

DESCRIPTION

The MXN7209 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -2.5V. This device is suitable for use as a load switch or in PWM applications.

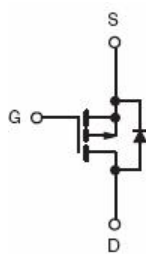
GENERAL FEATURES

- $V_{DS} = -20V$, $I_D = -30A$
 $R_{DS(ON)}(Typ.) = 16m\Omega$ @ $V_{GS} = -2.5V$
 $R_{DS(ON)}(Typ.) = 12m\Omega$ @ $V_{GS} = -4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

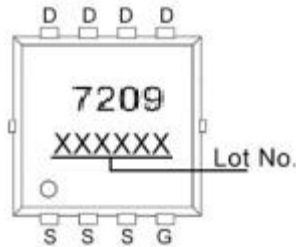
APPLICATION

- PWM applications
- Load switch
- Power management

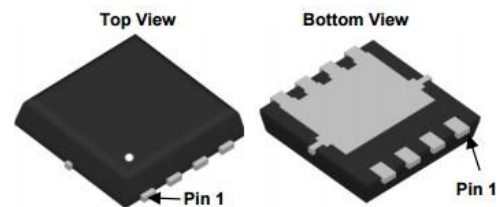
PINOUT



Schematic diagram



Marking and pin Assignment



PDFN3.3*3.3-8L top & bottom view

ORDERING INFORMATION

Part Number	Marking	Storage Temperature	Package	Devices Per Reel
MXN7209	7209	-55°C to 150°C	PDFN3.3*3.3-8L	3000

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous ($T_C = 25^\circ C$)	I_D	-30	A
Drain Current-Pulsed ^(Note1)	I_{DM}	-90	A
Drain Current-Continuous ($T_A = 25^\circ C$)	I_{DSM}	-12	A
Maximum Power Dissipation ($T_C = 25^\circ C$)	P_D	29	W
Maximum Power Dissipation ($T_A = 25^\circ C$)	P_{DSM}	3.1	W
Single Pulse Avalanche Energy ^(Note3)	E_{AS}	58	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient ^(Note2)	$R_{\theta JA}$	40	$^\circ C/W$
Thermal Resistance, Junction-to-Case, Steady State	$R_{\theta JC}$	4.2	$^\circ C/W$

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2. Surface Mounted on FR4 Board, $t \leq 10$ sec.

Note 3. E_{AS} condition : $T_J = 25^\circ C, V_{DD} = -15V, V_G = -10V, L = 0.1mH, R_g = 25\Omega$



ELECTRICAL CHARACTERISTICS($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
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Off Characteristics

Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA

On Characteristics(Note3)

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-2.5V, I_D=-7A$	-	16	22	m Ω
		$V_{GS}=-4.5V, I_D=-10A$	-	12	16	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-10A$	20	-	-	S

Dynamic Characteristics(Note4)

Input Capacitance	C_{iss}	$V_{DS}=-10V, V_{GS}=0V, F=10KHz$	-	2320	-	pF
Output Capacitance	C_{oss}		-	347	-	pF
Reverse Transfer Capacitance	C_{rss}		-	225	-	pF

Switching Characteristics(Note4)

Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=-15V, I_D=-10A, V_{GS}=-10V, R_{GEN}=1\Omega$	-	11	-	nS
Turn-on Rise Time	t_r		-	6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	$V_{DS}=-10V, I_D=-10A, V_{GS}=-4.5V$	-	31	-	nC
Gate-Source Charge	Q_{gs}		-	6.4	-	nC
Gate-Drain Charge	Q_{gd}		-	7.8	-	nC

Drain-Source Diode Characteristics

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-2A$	-	-	-1.2	V
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Note 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Note 4. Guaranteed by design, not subject to production



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

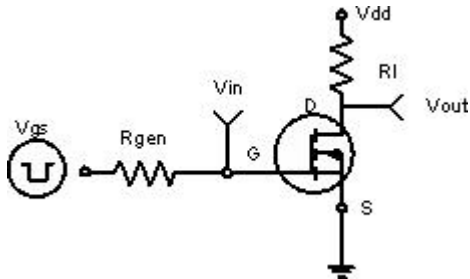


Figure 2. Switching Waveform

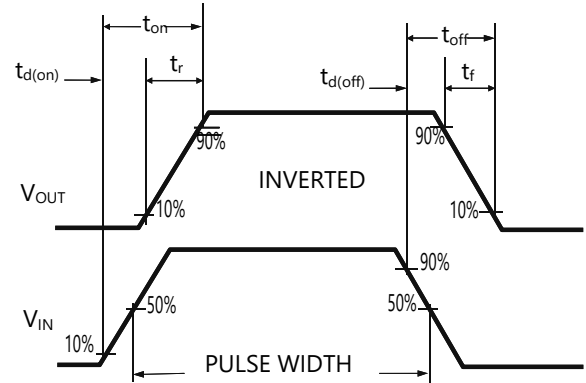


Figure 3. Power De-rating

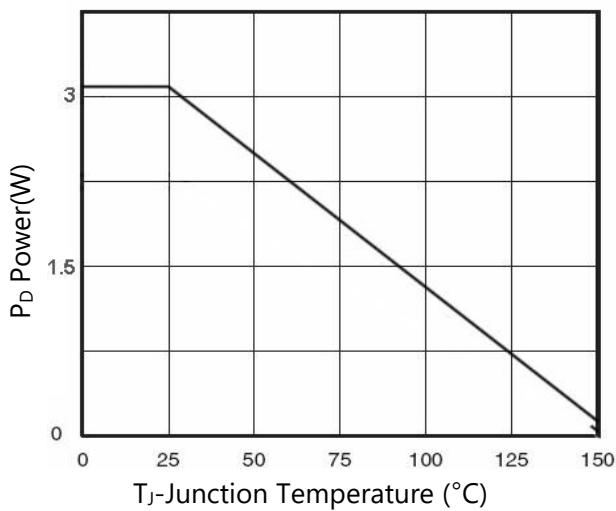


Figure 4. Drain Current

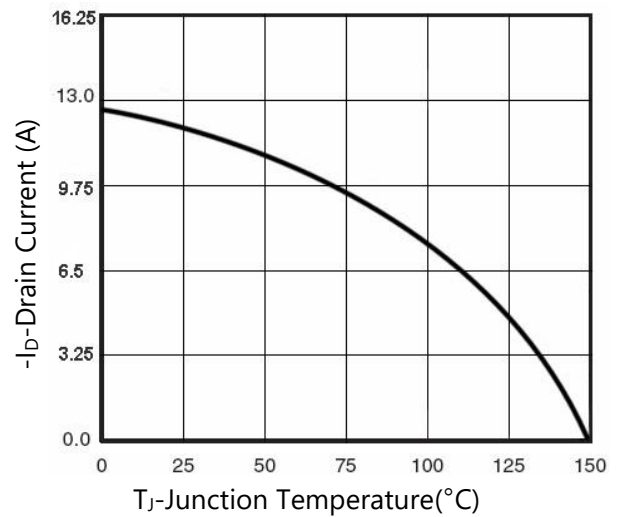


Figure 5. Output Characteristics

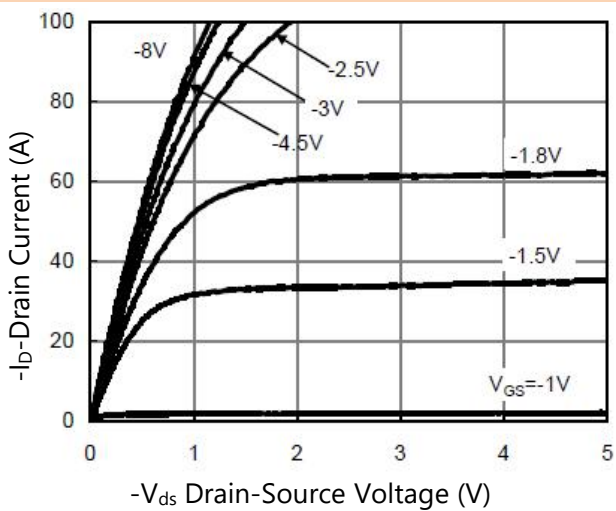
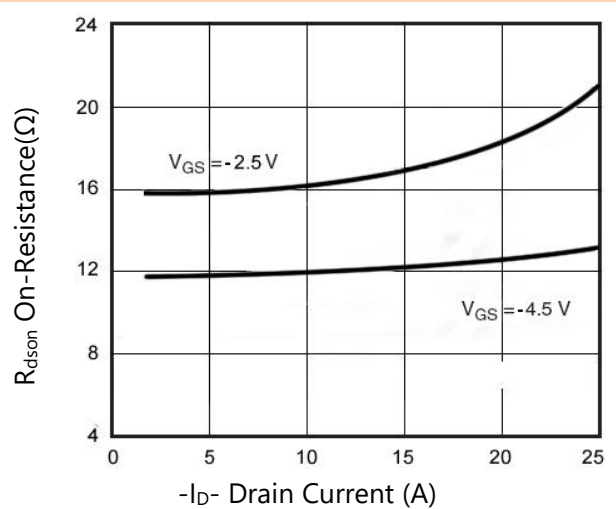


Figure 6. R_{ds(on)} vs Drain Current





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

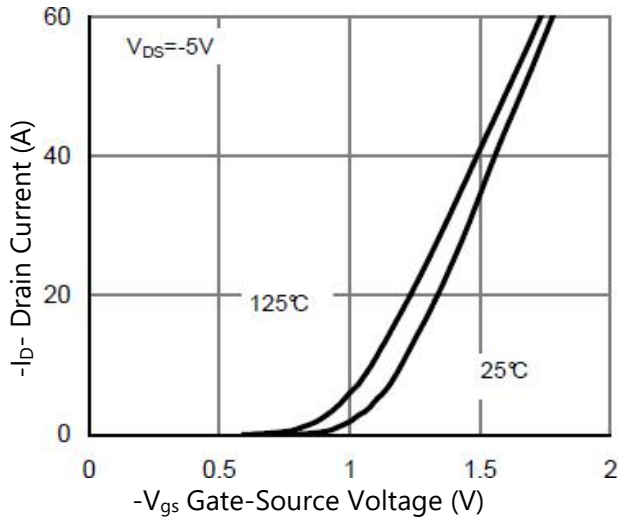


Figure 8. R_{dson} vs Junction Temperature

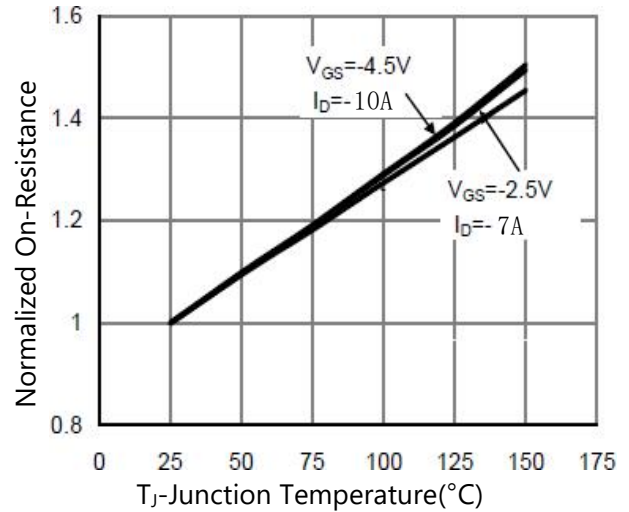


Figure 9. R_{dson} vs V_{gs}

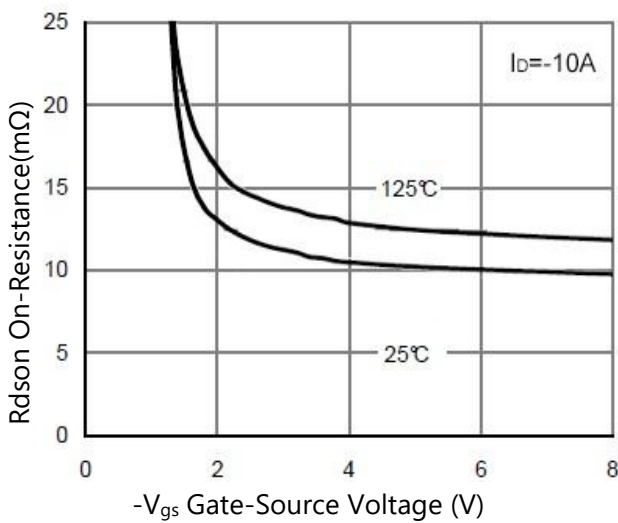


Figure 10. Capacitance vs V_{ds}

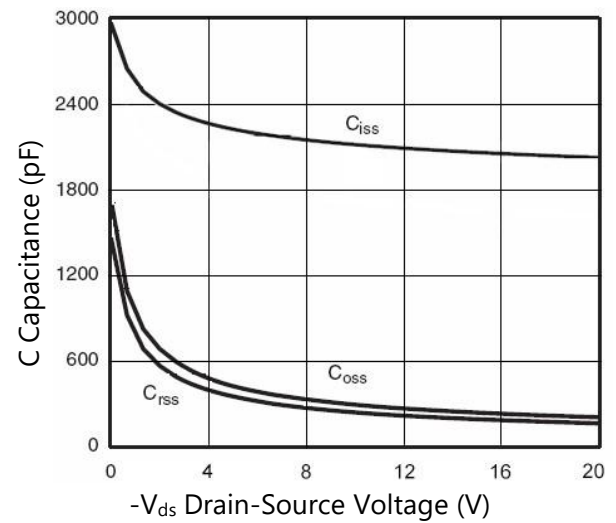


Figure 11. Gate Charge

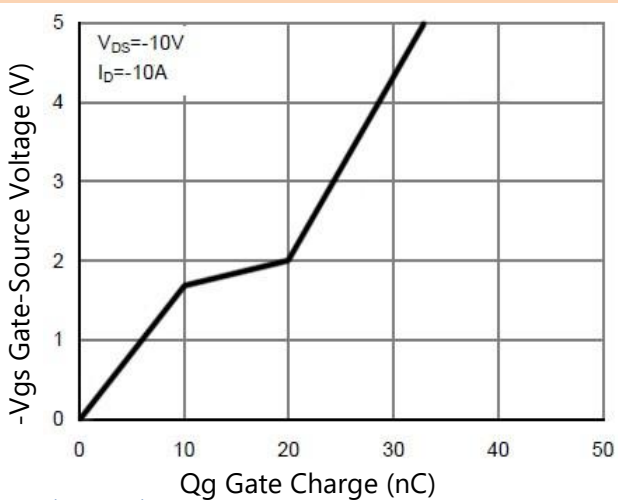
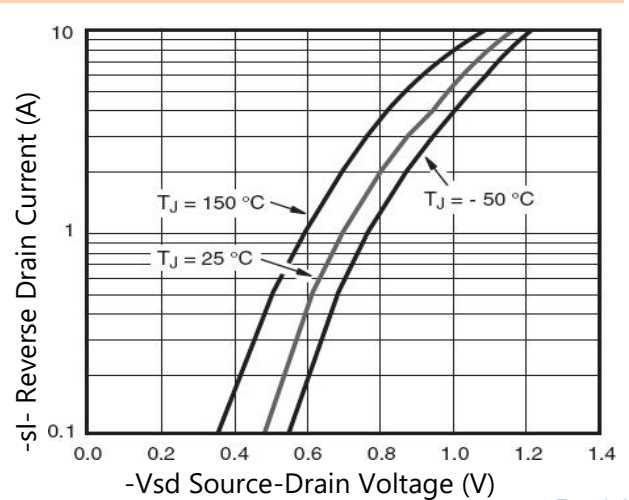


Figure 12. Source- Drain Diode Forward





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 11. Safe Operation Area

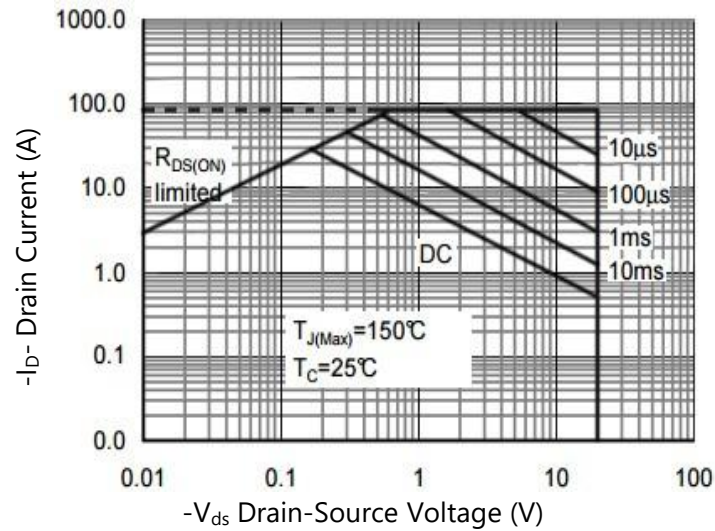
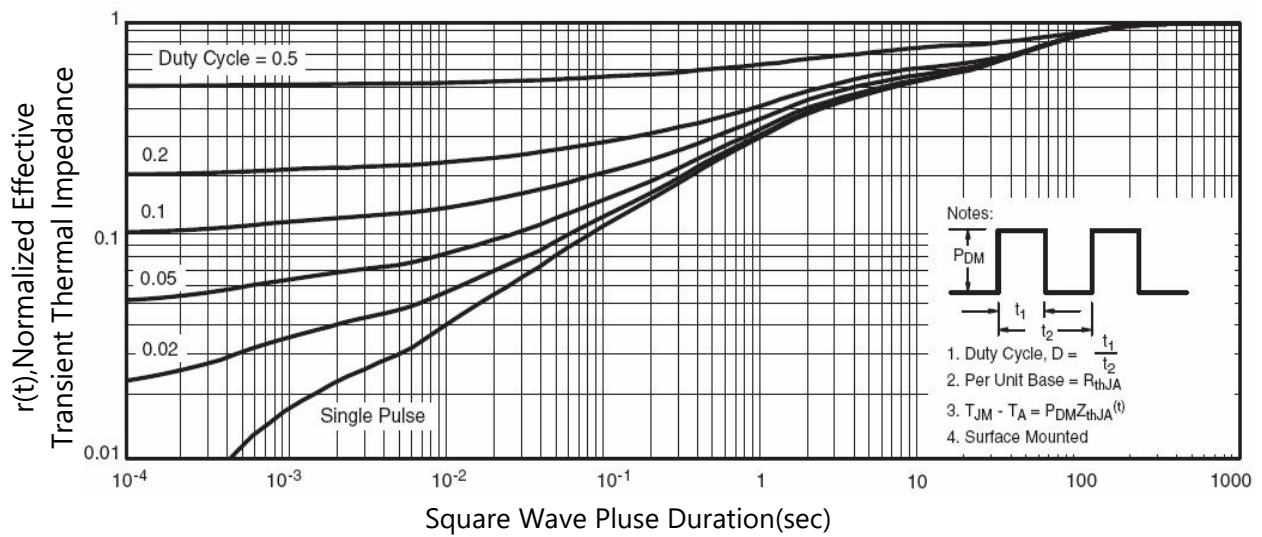


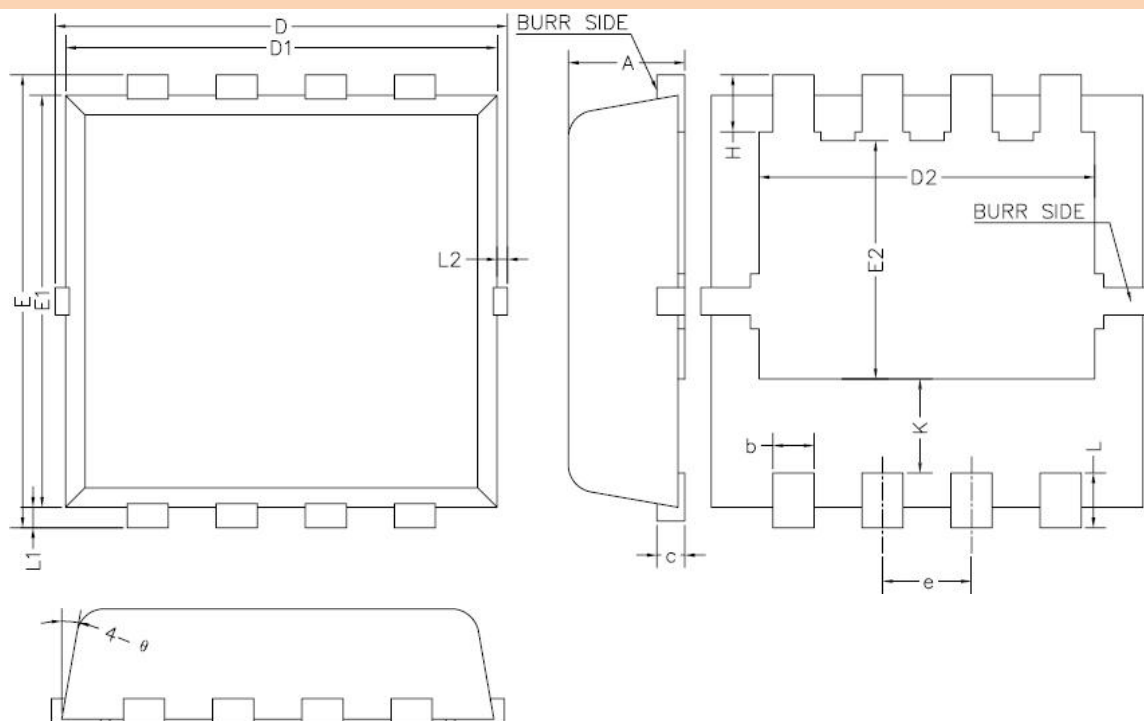
Figure 12. Normalized Maximum Transient Thermal Impedance





PACKAGE INFORMATION

PDFN3.3*3.3-8L



Symbol	Dimensions In Millimeters		
	Min.	Typ.	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	3.16	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	0.16	0.20
L2	-	-	0.15
θ	8°	10°	12°