

DATASHEET

N-Channel Enhancement Mode Power MOSFET

Description

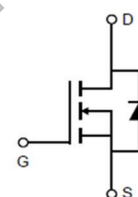
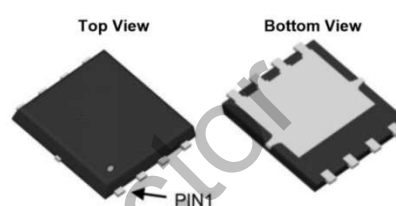
This Power MOSFET is produced using advanced TRENCH technology.

This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- $V_{DS}=30V$, $I_D=90A$
- $R_{DS(ON) TYP} = 3.6m\Omega @V_{GS}=10V$
- $R_{DS(ON) TYP} = 6m\Omega @V_{GS}=4.5V$
- Very Low On-resistance $R_{DS(ON)}$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

PDFN5*6-8L



Schematic diagram

Applications

- PWM Application
- Load Switch
- Power Management

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Package Marking and Ordering Information

Device	Marking	Package	Packing	Reel size	Reel (pcs)	Per Carton (pcs)
90N03		PDFN5*6	Reel	13inch	5000	60000

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Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	90	A
	$T_C=100^{\circ}\text{C}$		58	
Pulsed Drain Current($T_C=25^{\circ}\text{C}$, T_p Limited By T_{jmax}) ^(note1)		I_{DM}	360	A
Maximum Power Dissipation($T_C=25^{\circ}\text{C}$)		P_D	90	W
Avalanche energy , single Pulse($L=0.5\text{mH}$) ^(note2)		E_{AS}	90	mJ
Operating Junction And Storage Temperature		T_j, T_{stg}	-55 To 150	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	$^{\circ}\text{C}$

Thermal Resistance

Parameter	Symbol	Max	Unit
Junction-to-Case	$R_{\theta JC}$	1.67	$^{\circ}\text{C/W}$

Note:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=15\text{V}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=19\text{A}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

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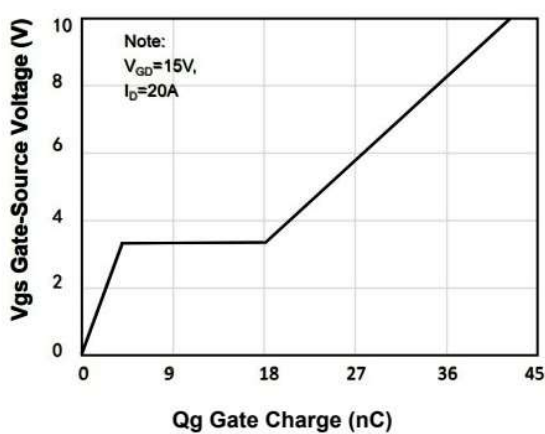
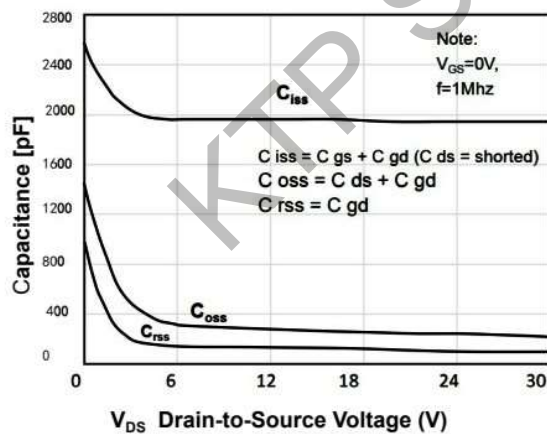
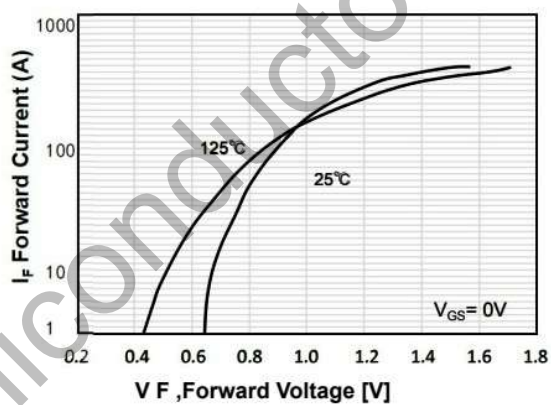
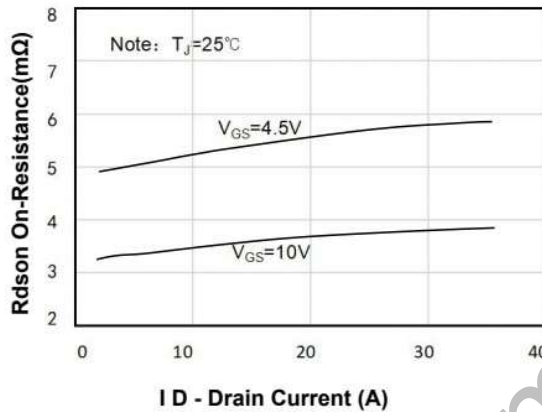
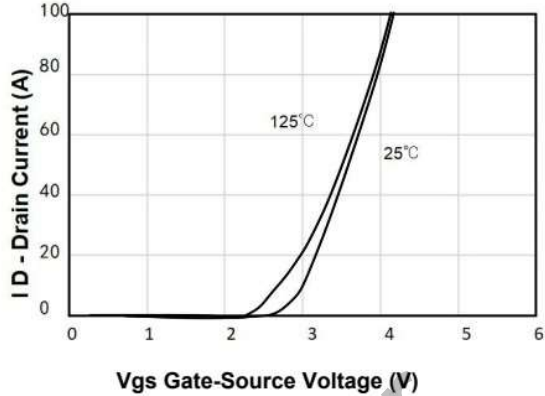
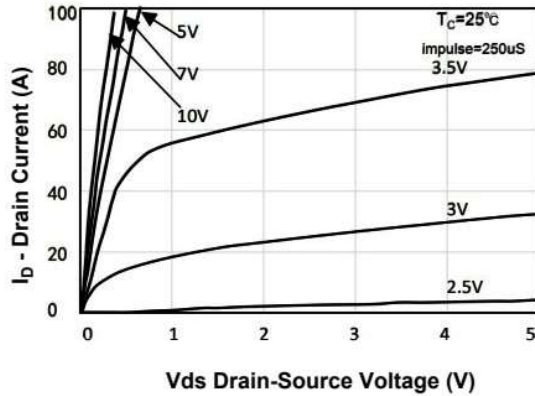
Electrical Characteristic (TC=25°C unless otherwise noted)

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Off Characteristic						
Drain-source breakdown voltage	BV _{DSS}	30	-	-	V	V _{GS} =0V, I _D =250μA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =30V, V _{GS} =0V
		-	-	10	μA	V _{DS} =24V, TC =125℃
Gate-source leakage current	I _{GSS}	-	-	± 100	nA	V _{GS} =± 20V, V _{DS} =0V
On Characteristics						
Gate threshold voltage	V _{GS(th)}	1.0	1.5	2.5	V	V _{DS} =V _{GS} , I _D =250μA
Drain-source on-state resistance	R _{DS(on)}	-	3.6	4.5	mΩ	V _{GS} =10V, I _D =30A
		-	6	6.5	mΩ	V _{GS} =4.5V, I _D =30A
Dynamic Characteristic						
Input Capacitance	C _{iss}	-	1950	-	PF	V _{GS} =0V, V _{DS} =15V, f=1.0MHz
Output Capacitance	C _{oss}	-	320	-		
Reverse Transfer Capacitance	C _{rss}	-	240	-		
Switching Characteristics						
Turn-on delay time	t _{d(on)}	-	13	-	nS	V _{DS} =15V, V _{GS} =10V, R _G =25Ω, I _D =30A
Turn-on Rise time	t _r	-	36	-		
Turn-off delay time	t _{d(off)}	-	43	-		
Turn-off Fall time	t _f	-	16	-		
Gate Total Charge	Q _G	-	42	-	nC	V _{GS} =10V, V _{DS} =15V, I _D =30A
Gate-Source Charge	Q _{gs}	-	4	-		
Gate-Drain Charge	Q _{gd}	-	14	-		
Drain-Source Diode Characteristics						
Body Diode Forward Voltage	V _{SD}	-	-	1.2	V	V _{GS} =0V, I _{SD} =30A, T _J = 25℃
Body Diode Forward Current	I _S	-	-	90	A	-
Body Diode Reverse Recovery Time	T _{rr}	-	16	-	ns	T _J =25℃ , I _{SD} =20A, V _{GS} =0V, d _i /d _t =100A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	-	5	-	nC	

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N- Channel Typical Characteristics



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N- Channel Typical Characteristics (Continued)

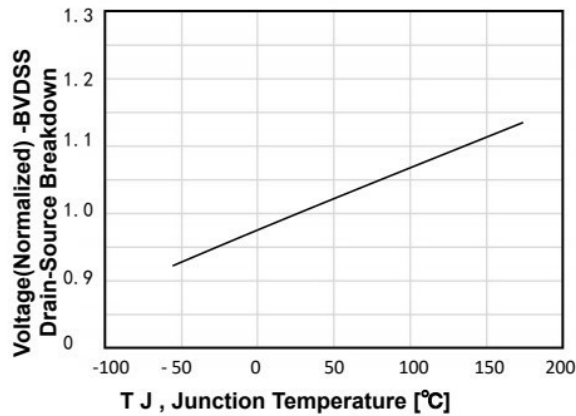


Figure 7. Breakdown Voltage Variation vs Temperature

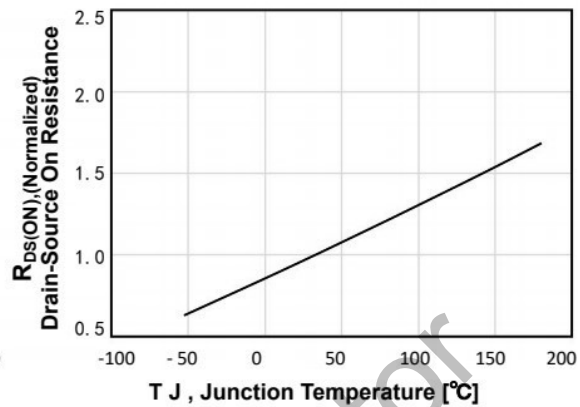


Figure 8. On-Resistance Variation vs Temperature

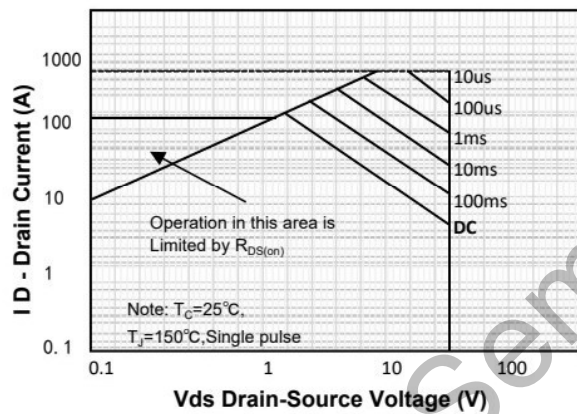


Figure 9. Maximum Safe Operating Area

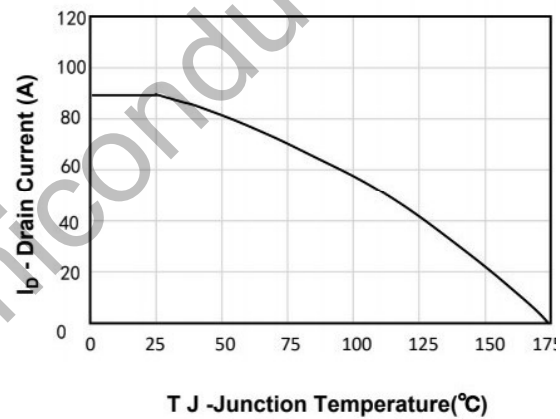


Figure 10. Maximum Continuous Drain Current vs Case Temperature

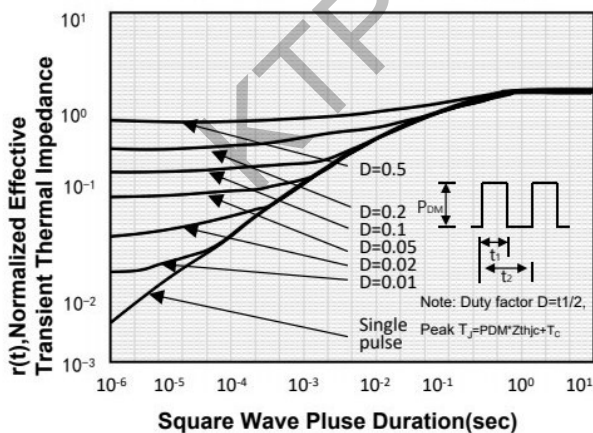
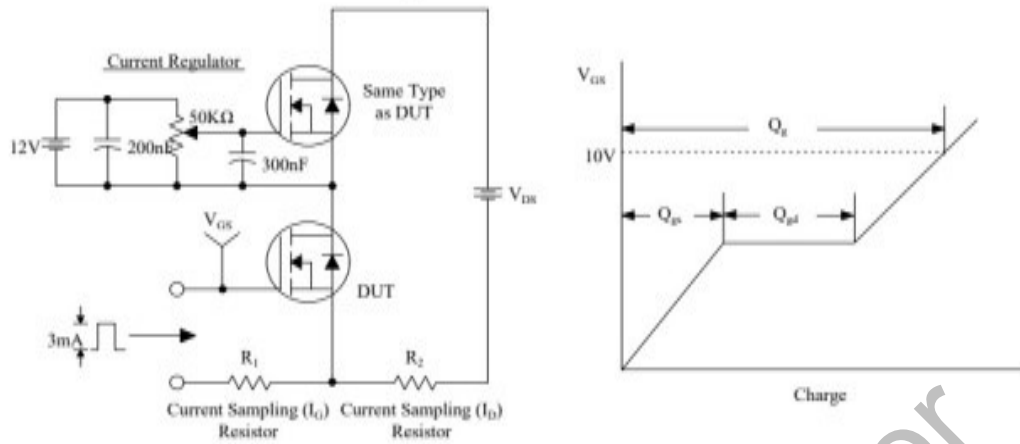


Figure 11. Transient Thermal Response Curve

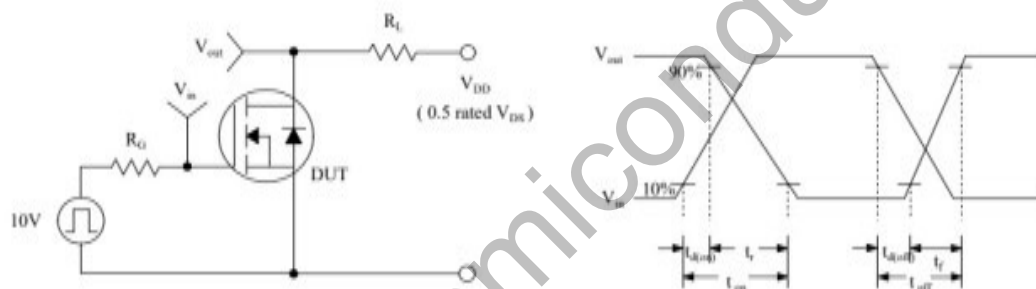
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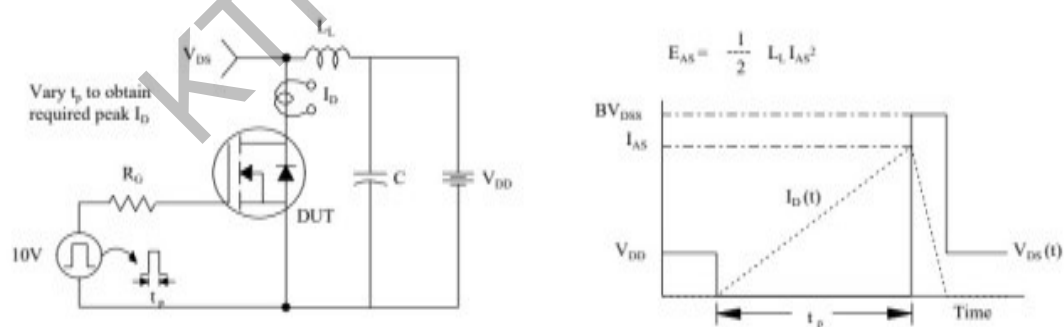
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



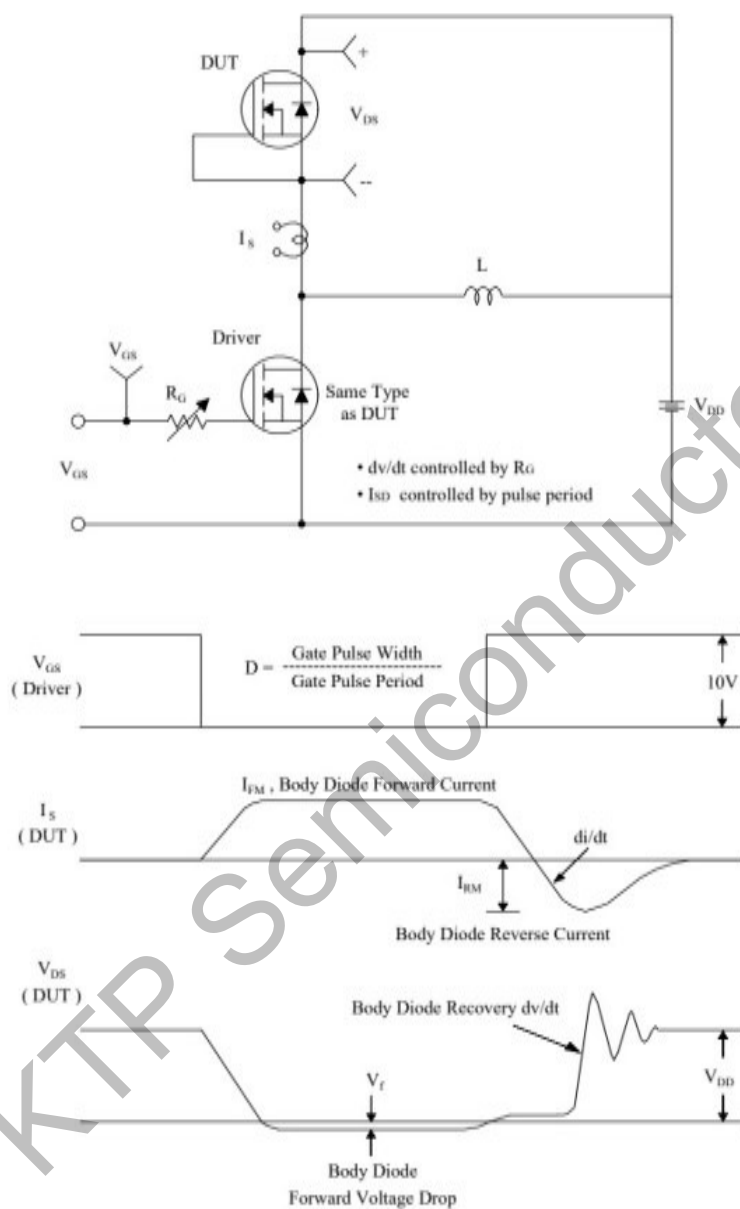
Unclamped Inductive Switching Test Circuit & Waveforms



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Peak Diode Recovery dv/dt Test Circuit & Waveforms

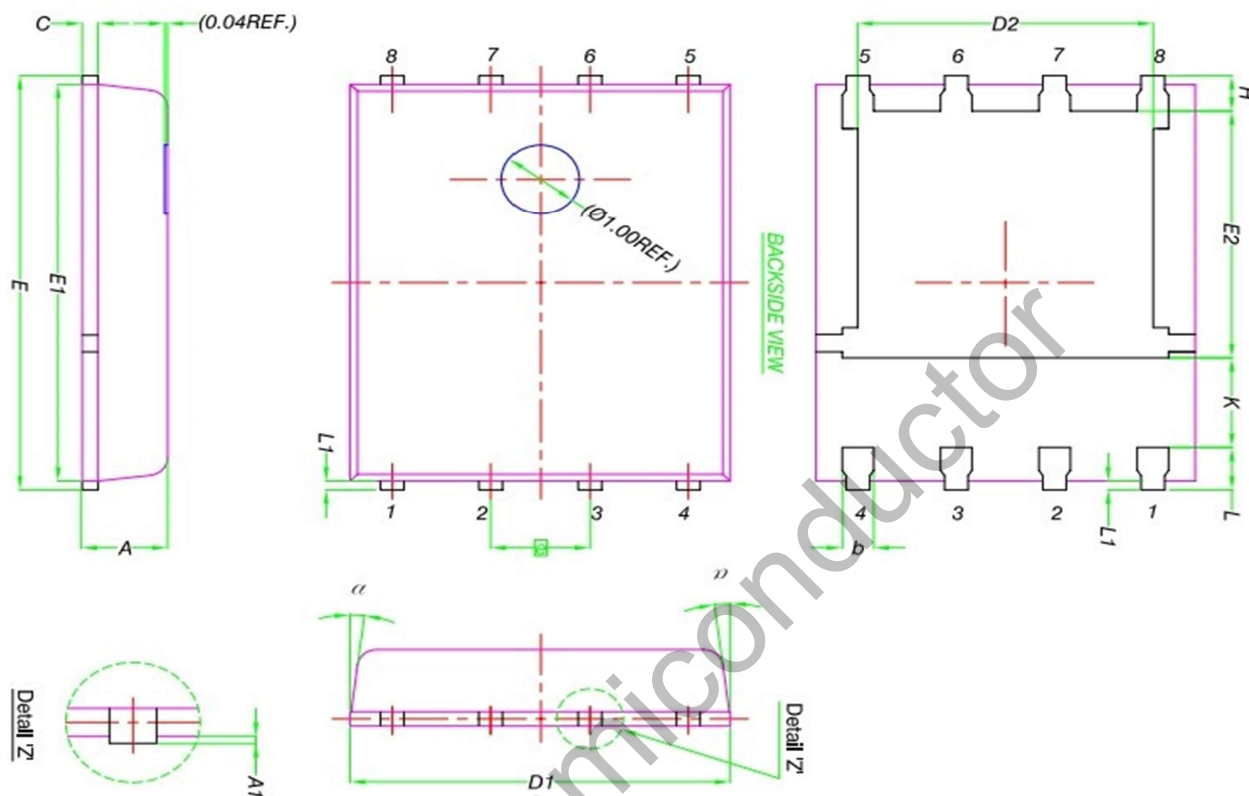


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Package Information

PDFN5*6-8L



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

