MOSFET - Power, Single N-Channel, SUPERFET®, FAST, TOLL-4L
600 V, 80 mΩ, 32 A
NTBL080N60S5H

The SUPERFET V MOSFET FAST series helps maximize system efficiency by the extremely low switching losses in hard switching application. The TOLL package offers improved thermal performance and excellent switching performance by providing a Kelvin Source configuration and lower parasitic source inductance.

Features

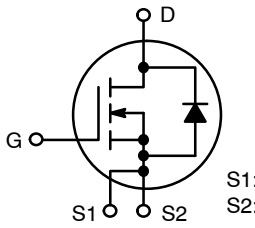
- 650 V @ T_J = 150°C
- Typ. $R_{DS(ON)}$ = 64 mΩ
- 100% Avalanche Tested
- Pb−Free, Halogen Free / BFR Free and are RoHS Compliant

Applications

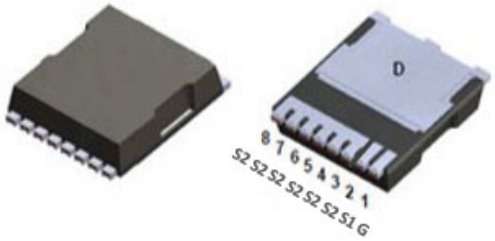
- Telecom / Sever Power Supplies
- EV Charger / UPS / Solar / Industrial Power Supplies

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
600 V	80 mΩ @ 10 V	32 A

N−CHANNEL MOSFET



S1: Driver Source
S2: Power Source



H−PSOF8L
CASE 100DC

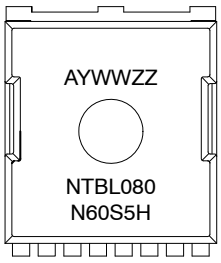
MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain−to−Source Voltage		V_{DSS}	600	V
Gate−to−Source Voltage	DC	V_{GS}	±30	V
	AC (f > 1 Hz)		±30	
Continuous Drain Current	T_C = 25°C	I_D	32	A
	T_C = 100°C		20	
Power Dissipation	T_C = 25°C	P_D	208	W
Pulsed Drain Current (Note 1)	T_C = 25°C	I_{DM}	112	A
Pulsed Source Current (Body Diode) (Note 1)		I_{SM}	112	A
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to +150	°C
Source Current (Body Diode)		I_S	32	A
Single Pulse Avalanche Energy	I_L = 5.8 A, R_G = 25 Ω	E_{AS}	287	mJ
Avalanche Current		I_{AS}	5.8	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	2.08	mJ
MOSFET dv/dt		dv/dt	120	V/ns
Peak Diode Recovery dv/dt (Note 2)			20	
Lead Temperature for Soldering Purposes (1/8″ from Case for 10 Seconds)		T_L	260	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Repetitive rating: pulse−width limited by maximum junction temperature.
2. I_{SD} ≤ 16 A, di/dt ≤ 200 A/s, V_{DD} ≤ 400 V, starting T_J = 25°C.

MARKING DIAGRAM



A	= Assembly Location
Y	= Year
WW	= Work Week
ZZ	= Assembly Lot Code
NTBL080N60S5H	= Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping†
NTBL080N60S5H	H−PSOF8L	2000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Units
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	0.6	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	43	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA, T_J = 25°C	600			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	I_D = 10 mA, Referenced to 25°C		630		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 600 V, T_J = 25°C			2	μA
Gate−to−Source Leakage Current	I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V			±100	nA
ON CHARACTERISTICS						
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 16 A, T_J = 25°C		64	80	mΩ
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 3.3 mA, T_J = 25°C	2.7		4.3	V
Forward Transconductance	g_{FS}	V_{DS} = 20 V, I_D = 16 A		32.8		S
CHARGES, CAPACITANCES & GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 250 KHz, V_{DS} = 400 V		3127		pF
Output Capacitance	C_{OSS}			46		
Time Related Output Capacitance	$C_{OSS(tr)}$	I_D = Constant, V_{DS} = 0 to 400 V, V_{GS} = 0 V		719		
Energy Related Output Capacitance	$C_{OSS(er)}$	V_{GS} = 0 V, V_{DS} = 0 to 400 V		77.1		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DD} = 400 V, I_D = 16 A		55.8		nC
Gate−to−Source Charge	Q_{GS}			15.1		
Gate−to−Drain Charge	Q_{GD}			14.6		
Gate−Resistance	R_G	f = 1 MHz		1.17		Ω
SWITCHING CHARACTERISTICS						
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 0/10 V, V_{DD} = 400 V, I_D = 16 A, R_G = 4.7 Ω		22.9		ns
Rise Time	t_r			6.15		
Turn−Off Delay Time	$t_{d(OFF)}$			67		
Fall Time	t_f			2.54		
SOURCE−TO−DRAIN DIODE CHARACTERISTICS						
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_{SD} = 16 A, T_J = 25°C			1.2	V
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, I_{SD} = 16 A, dI_S/dt = 100 A/μs, V_{DD} = 400 V		383		ns
Reverse Recovery Charge	Q_{RR}			6092		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS

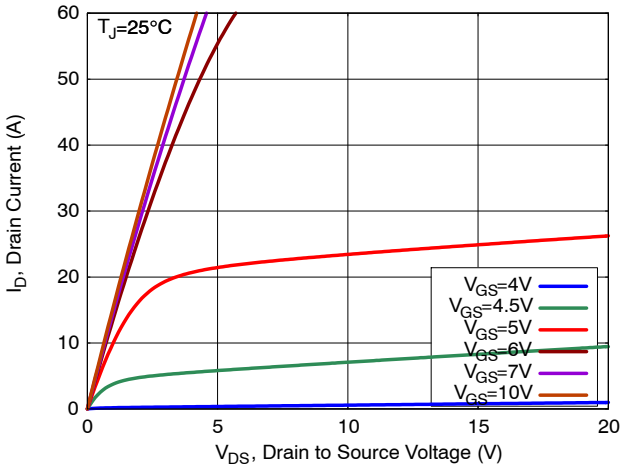


Figure 1. On−Region Characteristics

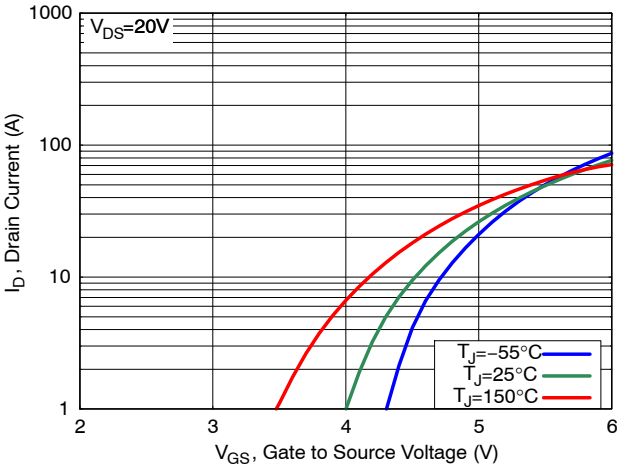


Figure 2. Transfer Characteristics

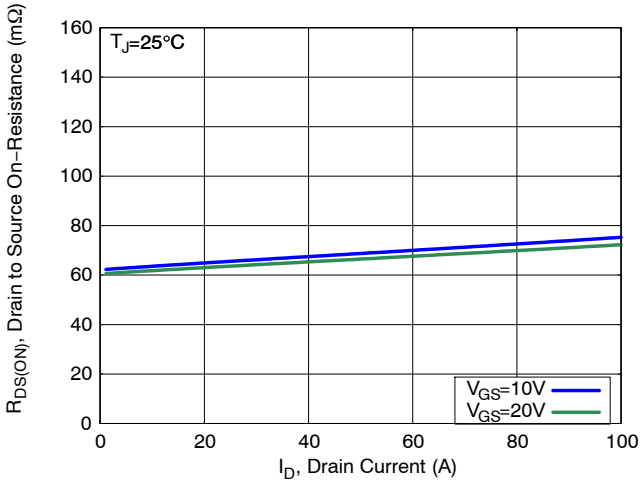


Figure 3. On−Resistance Variation vs. Drain Current and Gate Voltage

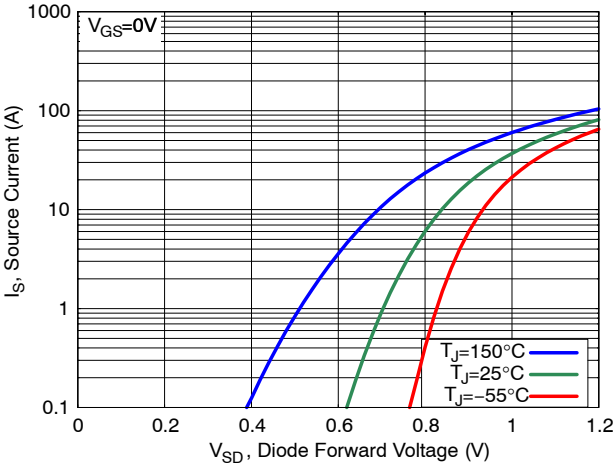


Figure 4. Diode Forward Voltage vs. Source Current

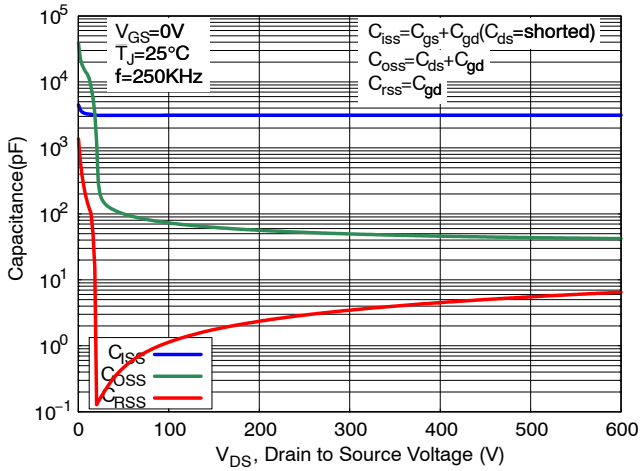


Figure 5. Capacitance Characteristics

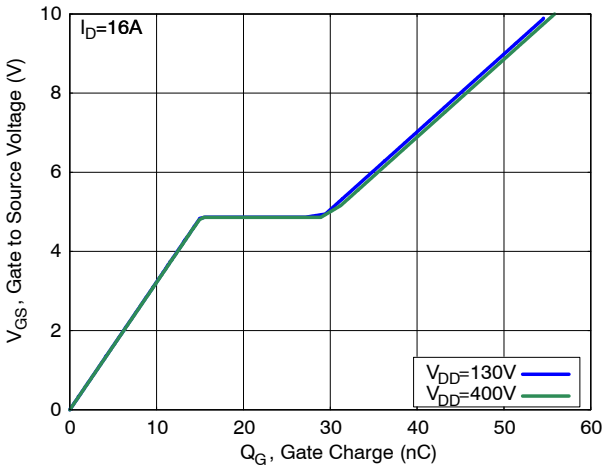


Figure 6. Gate Charge Characteristics

TYPICAL CHARACTERISTICS

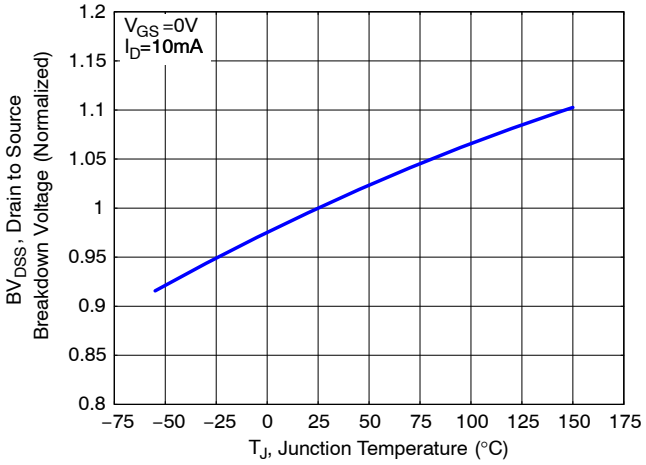


Figure 7. Breakdown Voltage Variation vs. Temperature

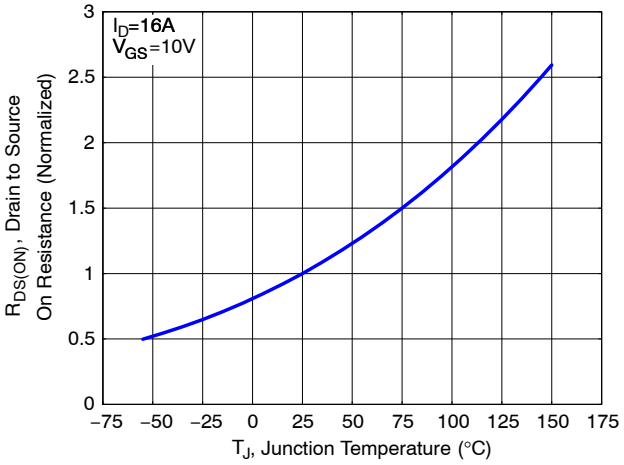


Figure 8. On−Resistance Variation vs. Temperature

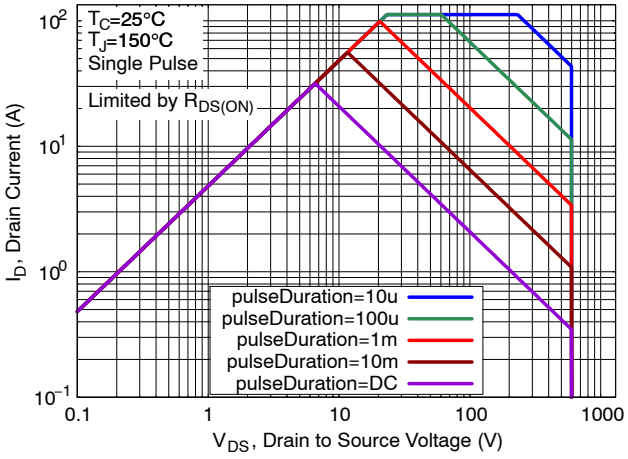


Figure 9. Maximum Safe Operating Area

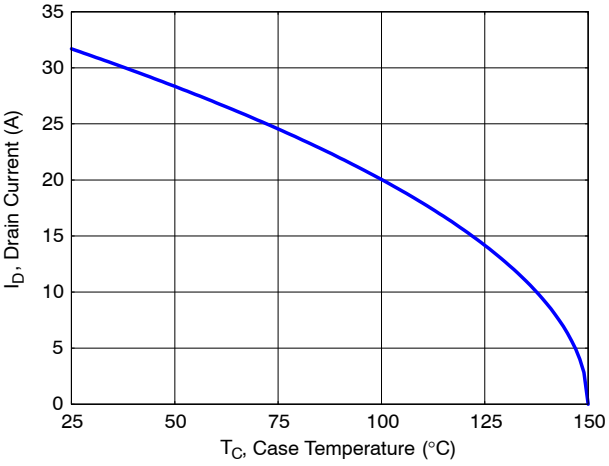


Figure 10. Maximum Drain Current vs. Case Temperature

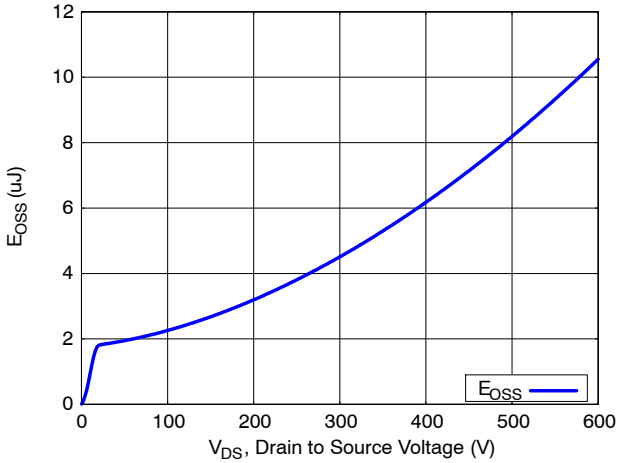


Figure 11. Eoss vs. Drain−to−Source Voltage

TYPICAL CHARACTERISTICS

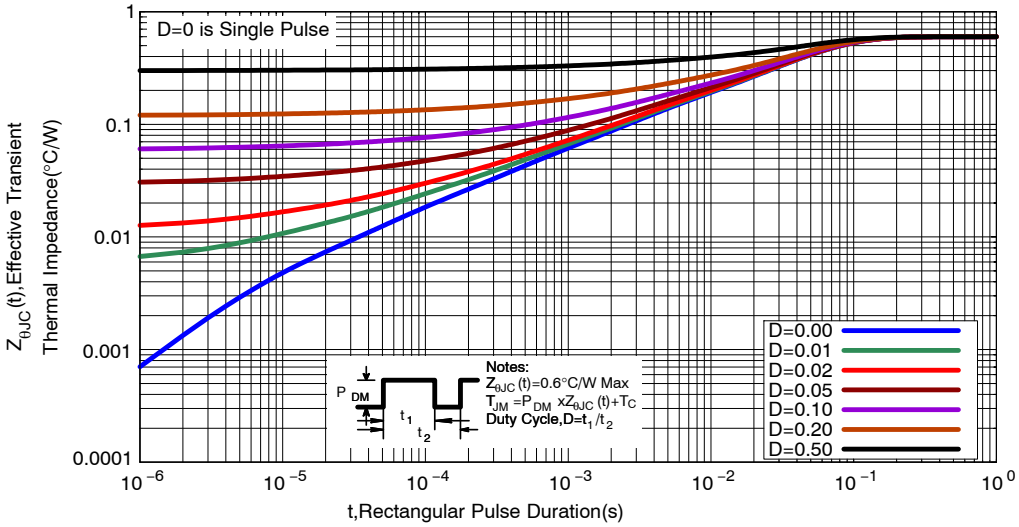
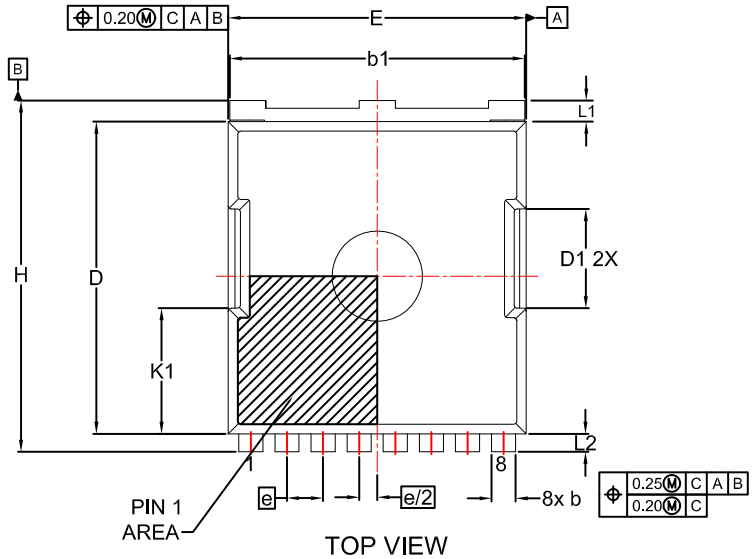


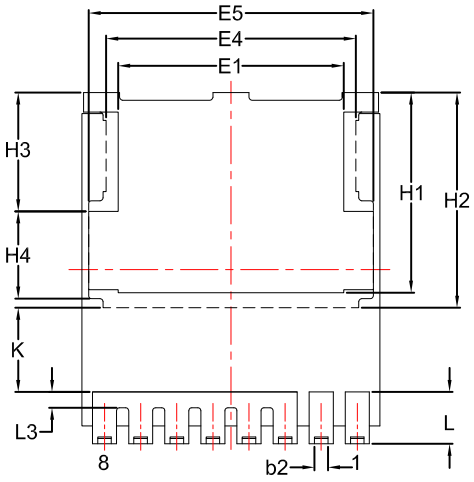
Figure 12. Transient Thermal Impedance

PACKAGE DIMENSIONS

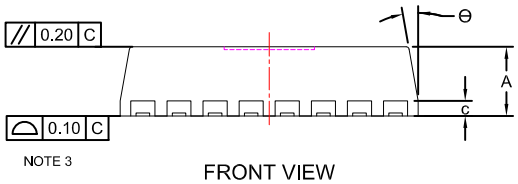
H−PSOF8L 9.90x11.68, 1.20P
CASE 100DC
ISSUE O



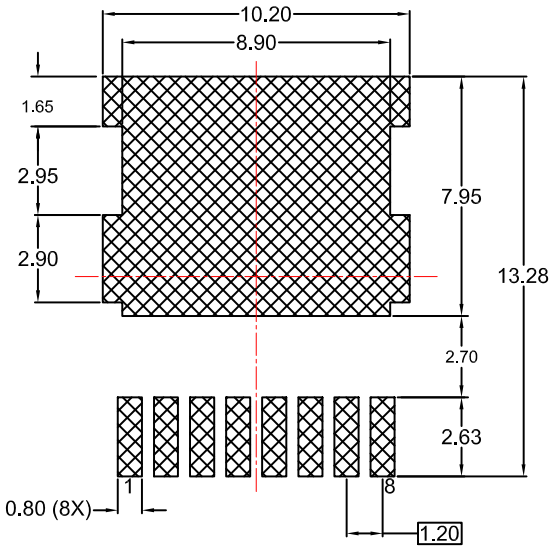
TOP VIEW



BOTTOM VIEW



FRONT VIEW



RECOMMENDED LAND PATTERN

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.36	0.46	0.56
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D1		3.30	
E	9.80	9.90	10.80
E1	7.40	7.50	7.60
E4		8.30	
E5		9.49	
e		1.20 BSC	
e/2		0.60 BSC	
H	11.58	11.68	11.78
H1	6.55	6.65	6.75
H2	7.05	7.15	7.25
H3		3.60	
H4		3.26	
K	2.70	2.80	2.90
K1		4.18	
L	1.63	1.73	1.83
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L3	1.10	1.20	1.30
Θ		10° REF.	

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