Lonten N-channel 30V, 30A, 9.8mΩ Power MOSFET

Description

These N-Channel enhancement mode power field effect transistors are using split gate trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- 30V,30A, $R_{DS(on),max}$ =9.8mΩ@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

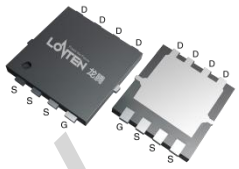
Applications

- Motor Drives
- UPS
- DC-DC Converter

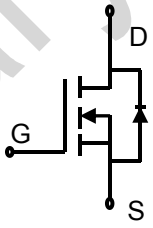
Product Summary

V_{DSS}	30V
$R_{DS(on),max}$@ V_{GS}=10V	9.8mΩ
I_D	30A

Pin Configuration



PRPAK3×3



N-Channel MOSFET

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	30	V
Continuous drain current (T_C = 25°C)	I_D	30	A
(T_C = 100°C)		21	A
Pulsed drain current[1)]	I_{DM}	90	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy[2)]	E_{AS}	7.2	mJ
Power Dissipation	P_D	18	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	6.9	°C/W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	85	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking
LSGNE03R098WB	PRPAK3X3	03R098

Electrical Characteristics

T_J = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=250uA	30	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.2	1.7	2.5	V
Drain-source leakage current	I_{DSS}	V_{DS}=30 V, V_{GS}=0V	---	---	1	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=20 V, V_{DS}=0 V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-20 V, V_{DS}=0 V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=12 A	---	7.5	9.8	mΩ
		V_{GS}=4.5 V, I_D=12 A	---	12.5	18.8	mΩ
Forward transconductance	g_{fs}	V_{DS} =5V , I_D=12A	---	46	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, F = 1MHz	---	563	---	pF
Output capacitance	C_{oss}		---	270	---	
Reverse transfer capacitance	C_{rss}		---	28	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 15V,V_{GS}=10V, I_D = 12A R_G=3.3Ω	---	5.1	---	ns
Rise time	t_r		---	3.8	---	
Turn-off delay time	$t_{d(off)}$		---	18.5	---	
Fall time	t_f		---	3.3	---	
Gate resistance	Rg	V_{GS}=0 V,V_{DS}=0 V, F=1MHz	---	3.1	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=15V, I_D=12A, V_{GS}= 10 V	---	2.5	---	nC
Gate to drain charge	Q_{gd}		---	1.5	---	
Gate charge total	Q_g		---	11	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	15	A
Pulsed Source Current[3)]	I_{SM}		---	---	45	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=12A, T_J=25℃	---	---	1.2	V

Notes:

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

2: V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=12A, Starting T_J=25℃.

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

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

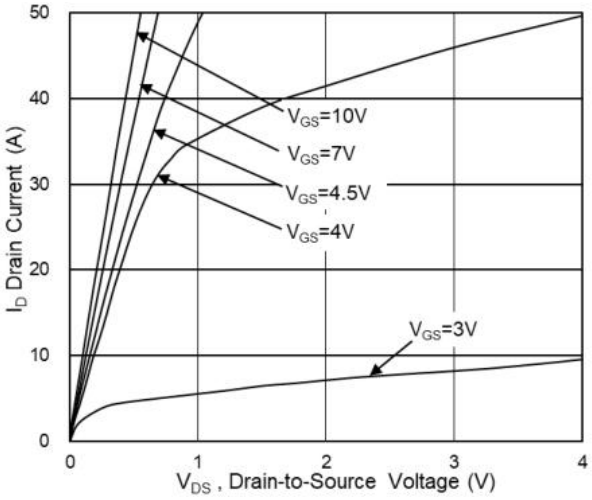


Figure 2. Transfer Characteristics

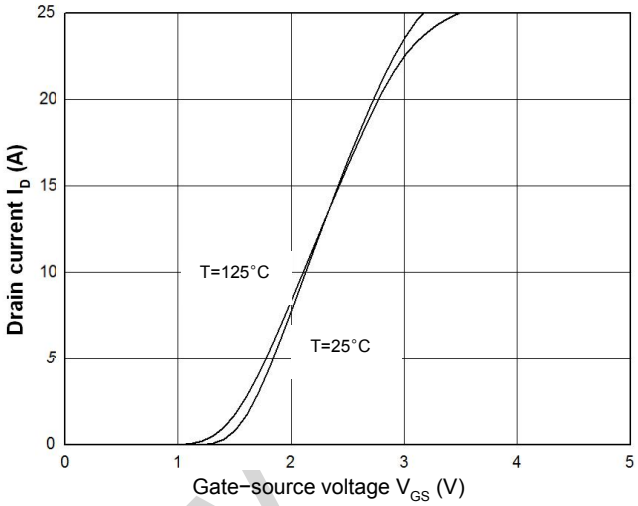


Figure 3. Capacitance Characteristics

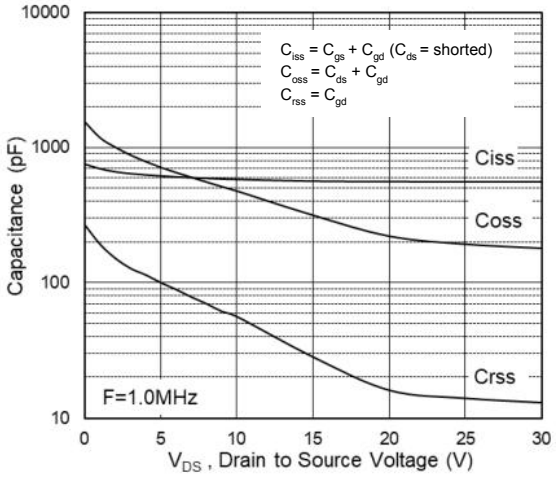


Figure 4. Gate Charge Waveform

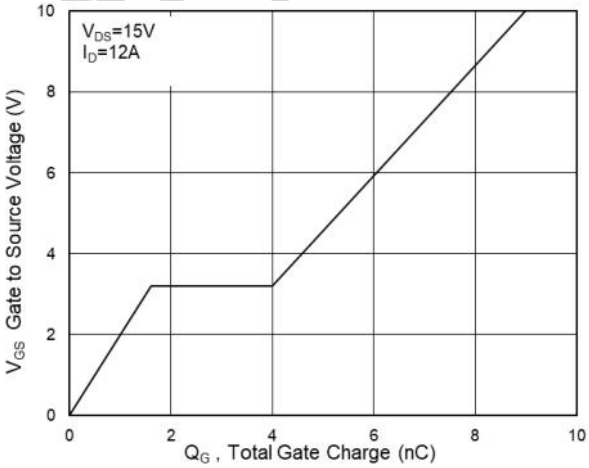


Figure 5. Body-Diode Characteristics

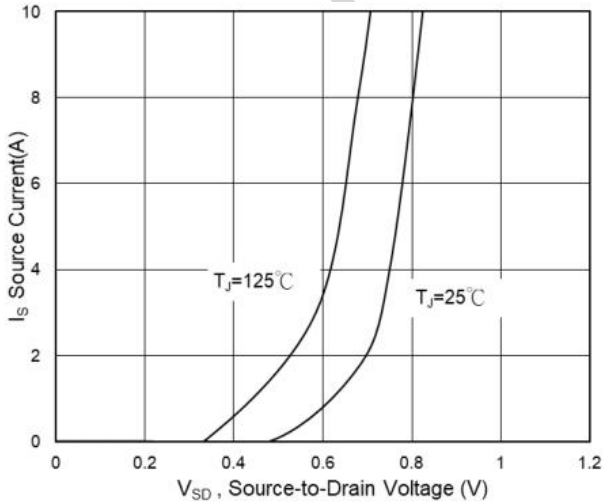


Figure 6. Rdson-Drain Current

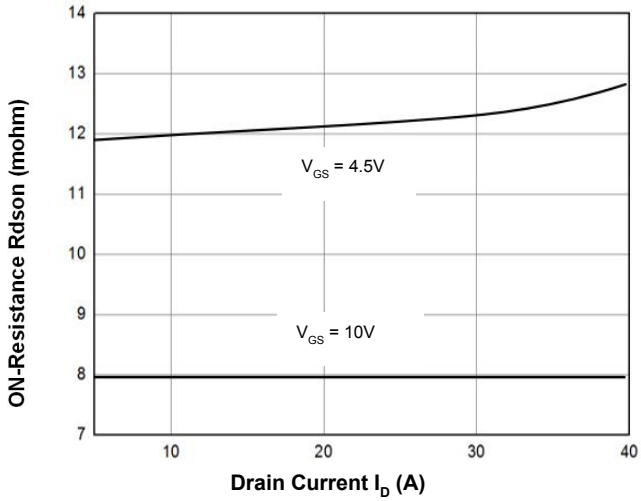


Figure 7. Rdson-Junction Temperature

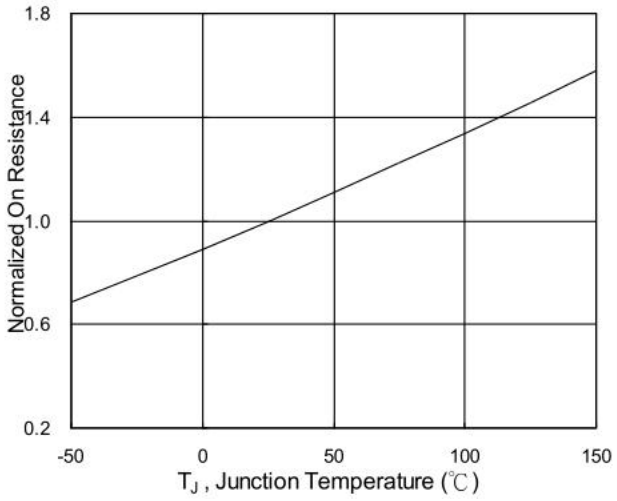


Figure 8. $V_{GS(th)}$-Junction Temperature

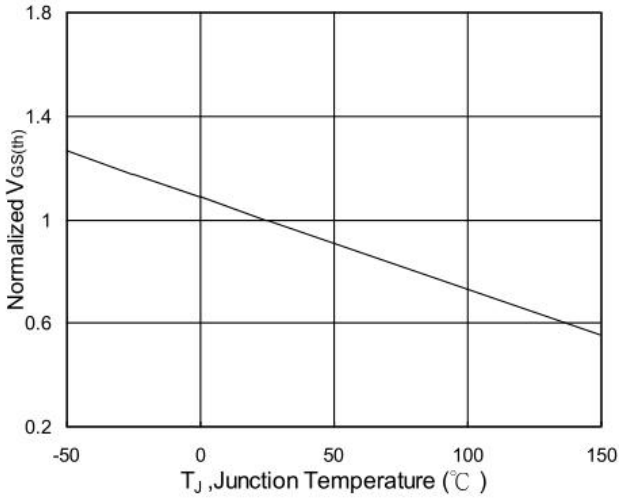


Figure 9. On-Resistance vs. Gate-to-Source voltage

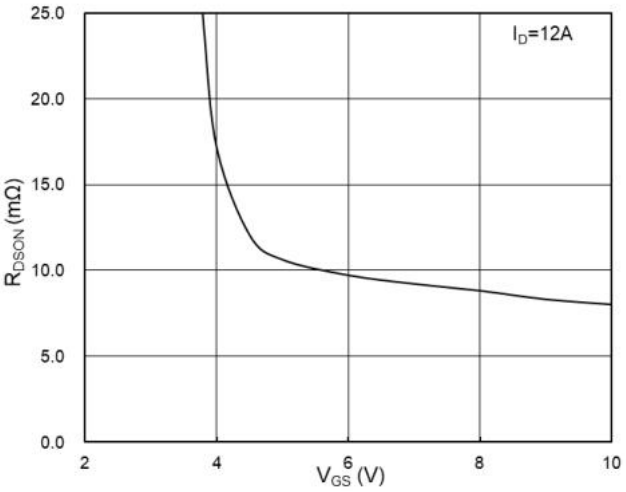


Figure 10: Safe Operating Area

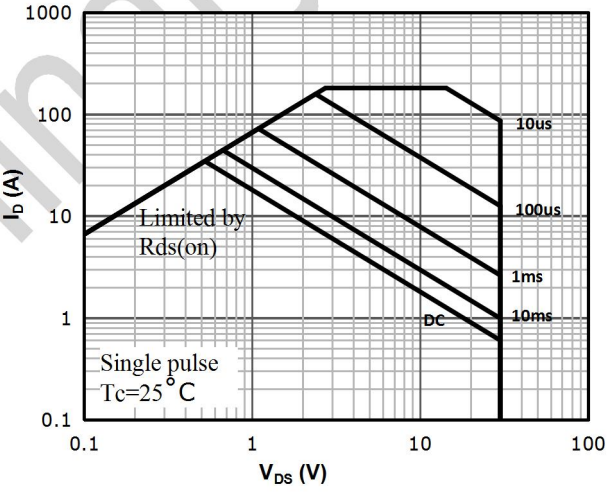
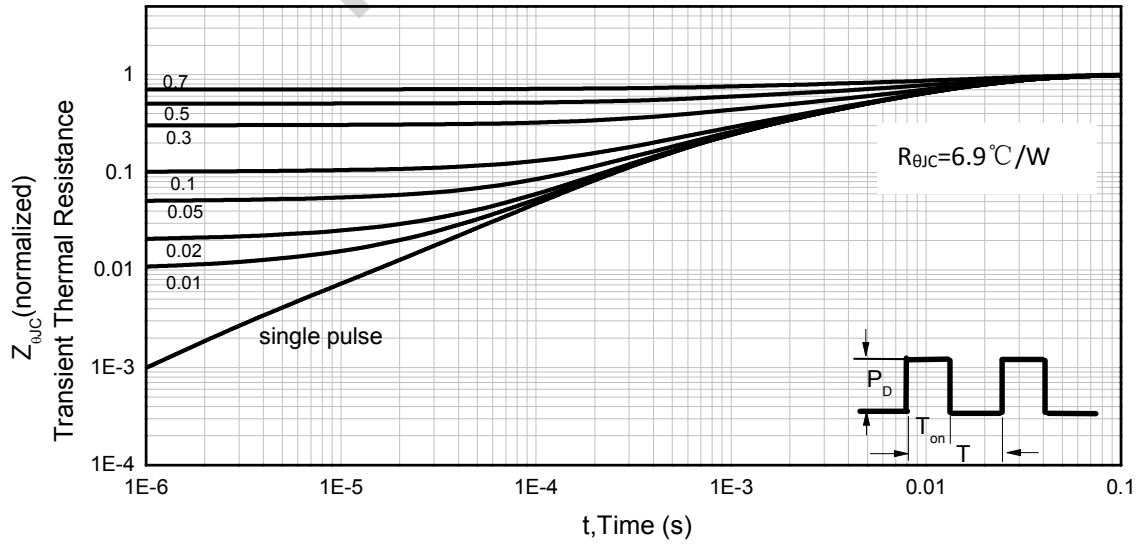
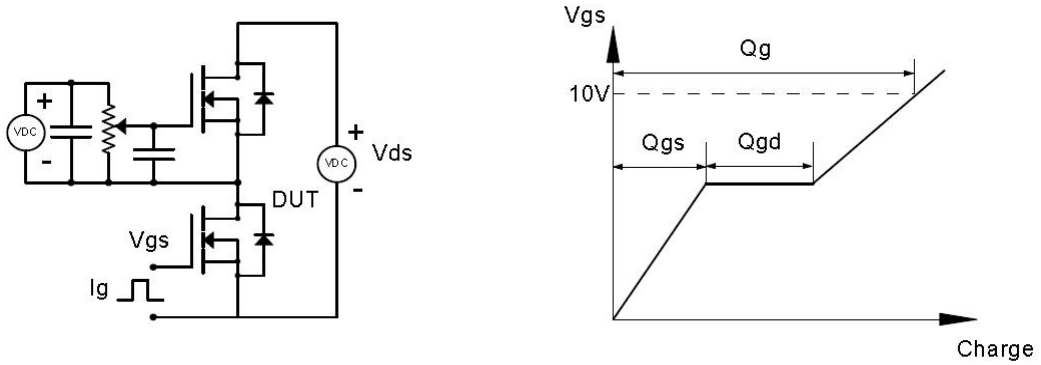


Figure 11. Normalized Maximum Transient Thermal Impedance (RthJC)

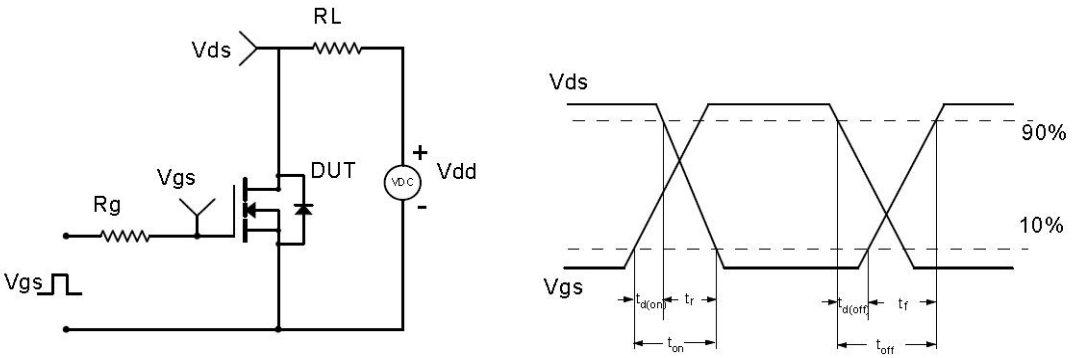


Test Circuit & Waveform

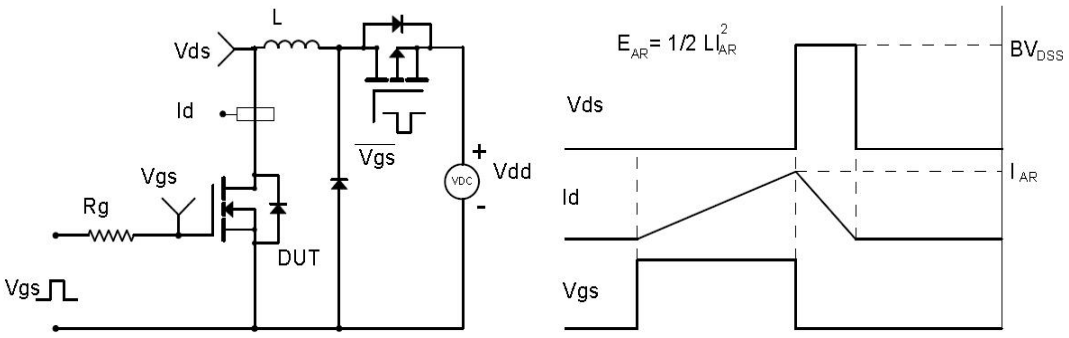
Gate Charge Test Circuit & Waveform



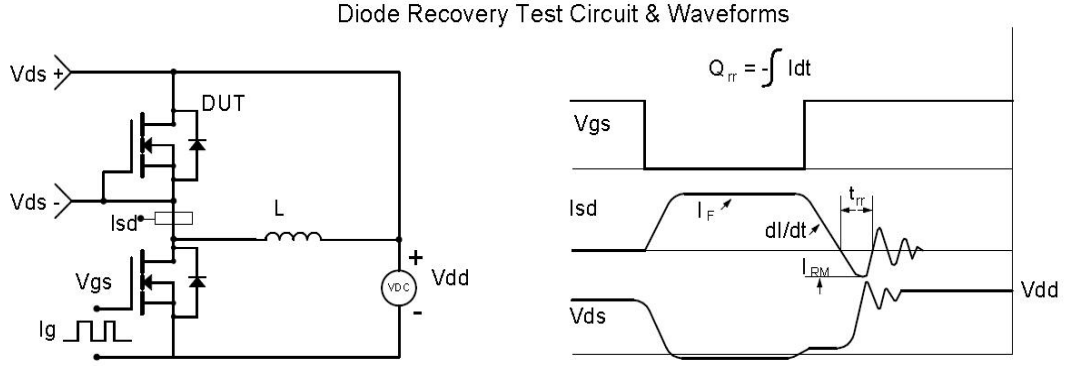
Resistive Switching Test Circuit & Waveforms



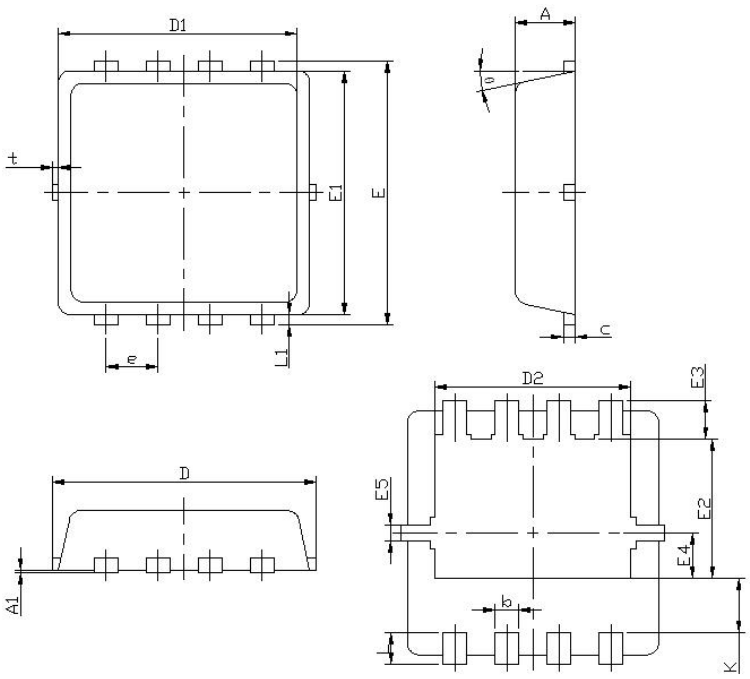
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Mechanical Dimensions for PRPAK3×3



DIMENSIONS IN MILLITMETERS			DIMENSIONS IN INCHES	
SYMBOL	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
A1	-	0.15	-	0.006
b	0.20	0.40	0.008	0.016
c	0.10	0.25	0.004	0.010
D	3.00	3.60	0.118	0.142
D1	2.90	3.25	0.114	0.128
D2	2.25	2.69	0.089	0.106
E	3.00	3.60	0.118	0.142
E1	2.90	3.20	0.114	0.126
E2	1.54	2.2	0.061	0.087
E3	0.28	0.65	0.011	0.026
E4	0.37	0.77	0.015	0.030
E5	0.075	0.3	0.003	0.012
e	0.6	0.7	0.024	0.028
K	0.52	0.89	0.020	0.035
L	0.15	0.5	0.006	0.020
L1	0.05	0.5	0.002	0.020
t	-	0.2	-	0.008
θ	9°	14°	9°	14°

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