FEATURES

● Dropout Voltage – 1.2V(Typ)

● Reference/Output Voltage Trimmed to ± 2%

● Maximum Input Voltage – 15V

● Adjustable Output Voltage or Fixed 1.2V, 1.25V, 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5V

● Line Regulation typically at 0.2% max

● Load Regulation typically at 0.4% max

● Current Limiting and Thermal Protection

● Standard 3-Pin Power Packages

● Operating Junction Temperature Range -40 to +125℃

● (for CBM1117C-1.2V 0℃ to +150℃)

APPLICATIONS

● Post Regulator for switching DC/DC Converter

● High Efficiency Linear Regulator

● Battery Chargers

● PC Add on Card

● Motherboard clock supplies

● LCD Monitor

● Set-top Box

GENERAL DESCRIPTION

The CBM1117C is a series of low dropout voltage regulators which can provide up to 1A of output cur-rent. The CBM1117C is available in eight fixed voltage, 1.2, 1.25, 1.5, 1.8, 2.5, 2.85, 3.3 and 5.0V. Additionally it is also available in adjustable version. On chip precision trimming adjusts the reference/ output voltage to within ± 2%. Current limit is also trimmed to ensure specified output current and controlled short-circuit current.

The CBM1117C series is available in SOT-223, TO-252, TO-263 packages.

A minimum of 10uF tantalum capacitor is required at the output to improve the transient response and Stability.

TYPICAL APPLICATION

$$V_{OUT} = 1.25 \left(1 + \frac{R2}{R1} \right)$$
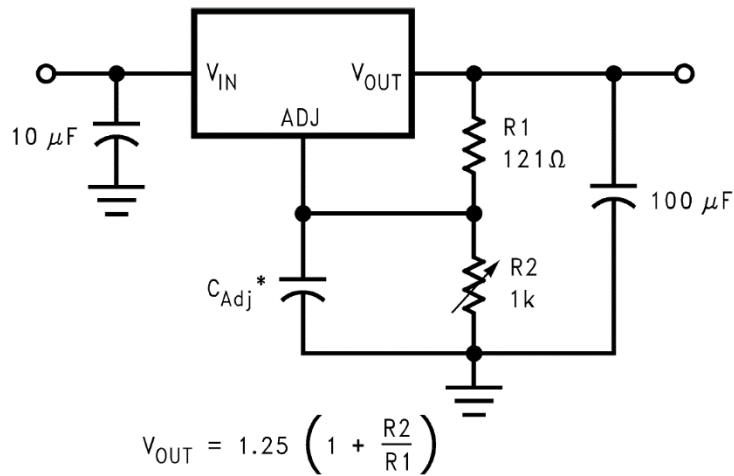
* C_{Adj} is optional, however it will improve ripple rejection.

Maximum ratings

SYMBOL	DESCRIPTION	MAX	UNITS
VIN	Input Voltage	15	V
IOUT	DC Output Current	PD/(VIN-VO)	mA
TJ	Operating Junction Temperature Range (* in case of CBM1117C-(1.2)	-40 to 125 (* 0 to 150)	℃
ΘJA	Thermal Resistance Junction-to-Ambient (SOT-223)	150	℃/W
ΘJA	Thermal Resistance Junction-to-Ambient (TO-252)	80	℃/W
ΘJA	Thermal Resistance Junction-to-Ambient (TO-220)	60	℃/W
ΘJC	Thermal Resistance Junction-to-Case (SOT-223)	35	℃/W
ΘJC	Thermal Resistance Junction-to-Case (TO-252)	22	℃/W
ΘJC	Thermal Resistance Junction-to-Case (TO-220)	15	℃/W

* Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indi-cated under "recommended operating conditions" is not implied.
Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

Tj = -40℃ to +125℃   (for CBM1117C-1.2   Tj = 0 to +150℃) unless otherwise specified

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
OUTPUT VOLTAGE					
CBM1117C-1.2	Io = 10mA to 1.0A, Vin = 2.7 to 12.0V	1.176	1.200	1.224	V
CBM1117C-1.25 (Adjustable)	Io = 10mA to 1.0A, Vin = 2.8 to 12.0V	1.225	1.250	1.280	
CBM1117C-1.5	Io = 10mA to 1.0A, Vin = 3.0 to 12.0V	1.470	1.500	1.530	
CBM1117C-1.8	Io = 10mA to 1.0A, Vin = 3.3 to 12.0V	1.764	1.800	1.836	
CBM1117C-2.5	Io = 10mA to 1.0A, Vin = 4.0 to 12.0V	2.450	2.500	2.550	
CBM1117C-2.85	Io = 10mA to 1.0A, Vin = 4.4 to 12.0V	2.790	2.850	2.910	
CBM1117C-3.3	Io = 10mA to 1.0A, Vin = 4.8 to 12.0V	3.240	3.300	3.360	
CBM1117C-5.0	Io = 10mA to 1.0A, Vin = 6.5 to 12.0V	4.900	5.000	5.100	
LINE REGULATION					
CBM1117C-1.2	Io =10mA, Vin = 2.7 to 12.0V		2.0	7.0	mV
CBM1117C-1.25 (Adjustable)	Io =10mA, Vin = 2.8 to 12.0V		0.1	0.2	%
CBM1117C-1.5	Io =10mA, Vin = 3.0 to 12.0V		2.0	7.0	mV
CBM1117C-1.8	Io =10mA, Vin = 3.3 to 12.0V		2.0	7.0	mV
CBM1117C-2.5	Io =10mA, Vin = 4.0 to 12.0V		2.0	7.0	mV
CBM1117C-2.85	Io =10mA, Vin = 4.4 to 12.0V		2.0	7.0	mV
CBM1117C-3.3	Io =10mA, Vin = 4.8 to 12.0V		3.0	7.0	mV
CBM1117C-5.0	Io =10mA, Vin = 6.5 to 12.0V		4.0	10.0	mV
LOAD REGULATION					
CBM1117C-1.2	Io = 10mA to 1.0A, Vin = 3.2V		3.0	10.0	mV
CBM1117C-1.25 (Adjustable)	Io = 10mA to 1.0A, Vin = 3.3V		0.2	0.4	%
CBM1117C-1.5	Io = 10mA to 1.0A, Vin = 3.5V		3.0	10.0	mV
CBM1117C-1.8	Io = 10mA to 1.0A, Vin = 3.8V		3.0	10.0	mV
CBM1117C-2.5	Io = 10mA to 1.0A, Vin = 4.5V		3.0	10.0	mV
CBM1117C-2.85	Io = 10mA to 1.0A, Vin = 4.85V		3.0	10.0	mV
CBM1117C-3.3	Io = 10mA to 1.0A, Vin = 5.3V		4.0	12.0	mV
CBM1117C-5.0	Io = 10mA to 1.0A, Vin = 7.0V		5.0	15.0	mV
DROPOUT VOLTAGE (2)					
All Models	Io =1A (Tj = 25℃)		1.20	1.30	V
	Io =1A (Tj = -40℃ to +125℃)		1.20	1.55	
CURRENT LIMIT	Vin - Vo = 5V (Tj = 25℃)	1000			mA
Minimum Load Current Adjustable Models	Vin = 13.75V			5	mA
QUIESCENT CURRENT	Vin - Vo = 1.5V		5.2	10	mA
Adjust Pin Current	Io = 10mA, Vin - Vo = 1.4 to 10V		50	120	uA
vs Load Current, CBM1117C	Io = 10mA to 1A, Vin - Vo = 1.4 to 10V		0.5	5	uA
TEMPERATURE DRIFT	Tj = -40℃ to +125℃		0.5		%
RMS Output Noise	Bandwidth of 10Hz to 10kHz at 25℃		0.003		%Vo
Ripple Rejection Ratio	120Hz input Ripple(Cadj for ADJ) =25uF Vin -Vo = 5V, Io = 1.0A Tj = -40℃ to +125℃	60	72		dB

Notes: (1) CBM1117C-X adjustable versions require a minimum load current for ±3% regulation.(2) Dropout voltage is the input voltage minus output voltage that produces a 1% decrease in utput voltage.
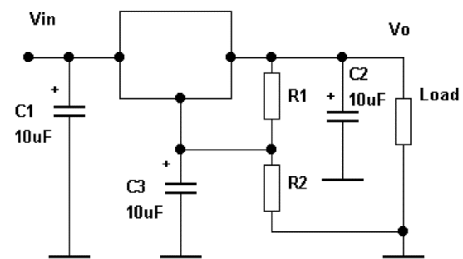
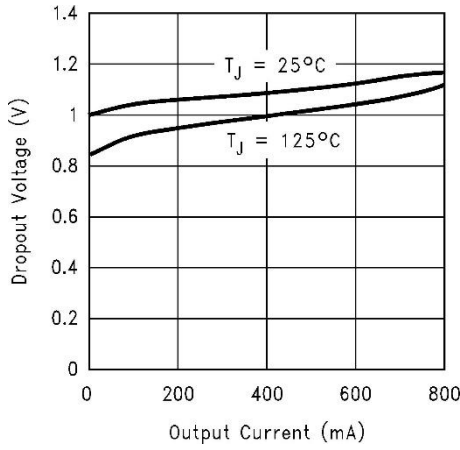# BLOCK DIAGRAM
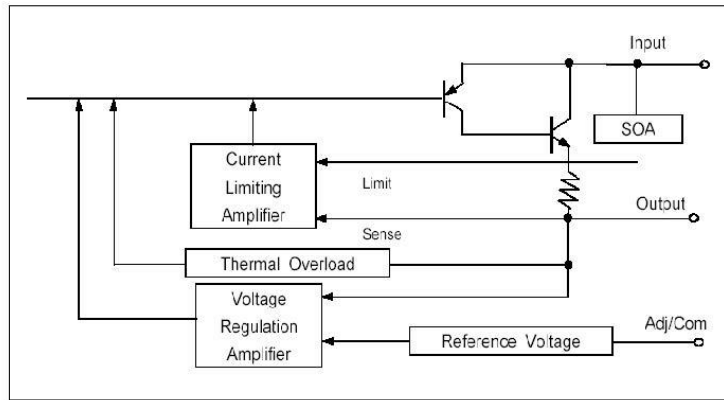
APPLICATION INFORMATION
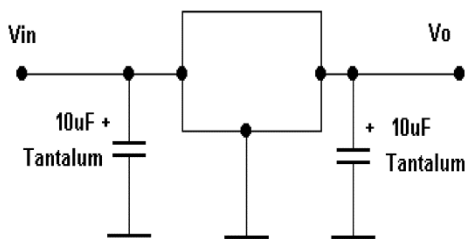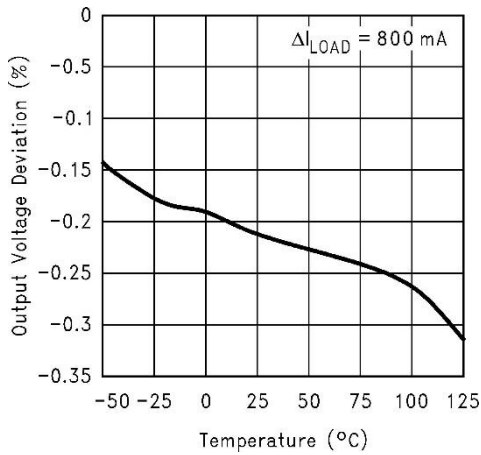

Fixed-Voltage Model
—Basic Connections.

Adjustable-Voltage Model
--Basic Connections.

Vo=Vref(1+R2/R1) + Iadj*R2

www.corebai.com
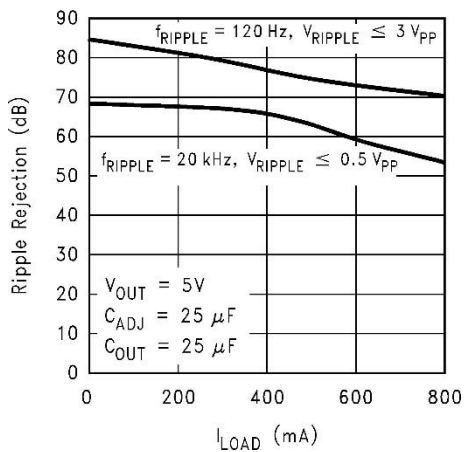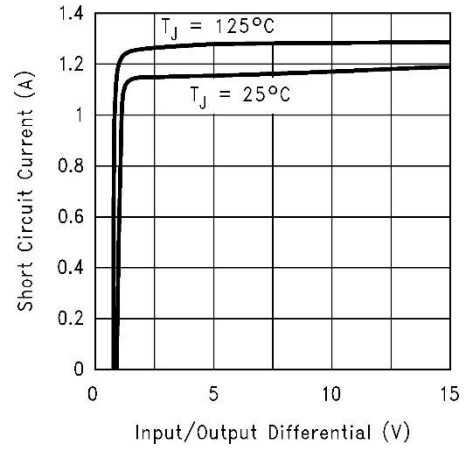
TYPICAL PERFOMANCE CHARACTERISTICS

Dropout Voltage (VIN – V OUT)

Short-Circuit Current

Load Regulation

CBM1117C-ADJ Ripple Rejection

CBM1117C-ADJ Ripple Rejection vs Current
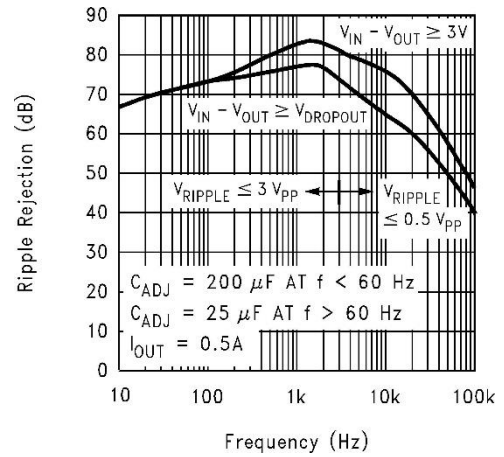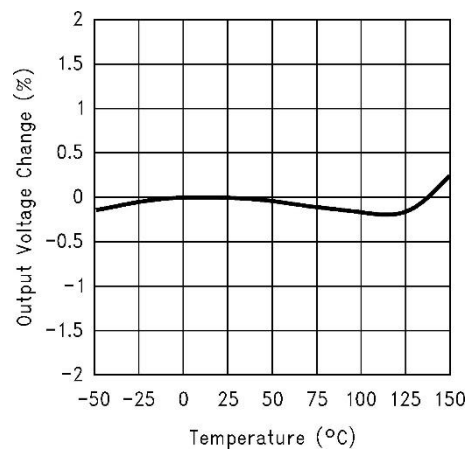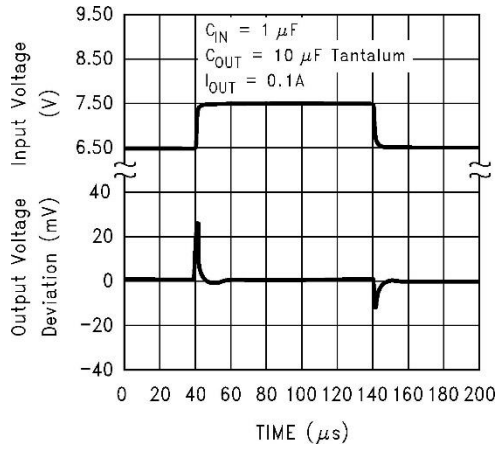

Temperature Stability

www.corebai.com
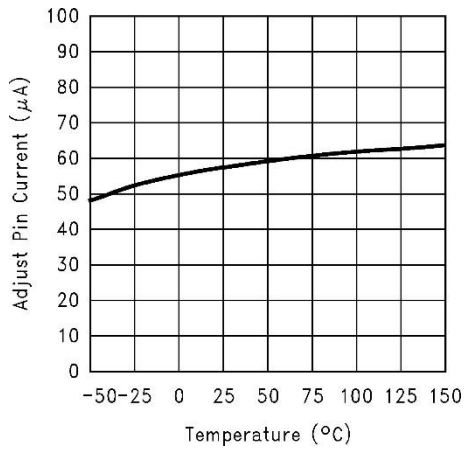
Adjust Pin Current
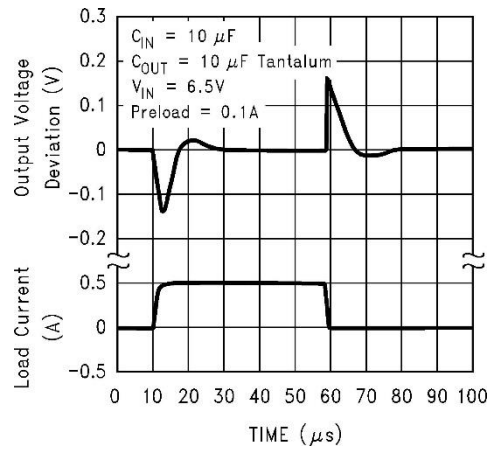
CBM1117C-5.0 Load Transient Response

CBM1117C-5.0 Line Transient Response

Application Information

Output voltage adjustment

Like most regulators, the CBM1117C regulates the output by comparing the output voltage to an internally generated reference voltage. On the adjustable version as shown in Fig.4, the V_{REF} is available externally as 1.25V between V_{OUT} and ADJ. The voltage ratio formed by R1 and R2 should be set to conduct 10mA (minu-mum output load).

The output voltage is given by the following equation:

Vo=Vref(1+R2/R1)+Iadj*R2

On fixed versions of CBM1117C, the voltage divider is provided internally
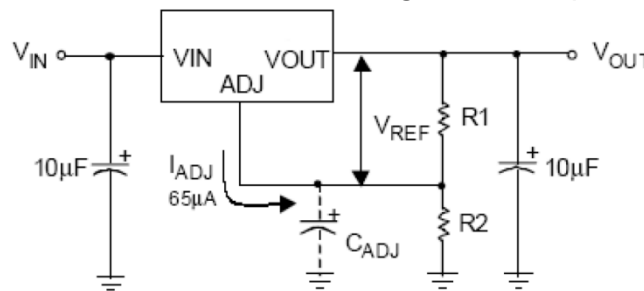

Figure 4. Basic Adjustable Regulator

Input Bypass Capacitor

An input capacitor is recommended. A 10µF tantalum on the input is a suitable input bypassing for almost all applications.

Adjust Terminal Bypass Capacitor

The adjust terminal can be bypassed to ground with a bypass capacitor (C_{ADJ}) to improve ripple rejection. This bypass capacitor prevents ripple from being amplified as the output voltage is increased. At any ripple frequency, the impedance of the C_{ADJ} should be less than R1 to prevent the ripple from being amplified:

$(2\pi*f_{RIPPLE}*C_{ADJ}) < R1$

The R1 is the resistor between the output and the adjust pin. Its value is normally in the range of 100- 200Ω. For example, with R1 = 124Ω and fRIPPLE = 120Hz, the C_{ADJ} should be 11µF.

Output Capacitor

CBM1117C requires a capacitor from V_{OUT} to GND to provide compensation feedback to the internal gain stage. This is to ensure stability at the output terminal. Typically, a 10µF tantalum or 50µF aluminum electrolytic is sufficient.

Note: The ESR is typically 1.0 Ω.

The output capacitor does not have a theoretical upper limit and increasing its value will increase stability. C_{OUT} = 100µF or more is typical for high current regulator design.

Load Regulation

When the adjustable regulator is used (Fig.5), the best load regulation is accomplished when the top of the resistor divider (R1) is connected directly to the output pin of the CBM1117C. When so connected, R_P is not multiplied by the divider ratio. For Fixed output version, the top of R1 is internally connected to the output and ground pins can be connected to low side of the load.
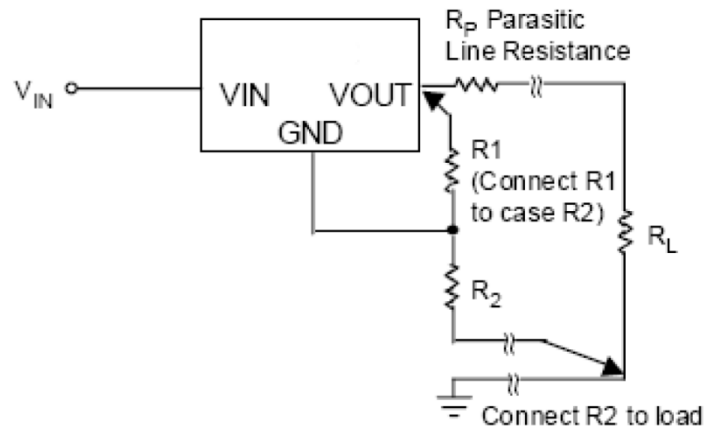
Figure 5. Best Load Regulation Using Adjustable Output Regulator

Thermal Protection

CBM1117C has thermal protection which limits junction temperature to 150℃. However, device functionality is only guaranteed to a maximum junction temperature of +125℃. The power dissipation and junction temperature for CBM1117C in DPAK package are given by

$P_D = (V_{IN} - V_{OUT}) \times I_{OUT}$

$T_{JUNCTION} = T_{AMBIENT} + (P_D \times \theta_{JA})$

Note: TJUNCTION must not exceed 125℃

Current Limit Protection

CBM1117C is protected against overload conditions. Current protection is triggered at typically 1.6A.

Thermal Consideration

The CBM1117C series contain thermal limiting circuitry designed to protect itself from over-temperature condi-tions. Even for normal load conditions, maximum junction temperature ratings must not be exceeded. As mention in thermal protection section, we need to consider all sources of thermal resistance between junction and ambient. It includes junction-tocase, case-to-heat-sink interface, and heat sink thermal resistance itself.

Junction-to-case thermal resistance is specified from the IC junction to the bottom of the case directly below the die. Proper mounting is required to ensure the best possible thermal flow from this area of the package to the heat sink. The case of all devices in this series is electrically connected to the output. Therefore, if the case of the device must be electrically isolated, a thermally conductive spacer is recommended.

www.corebai.com

PACKAGE

SOT-223
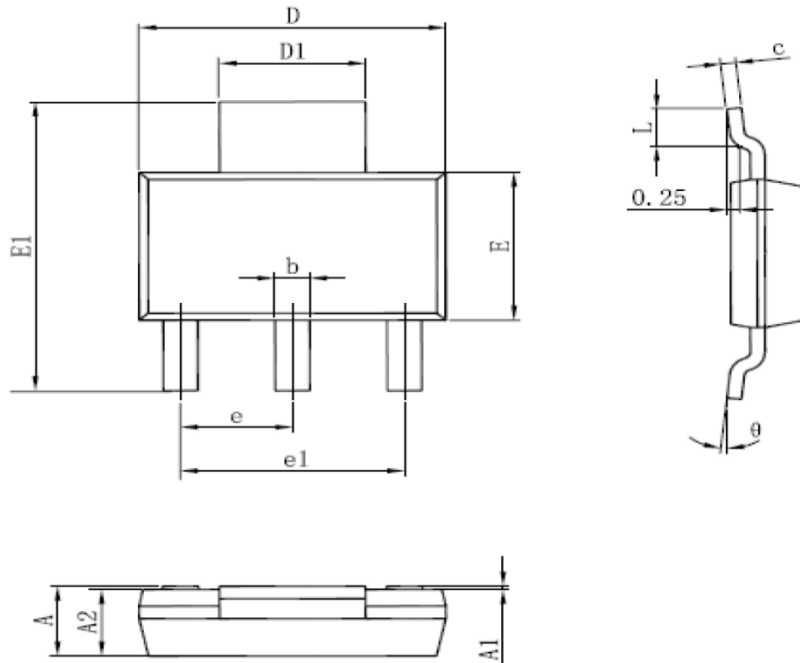
SYMBOL	DIMENSIONS IN MILLIMETERS		DIMENSIONS IN INCHES	
	MIN	**MAX**	**MIN**	**MAX**
A	1.520	1.800	0.060	0.071
A1	0.02	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.810	0.026	0.032
c	0.240	0.320	0.010	0.014
D	6.300	6.500	0.248	0.256
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300 BSC		0.091 BSC	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.048
θ	0°	10°	0°	10°

www.corebai.com

TO-263-3L

www.corebai.com
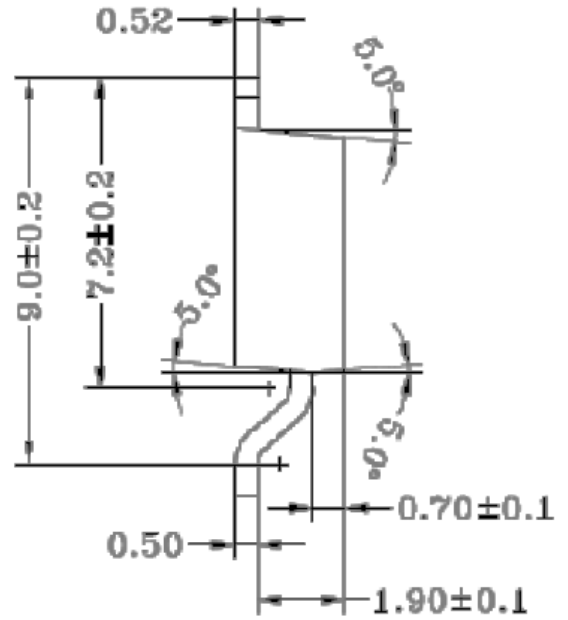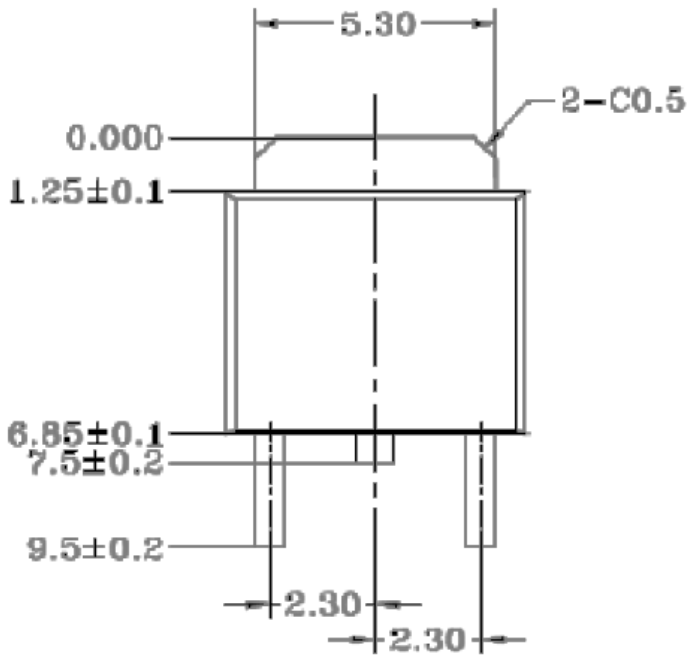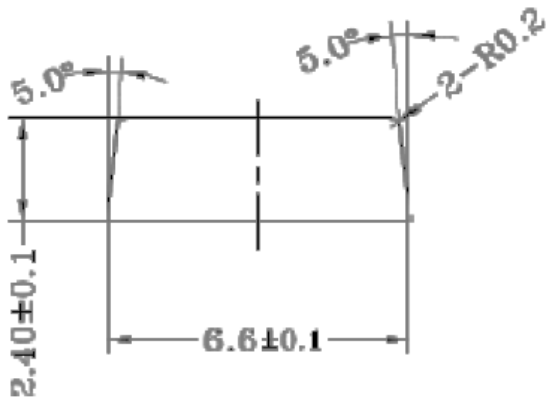
PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPRANGE	PACKAGE	PAKEAGE MARKING	TRANSPOT MEDIA,QUANTILY
CBM1117	CBM1117C-1.2	-40℃~125℃	SOT223-3	1117C-1.2	Tape and Reel,2500
	CBM1117C-1.25(ADJ)	-40℃~125℃	SOT223-3	1117C-1.25	Tape and Reel,2500
	CBM1117C-1.5	-40℃~125℃	SOT223-3	1117C-1.5	Tape and Reel,2500
	CBM1117C-1.8	-40℃~125℃	SOT223-3	1117C-1.8	Tape and Reel,2500
	CBM1117C-2.5	-40℃~125℃	SOT223-3	1117C-2.5	Tape and Reel,2500
	CBM1117C-3.3	-40℃~125℃	SOT223-3	1117C-3.3	Tape and Reel,2500
	CBM1117C-5.0	-40℃~125℃	SOT223-3	1117C-5.0	Tape and Reel,2500

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Linear Voltage Regulators *category:*

Click to view products by Corebai Microelectronics *manufacturer:*

Other Similar products are found below :

LV56831P-E LV5684PVD-XH MCDTSA6-2R L7815ACV-DG PQ3DZ53U LV56801P-E TLE42794G L78L05CZ/1SX L78LR05DL-MA-E 636416C 714954EB BA033LBSG2-TR LV5680P-E L78M15CV-DG TLS202B1MBV33HTSA1 L79M05T-E TLS202A1MBVHTSA1 L78LR05D-MA-E NCV317MBTG NTE7227 LV5680NPVC-XH LT1054CN8 MP2018GZD-5-Z MP2018GZD-33-Z MIC5281-3.3YMM RT9078-28GQZ MC78L06BP-AP TA48LS05F(TE85L,F) TA78L12F(TE12L,F) TC47BR5003ECT TCR2LN12,LF(S TCR2LN28,LF(S TCR2LN30,LF(S TCR3DF295,LM(CT TCR3DF40,LM(CT BA178M20CP-E2 L78M12ABDT LM7812SX/NOPB LR645N3-G-P003 LR645N3-G-P013 ZXTR2005P5-13 SCD7812BTG TCR3DF335,LM(CT ZXTR2012K-13 TLE42994E V33 ZXTR2008K-13 ZXTR2005K-13 LA5693D-E L88R05DL-E ADP3300ARTZ-2.7RL7