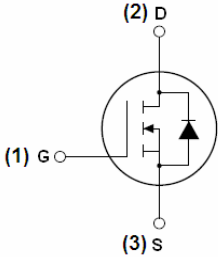
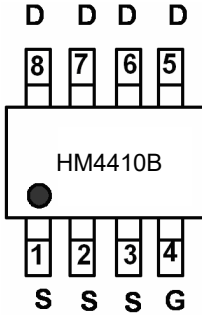



N-Channel Enhancement Mode Power MOSFET

<p>DESCRIPTION</p> <p>The HM4410B uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.</p> <p>GENERAL FEATURES</p> <ul style="list-style-type: none"> ● $V_{DS} = 30V, I_D = 12A$ $R_{DS(ON)} < 12.5m\Omega @ V_{GS}=10V$ $R_{DS(ON)} < 19m\Omega @ V_{GS}=4.5V$ ● High density cell design for ultra low Rdson ● Fully characterized Avalanche voltage and current <p>Application</p> <ul style="list-style-type: none"> ● Power switching application ● Hard Switched and High Frequency Circuits ● Uninterruptible Power Supply 	<div style="text-align: center;">  <p>(1) G (2) D (3) S</p> <p>Schematic diagram</p>  <p>Marking and pin Assignment</p>  <p>SOP-8 top view</p> </div>
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Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM4410B	HM4410B	SOP-8	Ø330mm	12mm	2500 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	12	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	7	A
Pulsed Drain Current	I_{DM}	60	A
Maximum Power Dissipation	P_D	3	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case(Note 2)	$R_{\theta JC}$	50	°C/W
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Electrical Characteristics (TA=25°C unless otherwise noted)

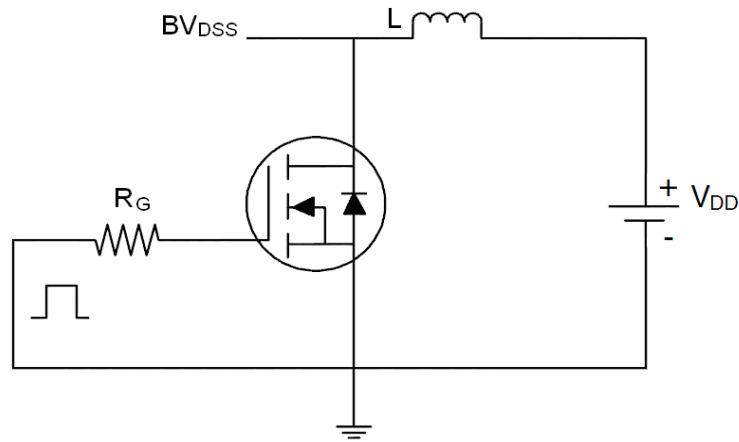
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=12A$	-	9.5	12.5	m Ω
		$V_{GS}=4.5V, I_D=5A$	-	16	19	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=12A$	15	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	1550	-	PF
Output Capacitance	C_{oss}		-	300	-	PF
Reverse Transfer Capacitance	C_{rss}		-	180	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=25V, I_D=1A$ $V_{GS}=10V, R_{GEN}=6\Omega$	-	30	-	nS
Turn-on Rise Time	t_r		-	20	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	100	-	nS
Turn-Off Fall Time	t_f		-	80	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=12A,$ $V_{GS}=5V$	-	13	-	nC
Gate-Source Charge	Q_{gs}		-	5.5	-	nC
Gate-Drain Charge	Q_{gd}		-	3.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=12A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	12	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test circuit

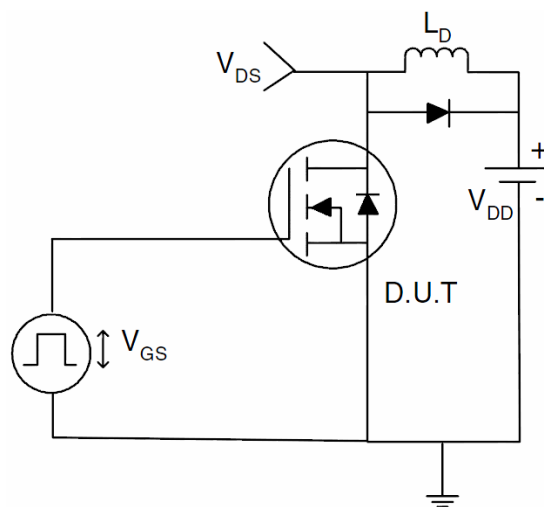
1) E_{AS} test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

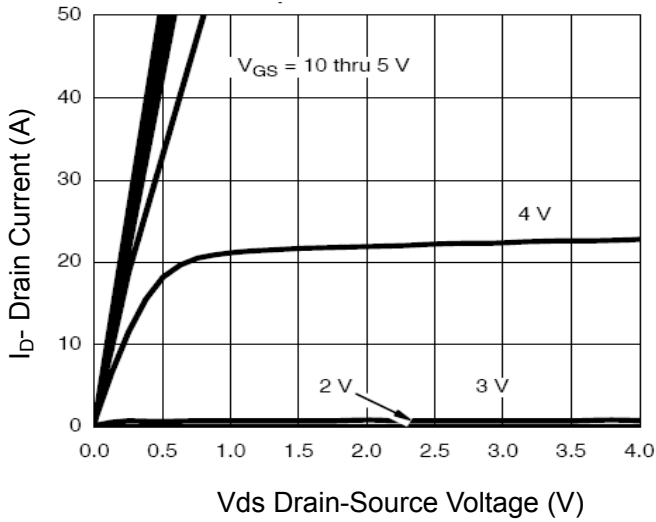


Figure 1 Output Characteristics

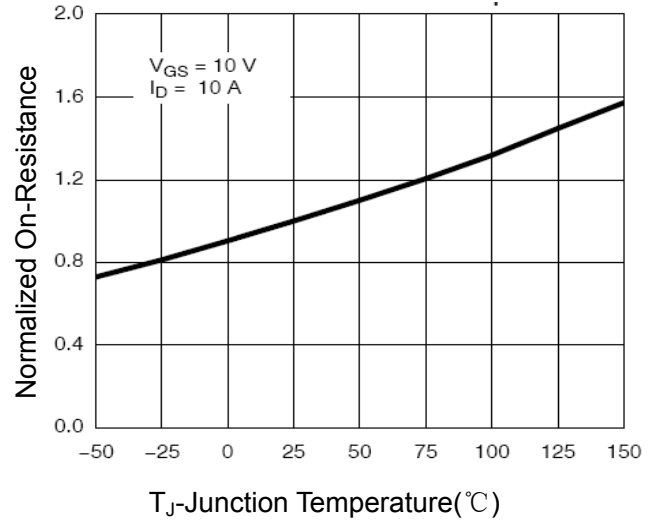


Figure 4 Rdson-Junction Temperature

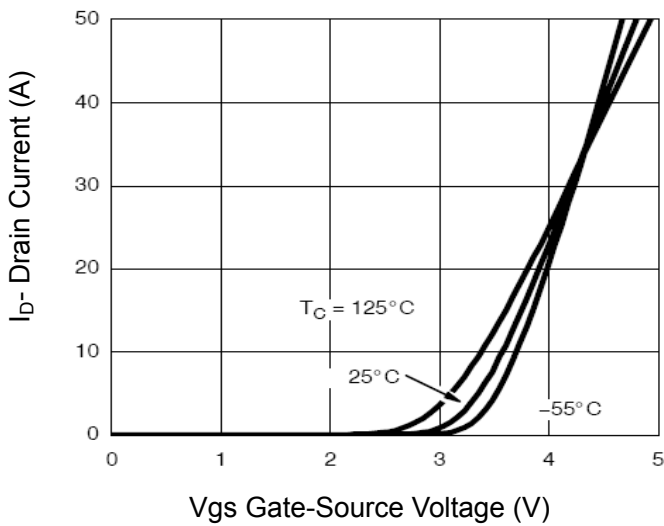


Figure 2 Transfer Characteristics

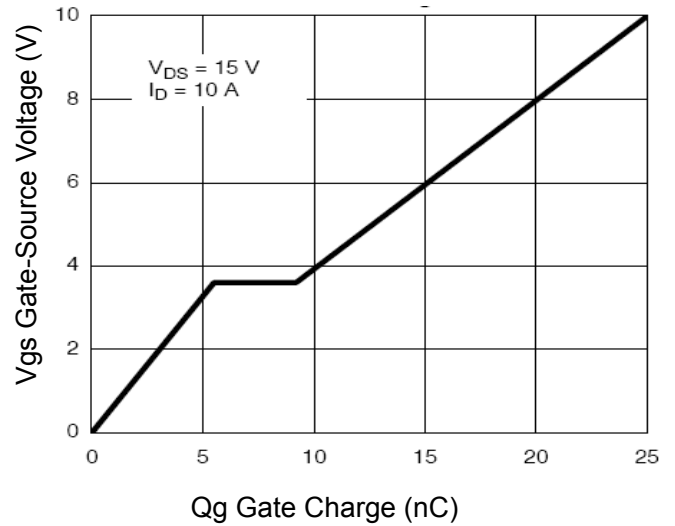


Figure 5 Gate Charge

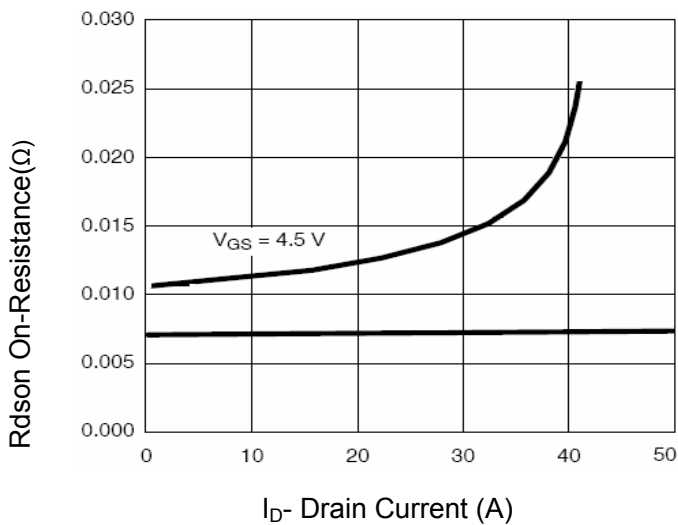


Figure 3 Rdson- Drain Current

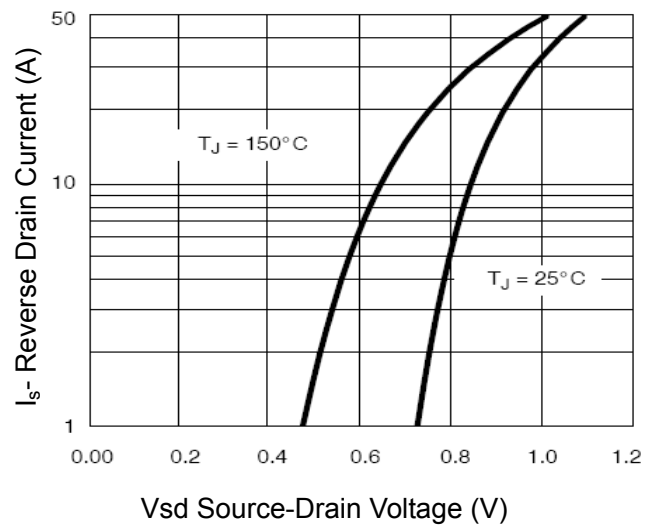


Figure 6 Source- Drain Diode Forward

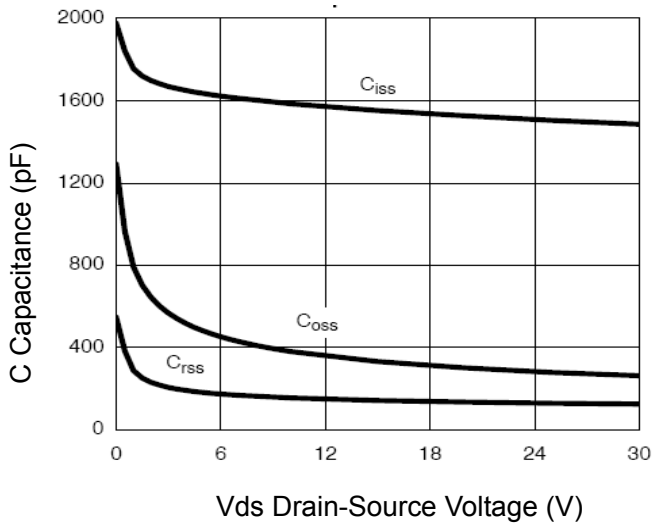


Figure 7 Capacitance vs Vds

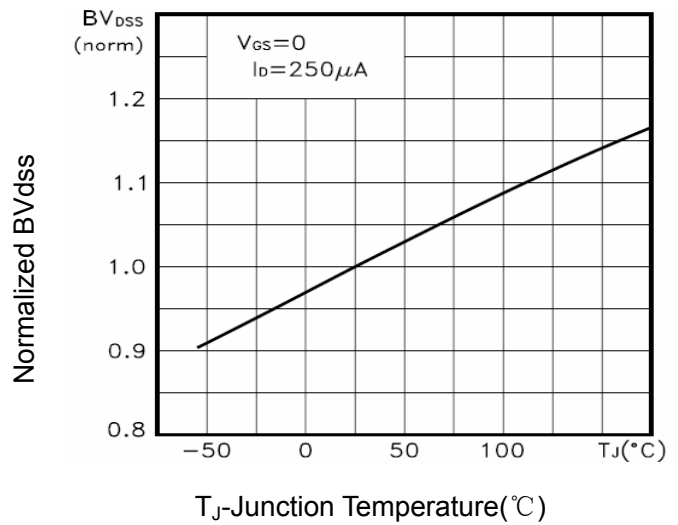


Figure 9 BV_{DSS} vs Junction Temperature

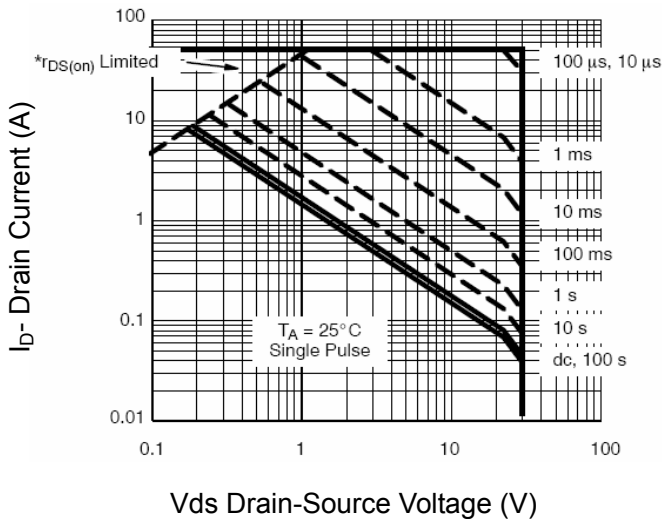


Figure 8 Safe Operation Area

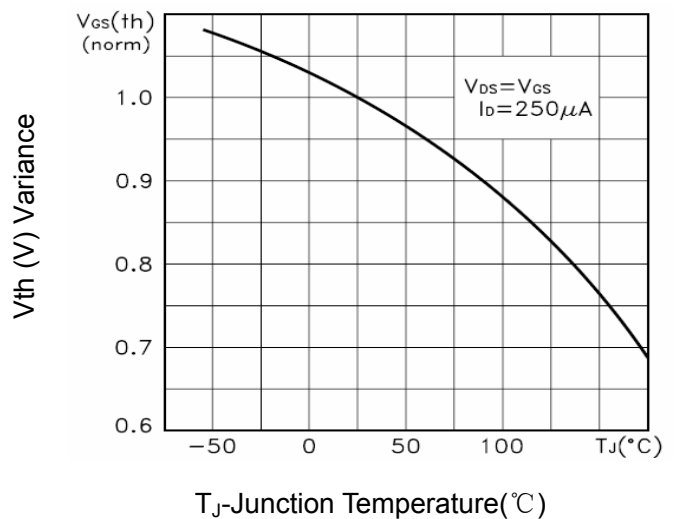


Figure 10 $V_{GS(th)}$ vs Junction Temperature

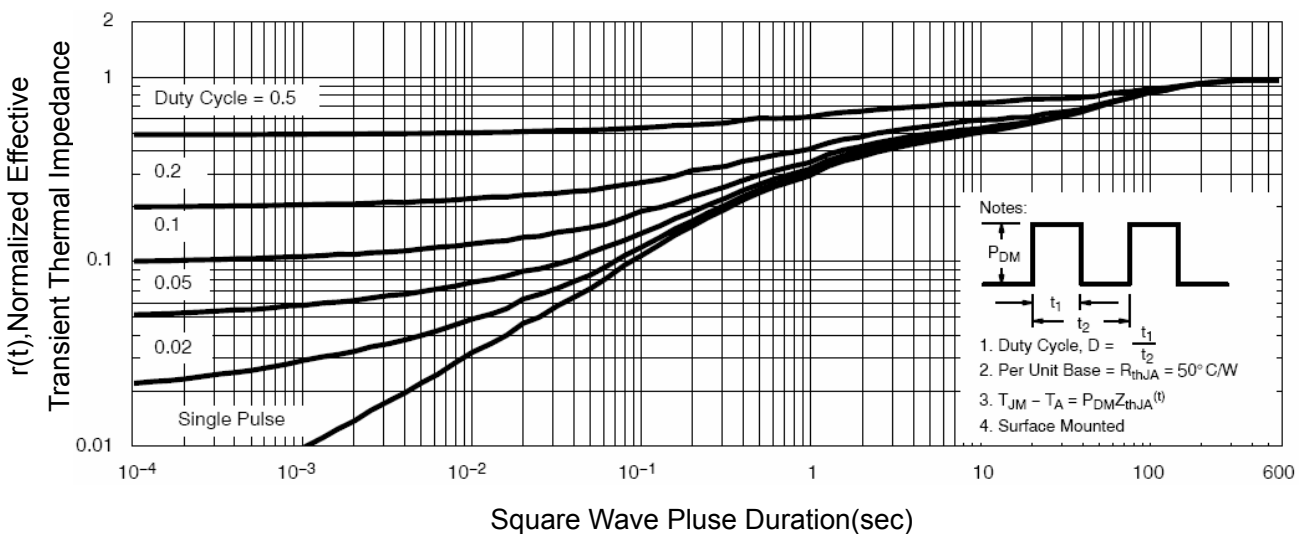
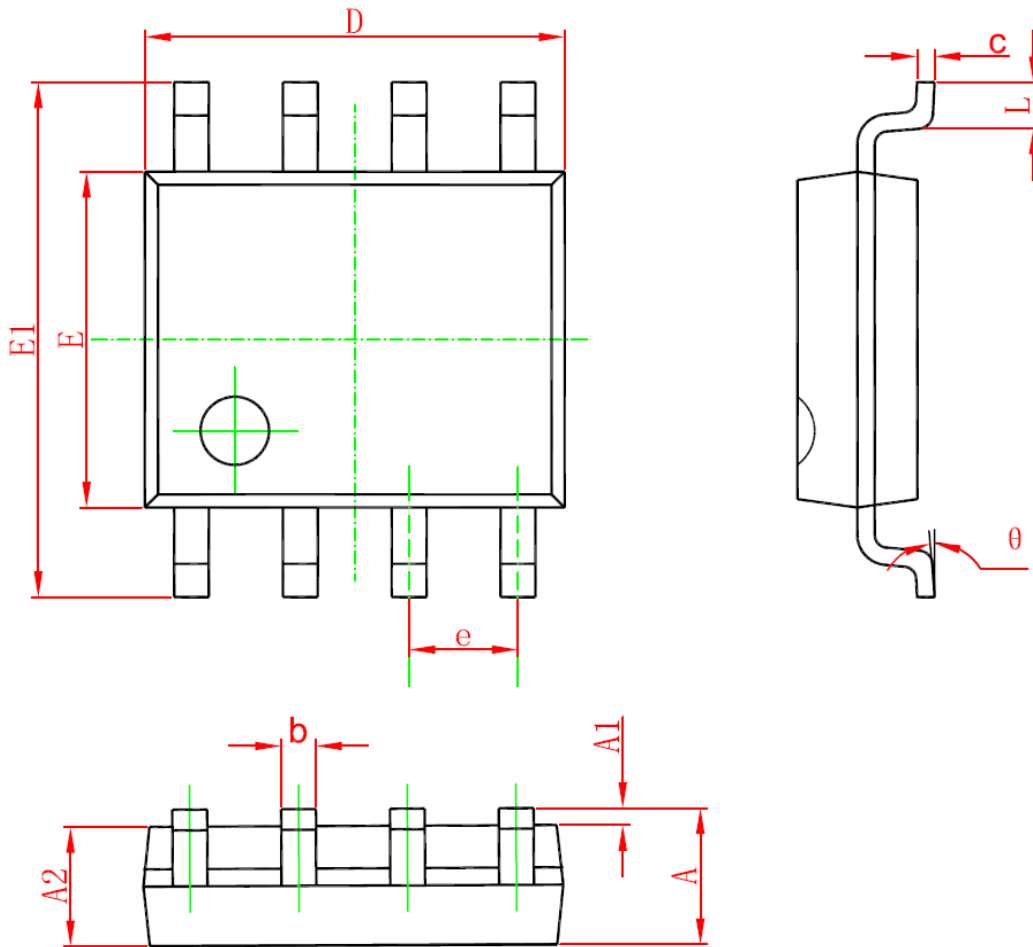


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 PACKAGE IN FORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°