1A 150KHz 100V PWM Buck DC/DC Converter

Features

Wide 4.5V to 80V Input Voltage Range
5V,12V,15V and adjustable versions
Output Adjustable from 1.25V to 24V
Maximum Duty Cycle 100%
Minimum Drop Out 2.0V
Fixed 150KHz Switching Frequency
Recommend output power less than 18W
0.5A Constant Output Current Capability
Internal Optimize Power Transistor
TTL shutdown capability
Excellent line and load regulation
Built in thermal shutdown function
Built in current limit function
Built in output short protection function
Built in second current limit function
Available in TO252-5 packages

Applications

Ebike Controller Power Supply
Telecom / Networking Equipment

Package Types

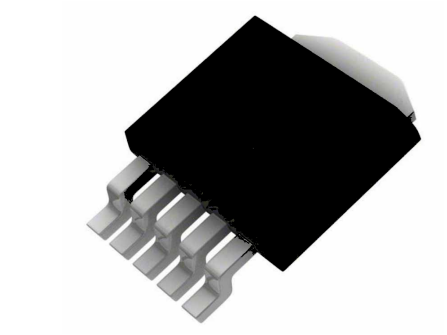


Figure 1. Package Types of CXL70XXX

Pin Configurations

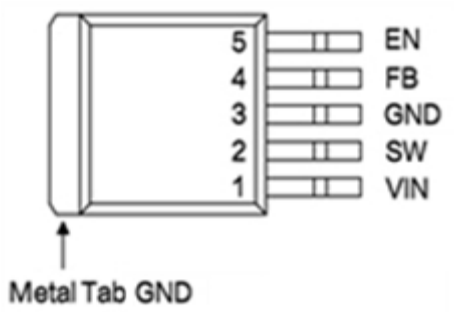


Figure 2 Pin Configuration of CXL70XX **(Top View)**

Pin Description

Pin Number	Pin Name	Description
1	VIN	Supply Voltage Input Pin. CXL70XX operates from a 4.5V to 80V DC voltage. Bypass Vin to GND with a suitably largecapacitor to eliminate noise on the input.
2	SW	Power Switch Output Pin (SW). Output is the switch node that supplies power to the output.
3	GND	Ground Pin.
4	FB	Feedback Pin (FB). Through an external resistor divider network, Feedback senses the output voltage and regulates it. The feedback threshold voltage is 1.25V.
5	EN	Enable Pin. Drive EN pin low to turn on the device, drive it high to turn it off. Floating is default low.
TAB	GND	Ground Pin.

Function Block

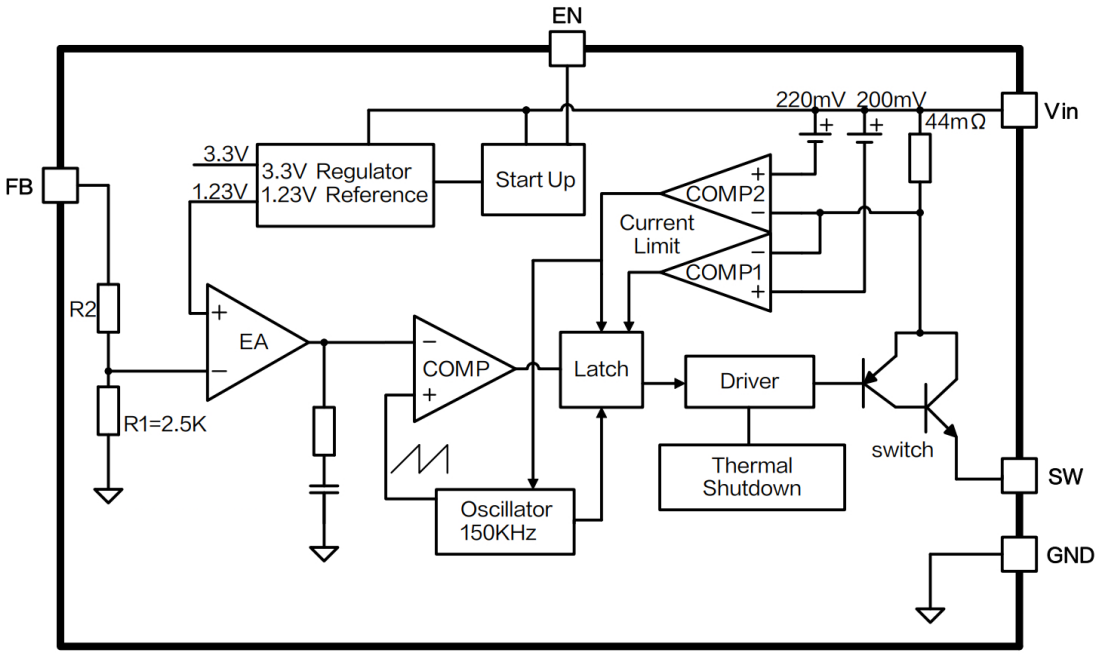


Figure 3 Function Block Diagram of CXL70XX

Typical Application Circuit

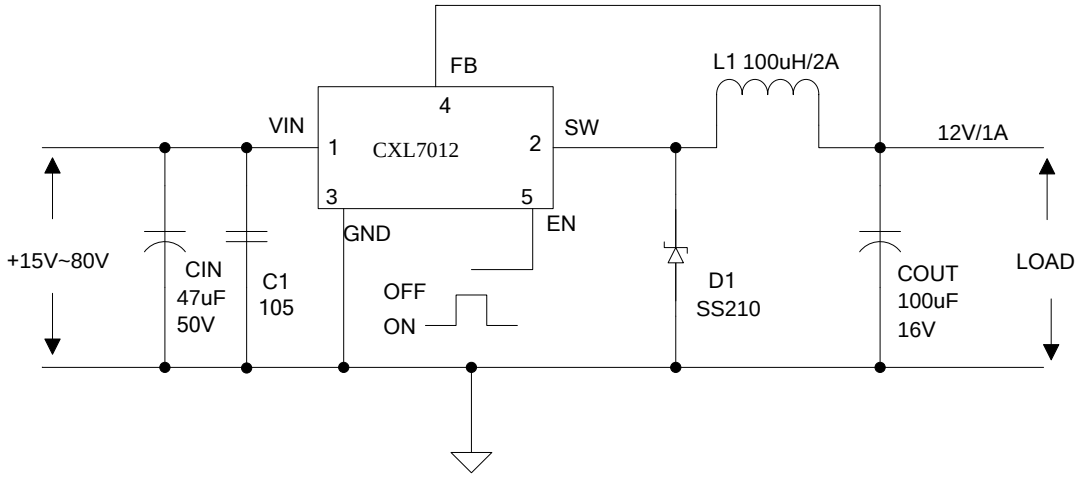


Figure4. CXL7012 Typical Application Circuit (VIN=15V~80V, VOUT=12V/1A)

Ordering Information

Order Information	Marking ID	Package Type	Eco Plan	Packing Type Supplied As
CXL7000E	XL7000	TO252-5	RoHS & HF	2500 Units on Reel
CXL7005E	XL7005E	TO252-5	RoHS & HF	2500 Units on Reel
CXL7012E	XL7012E	TO252-5	RoHS & HF	2500 Units on Reel
CXL7015E	XL7015E	TO252-5	RoHS & HF	2500 Units on Reel

Absolute Maximum Ratings

Note1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Parameter	Symbol	Value	Unit
Input Voltage	V_{IN}	-0.3 to 100	V
Feedback Pin Voltage	V_{FB}	-0.3 to VIN	V
Enable Pin Voltage	V_{EN}	-0.3 to VIN	V
Switch Pin Voltage	V_{SW}	-0.3 to VIN	V
Power Dissipation	P_D	Internally limited	mW
Operating Junction Temperature	T_J	-40~125	ºC
Storage Temperature	T_{STG}	-65 to 150	ºC
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	260	ºC
ESD (HBM)		2000	V
MSL		Level3	
Thermal Resistance-Junction to Ambient	RθJA	85	ºC / W
Thermal Resistance-Junction to Case	RθJC	45	ºC / W

CXL7005E Electrical Characteristics

T_a = 25℃;unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
System parameters test circuit figure6						
VOUT	Output Voltage	Vin = 8.0V to 80V Iload=0.1A to 1A	4.8	5	5.2	V
η	Efficiency	Vin=48V ,Vout=5.0V Iout=0.2A	–	82	–	%

CXL7012E Electrical Characteristics

T_a = 25℃;unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
System parameters test circuit figure7						
VOUT	Output Voltage	Vin =15V to 80V, Iload=0.1A to 1A	11.52	12	12.48	V
η	Efficiency	Vin=48V ,Vout=12V Iout=0.2A	–	86	–	%

CXL7015E Electrical Characteristics

T_a = 25℃;unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
System parameters test circuit figure8						
VOUT	Output Voltage	Vin = 18V to 80V, Iload=0.1A to 1A	14.40	15	15.60	V
η	Efficiency	Vin=48V ,Vout=15V Iout=0.2A	–	87	–	%

CXL7000E Electrical Characteristics

T_a = 25℃;unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
System parameters test circuit figure9						
VOUT	Output Voltage	Vin = 4.5V to 80V, Iload=0.1A to 1A	1.225	1.25	1.275	V
η	Efficiency	Vin=48V ,Vout=15V Iout=0.2A	–	87	–	%

Electrical Characteristics (DC Parameters)

Vin = 48V for the 5V,12V,15V,and Adjustable versions, GND=0V, Vin & GND parallel connect a 100uF/100V capacitor; Iout=200mA, T_a = 25℃;the others floating unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	Vin		4.5		80	V
Shutdown Supply Current	I_S	V_{EN}=5V		50	200	uA
Quiescent Supply Current	I_q	V_{EN} =0V, V_{FB} =High		4.5	10	mA
Oscillator Frequency	Fosc		127	150	173	Khz
Switch Current Limit	I_L	V_{FB} =0V		1.5		A
EN Pin Threshold	V_{EN}	High (Regulator OFF) Low (Regulator ON)		1.4 0.8		V
EN Pin Input Leakage Current	I_H	V_{EN} =2.5V (OFF)		8	15	uA
	I_L	V_{EN} =0.5V (ON)		0.5	5	uA
Output Saturation Voltage	V_{CE}	V_{FB}=0V I_{out}=1.0A		1.2	1.5	V
Max. Duty Cycle	D_{MAX}	V_{FB}=0V		100		%

Test Circuit and Layout guidelines

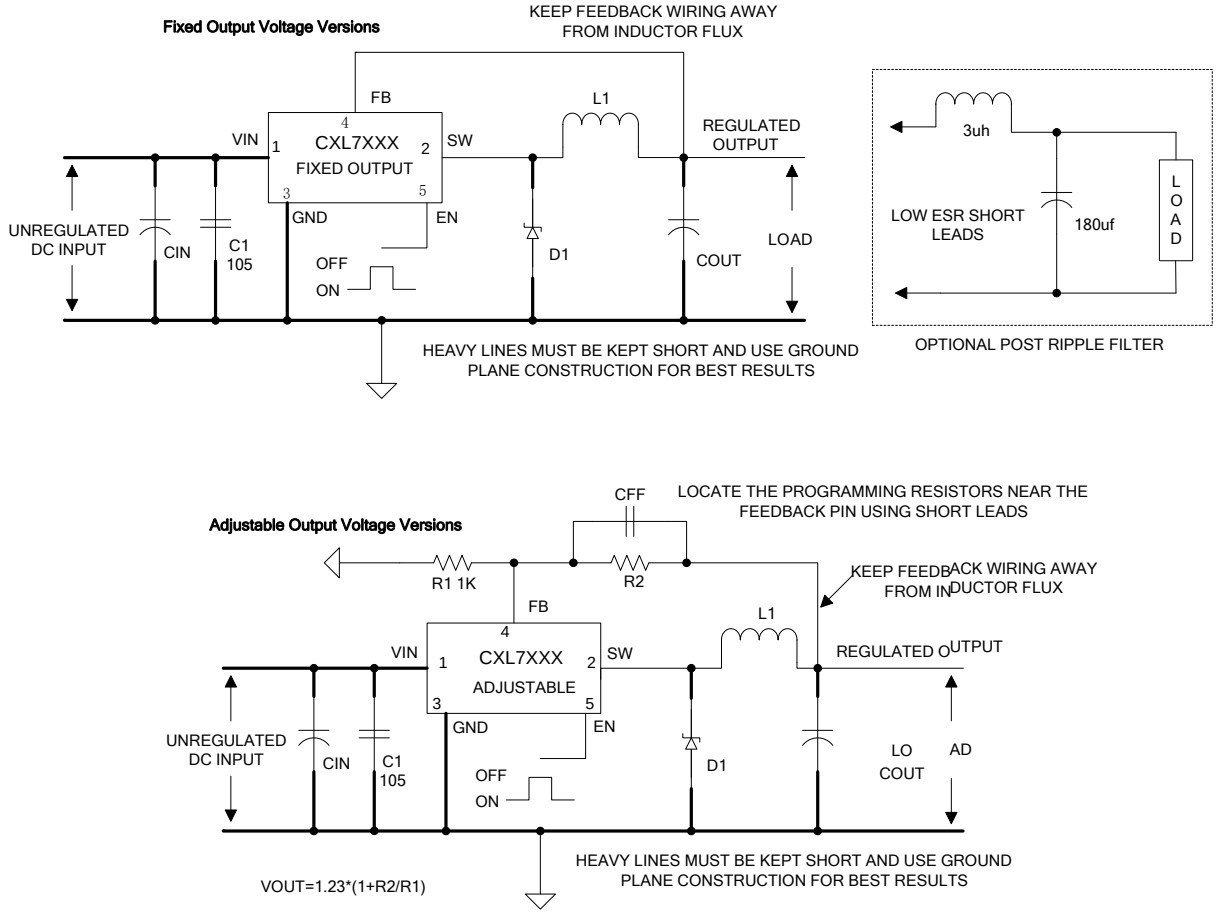


Figure4. Standard Test Circuits and Layout Guides

Select R1 to be approximately 1K, use a 1% resistor for best stability.

C1 and CFF are optional; in order to increase stability and reduce the input power line noise, C1 must be placed near to PIN1 and PIN3;

For output voltages greater than approximately 12V, an additional capacitor CFF is required. The compensation capacitor is typically between 100 pf and 33 nf, and is wired in parallel with the output voltage setting resistor, R2. It provides additional stability for high output voltage, low input−output voltages, and/or very low ESR output capacitors, such as solid tantalum capacitors.

CFF=1/(31*1000*R2); This capacitor type can be ceramic, plastic, silver mica, etc. (Because of the unstable characteristics of ceramic capacitors made with Z5U material, they are not recommended.)

Typical System Application (Recommend output current safe work range)

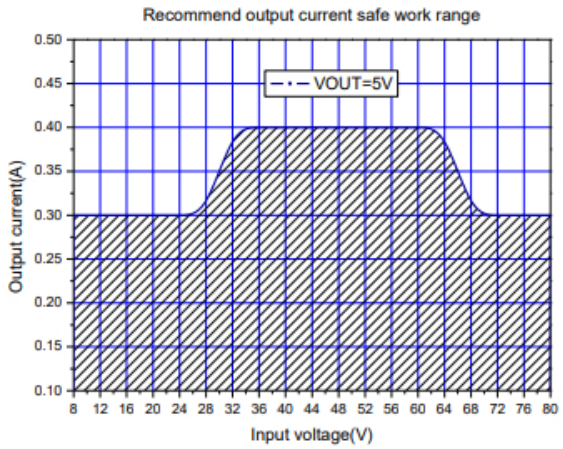


Figure5.Max output current(VOUT=5V)

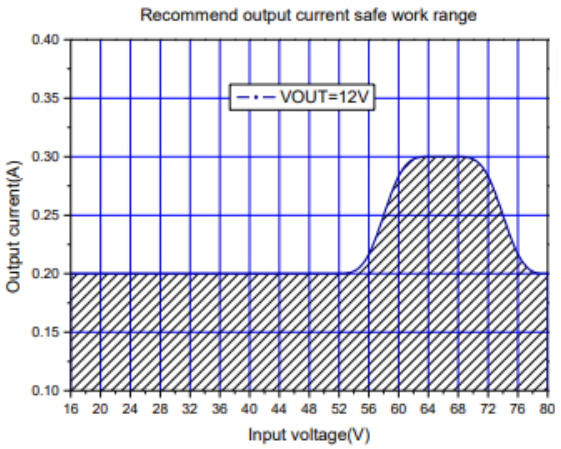


Figure6.Max output current(VOUT=12V)

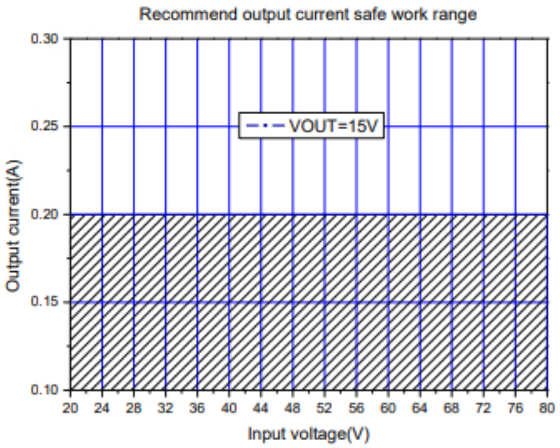


Figure7.Max output current(VOUT=15V)

Typical System Application for 5.0V Version

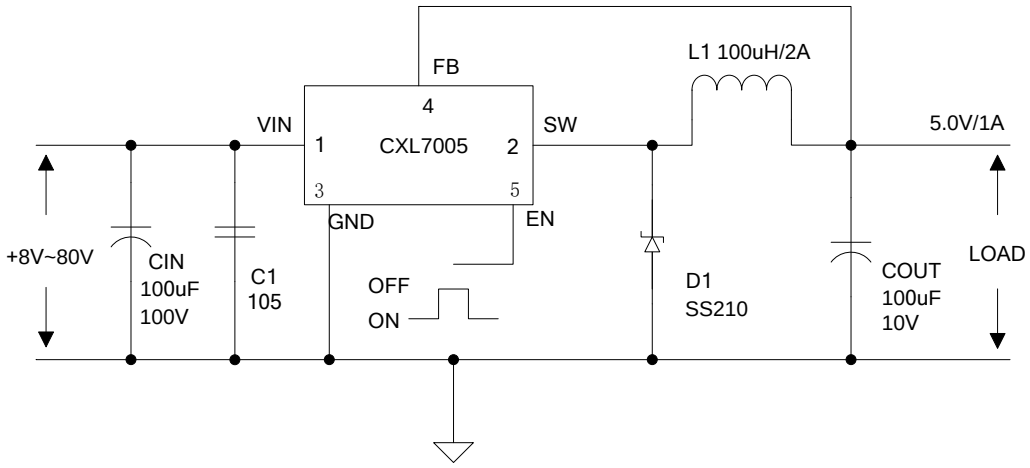


Figure8. CXL7005E System Parameters Test Circuit

Typical System Application for 12V Version

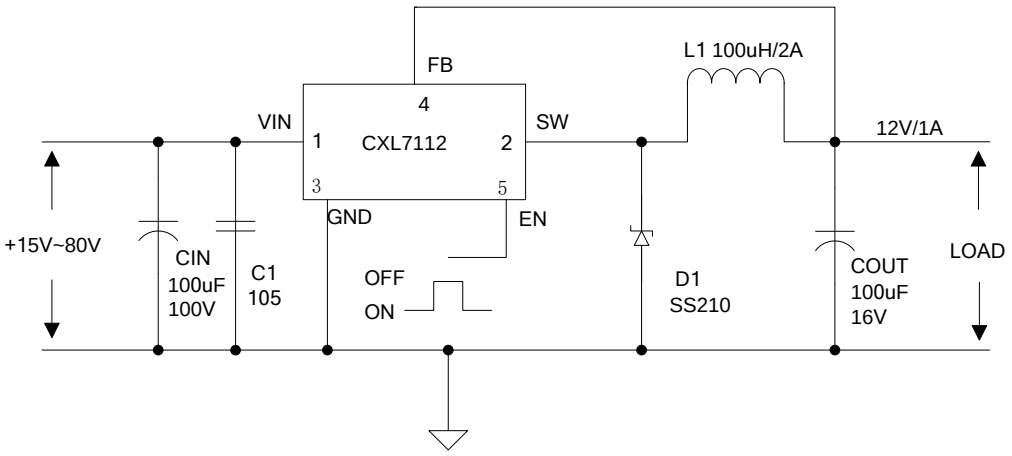


Figure9. CXL7112E System Parameters Test Circuit

Typical System Application for 15V Version

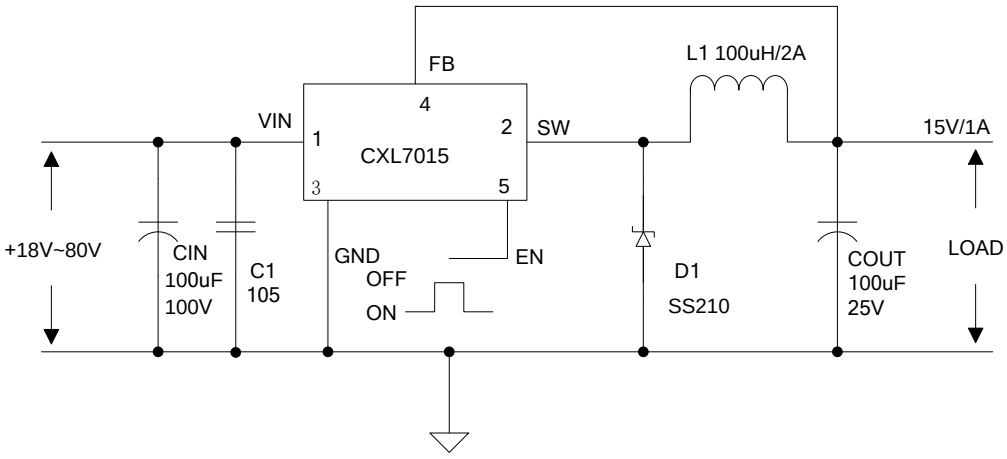


Figure10. CXL7015E System Parameters Test Circuit

Typical System Application for ADJ Version

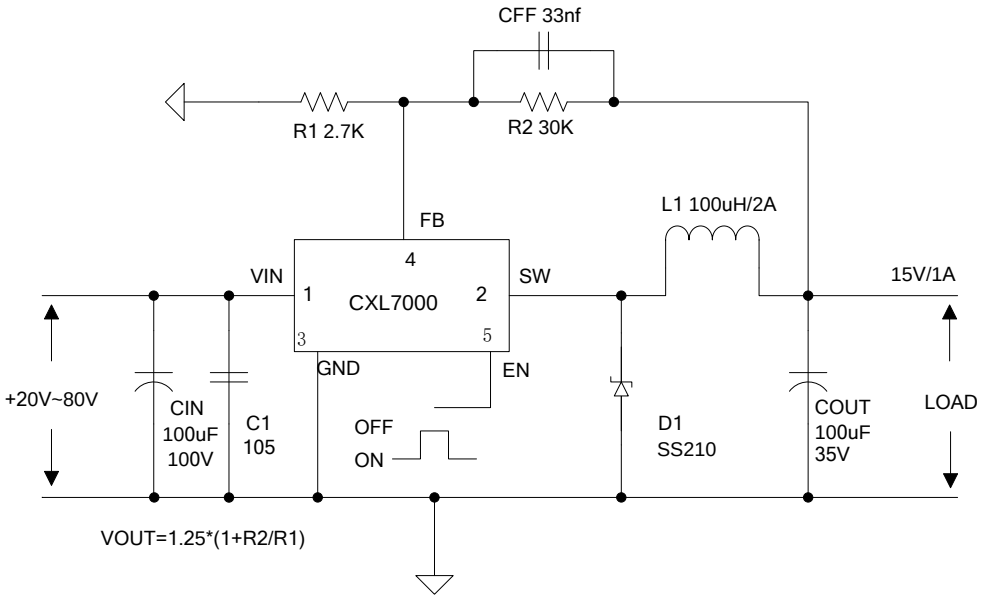
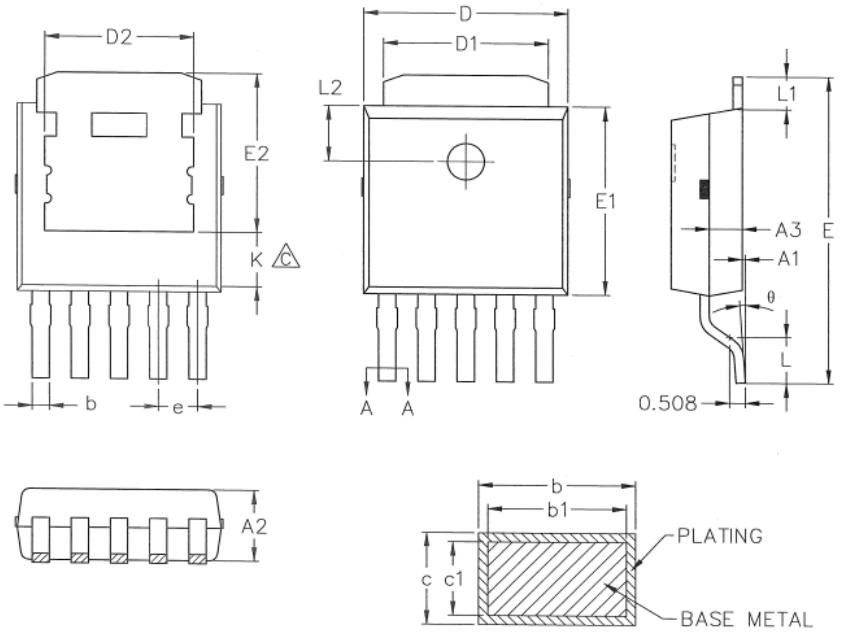


Figure11.CXL7000E System Parameters Test Circuit

TO252-5 Package Outline Dimensions



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A1	0	–	0.10
A2	2.20	2.30	2.40
A3	0.97	1.05	1.12
b	0.51	–	0.61
b1	–	0.56	–
c	0.25	–	0.35
c1	–	0.30	–
D	6.55	6.60	6.65
D1		5.33REF	
D2		4.83REF	
E	9.80	9.95	10.10
E1	6.05	6.10	6.15
E2		5.18REF	
e		1.27BSC	
L	1.40	1.50	1.60
L1		1.01REF	
L2		1.80REF	
θ	0°	4°	8°
K	1.60	–	1.90