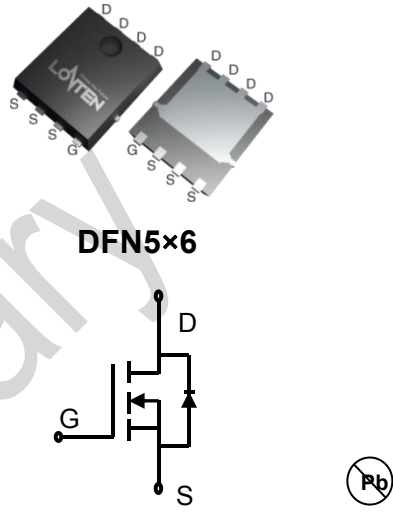


Lonten N-channel 40V, 39A, 7.5mΩ Power MOSFET

<p>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.</p> <p>Features</p> <ul style="list-style-type: none"> ◆ 40V,39A, $R_{DS(on),max} = 7.5m\Omega @ V_{GS} = 10V$ ◆ Improved dv/dt capability ◆ Fast switching ◆ 100% EAS Guaranteed ◆ Green device available <p>Applications</p> <ul style="list-style-type: none"> ◆ Motor Drives ◆ UPS ◆ DC-DC Converter 	<p>Product Summary</p> <p>V_{DSS} 40V</p> <p>$R_{DS(on),max} @ V_{GS}=10V$ 7.5mΩ</p> <p>I_D 39A</p> <p>Pin Configuration</p>  <p style="text-align: center;">DFN5×6</p> <p style="text-align: center;">N-Channel MOSFET</p>
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Absolute Maximum Ratings T_c = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	40	V
Continuous drain current (T _c = 25°C) (T _c = 100°C)	I_D	39	A
		26	A
Pulsed drain current ¹⁾	I_{DM}	117	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy ²⁾	E_{AS}	11	mJ
Power Dissipation	P_D	24	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	$R_{\theta JC}$	5.3	°C/W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	60	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Reel
LSGN04R075WB	DFN5X6	04R075WB	5000

Electrical Characteristics
 $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=250\mu\text{A}$	40	---	---	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.2	1.7	2.5	V
Drain-source leakage current	I_{DSS}	$V_{DS}=40\text{ V}, V_{GS}=0\text{V}$	---	---	1	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=12\text{ A}$	---	5.8	7.5	$\text{m}\Omega$
		$V_{GS}=4.5\text{ V}, I_D=10\text{ A}$	---	8.7	12	$\text{m}\Omega$
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V},$ $F = 1\text{MHz}$	---	693	---	pF
Output capacitance	C_{oss}		---	195	---	
Reverse transfer capacitance	C_{rss}		---	39.5	---	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15\text{V}, V_{GS}=10\text{V}, I_D = 12\text{A}$ $R_G=3.3\Omega$	---	14.5	---	ns
Rise time	t_r		---	6.1	---	
Turn-off delay time	$t_{d(off)}$		---	20.5	---	
Fall time	t_f		---	11.6	---	
Gate resistance	R_g	$V_{GS}=0\text{ V}, V_{DS}=0\text{ V}, F=1\text{MHz}$	---	1.8	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DS}=20\text{V}, I_D=12\text{A},$ $V_{GS}= 10\text{ V}$	---	3.1	---	nC
Gate to drain charge	Q_{gd}		---	1.3	---	
Gate charge total	Q_g		---	15.5	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	20	A
Pulsed Source Current ⁽³⁾	I_{SM}		---	---	60	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}, I_S=12\text{A}, T_J=25^\circ\text{C}$	---	---	1.2	V

Notes:

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

 2: $V_{DD}=25\text{V}, V_{GS}=10\text{V}, L=0.1\text{mH}, I_{AS}=15\text{A},$ Starting $T_J=25^\circ\text{C}$.

 3: Pulse Test: Pulse Width $\leq 300\ \mu\text{s},$ Duty Cycle $\leq 2\%$.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

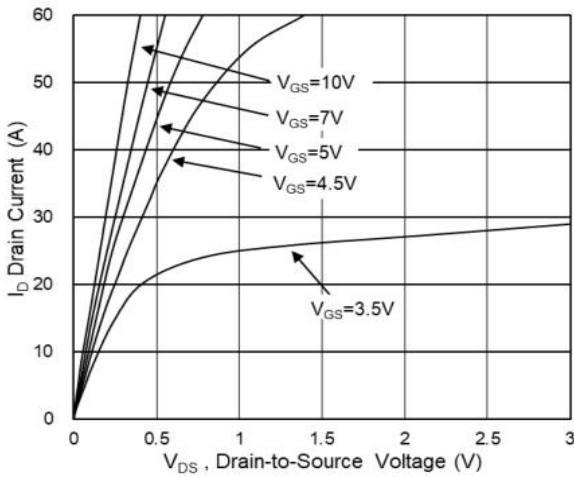


Figure 2. Transfer Characteristics

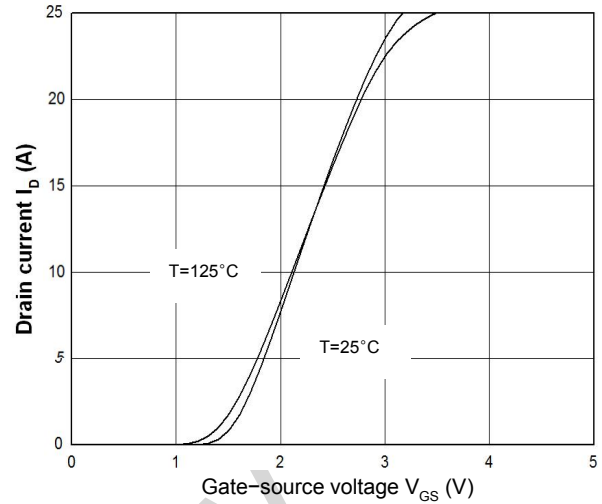


Figure 3. Capacitance Characteristics

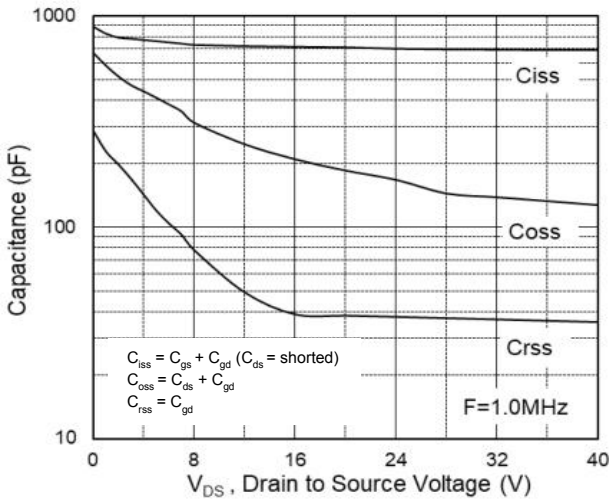


Figure 4. Gate Charge Waveform

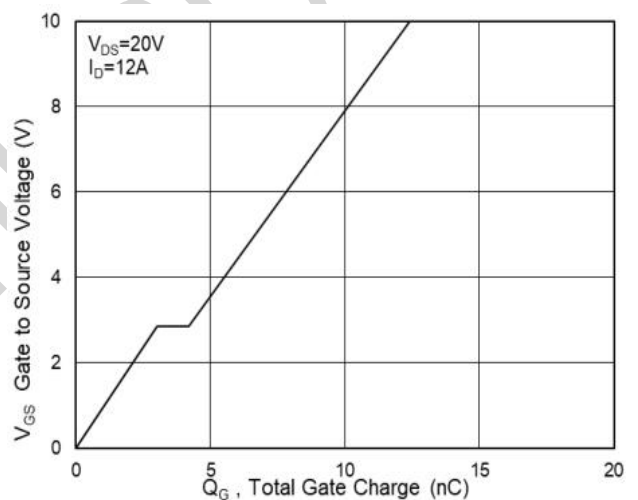


Figure 5. Body-Diode Characteristics

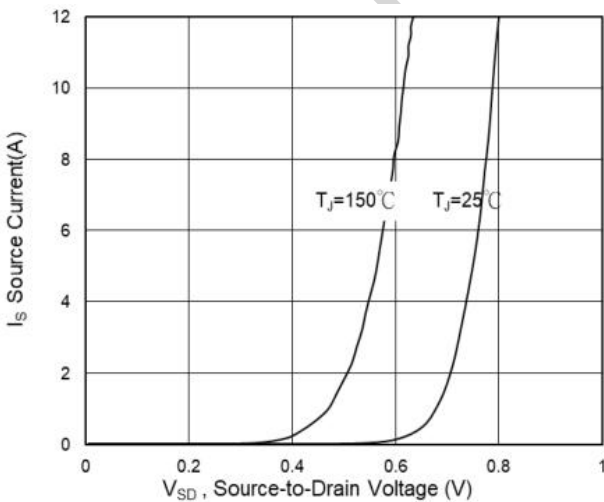


Figure 6. Rdson-Drain Current

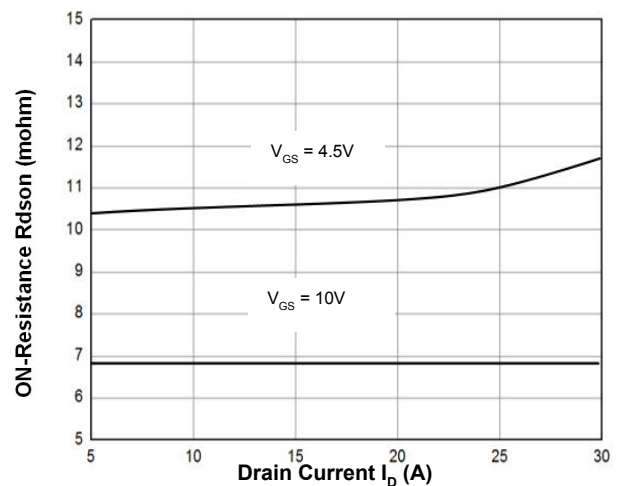


Figure 7. R_{ds(on)}-Junction Temperature

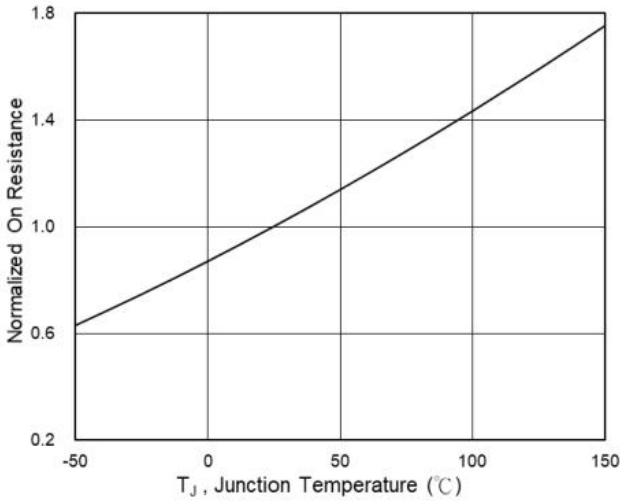


Figure 8. V_{GS(th)}-Junction Temperature

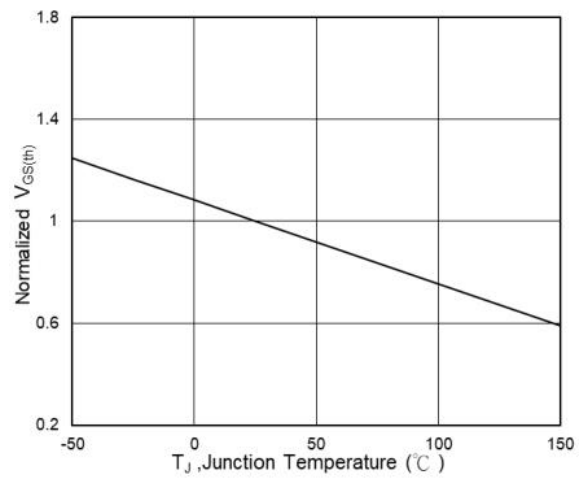


Figure 9. On-Resistance vs. Gate-to-Source voltage

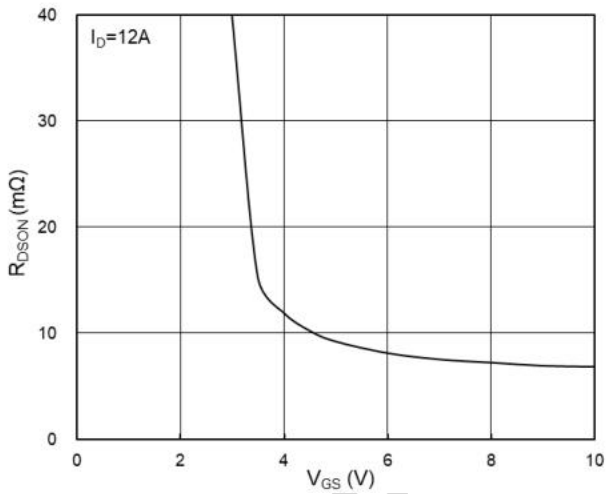


Figure 10: Safe Operating Area

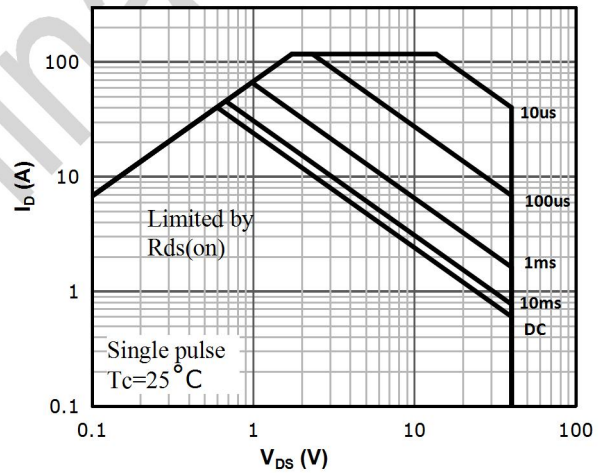
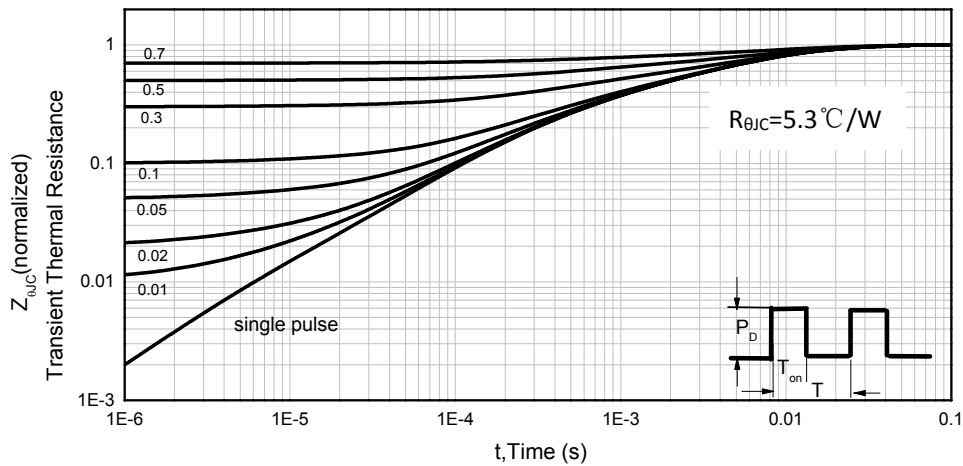
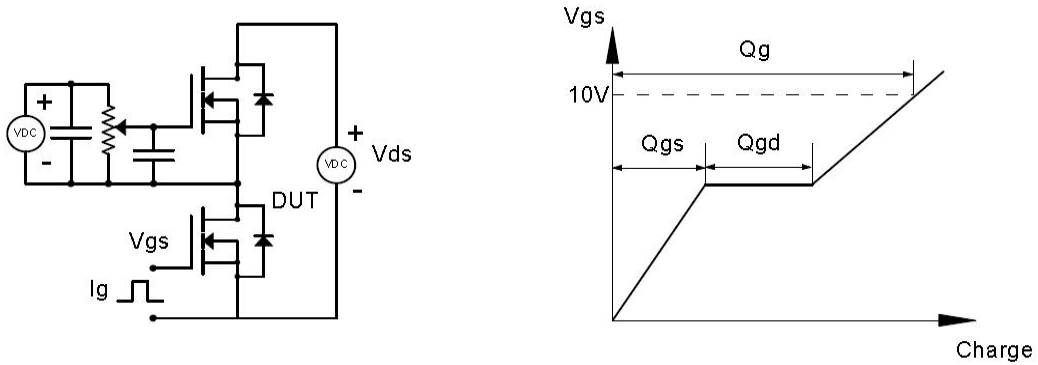


Figure 11. Normalized Maximum Transient Thermal Impedance (R_{thJC})

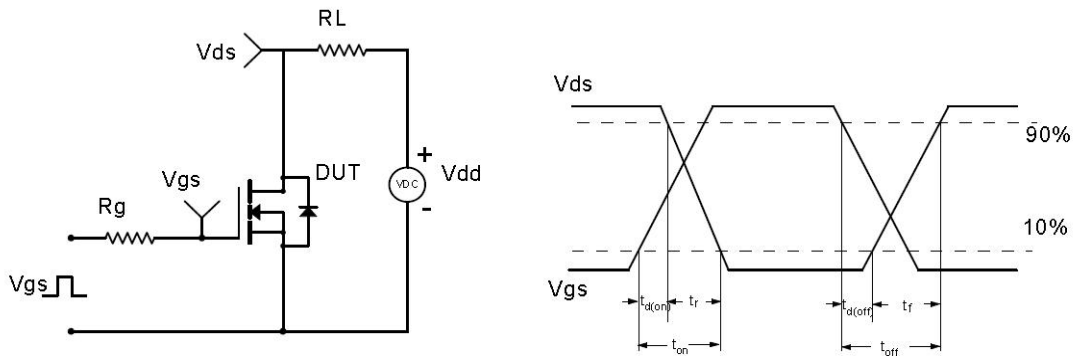


Test Circuit & Waveforms

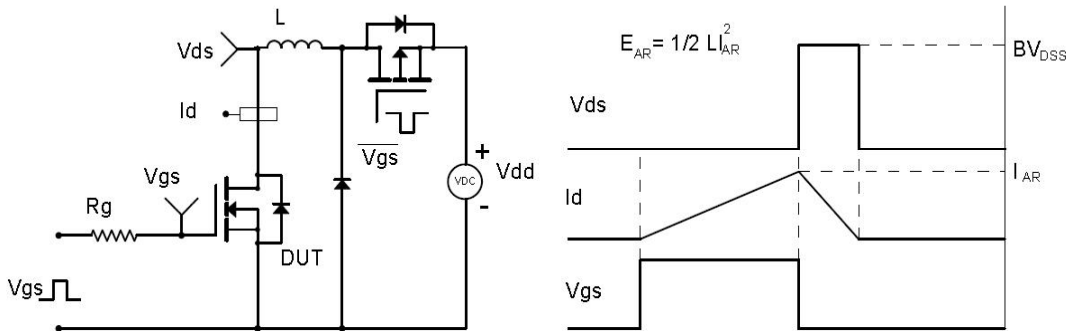
Gate Charge Test Circuit & Waveform



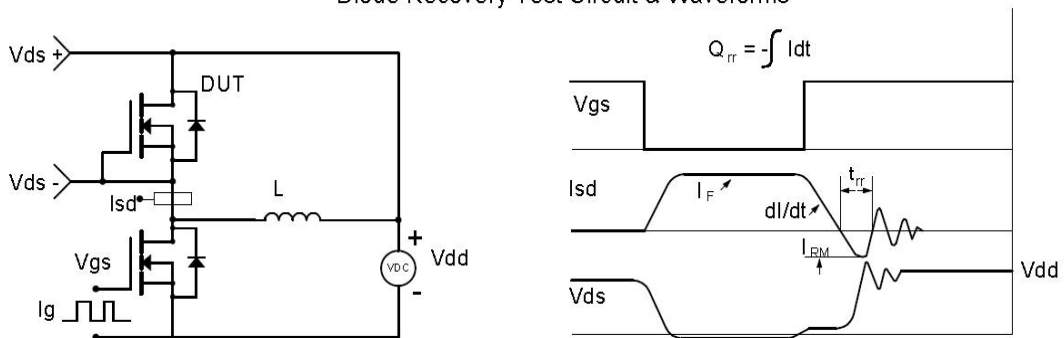
Resistive Switching Test Circuit & Waveforms



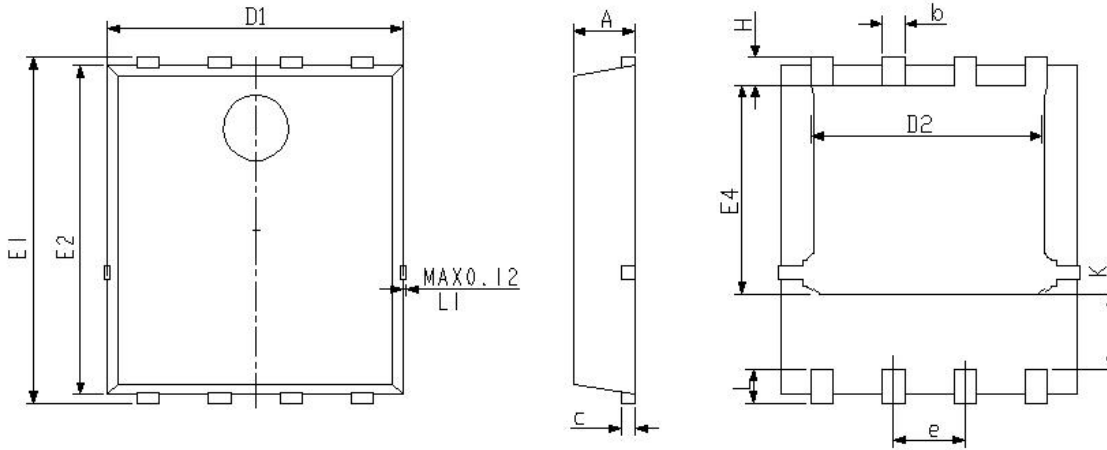
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Mechanical Dimensions for DFN5×6



DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES	
SYMBOL	MIN	MAX	MIN	MAX
A	0.85	1.20	0.033	0.047
b	0.30	0.51	0.012	0.020
c	0.15	0.35	0.006	0.014
D1	4.80	5.40	0.189	0.213
D2	3.70	4.55	0.146	0.179
E1	5.95	6.35	0.234	0.250
E2	5.45	6.06	0.215	0.239
E4	3.30	3.92	0.130	0.154
e	1.27BSC		0.05BSC	
L	0.3	0.71	0.012	0.028
H	0.38	0.71	0.015	0.028
K	1.15	1.45	0.045	0.057

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