AI020C135TD

IGBT Discrete

Product Summary

$V_{(BR)CES}$	$V_{CE(SAT)TYP}$	I_C(100℃)
1350V	1.8V@15V	20A

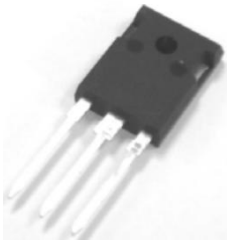
Feature

- Internal integrated rectifier diode
- High breakdown voltage

Application

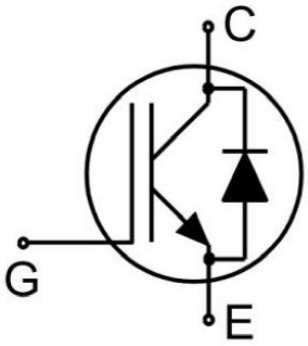
- Induction cooking

Package

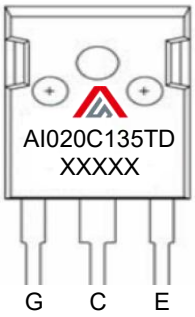


TO-247AB

Circuit diagram



Marking



Absolute maximum ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	1350	V
Continuous Gate- Emitter Voltage	V_{GE}	±20	V
Collector Current	I_C	40	A
Collector Current (T_C =100℃)	I_C(100℃)	20	A
Pulsed Collector Current	I_{CM}	60	A
Power Dissipation	P_D	250	W
Thermal Resistance, Junction to case for Diode	$R_{\theta JC}$	0.5	℃/ W
Thermal Resistance, Junction to case for IGBT	$R_{\theta JC}$	0.5	℃/ W
Operating junction temperature range	T_J	-55 ~ +150	℃
Storage Temperature Range	T_{STG}	-55 ~ +150	℃

Electrical characteristics of the IGBT (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	V_{GE} =0V, I_C =1mA	1350			V
Collector-Emitter Leakage Current	I_{CES}	V_{GE} =0V, V_{CE} =1200V			500	μA
Gate to Emitter Leakage Current	I_{GES}	V_{GE} =±20V, V_{CE} =0V			±400	nA
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE} =V_{CE}, I_C =2mA	3.5	6	7.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE} =20V, I_C =15A		1.8	2.2	V
		V_{GE} =20V, I_C =15A, T_J =125℃		2.2		
Dynamic characteristics						
Input Capacitance	C_{ies}	V_{CE} =30V, V_{GE} =0V, f =1MHz		1500		pF
Output capacitance	C_{oes}			55		
Reverse Transfer Capacitance	C_{res}			43		
Total Gate Charge	Q_g	V_{CC} =600V, V_{GE} =15V, I_C =20A		125		nC
Gate-Emitter Charge	Q_{ge}			16		
Gate-Collector Charge	Q_{gc}			80		
Turn-on delay time	$t_{d(on)}$	V_{CC} =600V, V_{GE} =15V, I_C =20A R_G =10Ω Inductive load		20		ns
Turn-on rise time	t_r			50		
Turn-off delay time	$t_{d(off)}$			140		
Turn-off fall time	t_f			260		
Turn-On Energy	E_{on}			1.8		mJ
Turn-Off Energy	E_{off}			1		
Total Switching Energy	E_{ts}			2.8		

Electrical characteristics of the Diode (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	I_F =20A		1.95	2.3	V
		I_F =20A, T_J =125℃		2.2		
Reverse Recovery Time	T_{rr}	I_F =20A, di/dt =-200A/μs		360		nS
Reverse Recovery Charge	Q_{rr}			3.5		μC

Typical Characteristics

Fig 1. Typical output characteristic

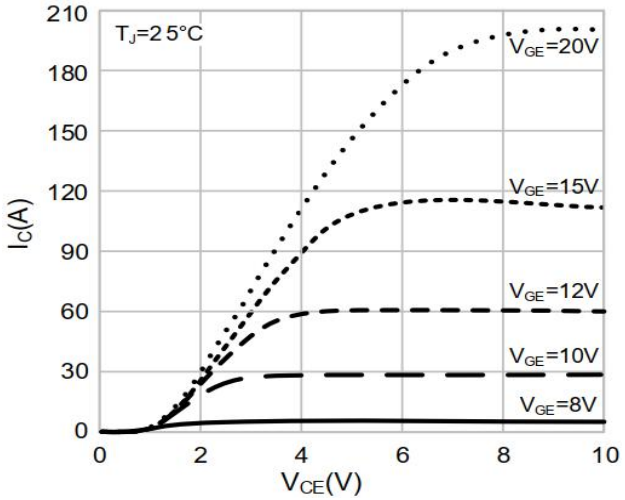


Fig 2. Typical output characteristic

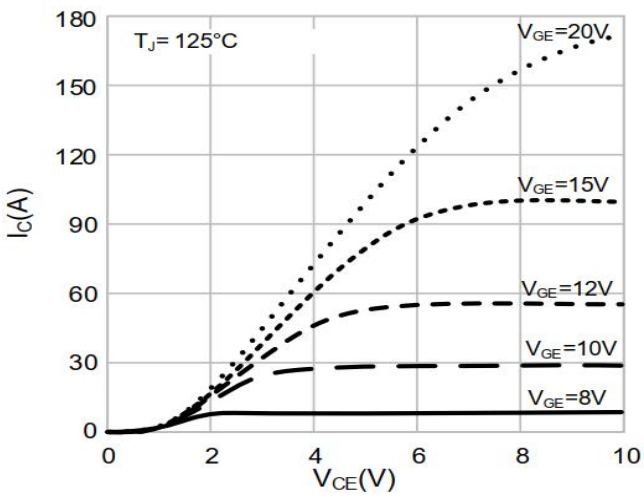


Figure 3. Typical V_{CEsat} Characteristics

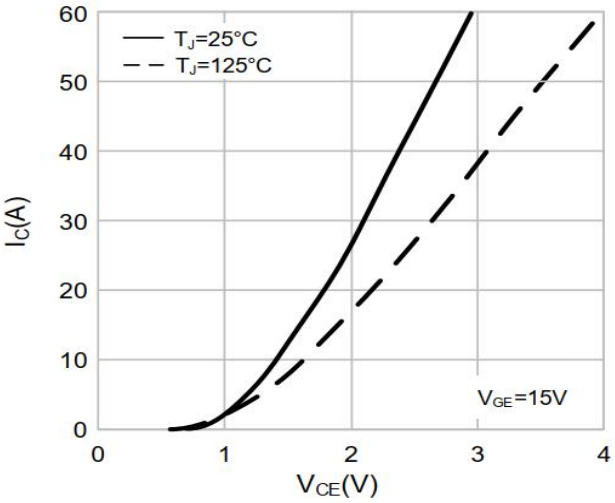


Figure 4. Transfer Characteristics

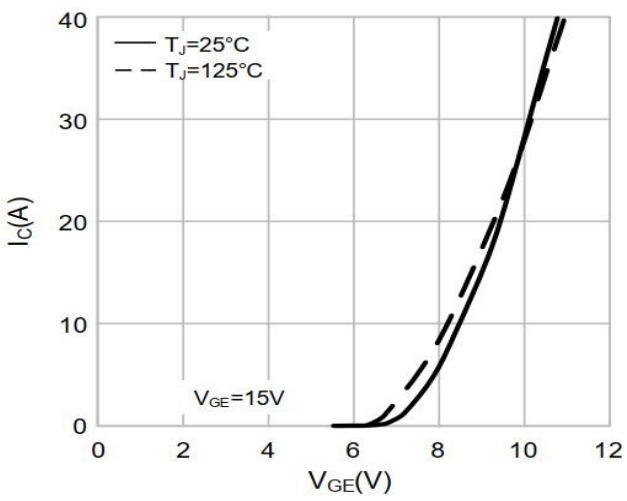


Figure 5. V_{CEsat} vs. V_{GE}

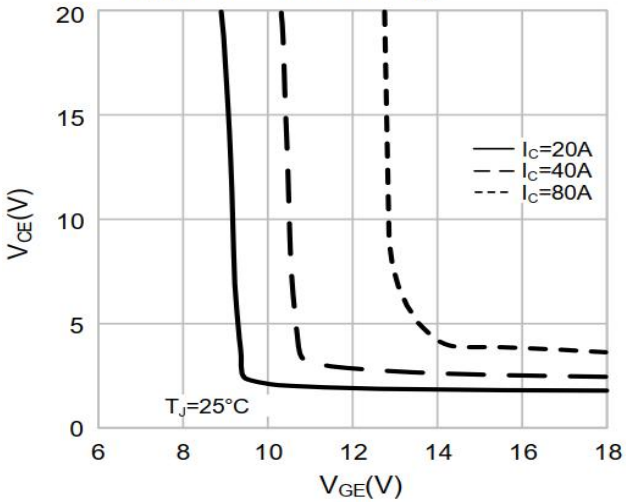
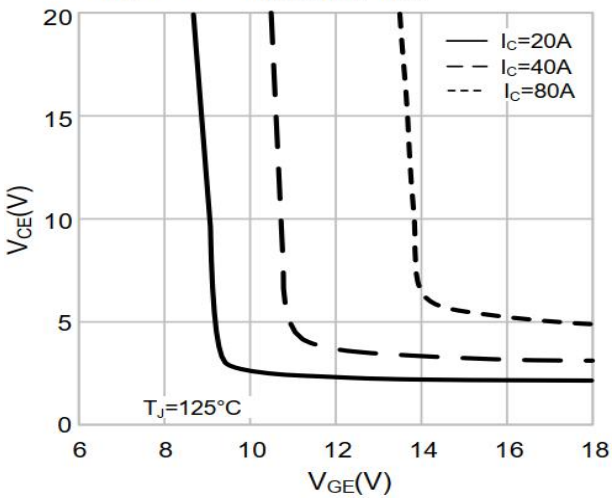


Figure 6. V_{CEsat} vs. V_{GE}



Typical Characteristics

Figure 7. Capacitance Characteristics

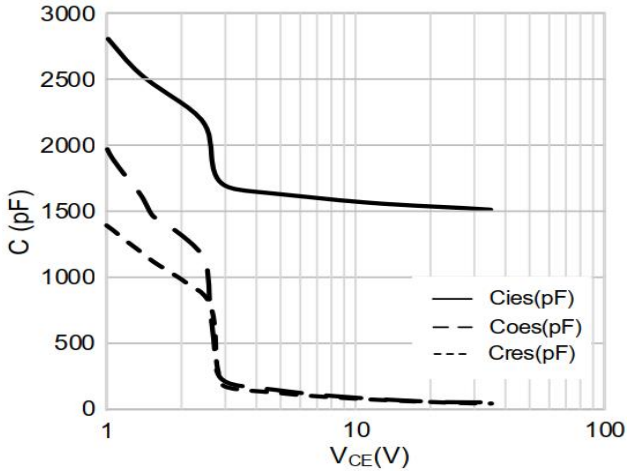


Figure 8. Gate Charge

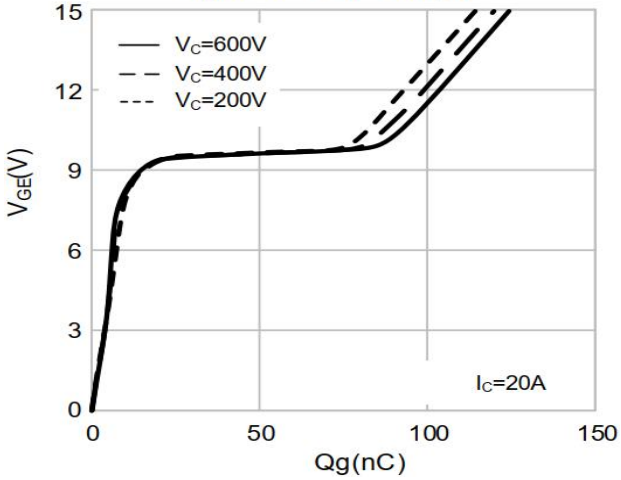


Figure 9. Switching times as a fuction of gate resistance

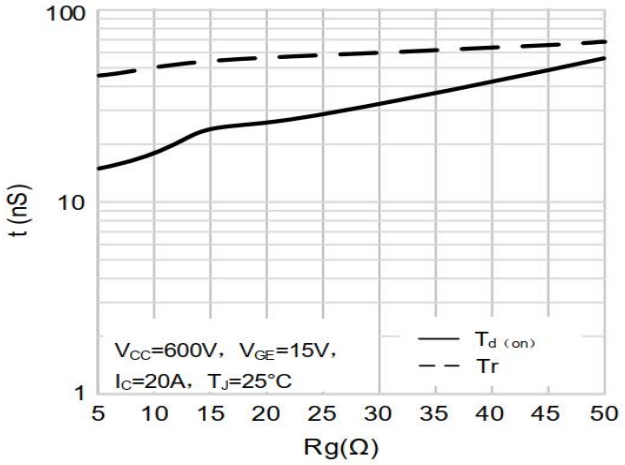


Figure 10.Switching times as a fuction of gate resistance

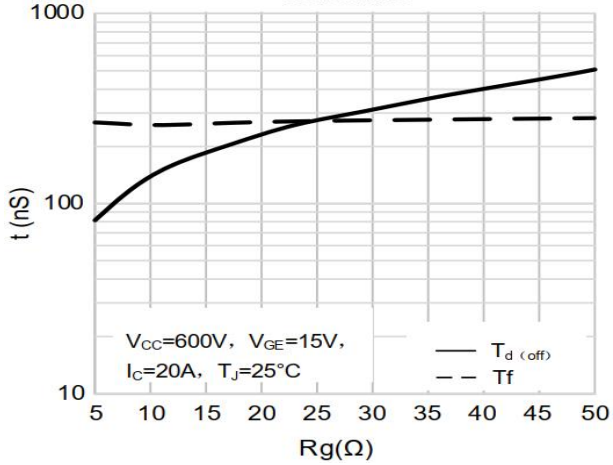


Figure 11.Switching energy losses as a fuction of gate resistance

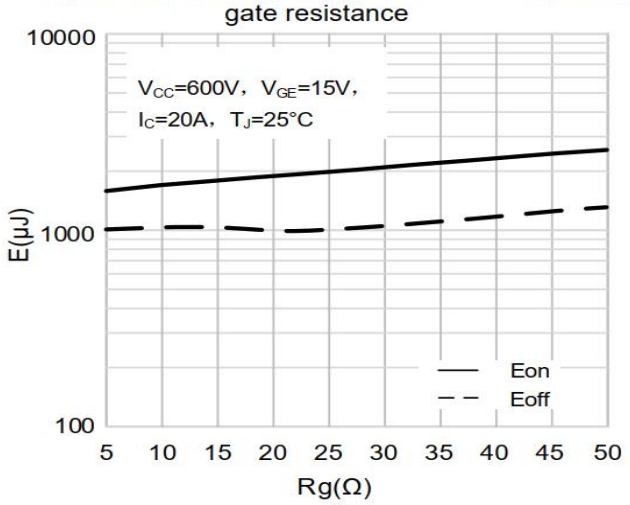
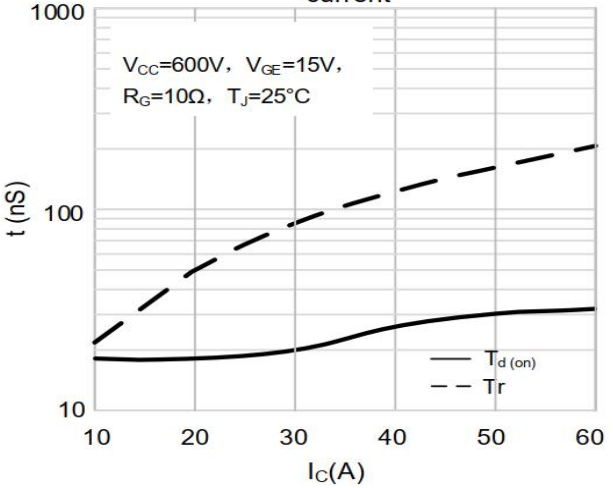


Figure 12.Switching times as a fuction of collect current



Typical Characteristics

Figure 13.Switching times as a function of collect current

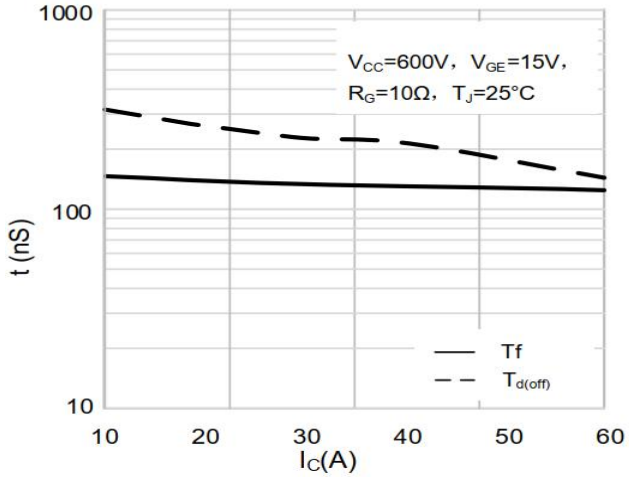


Figure 14.Switching energy losses as a function of collect current

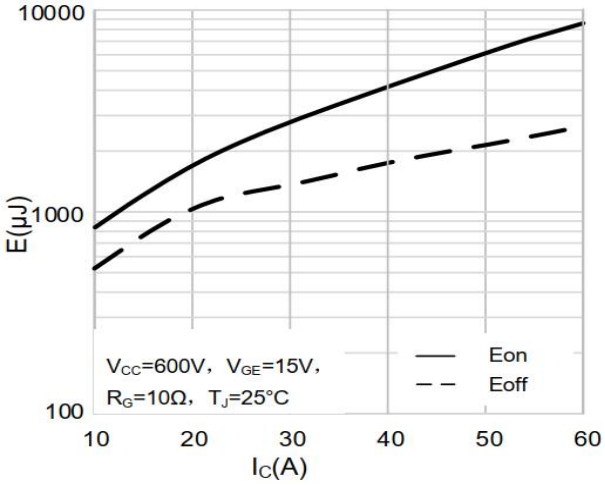


Figure 15.Forward characteristics

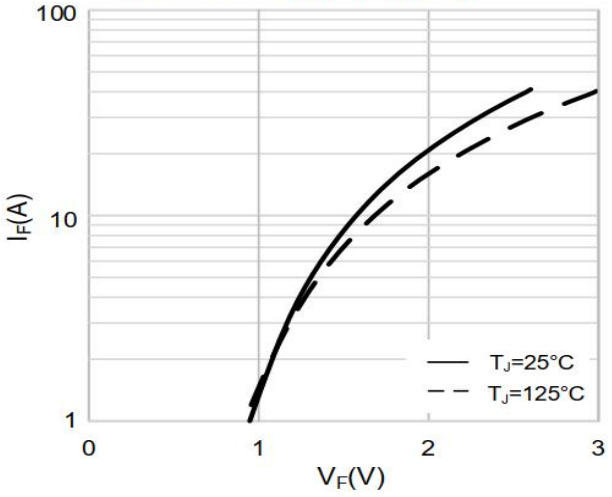


Figure 16. Trr vs. I_F

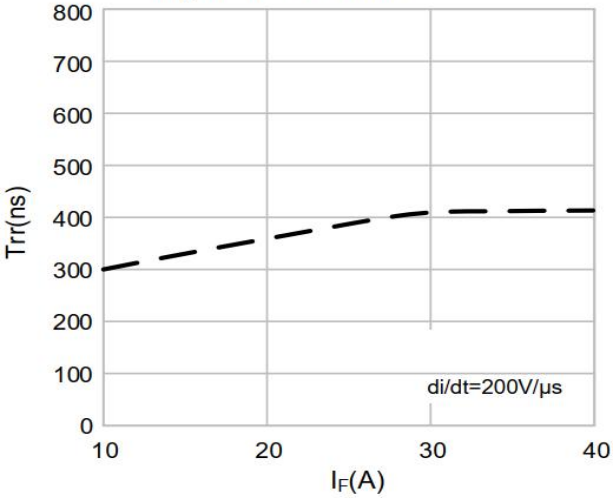


Figure 17. *Qrr* vs. I_F

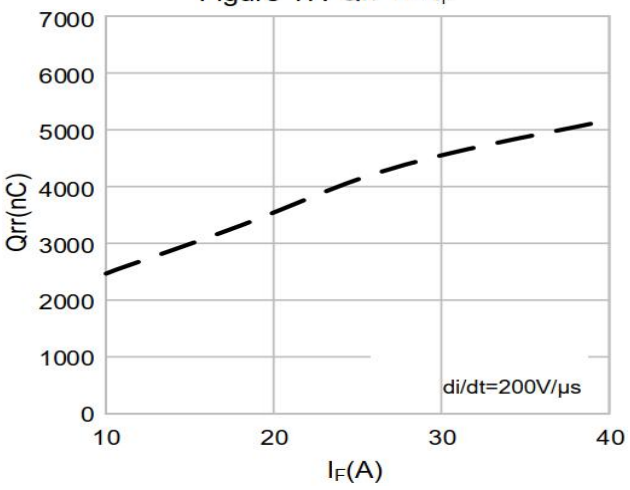
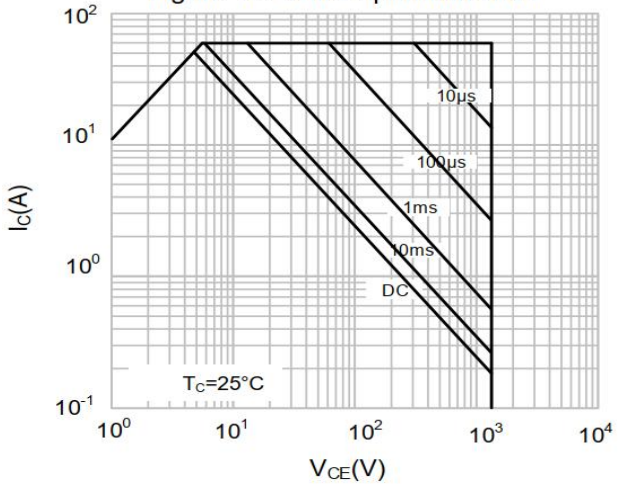
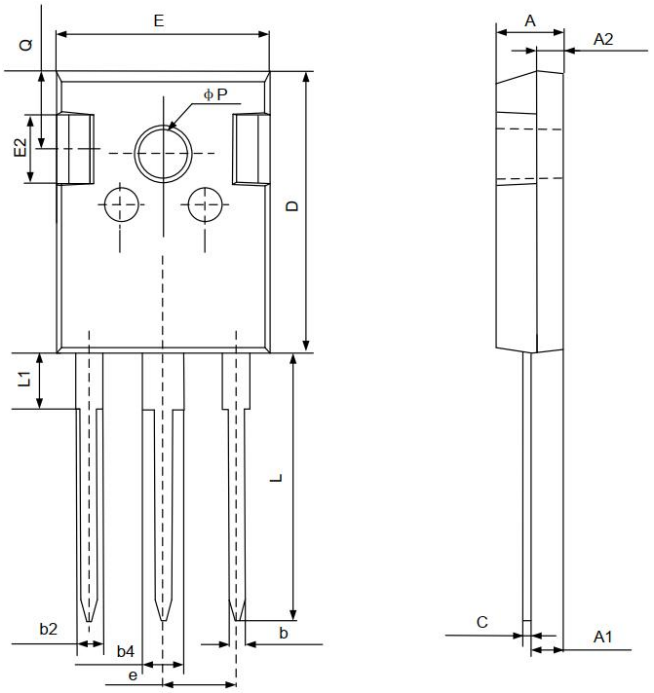


Figure 18. Safe Operation Area



TO-247AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.200	0.189	0.205
A1	2.210	2.590	0.087	0.102
A2	1.850	2.150	0.073	0.085
b	1.110	1.360	0.044	0.054
b2	1.910	2.250	0.075	0.089
b4	2.910	3.250	0.115	0.128
c	0.510	0.750	0.020	0.030
D	20.800	21.300	0.819	0.839
E	15.500	16.100	0.610	0.634
E2	4.400	5.200	0.173	0.205
e	5.440 BSC.		0.214 BSC.	
L	19.720	20.22	0.776	0.796
L1	0.000	4.300	0.000	0.169
Q	5.600	6.000	0.220	0.236
P	3.400	3.800	0.134	0.105