
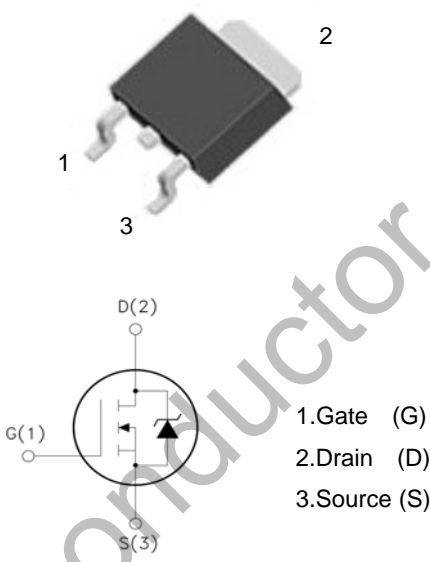


## WGD120N03

**Features:**

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 70nC (Typ.).
- BVDSS=30V,I<sub>D</sub>=120A
- R<sub>DS(on)</sub> : 4.2mΩ (Max) @V<sub>G</sub>=10V
- 100% Avalanche Tested

TO-252 



1 2  
3

1.Gate (G)  
2.Drain (D)  
3.Source (S)

**Absolute Maximum Ratings** (Ta=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V <sub>DSS</sub>	Drain-Source Voltage	30	V
I <sub>D</sub>	Drain Current	T <sub>j</sub> =25°C	120
		T <sub>j</sub> =100°C	70
V <sub>GSS</sub>	Gate Threshold Voltage	±20	V
E <sub>AS</sub>	Single Pulse Avalanche Energy (note5)	350	mJ
I <sub>DM</sub>	Pulsed Drain Current	400	A
P <sub>D</sub>	Power Dissipation (T <sub>j</sub> =25°C)	110	W
T <sub>j</sub>	Junction Temperature(Max)	175	°C
T <sub>stg</sub>	Storage Temperature	-55~+175	
TL	Maximum lead temperature for soldering purpose,1/8" from case for 5 seconds	300	

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJC</sub>	Thermal Resistance,Junction to Case	-	1.36	°C/W

**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.6	3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	3.3	4.2	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =20A	50	-	-	S
<b>Dynamic Characteristics</b> (Note4)						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1.0MHz		3400		PF
Output Capacitance	C <sub>oss</sub>			356		PF
Reverse Transfer Capacitance	C <sub>rss</sub>			308		PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =60A V <sub>GS</sub> =4.5V, R <sub>GEN</sub> =1.8Ω	-	11	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	160	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	25	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	60	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V		70		nC
Gate-Source Charge	Q <sub>gs</sub>			8.8		nC
Gate-Drain Charge	Q <sub>gd</sub>			16.3		nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	-	1.2	V
Diode Forward Current (Note 2)	I <sub>S</sub>	-	-	-	120	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 60A di/dt = 100A/μs (Note3)	-	56	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	110	-	nC
Forward Turn-On Time	t <sub>on</sub>	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. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω

Typical Electrical and Thermal Characteristics (Curves)

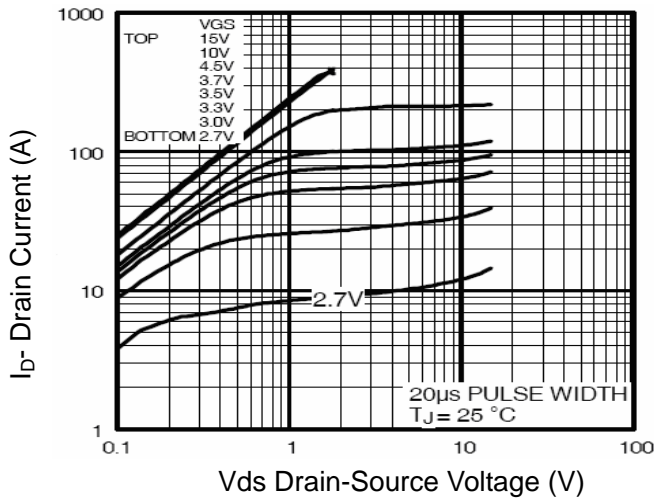


Figure 1 Output Characteristics

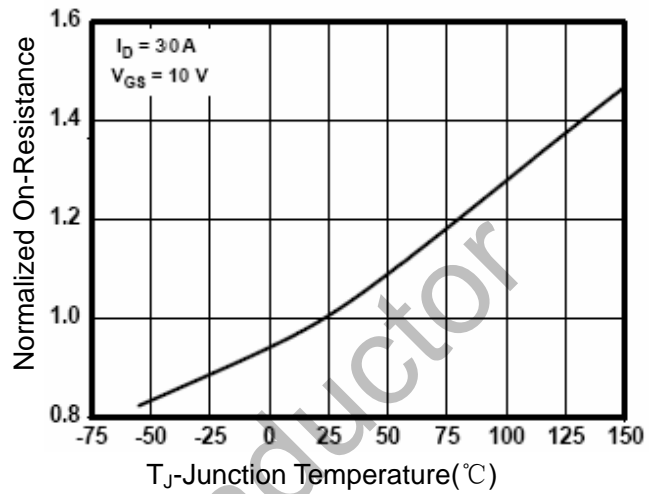


Figure 4 Rdson-Junction Temperature

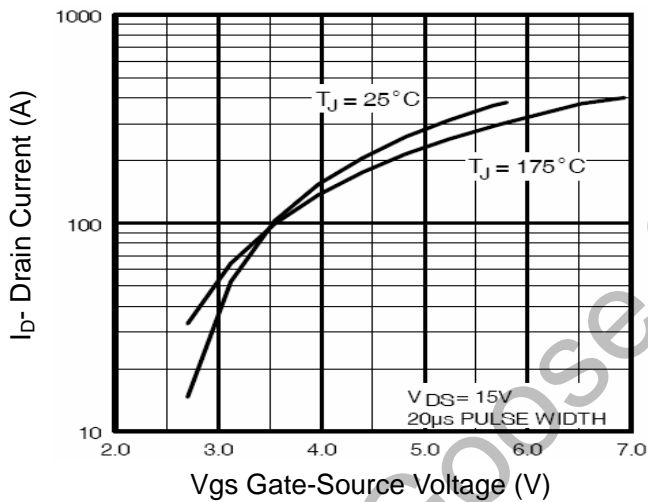


Figure 2 Transfer Characteristics

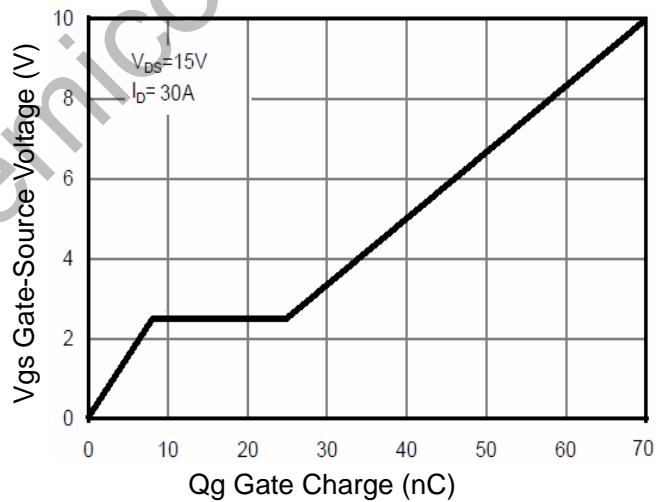


Figure 5 Gate Charge

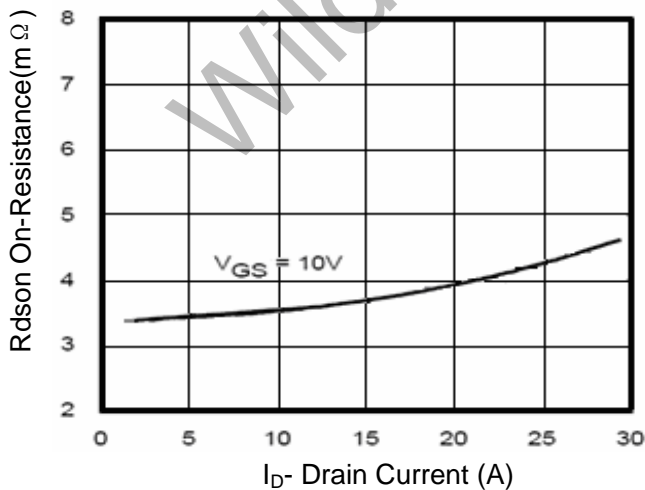


Figure 3 Rdson- Drain Current

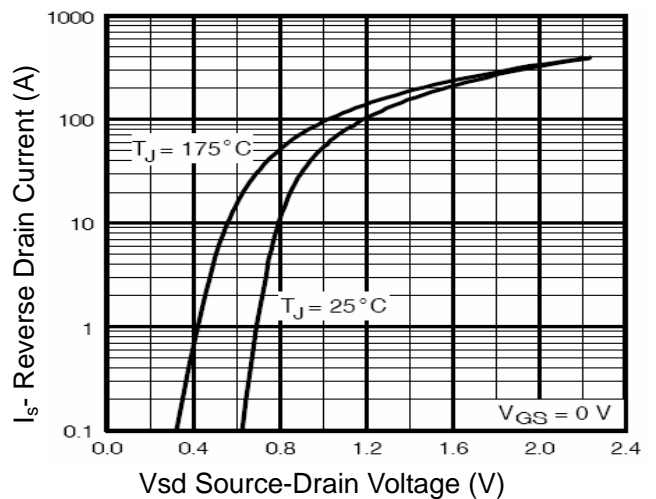


Figure 6 Source- Drain Diode Forward

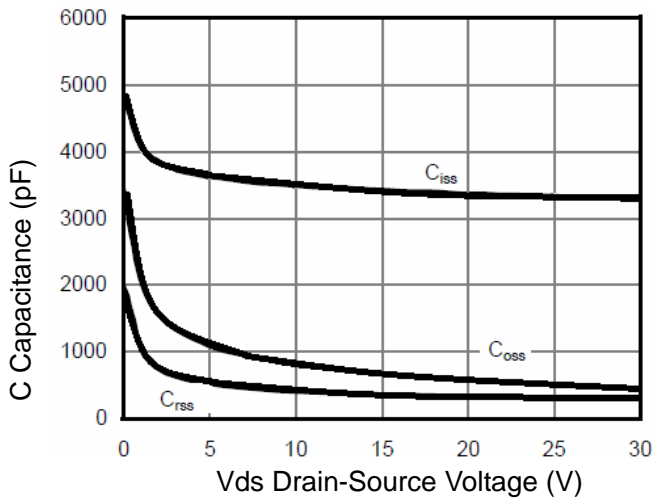


Figure 7 Capacitance vs Vds

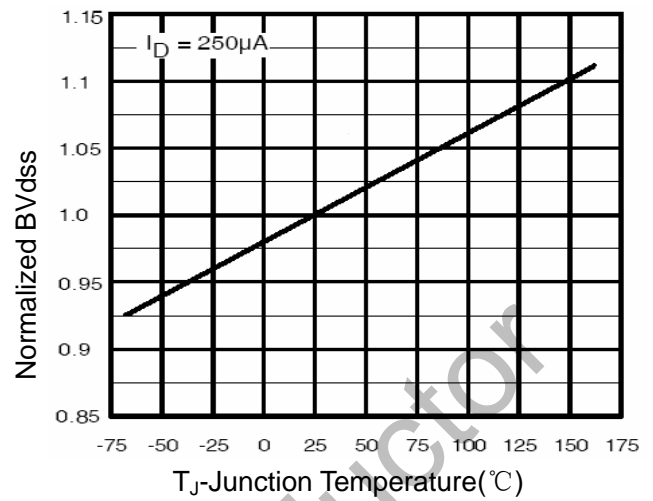


Figure 9  $BV_{DSS}$  vs Junction Temperature

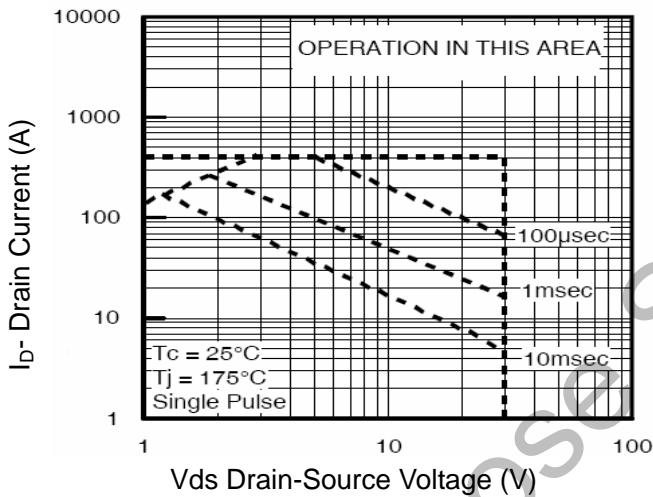


Figure 8 Safe Operation Area

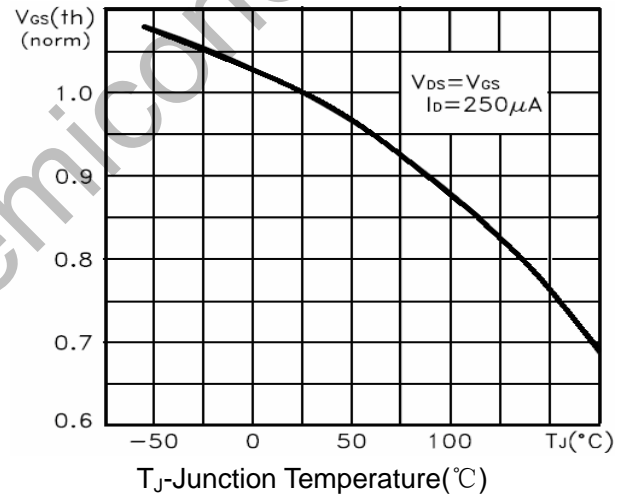


Figure 10  $V_{GS(th)}$  vs Junction Temperature

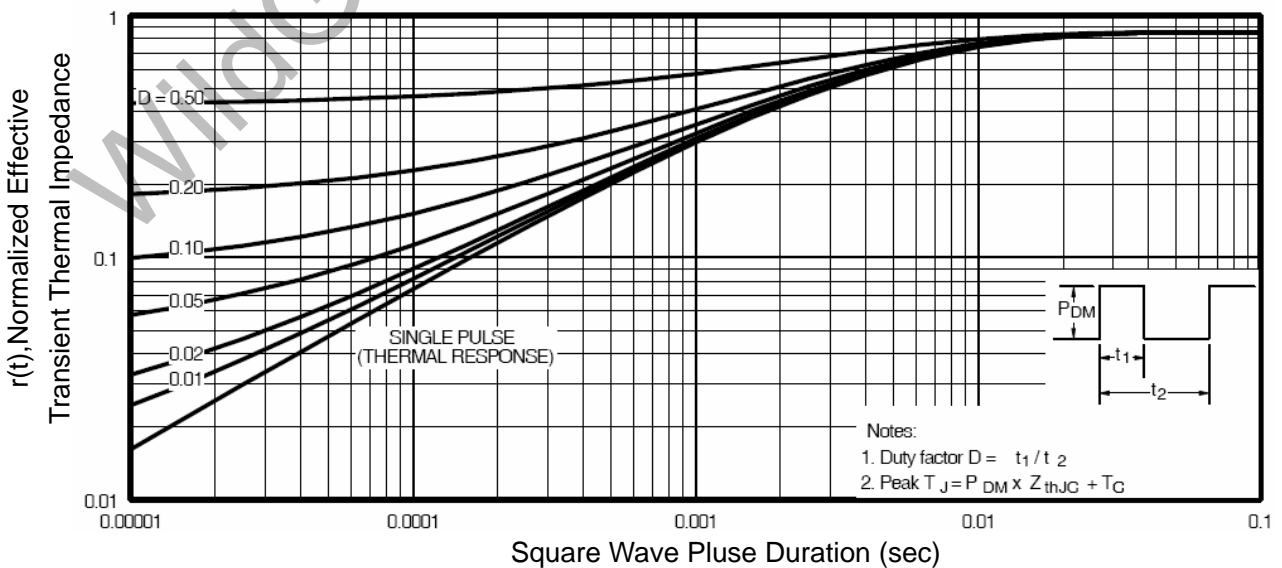
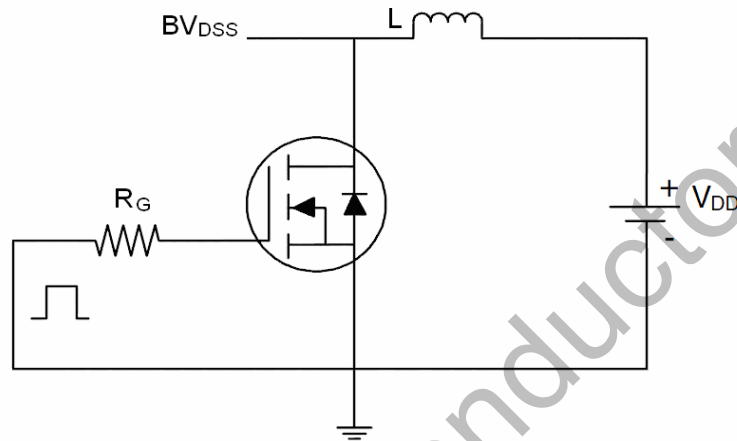


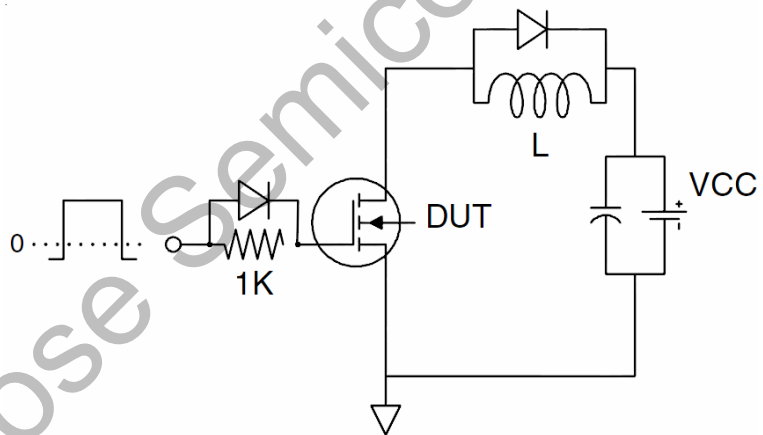
Figure 11 Normalized Maximum Transient Thermal Impedance

**Test circuit**

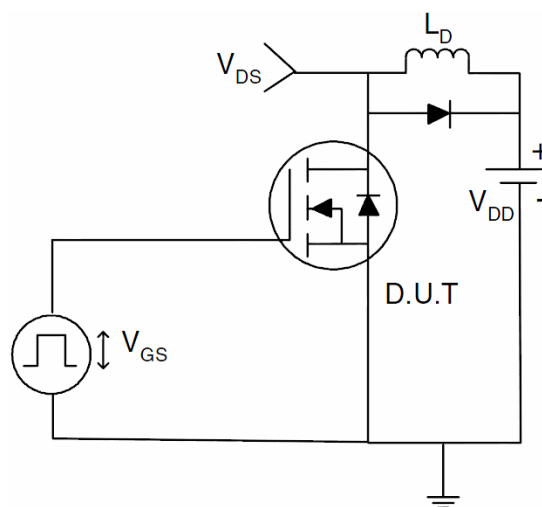
**1)  $E_{AS}$  test Circuit**



**2) Gate charge test Circuit**



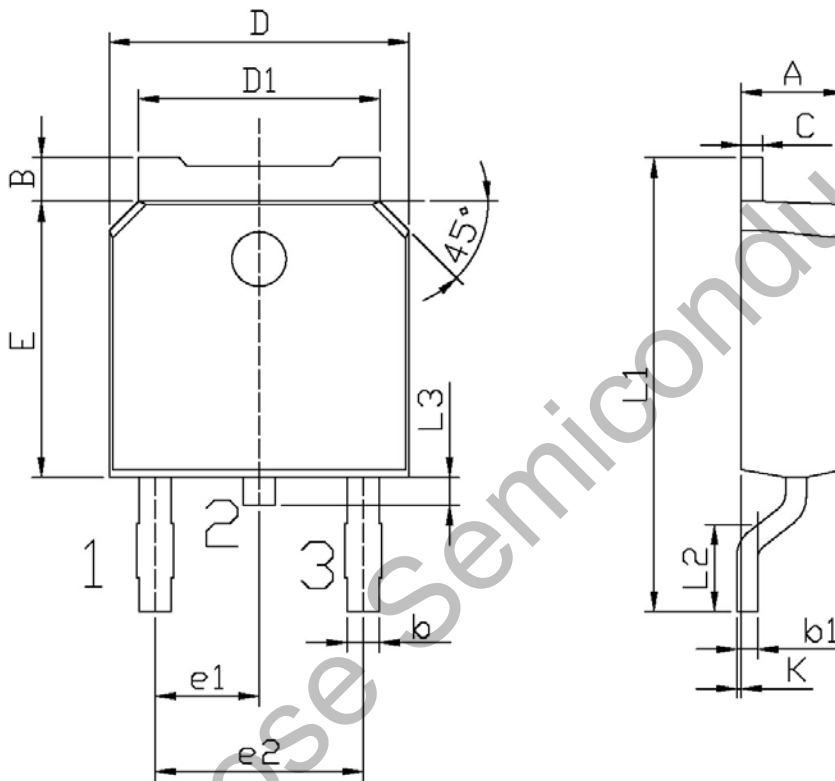
**3) Switch Time Test Circuit**



**Package Dimension**

**TO-252**

Unit: mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10

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