

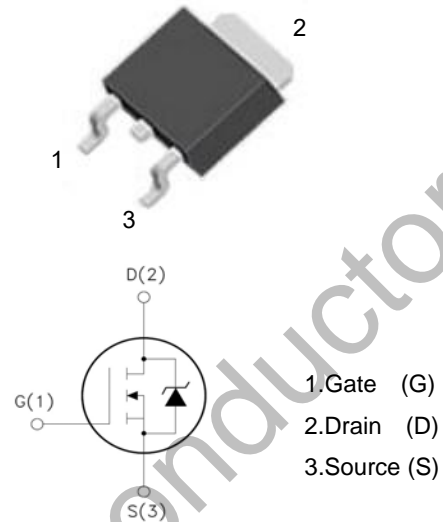


WGD7N40SE

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g=16\text{nC}$ (Typ.).
- $BVDSS=400\text{V}, I_D=7\text{A}$
- $R_{DS(on)} : 1.1\ \Omega$ (Max) @ $V_G=10\text{V}$
- 100% Avalanche Tested

TO-252



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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	400	V
I_D	Drain Current	$T_C=25^\circ\text{C}$	7
		$T_C=100^\circ\text{C}$	3.8
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy (note1)	260	mJ
I_{AR}	Avalanche Current (note2)	7	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	75	W
T_j	Junction Temperature(Max)	150	°C
T_{stg}	Storage Temperature	-55~+150	
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	-	1.67	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	100	
$R_{\theta CS}$	Thermal Resistance, Case to Sink	0.5	-	

Electrical Characteristics (Ta=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0	400	-	-	V
ΔBVDSS/ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, Reference to 25°C	-	0.5	-	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =400V, V _{GS} =0V	-	-	1	μA
		V _{DS} =320V, T _c =125°C	-	-	10	
I _{GSSF}	Gate-body leakage Current, Forward	V _{GS} =+30V, V _{DS} =0V	-	-	100	nA
I _{GSSR}	Gate-body leakage Current, Reverse	V _{GS} =-30V, V _{DS} =0V	-	-	-100	
On Characteristics						
V _{GS(TH)}	Gate Threshold Voltage	I _D =250μA, V _{DS} =V _{GS}	2	-	4	V
R _{DS(ON)}	Static Drain-Source On-Resistance	I _D =2.0A, V _{GS} =10V	-	0.95	1.1	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0, f=1.0MHz	-	583	-	pF
C _{oss}	Output Capacitance		-	71	-	
C _{rss}	Reverse Transfer Capacitance		-	5.1	-	
Switching Characteristics						
T _{d(on)}	Turn-On Delay Time	V _{DD} =200V, I _D =7A R _G =10Ω (Note 3,4)	-	14	-	ns
T _r	Turn-On Rise Time		-	20	-	
T _{d(off)}	Turn-Off Delay Time		-	31	-	
T _f	Turn-Off Rise Time		-	12	-	
Q _g	Total Gate Charge	V _{DS} =320V, V _{GS} =10V, I _D =7 A (Note 3,4)	-	16	-	nC
Q _{gs}	Gate-Source Charge		-	7.0	-	
Q _{gd}	Gate-Drain Charge		-	7.1	-	
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Max. Diode Forward Current	-	-	-	7	A
I _{SM}	Max. Pulsed Forward Current	-	-	-	36	
V _{SD}	Diode Forward Voltage	I _D =7 A	-	-	1.5	V
T _{rr}	Reverse Recovery Time	I _S =7 A, V _{GS} =0V diF/dt=100A/μs	-	240	-	nS
Q _{rr}	Reverse Recovery Charge	(Note3)	-	1.8	-	μC

- Notes : 1, L=2.26mH, I_{AS}=7A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
 2, Repetitive Rating : Pulse width limited by maximum junction temperature
 3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
 4, Essentially Independent of Operating Temperature

Typical Characteristics

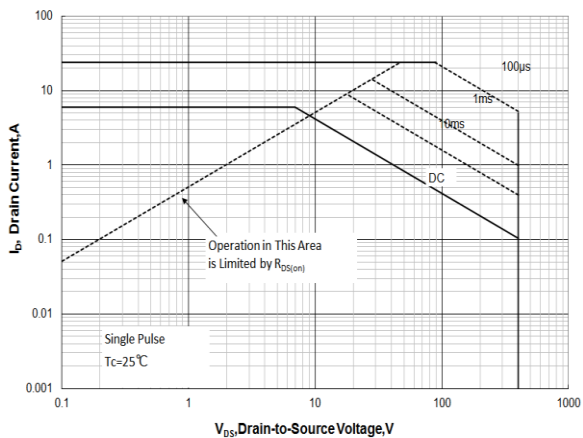


Figure 1 Maximum Forward Bias Safe Operating Area

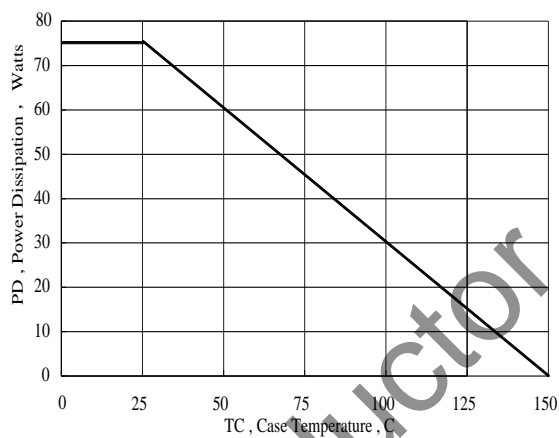


Figure 2 Maximum Power dissipation vs Case Temperature

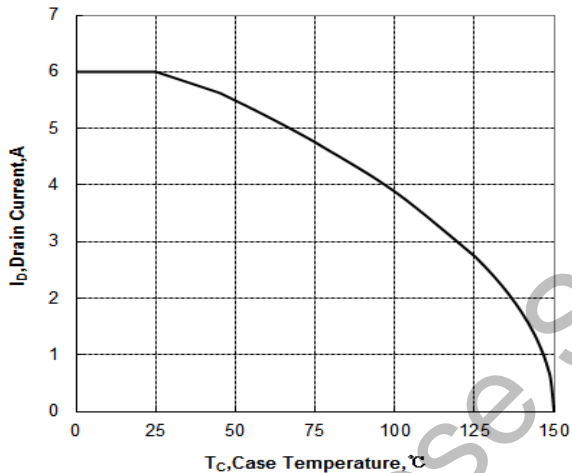


Figure 3 Maximum Continuous Drain Current vs Case Temperature

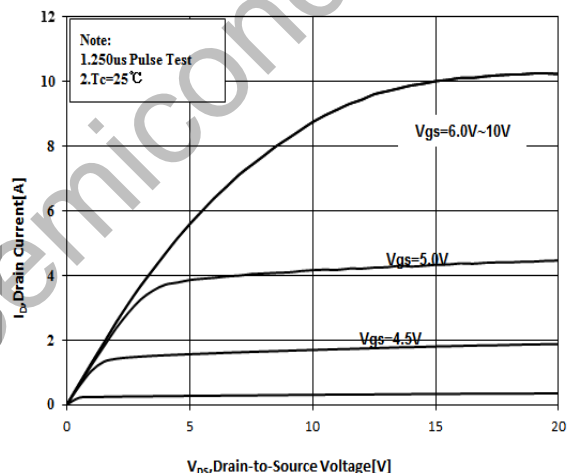


Figure 4 Typical Output Characteristics

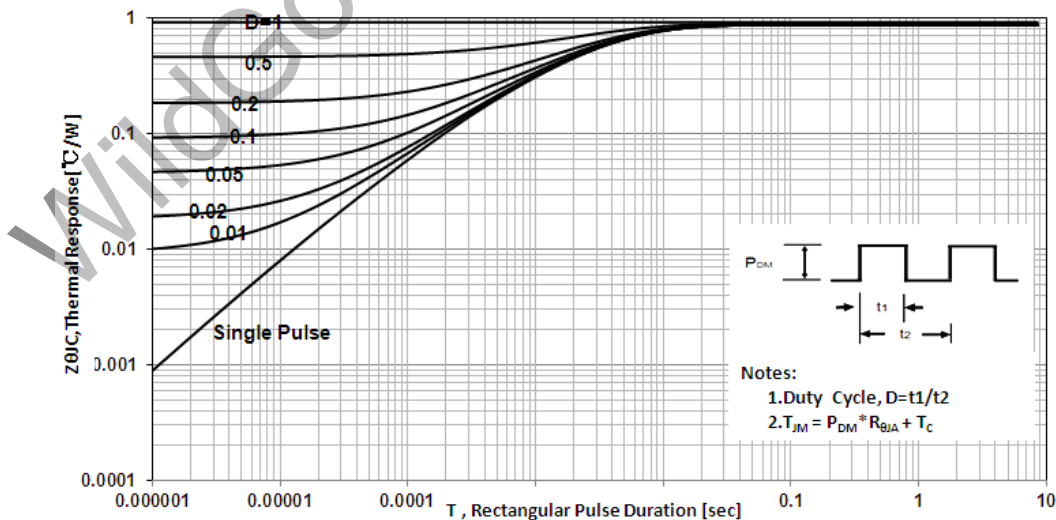


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

Typical Characteristics (Continued)

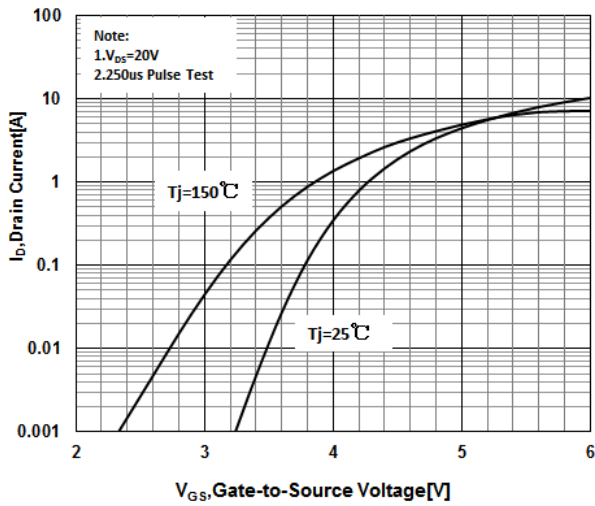


Figure 6 Typical Transfer Characteristics

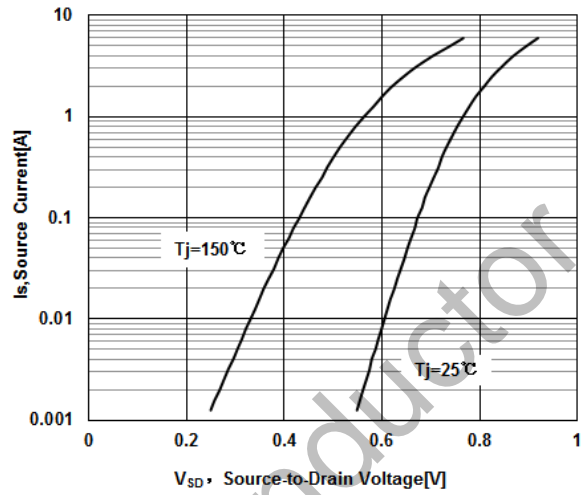


Figure 7 Typical Body Diode Transfer Characteristics

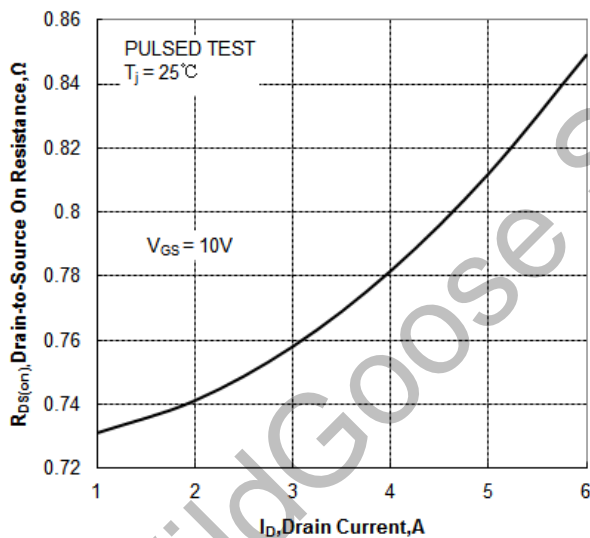


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

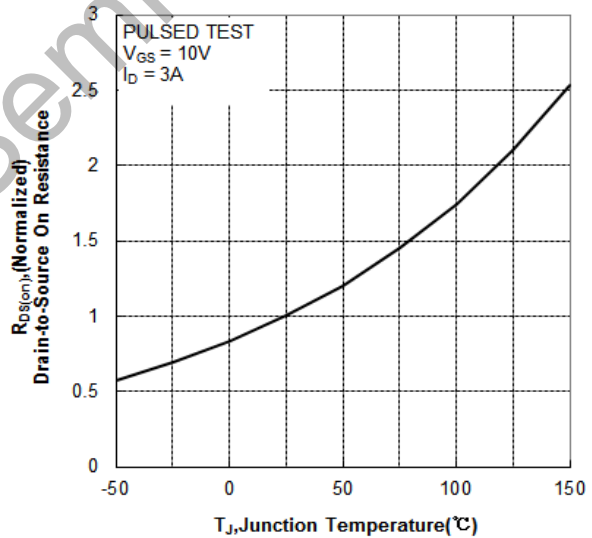
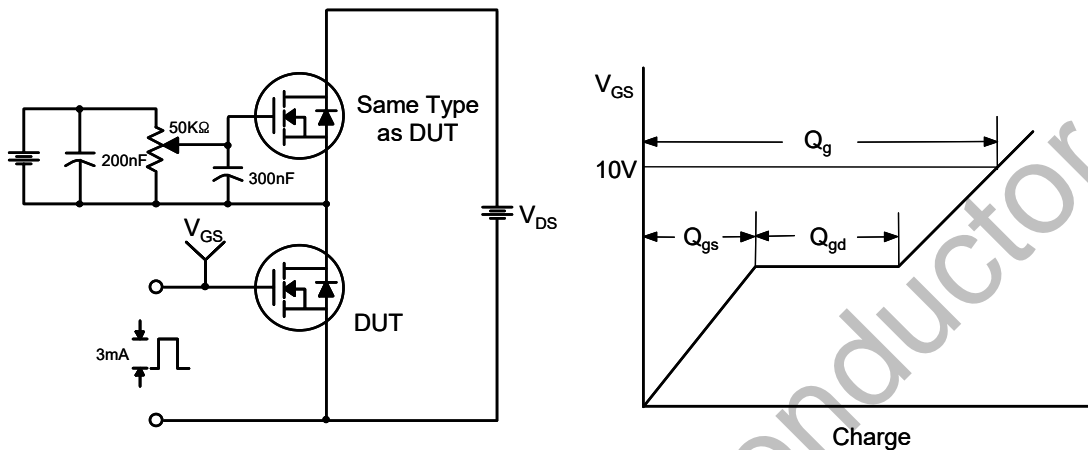
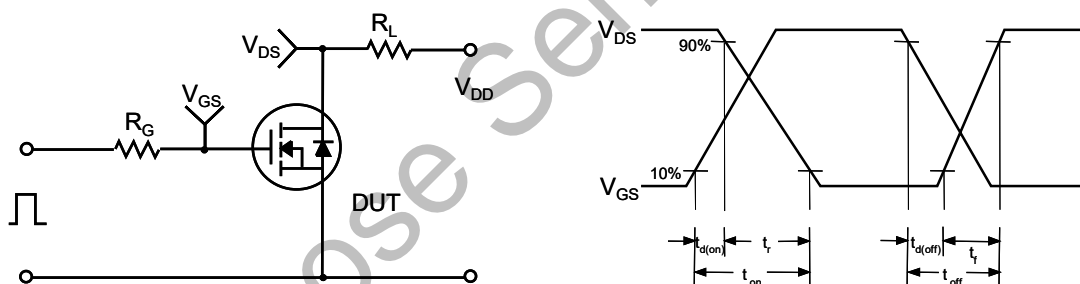


Figure 9 Typical Drain to Source on Resistance vs Junction Temperature

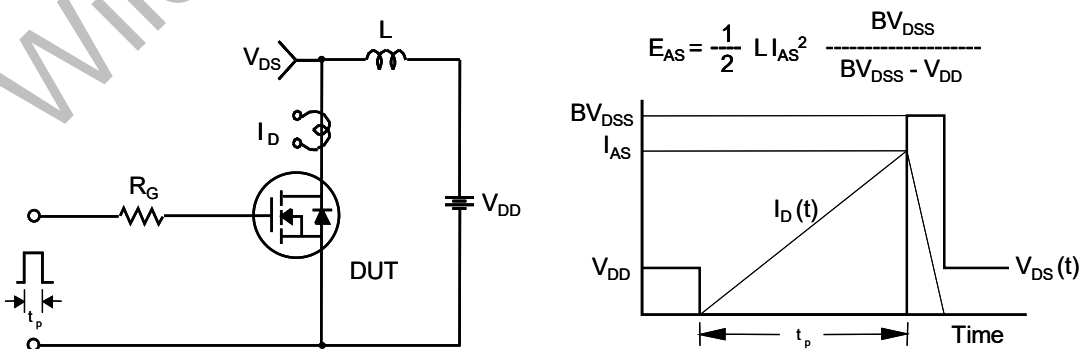
Gate Charge Test Circuit & Waveform



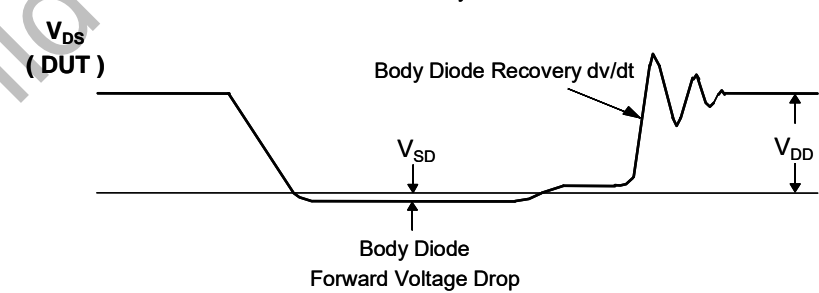
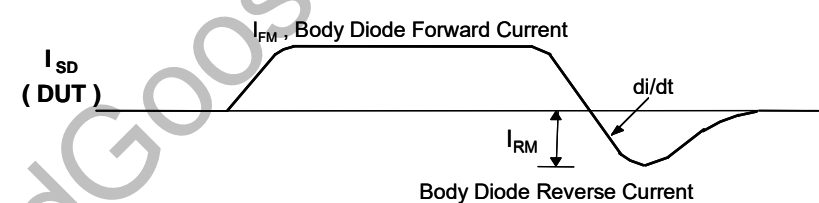
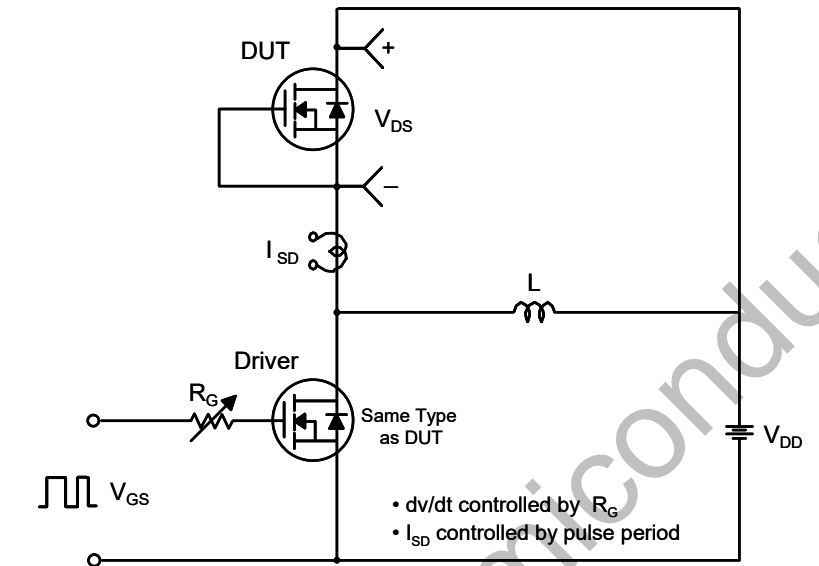
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



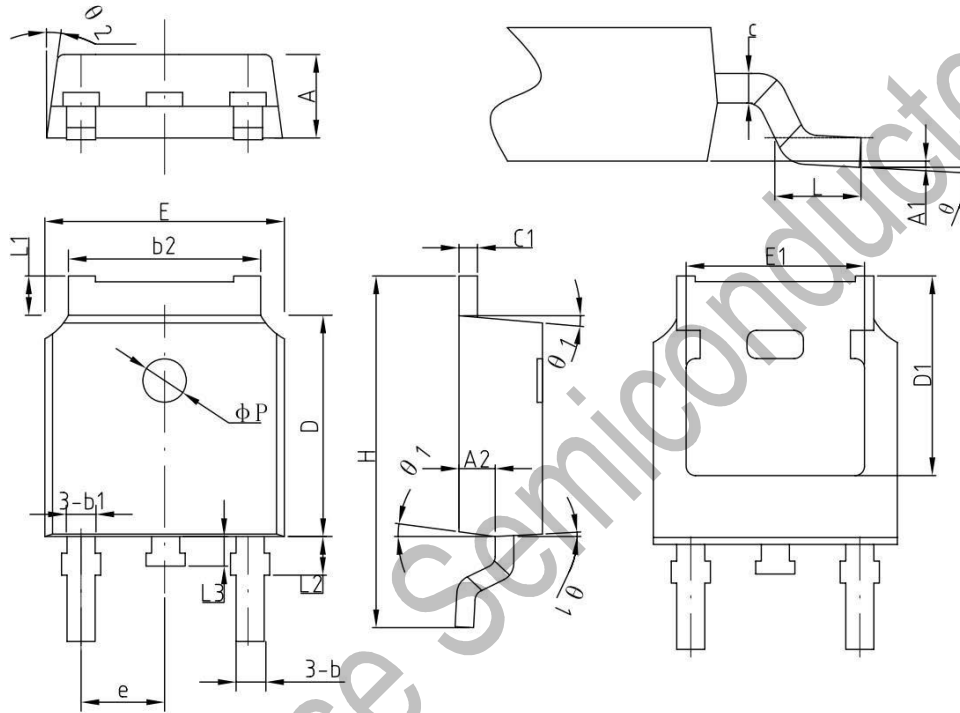
Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimension

TO-252

Unit: mm



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.2	2.30	2.38
A1	0	-	0.10
A2	0.90	1.01	1.10
b	0.71	0.76	0.86
b1		0.76	
b2	5.13	5.33	5.46
c	0.47	0.50	0.60
c1	0.47	0.50	0.60
D	6.0	6.10	6.20
D1	-	5.30	-
E	6.50	6.60	6.70
E1	-	4.80	-
e	2.286BSC		
H	9.70	10.10	10.40
L	1.40	1.50	1.70
L1	0.90	-	1.25
L2		1.05	
L3		0.8	
phi P		1.2	
theta	0°	-	8°
theta 1	5°	7°	9°
theta 2	5°	7°	9°

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