



虹冠電子工業股份有限公司
Champion Microelectronic Corporation

Specialized in Integrated High Efficient Switching Power Management Solutions
高整合高效率交換型電源管理方案之專業 I.C. 設計



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GENERAL DESCRIPTION

The CM2831 family is a positive voltage linear regulator developed utilizing CMOS technology featured low quiescent current (30 μ A typ.), low dropout voltage, and high output voltage accuracy, making them ideal for battery applications. EN input connected to CMOS has low bias current. The space-saving SOT-23-5 package is attractive for "Pocket" and "Hand Held" applications.

These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions.

In application requiring a low noise, regulated supply, place a 1000pF capacitor between Bypass and Ground.

The CM2831 is stable with an output capacitance of 2.2 μ F or greater.

FEATURES

- ◆ Very Low Dropout Voltage
- ◆ Low Current Consumption: Typ. 30 μ A, Max. 35 μ A
- ◆ Output Voltage: 1.5V, 1.8V, 1.9V, 2.2V, 2.5V, 2.7V, 2.8V, 2.9V, 3.0V, 3.3V, 3.5V, 3.6V, and 3.8V
- ◆ High Accuracy Output Voltage: $\pm$ 1.5%
- ◆ Guaranteed 300mA Output
- ◆ Input Range of 2.6V to 7.0V
- ◆ Thermal Shutdown
- ◆ Current Limiting
- ◆ Compact Package: SOT-23-5
- ◆ Factory Pre-set Output Voltages
- ◆ Short Circuit Current Fold-Back
- ◆ Low Temperature Coefficient

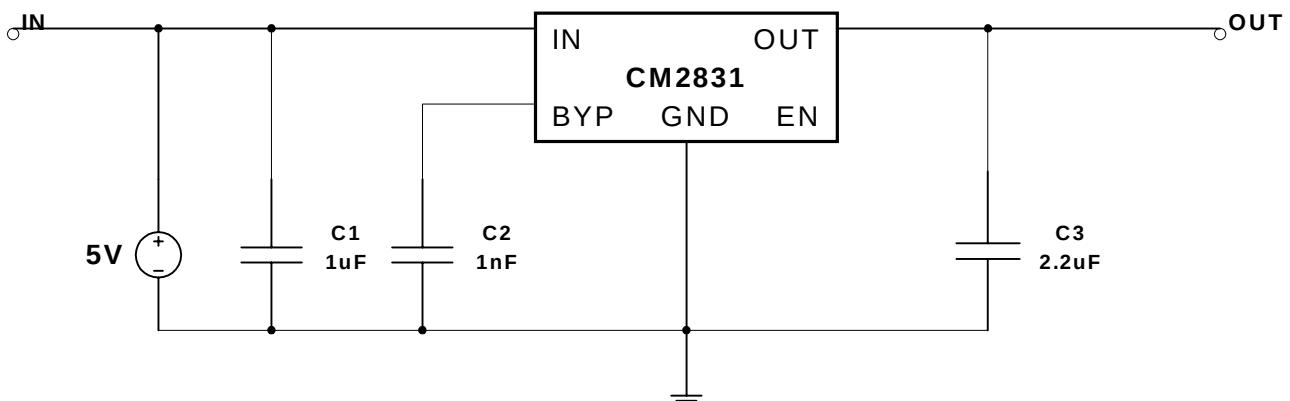
APPLICATIONS

- ◆ Battery-powered devices
- ◆ Personal communication devices
- ◆ Home electric/electronic appliances
- ◆ PC peripherals

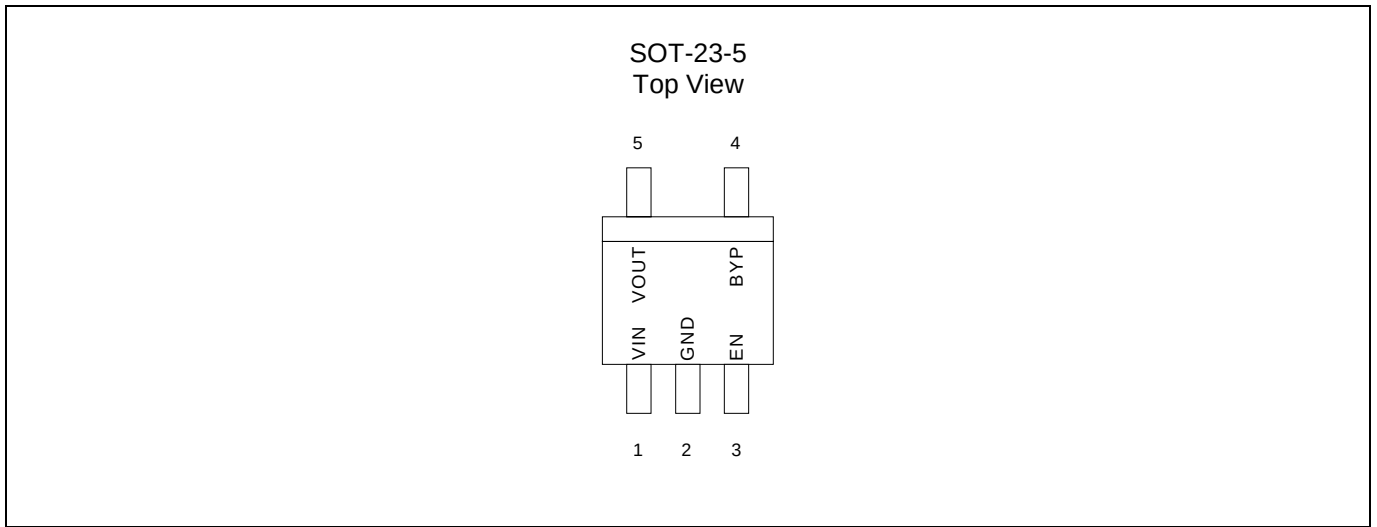
24 Hours Technical Support--WebSIM

Champion provides customers an online circuit simulation tool called WebSIM. You could simply logon our website at www.champion-micro.com for details.

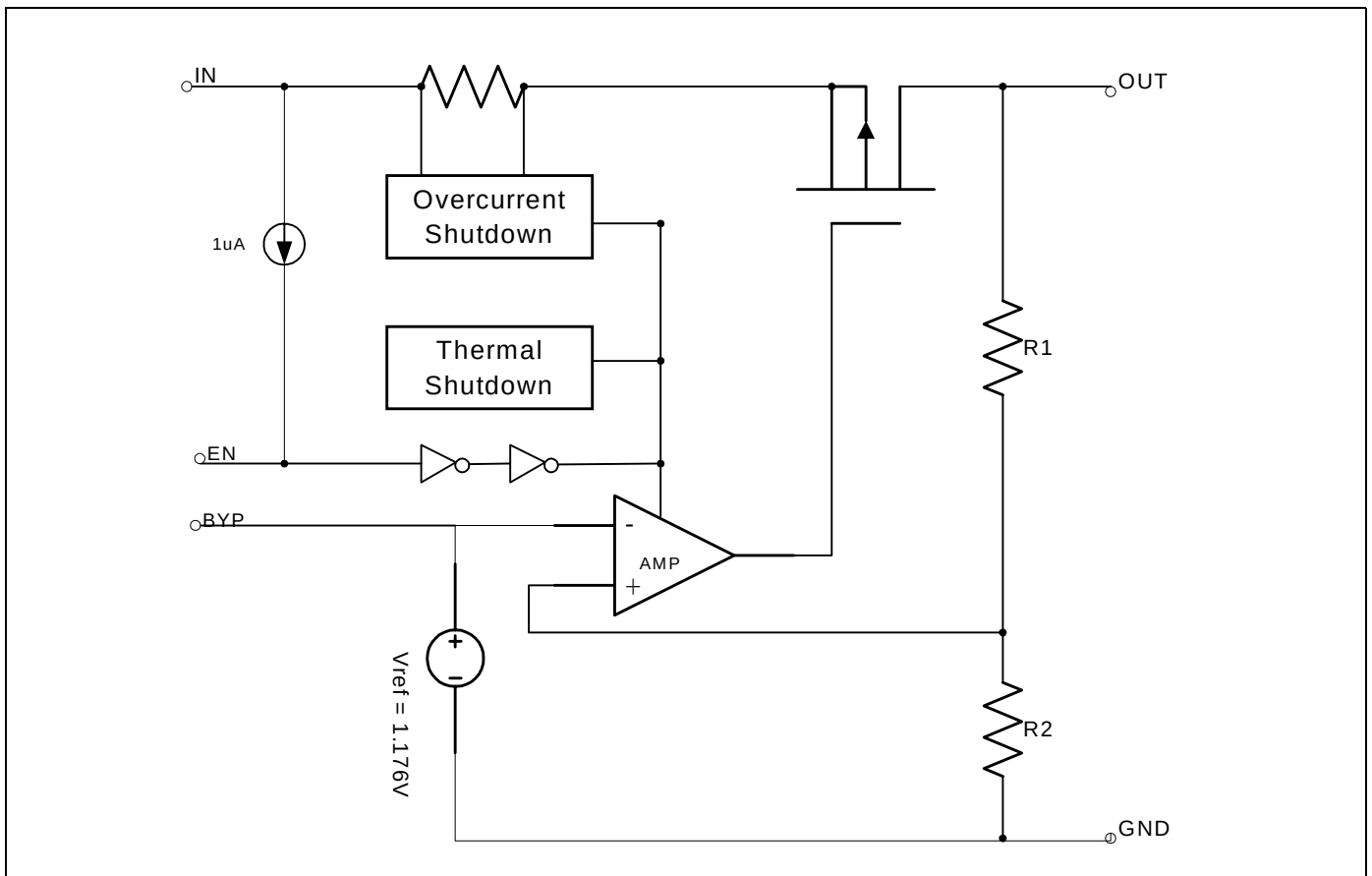
TYPICAL APPLICATIONS



PIN CONFIGURATION



BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Output Voltage	Temperature Range	Package
CM2831AIM25	1.5V	-40°C ~ +85°C	SOT-23-5
CM2831DIM25	1.8V	-40°C ~ +85°C	SOT-23-5
CM2831EIM25	1.9V	-40°C ~ +85°C	SOT-23-5
CM2831HIM25	2.2V	-40°C ~ +85°C	SOT-23-5
CM2831KIM25	2.5V	-40°C ~ +85°C	SOT-23-5
CM2831MIM25	2.7V	-40°C ~ +85°C	SOT-23-5
CM2831NIM25	2.8V	-40°C ~ +85°C	SOT-23-5
CM2831OIM25	2.9V	-40°C ~ +85°C	SOT-23-5
CM2831PIM25	3.0V	-40°C ~ +85°C	SOT-23-5
CM2831SIM25	3.3V	-40°C ~ +85°C	SOT-23-5
CM2831UIM25	3.5V	-40°C ~ +85°C	SOT-23-5
CM2831VIM25	3.6V	-40°C ~ +85°C	SOT-23-5
CM2831XIM25	3.8V	-40°C ~ +85°C	SOT-23-5

Note: For other pre-set output voltage requirements, please contact Champion Sales office.

ABSOLUTE MAXIMUM RATINGS

Input Voltage +7V
Output Current $P_D / (V_{IN} - V_O)$ mA
Output Voltage GND-0.3V to $V_{IN}+0.3V$
ESD Classification B

OPERATING RATINGS

Ambient Temperature Range (T_A) -40°C to +85°C
Junction Temperature Range -40°C to +125°C

THERMAL INFORMATION

Parameter		Maximum	Unit
Thermal Resistance (θ_{jc})	SOT-23-5	260	°C/W
Internal Power Dissipation (P_D) ($\Delta T = 100^\circ\text{C}$)	SOT-23-5	380	°C/W
Maximum Junction Temperature		150	°C
Maximum Lead Temperature (10 Sec)		300	°C

Caution: Stress above the listed absolute rating may cause permanent damage to the device.

ELECTRICAL CHARACTERISTICS

$T_A = +25^{\circ}\text{C}$; unless otherwise noted

Parameter	Symbol	Test Conditions		CM2831			Unit
				Min.	Typ.	Max.	
Input Voltage	V _{IN}			Note 1		7	V
Output Voltage Accuracy	V _{OUT}	I _O = 1mA to 300mA		-1.5		1.5	%
Dropout Voltage	V _{DROPOUT}	I _O = 300mA, V _{OUT} =V _{O(NOM)} -2%, V _{OUT} >=2.5V			300		mV
		I _O = 300mA, V _{OUT} =V _{O(NOM)} -2%, V _{OUT} <2.5V			800		
Output Current	I _O	V _{OUT} > 1.2V		300			mA
Current Limit	I _{LIM}	V _{OUT} > 1.2V		300	450		mA
Short Circuit Current	I _{SC}	V _{OUT} < 0.95V			150	300	mA
Quiescent Current	I _Q	I _O = 0mA			30	35	μA
Ground Pin Current	I _{GND}	I _O = 1mA to 300mA			30	50	μA
Line Regulation	REG _{LINE}	I _{OUT} =5mA, V _{IN} =V _{OUT} +1 to V _{OUT} +2	V _{OUT} <= 3.0V	-0.15	0.03	0.15	%
			V _{OUT} > 3.0V	-0.3	0.06	0.3	%
Load Regulation	REG _{LOAD}	I _O =1mA to 300mA			0.2	1	%
Over Temperature Shutdown	OTS				150		°C
Over Temperature Hysteresis	OTH				30		°C
V _{OUT} Temperature Coefficient	TC				25		ppm/°C
Power Supply Rejection	PSRR	I _O = 100mA C _O =2.2μF ceramic	f=1kHz		60		dB
			f=10kHz		50		
			f=100kHz		40		
Power Supply Rejection	PSRR	I _O = 100mA C _O =2.2μF ceramic C _{BYP} =0.01μF	f=1kHz		75		dB
			f=10kHz		55		
			f=100kHz		30		
Output Voltage Noise	eN	f=10Hz to 100kHz I _O = 10mA, C _{BYP} =0μF	C _O =2.2μF		30		μVrms
			C _O =100μF		20		
Output Voltage Noise	eN	f=10Hz to 100kHz I _O = 10mA, C _{BYP} =0.01μF	C _O =2.2μF		30		μVrms
			C _O =100μF		20		
Shutdown Supply Current	I _{SD}	V _{IN} =5.0V, V _{OUT} =0V, V _{EN} < V _{EL}			2.0	3.0	μA
EN Input Bias Current	I _{EH}	V _{EN} =V _{IN} , V _{IN} =2.6V to 7V				0.1	μA
	I _{EL}	V _{EN} =V _{IN} , V _{IN} =2.6V to 7V			1.0	3.0	μA
EN Input Threshold	V _{EH}	V _{IN} =2.6V to 7V			V _{IN} /2+0.8V	V _{IN}	V
	V _{EL}	V _{IN} =2.6V to 7V		0	V _{IN} /2-0.8V		V

Note 1. $V_{IN(MIN)} = V_{OUT} + V_{DROPOUT}$

DETAILED DESCRIPTION

The CM2831 family of CMOS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection, thermal shutdown, and short circuit protection.

The P-channel pass transistor receives data from the error amplifier, over-current shutdown, short output protection, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 150°C, or the current exceeds 300mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C.

The CM2831 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The CM2831 also incorporates current fold-back to reduce power dissipation when the output is short-circuited. This feature becomes active when the output drops below 1.05V, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.95V.

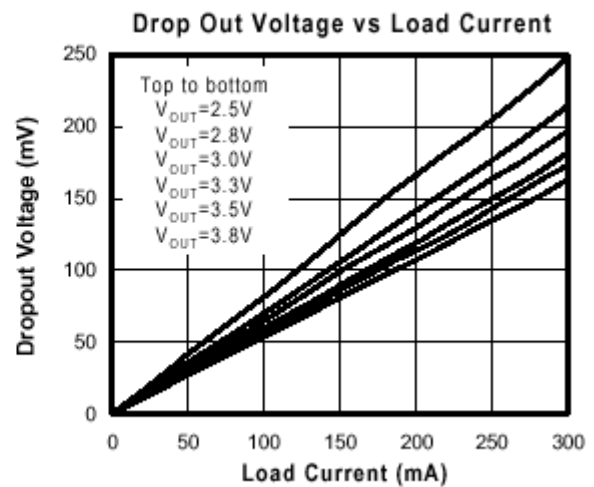
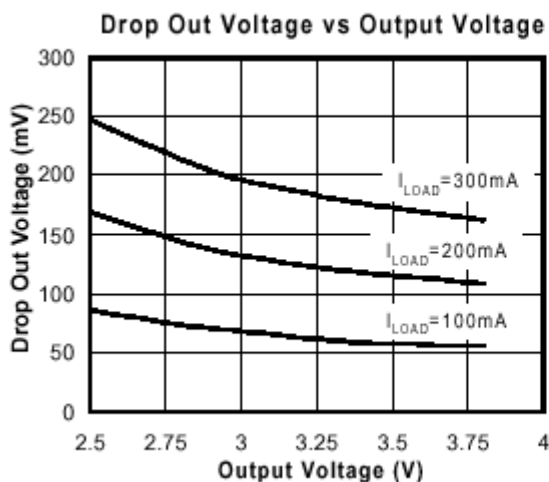
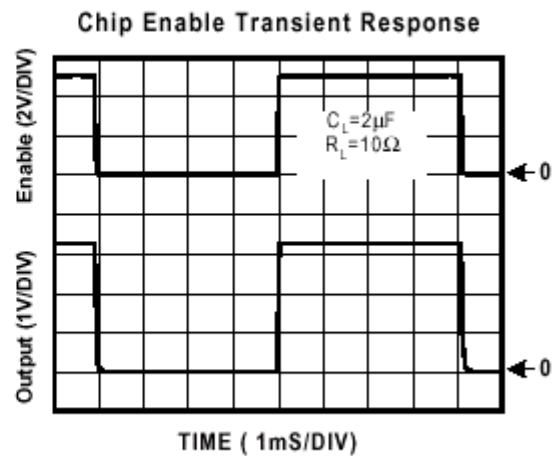
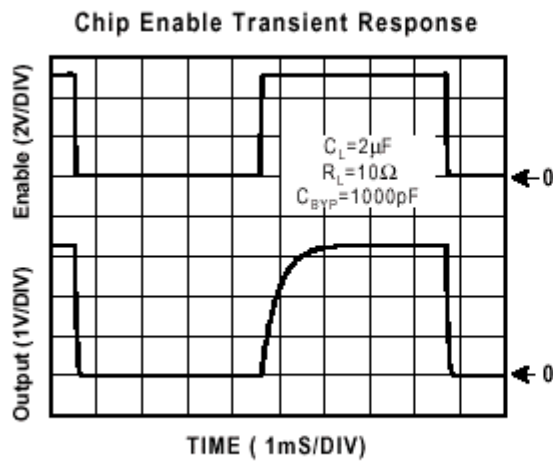
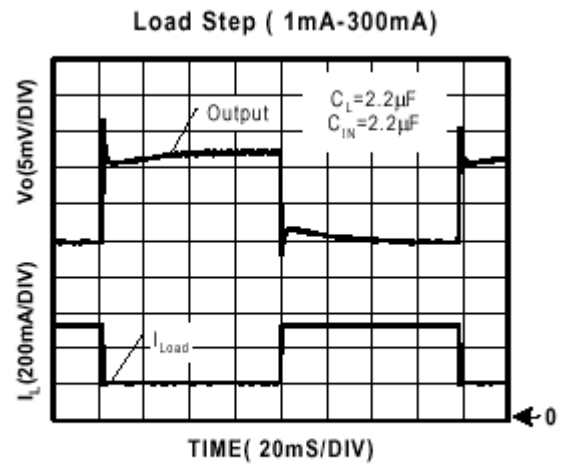
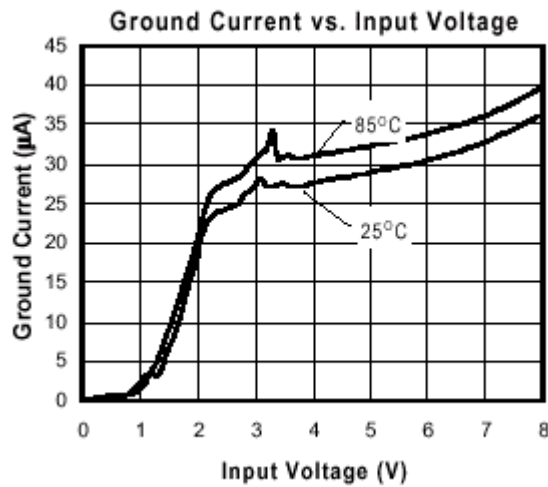
ENABLE

The Enable pin normally floats high. When actively, pulled low, the PMOS pass transistor shut off, and all internal circuits are powered down. In this state, the quiescent current is less than 2μA. This pin behaves much like an electronic switch.

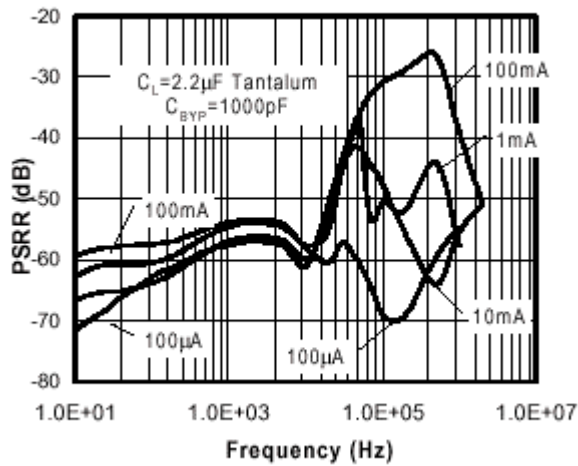
EXTERNAL CAPACITOR

The CM2831 is stable with an output capacitor to ground of 2.2μF or greater. It can keep stable even with higher or poor ESR capacitors. A second capacitor is recommended between the input and ground to stabilize VIN. The input capacitor should be larger than 0.1μF to have a beneficial effect. All capacitors should be placed in close proximity to the pins. A "quiet" ground termination is desirable.

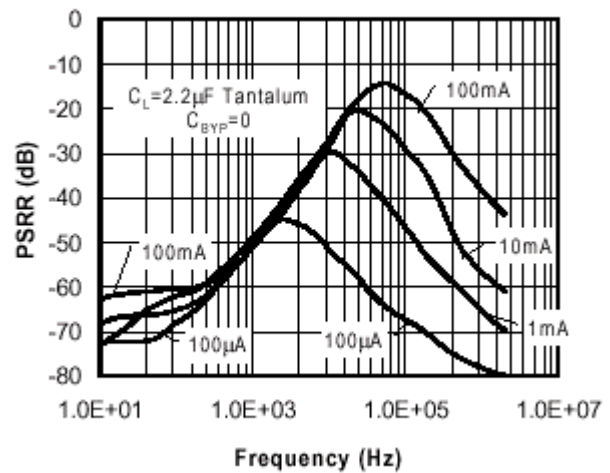
TYPICAL ELECTRICAL CHARACTERISTICS



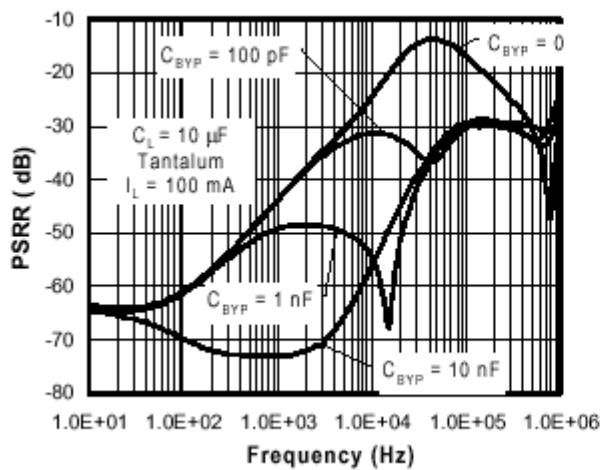
Power Supply Rejection Ratio



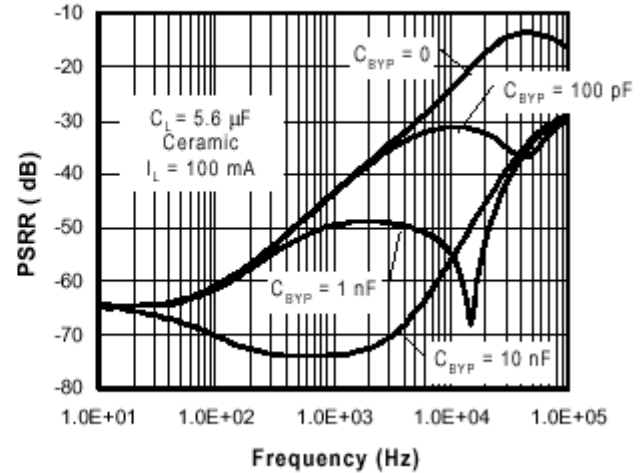
Power Supply Rejection Ratio



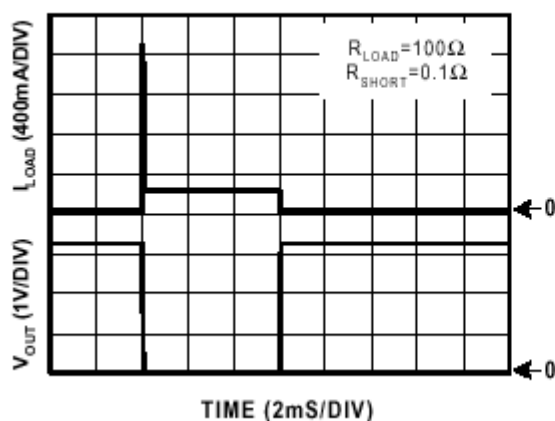
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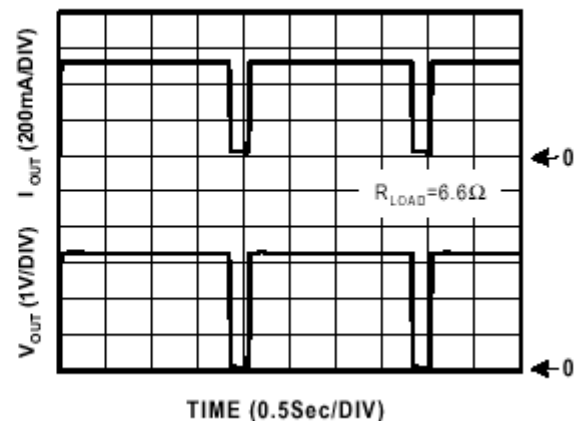
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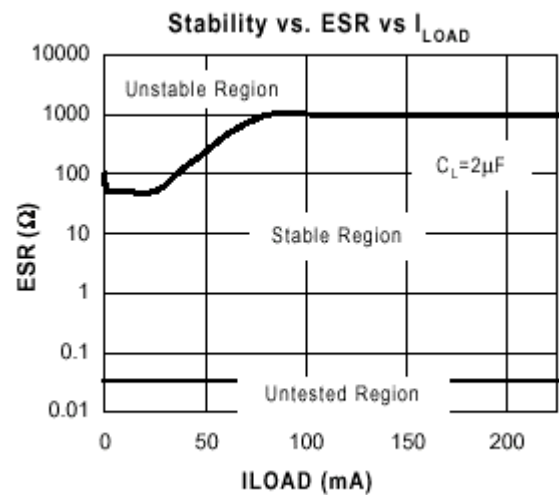
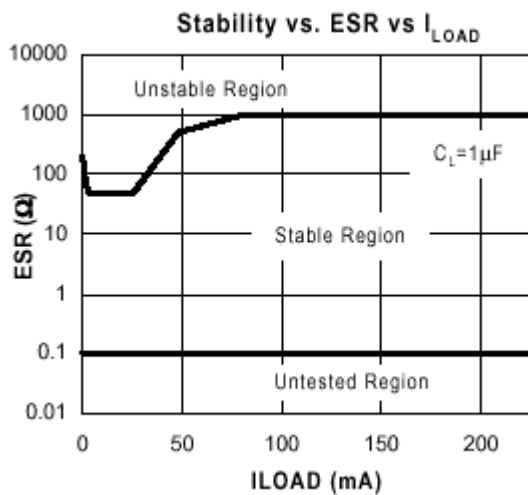
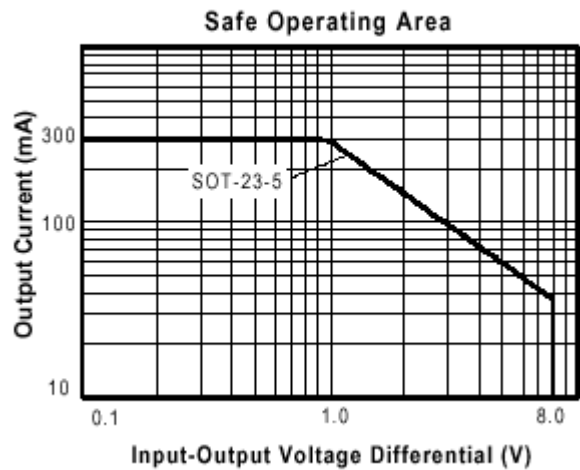
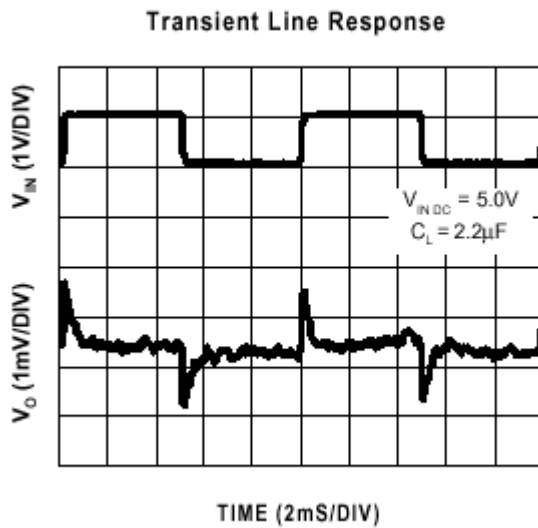
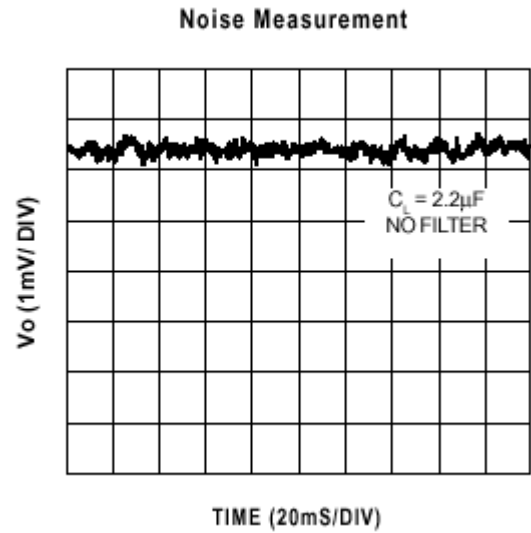
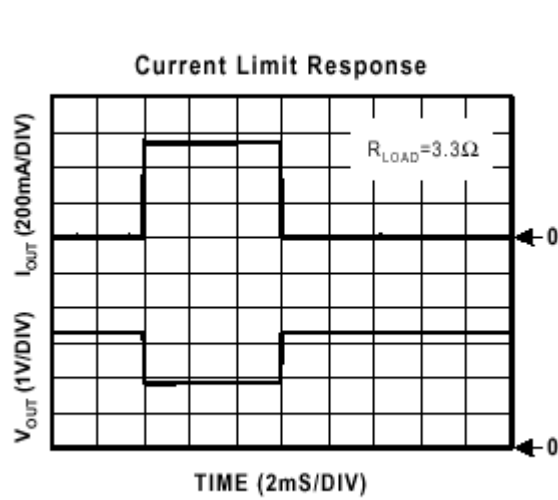


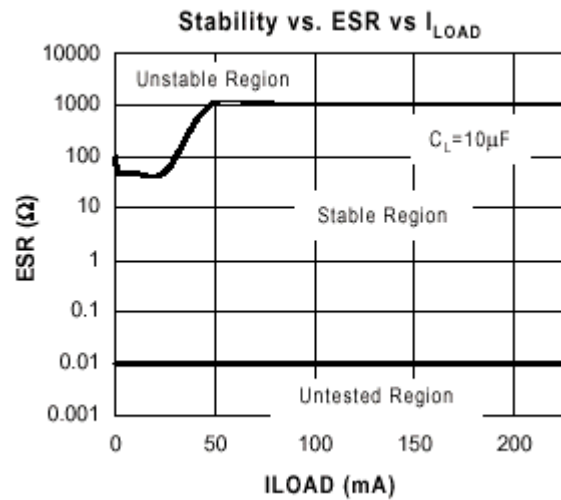
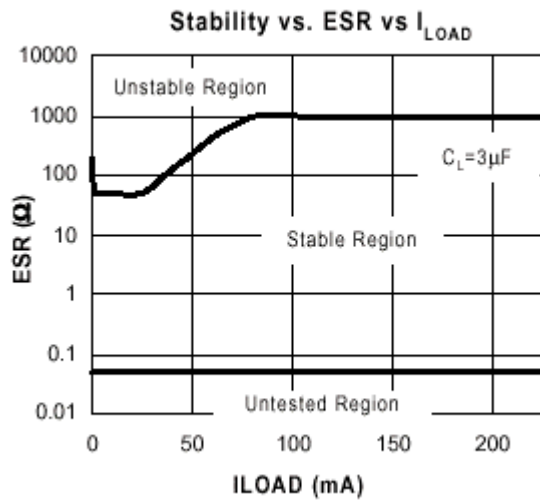
Short Circuit Response



Overtemperature Shutdown

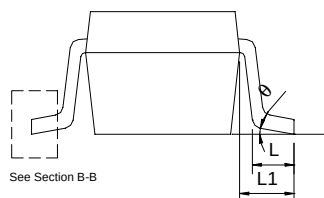
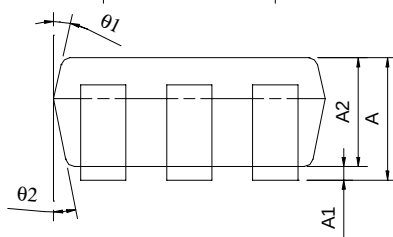
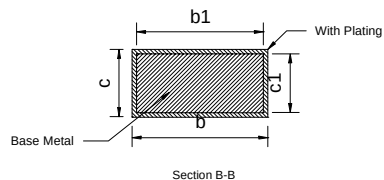
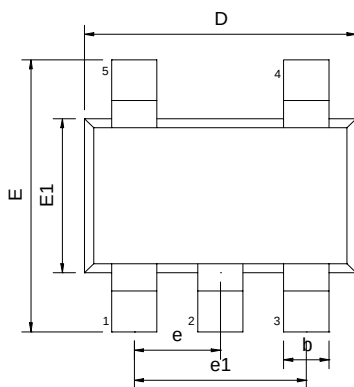






PACKAGE DIMENSION

SOT-23-5 (M25)



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.05	---	1.35	0.041	---	0.053
A1	0.05	---	0.15	0.002	---	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	---	0.50	0.010	---	0.020
b1	0.25	0.40	0.45	0.010	0.016	0.018
c	0.08	---	0.20	0.003	---	0.008
c1	0.08	0.11	0.15	0.003	0.004	0.006
D	2.70	2.90	3.00	0.106	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
L	0.35	0.45	0.55	0.014	0.018	0.022
L1	0.60 REF			0.024 REF		
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°

NUMBERING SCHEME

Ordering Number: CM2831XYZ (note1)

note1:

CM2831 : 300mA CMOS LDO with enable

X : Suffix for voltage output (note 2)

Y : Suffix for Temperature Range (note 3)

Z : Suffix for Package Type (note 4)

note 2: see CMOS LDO Voltage Suffix Table

CM2831 will provide options of A(1.5V), D (1.8V), E(1.9V),, H(2.2V), K(2.5V), M(2.7V), N(2.8V), O(2.9V), P(3.0V), S(3.3V), U(3.5V), V(3.6V), X(3.8V)

note 3:

Y= I : -40°C ~ +85°C (only I grade support for all CMOS LDOs)

note 4:

Z is single alphabet with or without digits

M25 : SOT-25 (TR only)

CMOS LDO Voltage Suffix Table

Output Voltage	Suffix	Output Voltage	Suffix
1.5V	A	3.0V	P
1.6V	B	3.1V	Q
1.7V	C	3.2V	R
1.8V	D	3.3V	S
1.9V	E	3.4V	T
2.0V	F	3.5V	U
2.1V	G	3.6V	V
2.2V	H	3.7V	W
2.3V	I	3.8V	X
2.4V	J	3.9V	Y
2.5V	K	4.0V	Z
2.6V	L		
2.7V	M		
2.8V	N		
2.9V	O		

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