AT10400K

100V N-Channel MOSFET

Features

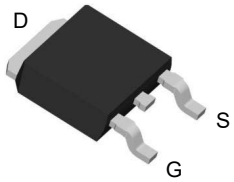
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Product Summary

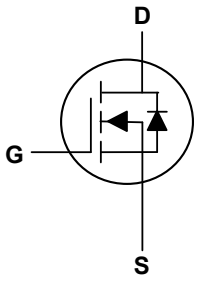
V_{DS}	100	V
I_D	40	A
$R_{DS(ON)}$ (at V_{GS}=10V)	20	mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	26	mΩ

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- LED TV Back Light



TO-252 Top View



Absolute Maximum Ratings(T_C=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current[1]	I_D@T_C=25℃	40	A
Pulsed Drain Current[2]	I_{DM}	120	A
Single Pulse Avalanche Energy[3]	EAS	30	mJ
Total Power Dissipation[4]	P_D@T_C=25℃	72	W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient[1]	$R_{\theta JA}$	---	62	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	1.74	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	100	---	---	V
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=10V , I_D=8A	---	16	20	mΩ
		V_{GS}=4.5V , I_D=6A	---	---	26	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.0	---	2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=100V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=100V , V_{GS}=0V , T_J=55℃	---	---	5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Total Gate Charge	Q_g	V_{DS}=50V , V_{GS}=10V , I_D=8A	---	19.8	---	nC
Gate-Source Charge	Q_{gs}		---	2.4	---	
Gate-Drain Charge	Q_{gd}		---	5.3	---	
Gate Plateau Voltage	$V_{plateau}$		---	3.2	---	V
Turn-On Delay Time	$T_{d(on)}$	V_{DS}=50V , V_{GS}=10V , R_G=2.2Ω, I_D=10A	---	17.8	---	ns
Rise Time	T_r		---	3.9	---	
Turn-Off Delay Time	$T_{d(off)}$		---	33.5	---	
Fall Time	T_f		---	3.2	---	
Input Capacitance	C_{iss}	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	1190.6	---	pF
Output Capacitance	C_{oss}		---	194.6	---	
Reverse Transfer Capacitance	C_{rss}		---	4.1	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1]	I_S	V_{GS}<V_{th}	---	---	40	A
Pulsed Source Current	I_{SM}		---	---	120	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=8A , T_J=25℃	---	---	1.3	V
Reverse Recovery Time	t_{rr}	I_S=8A ,di/dt=100A/μs, T_J=25℃	---	50.2	---	nS
Reverse Recovery Charge	Q_{rr}		---	95.1	---	nC
Peak Reverse Recovery Current	I_{rrm}		---	2.5	---	A

Note:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=50V,V_{GS}=10V,L=0.3mH,R_G=25Ω

4.The power dissipation is limited by 150℃ junction temperature

Typical Characteristics

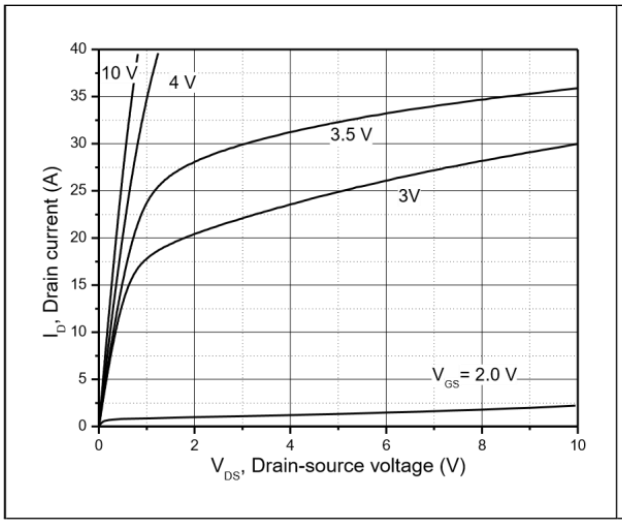


Figure 1, Typ. output characteristics

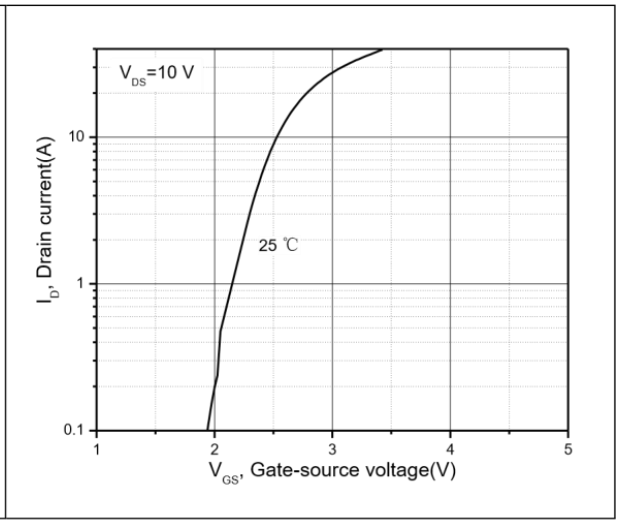


Figure 2, Typ. transfer characteristics

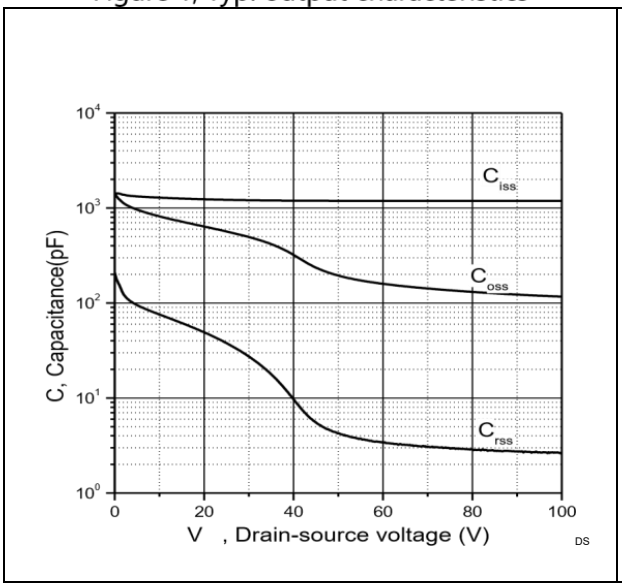


Figure 3, Typ. capacitances

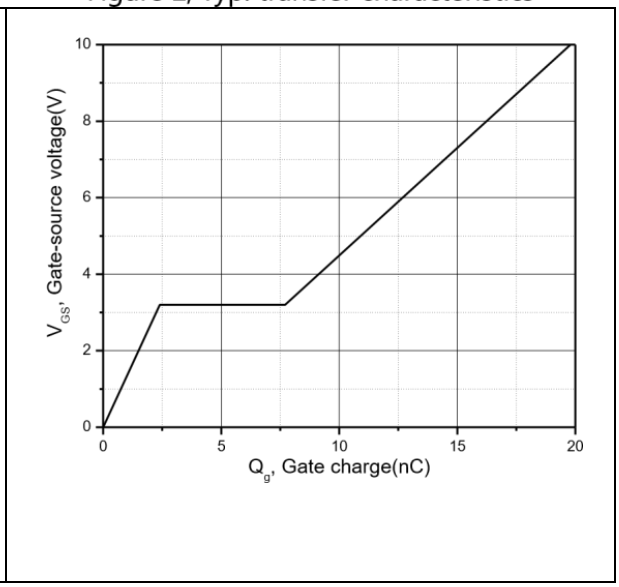


Figure 4, Typ. gate charge

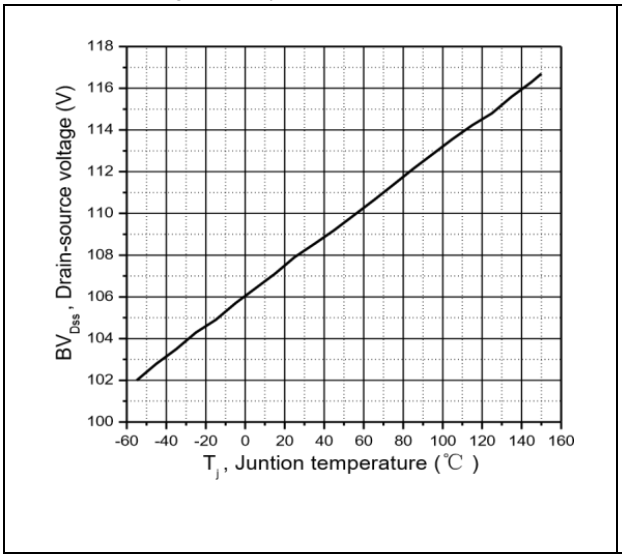


Figure 5, Drain-source breakdown voltage

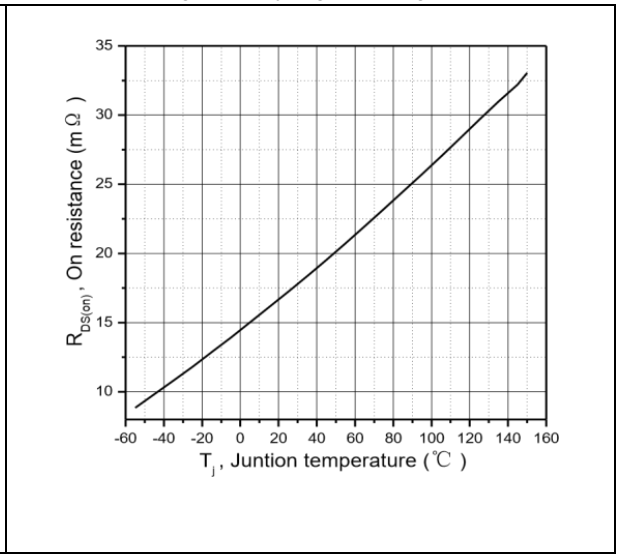


Figure 6, Drain-source on-state resistance

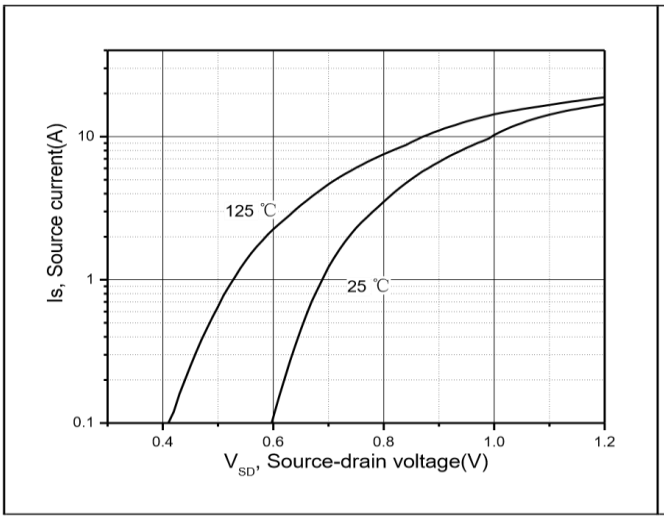


Figure 7, Forward characteristic of body diode

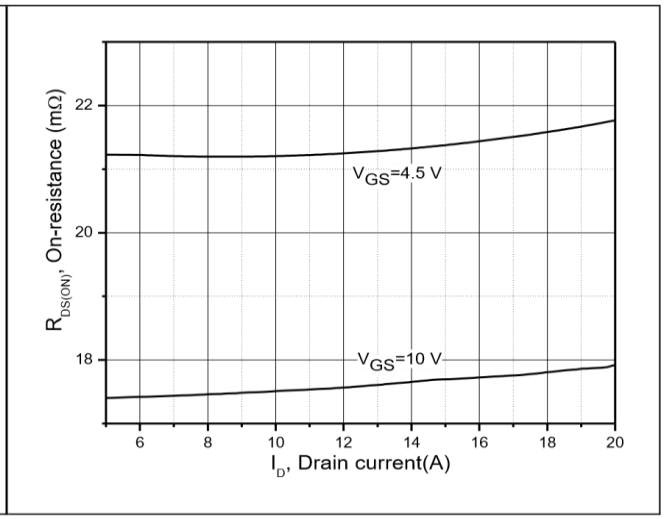


Figure 8, Drain-source on-state resistance

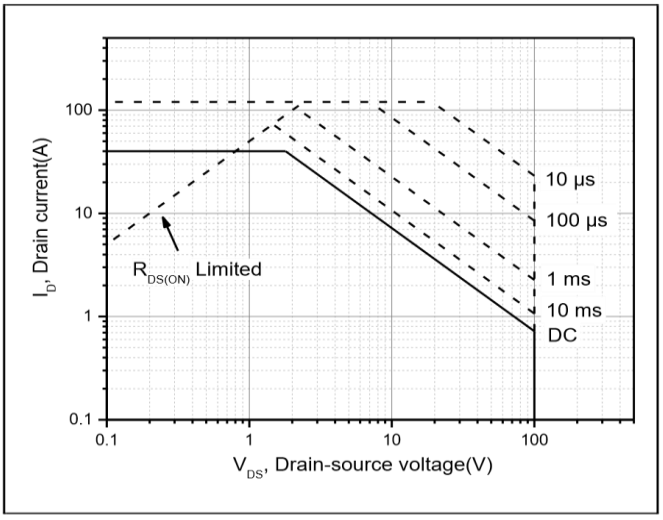


Figure 9, Safe operation area T_C=25 ℃

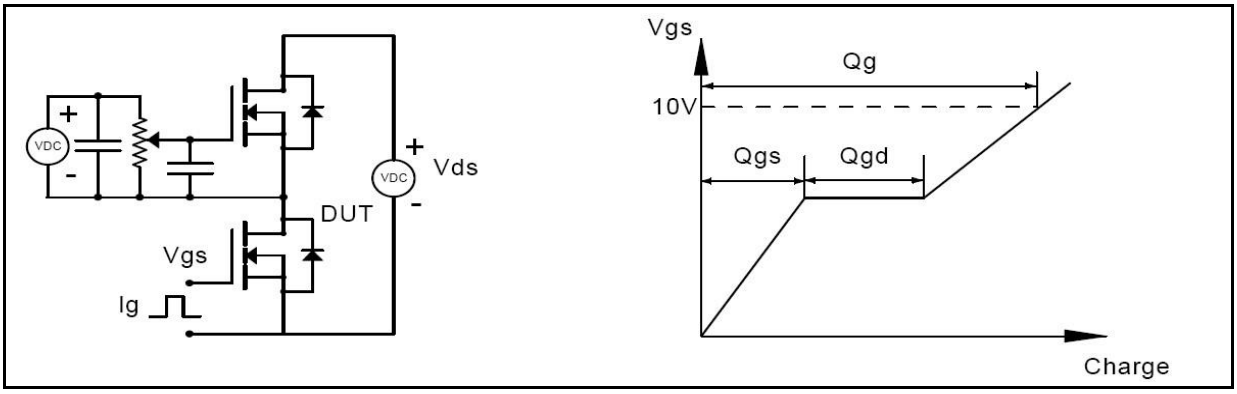


Figure 1, Gate charge test circuit & waveform

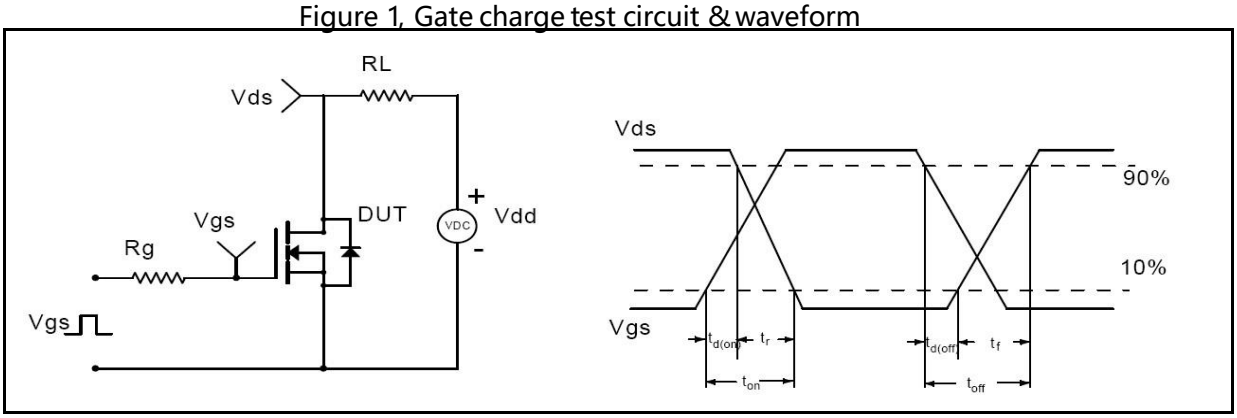


Figure 2, Switching time test circuit & waveforms

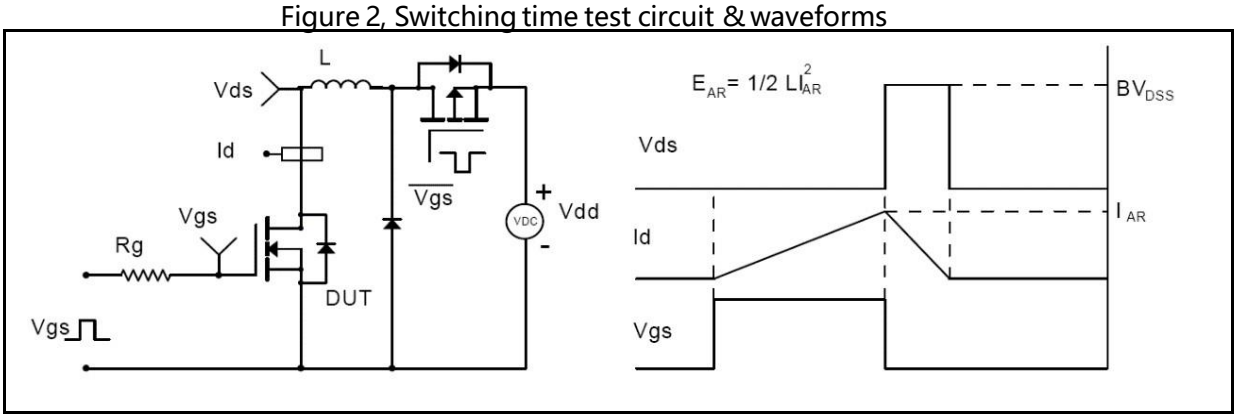


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

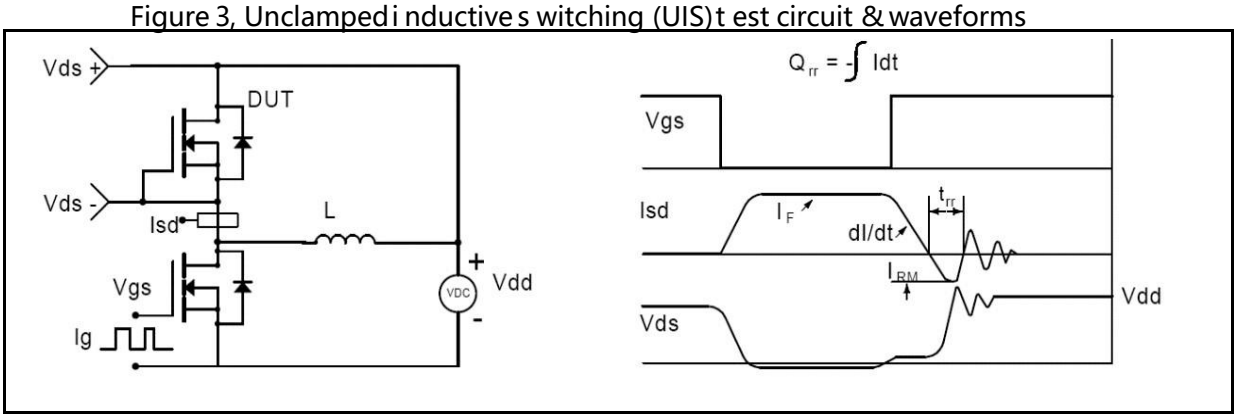
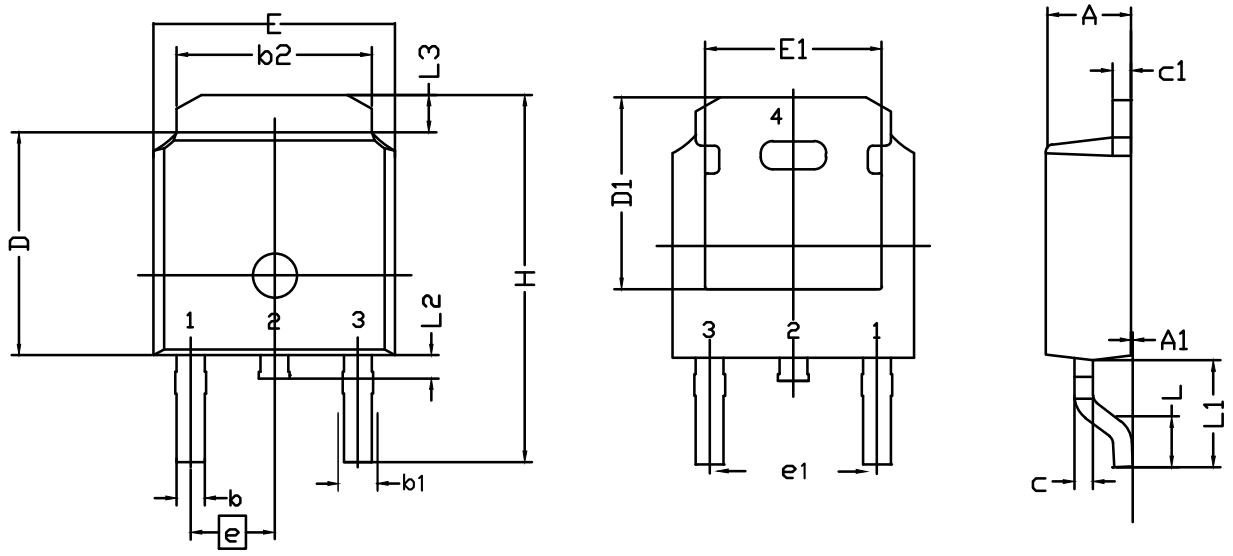


Figure 4, Diode reverse recovery test circuit & waveforms

TO-252 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	2.30	2.38	E	6.40	6.60	6.731
A_1	0.00	0.10	0.20	E_1	4.40	--	--
b	0.64	0.76	0.89	e	2.286 BSC		
b_1	0.77	0.85	1.14	e_1	4.572 BSC		
b_2	5.00	5.33	5.46	H	9.40	10.00	10.40
c	0.458	0.508	0.610	L	1.40	1.52	1.77
C_1	0.458	0.508	0.620	L_1	--	2.743	--
D	5.98	6.10	6.223	L_2	0.60	0.80	1.01
D_1	5.20	5.25	5.38	L_3	0.90	1.06	1.25