


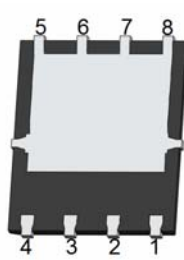
NCE P-Channel Super Trench Power MOSFET

<p>Description</p> <p>The NCEP40P80G uses Super Trench technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification</p> <p>Application</p> <ul style="list-style-type: none"> ● DC/DC Converter ● Ideal for high-frequency switching and synchronous rectification 	<p>General Features</p> <ul style="list-style-type: none"> ● $V_{DS} = -40V, I_D = -80A$ ● $R_{DS(ON)} = 6.3m\Omega$ (typical) @ $V_{GS} = -10V$ ● $R_{DS(ON)} = 9.0m\Omega$ (typical) @ $V_{GS} = -4.5V$ ● Excellent gate charge x $R_{DS(on)}$ product(FOM) ● Very low on-resistance $R_{DS(on)}$ ● 150 °C operating temperature ● Pb-free lead plating <p style="text-align: right; color: red;">100% UIS TESTED! 100% ΔV_{ds} TESTED!</p>
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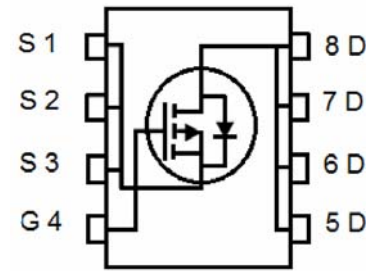
DFN 5X6



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP40P80G	NCEP40P80G	DFN5X6-8L	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	$I_D(T_C = 25^\circ C)$	-80	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(T_C = 100^\circ C)$	-56	A
Drain Current-Continuous ($T_A = 25^\circ C$)	$I_D(T_A = 25^\circ C)$	-12.8	A
Pulsed Drain Current	I_{DM}	-320	A
Maximum Power Dissipation($T_C = 25^\circ C$)	$P_D(T_C = 25^\circ C)$	75	W
Maximum Power Dissipation($T_A = 25^\circ C$)	$P_D(T_A = 25^\circ C)$	2.3	W
Pulsed Drain Current	I_{DM}	-320	A
Derating factor		0.6	W/ $^\circ C$
Single pulse avalanche energy ^(Note 3)	E_{AS}	500	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.67	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient ^(Note 1)	$R_{\theta JA}$	55	$^{\circ}\text{C/W}$

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-40		-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.1	-1.6	-2.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$	-	6.3	7.5	m Ω
		$V_{GS}=-4.5V, I_D=-20A$	-	9.0	12.0	m Ω
Gate resistance	R_G		-	2.0	-	Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-20A$	-	30	-	S
Dynamic Characteristics ^(Note2)						
Input Capacitance	C_{iss}	$V_{DS}=-20V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	3700	-	PF
Output Capacitance	C_{oss}		-	880	-	PF
Reverse Transfer Capacitance	C_{riss}		-	20	-	PF
Switching Characteristics ^(Note 2)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-20V, I_D=-20A$ $V_{GS}=-10V, R_G=1.6\Omega$	-	10.5	-	nS
Turn-on Rise Time	t_r		-	4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	-	nS
Turn-Off Fall Time	t_f		-	5	-	nS
Total Gate Charge	Q_g	$V_{DS}=-20V, I_D=-20A,$ $V_{GS}=-10V$	-	57	-	nC
Gate-Source Charge	Q_{gs}		-	9.8	-	nC
Gate-Drain Charge	Q_{gd}		-	7.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-20A$	-		-1.2	V
Diode Forward Current	I_S		-	-	-80	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = -20A$	-		24	nS
Reverse Recovery Charge	Q_{rr}	$di/dt = 100A/\mu s$	-		68	nC

Notes:

- The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^{\circ}\text{C}$.
- Guaranteed by design, not subject to production
- EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=-20V, V_G=-10V, L=0.5\text{mH}, R_G=25\Omega$

Typical Electrical and Thermal Characteristics

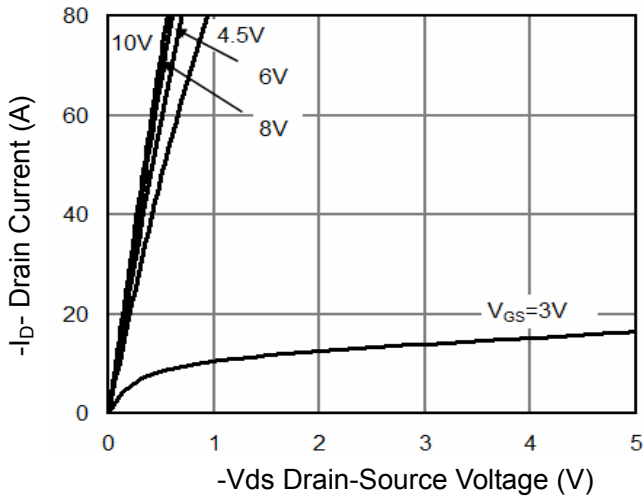


Figure 1 Output Characteristics

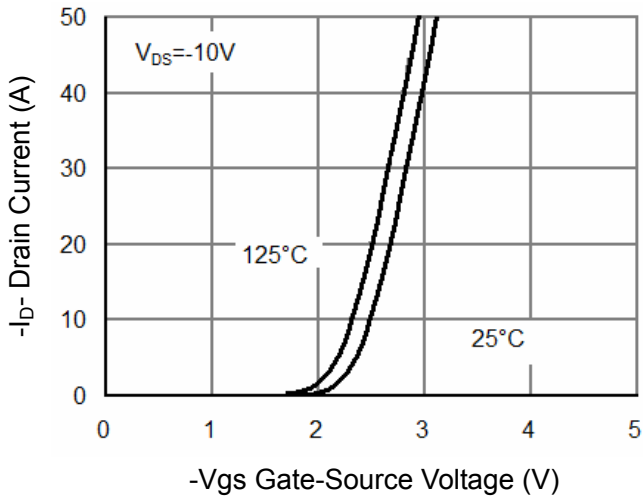


Figure 2 Transfer Characteristics

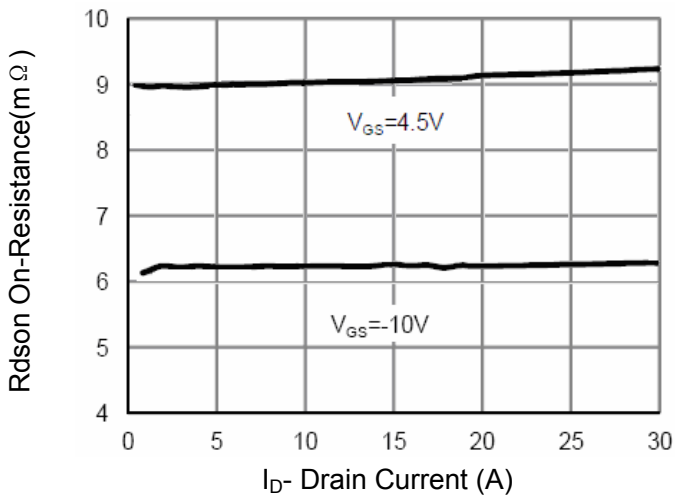


Figure 3 Rdson- Drain Current

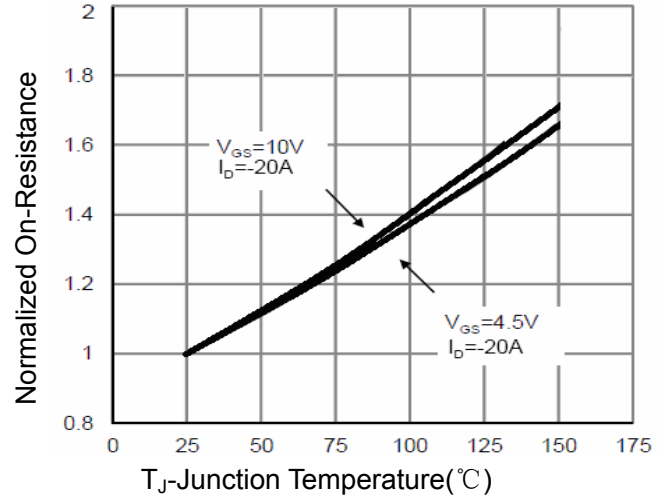


Figure 4 Rdson-Junction Temperature

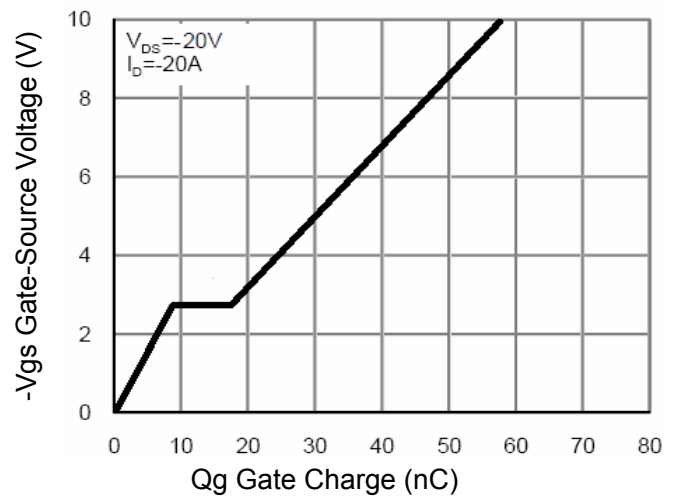


Figure 5 Gate Charge

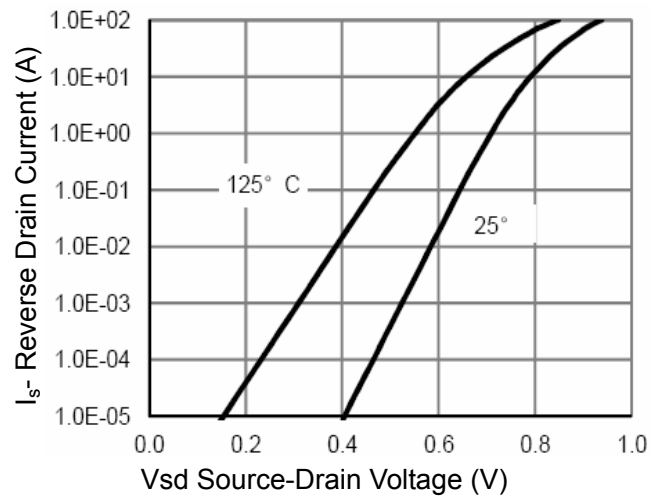


Figure 6 Source- Drain Diode Forward

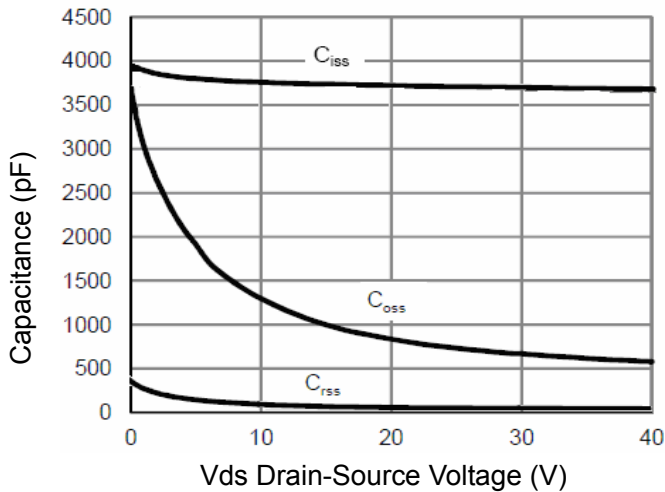


Figure 7 Capacitance vs Vds

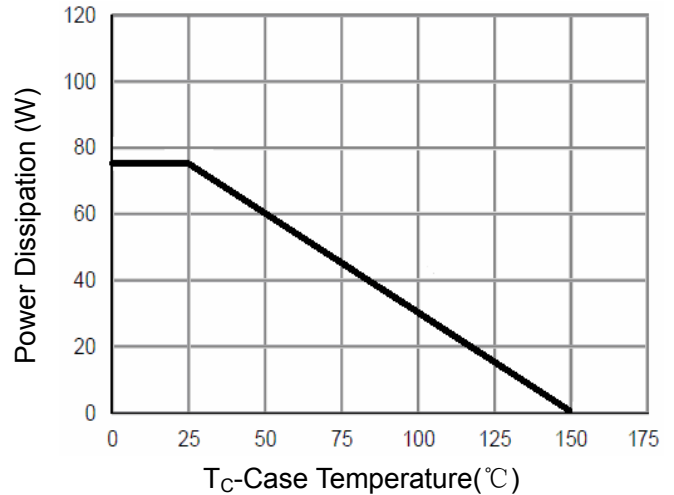


Figure 9 Power De-rating

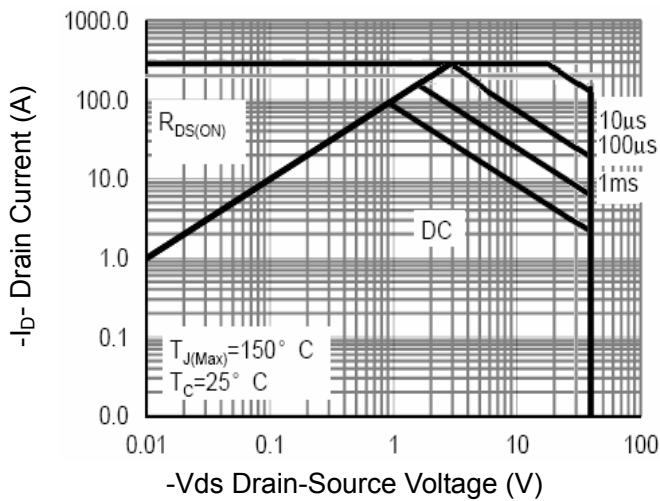


Figure 8 Safe Operation Area

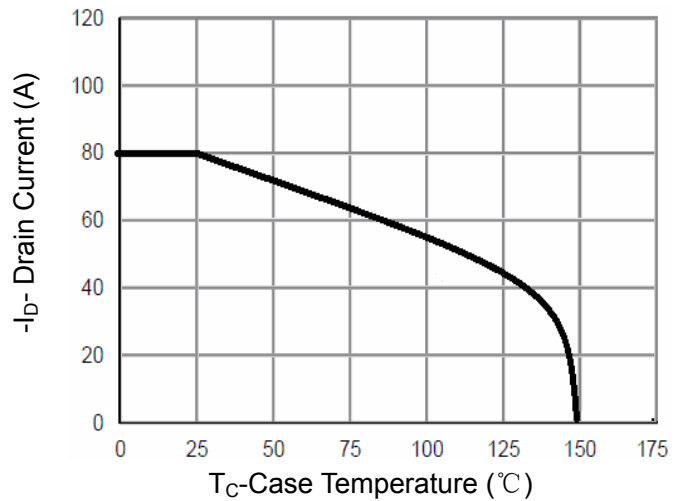


Figure 10 Current De-rating

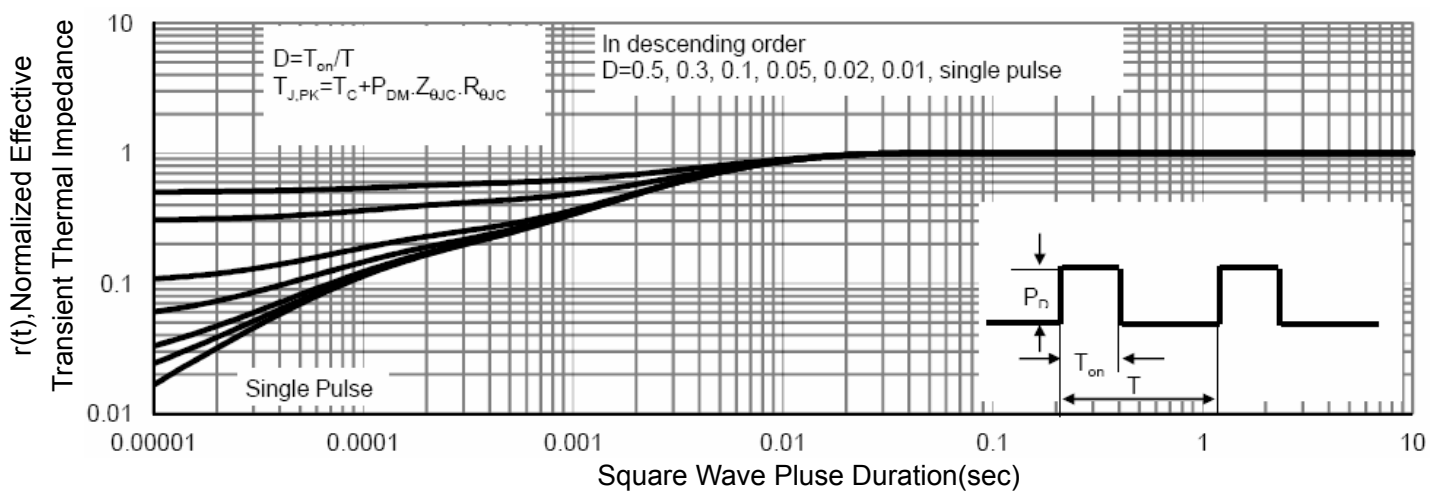
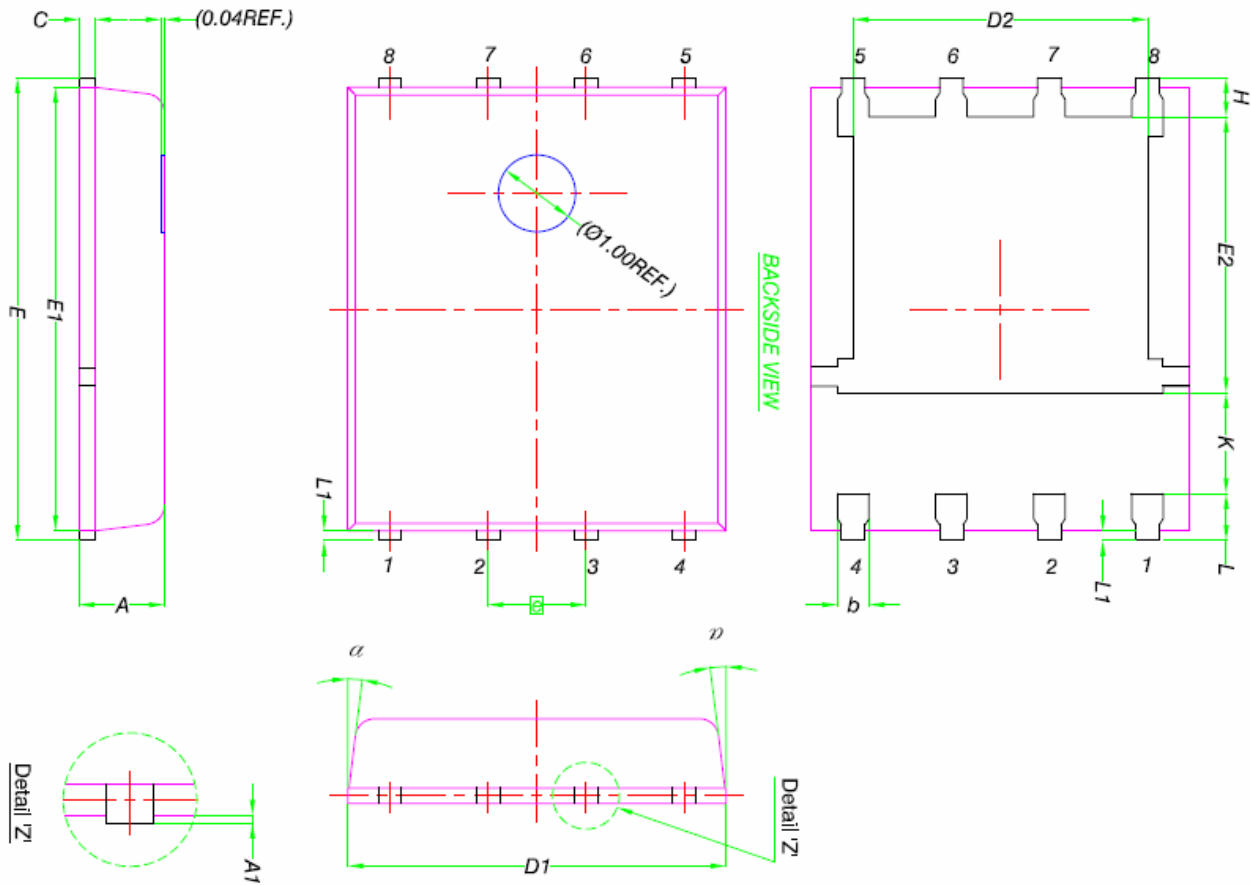
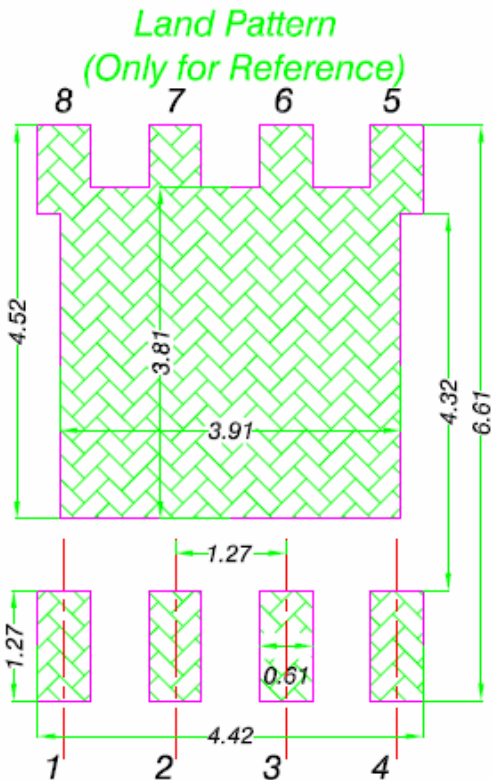


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



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°



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