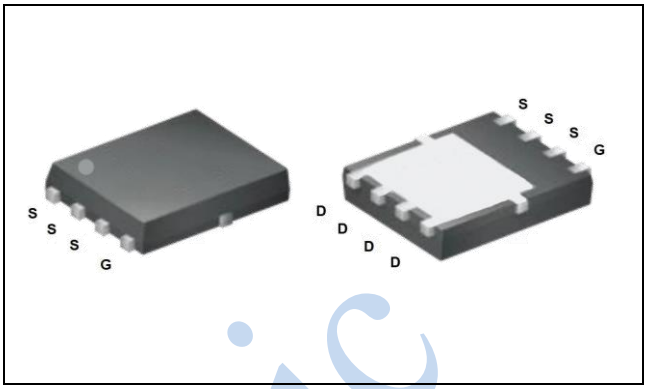
N-Channel 100 V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
100	5.2 @ V_{GS} = 10V 7.0 @ V_{GS} = 4.5V	80 (1)

PDFN5X6-8L

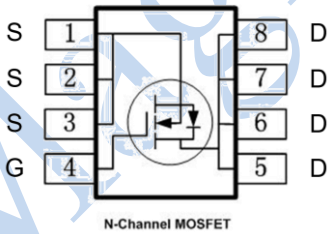


Features

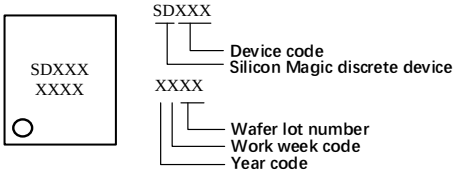
- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- Motor drives



Pb-free
RoHS COMPLIANT
HALOGEN FREE



Package and ordering information

Ordering code	Package	Device code
SDN10K5P2S2C	PDFN5X6-8L	AAT

1. Maximum ratings

Absolute maximum ratings (T_A = 25℃ unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-source voltage		V_{DS}	100	V
Drain-source voltage spike, 10μs		V_{DS}	120	
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25℃ (1)	I_D	80	A
	T_C=100℃		73	
	T_A=25℃ (4)		16	
Pulsed drain current(2)		$I_{D,pulse}$	320	
Avalanche energy, single pulse(3)		E_{AS}	204	mJ
Power dissipation	T_C=25℃	P_D	125	W
	T_A=25℃ (4)		2.7	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		**Symbol**	**Max.**	**Unit**
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	1.0	°C/W
Thermal resistance, junction-to-ambient (4)	Steady state	$R_{\theta JA}$	45	

3. Electrical Characteristics

Electrical characteristics (T_A = 25°C unless otherwise noted)						
Parameter	**Symbol**	**Test conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0, I_D = 250 μA	100			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1.2	1.9	2.6	V
Gate-body leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V			1	μA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 40 A		4.8	5.2	mΩ
		V_{GS} = 4.5 V, I_D = 16 A		6.1	7	
Forward transconductance (5)	g_{fs}	V_{DS} = 5 V, I_D = 40 A		97		S
Gate resistance	R_g	f = 1MHz		1	2	Ω
Dynamic(5)						
Total gate charge	Q_g	V_{DS} = 50 V, I_D = 40 A, V_{GS} = 10 V		56	79	nC
Gate-source charge	Q_{gs}			10	14	
Gate-drain charge	Q_{gd}			16	23	
Turn-on delay time	$t_{d(on)}$	V_{DS} = 50 V, I_D = 40 A, V_{GS} = 10 V, R_{GEN} = 3 Ω		16	32	ns
Rise time	t_r			22	44	
Turn-off delay time	$t_{d(off)}$			48	96	
Fall time	t_f			14	28	
Input capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz		2200	3080	pF
Output capacitance	C_{oss}			415	580	
Reverse transfer capacitance	C_{rss}			15	30	
Reverse Diode Characteristics (5)						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 40 A		0.8	1.1	V
Reverse recovery time	t_{rr}	V_{DS} = 50 V, I_F = 40 A, di/dt = 100 A/μs		150	270	ns
Reverse recovery charge	Q_{rr}			263	475	nC

Notes

(1) Package limited.

(2) Pulse width limited by maximum junction temperature.

(3) V_{DS} = 75 V, V_{GS} = 10 V, L = 0.3 mH.

(4) $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.

(5) Guaranteed by design, not subject to production testing.

4. Electrical characteristics diagrams

Fig.1 Typ. transfer characteristics

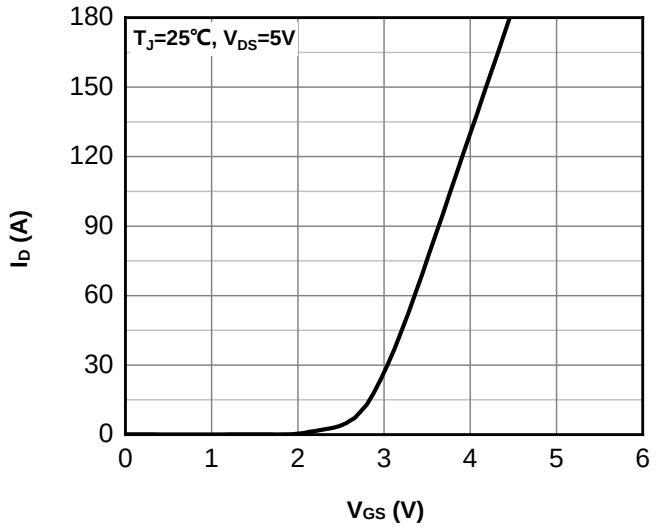


Fig.2 Typ. output characteristics

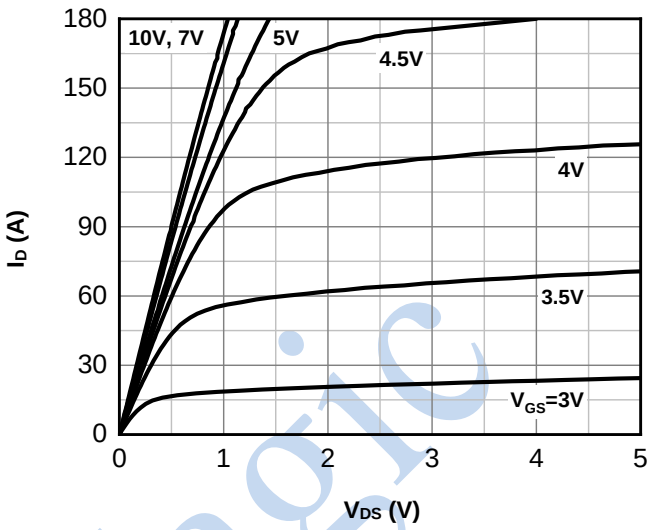


Fig.3 Normalized on-resistance vs drain current

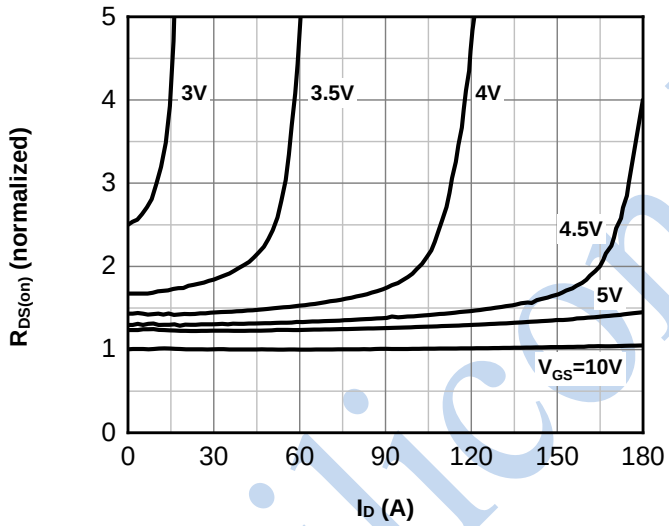


Fig.4 Typ. on-resistance vs gate-source voltage

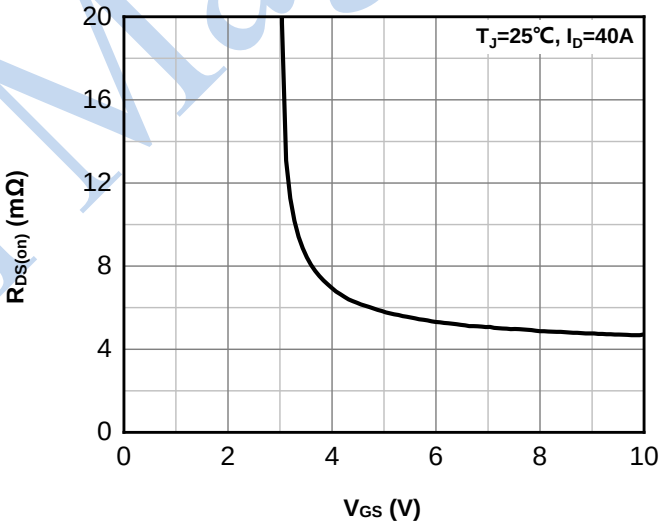


Fig.5 Normalized on-resistance vs junction temperature

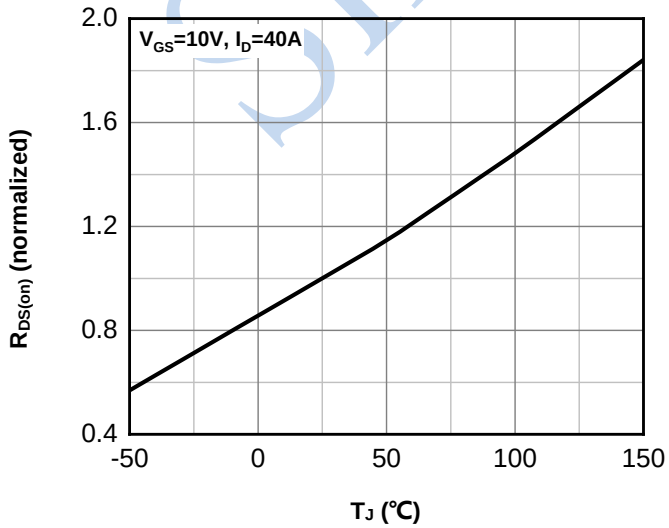


Fig.6 Typ. gate charge

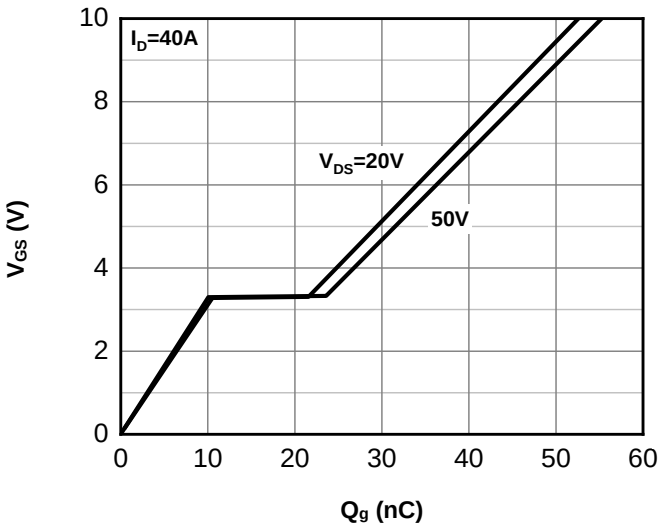


Fig.7 Typ. forward characteristics of body diode

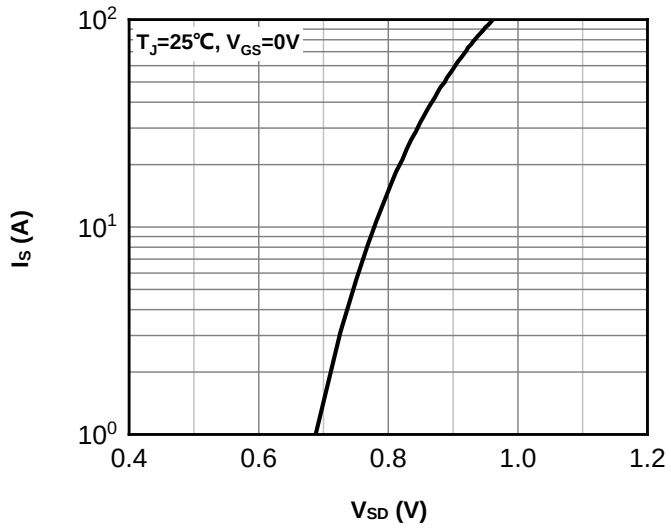


Fig.8 Safe operating area

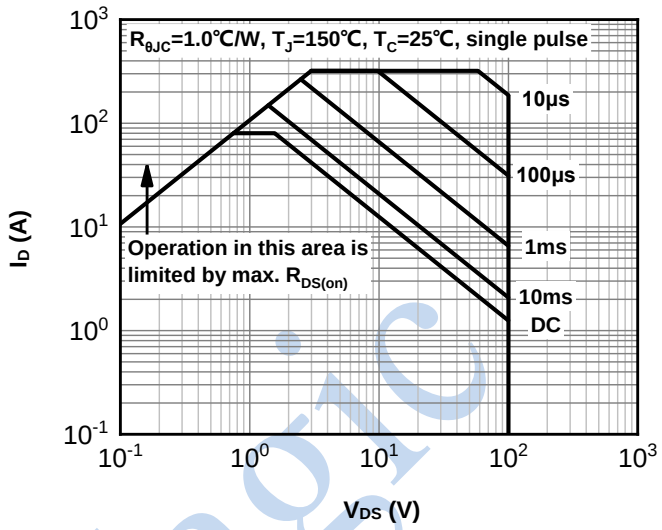


Fig.9 Typ. Capacitance

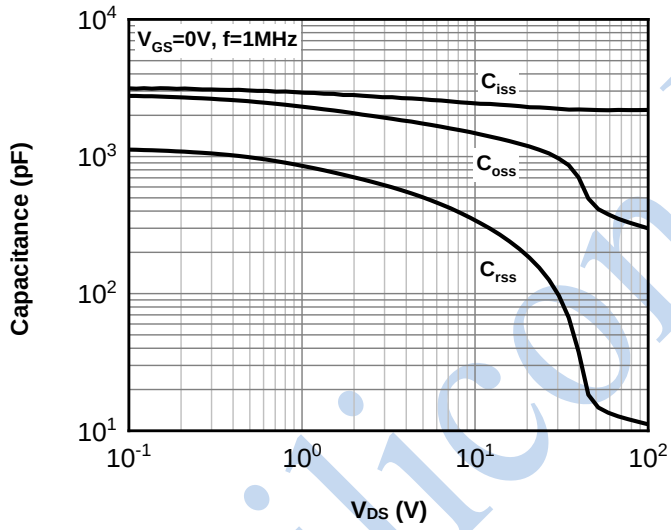


Fig.10 Single pulse maximum power dissipation

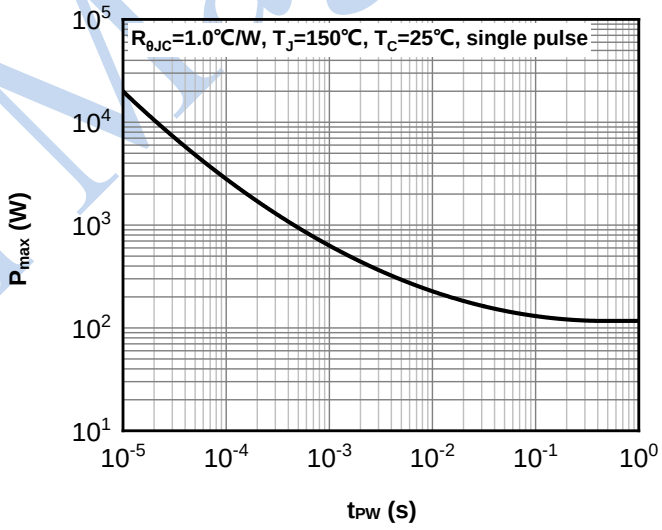


Fig.11 Max. power dissipation vs case temperature

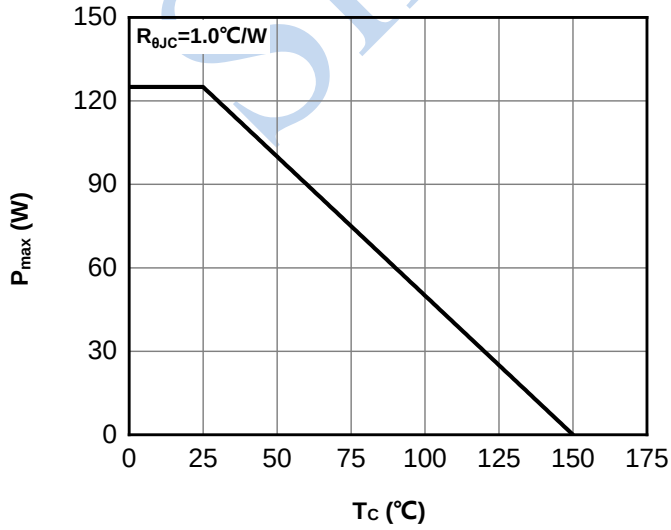


Fig.12 Max. continuous drain current vs case temperature

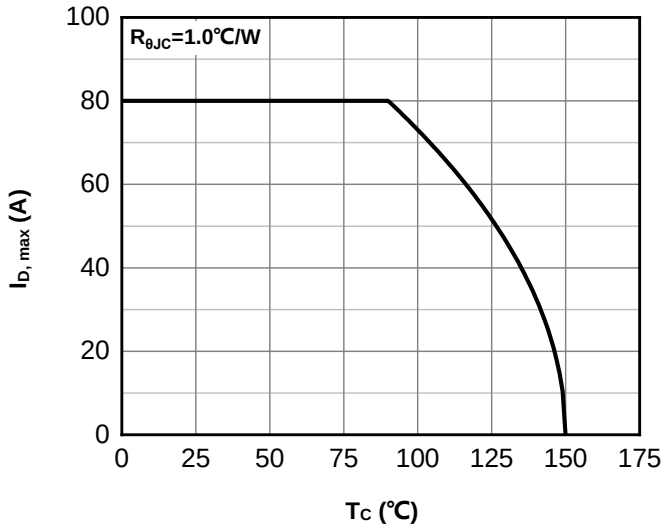
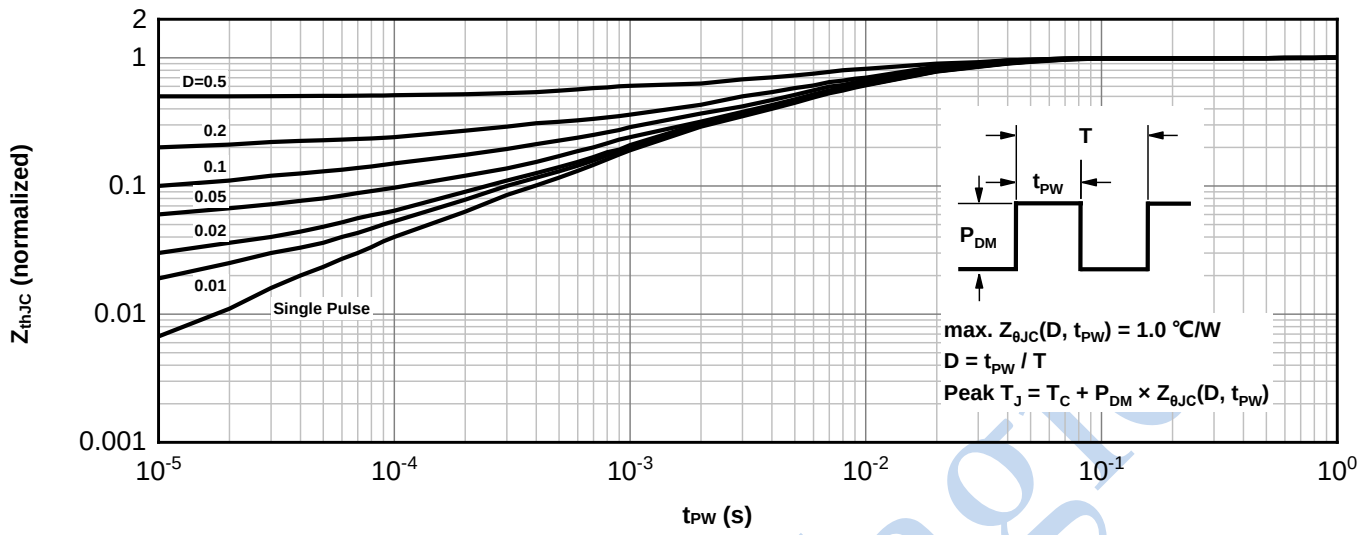
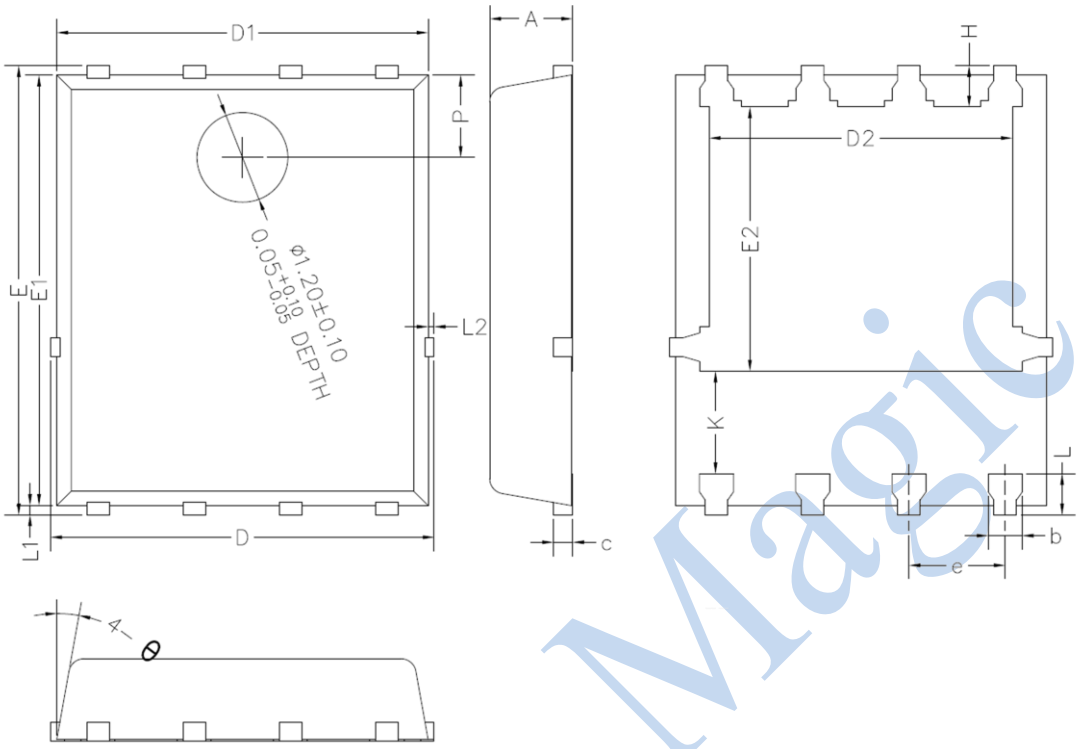


Fig.13 Normalized transient thermal impedance from junction to case



5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	0.900	1.050	1.200
b	0.310	0.425	0.540
c	0.210	0.275	0.340
D	4.800	5.100	5.400
D1	4.800	4.975	5.150
D2	3.900	4.050	4.200
e	1.170	1.270	1.370
E	5.900	6.075	6.250
E1	5.500	5.650	5.800
E2	3.425	3.528	3.630
H	0.450	0.6250	0.800
K	1.125	1.348	1.570
L	0.450	0.575	0.700
L1	0.000	0.188	0.375
L2	0.000	0.075	0.150
P	1.000	1.100	1.200
θ	8°	10°	12°

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