

N-Channel Enhancement Mode Power MOSFET

Description

The HM3207B uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in Automotive applications and a wide variety of other applications.

General Features

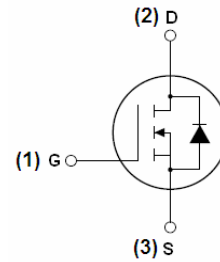
- $V_{DSS} = 70V, I_D = 180A$
 $R_{DS(ON)} < 4m\Omega @ V_{GS} = 10V$
- Good stability and uniformity with high E_{AS}
- Special process technology for high ESD capability
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Automotive applications
- Hard switched and high frequency circuits
- Uninterruptible power supply

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Schematic diagram



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM3207B	HM3207B	TO-220	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	70	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	180	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	150	A
Pulsed Drain Current	I_{DM}	720	A
Maximum Power Dissipation	P_D	310	W
Derating factor		2.07	W/°C

Single pulse avalanche energy (Note 4)	E_{AS}	2200	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 1)	$R_{\theta JC}$	0.48	°C/W
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Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

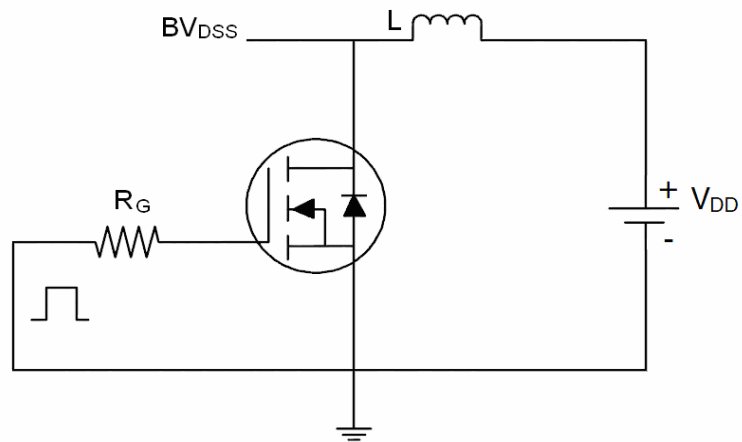
Parameter		Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V I _D =250μA	70			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} =70V,V _{GS} =0V			1	μA
Gate-Body Leakage Current		I _{GSS}	V _{GS} =±20V,V _{DS} =0V			±200	nA
On Characteristics							
Gate Threshold Voltage		V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2	3	4	V
Drain-Source On-State Resistance	25℃	R _{DS(ON)}	V _{GS} =10V, I _D =40A		2.7	4	mΩ
	125℃				4.7	6.5	mΩ
Forward Transconductance		g _{FS}	V _{DS} =25V,I _D =40A	100	165		S
Dynamic Characteristics							
Input Capacitance		C _{iss}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz		11000		PF
Output Capacitance		C _{oss}			914		PF
Reverse Transfer Capacitance		C _{rss}			695		PF
Switching Characteristics							
Turn-on Delay Time		t _{d(on)}	V _{DD} =30V,I _D =2A,R _L =15Ω V _{GS} =10V,R _G =2.5Ω		23		nS
Turn-on Rise Time		t _r			190		nS
Turn-Off Delay Time		t _{d(off)}			130		nS
Turn-Off Fall Time		t _f			120		nS
Total Gate Charge		Q _g	ID=30A,VDD=30V,VGS=10V	-	250		nC
Gate-Source Charge		Q _{gs}		-	48		nC
Gate-Drain Charge		Q _{gd}		-	98		nC
Drain-Source Diode Characteristics							
Diode Forward Voltage		V _{SD}	V _{GS} =0V,I _S =40A			1.2	V
Reverse Recovery Time		t _{rr}	TJ = 25℃, IF = 40A		63		nS
Reverse Recovery Charge		Q _{rr}	di/dt = 100A/μs(Note2)		98		nC
Forward Turn-On Time		t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

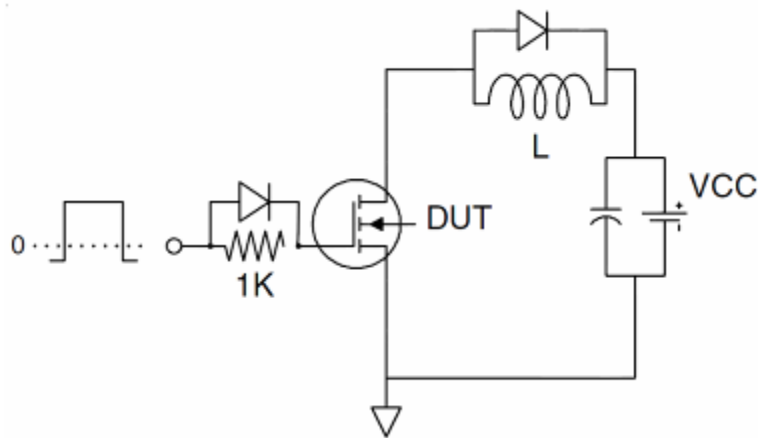
1. Surface Mounted on FR4 Board, $t \leq 10$ sec.
2. Pulse Test: Pulse Width $\leq 400\mu s$, Duty Cycle $\leq 2\%$.
3. EAS condition: $T_J=25^{\circ}C, V_{DD}=37.5V, V_G=10V, L=2mH, R_G=25\Omega, I_{AS}=37A$

Test circuit

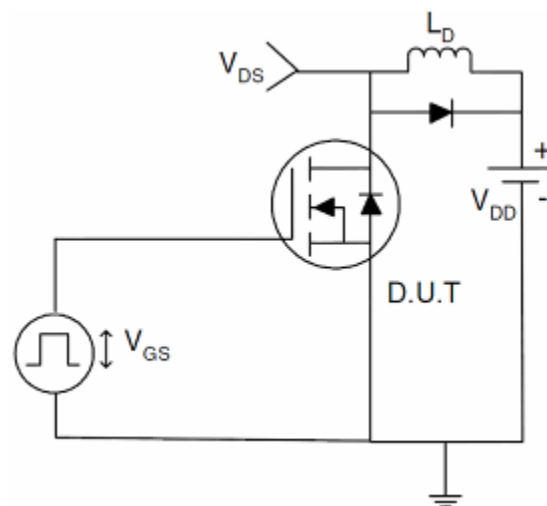
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

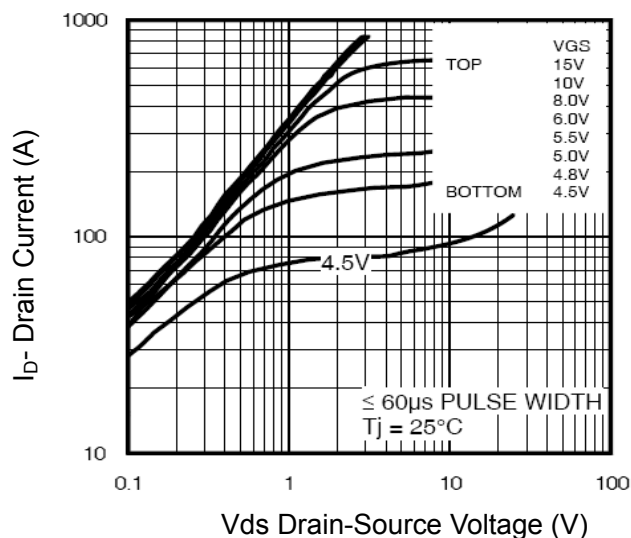


Figure 1 Output Characteristics

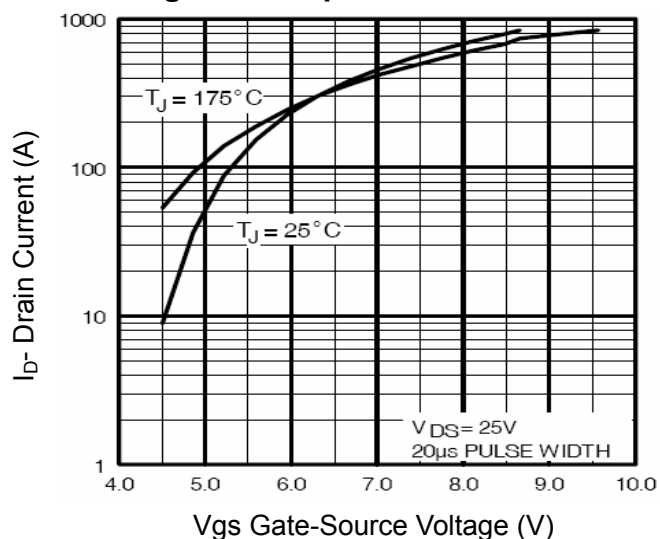


Figure 2 Transfer Characteristics

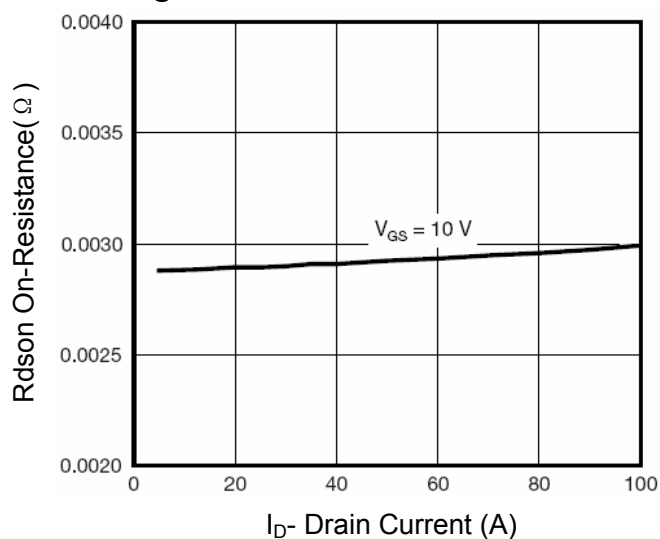


Figure 3 $R_{DS(on)}$ - Drain Current

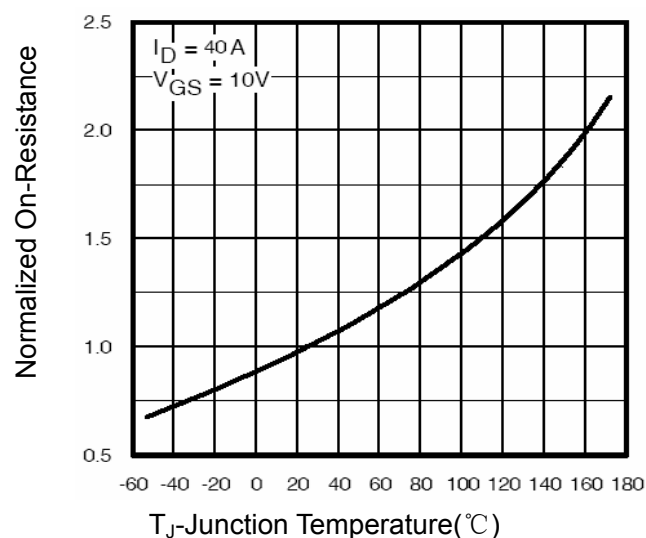


Figure 4 $R_{DS(on)}$ -Junction Temperature

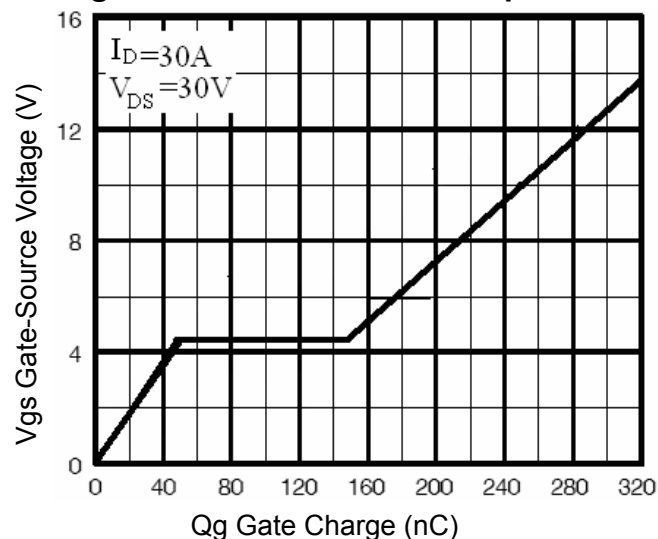


Figure 5 Gate Charge

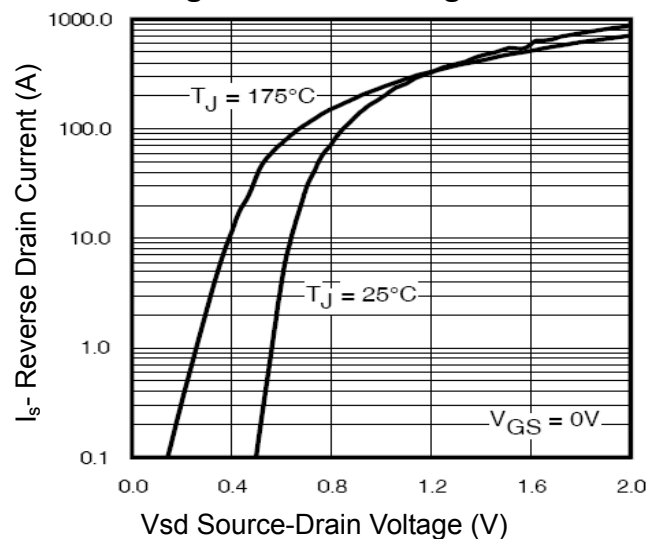


Figure 6 Source- Drain Diode Forward

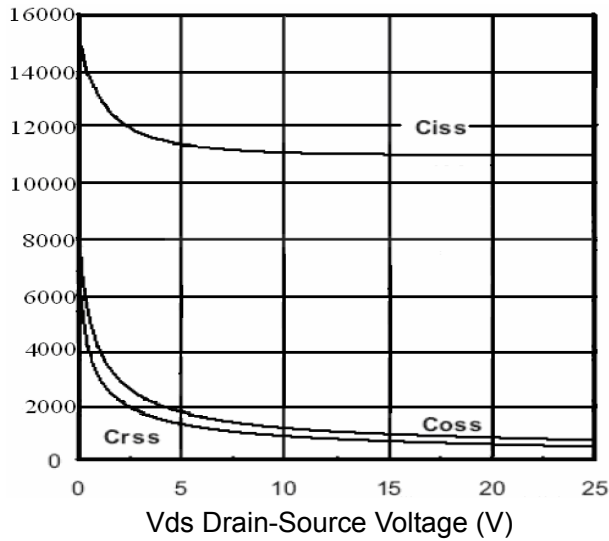


Figure 7 Capacitance vs Vds

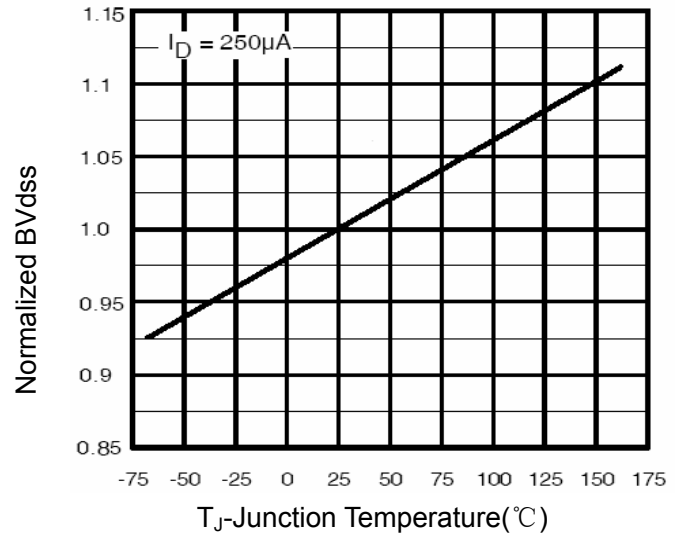


Figure 9 BV_{DSS} vs Junction Temperature

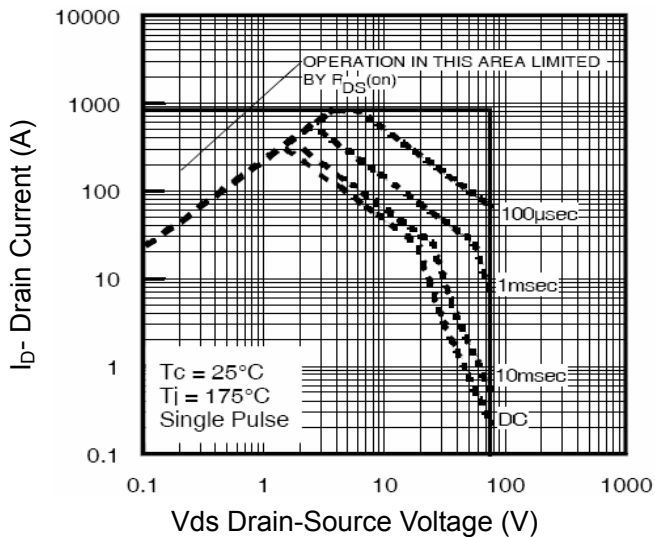


Figure 8 Safe Operation Area

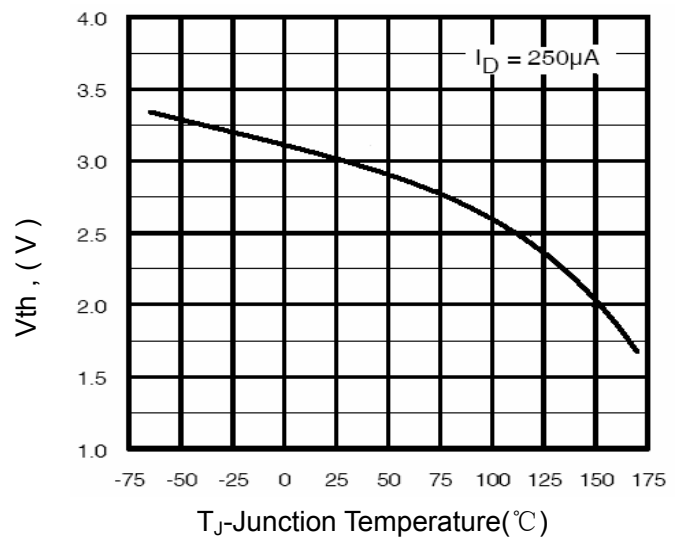


Figure 10 $V_{GS(th)}$ vs Junction Temperature

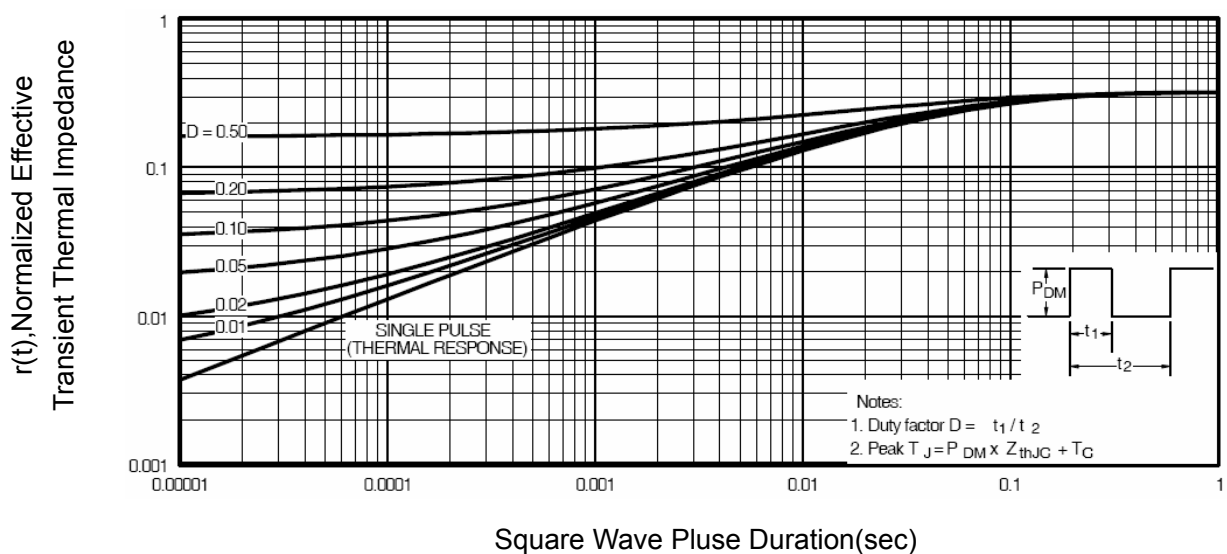
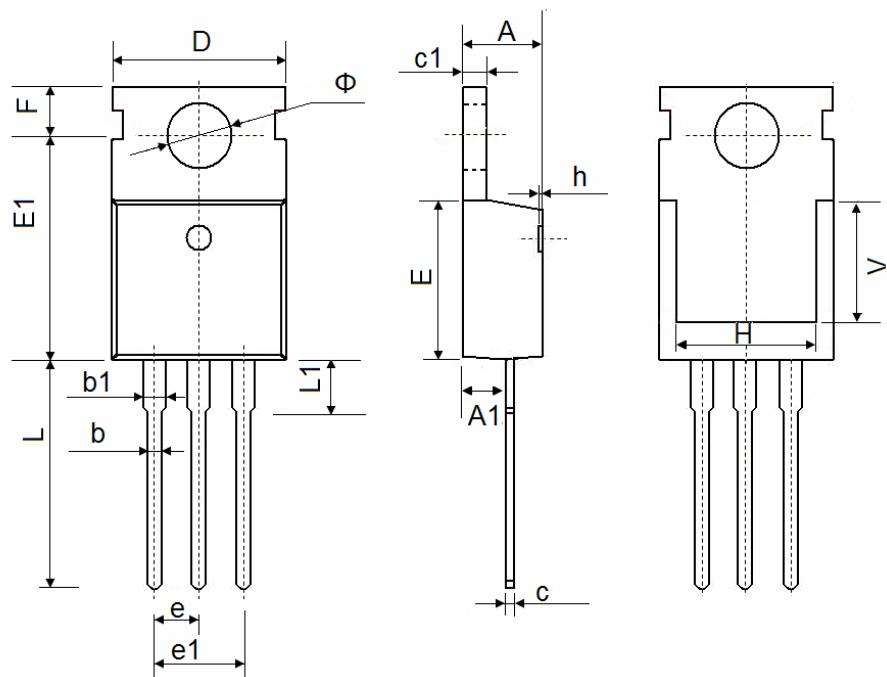


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150