



VMDSEMI

VUTL004R085NA

Datasheet



VMDSEMI

General Description

Symbol

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	I_D
40V	8.5mΩ@10V	55A
	12mΩ@4.5V	

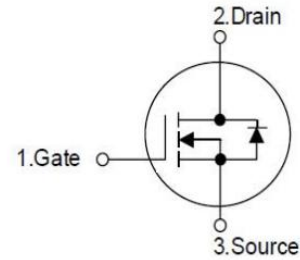


Figure 1 Symbol of VUTL004R085NA

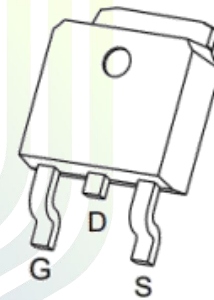
Features

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

Application

- Battery protection applications
- Power Switch Application

Package Type



TO-252-2L

Figure 2 Package Type of VUTL004R085NA

Ordering Information

Product Name	Package
VUTL004R085NA	TO-252-2L

Absolute Maximum Ratings ($T_A = 25\text{ °C}$, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	40	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current ^{Note1}	I_D	$T_C = 25\text{ °C}$	A
Continuous Drain Current ^{Note1}		$T_C = 100\text{ °C}$	
Pulsed Drain Current ^{Note2}	I_{DM}	220	
Avalanche Current ^{Note3}	I_{AS}	27	A
Single Pulsed Avalanche Energy ^{Note3}	E_{AS}	182	mJ
Total Power Dissipation ^{Note5}	P_D	$T_C = 25\text{ °C}$	W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 to 150	°C

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient ^{Note6}	$R_{\theta JA}$		55		°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		3		°C/W

Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage ^{Note4}	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	3	V
Static Drain-Source On-Resistance ^{Note4}	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		6.5	8.5	mΩ
		$V_{GS}=4.5V, I_D=10A$		8.2	12	
Dynamic Characteristics						
Input Capacitance	C_{ISS}	$V_{DS}=20V$		2896		pF
Output Capacitance	C_{OSS}	$V_{GS}=0V$		190		pF
Reverse Transfer Capacitance	C_{RSS}	$f=1MHz$		157		pF
Total Gate Charge	Q_g	$V_{DS}=30V$		51		nC
Gate-Source Charge	Q_{gs}	$V_{GS}=10V$		9		
Gate-Drain Charge	Q_{gd}	$I_D=20A$		7.7		
Gate Resistance	R_g	$f=1MHz, \text{Open drain}$		2.0		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V$		9		ns
Turn-on Rise Time	t_r	$V_{GS}=10V$		22		
Turn-off Delay Time	$t_{d(off)}$	$R_L=1.5\Omega$		45		
Turn-off Fall Time	t_f	$R_G=3\Omega$		22		
Diode Characteristics						
Diode Forward Voltage ^{Note4}	V_{SD}	$V_{GS}=0V, I_S=10A$			1.2	V

Notes :

1. The maximum current rating is limited by package. And device mounted on a large heatsink.
2. Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
3. EAS condition: $V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH, R_G=25\Omega$ Starting $T_J = 25^\circ\text{C}$.
4. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. The power dissipation P_D is limited by $T_{J(MAX)} = 150^\circ\text{C}$. And device mounted on a large heatsink
6. Device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.

Typical Performance Characteristics

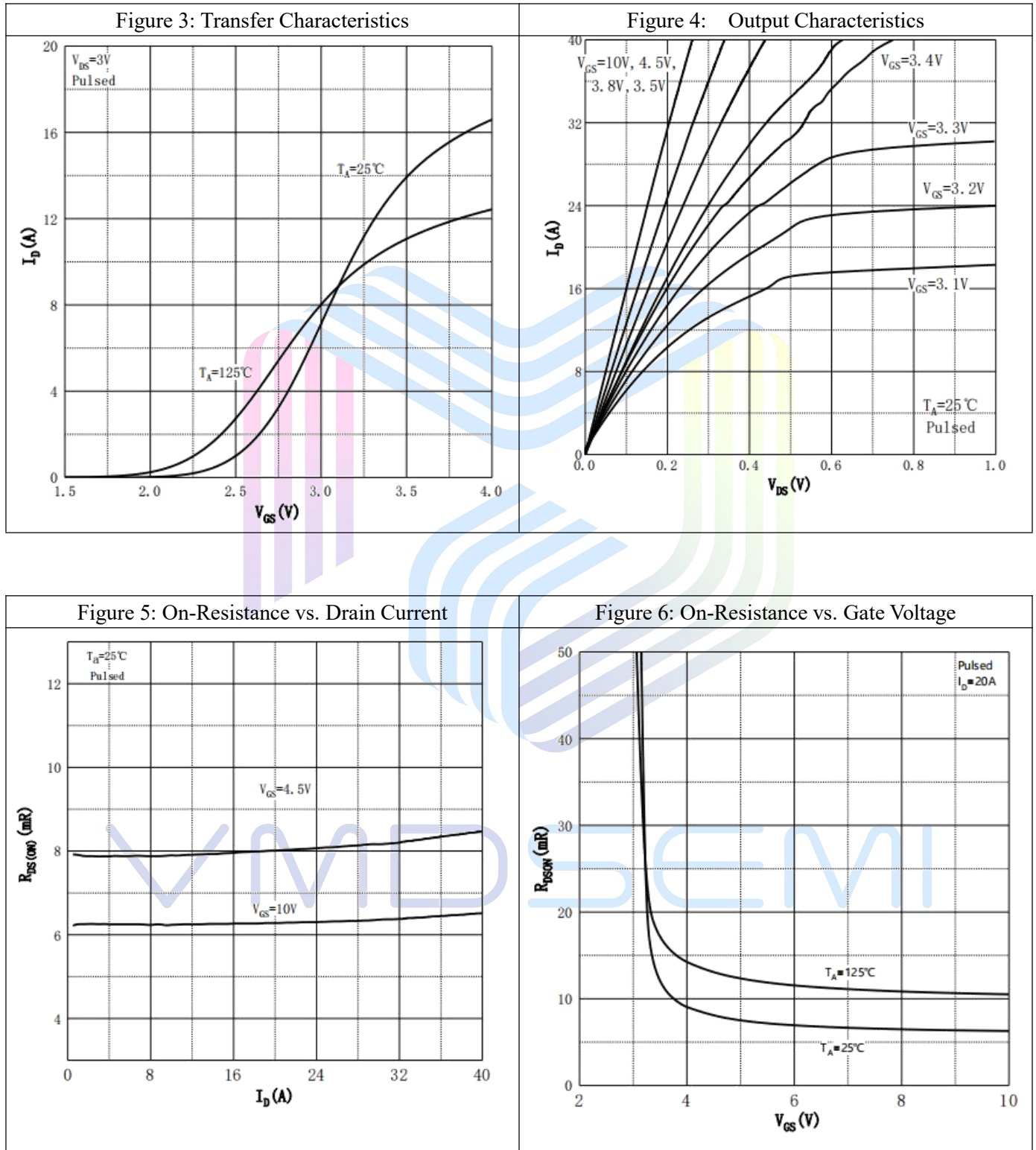


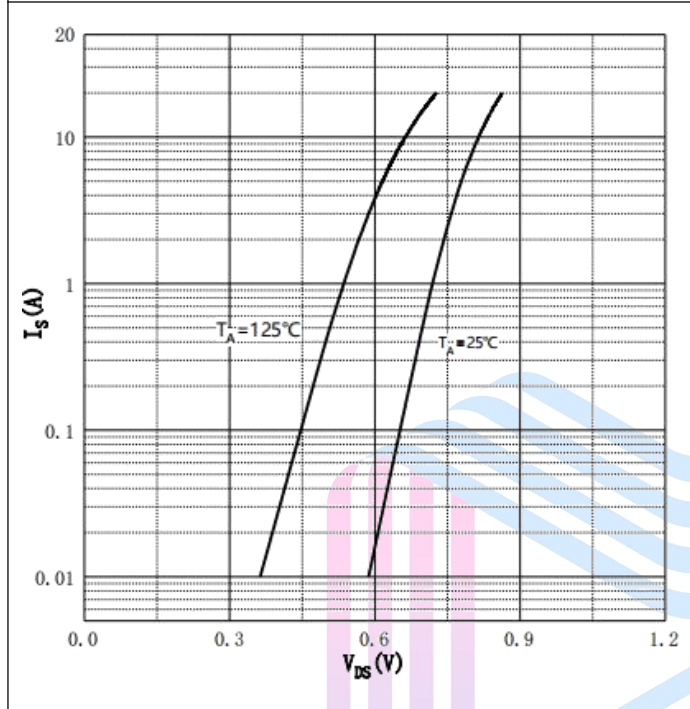
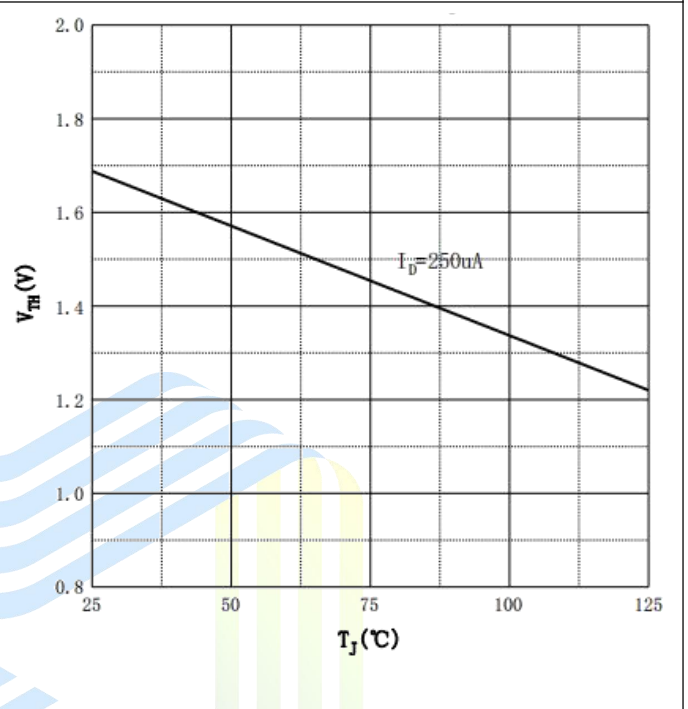
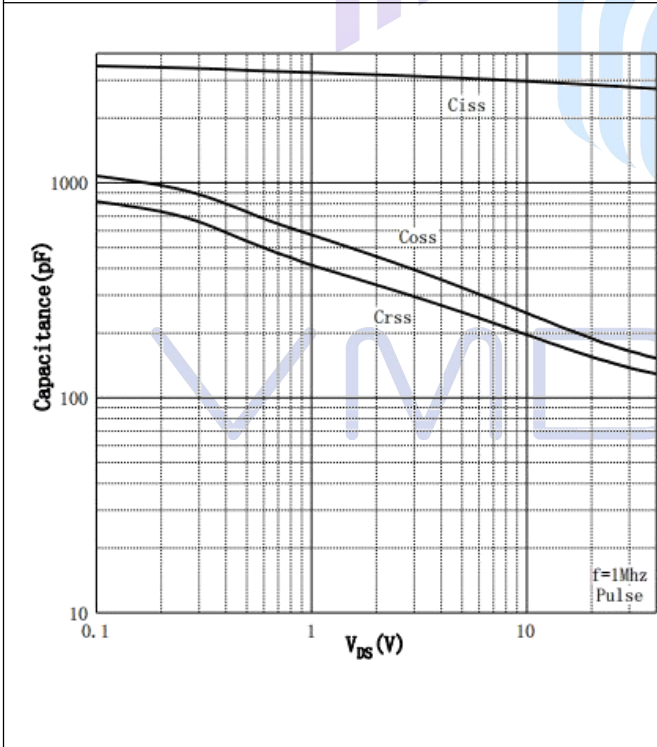
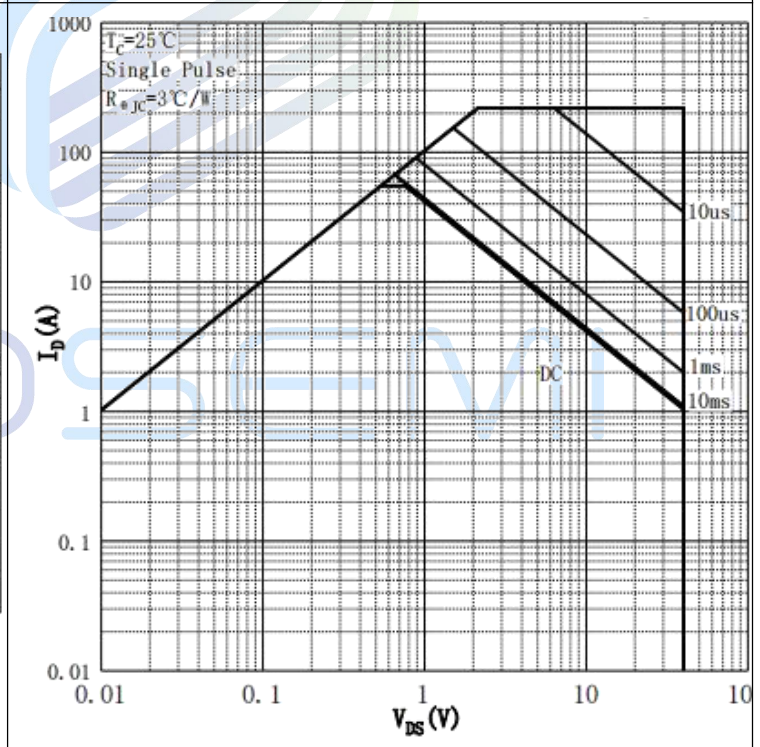
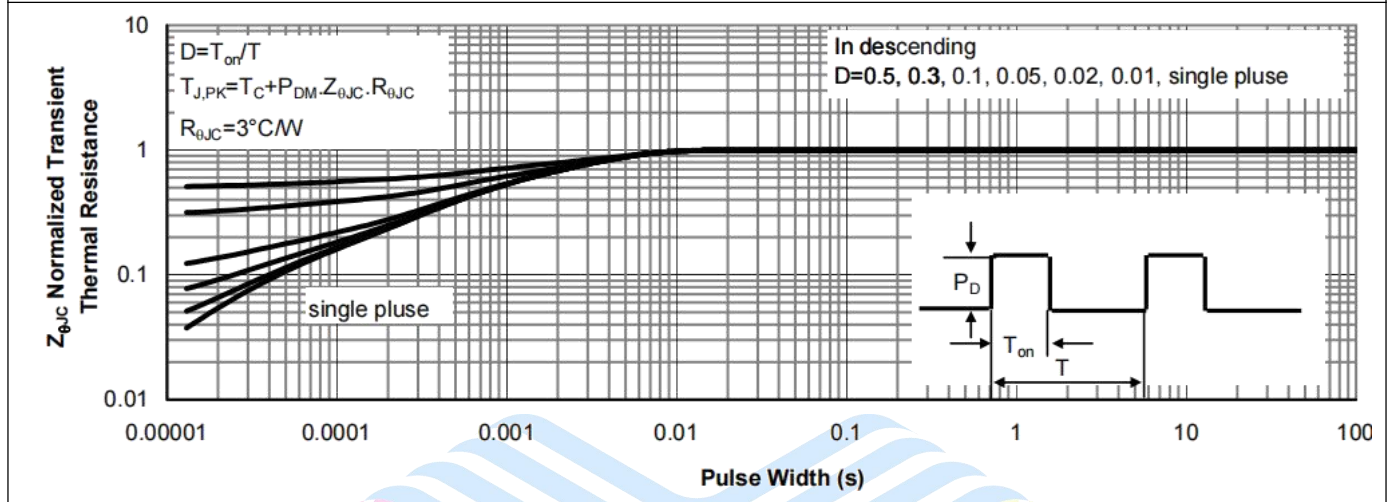
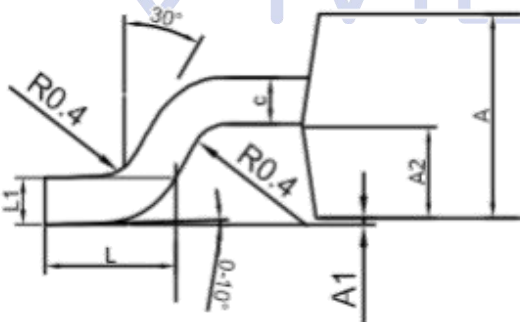
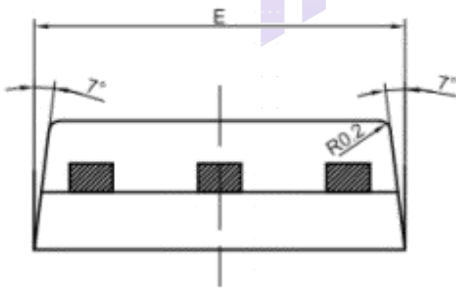
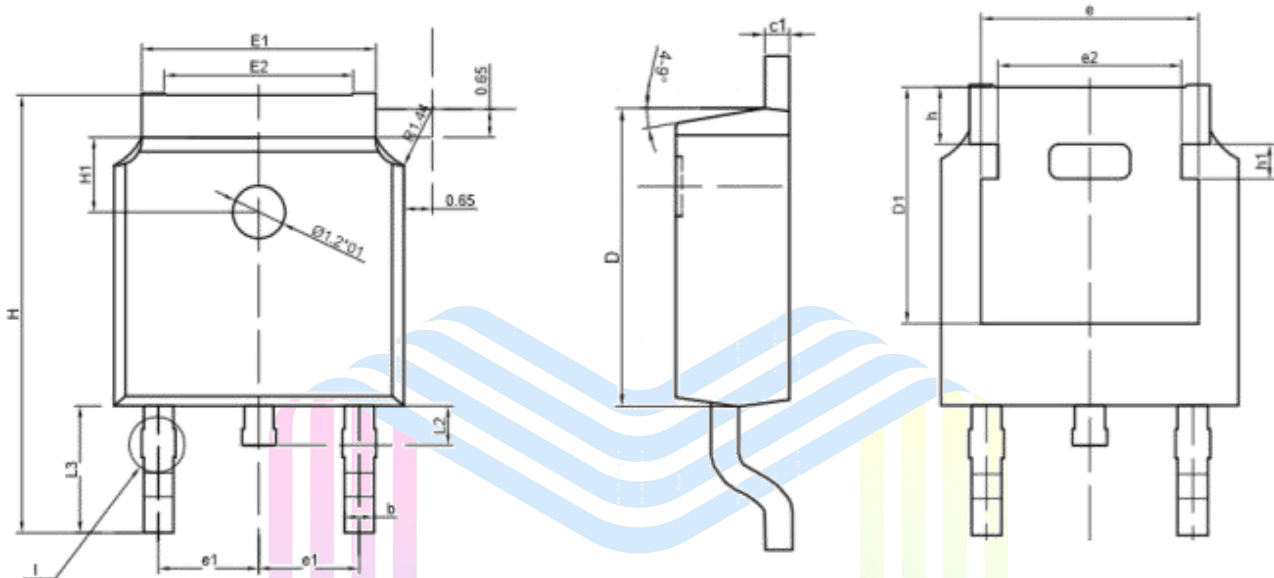
Figure 7: Body Diode Characteristics

Figure 8: Threshold Voltage

Figure 9: Typical Capacitance

Figure 10: Safe Operation Area


Figure 11: Normalized Maximum Transient Thermal Impedance




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Mechanical Dimensions:
TO-252-2L Package Information


SYMBOL	MIN	NOM	MAX
A	2.29	2.30	2.31
A1	0.00	0.07	0.15
A2	1.020	1.025	1.030
b	0.645	0.670	0.695
b1	0.67	0.77	0.87
c	0.523	0.528	0.533
c1	0.498	0.508	0.518
D	6.09	6.10	6.11
D1	5.244	5.249	5.254
E	6.50	6.60	6.70
E1	5.284	5.334	5.384
E2	4.284	4.334	4.312
e	4.821	4.826	4.831
e1	2.281	2.286	2.291
e2	4.059	4.064	4.069
H	9.8	10.0	10.2
H1	1.5	1.6	1.7
h	1.316	1.321	1.326
h1	0.757	0.762	0.767
L	1.4	1.5	1.6
L1	0.50	0.51	0.52
L2	0.8	0.9	1.0
L3	2.88	2.888	2.893

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