D =-0.1A		1020	1600	
		V _{GS} =-1.2V, I _D =-0.1A	---	1800	3000	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.3	-0.6	-1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3	---	mV/°C

Dynamic and switching Characteristics

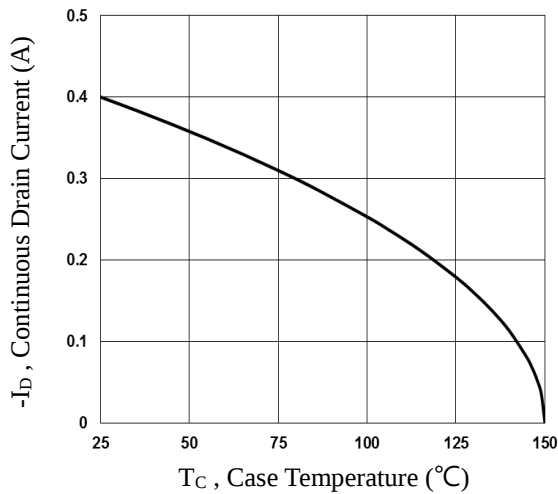
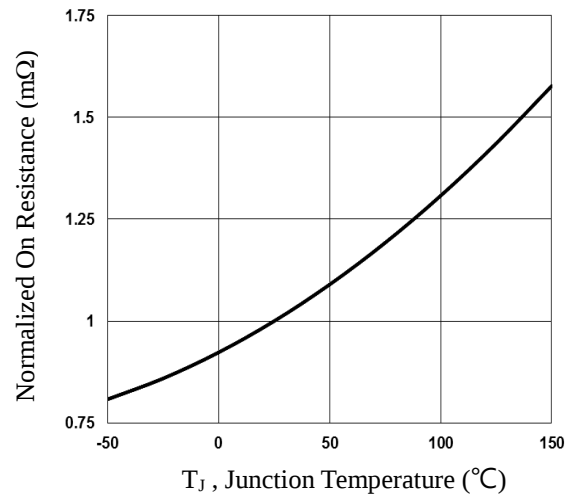
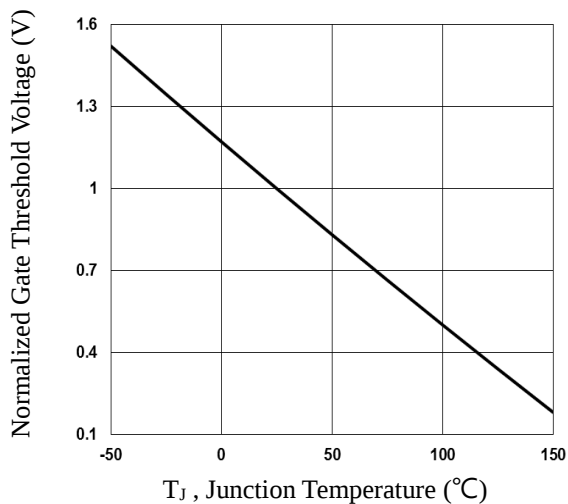
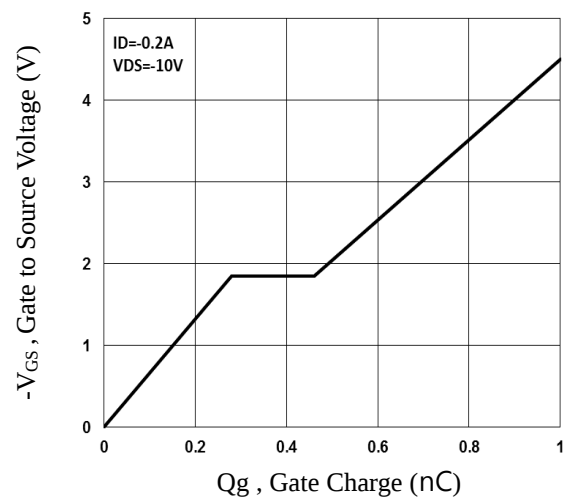
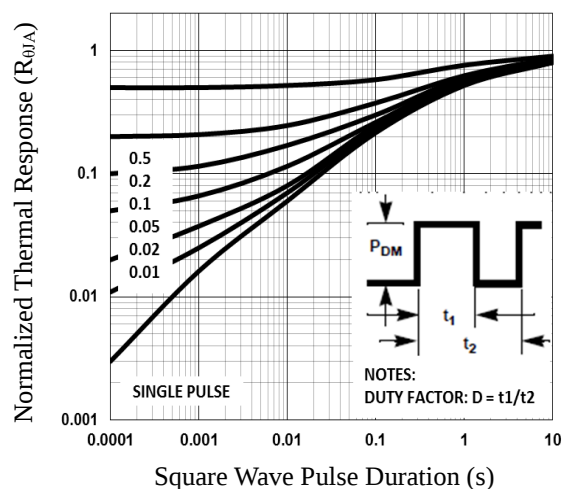
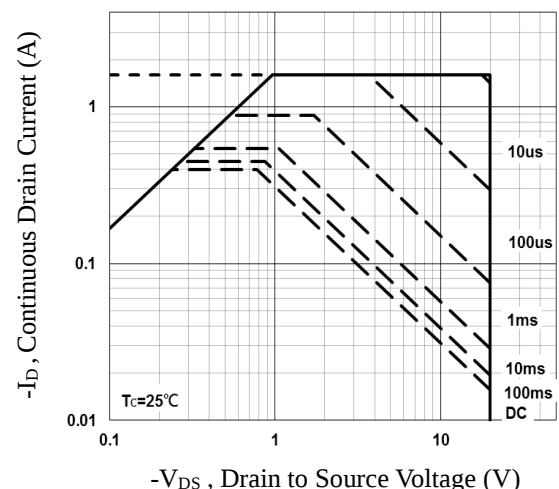
Q _g	Total Gate Charge ^{2, 3}	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-0.2A	---	1	2	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.28	0.5	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	0.18	0.4	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =10Ω I _D =-0.2A	---	8	16	ns
T _r	Rise Time ^{2, 3}		---	5.2	10	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	30	60	
T _f	Fall Time ^{2, 3}		---	18	36	
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, F=1MHz	---	40	78	pF
C _{oss}	Output Capacitance		---	15	30	
C _{rss}	Reverse Transfer Capacitance		---	6.5	13	

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	---	---	-0.4	A
I _{SM}	Pulsed Source Current		---	---	-0.8	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-0.2A, T _J =25°C	---	---	-1	V

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.


Fig.8 Continuous Drain Current vs. T_C

Fig.9 Normalized $R_{DS(on)}$ vs. T_J

Fig.10 Normalized V_{th} vs. T_J

Fig.11 Gate Charge Waveform

Fig.12 Normalized Transient Impedance

Fig.13 Maximum Safe Operation Area

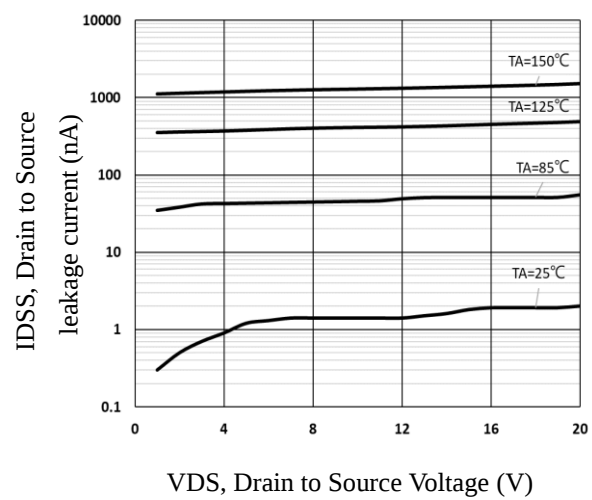
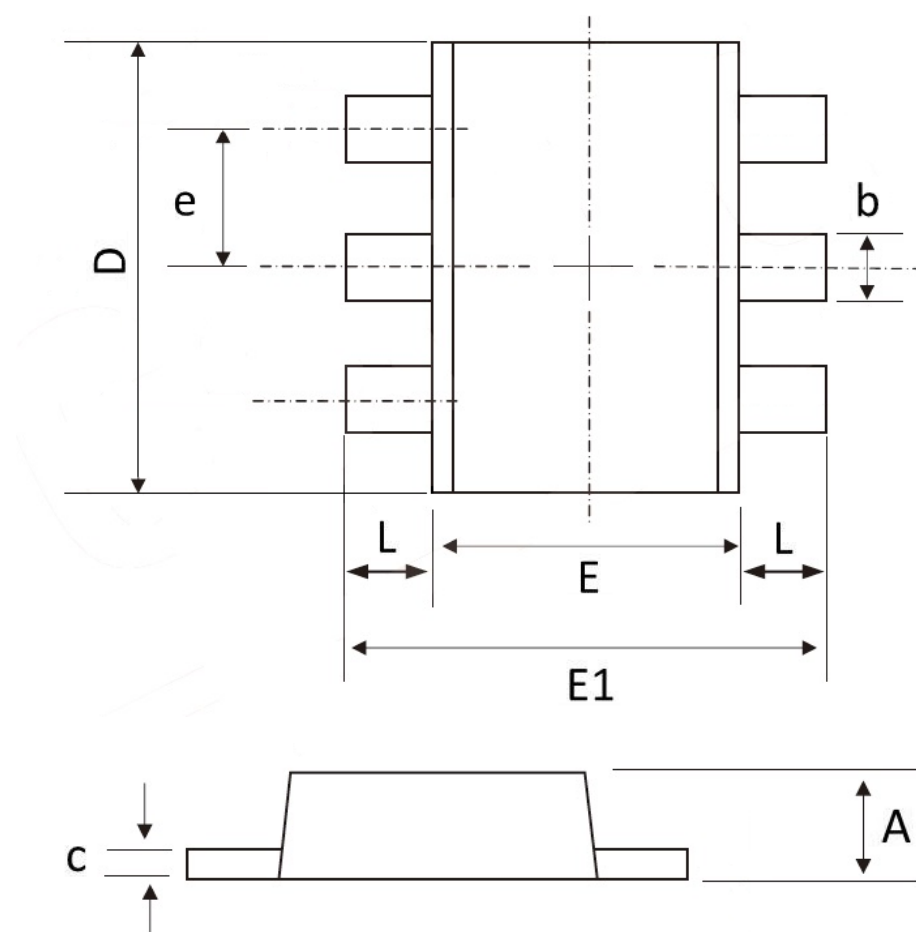


Fig.14 Leakage Current vs. VDS

SOT563 Dual PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.600	0.500	0.024	0.020
b	0.300	0.150	0.012	0.006
c	0.180	0.100	0.007	0.004
D	1.700	1.500	0.067	0.059
E	1.250	1.100	0.049	0.043
E1	1.700	1.550	0.067	0.061
e	0.5BSC		0.02BSC	
L	0.300	0.100	0.012	0.004