SHANGHAI SINO-IC MICROELECTRONICS CO., LTD.

Dec 2014

SE60120A

N-Channel Enhancement-Mode MOSFET

Revision: A

General Description

This type used advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge.

- High density cell design for ultra low $R_{DS(ON)}$
- Excellent package for good heat dissipation

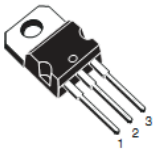
Features

For a single MOSFET

- V_{DS} = 60V
- $R_{DS(ON)}$ = 6mΩ @ V_{GS}=10V
-

Pin configurations

See Diagram below



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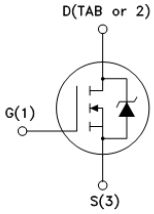


Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	Continuous	I_D	120	A
	Pulsed		370	
Total Power Dissipation	@TA=25℃	P_D	110	W
Operating Junction Temperature Range		T_J	-55 to 175	℃

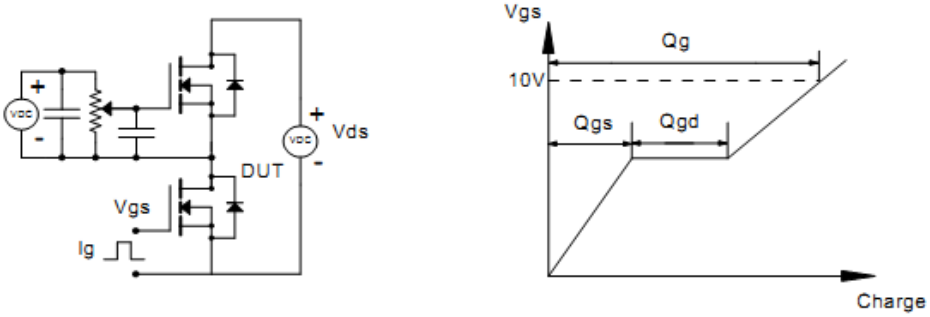
Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ**	**Max**	**Units**
OFF CHARACTERISTICS (Note 2)						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0 V	60			V
I_{DSS}	Drain to Source Leakage Current	V_{DS}= 48V, V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	2		4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=60A		6	7	mΩ
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=40V, f=1MHz		7765		pF
C_{oss}	Output Capacitance			960		pF
C_{rss}	Reverse Transfer Capacitance			66		pF
SWITCHING PARAMETERS						
Q_g	Total Gate Charge [2]	V_{GS}=10V, V_{DS}=40V, I_D=20A		127	178	nC
Q_{gs}	Gate Source Charge			58		nC
Q_{gd}	Gate Drain Charge			35		nC
$t_{d(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DS}=40V, R_{GEN}=3Ω		24		ns
$t_{d(off)}$	Turn-Off Delay Time			55		ns
$t_{d(r)}$	Turn-On Rise Time			18		ns
$t_{d(f)}$	Turn-Off Fall Time			17		ns

Thermal Resistance

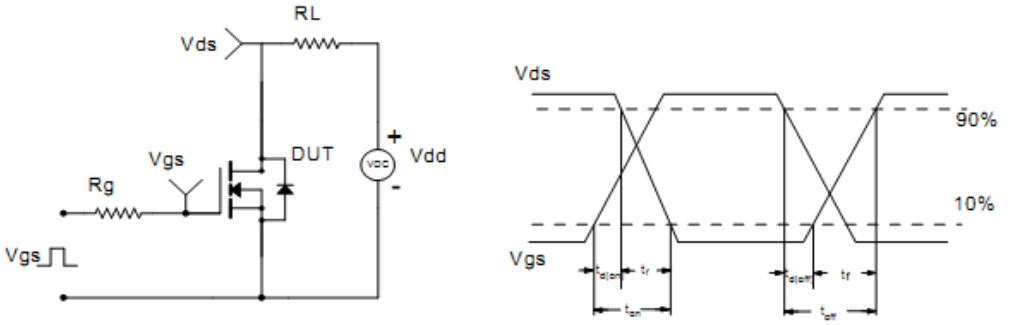
Symbol	**Parameter**	**Min**	**Typ**	**Units**
$R_{\theta JC}$	Junction to Case	0.35	0.55	℃/W

Test Circuit

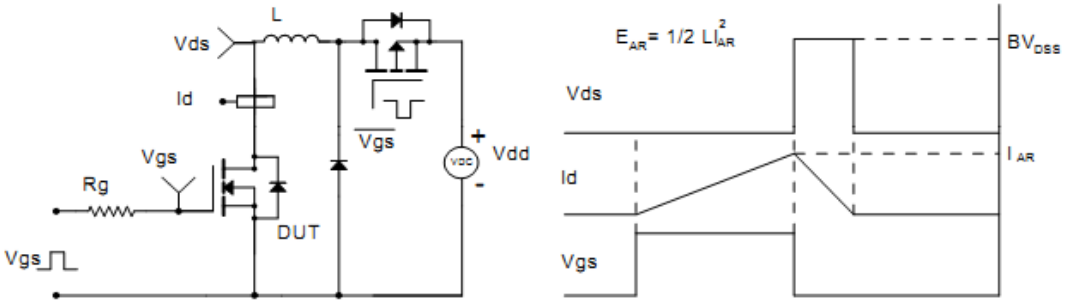
Gate Charge Test Circuit & Waveform



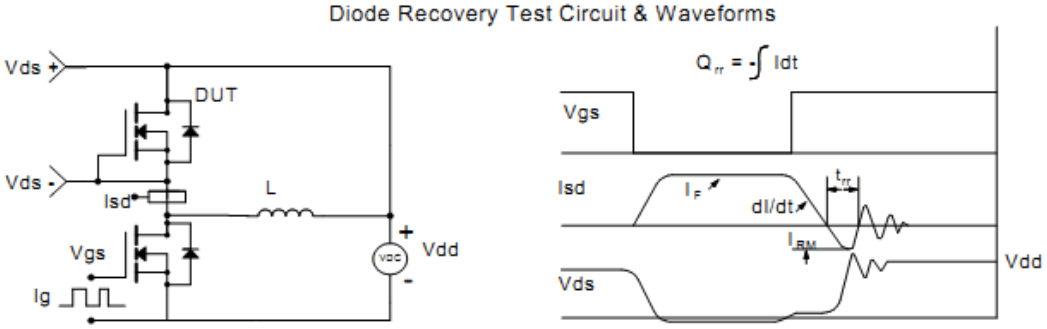
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

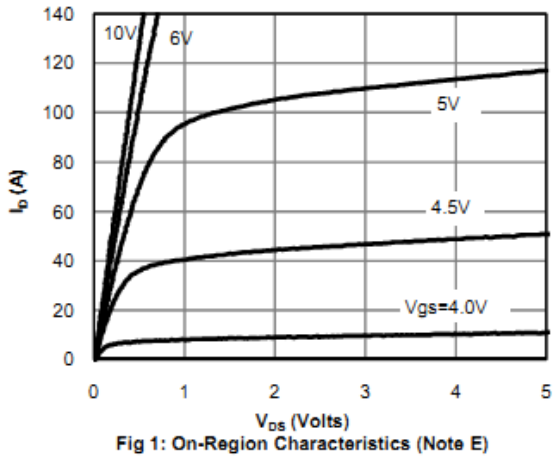


Fig 1: On-Region Characteristics (Note E)

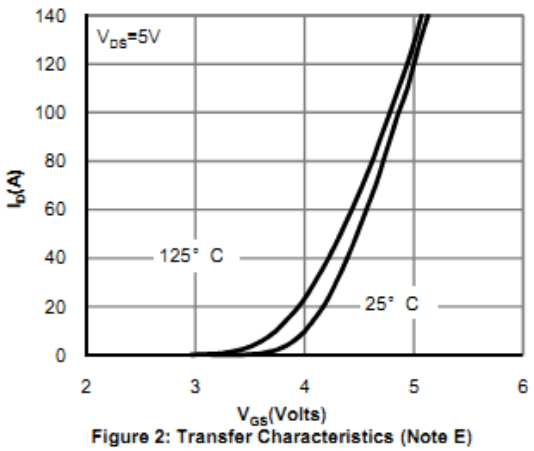


Figure 2: Transfer Characteristics (Note E)

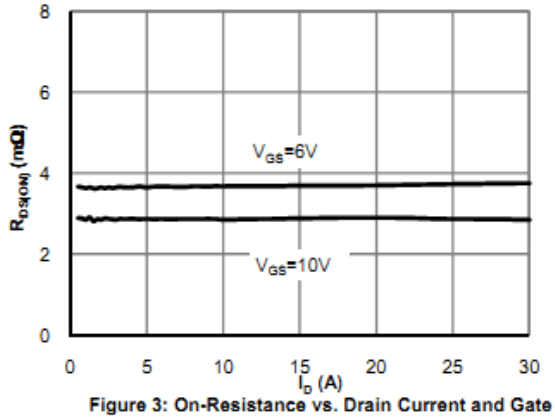


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

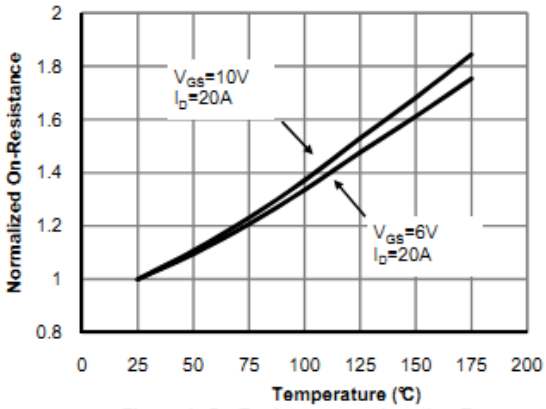


Figure 4: On-Resistance vs. Junction Temperature (Note E)

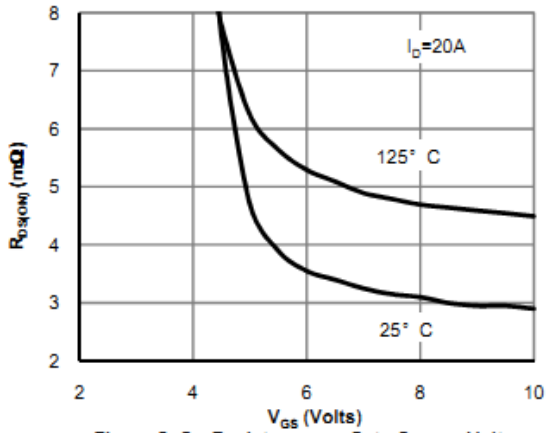


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

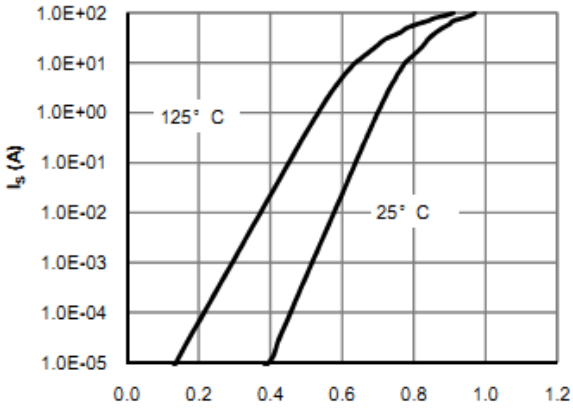


Figure 6: Body-Diode Characteristics (Note E)

Typical Characteristics

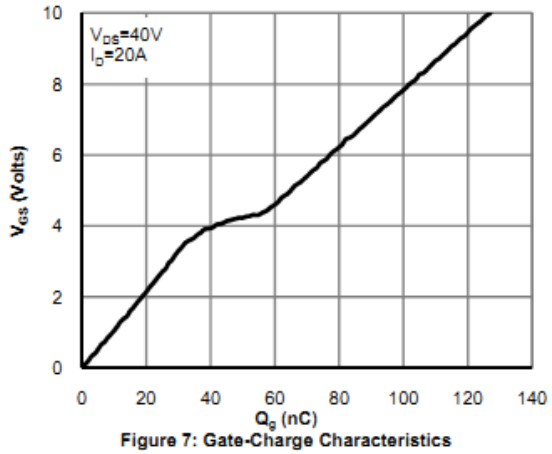


Figure 7: Gate-Charge Characteristics

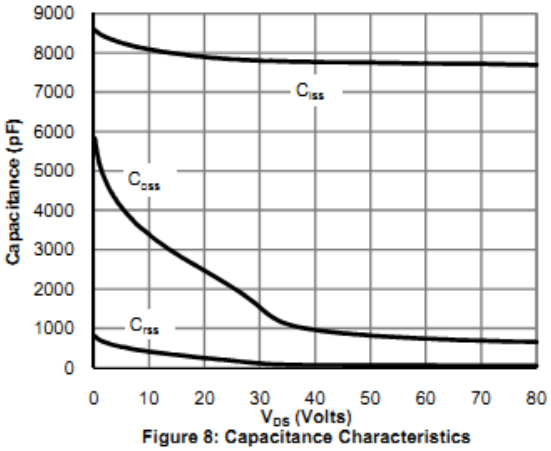


Figure 8: Capacitance Characteristics

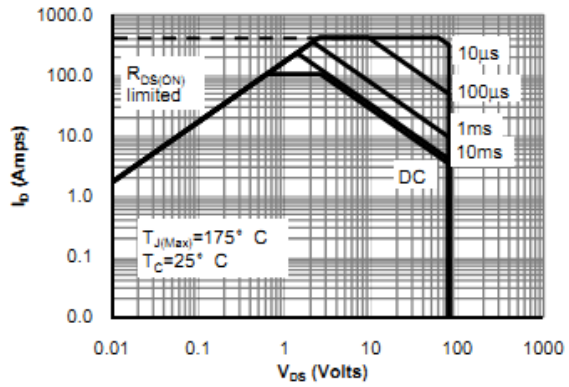


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

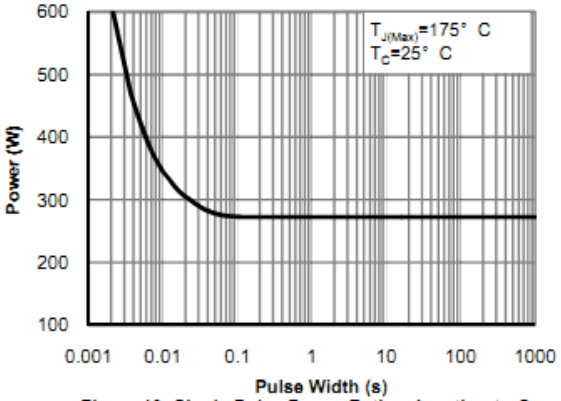


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

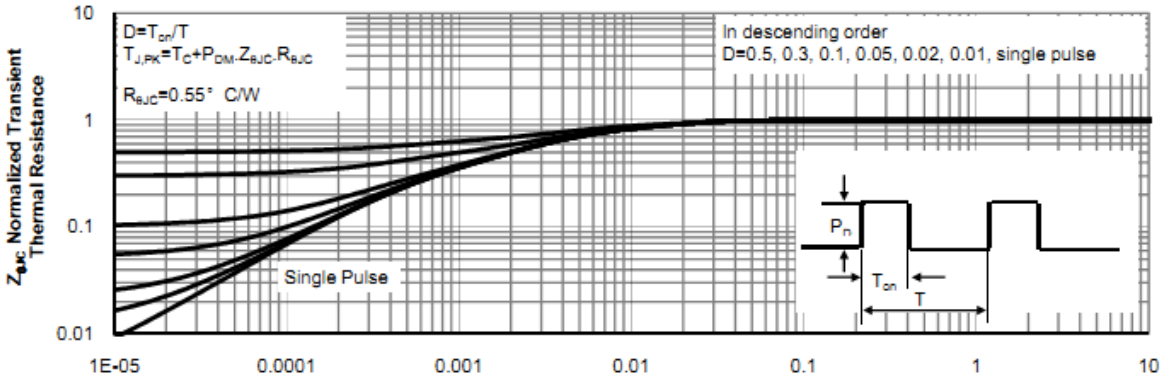


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Typical Characteristics

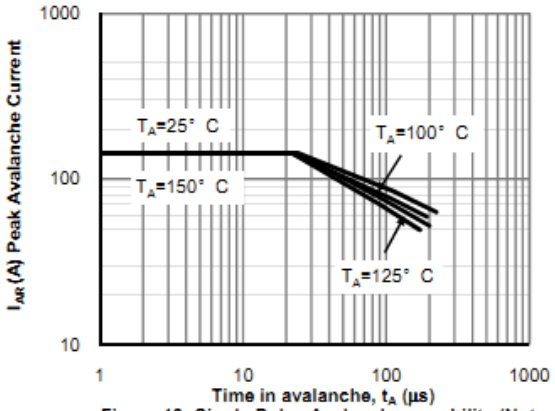


Figure 12: Single Pulse Avalanche capability (Note C)

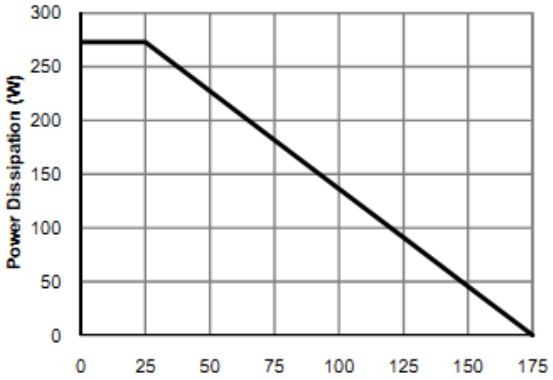


Figure 13: Power De-rating (Note F)

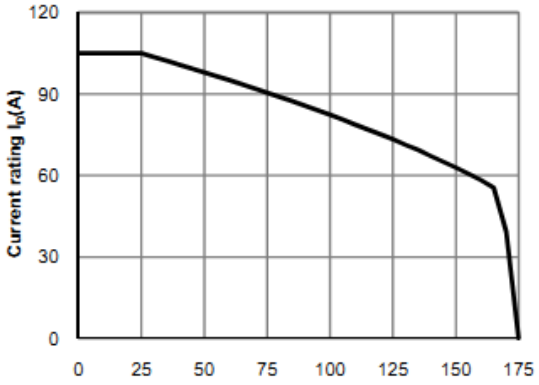


Figure 14: Current De-rating (Note F)

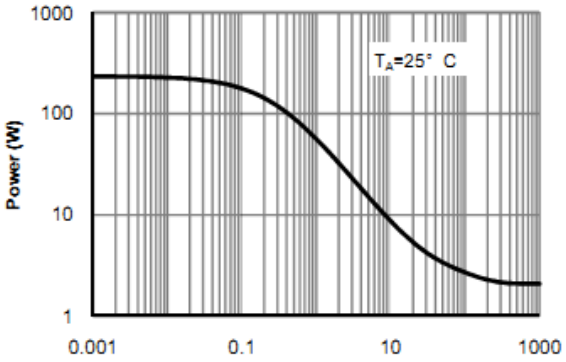


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

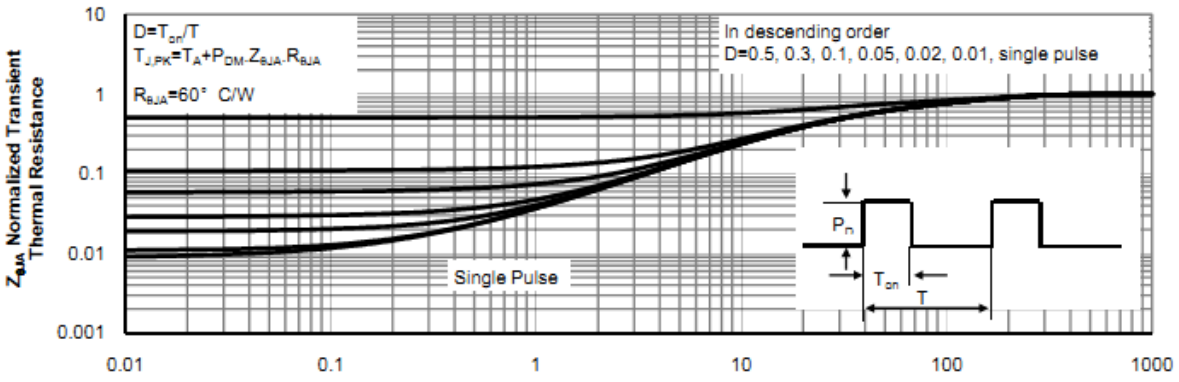


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Package Outline Dimension

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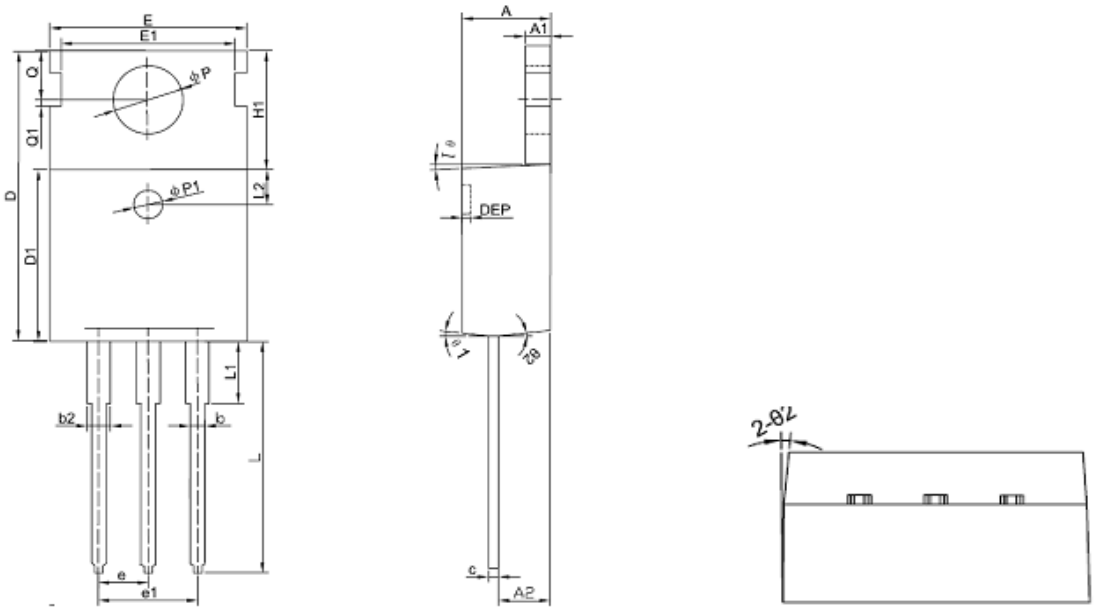

Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.400	4.550	4.700	0.173	0.179	0.185
A1	1.270	1.300	1.330	0.050	0.051	0.052
A2	2.590	2.690	2.790	0.102	0.106	0.110
b	0.770	-	0.900	0.030	-	0.035
b2	1.230	-	1.360	0.048	-	0.054
c	0.480	0.500	0.520	0.019	0.020	0.020
D	15.100	15.400	15.700	-	0.606	-
D1	9.000	9.100	9.200	0.354	0.358	0.362
DEP	0.050	0.285	0.520	0.002	0.011	0.020
E	10.060	10.160	10.260	0.396	0.400	0.404
E1	-	8.700	-	-	0.343	-
ΦP1	1.400	1.500	1.600	0.055	0.059	0.063
e		2.54BSC			0.1BSC	
e1		5.08BSC			0.2BSC	
H1	6.100	6.300	6.500	0.240	0.248	0.256
L	12.750	12.960	13.170	0.502	0.510	0.519
L1	-	-	3.950	-	-	0.156
L2		1.85REF			0.073REF	
ΦP	3.570	3.600	3.630	0.141	0.142	0.143
Q	2.730	2.800	2.870	0.107	0.110	0.113
Q1	-	0.200	-	-	0.008	-
θ1	5^0	7^0	9^0	5^0	7^0	9^0
θ2	1^0	3^0	5^0	1^0	3^0	5^0

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