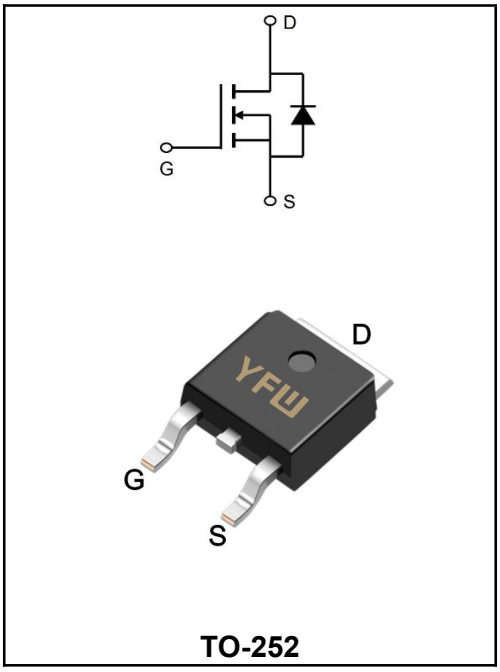
200V N-CHANNEL TRENCH POWER MOSFET

MAIN CHARACTERISTICS

I_D	24A
V_{DS}	200V
R_{DSON}-typ(@V_{GS}=10V)	＜80mΩ(Typ:64mΩ)



TO-252

FEATURES

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability
- **YFW-SGT technology**

APPLICATIONS

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±20	V
Continue Drain Current	I_D	24	A
Drain Current-Continuous(T_C=100℃)	I_D	17	A
Pulsed Drain Current	I_{DM}	100	A
Power Dissipation	P_D	150	W
Single Pulse Avalanche Energy(Note5)	E_{AS}	250	mJ
Operating Temperature Range	T_J	175	°C
Storage Temperature Range	T_{STG}	-55 to +175	°C
Thermal Resistance, Junction to Case(Note 2)	$R_{\theta JC}$	1	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	200	220	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=200V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.5	3.2	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=15A	-	64	80	mΩ
Forward Transconductance	g_{FS}	V_{DS}=50V,I_D=15A	30	-	-	S
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz		4180		pF
Output Capacitance	C_{oss}			162		
Reverse Transfer Capacitance	C_{rss}			73		
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=100V,I_D=15A V_{GS}=10V,R_{GEN}=2.5Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	18	-	
Turn-Off Delay Time	$t_{d(off)}$		-	22	-	
Turn-Off Fall Time	t_f		-	5	-	
Total Gate Charge	Q_g	V_{DS}=100V,I_D=15A, V_{GS}=10V		60		nC
Gate-Source Charge	Q_{gs}			19		
Gate-Drain Charge	Q_{gd}			17		
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=11A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S	-	-	-	24	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 15A di/dt = 100A/μs(Note3)	-	90	-	nS
Reverse Recovery Charge	Qrr		-	300	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2.Surface Mounted on FR4 Board, t ≤ 10 sec.

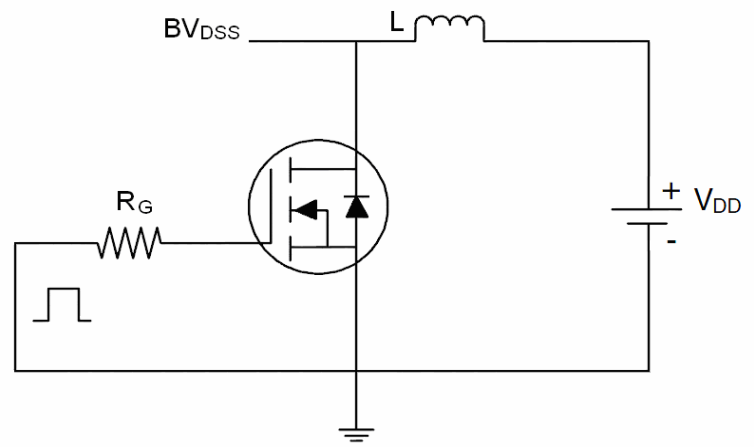
3.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

4.Guaranteed by design, not subject to production

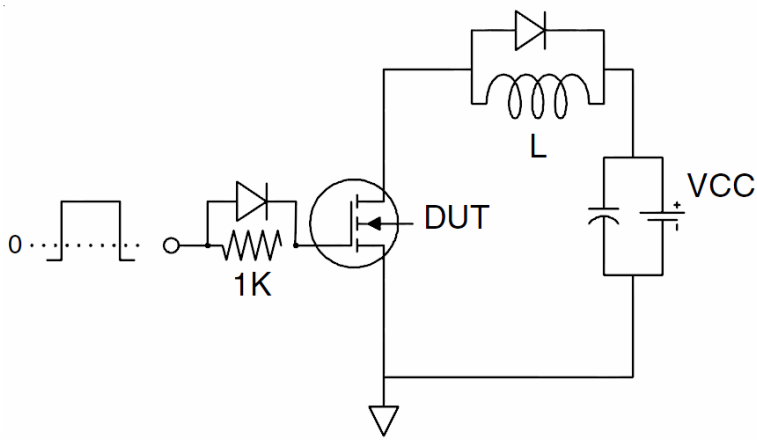
5.E_{AS} condition: Tj=25℃,V_{DD}=100V,V_G=10V,L=0.5mH,Rg=25Ω

Test Circuit

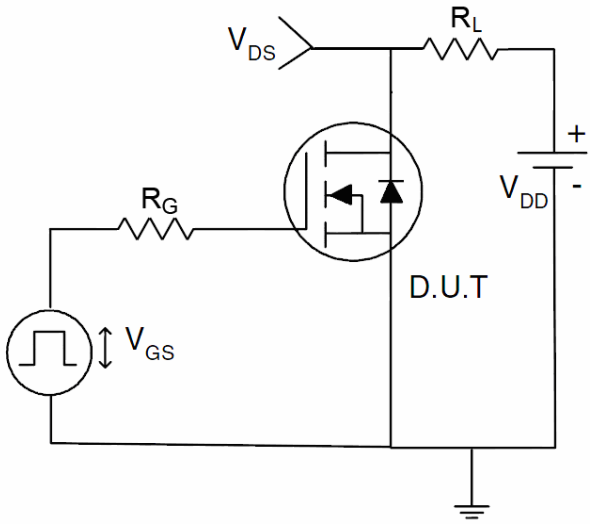
1) E_{AS} test Circuits



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

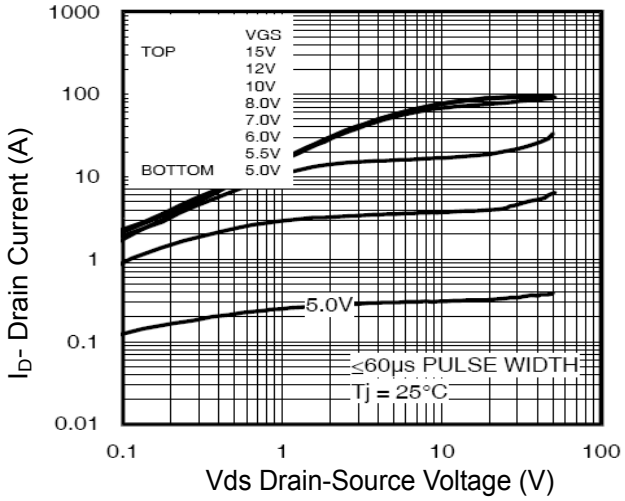


Figure 1 Output Characteristics

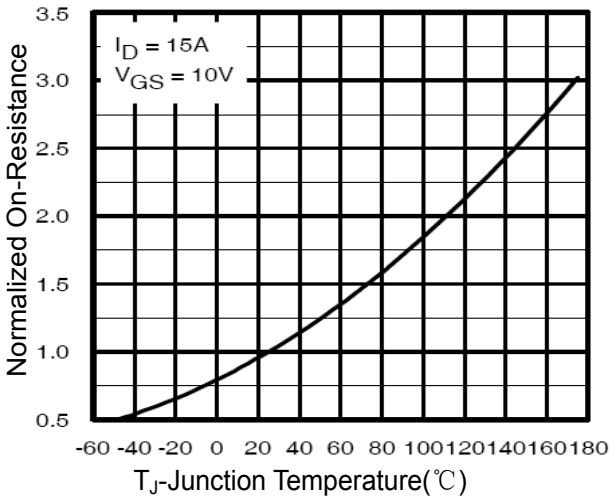


Figure 4 Rdson-JunctionTemperature

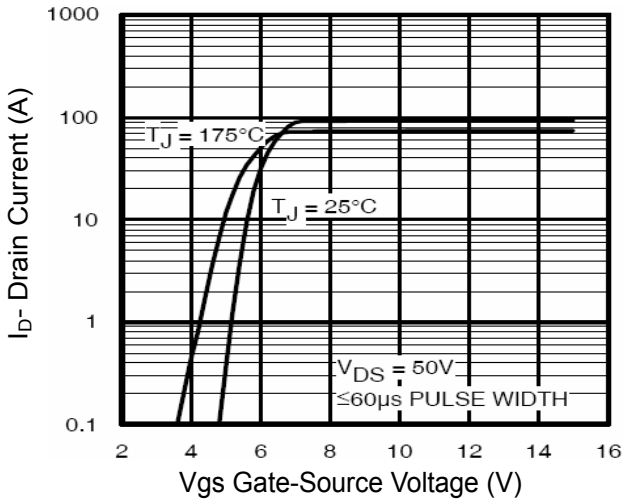


Figure 2 Transfer Characteristics

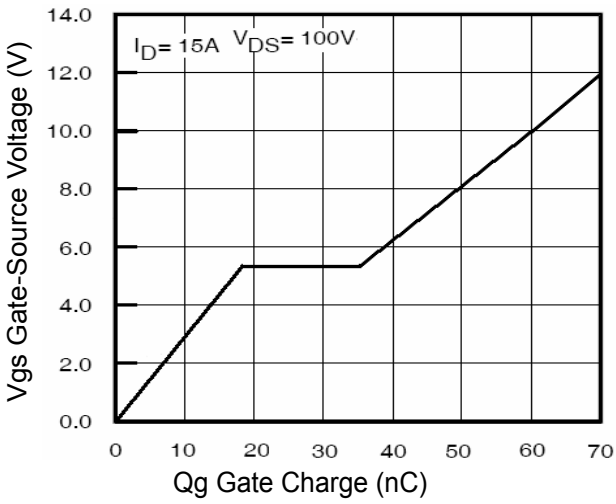


Figure 5 Gate Charge

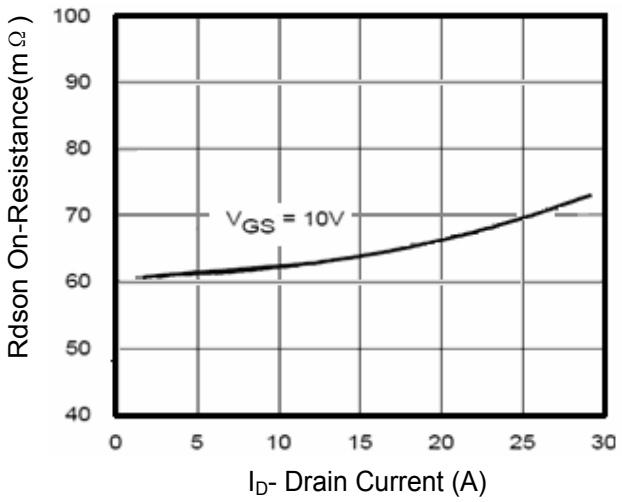


Figure 3 Rdson- Drain Current

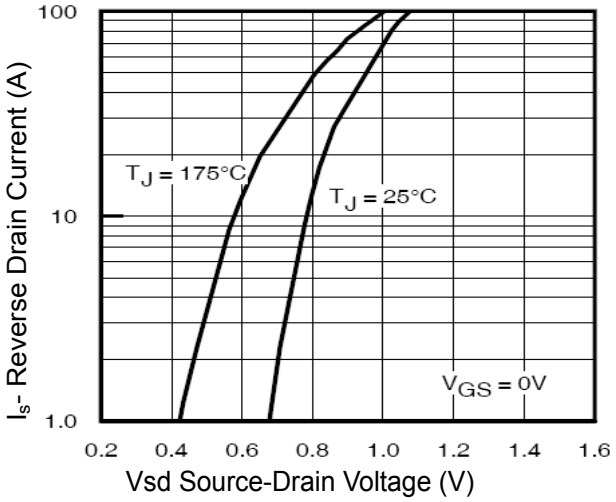


Figure 6 Source- Drain Diode Forward

Typical Electrical and Thermal Characteristics (Curves)

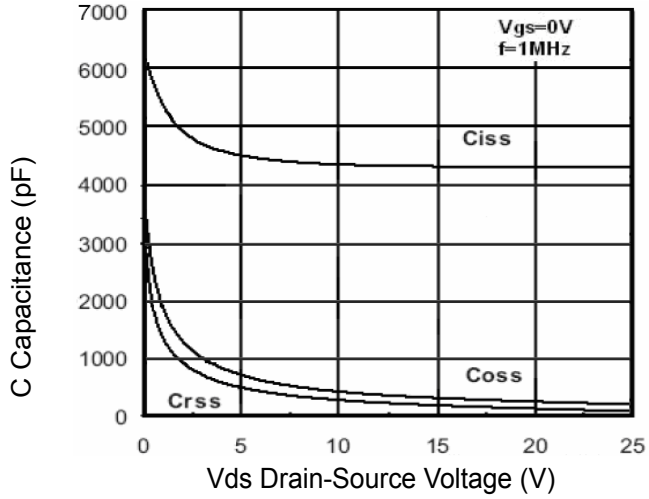


Figure 7 Capacitance vs Vds

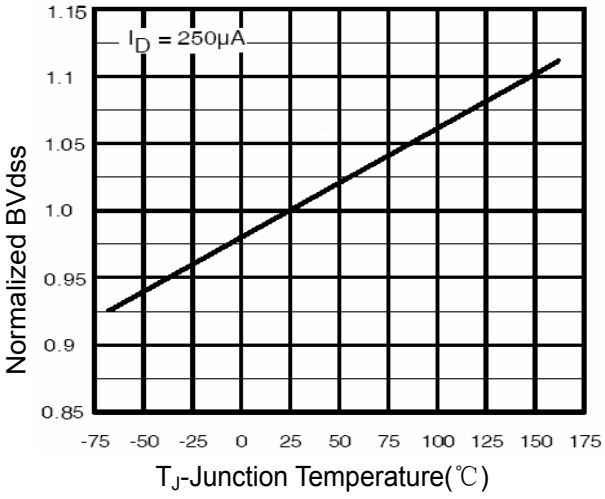


Figure 9 BV_{DSS} vs Junction Temperature

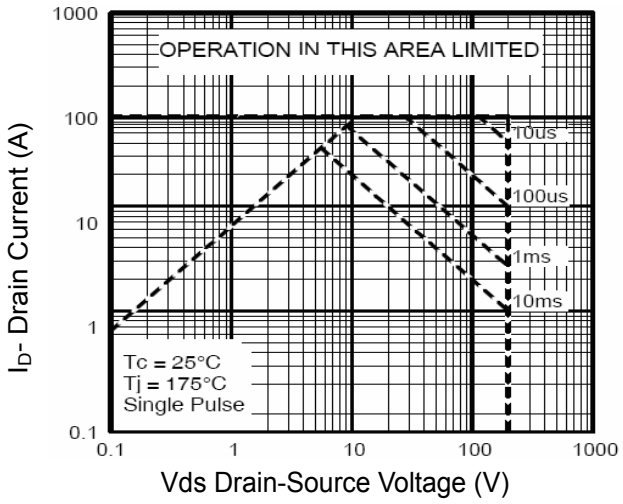


Figure 8 Safe Operation Area

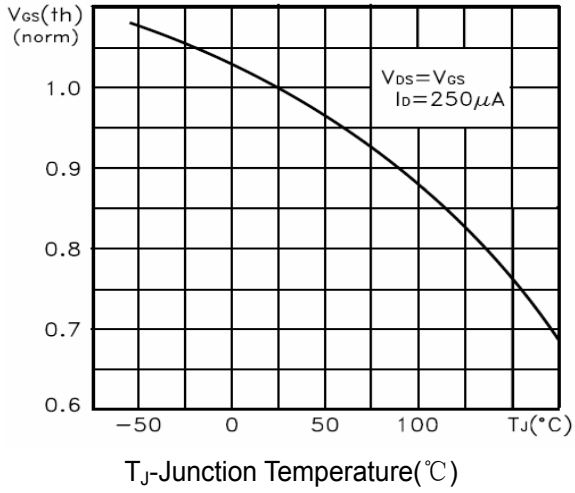


Figure 10 $V_{GS(th)}$ vs Junction Temperature

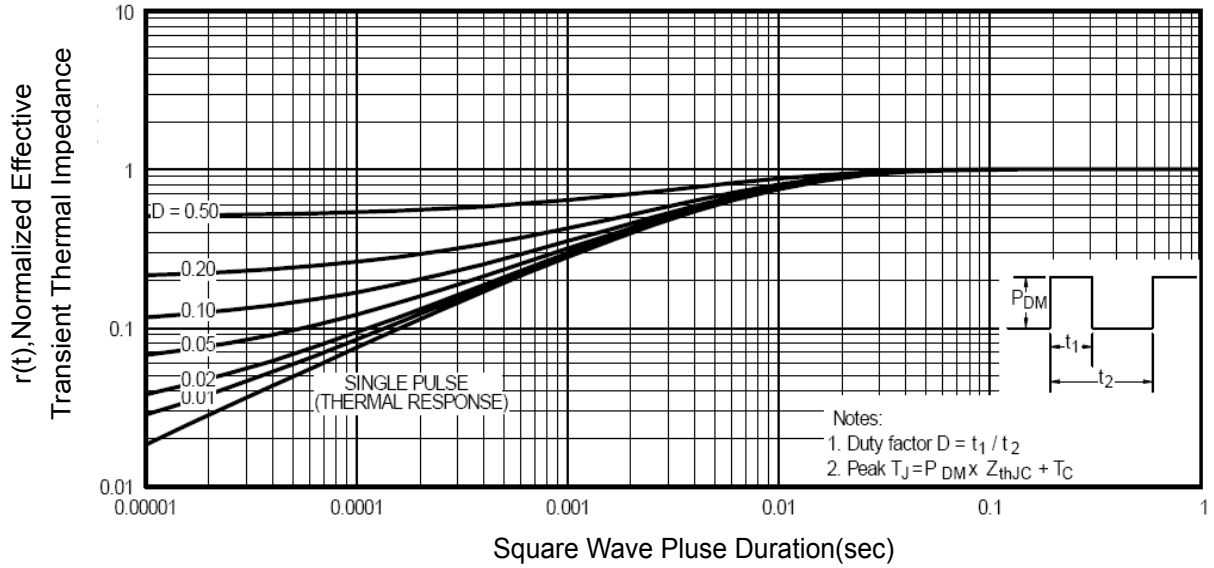
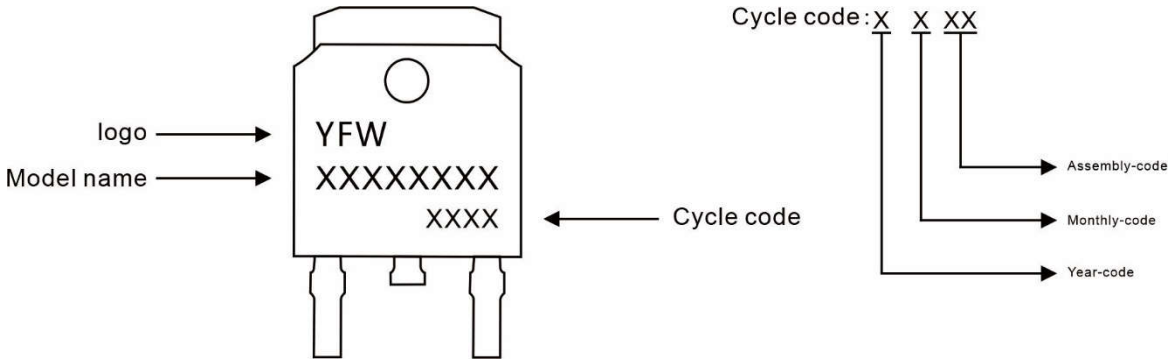


Figure 11 Normalized Maximum Transient Thermal Impedance

Marking Diagram

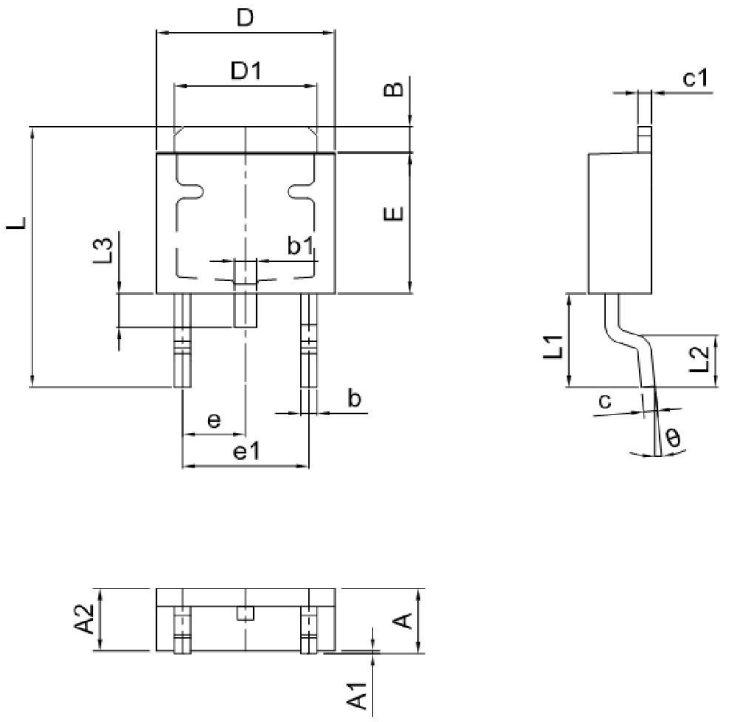


Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFWG24N20AD	TO-252	0.011oz(0.32g)	2500pcs/reel	5000pcs/box 25000pcs/Carton

Package Dimensions

TO-252



Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.50	0.087	0.098
A1	0.00	0.12	0.000	0.005
A2	2.20	2.40	0.087	0.094
B	1.20	1.60	0.047	0.063
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
c1	0.40	0.60	0.016	0.024
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.213
E	5.40	5.70	0.213	0.224
e	2.20	2.40	0.087	0.094
e1	4.40	4.80	0.173	0.189
L	10.00	11.00	0.393	0.433
L1	2.70	3.10	0.106	0.122
L2	1.40	1.80	0.055	0.071
L3	0.90	1.50	0.035	0.059

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