



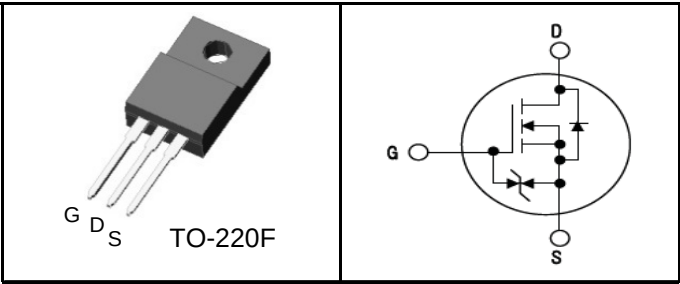
迈长铭科技

MPSA65M380B

650V N Channel Super Junction MOSFET

Features

- $BV_{DSS}=650\text{ V}$, $I_D=10.4\text{ A}$
- $R_{DS(on)}:0.38\Omega\text{ (Max) @ }V_{GS}=10\text{V}$
- Very Low FOM ($R_{DS(on)} \times Q_g$)
- Extremely low switching loss
- Excellent stability and uniformity
- 100% Avalanche Tested
- Built-in ESD Diode



Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- TV power & LED Lighting Power



Device Marking and Package Information

Device	Package	Marking
MPSA65M380B	TO-220F	MP65M380B

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C = 25^{\circ}\text{C}$)	10.4 *	A
	Drain Current - Continuous ($T_C = 100^{\circ}\text{C}$)	6.6 *	A
$I_{DM}^{1)}$	Drain Current - Pulsed	29.0 *	A
$E_{AS}^{2)}$	Single Pulsed Avalanche Energy	140	mJ
I_{AR}	Avalanche Current	1.8	A
dv/dt	MOSFET dv/dt ruggedness, $V_{DS}=0\ldots 520\text{V}$	50	V/ns
dv/dt	Reverse diode dv/dt, $V_{DS}=0\ldots 520\text{V}$, $I_{DS}\leq I_D$	15	V/ns
P_D	Power Dissipation ($T_C = 25^{\circ}\text{C}$)	30	W
$V_{ESD(G-S)}$	Gate source ESD(HBM-C=100pF, R=1.5K Ω)	2500	V
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^{\circ}\text{C}$

* Drain current limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	4.1	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient , Max.	62.5	$^{\circ}\text{C/W}$

Electrical Characteristics $T_J=25\text{ }^{\circ}\text{C}$ unless otherwise specified

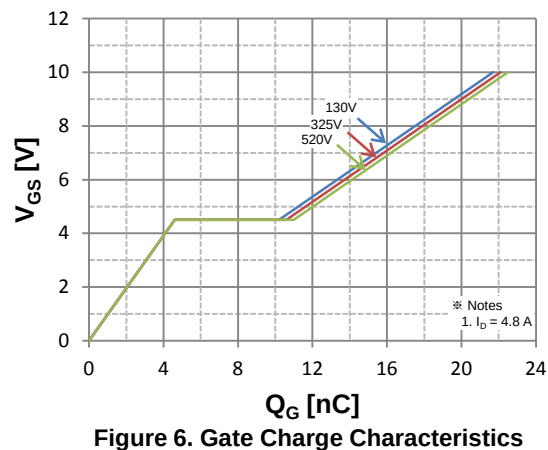
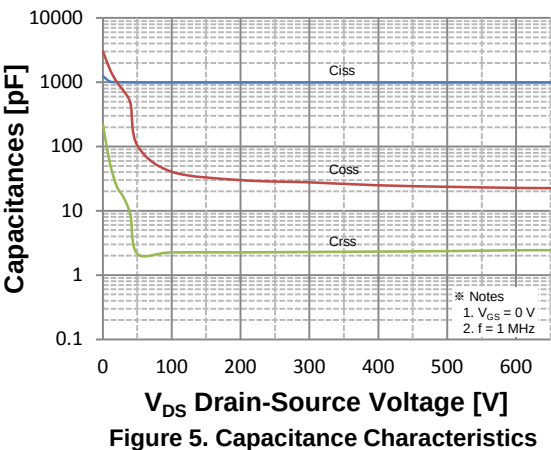
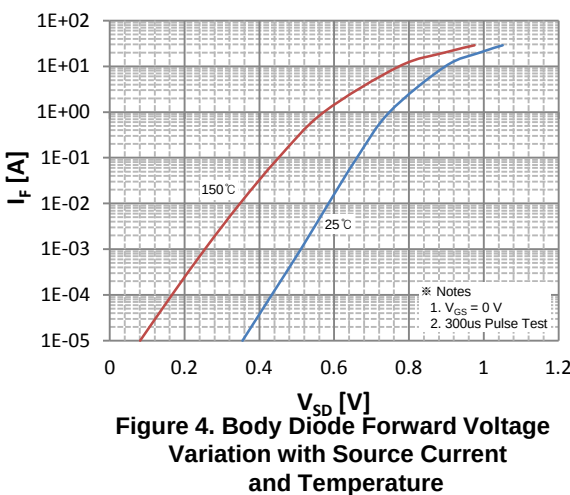
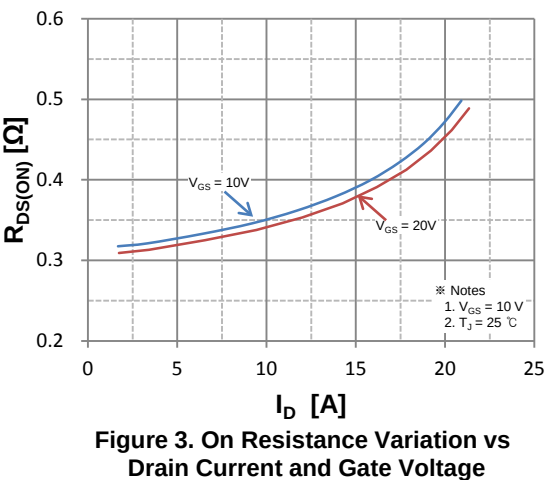
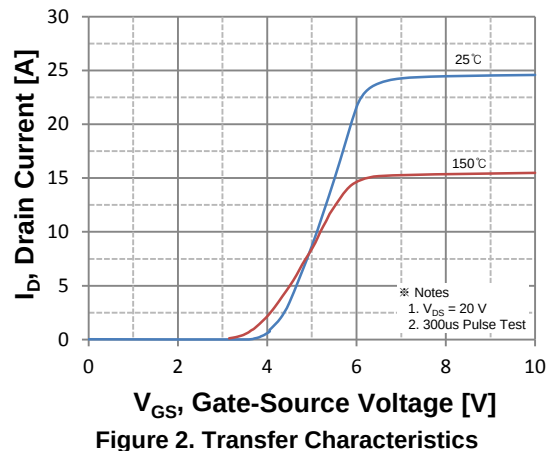
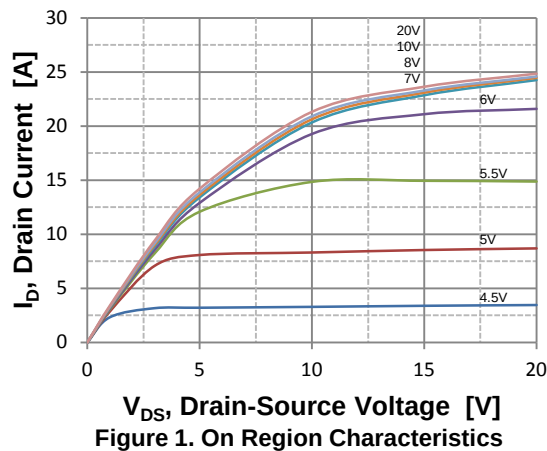
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
On Characteristics						
V _{GS}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 370 μA	2.0	-	4.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 3.4 A	-	0.33	0.38	Ω
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 1mA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650 V, V _{GS} = 0	-	-	1	μA
		V _{DS} = 650 V, T _C = 150 °C	-	-	100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20 V, V _{DS} = 0 V	-	-	±1	μA
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 100 V, V _{GS} = 0 V, f = 1.0 MHz	-	990	-	pF
C _{oss}	Output Capacitance		-	40	-	pF
C _{rss}	Reverse Transfer Capacitance		-	2.3	-	pF
Switching Characteristics						
t _{d(on)}	Turn-On Time	V _{DS} = 325 V, I _D = 4.8 A, R _G = 25 Ω (Note 3,4)	-	30	-	ns
t _r	Turn-On Rise Time		-	23	-	ns
t _{d(off)}	Turn-Off Delay Time		-	190	-	ns
t _f	Turn-Off Fall Time		-	20	-	ns
Q _g	Total Gate Charge	V _{DS} = 520 V, I _D = 4.8 A, V _{GS} = 10 V (Note 3,4)	-	22.6	-	nC
Q _{gs}	Gate-Source Charge		-	4.6	-	nC
Q _{gd}	Gate-Drain Charge		-	6.4	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		-	-	10.4	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	29	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 4.8 A	-	-	1.3	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 4.8 A di _F /dt = 100 A/μs	-	240	-	ns
Q _{rr}	Reverse Recovery Charge		-	2.1	-	μC

Notes :

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $I_{AS}=1.8\text{ A}$, $V_{DD}=50\text{ V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
3. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
4. Essentially Independent of Operating Temperature



Typical Characteristics



Typical Characteristics

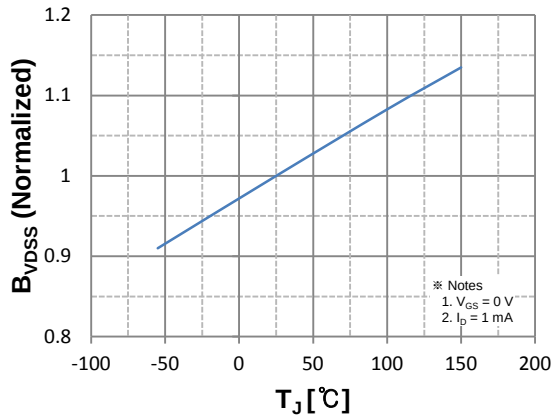


Figure 7. Breakdown Voltage Variation vs. Temperature

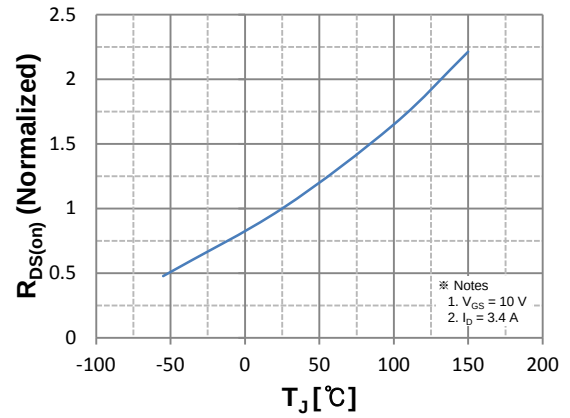


Figure 8. On-Resistance Variation vs. Temperature

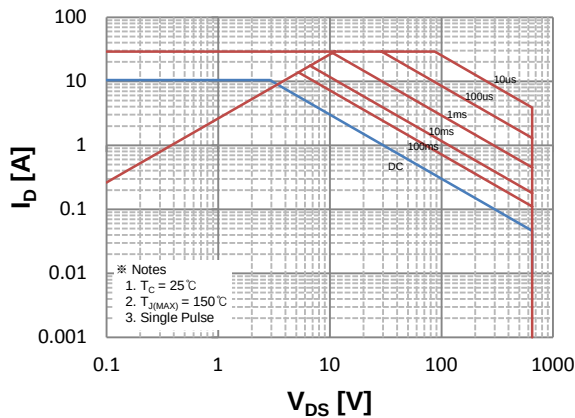


Figure 9. Maximum Safe Operating Area

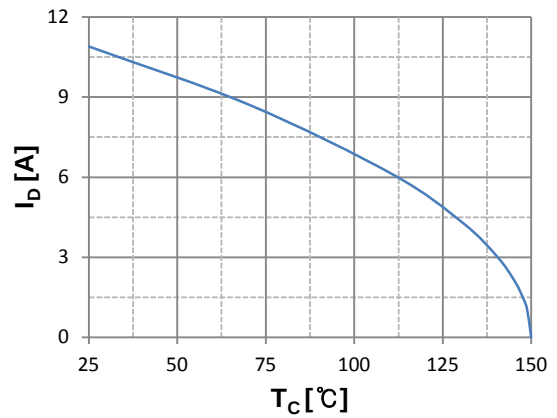


Figure 10. Maximum Drain Current vs. Case Temperature

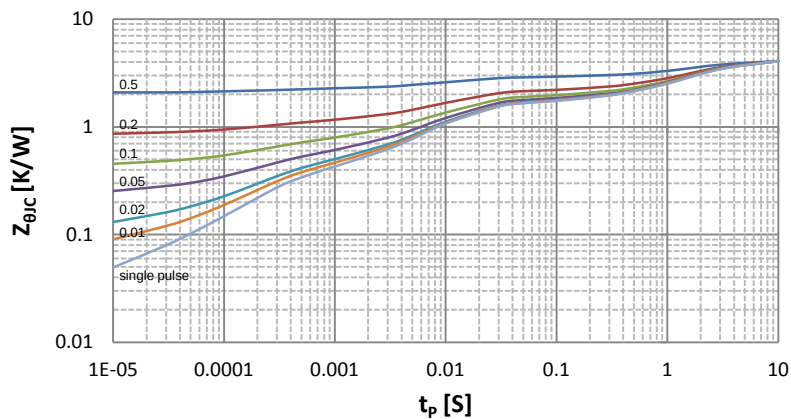


Figure 11. Transient Thermal Response Curve

Fig 12. Gate Charge Test Circuit & Waveform

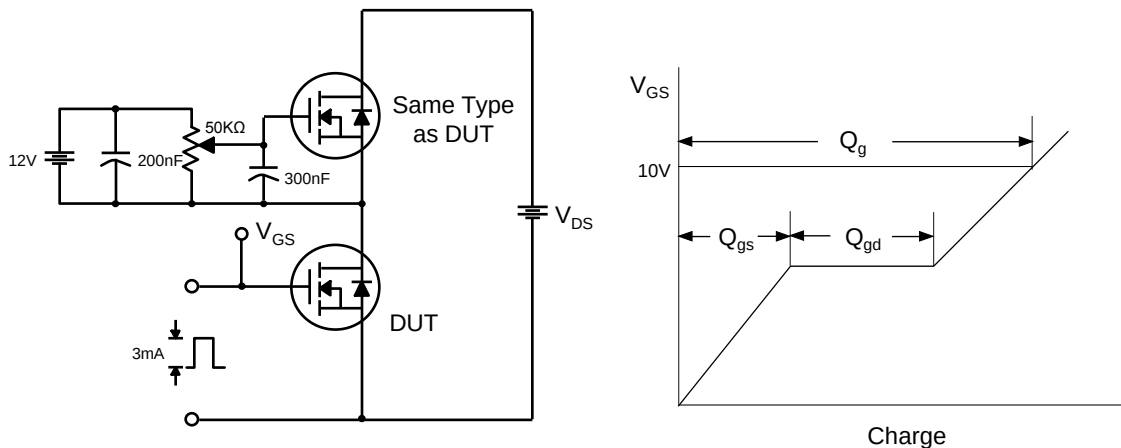


Fig 13. Resistive Switching Test Circuit & Waveforms

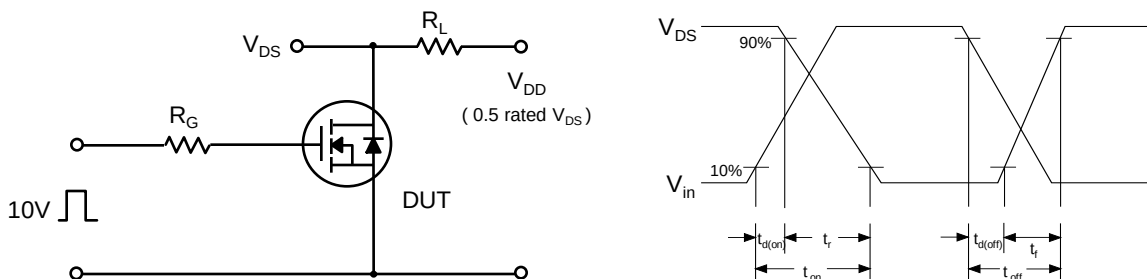


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

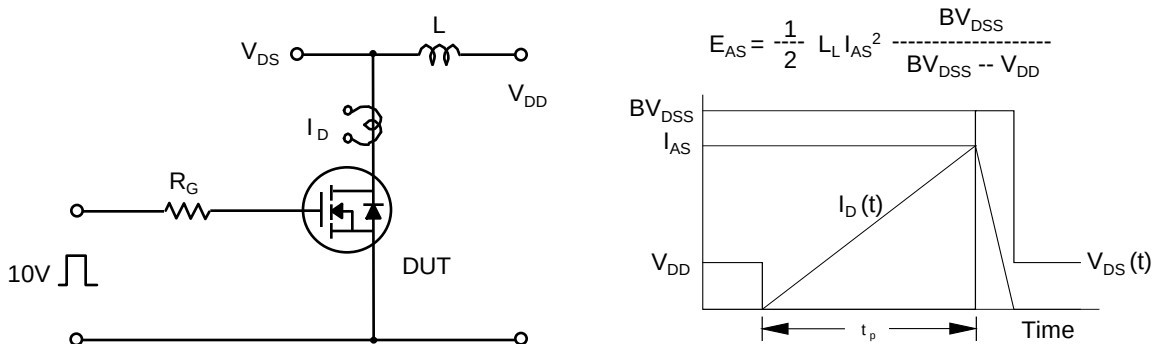
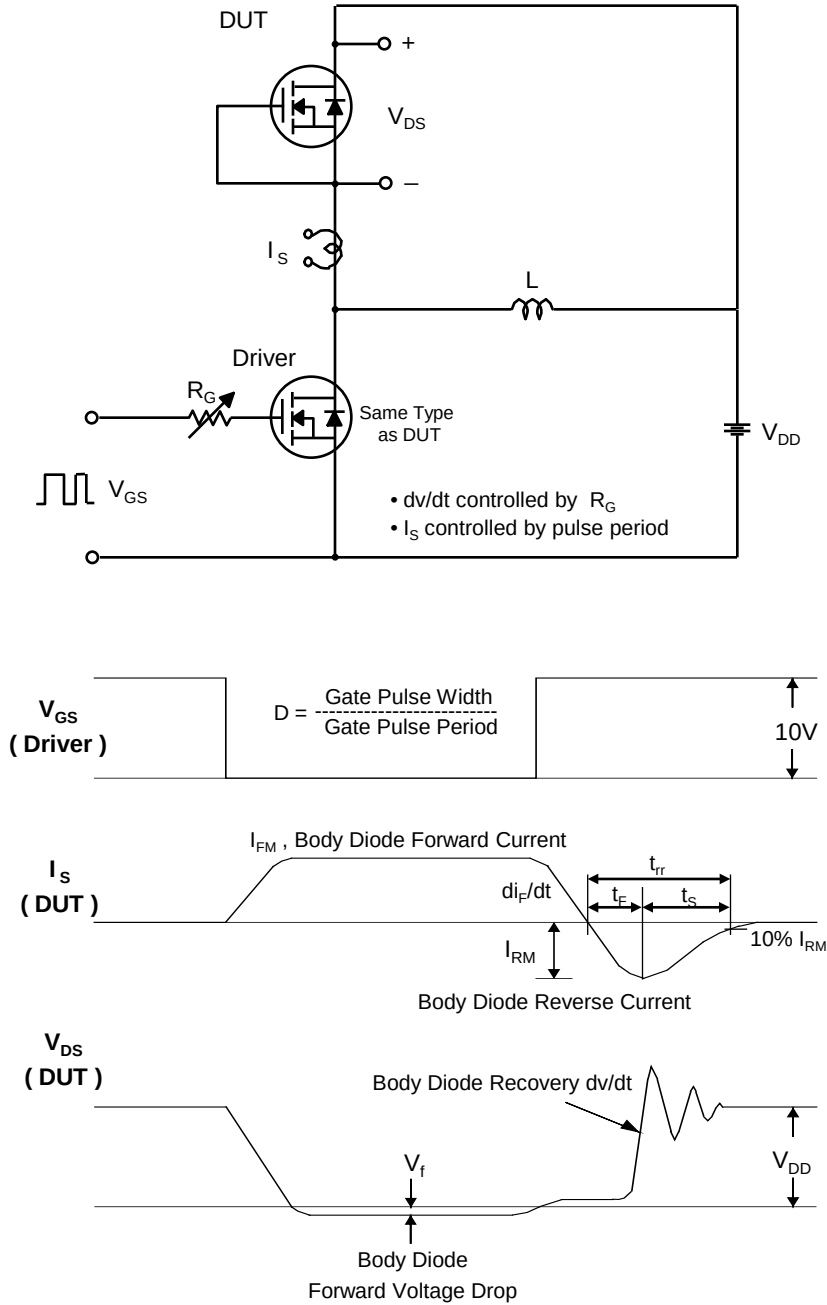
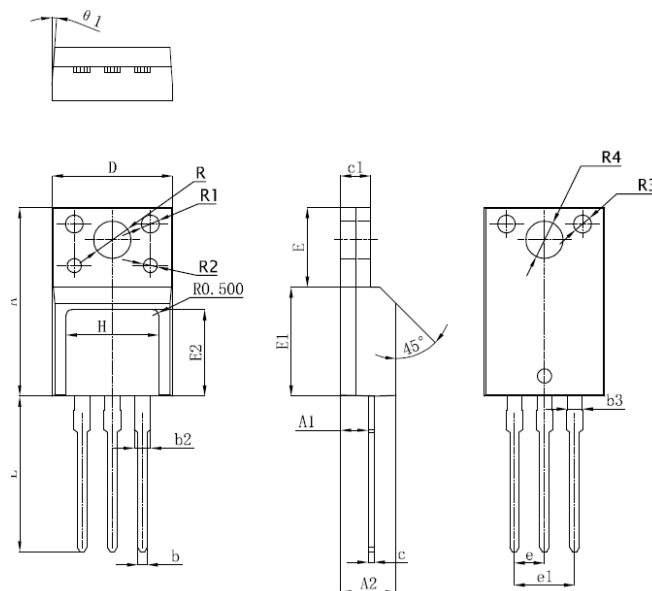


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimension

unit: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	15.670	15.870	16.070
A1	2.150	2.350	2.550
A2	4.500	4.700	4.900
b	0.770	0.800	0.830
b2	1.200	1.300	1.400
b3	1.200BSC		
c	0.490	0.500	0.520
c1	2.340	2.540	2.740
D	9.960	10.160	10.360
E	6.480	6.680	6.880
E1	8.990	9.190	9.390
E2	7.100	7.300	7.500
e	2.540BSC		
e1		5.080	
L	13.140	13.340	13.540
R		3.150	
R1		1.500	
R2		1.200	
R3		1.500	
R4		3.180	
H	7.600	7.800	8.000
θ 1	4°	4.5°	5°