优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

0755-83047638
ysbdt@szyoushang.cn
www.szyoushang.cn

企业微信二维码　　企业QQ二维码

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
30V	7mΩ @ V_{GS} = 10V	60A
	11mΩ @ V_{GS} = 4.5V	

Description

This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

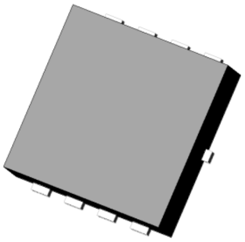
- Power Management Functions
- Analog Switch

Features

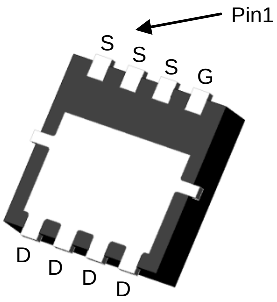
- Low $R_{DS(ON)}$ – Ensures On-State Losses are Minimized
- 100% Unclamped Inductive Switching (Test in Production) – Ensures More Reliable and Robust End Application
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product

Mechanical Data

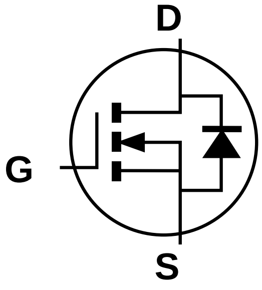
- Case: PowerDI® 3333-8 (Type UX)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ⓔ3
- Weight: 0.03 grams (Approximate)



Top View



Bottom View



Equivalent Circuit

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current, V_{GS} = 10V (Note 8)	Steady State	T_C = +25°C T_C = +70°C	I_D	60 45	A
Maximum Body Diode Forward Current (Note 8)			I_S	2	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I_{DM}	90	A
Pulsed Drain Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)			I_{SM}	90	A
Avalanche Current (L = 0.1mH) (Note 9)			I_{AS}	24	A
Avalanche Energy (L = 0.1mH) (Note 9)			E_{AS}	29	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)		P_D	1.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	130	°C/W
Total Power Dissipation (Note 7)		P_D	2.0	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	63	°C/W
Thermal Resistance, Junction to Case (Note 8)		$R_{\theta JC}$	2.9	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 10)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1	µA	V_{DS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = +20V, V_{DS} = 0V V_{GS} = -16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 10)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	3.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	5.6	7	mΩ	V_{GS} = 10V, I_D = 9.0A
			8.0	11		V_{GS} = 4.5V, I_D = 8.5A
Diode Forward Voltage	V_{SD}	—	0.70	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	1,155	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	456	—		
Reverse Transfer Capacitance	C_{rss}	—	72	—		
Gate Resistance	R_g	—	1.6	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f =1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	8.4	—	nC	V_{DD} = 15V, I_D = 9A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	16.7	—		
Gate-Source Charge	Q_{gs}	—	2.2	—		
Gate-Drain Charge	Q_{gd}	—	3.5	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	V_{DD} = 15V, V_{GS} = 10V, R_G = 3Ω, I_D = 9A
Turn-On Rise Time	t_R	—	5.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	13.5	—		
Turn-Off Fall Time	t_F	—	4.6	—		
Reverse Recovery Time	t_{RR}	—	19.3	—	ns	I_F = 1.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	8.6	—	nC	

Notes:
6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
8. Thermal resistance from junction to soldering point (on the exposed drain pad).
9. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
10. Short duration pulse test used to minimize self-heating effect.
11. Guaranteed by design. Not subject to product testing.

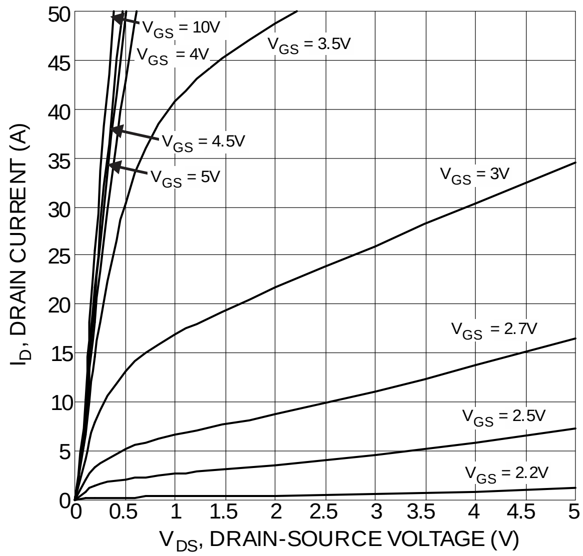


Figure 1 Typical Output Characteristic

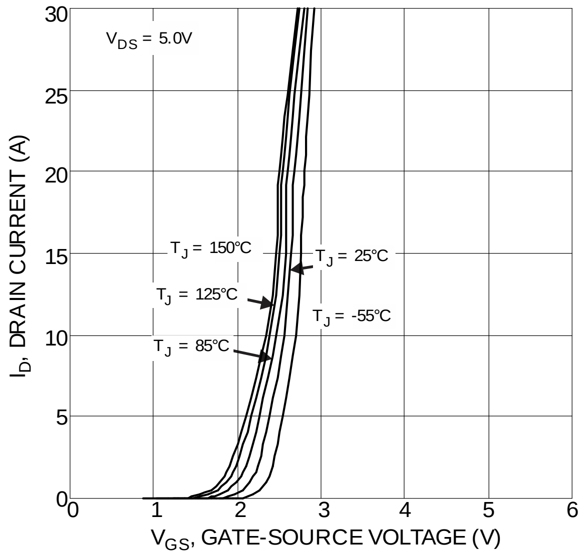


Figure 2 Typical Transfer Characteristics

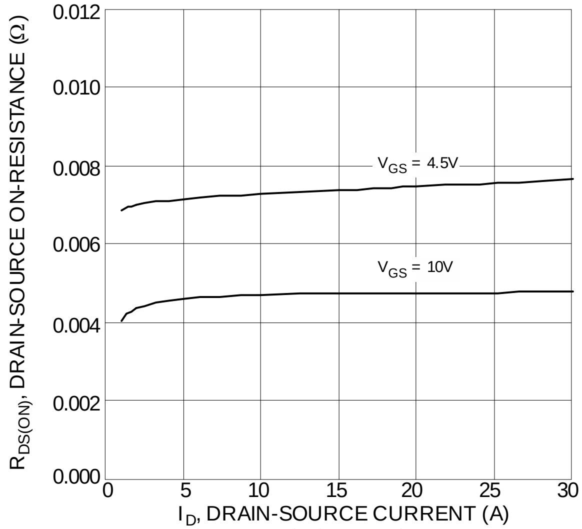


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

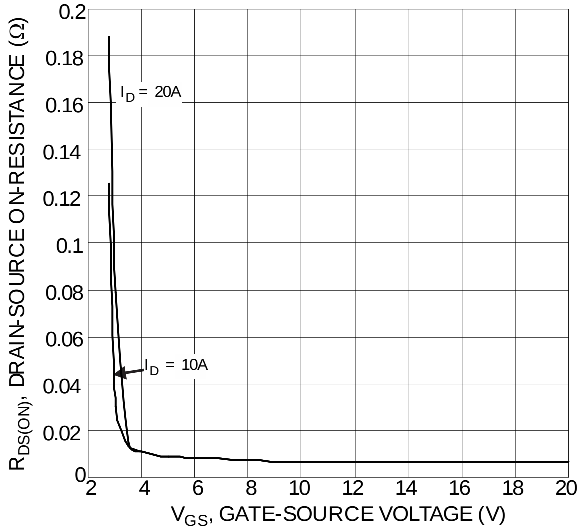


Figure 4 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

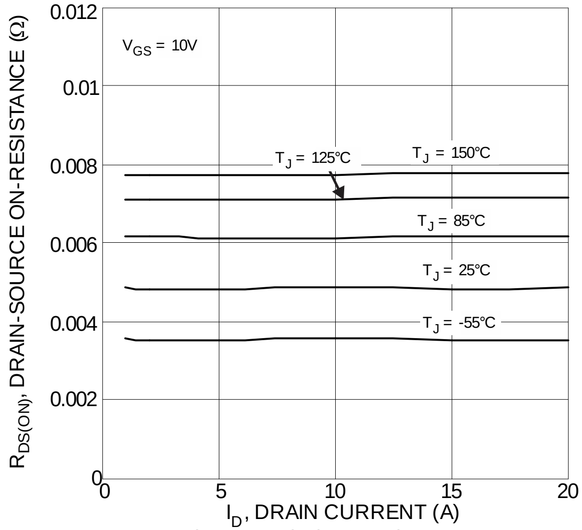


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

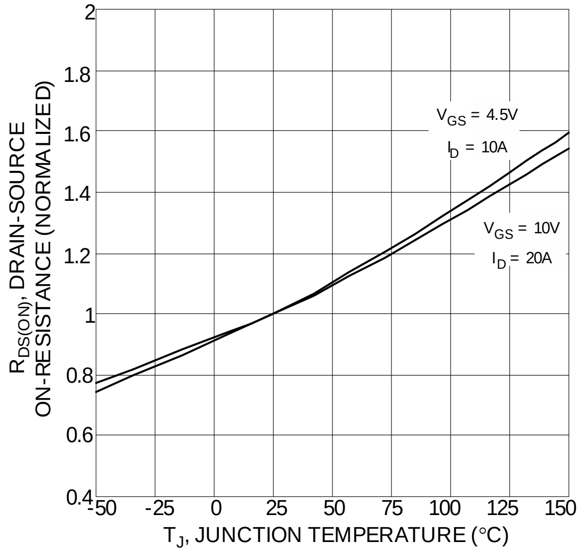


Figure 6 On-Resistance Variation with Temperature

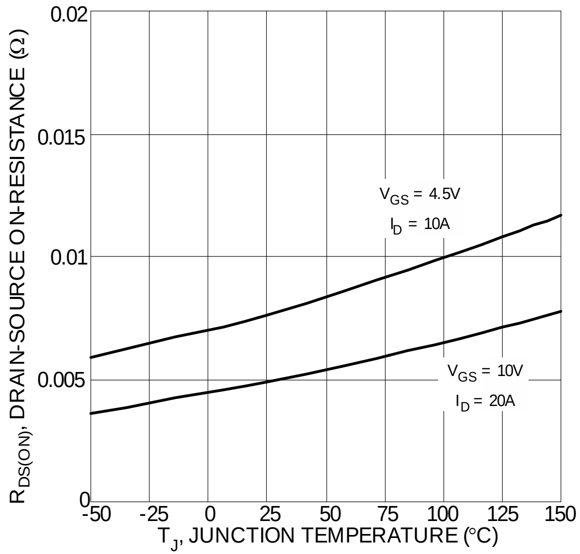


Figure 7 On-Resistance Variation with Temperature

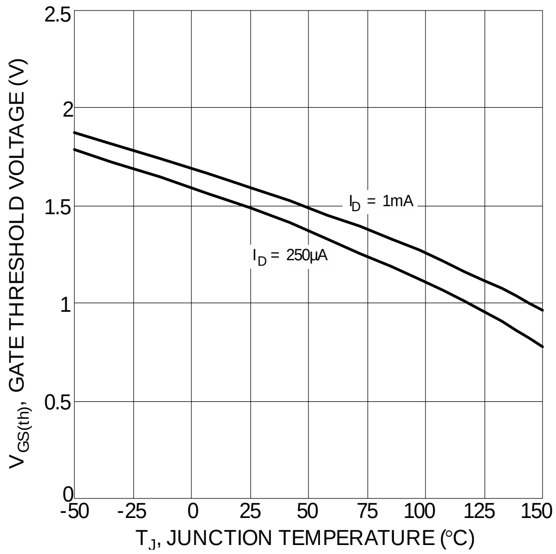


Figure 8 Gate Threshold Variation vs. Junction Temperature

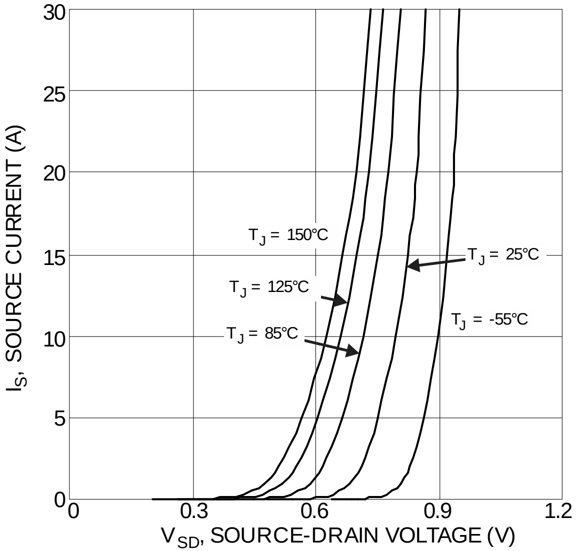


Figure 9 Diode Forward Voltage vs. Current

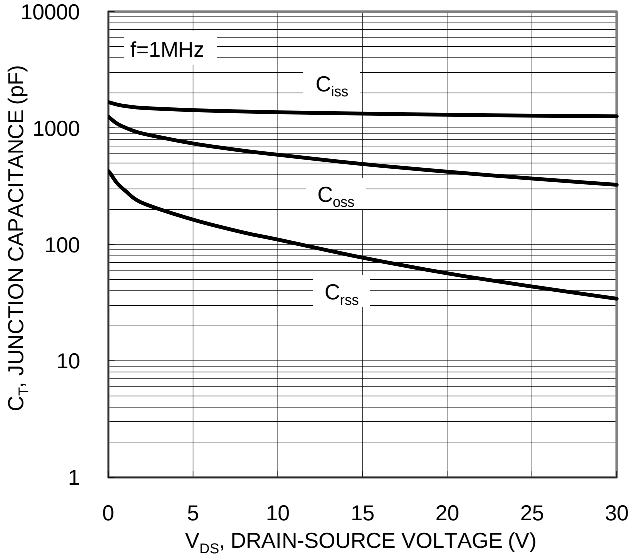


Figure 10. Typical Junction Capacitance

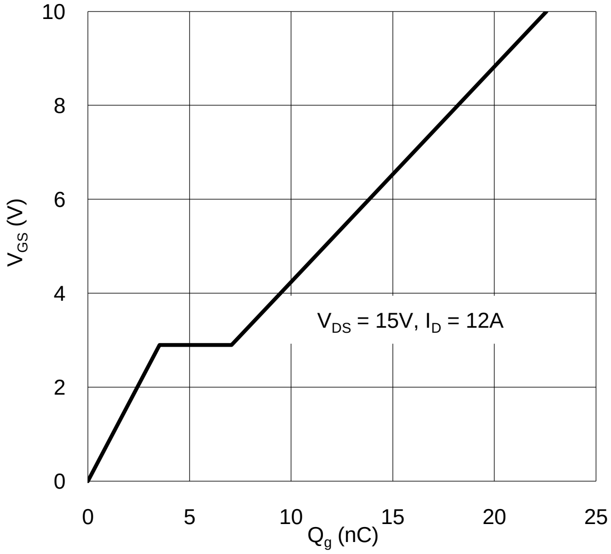


Figure 11. Gate Charge

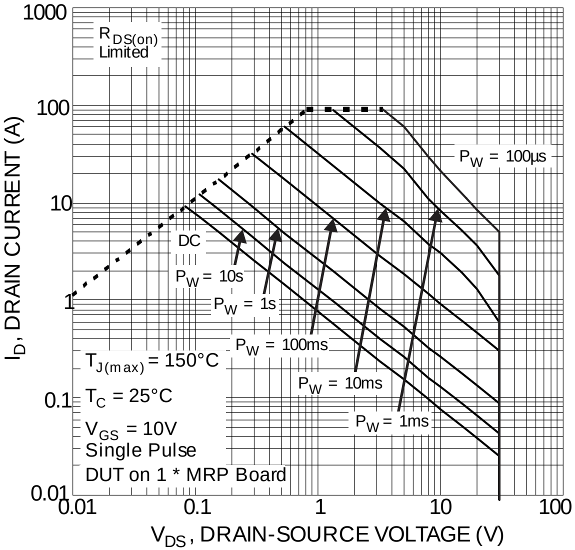


Figure 12 SOA, Safe Operation Area

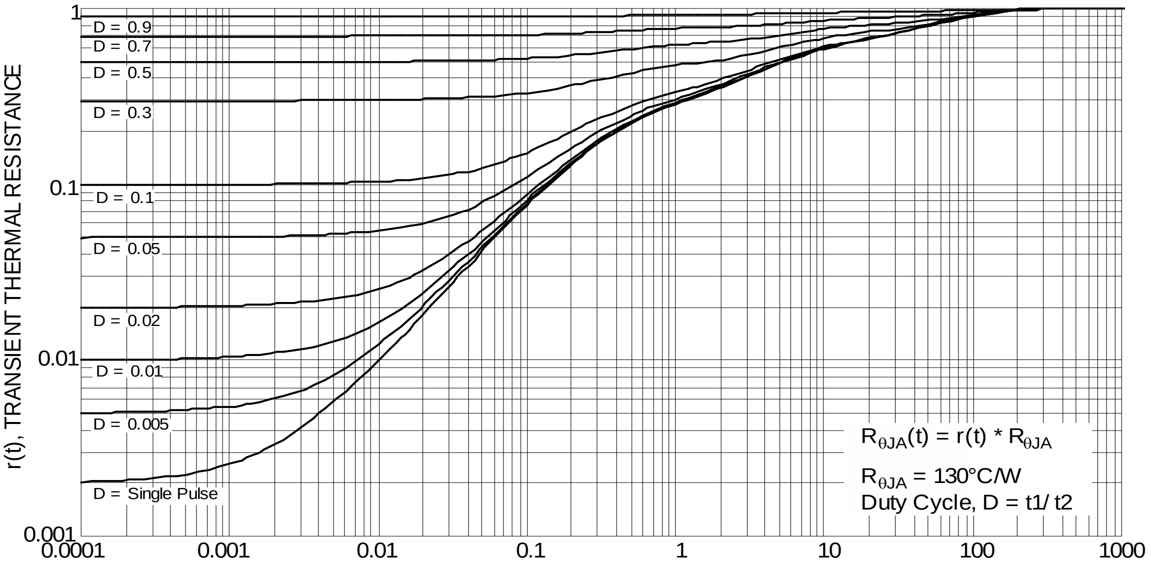
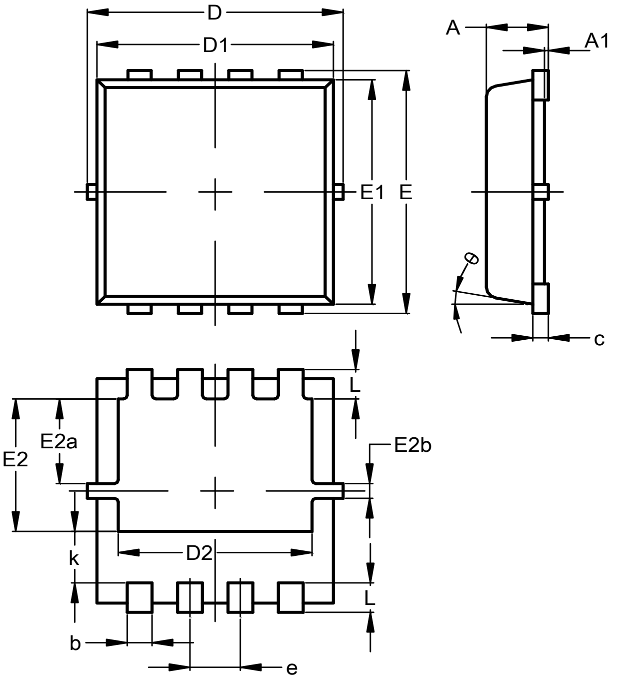


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

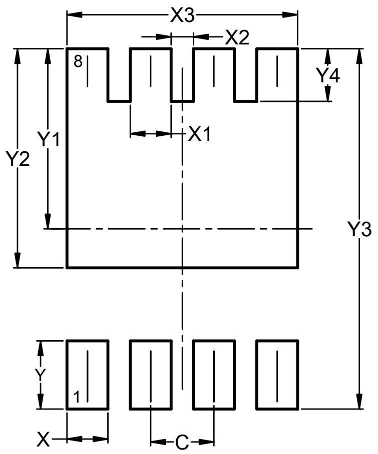
PowerDI3333-8 (Type UX)



PowerDI3333-8 (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40
θ	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

PowerDI3333-8 (Type UX)



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.370
Y	0.700
Y1	1.850
Y2	2.250
Y3	3.700
Y4	0.540