

## Description and Applications

The DIODES™ DLS3035FGBQ low-side switch provides a component and area-reducing solution for efficient power domain switching. In addition to integrated control functionality with ultra-low on-resistance, this device offers system safeguards and monitoring via fault protection and fault signaling. This cost effective solution is ideal for power management applications requiring low power consumption in a small footprint.

## Applications

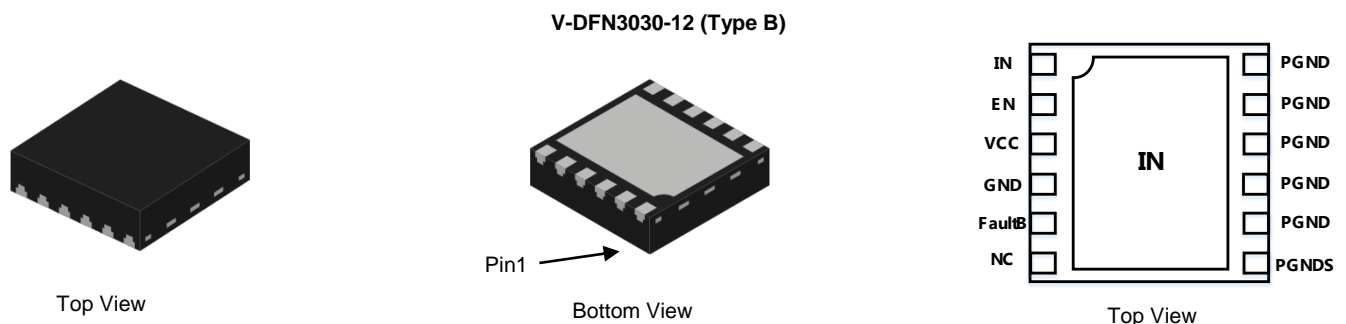
- USB charging port short to VBAT protection for automotive
- Low side drive loads

## Features and Benefits

- Integrated 30V N-Channel MOSFET with Ultra Low  $R_{ON}$
- Short-Circuit Protection with Hiccup Recovery
- Thermal Shutdown
- Fault Reporting
- Extremely Low Standby Current
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DLS3035FGBQ is suitable for automotive applications requiring specific change control; this part is AEC-Q100 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

- Package: V-DFN3030-12
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @4
- Weight: 0.024 grams (Approximate)



## Ordering Information (Note 4)

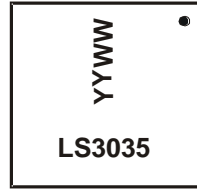
Part Number	Package	Tape Width	Tape Pitch	Packing	
				Qty.	Carrier
DLS3035FGBQ-7	V-DFN3030-12 (Type B)	8mm	4mm	3,000	Tape & Reel
DLS3035FGBQ-7A	V-DFN3030-12 (Type B)	12mm	8mm	1,500	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

Site 1

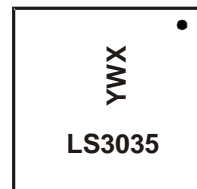
V-DFN3030-12 (Type B)



LS3035 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Two Digits of Year (ex: 22 = 2022)  
WW = Week Code (01 to 53)

Site 2

V-DFN3030-12 (Type B)



LS3035 = Product Type Marking Code  
YWX = Date Code Marking  
Y = Year (ex: 2 = 2022)  
W = Week (ex: a = Week 27; z Represents Week 52 and 53)  
X = Internal Code (ex: U = Monday)

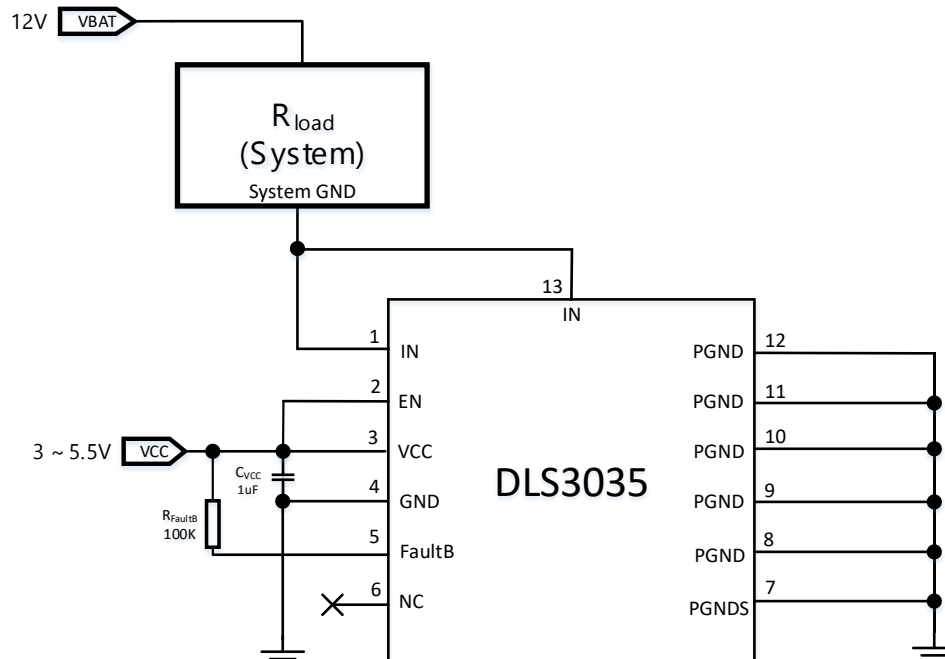
Date Code Key

Year	2020	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	0	...	2	3	4	5	6	7	8	9	0	1

Week	1-26	27-52	53
Code	A-Z	a-z	z

Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Code	T	U	V	W	X	Y	Z

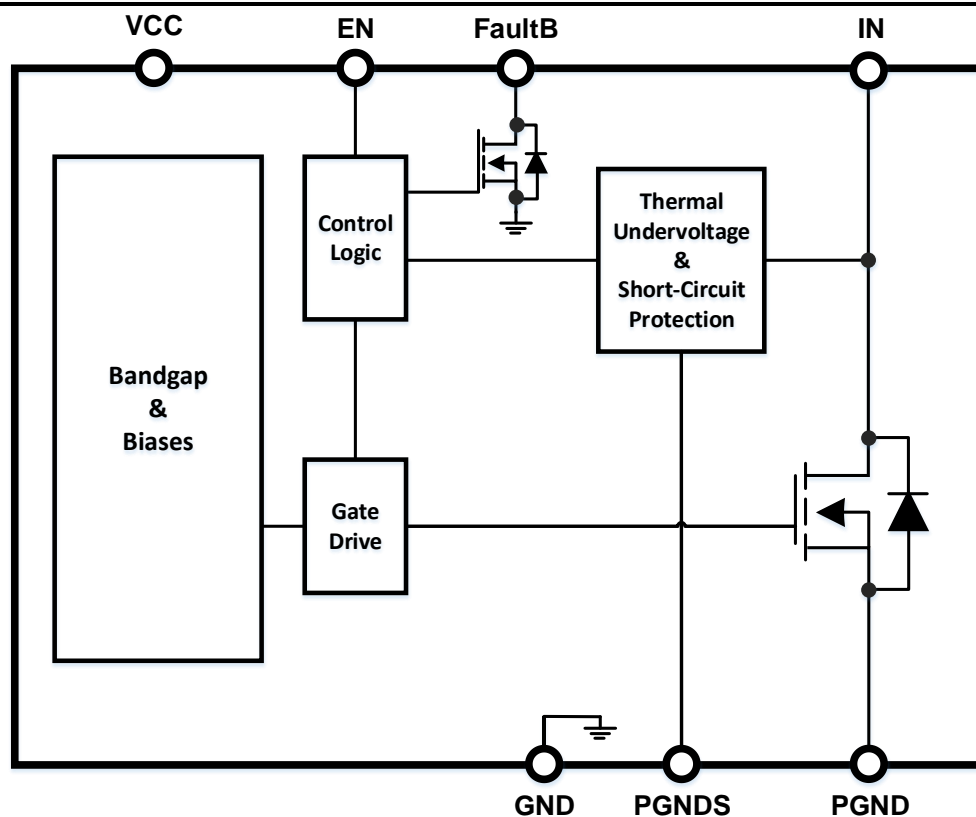
## Typical Application Circuit



## Pin Description

Pin Number	Pin Name	Pin Function
1, 13	IN	Drain of internal MOSFET, Pin 1 must be connected to Pin 13.
2	EN	Active-high digital input used to turn on the MOSFET, pin has an internal pull down resistor to GND (For LS application, tied to Vcc would be better).
3	VCC	Supply voltage to controller (3.0V to 5.5V).
4	GND	Ground.
5	FaultB	Fault status indicator. Active Low, open-drain output. Whenever an exception happens, the output of this pin is pulled to GND.
6	NC	Not connected Pin.
7	PGNDS	PGND sense connection which must be tied to GND.
8 to 12	PGND	Source of internal MOSFET, connected to GND.

### Functional Block Diagram



### Absolute Maximum Rating

Parameter	Rating
IN to GND	-0.3V to 32V
EN, VCC, FaultB to GND	-0.3V to 6V
IMAX	20A
Storage Temperature (Ts)	-55°C to +150°C
ESD Capability, Human Body Model	2kV
ESD Capability, Charge Device Model	500V

## Recommended Operating Ranges

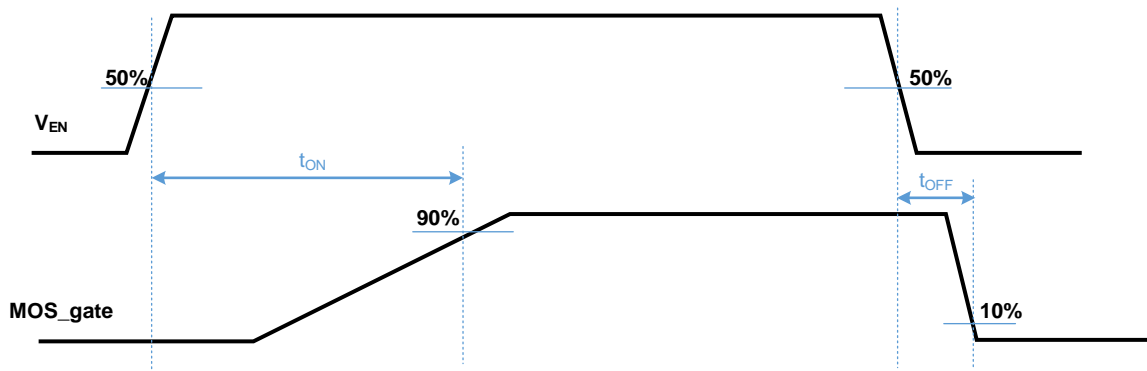
Parameter	Rating
Supply Voltage (V <sub>VCC</sub> )	3V to 5.5V
Input Voltage (V <sub>IN</sub> )	0V to 24V
Ambient Temperature (T <sub>A</sub> )	-40°C to +125°C
Junction Temperature (T <sub>J</sub> )	-40°C to +150°C
Package Thermal Resistance (θ <sub>JC</sub> )	4.5°C/W
Package Thermal Resistance (θ <sub>JA</sub> )	40°C/W

**Electrical Characteristics** ( $T_A = +25^\circ\text{C}$ ,  $V_{VCC} = 5.0\text{V}$ ,  $V_{IN} = 0.1\text{V}$ , unless otherwise specified.)

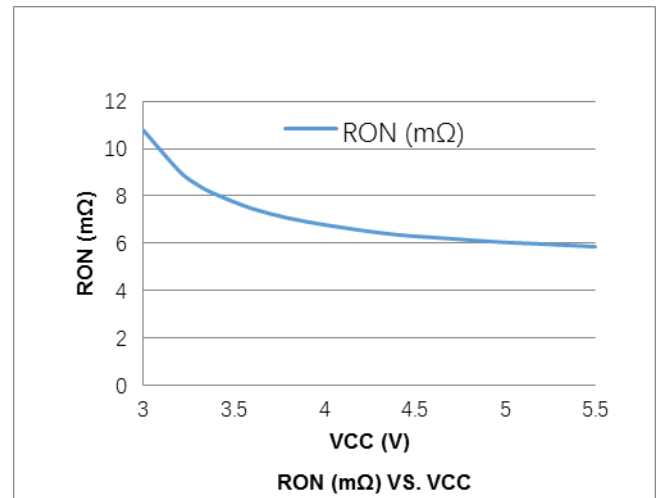
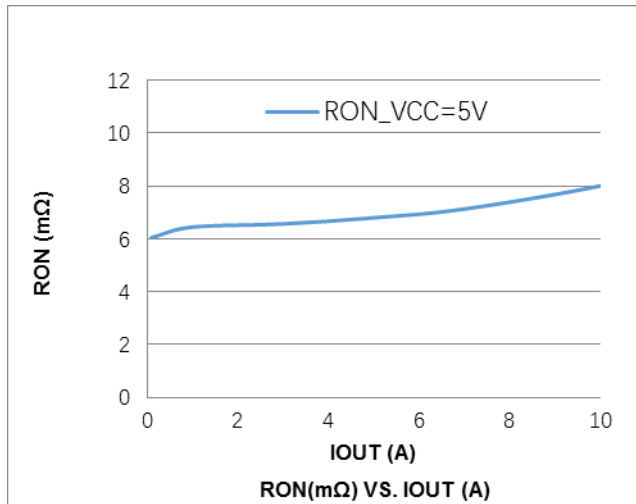
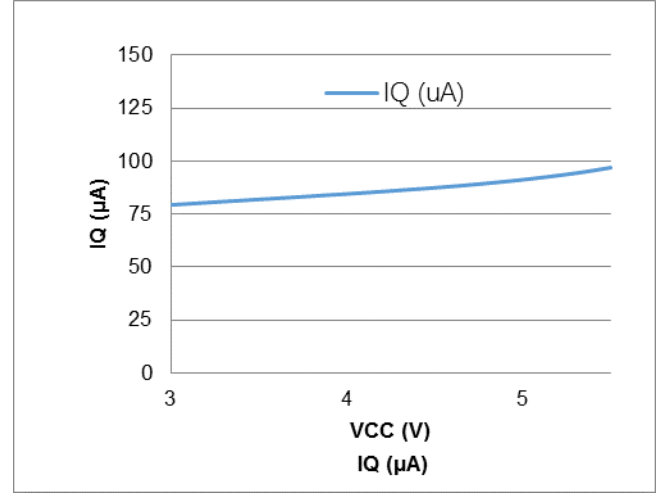
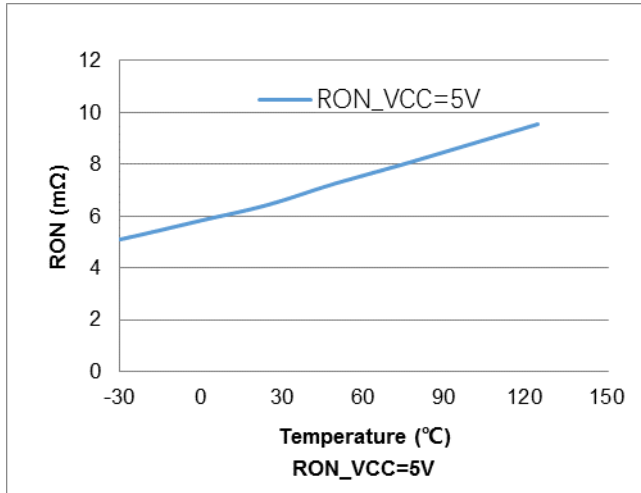
Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{IN}$	Input Voltage	—	-0.3	—	30	V
$V_{VCC}$	Supply Voltage	—	3.0	—	5.5	V
$I_{DYN}$	$V_{CC}$ Dynamic Supply Current	$V_{EN} = V_{VCC} = 3\text{V}$	—	65	150	$\mu\text{A}$
		$V_{EN} = V_{VCC} = 5.5\text{V}$	—	85	200	$\mu\text{A}$
$I_{STBY}$	$V_{CC}$ Shutdown Supply Current	$V_{VCC} = 3\text{V}$ , $V_{EN} = 0\text{V}$	—	0.1	1	$\mu\text{A}$
		$V_{VCC} = 5.5\text{V}$ , $V_{EN} = 0\text{V}$	—	0.1	2	$\mu\text{A}$
$V_{ENH}$	EN High Level Voltage	$V_{VCC} = 3\text{V}$ to $5.5\text{V}$	2.0	—	—	V
$V_{ENL}$	EN Low Level Voltage	$V_{VCC} = 3\text{V}$ to $5.5\text{V}$	—	—	0.8	V
$V_{FaultB}$	FaultB Output Low Voltage	$V_{VCC} = 5\text{V}$ , $I_{SINK} = 5\text{mA}$	—	—	0.2	V
$I_{FaultB}$	FaultB Output Leakage Current	$V_{VCC} = 5\text{V}$	—	—	100	nA
<b>Switching Device</b>						
$R_{ON}$	Switch On-State Resistance	$V_{VCC} = 5\text{V}$ , $I_{IN} = 1\text{A}$	—	8	10	m $\Omega$
$I_{LEAK}$	Input Shutdown Supply Current	$V_{EN} = 0\text{V}$ , $V_{IN} = 24\text{V}$	—	100	—	$\mu\text{A}$
$R_{PDEN}$	EN Pull Down Resistance	—	—	1000	—	k $\Omega$
<b>Fault Protection</b>						
$T_{OTP}$	Thermal Shutdown Threshold	$V_{VCC} = 3\text{V}$ to $5.5\text{V}$	—	150	—	$^\circ\text{C}$
$T_{OTPHYS}$	Thermal Shutdown Hysteresis	$V_{VCC} = 3\text{V}$ to $5.5\text{V}$	—	30	—	$^\circ\text{C}$
$UVLO$	$V_{VCC}$ Lockout Threshold	—	—	2.55	—	V
$UVLOHYS$	$V_{VCC}$ Lockout Hysteresis	—	—	200	—	mV
$V_{SCP}$	Short-Circuit Protection Threshold	$V_{VCC} = 3\text{V}$ to $5.5\text{V}$ , $V_{IN}$ Ramp Up	180	265	350	mV

**Switching Characteristics** ( $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b><math>V_{IN} = 0.1\text{V}</math></b>						
$t_{ON}$	MOS Output Turn-On Delay Time	$V_{VCC} = 5\text{V}$	—	100	—	$\mu\text{s}$
$t_{OFF}$	MOS Output Turn-Off Delay Time	$V_{VCC} = 5\text{V}$	—	0.5	—	



**Performance Characteristics** ( $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

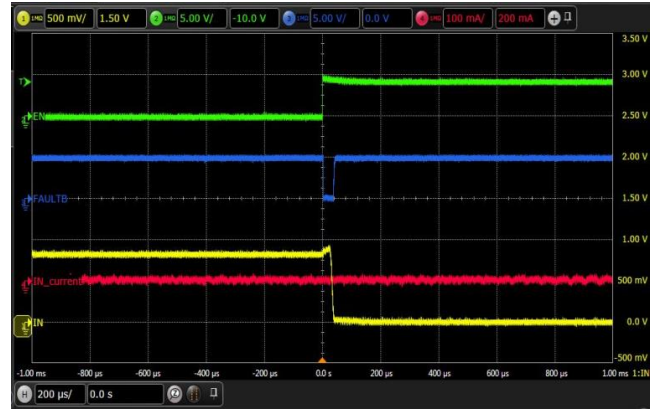


## Performance Characteristics (T<sub>A</sub> = +25°C, unless otherwise specified.)

IN = 0V, V<sub>CC</sub> = 5 = EN = 0V to 5V, R<sub>disc</sub> = 1kΩ



IN = 5V, V<sub>CC</sub> = 5 = EN = 0V to 5V, R<sub>disc</sub> = 1kΩ



V<sub>CC</sub> = EN = 5V, IN\_Current = 0A to 10A (IN Initial = 0V)



UVLO Locked Out Threshold and Hysteresis.



V<sub>CC</sub> = EN = 5V, IN = 0V Hard Short to 12V



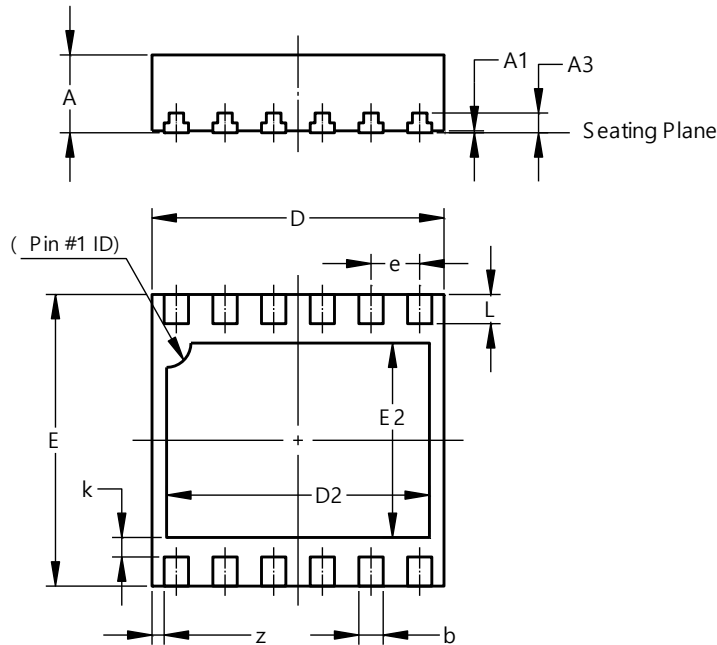
IN = Hard Short to 5V, V<sub>CC</sub> = EN = 0V to 5V



## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**V-DFN3030-12 (Type B)**

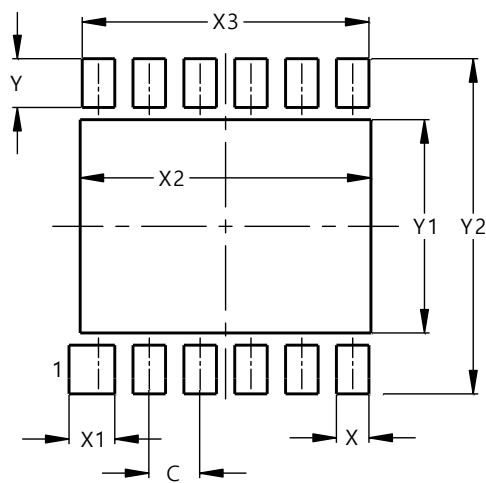


V-DFN3030-12 Type B			
Dim	Min	Max	Typ
A	0.77	0.85	0.80
A1	0.00	0.05	0.02
A3	--	--	0.203
b	0.20	0.30	0.25
D	2.95	3.05	3.00
D2	2.60	2.80	2.70
E	2.95	3.05	3.00
E2	1.90	2.10	2.00
e	0.50BSC		
k	--	--	0.20
L	0.25	0.35	0.30
z	--	--	0.125
All Dimensions in mm			

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**V-DFN3030-12 (Type B)**



Dimensions	Value (in mm)
C	0.50
X	0.32
X1	0.45
X2	2.86
X3	2.82
Y	0.48
Y1	2.10
Y2	3.30

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