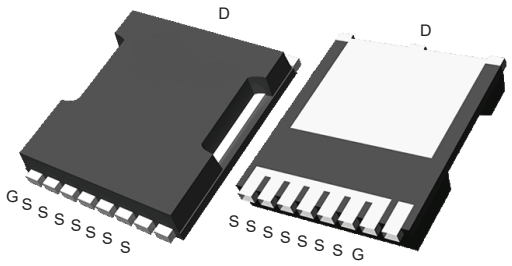
40V, 570A N-Channel Enhancement Mode MOSFET

Features

- V_{DS}= 40V, I_D= 570A
- $R_{DS(ON)}$≤ 1.0mΩ (0.8mΩ Typ.) @V_{GS}=10V
- Rugged and Reliable
- 100% UIS & R_g Tested
- Low On-Resistance for High Efficiency
- Lead-Free, RoHS Compliant

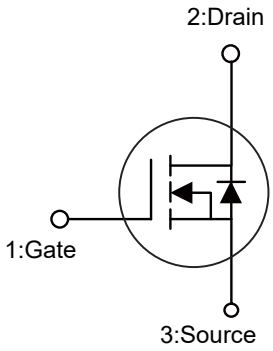
TO-LL



Applications

- OR-ing
- Synchronous Rectifier for Server
- Battery Charger and Power Circuits
- DC-DC Converters
- CPU Power Delivery
- Load Switch / Power Management

Schematic Diagram (NMOS)



Mechanical Data

- TO-LL Small Outline Plastic Package
- Epoxy UL: 94V-0
- Mounting Position: Any

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	
I_S [1]	Diode Continuous Forward Current	T_C=25°C	570	A
I_D [1]	Continuous Drain Current	T_C=25°C	570	
		T_C=100°C	428	
I_{DM} [1]	Pulsed Drain Current	T_C=25°C	1710	
P_D	Maximum Power Dissipation	T_C=25 °C	375	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	0.85	°C/W
$R_{\theta JA}$ [2]	Thermal Resistance-Junction to Ambient		50	°C/W
I_{AS} [3]	Avalanche Current, Single pulse	L=0.5mH	85	A
E_{AS} [3]	Avalanche Energy, Single pulse	L=0.5mH	1800	mJ

Note 1: Pulse width limited by maximum junction temperature.
Note 2: Surface mounted on 1in^2 pad area.
Note 3: UIS tested and pulse width limited by maximum junction temperature (initial temperature T_j=25°C).

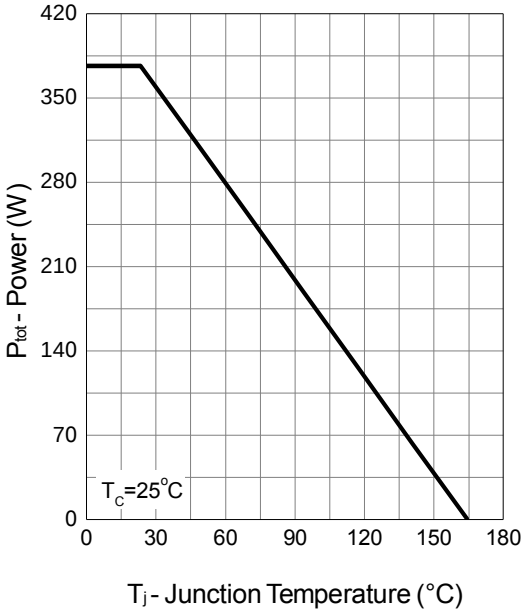
Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	2	3	4	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V		-	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=25A	-	0.8	1	mΩ
		T_J=125°C	-	1.1	-	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=20A	-	3.5	-	S
Diode Characteristics						
V_{SD} [4]	Diode Forward Voltage	I_{SD}=20A, V_{GS}=0V	-	0.78	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=25A, dI_{SD}/dt=100A/μs V_{dd}=20V	-	61	-	ns
t_a	Charge Time		-	31	-	
t_b	Discharge Time		-	30	-	
Q_{rr}	Reverse Recovery Charge		-	67	-	nC
Dynamic Characteristics [5]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	0.6	0.9	2	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, Frequency=1.0MHz	-	5230	-	pF
C_{oss}	Output Capacitance		-	2000	-	
C_{rss}	Reverse Transfer Capacitance		-	175	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=20V, R_L=20Ω, I_{DS}=1A, V_{GEN}=10V, R_G=1Ω	-	18.8	-	ns
t_r	Turn-on Rise Time		-	9.8	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	50	-	
t_f	Turn-off Fall Time		-	90.8	-	
Gate Charge Characteristics [5]						
Q_g	Total Gate Charge	V_{DS}=20V, V_{GS}=10V, I_{DS}=25A	-	88.98	-	nC
Q_{gs}	Gate-Source Charge		-	24.75	-	
Q_{gd}	Gate-Drain Charge		-	15.63	-	

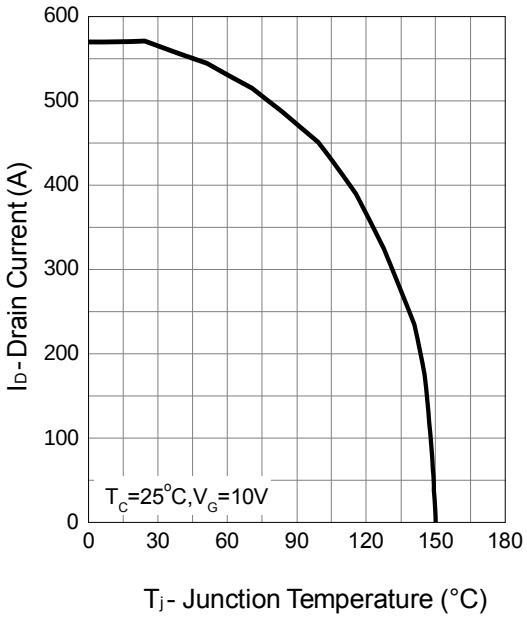
Note 4: Pulse test; pulse width≤300μs, duty cycle≤2%.
Note 5: Guaranteed by design, not subject to production testing.

Typical Operating Characteristics (T_A=25°C unless otherwise noted)

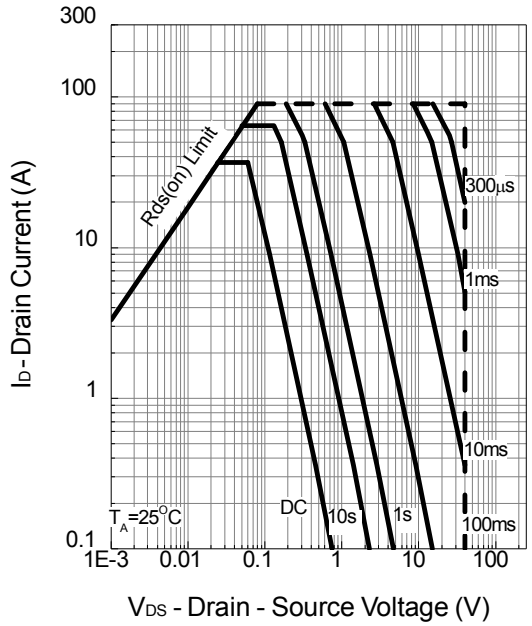
Power Dissipation



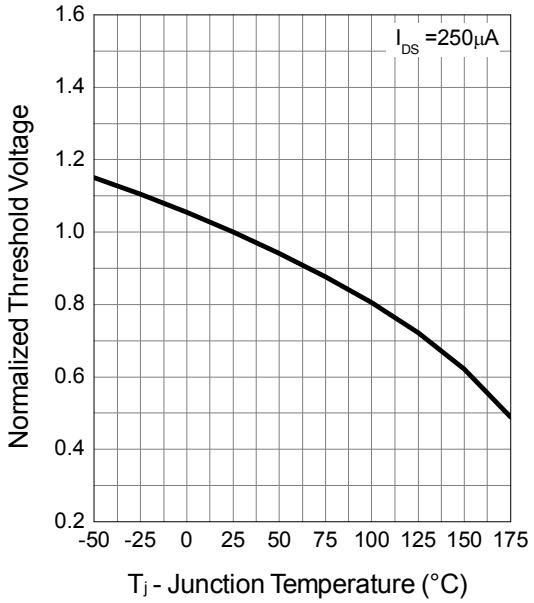
Drain Current



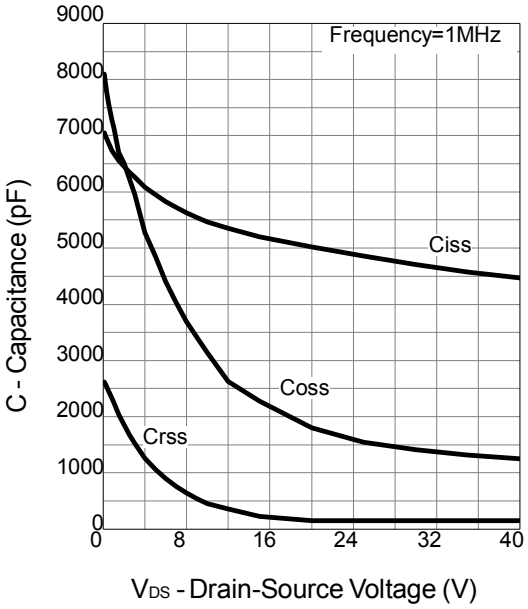
Safe Operation Area



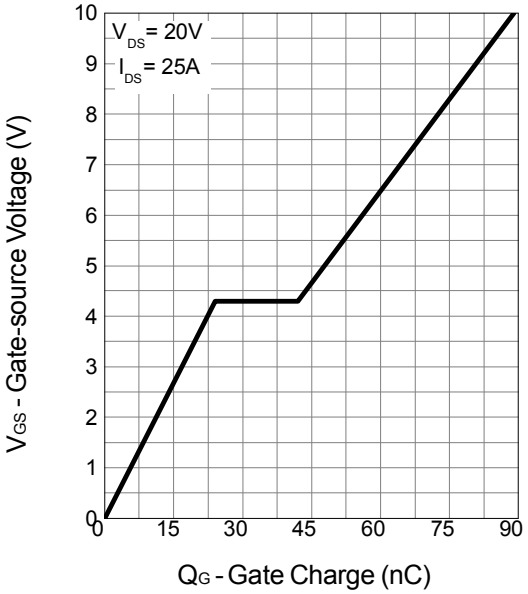
Gate Threshold Voltage



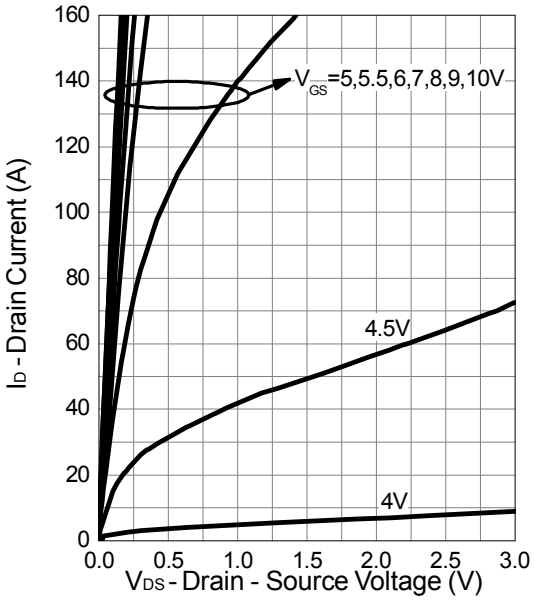
Capacitance



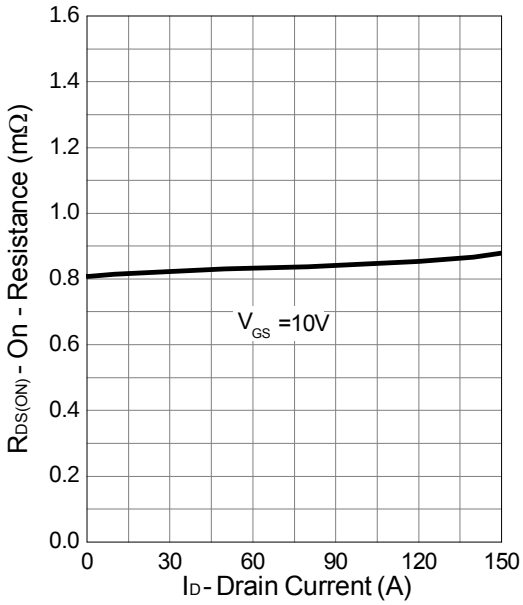
Gate Charge



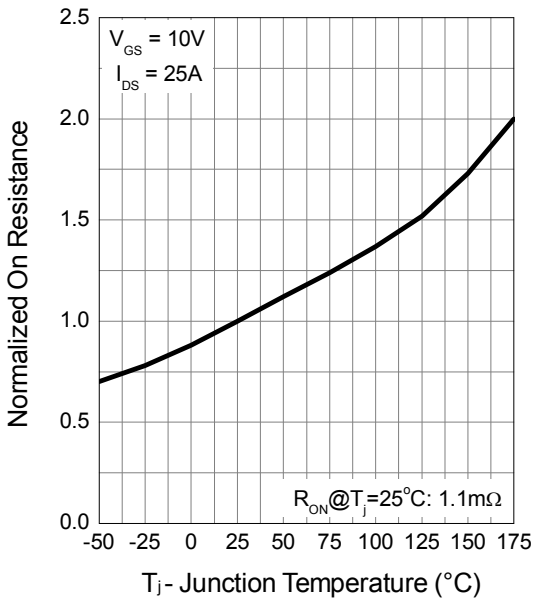
Output Characteristics



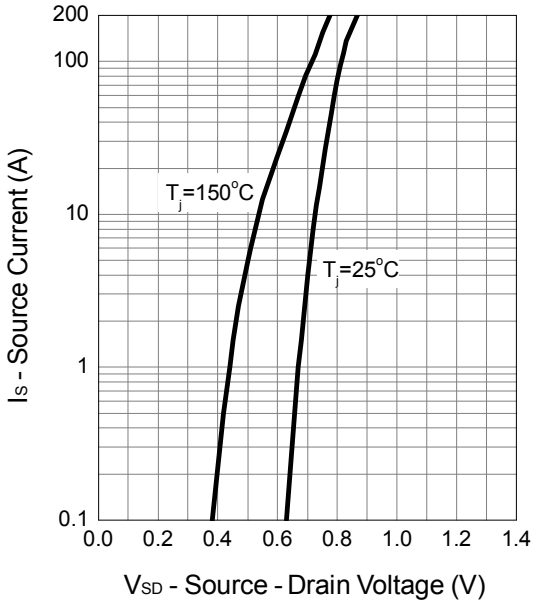
Drain-Source On Resistance

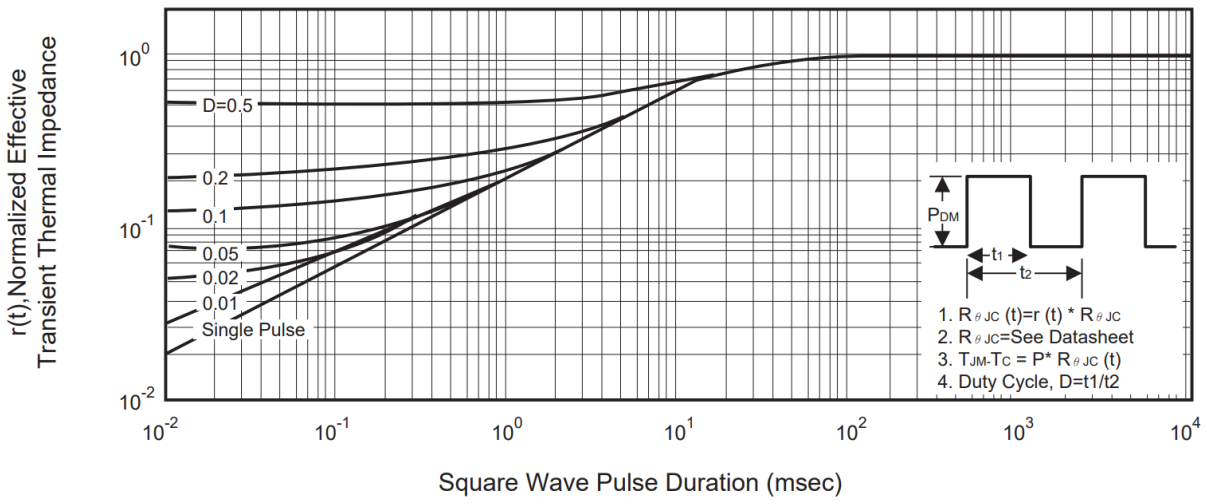


Drain-Source On Resistance

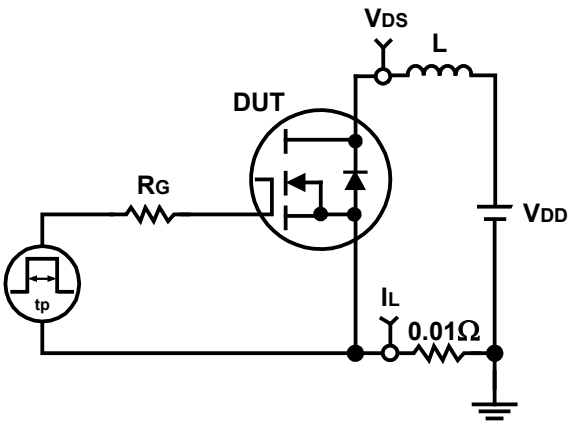


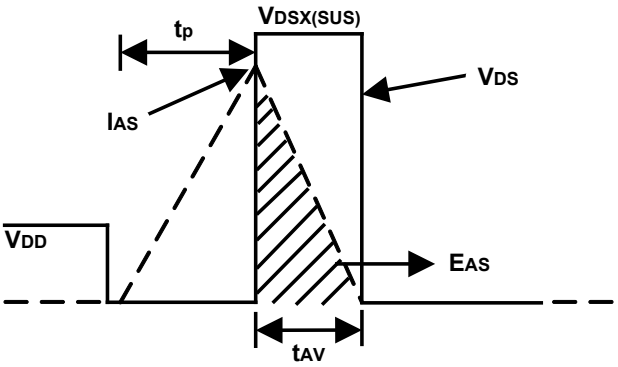
Source-Drain Diode Forward



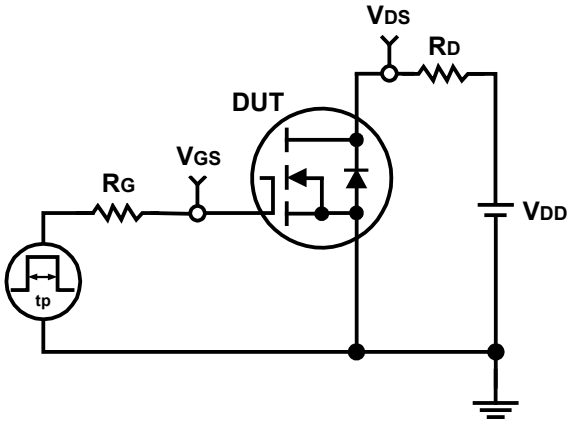


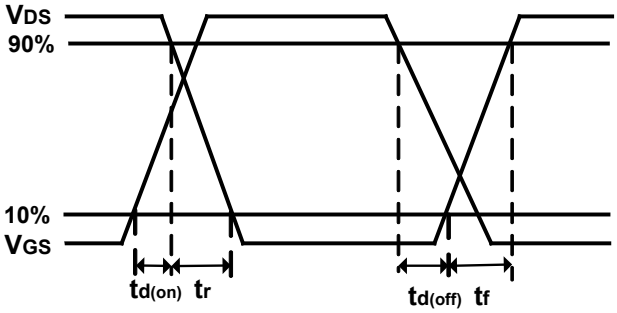
Avalanche Test Circuit and Waveforms



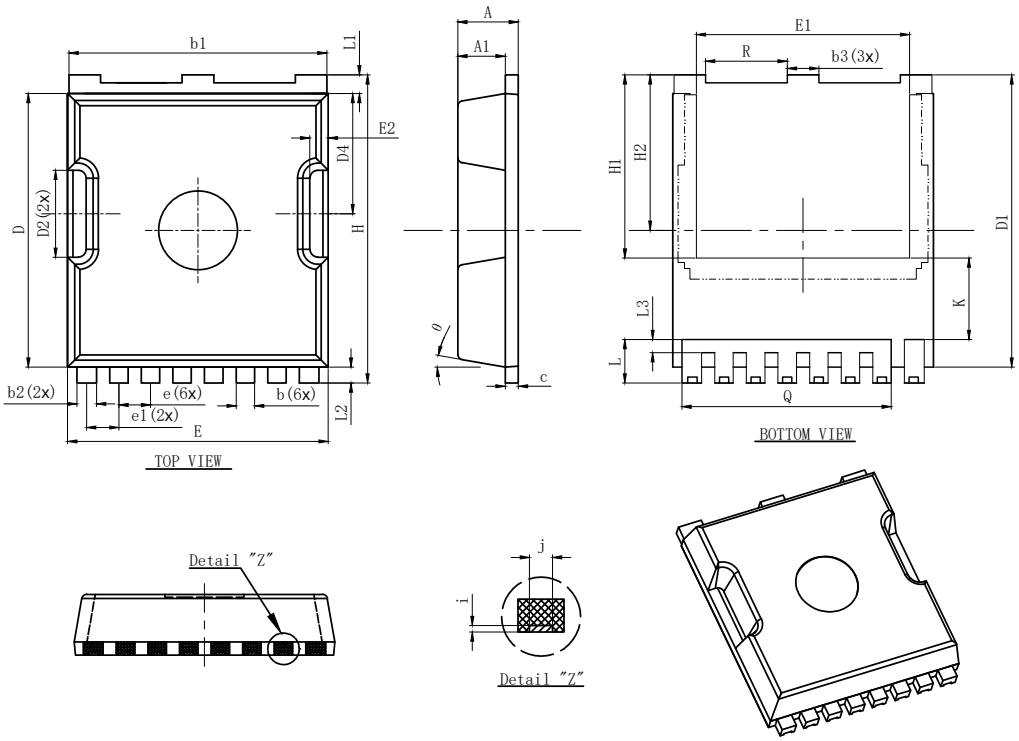


Switching Time Test Circuit and Waveforms





Package Outline Dimensions (TO-LL)



Symbol	Millimeter		
	Min.	Nom.	Max.
A	2.200	2.300	2.400
A1	1.700	1.800	1.900
b	0.600	0.700	0.800
b1	9.700	9.800	9.900
b2	0.650	0.750	0.850
b3	1.100	1.200	1.300
c	0.400	0.500	0.600
D	10.300	10.400	10.500
D1	11.000	11.100	11.200
D2	3.200	3.300	3.400
D4	4.470	4.570	4.670
E	9.800	9.900	10.000
E1	8.000	8.100	8.200
E2	0.500	0.600	0.700
e	1.200 BSC		
e1	1.225 BSC		
H	11.600	11.700	11.800
H1	6.950 BSC		
H2	5.900 BSC		
i	0.100 REF.		
j	0.350 REF.		
K	3.100 REF.		
L	1.550	1.650	1.750
L1	0.600	0.700	0.800
L2	0.500	0.600	0.700
L3	0.400	0.500	0.600
Q	7.950 REF.		
R	3.000	3.100	3.200
θ	10° REF.		