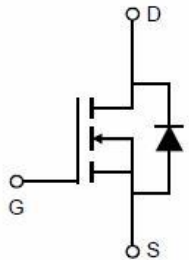
N-Channel Enhancement Mode Power MOSFET

Description

The MXN3016M uses advanced trench technology to provide excellent RDS(ON) and low gate charge . This device can be used for a variety of applications

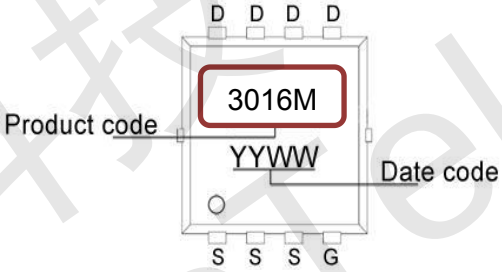


General Features

- V_{DS} =30V，I_D =45A
- @V_{GS}=10V $R_{DS(ON)}$(Typ.)=5mΩ
- @V_{GS}=4.5V $R_{DS(ON)}$(Typ.)=7mΩ

High density cell design for ultra low Rdson
Fully characterized Avalanche voltage and current
Good stability and uniformity with high E_{AS}
Excellent package for good heat dissipation
Special process technology for high ESD capability

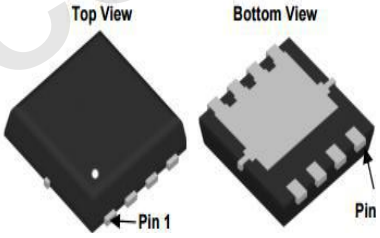
Schematic diagram



Marking and pin assignmen

Application

DC/DC Converters in Computing, Servers, and POL
Isolated DC/DC Converters in Telecom and Industrial
Uninterruptible Power Supply



PDFN3X3-8L

Absolute Maximum Ratings (TA=25℃unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25℃)	I_D	45	A
Drain Current-Continuous(T_A=25℃)	I_{DSM}	16	A
Pulsed Drain Current (Note 1)	I_{DM}	110	A
Maximum Power Dissipation	P_D	3.1	W
Avalanche Current	I_{AS}	26	A
Single pulse avalanche energy (Note 5)	E_{AS}	169	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	40	℃/W
Thermal Resistance,Junction-to-Case, Steady State	$R_{\theta JC}$	4.2	℃/W

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.6	2	2.7	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=12A	-	5	6.5	mΩ
		V_{GS}=4.5V, I_D=10A	-	7	10	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=11A	-	24	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	1350	-	PF
Output Capacitance	C_{oss}		-	132	-	PF
Reverse Transfer Capacitance	C_{rss}		-	261	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=15V, R_L=0.75Ω V_{GS}=10V,R_G=3Ω	-	8.8	-	nS
Turn-on Rise Time	t_r		-	12.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.5	-	nS
Turn-Off Fall Time	t_f		-	8.6	-	nS
Total Gate Charge	Q_g	V_{DS}=25V,I_D=11A, V_{GS}=10V	-	20.7		nC
Gate-Source Charge	Q_{gs}		-	3.7		nC
Gate-Drain Charge	Q_{gd}		-	2.9		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1A	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	16	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF =20A di/dt = 100A/μs (Note3)	-	22.4	-	nS
Reverse Recovery Charge	Qrr		-	14	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.
2.Surface Mounted on FR4 Board, t ≤ 10 sec.
3.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

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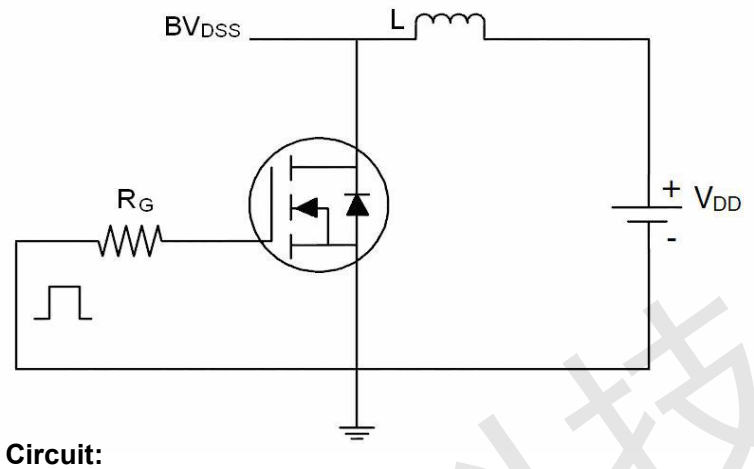
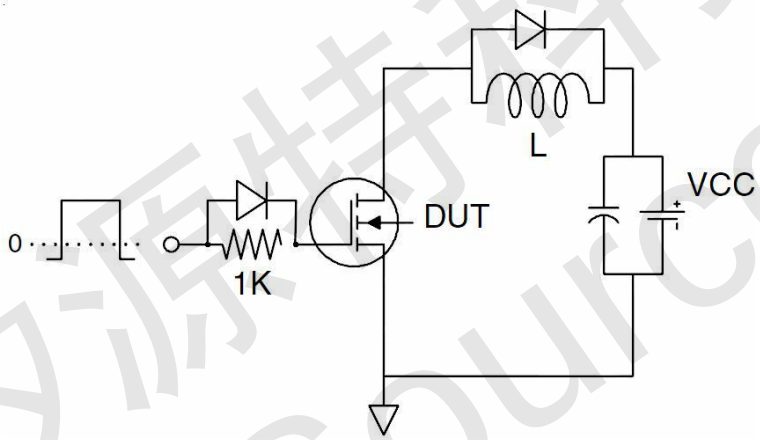
Test circuit

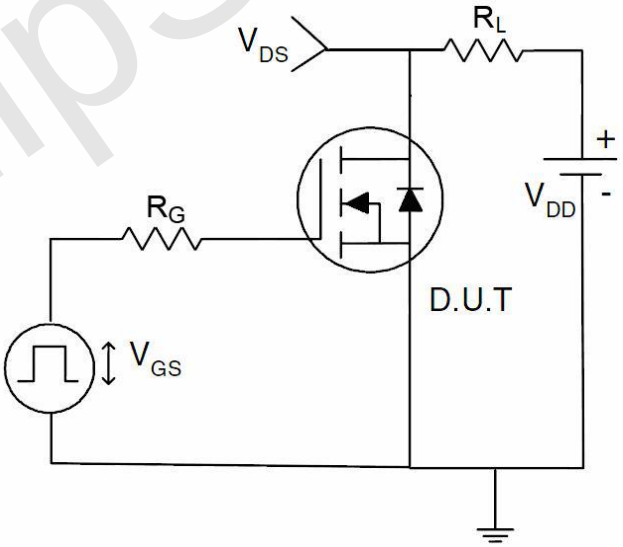
1）E_{AS} test Circuits



2）Gate charge test Circuit:



3）Switch Time Test Circuit：



Typical Electrical and Thermal Characteristics (Curves)

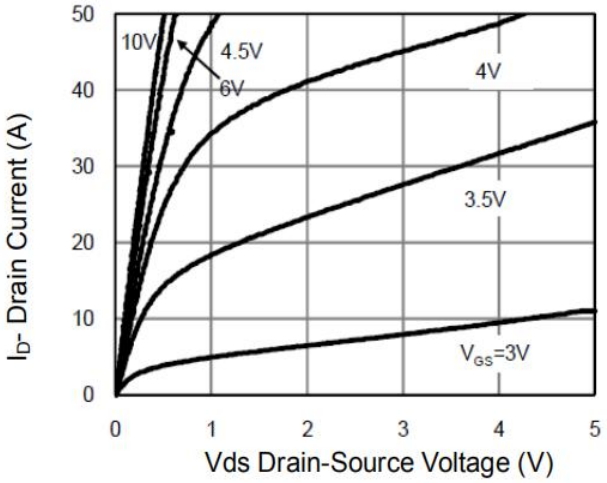


Figure 1 Output Characteristics

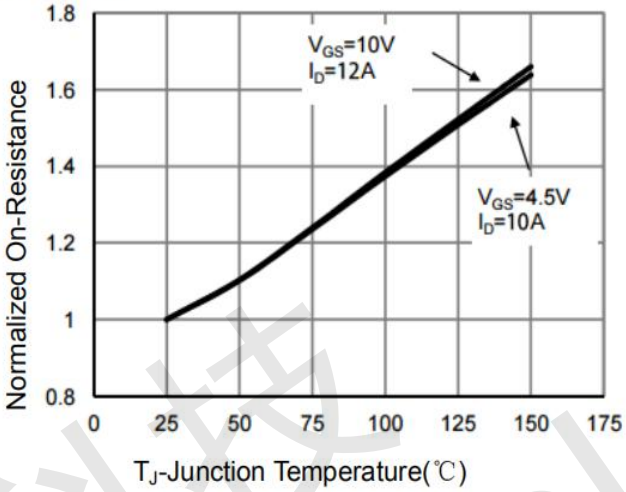


Figure 4 Rdson-Junction Temperature

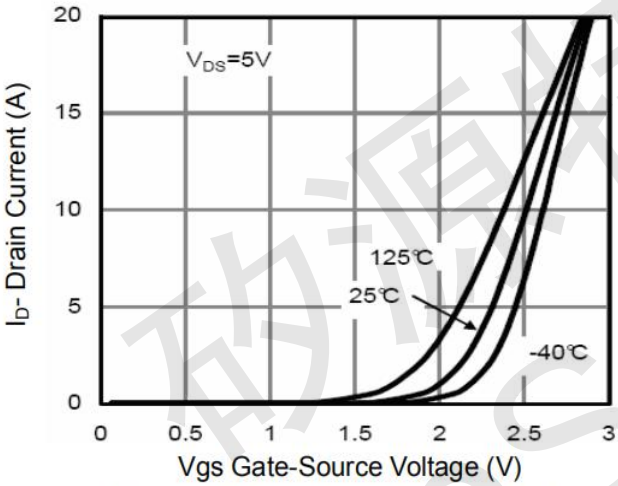


Figure 2 Transfer Characteristics

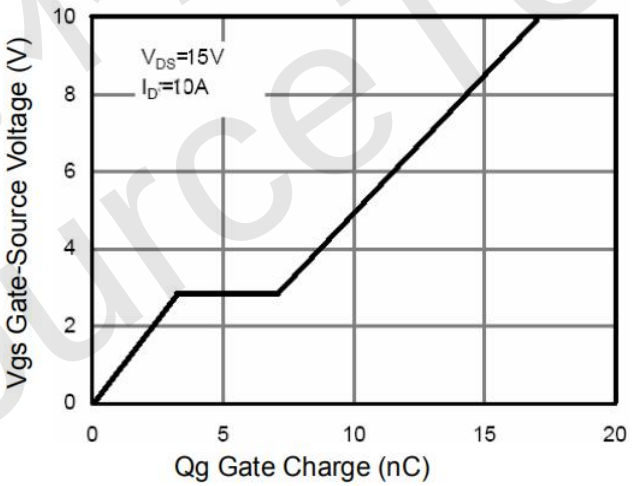


Figure 5 Gate Charge

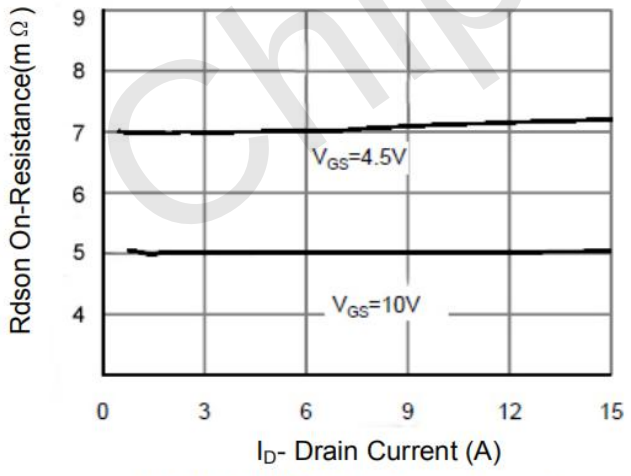


Figure 3 Rdson- Drain Current

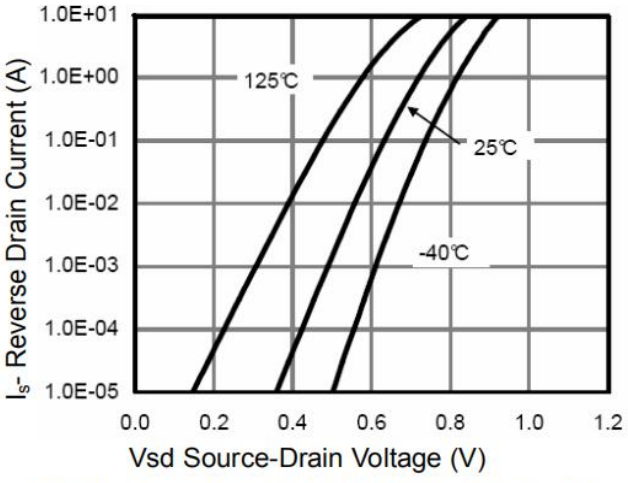


Figure 6 Source- Drain Diode Forward

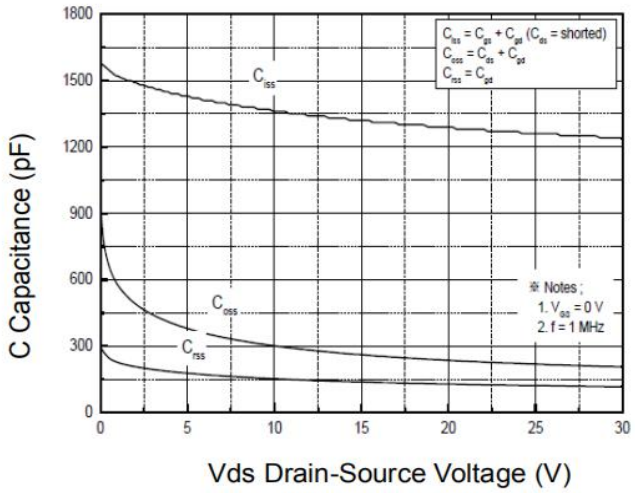


Figure 7 Capacitance vs Vds

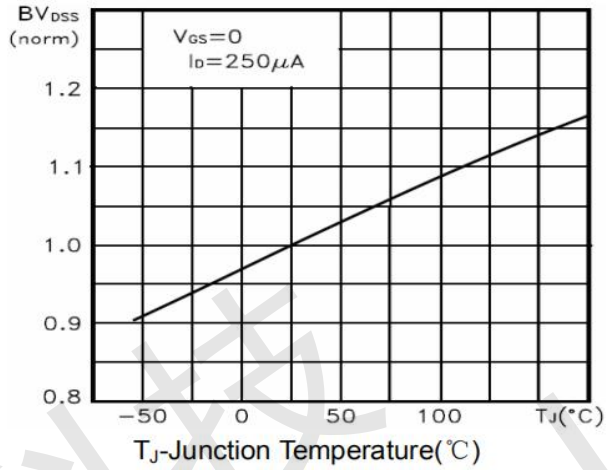


Figure 9 BV_{DSS} vs Junction Temperature

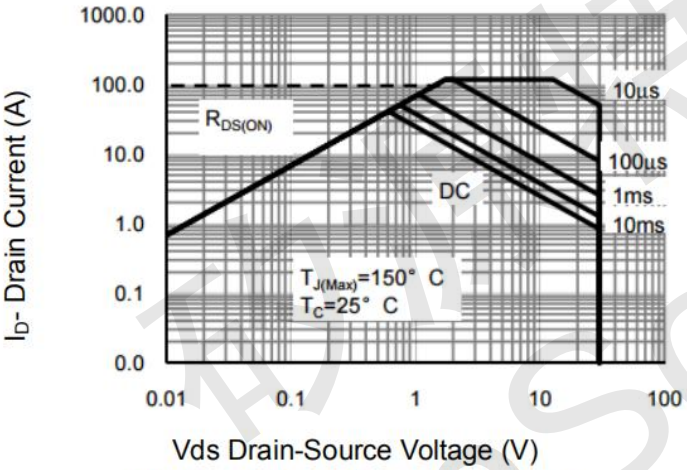


Figure 8 Safe Operation Area

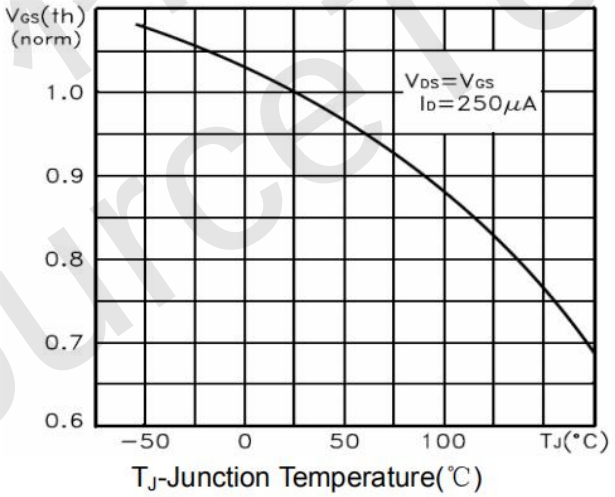


Figure 10 $V_{GS(th)}$ vs Junction Temperature

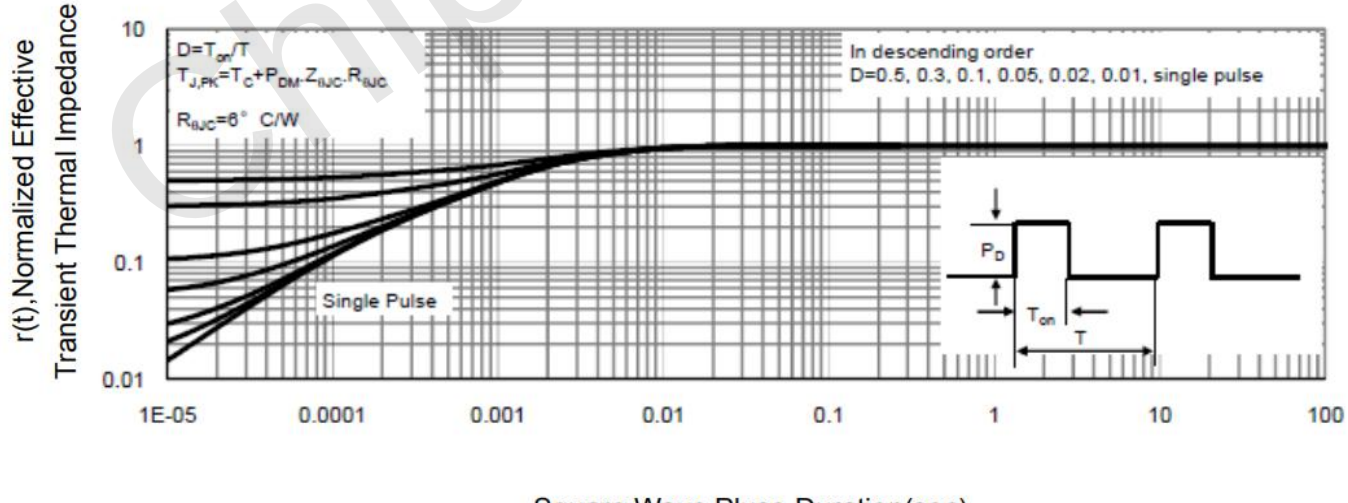


Figure 11 Normalized Maximum Transient Thermal Impedance

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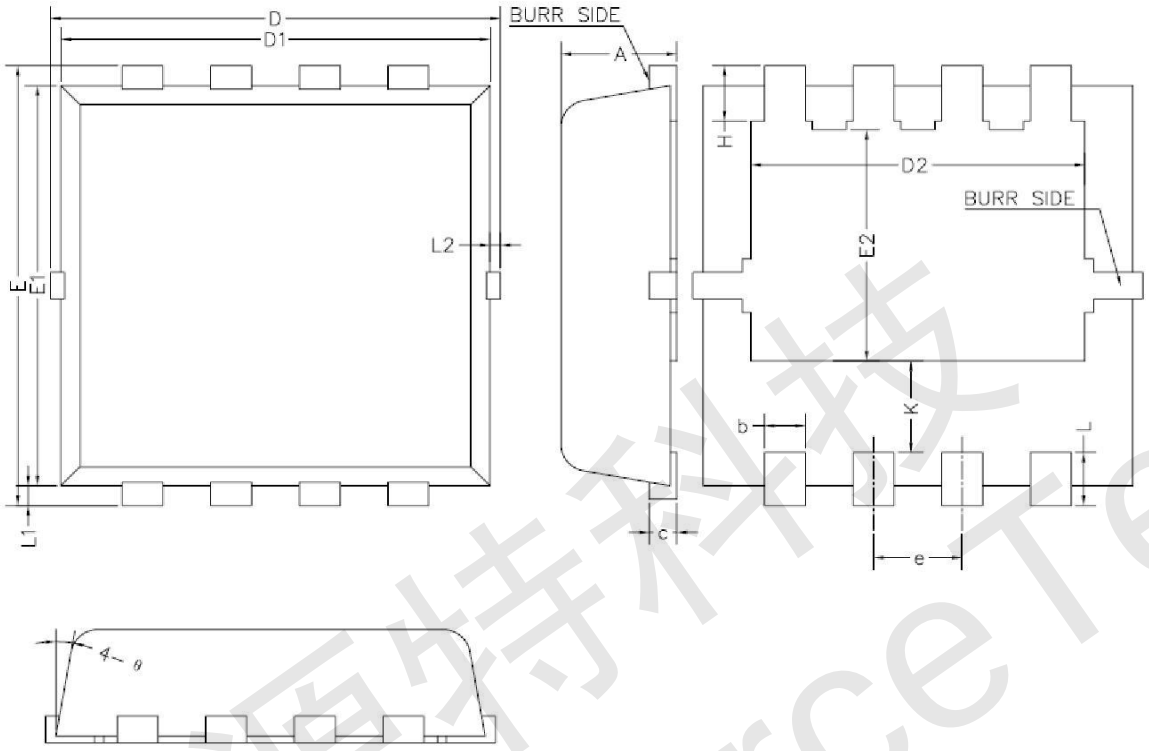

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
b	0.25	0.30	0.35
c	0.14	0.15	0.20
D	3.10	3.30	3.50
D1	3.05	3.15	3.25
D2	2.35	2.45	2.55
e	0.55	0.65	0.75
E	3.10	3.30	3.50
E1	2.90	3.00	3.10
E2	1.64	1.74	1.84
H	0.32	0.42	0.52
K	0.59	0.69	0.79
L	0.25	0.40	0.55
L1	0.10	0.15	0.20
L2	–	–	0.15
θ	8°	10°	12°