



TO-220F-D Plastic-Encapsulate MOSFETS

CJPF360JN65A N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D
650V	320mΩ@10V	11.5A

DESCRIPTION

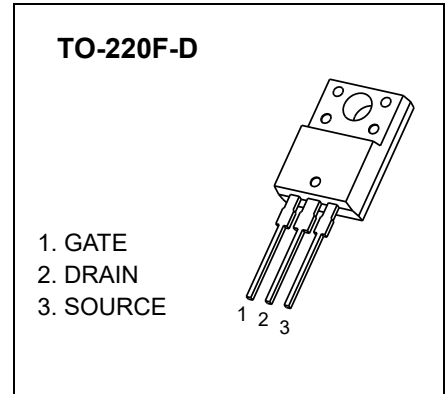
The CJPF360JN65A uses super junction technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

FEATURES

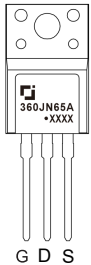
- New technology for high voltage device
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested
- ROHS compliant

APPLICATIONS

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)

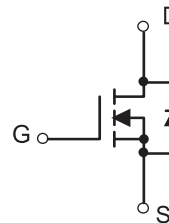


MARKING



360JN65A= Device code.
Solid dot = Green molding compound device,
if none, the normal device.
XXXX = Code.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage, AC ($f > 1\text{Hz}$)	V_{GS}	± 30	V
Continuous Drain Current	I_D ^①	11.5	A
Pulsed Drain Current	I_{DM} ^{①②}	46	A
Single Pulsed Avalanche Energy	E_{AS} ^③	50	mJ
Power Dissipation	P_D ^①	89	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$ ^⑤	42.5	$^{\circ}\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$ ^①	1.4	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^{\circ}\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS

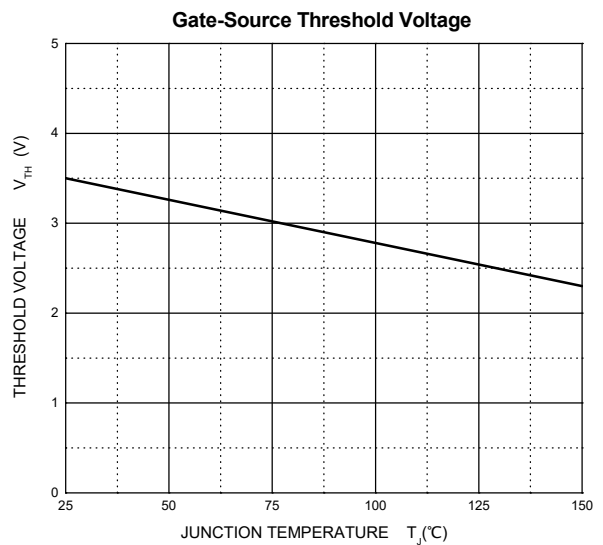
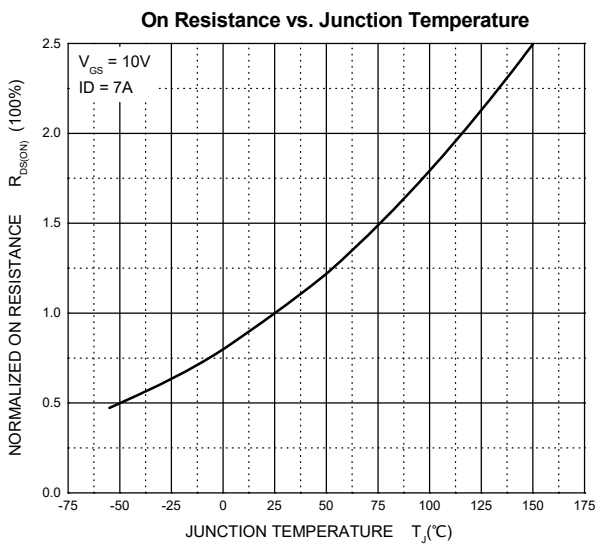
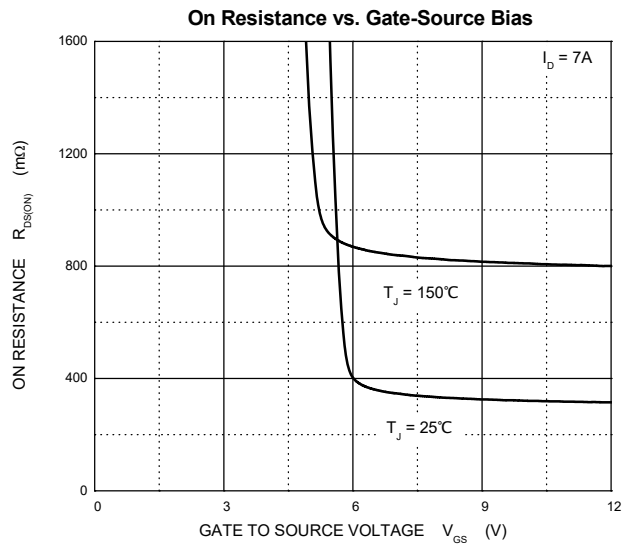
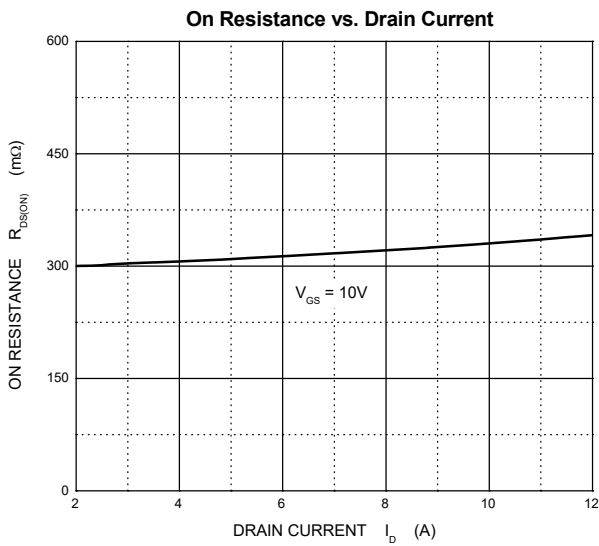
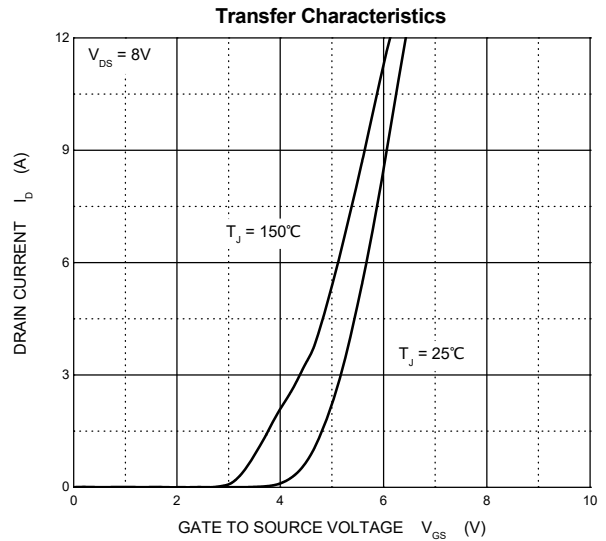
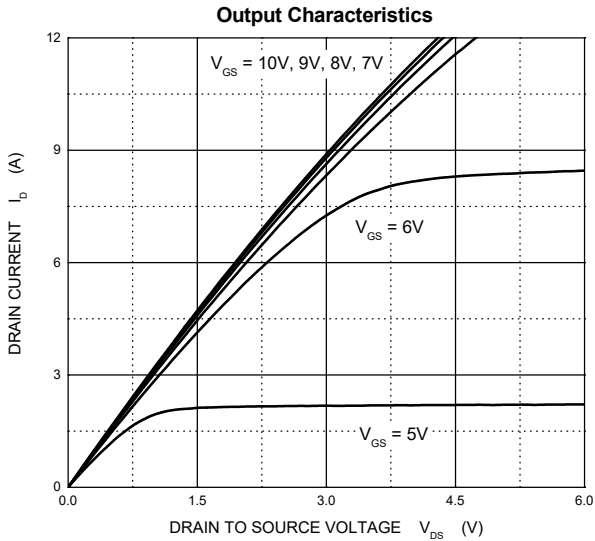
$T_J=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
Off characteristics							
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650	-	-	V	
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$	$T_J = 25^{\circ}\text{C}$	-	-	1.0	μA
			$T_J = 125^{\circ}\text{C}$	-	-	100	
Gate-body leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA	
On characteristics ^④							
Gate-threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.5	3.5	4.5	V	
Static drain-source on-state resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 7A$		320	360	m Ω	
Dynamic characteristics							
Input capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 100\text{kHz}$	-	807	-	μF	
Output capacitance	C_{oss}		-	42	-		
Reverse transfer capacitance	C_{rss}		-	1.1	-		
Gate resistance	R_g	$f = 1\text{MHz}$	-	21	-	Ω	
Switching characteristics							
Total gate charge	Q_g	$V_{GS} = 6V, V_{DD} = 480V, I_D = 11.5A$	-	13.7	-	nC	
Total gate charge	Q_g	$V_{GS} = 10V, V_{DD} = 480V, I_D = 11.5A$	-	23.5	-		
Gate-source charge	Q_{gs}		-	4.3	-		
Gate-drain charge	Q_{gd}		-	10.5	-		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 10V, V_{GS} = 10V, R_L = 2\Omega, R_g = 10\Omega$	-	20	-	ns	
Turn-on rise time	t_r		-	30	-		
Turn-off delay time	$t_{d(off)}$		-	42	-		
Turn-off fall time	t_f		-	34	-		
Drain-Source Diode Characteristics							
Drain-source diode forward voltage	V_{SD} ^④	$V_{GS} = 0V, I_S = 12A$	-	-	1.2	V	
Continuous drain-source diode forward current	I_S ^①		-	-	11.5	A	
Pulsed drain-source diode forward current	I_{SM} ^{①②}		-	-	46	A	

Notes:

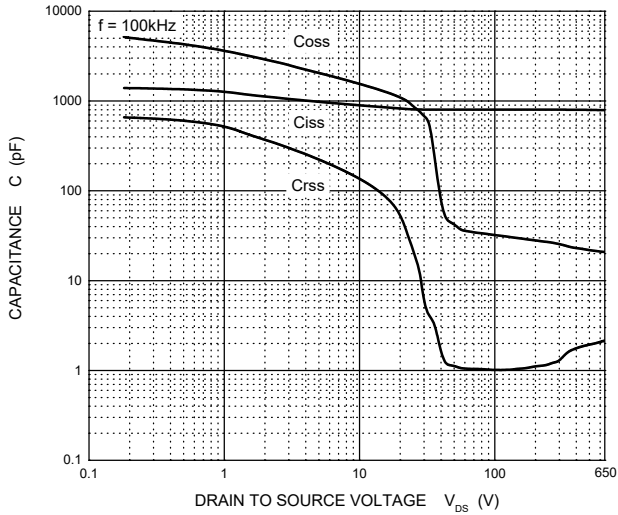
- $T_C = 25^{\circ}\text{C}$.
- Limited only by maximum temperature allowed.
- $V_{DD} = 50V, V_{GS} = 10V, L = 1\text{mH}, R_g = 25\Omega$ Starting $T_J = 25^{\circ}\text{C}$.
- Pulse Test : Pulse Width $\leq 380\mu s$, duty cycle $\leq 2\%$.
- Device in a still air environment with $T_A = 25^{\circ}\text{C}$.

Typical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

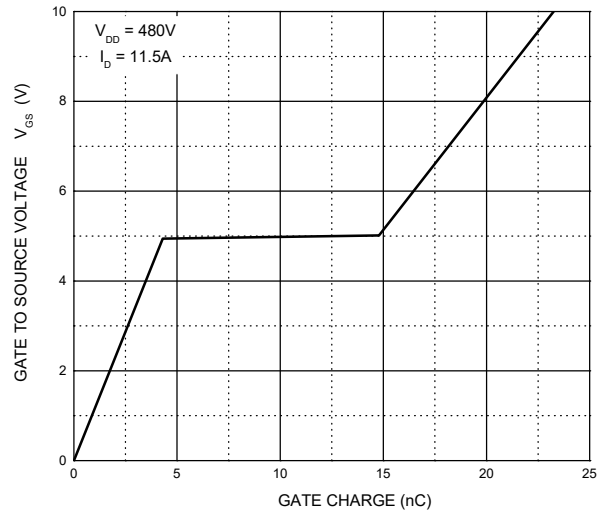


Typical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

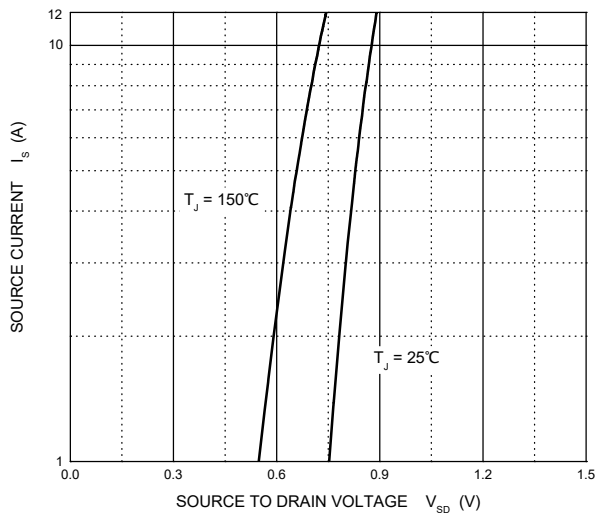
Typical Capacitances



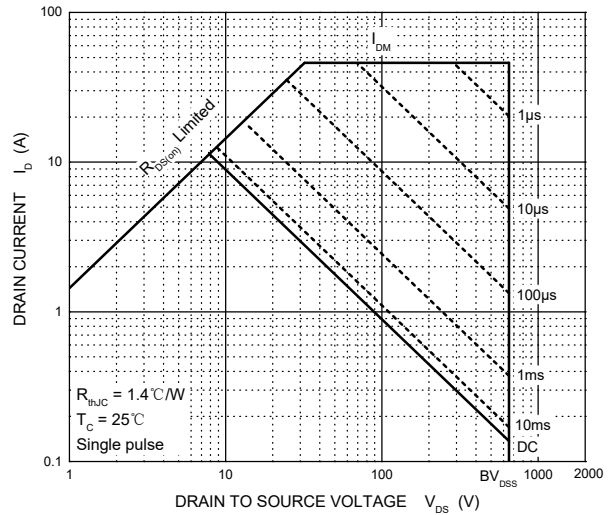
Gate Charge



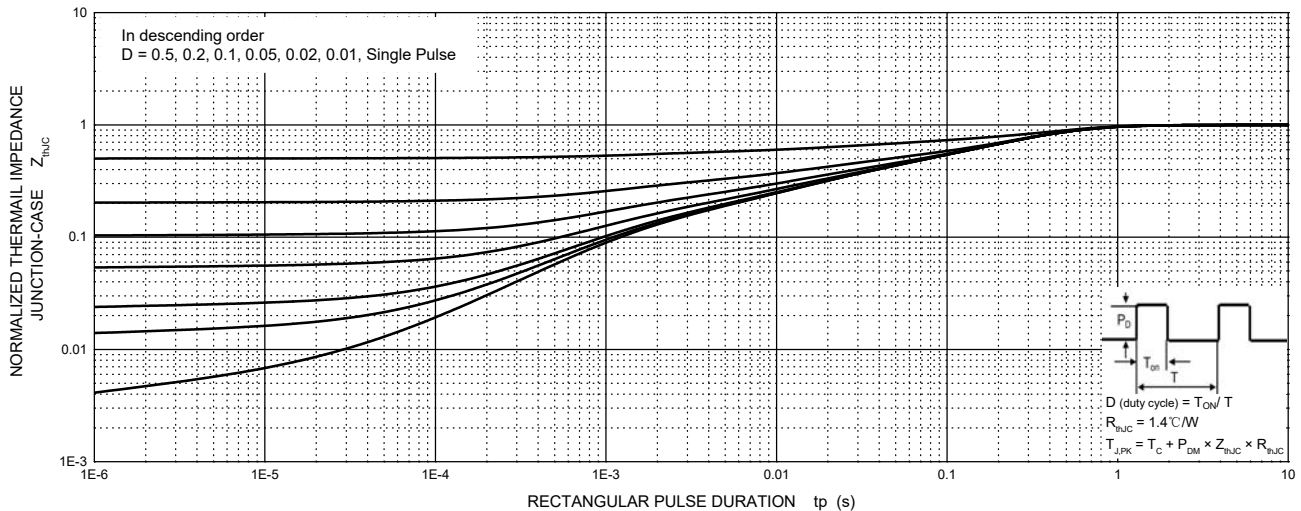
Source-Drain Diode Forward Characteristics



Maximum Safe Operating Area



Transient Thermal Impedance, Junction-Case

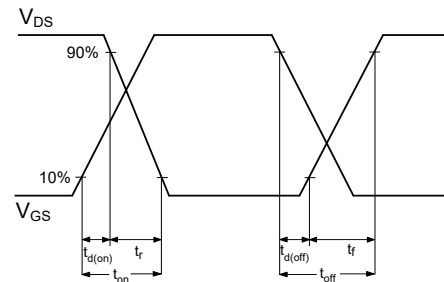
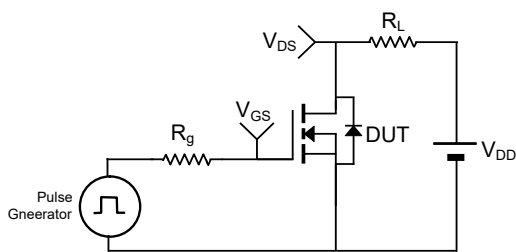


TEST CIRCUIT AND WAVEFORMS

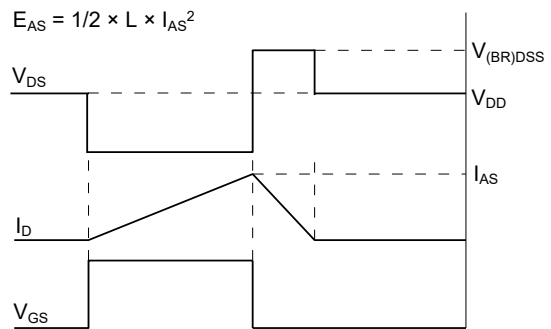
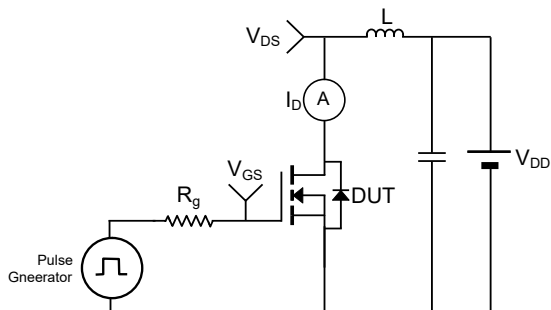
Gate Charge



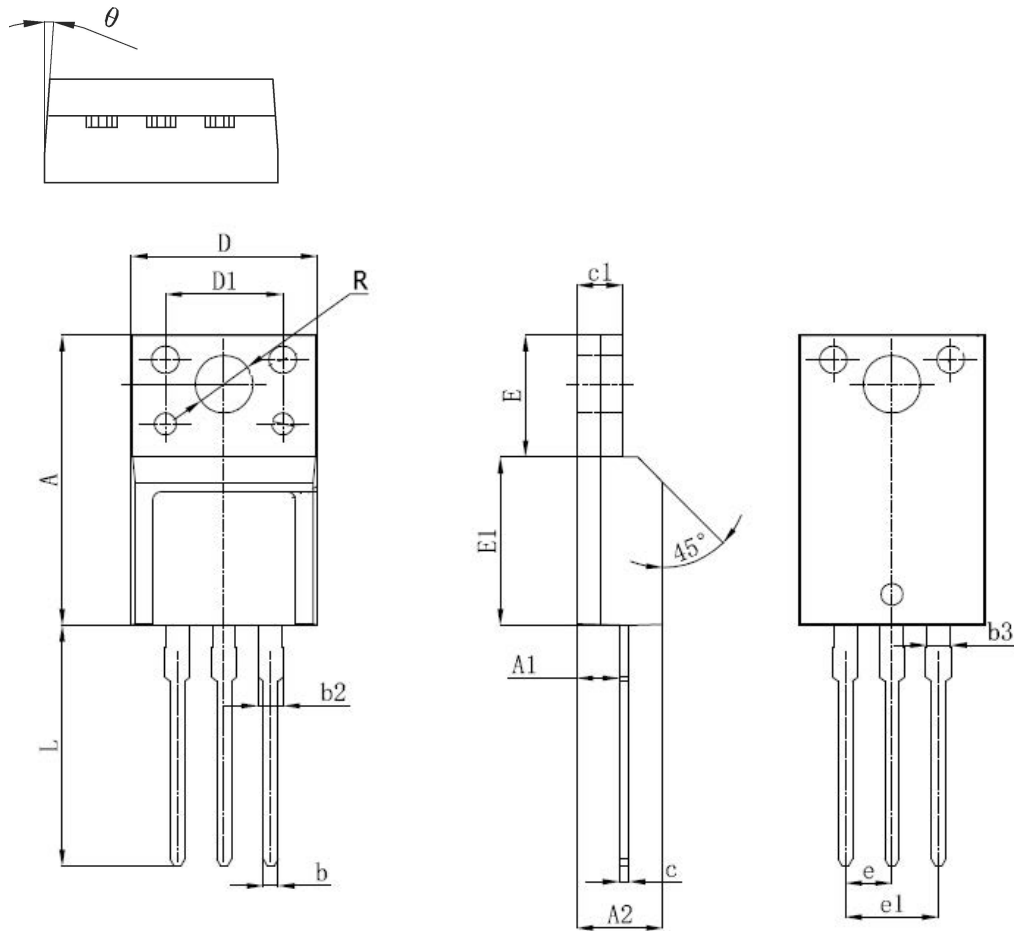
Resistive Load Switching Time



Un-clamped Inductive Load Switching



TO-220F-D Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	15.670	16.070	6.169	6.326
A1	2.150	2.550	0.846	1.003
A2	4.500	4.900	1.772	1.929
b	0.770	0.830	0.303	0.327
b2	1.200	1.400	0.472	0.551
b3	1.200BSC		0.472BSC	
c	0.400	0.600	0.157	0.236
c1	2.440	2.640	0.961	1.039
D	9.860	10.460	3.882	9.801
D1	6.900	7.100	2.717	2.795
E	6.480	6.880	2.551	2.709
E1	8.990	9.390	3.539	3.697
e	2.540BSC		1.000BSC	
e1	5.080BSC		2.000BSC	
L	13.140	13.540	5.173	5.331
R	3.100	3.500	1.220	1.378
θ	4°	5°	4°	5°